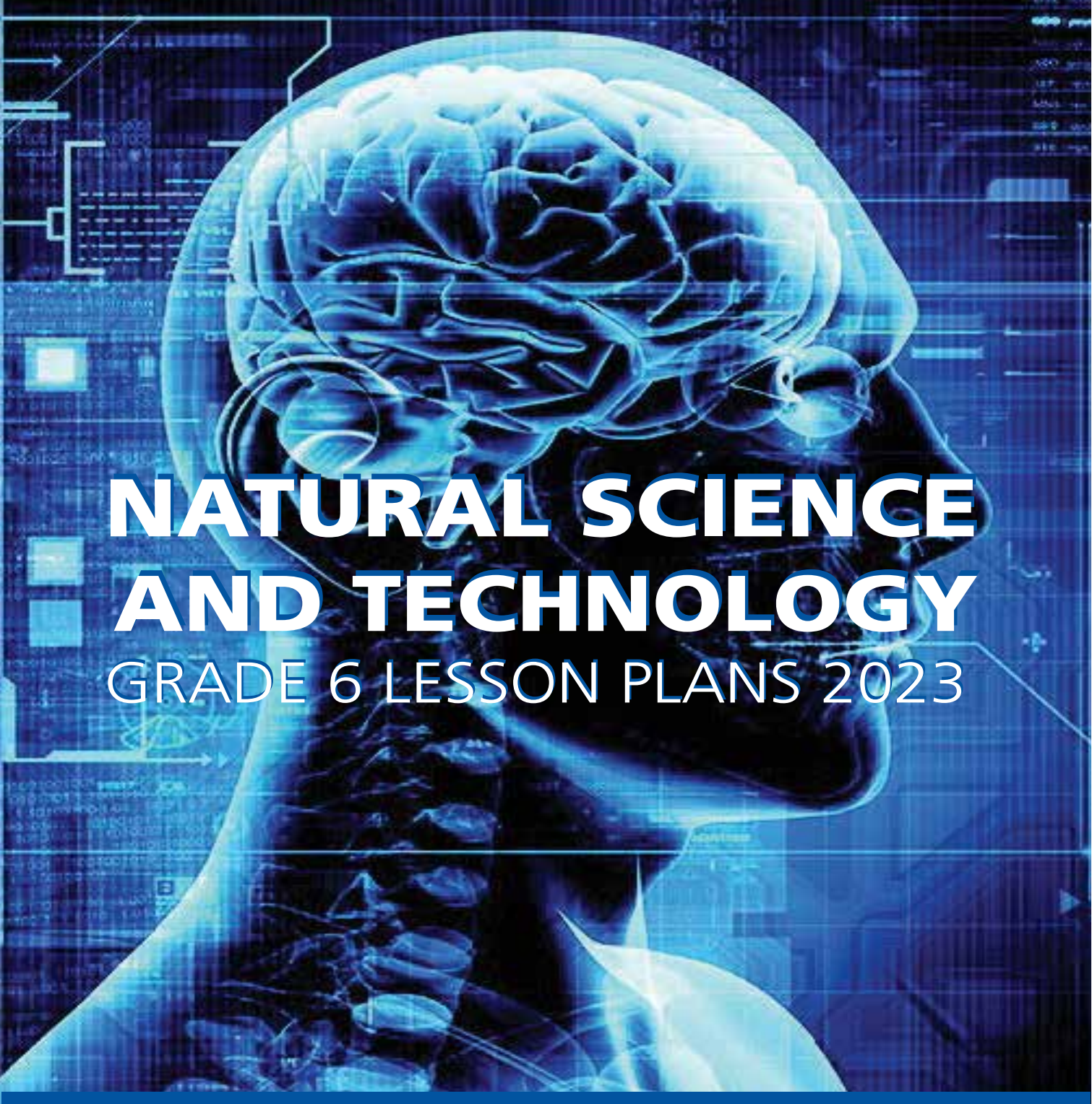




NATURAL SCIENCE AND TECHNOLOGY

GRADE 6 LESSON PLANS 2023



GAUTENG PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA



FOREWORD

Dear Natural Sciences & Technology teachers,

Welcome to the GDE Natural Sciences & Technology Lesson Plan Development Program. These lesson plans were designed as per the CAPS document, and covers all strands in Natural Sciences & Technology. Each lesson plan is based on a 30-minute time frame and where practical activities are necessary for concept development the lesson plan will extend over more periods. The lesson plans come with:

- Images and videos for easy access to content and support material.
- Informal activities for learners to engage with, based on the content covered for that lesson.

It is of importance to note that each lesson plan is developed at a basic level to serve as a generic structure that can be built upon according to context and resource availability. Reference has been made to the Sasol Inzalo learner books as these were made available to schools in either hard copy or as a soft copy that could be downloaded free of charge from the web. All lesson plans allow for supplementary resources to be used e.g. textbooks, developed content manuals etc.

It is of importance to remember that much of the work done in future grades has to be firmly developed in the intermediate and senior phases, with a sound foundation in Natural Sciences & Technology, specialist subjects like Life Sciences and Physics will be able to flourish in the FET band.

Please take note that Natural Sciences & Technology is a subject that needs to be taught in an investigative and exploratory manner for various scientific phenomena to be understood. This will be the basis for future development in STEM (Science; Technology; Engineering and Maths) subjects. Where necessary the principle of "Science on a shoe string" must be applied. Resources must be used with care and respect, such that it can be optimized for each lesson and for years to follow.

We hope that the lesson plan resource being made available will be of benefit to you and that its implementation will benefit your learners extensively. We envisage that the lesson plans provided will be of great assistance to you, the teacher, and that all efforts will be made to enhance the quality of teaching and learning. It must also be mentioned that the developed lesson plans will greatly reduce the administrative workload that teachers are faced with on a daily basis. However, these lesson plans must be engaged with prior to the lesson being delivered for its true potential and impact to be determined.

GDE Natural Sciences & Technology Team

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Johannesburg
2000

The Importance of Lesson Planning

Lesson planning is the most essential element of being an effective and resourceful teacher. The lesson planning process has to consider the learner; the school or classroom context and whether the essence of the content found within the curriculum can be addressed effectively. Integral to this process is the pedagogical knowledge the teacher possesses and how it will be used to elicit the content that needs to be taught. The time allocated to the subject must be effectively utilized and optimized such that a suitable learning environment can be created for the learner to engage with the learning process. It should be an experience that would articulate the content in a manner that the learner will be able to imbibe and reflect its worth and value in context of the real world. Each lesson provides an opportunity for the teacher to reflect and improve and scaffold the content for the next lesson. Lesson planning proposes and intention for the lesson, while preparation emphasizes the execution of the lesson plan.

Why plan?

Lesson planning is a vital component of the teaching-learning process. Proper classroom planning will keep teachers organized and on track while teaching, thus allowing them to teach more, help students reach objectives more easily and manage less. The better prepared the teacher is, the more likely she/he will be able to handle whatever unexpectedly happens in the lesson.

Lesson planning:

- provides a coherent framework for smooth efficient teaching.
- helps the teacher to be more organized.
- gives a sense of direction in relation to the syllabus.
- helps the teacher to be more confident when delivering the lesson.
- provides a useful basis for future planning.
- helps the teacher to plan lessons which cater for different students.
- Is a proof that the teacher has taken a considerable amount of effort in his/her

Teaching.

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Decisions involved in planning lessons:

Planning is imagining the lesson before it happens. This involves prediction, anticipation, sequencing, organizing and simplifying. When teachers plan a lesson, they have to make different types of decisions which are related to the following items:

- the aims to be achieved;
- the content to be taught;
- the group to be taught: their background, previous knowledge, age, interests, etc.
- the lessons in the book to be included or skipped;
- the tasks to be presented;
- the resources needed, etc.

The decisions and final results depend on the teaching situation, the learners level, needs, interests and the teacher's understanding of how learners learn best, the time and resources available.

Hints for effective lesson planning:

- When planning, think about your students and your teaching context first.
- Prepare more than you may need: It is advisable to have an easily presented, light "reserve" activity ready in case of extra time. Similarly, it is important to think in advance which component(s) of the lesson may be skipped. if you find yourself with too little time to do everything you have planned.
- Keep an eye on your time. Include timing in the plan itself. The smooth running of your lesson depends to some extent on proper timing.
- Think about transitions (from speaking to writing or from a slow task to a more active one).
- Include variety if things are not working the way you have planned.
- Pull the class together at the beginning and at the end.
- End your lessons on a positive note.

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Planning enables you to think about your teaching in a systematic way before you enter the classroom. The outcome of your planning is a coherent framework which contains a logical sequence of tasks to prepare the field for more effective teaching and learning.

Plans only express your intentions. Plans are projects which need to be implemented in a real classroom with real students. Many things may happen which you had not anticipated. In the end you need to adapt your plans in order to respond to your pupils' actual needs. It is important to bear in mind Jim Scrivener's words:

“Prepare thoroughly. But in class, teach the learners not the plan.”

BIBLIOGRAPHY

- Moon, J. (2005) Children Learning English. Macmillan.
- Scrivener, J. (2011) Learning Teaching. Macmillan
- Ur, P. (1996) A Course in Language Teaching. Cambridge: CUP

Use of the developed lesson plans

The developed lesson plans were designed with the intention of providing teachers with an exemplar that could be used as is or customized to suite the context of each individual class situation. As is the case in most instances, when it comes to lesson plan development, it is very difficult to establish a plan that will satisfy everyone and every situation and context, thus the lesson plans provided here are merely a base document that can be contextualized as per each teachers own liking, as lesson plans are a personal document that also expresses the teachers own creativity and professionalism.

Lesson plans were developed for all strands, namely:

- Life & Living
- Matter & Material
- Energy & Change
- Planet Earth & Beyond

Each lesson plan was developed according to the notional times as prescribed within the CAPS document, that is 30 minute periods with seven periods a week for a 5-day cycle. In some instances, to cater for practical activities the lesson plan will be indicated as components and not as one lesson plan.

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The lesson plans are accompanied with informal class activities to assist in reinforcing the content and concepts expressed in the lesson. The developed lesson plans also make use of PowerPoint presentations, videos and other ICT related resources to help facilitate the learning process in the digital age, these are optional and can be used as is or the teacher can contextualize it according to resources and infrastructure available at school.

We envisage that the lesson plans provided will be of great assistance to you, the teacher, and that all efforts will be made to enhance the quality of teaching and learning. It must also be mentioned that the developed lesson plans will greatly reduce the administrative workload that teachers are faced with on a daily basis. However, these lesson plans must be engaged with prior to the lesson being delivered for its true potential and impact to be determined.

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Acknowledgement

The following colleagues from the various district offices within Gauteng played an integral role in the development of the lesson plans being presented. Their unwavering dedication and high degree of professionalism and discipline is greatly appreciated and acknowledged.

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GRADE 6

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- NUTRITION
- FOOD PROCESSING
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- PROCESSES TO PURIFY WATER

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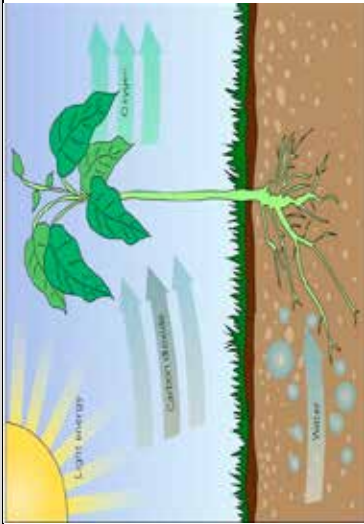
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- MOVEMENTS OF THE EARTH AND PLANETS
- THE MOVEMENT OF THE MOON
- SYSTEMS FOR LOOKING INTO SPACE
- SYSTEMS TO EXPLORE THE MOON AND MARS

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: PHOTOSYNTHESIS		- Define Photosynthesis - Tell where photosynthesis takes			
Subtopic Plants and food: What is photosynthesis and where it occur?					
Terminology	Photosynthesis, carbon dioxide, oxygen, chlorophyll				
SPECIFIC AIMS	1. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	2. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing		Predicting	✓	Interpreting Information
	Measuring		Hypothesizing		Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Photosynthesis is the process that plants use energy from sunlight to make own food (Glucose sugar). Photosynthesis takes place takes place mainly in the green leaves of the plants. Leaves contains the green a pigments called Chlorophyll which the use in the process of photosynthesis.	The teacher will briefly explain photosynthesis to the learners using Sasol Inzalo (Siyavula Book P 4) with the pictures of photosynthesis. Allowing learners to look at the picture of photosynthesis at P 5 Sasol Inzalo (Siyavula.book) Learners to open page 5 of their Sasol Inzalo (Siyavula Book) to see the picture of photosynthesis		Video clips Internet Worksheets Chalkboard/White board Sasol Inzalo Siyavula Book Charts

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																								
 Picture showing process of photosynthesis (Thunderbolt.co.za)																										
ASSESSMENT	Discussions,																									
TEACHER REFLECTION	<table><thead><tr><th colspan="3">Good practices</th></tr></thead><tbody><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate LTM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></tbody></table> <table><thead><tr><th>Areas of improvement</th><th>Possible teacher interventions</th></tr></thead><tbody><tr><td>Some learners did not participate.</td><td>Scaffold: break down task into smaller activities.</td></tr><tr><td>Class organisation.</td><td>Straddle: Change complexity of content presentation.</td></tr></tbody></table>		Good practices			Good learner participation.		Effective use of appropriate LTM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge	Areas of improvement	Possible teacher interventions	Some learners did not participate.	Scaffold: break down task into smaller activities.	Class organisation.	Straddle: Change complexity of content presentation.
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	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

ACTIVITY SHEET

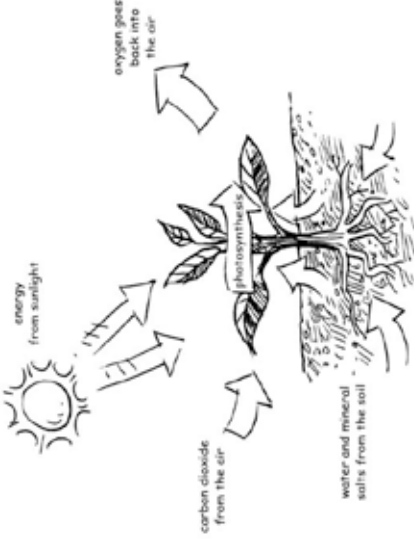
1. Define photosynthesis.

2. What does photosynthesis need in order to occur?

3. Which parts of the plants where photosynthesis takes place?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: <u>PHOTOSYNTHESIS</u>		• Explain the process of photosynthesis			
Subtopic Plants and food: How does process of photosynthesis occur / process of photosynthesis		• Draw illustrating how the process of photosynthesis takes places.			
Terminology	Sunlight, Hydrogen, Energy				
SPECIFIC AIMS		1. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		2. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations	
Observing	✓	Raising Questions	✓	Recording Information	
Comparing		Predicting		Interpreting Information	
Measuring		Hypothesizing		Communicating	
Sorting & Classifying		Planning Investigations		Making/Constructing	
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CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- During photosynthesis plants use sunlight energy, carbon dioxide (from the air) and water to make food called glucose sugar. - Chlorophyll captures the sunlight energy. - This energy splits the water into hydrogen and oxygen. - The oxygen is released into the air. - The hydrogen is used with the carbon dioxide to make glucose (sugars).	The teacher will briefly explain how the process of photosynthesis occur while using the illustration on page 6 of Sasol Inzalo (Siyavula Book) Learners will be listening and taking notes while referring to the illustration on page 6 of Sasol Inzalo (Siyavula Book) Learners answer the questions on the attached activity page.	Video clips Internet Worksheets Chalkboard/White board Sasol Inzalo Siyavula Book Charts

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																					
 energy from sunlight oxygen gas goes back into the air photosynthesis carbon dioxide from the air water and mineral salts from the soil This process is called photosynthesis Illustration of photosynthesis (Thunderbolt.co.za)																							
ASSESSMENT	Discussion, demonstration																						
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	Class organisation.			Straddle: Change complexity of content presentation.	
	Over-crowded classroom.			Enhance lesson presentation by employing concrete/visual resources.	

CLASS ROOM ACTIVITY: PROCESS OF PHOTOSYNTHESIS ACTIVITY

1. Brief explain how the process of photosynthesis occur?

2. Mention the places where the plants store the starch.

3. Complete the table of things that plants need for photosynthesis and things they make during photosynthesis

Things that plants need for photosynthesis	Things they make during photosynthesis

HOME WORK

Draw picture showing how the process of photosynthesis occurs?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: ● Explain how sugar change into starch ● List the storage parts of the plants ● Give examples of the food containing starch			
TOPIC: PHOTOSYNTHESIS					
Subtopic: Plants and food: Food storage in plants					
Terminology	Store, Veins, carries				
SPECIFIC AIMS			1. DOING SCIENCE		
			2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
			3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions		Recording Information
✓	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing		Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
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CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- The sugars are moved from the leaves to other parts of the plants where they are stored. - The water in the plant veins carries the sugars. When the sugars reach the storage parts they are changed into starch. - Plants can store the starch in these places: - leaves (cabbage, spinach, lettuce) - fruit (apples, banana, peaches)	The teacher will ask learners to identify the different parts of the plants using the picture of the plants. Learners identifying those plants parts The teacher will list the parts that store food while explaining how plants change sugar into starch. Listing the storage and give example of food found in that part of plant, e.g. 1. leaves (cabbage, spinach, lettuce) 2. fruit (apples, banana, peaches) 3. stem (sugar cane) 4. seeds (wheat or mealies)	Worksheets Chalkboard/White board Sasol Inzalo Book Charts Book

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources												
– stem (sugar cane) – seeds (wheat or mealies) – flowers (nasturtiums, broccoli and cauliflower) – roots (carrots or beetroot)	5. flowers (nasturtiums, broccoli and cauliflower) 6. roots (carrots or beetroot) Learners refer to p 10 Sasol InzaloSiyavula Book while taking notes. Learners participate in discussion and answering questions on the attached activity sheet.													
ASSESSMENT	Discussions													
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CLASSROOM ACTIVITY: FOOD STORAGE

1. Explain how sugar changes into starch.

2. Which parts of the plants store food and give one example of food that is stored in that parts?

HOME WORK

1. Complete this table by writing one other food type that is stored in the following parts of plants.

	Storage part	Other food type
1. Leaves		
2. Fruit		
3. Stem		
4. Seeds		
5. Fowers		
6. Roots		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Know how to conduct a scientific experiment. • Know how to test for sugar, and in various foods. • Identify food containing starch by testing			
TOPIC: PHOTOSYNTHESIS					
Subtopic Plants and Food : Testing for starch with iodine solution					
Terminology	Starch, Iodine solution, hypothesis				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
✓	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring	✓	Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations	✓	Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Foods that we eat contain either one of these starch, protein, and fats/oil. - Starch is made by green plants and stored in different parts of the plants. - We can test if the starch is present in plant or food using a solution of substance called iodine. - Iodine solution is yellow brown	The teacher will explain scientific method briefly. Learners will conduct tests for starch working in groups ➤ Put a teaspoon of food containing starch on a saucer. ➤ Put a few drops of iodine solution on the food containing starch (maize flour) ➤ Observe if the iodine changes colour while recording their findings. The teacher ask questions: Is the starch present? How do you know? Learners respond according to their findings. Class discussion about observations and findings from the experiments conducted in the lessons.	Glucose powder Maize flour Iodine solution Syringe, saucer, Teaspoon Worksheets Chalkboard/White board (Sasol InzaloSiyavulaBo

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																										
in colour. • Iodine solution changes to blue black when you add it to starch. • If there is no starch present in the food you are testing, the iodine solution will remain yellow brown in colour	The asks questions during presentations and allow other groups to ask questions and comment	ok) Learner Textbook Charts																										
ASSESSMENT	Informal : Discussion, Questions																											
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CLASSWORK ACTIVITIES

QUESTIONS:

1. Which solution do you think is more accurate to test for starch?

3. How do you test to see if any food contains starch?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Photosynthesis		• Know how to conduct a scientific experiment.			
Subtopic: Test Different foods for starch		• Know how to test for sugar, starch and oils in various foods.			
		• Identify food containing starch by testing			
Terminology	Hypothesis, Evaluate				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	✓
Observing	✓	Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting	✓	Interpreting Information	✓
Measuring	✓	Hypothesizing	✓	Communicating	✓
Sorting & Classifying	✓	Planning Investigations	✓		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Foods that we eat contain either one of these starch, protein, and fats/oil. - Starch is made by green plants and stored in different parts of the plants. - We can test if the starch is present in plant or food using a solution of substance called iodine. - Iodine solution is yellow brown in colour.	The teacher allows learners work in groups. The teacher explain the scientific investigation to the learners. The teacher ask learners to do the following: - Write down hypothesis for investigation. Which foods do you think contains starch? Write down a hypothesis for the investigation. - Plan and conduct your investigation. Write down step-by-step methods to do the test for the starch. Make sure that your instructions are clear enough for someone else to follow. - Record your results in table form like the one below.	Iodine solution, dropper, saucers, or plates, cooked rice, flour, potatoes, bread, apple, cooking oil, boiled eggs, cheese, Teaspoon Worksheets Chalkboard/White board

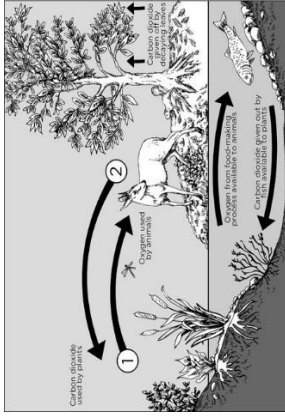
CONTENT		TEACHING & LEARNING ACTIVITIES			Resources																		
- Iodine solution changes to blue black when you add it to starch. - If there is no starch present in the food you are testing, the iodine solution will remain yellow brown in colour	Food tested	Observation	Is starch present	Sasol Inzalo Siyavula Book Learner textbook Charts																			
4. Draw conclusion. Compare the substances that contain starch with those that do not contain starch. 5. Evaluate your investigation.																							
ASSESSMENT		Evaluation																					
TEACHER REFLECTION																							
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ACTIVITY: Evaluating an investigation

Use the checklist below to evaluate yourselves. Where the answer is no that points where you should improve or adapt your investigation.

	Yes	NO
Writing the hypothesis		
• Did I predict the outcome correctly?		
• Did I include the correct variables in my hypothesis?		
Planning and conducting the investigation		
• Did I collect all the materials?		
• Did I use the appropriate equipment correctly?		
• Did I follow the instructions carefully?		
• Were my observations and measurement accurate?		
1. Recording the results		
Did I record the results correctly in tables or graphs		
• Would I get the same results if I repeated the investigation?		
Drawing conclusions		
• Could I make sense of the results?		
• Can I make general statement based on the results?		
• Do I need to find other methods to ensure a more accurate outcome?		

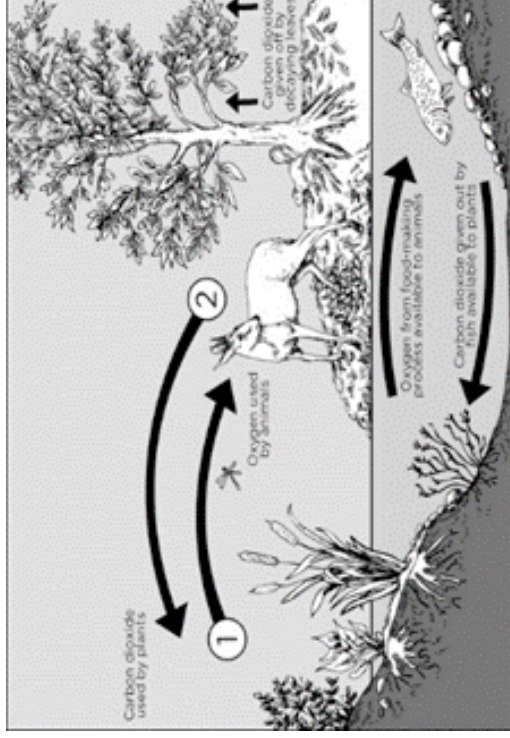
DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Tell how plants breath • Differentiate between oxygen and carbon dioxide as gases.		
TOPIC: PHOTOSYNTHESIS				
Subtopic: Plants and Air : Plants breathing (carbon dioxide and Oxygen)				
Terminology	Breathing, respiration, Energy			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		
				✓
				✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
During photosynthesis plants uses carbon dioxide from the air and gives off oxygen into the air. 	As an introduction, the teacher ask learners to name the different types of gases we take in (inhale) which one we take out (exhale)? Learners answer the questions The teacher open discussion on how plants use carbon dioxide and gives off oxygen. Learner participate in class discussion based on the given picture (alongside) Answer the questions on the attached activity sheet.	Textbook Worksheets Chalkboard/White board Sasol Inzalo Book Charts

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																										
Picture showing oxygen and carbon dioxide circle. Thunderbolt.co.za Animals including people, use the oxygen from the air for breathing and gives out carbon dioxide which is used by plants for photosynthesis.																												
ASSESSMENT	Informal (Questions)																											
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate L TSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table> <table><tr><th>Areas of improvement</th><th>Possible teacher interventions</th></tr><tr><td>Some learners did not participate.</td><td>Scaffold: break down task into smaller activities.</td></tr><tr><td>Class organisation.</td><td>Straddle: Change complexity of content presentation.</td></tr><tr><td>Over-crowded classroom.</td><td>Enhance lesson presentation by employing concrete/visual resources.</td></tr></table>		Good practices			Good learner participation.		Effective use of appropriate L TSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge	Areas of improvement	Possible teacher interventions	Some learners did not participate.	Scaffold: break down task into smaller activities.	Class organisation.	Straddle: Change complexity of content presentation.	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.
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CLASSROOM ACTIVITY

A. Look at the picture of oxygen and carbon dioxide circle



1. Make a list of living organisms that produce both oxygen and carbon dioxide in this picture.

2. Identify three living organisms that cannot produce oxygen in this picture.

3. Predict what you think would happen if all the animals were removed from this habitat.

4. What two life processes are involved in the carbon dioxide/oxygen cycle?

5. Complete this cycle by filling in the missing information for the two arrows on the left hand side of the illustration. Supply the labels for arrows 1 and 2.

6. Explain why animals would not survive if all the plants on Earth were to suddenly die.

7. Why do we say the oxygen and carbon dioxide are in a cycle?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Identify the different groups of food.		
Subtopic: Food groups: Food groups Classification		• Sort and classify the foods according to its groups		
		• Compare the different foods groups		
Terminology	Carbohydrates, Proteins, Fats, Vitamins, Minerals,			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Living organism need food to grow and stays healthy. Every living thing needs energy to carry out the seven life processes (to feed, breathe, move, grow, excrete, sense and produce). People and animals get energy from the food they eat. Every food you eat contains nutrients. Nutrients are the substances that keeps you healthy. Foods are classified into five groups. Foods that supply the following nutrients: • Carbohydrates • Proteins	The teacher recap the previous knowledge by asking the questions on work completed in previous grades. Learners answer the questions based on the previous lessons Power point presentation: The teacher classify the food into different food groups. Learners use the attached activity sheet to sort food into different food groups	Computer Pictures of different food groups Learner Textbook Chalkboard/White board Sasol Inzalo Book Charts

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Fats - Vitamins and Minerals  Picture showing food groups (thunderbolt.co.za)		
ASSESSMENT	Informal (questions)	
TEACHER REFLECTION	Good practices	
	Good learner participation.	Effective use of appropriate LTM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Good use of lab apparatus
	Drawing of food tests assisted with understanding topic	Added extra food tests for additional knowledge

CONTENT	TEACHING & LEARNING ACTIVITIES			Resources
	Areas of improvement		Possible teacher interventions	
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CLASSROOM ACTIVITY

FORMAL ASSESSMENT TASK 1

1. Look at the illustration of the different food below and then classify (sort) the foods into their correct group in the table below.



- | | | | | | |
|----------------|-----------|---------------|-----------------|-----------------|------------|
| 1. Bread | 2. Rice | 3. Pasta | 4. Potatoes | 5. Meat | 6. Lentils |
| 7. Almond nuts | 8. Cheese | 9. Mixed nuts | 10. Cooking oil | 11. Peanuts but | |

Carbohydrates	Proteins	Fats and Oils	Vitamins and minerals

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: NUTRIENTS IN FOOD		• Describe the functions of different foods			
Subtopic Food Groups: Functions of Foods and Nutrients supply		• Investigate the different types of food nutrients			
Terminology		Energy, Growth, Repair, Insulation, Protection, Organs, Healthy, Energy, Immune, Natural			
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	✓
Observing		Raising Questions	✓	Recording Information	✓
Comparing		Predicting		Interpreting Information	✓
Measuring		Hypothesizing		Communicating	✓
Sorting & Classifying		Planning Investigations		Describe	✓

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Food can be grouped according to their functions in the body and the main nutrients they supply: Carbohydrates provide energy in the body Proteins for growth and body repair Fats and oil for insulation and protection for nerves and organs. Vitamins and Minerals building bones and teeth, and maintaining a healthy immune system. - Most nutrients contain more than one nutrients groups	Recap previous knowledge of the different food groups by asking the different questions. Learners will apply acquired knowledge by answering the questions. The teacher expands the knowledge of foods groups by explaining the functions of each food groups, for our healthy immune system, growth and repair, energy, insulation and protections. Learners complete the attached activity sheet.		Pictures of different foods Learner Textbook Chalkboard/White board Sasol Inzalo Book Charts

ASSESSMENT	Informal : Questions																				
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CLASSROOM ACTIVITY

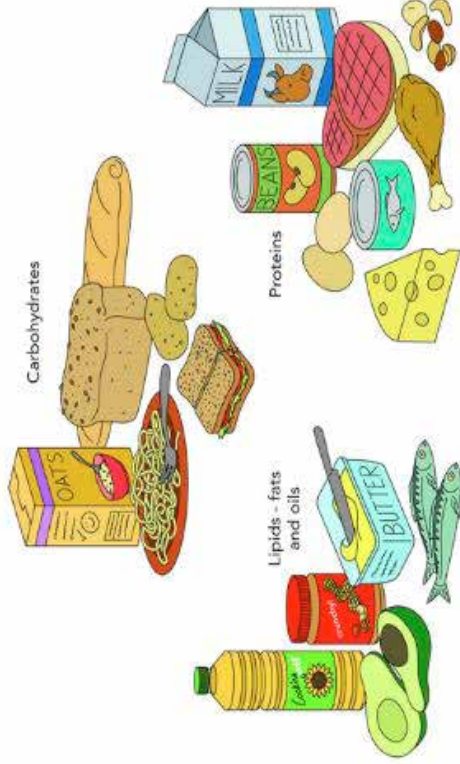
1. Complete the table below by writing the nutrients found in each food group and functions

Foods group	Nutrients found in the food	Function of the nutrients
a. Cooking oil / butter		
b. Rice/maize meal		
c. Meat(Beef)		
d. Cabbage/ spinach		
e. Milk		

HOMEWORK

1. Look at the table below with the different food groups and answer the questions that follow.

a) Which food groups may be containing more than one nutrient/s?



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Know the different food containing starch and food containing sugar.		
Subtopic ; Carbohydrates		• Identified different food with different nutrients.		
Terminology	Carbohydrates, organisms			
1. DOING SCIENCE				
2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS				
Accessing & recalling Information		✓	Identifying problems & issues	✓ Doing Investigations
Observing			Raising Questions	✓ Recording Information
Comparing			Predicting	Interpreting Information
Measuring			Hypothesizing	Communicating
Sorting & Classifying		✓	Planning Investigations	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Carbohydrates give living organisms energy. - Are used by the body to keep it warm and provide all the energy it needs for growth and movement. - Without energy would be too tired to walk, run, dance or even think. - Sugar and starch are two main carbohydrates that we eat. - Sugar gives our body quick energy e.g. sugar from apple etc. - We find starch in food such as maize	The teacher ask learners to give the list of the food they eat at home and to classify them according to their food groups. Allow the learners 5 to 7 minutes to complete this activity in their notebooks with revision / corrections / done as a class discussion. According to the groups they classify ask them to tell which nutrients they eat more than the other per day. The teacher introduces the topic “carbohydrates.” Learners participate in discussion that centres on the advantages and disadvantages of eating food containing too much or too little carbohydrates.	Chalkboard/White board Sasol Inzalo Book Charts Platinum text book

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
meal, potatoes, rice and some fruits. - Starch gives you energy more slowly, so lasts longer. Starch is the most common carbohydrates in our diet, - Around 60% of our food comes from carbohydrates.			
ASSESSMENT	Informal: Questions		
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate L TSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
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	Areas of improvement		Possible teacher interventions
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Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources	

ACTIVITY:

Answer the following questions that follow:

1. Why is it useful to know which food contain starch?

2. Name one advantages of eating foods that contain starch.

3. Does bread contain starch? Give reason to support your answer.

4. Name one disadvantage of eating foods that contain too much carbohydrate

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Identify different foods containing proteins. • Identify different foods with different nutrients.		
Subtopic: Proteins				
Terminology	Proteins			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Living organisms need proteins to build and repair their bodies and for growth. - Proteins also help your immune system fight off infection. - Immune system protects the body from sickness and helps you get better if you have sick. - Protein also makes up part of the red blood cells, which are responsible for carrying oxygen from lungs to the rest of your	The teacher explain the importance of the proteins in the body. The teacher ask learners to make a list of the foods containing protein that they may consume on a daily / weekly basis. They can work in pairs (or in groups) Allow the learners 5 to 7 minutes to complete this activity in their notebooks with revision / corrections / done as a class discussion. Ask them to compare the food containing carbohydrates (from previous lesson) and protein. Further discussion about the function and importance of the protein in our body.	Chalkboard/White board Sasol Inzalo Book Charts Learner Textbook

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																		
body. • The nutrients in the protein group help children grow muscles and organs are mostly made up of proteins. • Obtain protein from food such as meat, fish, eggs, nuts, and beans																				
ASSESSMENT																				
TEACHER REFLECTION																				
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ACTIVITY

1. Sort the following foods into the correct food groups in the table given below:

Meat, Bread, Beans, eggs, beans, potatoes, maize meal, cool drink, nuts

Carbohydrates	Proteins

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Know the different food containing oil and fats • Identified different food with different nutrients.		
Subtopic: Oils and Fats				
Terminology	Saturated, protective			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations	
Observing		Raising Questions	Recording Information	
Comparing	✓	Predicting	Interpreting Information	
Measuring		Hypothesizing	Communicating	
Sorting & Classifying	✓	Planning Investigations	✓	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Oils and fats give energy to the living organisms. - Oils and fats give more energy than any other food type. - They store energy in the form of body fats. - These fats form protective layers inside the body, to protect the organs and keep some animals warm. - Food such as nuts, avocado, sardines and margarines all contain healthy oils and fats.	Class discussion where the teacher ask learners to give the different types of foods that they eat that contain fats and oils. The teacher ask learners to tell why they think they contain fats or oils. The teacher ask learners again to give a list of plants food containing fats and oils Learners give the list of those food they think may contain fats and oils Further explanation about more foods that contain fats and oils and about the importance, advantage and disadvantages of eating foods that contain healthy / unhealthy fats and oils.	Chalkboard/White board Sasol Inzalo Book Charts Learner Textbook

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Oils are liquid fats made from plants and fish and provide important nutrients. - It is not good to eat too much red meat, chocolates, cakes and cooking fat, as they contain which is not a healthy fat. It is far healthier to get oils and fats from plants foods and fish	<u>HOMEWORK</u> Learners are required to find 5 pictures of foods that contain fats and oils and must indicate whether or not these contains healthy / unhealthy fats and oils	Old Magazines and newspapers
ASSESSMENT TEACHER REFLECTION	Informal assessment by asking the questions to the learners.	
	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Good use of lab apparatus
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	Areas of improvement	
	Some learners did not participate.	Scaffold: break down task into smaller activities.
	Class organisation.	Straddle: Change complexity of content presentation.
	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Conduct a scientific experiment.		
Subtopic: Test for fats and oils		• Test for fats and oils in various foods.		
		• Identify food containing oils and fats		
Terminology				
1. DOING SCIENCE				
2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing	✓	Raising Questions	✓	Recording Information
Comparing	✓	Predicting	✓	Interpreting Information
Measuring	✓	Hypothesizing	✓	Communicating
Sorting & Classifying	✓	Planning Investigations	✓	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
To see that food contain oils or fats when rubbing a bit of the food on brown paper the stain will appear on the paper. The stain does not dry or disappear, that means oils or fats is present in the food.	Each learner will be required to bring one food item that they think contains fats and oils. The teacher briefly remind them about scientific method when conducting experiment. Learners will work in groups of four (or six) - Take the different types of food containing the oils and fats and those does not contain oils and fats. - Rub the different types of foods lightly (so as not to tear) against brown paper. - They should label each of the stains on the brown paper to be able to identify the different foods at a later stage should the need arise. - Observe if the brown paper will develop a stain that does not dry or disappear. - The record their findings according to the response from the different types of foods	Chalkboard/White board Sasol Inzalo Book Charts Learner Textbook Brown papers, different foods containing oils or fats and foods that does not contain oils or fats

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																		
	Class discussion about observations and findings from the experiments conducted in the lessons. The teacher give further explanation and clarifications about the experiments that conducted / completed.																			
ASSESSMENT	Informal assessment : questions																			
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate L TSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table>		Good practices			Good learner participation.		Effective use of appropriate L TSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
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Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.																			

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: NUTRIENTS IN FOOD		• Identify different types of vitamins and minerals obtained from foods. • Identify different types of foods that provide a certain type of vitamins. • Explain the functions of vitamins and minerals in our body.		
Subtopic: Vitamins and minerals				
Terminology				
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Vitamins and minerals are other important substances that we get from the food we eat. - They work together with carbohydrates, proteins and fats to help our bodies grow and develop normally. - Our body need vitamins and minerals to help build strong teeth and bones, have good eyesight and immune system. - The immune system fights	The teacher introduces learners other foods that contain vitamins and minerals that are also important to our bodies and overall wellbeing. Content outlining the functions / importance of vitamins and minerals to the human body is discussed from learner textbooks (or Sasol Inzalo book Page 26, 27, 28.) The teacher give learners few minutes to read silently those functions and the foods in which those substances obtained from. The ask questions about the functions and type of food that provide that substance.	Chalkboard Whiteboard Sasol Inzalo Book Charts Learner Textbook

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
germs and protect us from getting sick.	Learners will complete the attached activity sheet		
ASSESSMENT	Informal assessment: questions		
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate LTM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		Possible teacher interventions
	Some learners did not participate.		Scaffold: break down task into smaller activities.
	Class organisation.		Straddle: Change complexity of content presentation.
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.

ACTIVITY1.

Complete the table below outlining different food groups, the nutrition benefits as well as the main function of the food groups.

Food group	Which Foods contain	Main function
Carbohydrates		
Proteins		
Fats		
Vitamins		
Minerals		

HOMEWORK

Complete the table below by writing in the function and foods that contain that vitamin or mineral

Vitamin	Function	Foods that contains the vitamin
A		
B		
C		
D		
E		
K		
Mineral	Function	Foods that contain the mineral
Calcium		
Iron		
Zinc		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Nutrients in food		• Identify different types of ingredients found in food.		
Subtopic: Food groups: The nutritional value of food		• Sort and classify foods according to their ingredients		
Terminology	Ingredients, manufactured, processed, preservatives, flavourings, colourings			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Most natural foods contains a mixture of more than one nutrients group. - Most processed (manufactured) foods have added salt, preservatives, flavourings and colourings.. - Calories tell you how much energy you get from one serving of the food. - It is important to read and understand food labels so	Teacher divides the class into groups of four (or six) learners. Each group is given a different food wrapper / package or canned foodlabel. The teacher gives learners five minutes to identify and write down the different ingredients that have been listed on that food label. Each group is given an opportunity to read the ingredients they have identified. The above feedback session will allow for expansion of knowledge as learners discuss the various unknown ingredients and their functions in the body.	- Worksheets - Pictures of different foods - Textbook - Chalkboard/White board - Sasol Inzalo Book - Charts - Tomato sauce bottles - maize meal packet packages:

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
that you can make smart decisions and eat healthy.	Additional revision activity sheet also attached herewith		
ASSESSMENT	Informal assessment (asking the questions)		
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
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Areas of improvement		Possible teacher interventions	
Some learners did not participate.		Scaffold: break down task into smaller activities.	
Class organisation.		Straddle: Change complexity of content presentation.	
Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

CLASS WORK

1. Read the label from the food packaging below and answer the questions.

A. On the maize meal packet package: Ingredients: Maize meal, cane Sugar, Salt.	B. On the Tomato sauce bottle: Ingredients: Tomato paste, can sugar, Vinegar, salt, citric acid,
--	---

a. Which food groups are in these two products?

Maize meal porridge.....(1)

Tomato sauce..... (1)

2. Write down the ingredients and say which food groups it belongs to.

_____ (2)

HOMEWORK: INVESTIGATE PACKAGED FOOD LABELS

1. Look at home or shops at the labels on these foods:
Box of cornflakes; Tin of baked beans; loaf of bread; jar of peanut butter; tin of pilchards.
2. Check whether they contain **(a) sodium (salt), (b) sugar, (c) saturated fats.**
3. Record your findings in a table like the one below. Tick the column if the food contains the additives.

Packaged food	Salt	Sugar	Saturated fat
Box of cornflakes			
Tin of baked beans			
Loaf of bread			
Jar of peanut butter			
Tin of pilchards.			

(15)

4. Collect five different food packages at home and write down the different ingredients found in them.

Name of Food	Ingredients
1.	
2.	

3.		
4.		
5.		

3. Locate the LIST OF INGREDIENTS on each food container.
You should have at least 10 different containers. (If you have too few, swap with another group when they are finished with theirs.)

4. Sort the different foods into the major food groups.

5. Record your work in the table below.

Carbohydrates	Proteins	Lipids	Vitamins and Minerals

Very often food manufacturers add different preservatives, flavourings and colourings, as well as salt and sugar, to make the food look or taste more attractive to their customers. These are called **additives**.

- 6. Read the ingredients on your 10 packaging labels again.
- 7. In the first column, write the name of your product.
- 8. Tick (✓) under each column if your product has any of these items added to it.
- 9. The first one is done as an example.

Food		Additives			
		Salt	Sugar	Others	
EXAMPLE	Bread	✓	✓	✓	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

- 10. Make a list of the main flavourings that were used in your products.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: NUTRITION		• Explain what is a balanced diet • Differentiate between healthy and unhealthy food • Compare healthy and unhealthy • Sort and classify healthy and unhealthy food			
Subtopic: Balance diet :Diet					
Terminology	Balance, Healthy, unhealthy, diet				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	✓
Observing		Raising Questions	✓	Recording Information	✓
Comparing		Predicting	✓	Interpreting Information	✓
Measuring		Hypothesizing	✓	Communicating	✓
Sorting & Classifying	✓	Planning Investigations	✓		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
• Diet refers to the selection of foods we eat every day. • The amounts of each food group we need to eat regularly to stay healthy. • We need to eat the correct amounts of carbohydrates, proteins, fats, vitamins and minerals. • Our body also need six to eight glasses of water per day. Without water our brain would	The teacher initiates discussion about the diet, learners are required to talk about the different types of food they eat at home. Learners actively participate in discussion. The discussion should focus on how often they eat the certain (or specific) types food, their staple diet, issues about health with regards to food they eat. The teacher gives more explanation about the food we eat at home, showing the different diet on the chart. Teachers can refer to p 51 Sasol Inszalo (Siyavula book) or make reference to the textbook currently being used by the school.		Pictures of different foods Learner Textbook Chalkboard/White board Sasol Inzalo Book Charts

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																		
not function well and we can suffer from constipation. Water keeps our blood vessels healthy. • Our body also needs enough fibre • Fibre is found in plant like fruit, vegetables and grains. • Fibre prevents suffering from constipation and it can also protect you against suffering from diabetes or heart problem.																				
ASSESSMENT	Informal : Questions																			
TEACHER REFLECTION																				
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CONTENT	TEACHING & LEARNING ACTIVITIES			Resources
	Areas of improvement		Possible teacher interventions	
	Some learners did not participate.		Scaffold: break down task into smaller activities.	
	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

HOMEWORK

1. Look at the food that you eat at home and the way you eat as family and tell if you eat balance diet or healthy and give reason for your answer?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: NUTRITION		• Evaluate a given diet • Determine if the food contains food from all nutrients groups	
Subtopic: Balance diet: What do we mean by balance diet			
Terminology	Quantities, nutrients		
SPECIFIC AIMS	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS			
Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations
Observing		Raising Questions	✓ Recording Information
Comparing	✓	Predicting	Interpreting Information
Measuring		Hypothesizing	✓ Communicating
Sorting & Classifying	✓	Planning Investigations	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Balanced diet is amounts of each food group we need to eat regularly to stay healthy. A balance food contains sufficient quantities of food from all four nutrients groups as well as water.	The teacher will use the food pyramid on page 37 Sasol inzalo showing the balance diet. The teacher explains to the learners should we eat balance in order to stay healthy referring to the food pyramid. Discussion about the different food groups depicted on the food pyramid. Learners will complete the attached activity sheet as evidence of their understanding of the concept.	Worksheets Textbook Chalkboard/White board Sasol Inzalo Book Charts

Picture showing balance diet (Thunderbolt.co.za)

A food pyramid provides a guide to a healthy balanced diet. It shows how to classify food types into different levels. A balanced healthy diet will include servings from each level of the food pyramid and will show the correct quantities you need to eat:

ASSESSMENT	
TEACHER REFLECTION	

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Informal : questions			
Areas of improvement		Possible teacher interventions	
Good practices			
Good learner participation.		Effective use of appropriate LTSM.	
Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	
Conducive learning environment.		Learners maintained good discipline.	
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	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

CLASSROOM ACTIVITY:

1. Evaluating a diet to see if it contains all the food groups.

MATERIALS: A record of the weekly diet of Farrah's brother, Rajesh

INSTRUCTIONS: 1. Carefully study Rajesh's weekly diet.

2. Answer the questions that follow.

	Breakfast	Lunch	Supper
Monday	Toast with peanut butter, coffee with milk and 3 teaspoons of sugar.	Two-minute noodles, cream soda, jelly (while watching TV).	SpaghettiBolognese (with chopped carrots in the mince) with cheese sprinkled on top, fruit juice, tea with milk and 2 teaspoons of sugar
Tuesday	Toast with peanut butter, coffee with milk and 3 teaspoons of sugar.	Two-minute noodles, Coke, toast with peanut butter, popcorn (while watching TV)	Mom and Dad worked late scrambled egg on toast with baked beans; coffee with milk and 3 teaspoons of sugar
Wednesday	Late for school - didn't eat.	2 eggs and toast with cheese, tea with milk and 3 sugars, more toast with jam and peanut butter later (while watching TV)	Hawaiian pizza, coke, cream soda, chocolate milkshake
Thursday	Toast with peanut butter, coffee with milk and 3 teaspoons of sugars	Indoor hockey practice after school-pie from tuck shop and Coke, chocolate and packet of hot chips	Roast chicken, butternut, baked potatoes, salad, fruit juice, coffee with milk and 1 teaspoon of sugar
Friday	Toast with butter (peanut butter is finished), coffee with milk and 3 teaspoons of sugar	Band practice after school pie from tuck shop and coke, sweets	Takeaway Deep Fried chicken, hot chips, Coke, tea with milk and 3 teaspoons of sugar, popcorn

QUESTIONS:

1. Reading only this table showing Rajesh's weekly diet, do you think he has a balanced diet? Why do you think so?

2. Now let's use our knowledge of a food pyramid to see how healthy Rajesh's diet for the week was. Use the tallying method to keep score of everything he ate: to tally up results you make one line down for every item you count and when you get to the fifth item you draw a diagonal line through the other four. That makes it easy to count in fives and count the few left over at the end.

Total Fats and Oils	Total Proteins	Total Vitamins & Minerals	Total Carbohydrate

3. List the times and days when Rajesh ate fruit or vegetables.

4. What important food group is Rajesh missing from his diet if he does not eat enough fruit and vegetables?

5. Can you predict what will happen if Rajesh continues with this diet?

6. Now that you have tallied up the different food groups that Rajesh ate in a week, do you think he ate a balanced diet? Why do you say so?

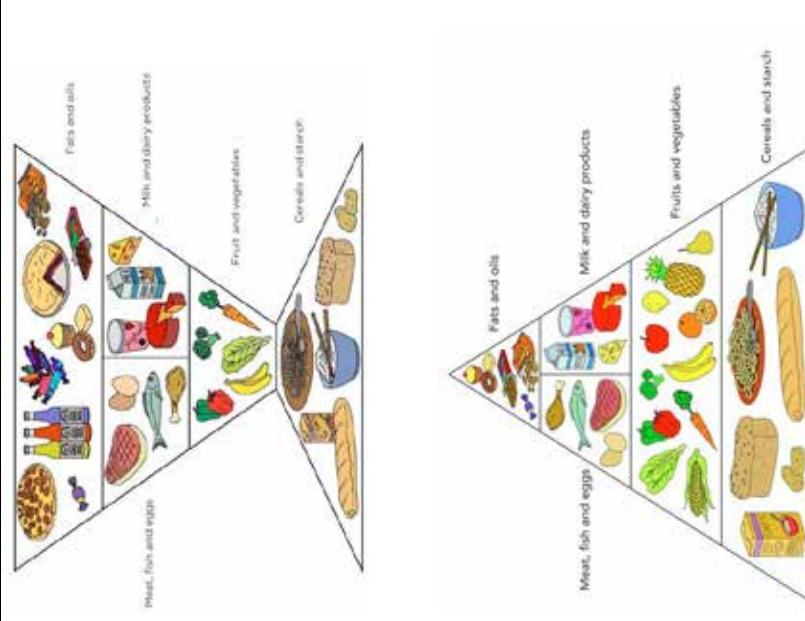
7. Do you think Rajesh is a very active person? Why do you say so?

8. Takeaways are known for being fatty and oily because restaurants often prepare the food in deep oil. Rajesh and Farrah's family ate takeaways twice in the week and the mom cooked twice. Compare the cooked meals with the takeaways specifically focusing on the amount of oil used to prepare the meals.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Nutrition		• Sort and classify healthy and unhealthy foods		
Subtopic: Diseases caused by an unhealthy diet		• Differentiate between unhealthy and healthy food		
Terminology	Nourishment, Rickets, Constipation, Obesity, Anorexia nervosa, Diabetes, Kwashiorkor			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		

1.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
CAUSES OF A POOR DIET There are many people in the world that do not or are not able to eat a healthy, balanced diet. Many choose to eat an unhealthy diet while others do not have a choice.	Revision and consolidation of the concepts taught in the previous lesson. The teacher ask learners to list the different types of food that they eat at home on a daily basis. Learners can work in groups of 4 or 6 The teacher writes the different list on the chalk board/white board. The teacher ask learners classify the group of healthy and unhealthy food using their list.	Pictures of different foods (Healthy and Unhealthy) Pictures of people who struggle with different ailments as a result of improper diet.

 Pictures of Pyramid showing unhealthy diet, and Pyramid healthy foods (Thunderbolt.co.za) Some diseases and conditions Often we get diseases and conditions because our bodies do not get the necessary nourishment. Some of these diseases are: • Tooth decay: When you eat or drink too	Learners classify to have group of healthy and unhealthy food. The teacher ask learners to tell the danger of eating unhealthy food. Learners tell what they know. The teacher use the pyramid of unhealthy food to explain the disease can be caused by eating unhealthy food. Use the pictures of people who struggle with different ailments to explain and discuss the repercussion of improper diet. ** As an extension activity, Teacher can give the learners the above as a research task where they have to make posters / brochures to show the different diseases / ailments / medical conditions associated with poor diets.	Learner Textbook Chalkboard/White board Sasol Inzalo Book Charts
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much sugar, the bacteria in your mouth makes acids that eat away at the tooth surface (called enamel), and causes cavities to form. • Rickets: This is condition mostly seen in babies and children. When children do not get enough fruit and vegetables and do not get enough Vitamin D, their bodies cannot absorb calcium and they cannot grow strong bones. • Constipation: This is painful condition (not a disease) that occurs when bowel movements become difficult and take place days or even weeks apart. An unhealthy diet is often to blame, but there are other causes too. The best way to treat constipation is to eat a healthy diet with lots of fibre in the carbohydrates, to exercise regularly and to drink plenty of water. • Obesity: This is condition (not a disease) where a person's body weight is more than 20% that of the average weight for other people the same age and height as that person. The best prevention for obesity is to follow a healthy, balanced diet. • Diabetes: This is disease that affects the body's ability to use blood sugar for energy. Diabetes symptoms may include an increased thirst and urination, blurred vision and excessive tiredness.		
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• Anorexia nervosa: This is life-threatening eating disorder where the patient starves themselves and deprives their bodies of nourishment to cause themselves to lose a large amount of weight. • Kwashiorkor: This is a disease that affects many children. It is a lack of protein and iodine in their diet. Children suffering from this may have swollen hands and feet, and especially a very large stomach, many ulcers on the skin and their hair might be discoloured.																															
ASSESSMENT	Informal : Sorting and Classifying																														
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table> <table><tr><th colspan="3">Areas of improvement</th></tr><tr><td></td><td></td><td>Possible teacher interventions</td></tr><tr><td>Some learners did not participate.</td><td></td><td>Scaffold: break down task into smaller activities.</td></tr><tr><td>Class organisation.</td><td></td><td>Straddle: Change complexity of content presentation.</td></tr></table>	Good practices			Good learner participation.		Effective use of appropriate LTSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge	Areas of improvement					Possible teacher interventions	Some learners did not participate.		Scaffold: break down task into smaller activities.	Class organisation.		Straddle: Change complexity of content presentation.
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	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.	

CLASS ACTIVITY

Comparing meals

1. Below are photographs of different meals for breakfast, lunch and dinner.

Breakfast:	Option 2: Fruit salad		Option 1: Flapjacks with syrup
			
	Option 1: Fruit loops		Option 2: Omelette with salad
			
Lunch:	Option 2: Fried chips		Option 1: Hamburger
			
	Option 1: Egg salad		
			

One of the meals is unhealthy and the other meal is healthy.

Supper:			
Option 1: Chicken pieces		Option 2: Beef, peas and rice	
			

[illegible]

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: - Explain how food is processed. - Explain what are the advantages of processing food.			
TOPIC: FOOD PROCESSING					
Subtopic: Need for processing food:					
Why do we need to food processing?					
Terminology	Processing, Edible, Preserving, Fermenting, dehydration, pasteurizing, perishable, freezing, pickling, smoking, canning and packaging.				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations	
Observing	✓	Raising Questions	✓	Recording Information	
Comparing		Predicting		Interpreting Information	
Measuring		Hypothesizing		Communicating	✓
Sorting & Classifying	✓	Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Food is processed to make it taste and last longer. Make it edible(preparing, cooking) - preparing food can be a very simple process such as when you peel an orange, butternuts or potatoes. More complicated processing methods are used to make the taste and colour of food better and last longer. One such as process called pasteurizing. It is used to get rid of	The teacher explain the new concepts The teacher initiates classroom discussion to gauge learners' relevant knowledge concerning food processing? Discuss content as given in learner textbooks (or on page 54 Sasol Inzalo Books) Use the link "goo.gl/3LTE2"(or other available videos) to show learners different methods of preserving food.	- Learner textbooks - Smart board / chalkboard - Worksheet - Sasol Inzalo Siyavula Drying foods (video). goo.gl/3LTE2

most harmful organisms found in food, to make food safe to eat. • Make it last longer(preserving) – This is used to make food like meat, milk etc. stay fresh for longer. Foods that spoil quickly are called perishable. These perishable foods can be made last longer, using methods called preserving like freezing, pickling, smoking, dehydration, canning and packaging. • Improve its nutrients value (fermenting) – It a biological process and involves a series of chemical reactions, and pickling. The fermentation of fungi and bacteria is how milk is turned into cheese, amasi and yoghurt																			
ASSESSMENT	Informal assessment: Questions																		
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table>	Good practices			Good learner participation.		Effective use of appropriate LTSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
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Class organisation effective.		Good use of lab apparatus																	
Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge																	

	Areas of improvement		Possible teacher interventions	
	Some learners did not participate.		Scaffold: break down task into smaller activities.	
	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

CLASSROOM ACTIVITY

1. Give reasons why food needs to be processed.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: FOOD PROCESSING		• Explain how processing methods that can results in a loss of nutrients. • Identify foods that can lose nutrients easily.	
Subtopic: Needs of processing food: Processing can lead to a loss in nutrients			
Terminology			
SPECIFIC AIMS		1. DOING SCIENCE	
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	
PROCESS SKILLS			
Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations
Observing		Raising Questions	✓ Recording Information
Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	Communicating ✓
Sorting & Classifying	✓	Planning Investigations	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Any processing methods that uses high levels of heat or exposes the food to light or air will cause the food to lose it nutrients. - During the cooking process, added fluids can wash out the nutrients in foods. For example, boiling a potato can cause much of the potato's nutrients to drain into the boiling water. - When food is heated, dried or salted will increase the loss of	Initiated class discussion about the loss of nutrients in food through foods processing. Questions and answers about the issues pertaining to the loss of nutrients during food processing. The teacher give detailed explanation about processing methods that can lead to the loss of nutrients based on content available in learner textbook, Sasol Inzalo learner books (Page 63) and educator guide. Learners complete the attached activity.	- Books - Smart board / chalkboard - Worksheet - Smart board / chalkboard - SasolInzalo - Siyavula

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																										
nutrients in food.																												
ASSESSMENT	Informal assessment : Questions																											
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ACTIVITY

1. Give 3 reasons why we process food?

2. How can food lose nutrients during processing? List and explain 2 ways.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: Identify, List and explain different methods of food processing.		
TOPIC: Food processing				
Subtopic: Methods of processing food:				
How are foods processed?				
Terminology	Habitat, harvested, peeled, chopped, inedible, sweeteners, ingredient, techniques,			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information		Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
There are different levels of food processing. Minimally processed foods: - Fruit and vegetables, nuts, meat and milk undergo very little processing from when the plant or animal product was in its natural habitat to the point where it lands on your table. - They need to be harvested, washed and sometimes peeled, chopped, juiced or cut	The teacher explain the new concepts (Content) “Minimum” and “Highly Processed” as given in learner textbooks (or on page 64 – Sasol Inzalo Learner books) Teacher lead class discussions by asking learners to cite personal examples of foods that have been processed in the above ways and learners should explain whether they feel the quality of the product was improved or diminished due to the processing. Learners complete the attached (or other suitable activity) as a written exercise.	- Note books - Smart board / chalkboard - Raw Materials / tools - Worksheet - Learner Textbooks - Sasol Inzalo Books

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
to remove inedible parts, before they are sold. These have a very short shelf-life. Processed food ingredients: • Products with a longer shelf-life, like flours, oils, fats, sugars, syrups, margarine, sweeteners and starches, fall into this category. • The original product has been changed and the ingredient does not look like the original kernel or grain, or oil seed or beans. • These processing techniques often break down any nutrient values and the manufacturers often add in extra nutrients, vitamins and minerals to their foods. Highly processed foods: • Highly processed foods include snack foods and desserts, biscuits, cereal bars, chips, cakes and pastries as well as soft drinks and breads, pastas, breakfast cereals and infant formula. • Animal products that are highly processed include processed meats (smoked, canned, salted or cured, nuggets, fish fingers, Vienna's, many sausages and boerewors, and burgers), Sasol inzalo (siyavula book)		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
ASSESSMENT	Informal : Asking question		
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		
	Some learners did not participate.		Possible teacher interventions
	Class organisation.		Scaffold: break down task into smaller activities.
	Over-crowded classroom.		Straddle: Change complexity of content presentation. Enhance lesson presentation by employing concrete/visual resources.

CLASSROOM ACTIVITY

1. Use the space below to draw a table to summarize the information above about the levels of food processing.
2. Include a short description of the level of food processing and examples.

LEVEL OF FOOD PROCESSING	SHORT DESCRIPTION	EXAMPLES.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		• Identify and explain the different methods of processing food.		
Subtopic: Methods For processing: Food processing methods				
Terminology	Principles, fermenting, drying, pickling, pasteurization, toasting, roasting			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing	✓	Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
There are many different methods (ways) to process food. The degree in which food is processed determines many of the food preserving processes involved. Food processing methods have changed in many ways, but the basic principles are still applied. There are many modern methods that are also used today.	Teacher divides the class into groups of 4 or 6. Each group is given 3 methods of how food can be processed. They discuss the various methods amongst themselves and provide feedback to the rest of the class. Class discussion to explain any misconceptions and to consolidate the concepts taught. Learners complete the attached activity sheet as an informal activity.	- Textbooks - Smart board / chalkboard / - Raw Materials/tools - Worksheet - Note books

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• sun drying • fermenting dairy into cheese, buttermilk (Amasi) or yogurt, or barley or grapes • pickling vegetables (onions or gherkins for example) • salting and spicing meat to preserve it (then drying it) • adding sugar to berries and/or fruit to make preserves • pasteurization: using just the right amount of heat to warm up milk or juice for example, to extend the shelf life • cooking: roasting, smoking, baking, frying • toasting • freezing or refrigerating • freeze drying • spray drying • making juice concentrates		
ASSESSMENT	Informal : Asking questions	
TEACHER REFLECTION	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Good use of lab apparatus
	Drawing of food tests assisted with understanding topic	Added extra food tests for additional knowledge

CONTENT	TEACHING & LEARNING ACTIVITIES			Resources
	Areas of improvement		Possible teacher interventions	
	Some learners did not participate.		Scaffold: break down task into smaller activities.	
	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

CLASS ACTIVITY

1. Use the space below to write down the different methods of processing food and give example of food that can be processed with that methods.
- 2.

Method of processing	Examples of food that can be processed
1.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		• Explain ways to combine foods as way of processing food		
Subtopic: Methods of processing foods: Combining food				
Terminology	Combine			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing	✓	Communicating
Sorting & Classifying		Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Foods is cooked or combined with either water or oil or both on open stoves. - This cooking methods includes chakalaka and African stew. - Body able to digest food and nutrients that is properly combined in the food	The teacher explain to the learners how to combine food. Cites examples from learner textbooks (or Inzalo Books Page 69) Learners can research other ways to combine foods other than chakalaka and African stews. They can present this information as a recipe. As an extension activity learners could possibly demonstrate the recipe if time allows.	- Learner Textbooks - Sasol Inzalo Books - Worksheet - Smart board / chalkboard
ASSESSMENT	Informal assessment: questions	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
TEACHER REFLECTION			
	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		Possible teacher interventions
	Some learners did not participate.		Scaffold: break down task into smaller activities.
	Class organisation.		Straddle: Change complexity of content presentation.
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		• Explain the importance of cooking food • Identify foods that can be eaten raw • Identify foods that cannot be eaten raw		
Subtopic: Methods for processing food: Cooking food				
Terminology	Raw, micro-organisms, mashed			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• Foods that cannot be eaten raw, for example eggs, potatoes, cabbage, broccoli, Brussels sprouts and spinach are cooked. • Cooking these foods destroys harmful micro-organisms and parasites by applying heat. • Cooking methods can create very tasty meals. • These methods can also lead to different tastes using the same	The teacher introduces the topic by indicating that there are foods that can be eaten raw and food that cannot be eaten raw. Class discussion to consolidate the above concept. The teacher explains by clarifying the importance for cooking these food.	• Textbooks • Sasol Inzalo Books • Worksheet • Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
ingredients, for example, potatoes can be boiled, mashed or roasted.			
ASSESSMENT	Informal assessment: asking questions		
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		
	Some learners did not participate.		Possible teacher interventions
	Class organisation.		Scaffold: break down task into smaller activities.
	Over-crowded classroom.		Straddle: Change complexity of content presentation. Enhance lesson presentation by employing concrete/visual resources.

ACTIVITY

1. Name at least five different foods that can be eaten raw.

2. Name at least five different foods that cannot be eaten raw.

3. Give the purposes of cooking these foods.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Food processing		• Explain the concept and importance of freezing food.		
Subtopic: Methods for processing foods: Freezing food				
Terminology	Temperature,			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Freezing food is another method to process food so that it will last longer. - Low temperatures will cause micro-organisms to grow slower. - Cook freezing is another preservation methods used where food is first cooked and then frozen at the temperature below 18°C. These food can be stored for long periods of time and must then be reheated to eat.	The teacher will explain the concept “freezing” as a method of processing and preserving foods. Class discussion (based on content as outlined in learner textbook) as to why it is important to keep food in the refrigerator. The teacher explains in the method and importance of processing and preserving food using freezing.	- Textbooks - Sasol Inzalo - Worksheet - Smart board / chalkboard
ASSESSMENT	Informal Assessment: Questions	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
TEACHER REFLECTION	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		
	Some learners did not participate.		Possible teacher interventions
	Class organisation.		Scaffold: break down task into smaller activities.
	Over-crowded classroom.		Straddle: Change complexity of content presentation. Enhance lesson presentation by employing concrete/visual resources.

ACTIVITY

1. Explain the importance of processing food using freezing methods.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		• Explain how to use pickling as a methods of processing food.		
Subtopic: Methods for processing food: Pickling food		• Identify different types of food that can be preserved / processed using pickling as method.		
Terminology	Pickling			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Pickling is done by soaking food in a mixture of salt and vinegar. - This processing methods uses the salt or other added spices to give the food a salty or sour taste. - The vinegar acts as a preservative. - Micro-organisms cannot survive in vinegar. - Most meat intended for pickling is cooked before the pickling process begins.	The teacher can use the most basic household ingredients, Use a basic pickling recipe / method and demonstrate the concept to the learners. 	- Textbooks - Sasol Inzalo - Worksheet - Smart board / chalkboard - Household ingredients - Magazines - Internet

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources												
	https://www.thekitchn.com/how-to-quick-pickle-any-vegetable-233882 The above link can also be used to show learners a short video about pickling. Learners must source a basic recipe as a consolidation of this lesson but also keep this on hand to assist with a formal assessment practical task													
ASSESSMENT	Informal Assessment: questions													
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	Class organisation.	Straddle: Change complexity of content presentation.												
	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.												

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: FOOD PROCESSING		• Explain how to process food using fermenting • Identify the foods products of fermentation process. • Outline the importance of bacteria/micro-organisms in food processing			
Subtopic: Methods for processing foods: Fermenting food					
Terminology	Texture, flavour				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
	Observing		Raising Questions	✓	Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- The process of fermenting food uses bacteria to change the food into more digestible and nutritional material. - Fermentation process uses these micro-organisms to improve the qualities, such as flavor and texture of some food products. - Food products example include yoghurt, sauerkraut, pickles, and sourdough bread and meat products	 	- Textbooks - Sasol Inzalo - Worksheet - Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources												
such as salami. • Fermenting food can also improve the flavour of some foods, like aged cheese or chocolate	 https://www.youtube.com/watch?v=ypZnaaWz8Vg Use the above link to show learners how to make Amasi as a fermented food. Explain the content as it appears in learner textbooks. Classroom discussion will enable the teacher to rectify any misconceptions and consolidate the concept.													
ASSESSMENT	Informal assessment : questions													
TEACHER REFLECTION	<table><tr><th colspan="2">Good practices</th></tr><tr><td>Good learner participation.</td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td>Added extra food tests for additional knowledge</td></tr></table>		Good practices		Good learner participation.	Effective use of appropriate LTSM.	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.	Conducive learning environment.	Learners maintained good discipline.	Class organisation effective.	Good use of lab apparatus	Drawing of food tests assisted with understanding topic	Added extra food tests for additional knowledge
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CONTENT	TEACHING & LEARNING ACTIVITIES			Resources
	Areas of improvement		Possible teacher interventions	
	Some learners did not participate.		Scaffold: break down task into smaller activities.	
	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	

ACTIVITY

1. How does fermentation process work?

2. What fermentation process use to improve the quality of the food?

3. Why is fermentation process important in food processing?

4. List five (5) food product that are the result of fermentation processing?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		● Explain how to process food using drying methods ● Identify the foods that can be processed through drying methods.		
Subtopic: Methods for foods processing: Drying food				
Terminology				
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
	Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations
	Observing		Raising Questions	✓ Recording Information
	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	✓

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
- When food is dried, water is removed from it. - Drying complete changes the state and texture of the food. For example, dried fruit become smaller than fresh fruit and taste sweeter - When water is removed, micro-organisms are unable to grow. - Some dried food need to have water before you can eat them, for example pasta	The teacher will ask learners to bring an example (small amount of about 50 grams) of some dried food substance that learners may have at home. Learner will be placed in groups of 4 to 6 and will discuss what the products looked like before they were dried, the reasons why these food substances were dried and outline a possible method used for drying the specific food item. Each group should be given an opportunity to demonstrate / explain using a different food item per group. Class discussion to consolidate the concept		- Textbooks - Sasol Inzalo - Worksheet - Smart board / chalkboard - Examples of dried food items brought from home by learners.

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources																		
	Learners complete the attached activity sheet / questions as consolidation																				
ASSESSMENT	Informal assessment: questions																				
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table>			Good practices			Good learner participation.		Effective use of appropriate LTSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
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Class organisation.	Straddle: Change complexity of content presentation.																				
Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.																				

ACTIVITY

1. What happen to the food when drying?

2. Why do we dry food?

3. Give four different types of the food that can be processed through drying.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: FOOD PROCESSING		• Explain how to process food using salt • Identify the foods that can be processed through salting. • List and explain the benefits of salting food.			
Subtopic: Methods for processing food: Salting food					
Terminology	Dehydrated				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing		Raising Questions	✓	Recording Information	
Comparing		Predicting		Interpreting Information	
Measuring		Hypothesizing		Communicating	✓
Sorting & Classifying		Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Micro-organisms cannot survive in high concentrations of salt. Meat and fish are always dried with plenty of salt to make biltong and dried fish (bokkoms). - Adding salts to the food acts as a preservatives, and is one of the oldest methods of preserving food. - When the food is salted, it becomes	  Drying foods (video).goo.gl/3LTE2	- Books - Sasol Inzalo - Worksheet - Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																				
dehydrated. Dehydration process draws out water of the food.	Teacher can use the above website together with pictures as outlined in the Sasol Inzalo Book on Page 54 to explain the method of drying to process certain types of food. Learner will make a list of all the food substances that they have in their homes that have been preserved / processed using “drying.” Informal assessment: questions																					
ASSESSMENT																						
TEACHER REFLECTION	<table><tr><th colspan="2">Good practices</th></tr><tr><td>Good learner participation.</td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td>Added extra food tests for additional knowledge</td></tr></table> <table><tr><th>Areas of improvement</th><th>Possible teacher interventions</th></tr><tr><td>Some learners did not participate.</td><td>Scaffold: break down task into smaller activities.</td></tr><tr><td>Class organisation.</td><td>Straddle: Change complexity of content presentation.</td></tr><tr><td>Over-crowded classroom.</td><td>Enhance lesson presentation by employing concrete/visual resources.</td></tr></table>		Good practices		Good learner participation.	Effective use of appropriate LTSM.	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.	Conducive learning environment.	Learners maintained good discipline.	Class organisation effective.	Good use of lab apparatus	Drawing of food tests assisted with understanding topic	Added extra food tests for additional knowledge	Areas of improvement	Possible teacher interventions	Some learners did not participate.	Scaffold: break down task into smaller activities.	Class organisation.	Straddle: Change complexity of content presentation.	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.
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Class organisation.	Straddle: Change complexity of content presentation.																					
Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.																					

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: FOOD PROCESSING		• List the different indigenous methods of processing food. • Explain how to process food using indigenous methods. • Show understanding that African nations / cultures used to process food indigenously.			
Subtopic Methods for processing food: Indigenous ways of processing food					
Terminology					
Indigenous, Culture, traditional, cottage					
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information		✓	Identifying problems & issues	✓	Doing Investigations
Observing			Raising Questions	✓	Recording Information
Comparing			Predicting		Interpreting Information
Measuring			Hypothesizing		Communicating
Sorting & Classifying			Planning Investigations		✓

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Indigenous ways of processing food refers to the different methods African people use to preserve their food in their different cultures. - In South Africa, traditional people like Zulu, Sotho, Tswana, or Xhosa stored grain in underground tanks within the cattle pen. Vegetables were boiled, then cooled and dried to preserve them. - Different types of meat and cheese	The teacher can use attached case study – “Making Zulu Beer” (or any other suitable material) to introduce the topic of “Indigenous ways of processing” Information about other traditional methods of processing food across other cultures can also be given to the learners. The teacher give learners' opportunity to answer the questions based on the lesson. Learners should be given a research task where they are required to find information about how food was processed in their own cultures.	- Books - Sasol Inzalo - Worksheet - Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
were laid in containers to dry in the sun and wind or they were exposed to smoke. • Milk was left to go sour. • Fermented liquid was used as a refreshing cold drink and thickened part, called the amasi, is mixed with various dishes. • Amasi is very popular, and tastes like cottage cheese of plain yoghurt. • This thick liquid is mostly poured over mealie meal porridge, called phuthu pap. • It is traditionally served in a clay pot and eaten with wooden spoons • The benefits of amasi are: 1. To maintain and restore our intestines to good health. 2. To improve our ability to absorb the nutrients from food we eat. 3. To reduce diarrhea 4. To improve our immune system. Platinum page 35).	Information / Pictures can be displayed on a poster or chart and presented to the rest of the class.	
ASSESSMENT	Informal assessment: Questions	
TEACHER REFLECTION		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	Good practices		
	Good learner participation.		Effective use of appropriate L.TSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Good use of lab apparatus
	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
	Areas of improvement		Possible teacher interventions
	Some learners did not participate.		Scaffold: break down task into smaller activities.
	Class organisation.		Straddle: Change complexity of content presentation.
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.

ACTIVITY

Work on your own

1. List four indigenous ways of processing food and give example of each.

2. What does Amasi taste like?

3. Briefly explain how one other traditional food is prepared/

4. Write down four health benefits of amasi.

ACTIVITY: Comparing traditional and commercial food processing methods

We have learnt a lot about food processing methods in our modern lives. However, the indigenous people of southern Africa have been preserving and processing food for many generations, and still use some of their traditional methods today.

INSTRUCTIONS:

1. Read the following description of how beer is made in the Zulu culture.
2. Then answer the questions that follow.

Zulu beer making

Beer (*utshwala*) forms an integral part in the Zulu culture, especially at social gatherings and traditional ceremonies. Zulu beer is traditionally made by the women. To brew the beer, the women soak coarse sorghum and maize in water for one day, typically in a big drum-like *imbizapot*. The following day, the broth is boiled over a fire and more dry sorghum is added to the mixture. After this, the mixture is mashed together and then allowed to cool for the rest of the day. The next day (day 3 of the brewing process), the mixture is filtered through a sieve to remove the big fibres. The sieve is made from palm fronds and the brew is poured from the big *imbizavessel* into the serving vessel, *iphangela*, made from clay. The beer is now ready to be served. The *iphangela* is carried from brewery in the kraal (a semi-thatched hut which allows the smoke from the fire to escape and ensures a good supply of oxygen to ferment the mixture) to the drinking assembly. A woman scoops the beer into a drinking vessel, *ukhamba* (a small, round clay pot decorated with traditional patterns) using a dried gourd and presents it on her knees to the men. She will first taste the beer to show the head of the household that she has brewed the beer properly, and then hand him the *ukhamba*, before passing it around to the rest. The beer contains 3% alcohol and it is nutritious as it is made from plant products without modern additives or colorants.

QUESTIONS:

1. What are the ingredients used to make *utshwala*?
2. What are the Zulu names for the three different clay pots (vessels) used in the beer making process?
3. What are these vessels made from?
4. Why does the brewery hut only have a semi-thatched roof and not a fully, enclosed roof?
5. Use the space below to draw a flow diagram to illustrate the Zulu beer-making process. Remember to include arrows to show the direction.

6. For the following task, you need to do some research outside of class, using books and the internet. Find out how beer is made in a modern brewery, such as the South African brewery in Newlands, Cape Town. In the space below, write a paragraph where you compare this modern beer-making process to the indigenous method of the Zulu people.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: FOOD PROCESSING		● Identify, list and explain the advantages of processing food		
Subtopic: Need for processing food : Benefits of (Advantages) of processing food				
Terminology	Producers, Consumers			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Food processing makes the modern 'balanced' and varied diet possible e.g fresh fruit and vegetables - Many times food and beverage producers add extra vitamins and nutrients to their food to make it healthier for their clients. - Buying and preparing processed food is also more convenient and less time-consuming. - Foods are processed to preserve them, such as when fruits are preserved to make jam, or pickled,	Classroom discussion (based on content in Sasol Inzalo Book on page 58 and 59) about some of the possible advantages of processed foods and the reasons some foods have to be processed. **Learners will complete the revision activity sheet as homework. This can be used to gauge the level of understanding of the learners. Other questions, diagrams, pictures could be added in order to make it more specific to ability levels of learners.	- Textbooks - Sasol Inzalo - Worksheet - Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources																		
such as pickled onions Food processing is lastly very important to people with allergies and diabetes because they are able to eat a greater variety of healthy food. An allergy for cow or goat milk is a very common allergy among small children. They are able to drink 'milk' only because modern food processing has found a way to make milk from rice, oats or soya. Sasol Inzalo																				
ASSESSMENT																				
TEACHER REFLECTION	<table><tr><th colspan="3">Good practices</th></tr><tr><td>Good learner participation.</td><td></td><td>Effective use of appropriate LTSM.</td></tr><tr><td>Learners worked well and completed activities.</td><td></td><td>Lesson outcomes/objectives successfully achieved.</td></tr><tr><td>Conducive learning environment.</td><td></td><td>Learners maintained good discipline.</td></tr><tr><td>Class organisation effective.</td><td></td><td>Good use of lab apparatus</td></tr><tr><td>Drawing of food tests assisted with understanding topic</td><td></td><td>Added extra food tests for additional knowledge</td></tr></table>		Good practices			Good learner participation.		Effective use of appropriate LTSM.	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.	Conducive learning environment.		Learners maintained good discipline.	Class organisation effective.		Good use of lab apparatus	Drawing of food tests assisted with understanding topic		Added extra food tests for additional knowledge
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CONTENT	TEACHING & LEARNING ACTIVITIES				Resources	
	Areas of improvement				Possible teacher interventions	
	Some learners did not participate.				Scaffold: break down task into smaller activities.	
	Class organisation.				Straddle: Change complexity of content presentation.	
	Over-crowded classroom.				Enhance lesson presentation by employing concrete/visual resources..	

ACTIVITY

1. Give five reasons why it is important to process food.

2. What type of foods is processed there in your house?

3. What will happen to those foods available at your house are not processed?

REVISION

1. Write a definition for 'food processing' that will explain what it means.

2. There are three main reasons why we process food. Explain what is meant by the following words in relation to food processing.

a) Preserving: _____

b) Cooking / frying: _____

c) Fermenting: _____

3. Many people believe that processing food is not good for their health. List three possible drawbacks (Disadvantages) of food processing.

4. Describe how you would preserve extra fish that you had caught while on an overnight camping trip.

5. A farmer wants to export table grapes to Australia from his farm near Worcester in the Western Cape. Suggest the best form of transport that you know of that he should use and explain why you gave him this advice.

6. Below is a table. Next to each item in column 1 write the degree to which the raw materials were processed.

Food	Degree of processing
Mealie bread	
Fresh mealie washed and packaged	
Sunflower oil	

7. Explain why many people believe that highly processed food is bad for your health.

[illegible]

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ECOSYSTEMS AND FOOD WEBS		- Identify a variety of ecosystems. - Explain what an ecosystem is.		
Subtopic: Different ecosystems.				
Terminology	Ecosystem, rocky shore, ponds, wetlands, grasslands, forests and deserts			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
An ecosystem is an area where living and non-living things depend on each other in many different ways. There are many different ecosystems such as rivers, mountains, sea, rocky shore, ponds, wetlands, grasslands, forests and deserts, which support different kinds of living things. An ecosystem can survive on its own without any help or products from any other sources because the living and non-living things in the ecosystem depend on each other for their survival.	The teacher show many pictures (in conjunction with the attached activity sheet) of variety of ecosystems and discuss the concept/s with the class Class discussion /new terminology about what plants and animals needs and where they live.	- Textbooks - Smart board / chalkboard - Materials / tools - Worksheet - Magazines

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
ASSESSMENT	Informal assessment		
TEACHER REFLECTION			
	Good practices		
	Good learner participation.		Effective use of appropriate LTSM.
	Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.		Learners maintained good discipline.
	Class organisation effective.		Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)
	Areas of improvement		Possible teacher interventions
	Learners did not participate.		Scaffold: break down task into smaller activities
	Class organisation.		Straddle: Change complexity of content presentation.
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.
	Inappropriate/insufficient LTSM.		Cater for multiple intelligences by using varied teaching methodologies
	Learner discipline.		Change learner's seating arrangements.
	Teaching methodology.		Use LTSM that is more appropriate.
	Assessment strategies		Maximise learner participation.
			Use of grade appropriate language.

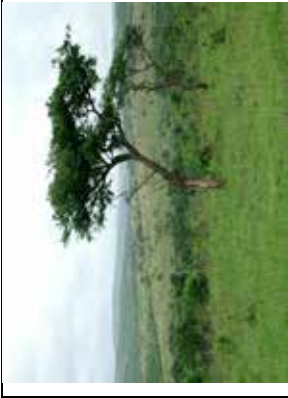
CLASSROOM ACTIVITY:

INSTRUCTIONS:

1. Below is a table with photographs of different ecosystems. Study each photograph.
2. In the column next to the photo, identify the type of ecosystem.
3. Then write a description of the ecosystem where you identify:
 - a. Some important physical features and structures, such as rivers, mountains, rocks, etc.
 - b. The type of climate you expect where this ecosystem is found.
 - c. The types of plants and animals you would expect to find in the ecosystem and why they might benefit from living in these conditions.

ECOSYSTEM	TYPE AND DESCRIPTION OF ECOSYSTEM
	
	

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ECOSYSTEMS AND FOOD WEBS		• Know a unique South African ecosystem • Know these unique South African ecosystem grow, • Identify the different plants found in this ecosystem • Compare the unique South African with the others			
Subtopic:Different Ecosystem: A unique South African ecosystem					
Terminology	Fynbos, region, unique, incredible, array, national, symbol, Protea, naturally				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing		Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting		Interpreting Information	
Measuring		Hypothesizing		Communicating	✓
Sorting & Classifying		Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
South Africa's fynbos region is unique- it produces an incredible array of plants and specifically flowers. Our national symbol, the Protea, grows wild here - and nowhere else in the entire world	Class discussion around the uniqueness of South African ecosystem The teacher shows the pictures of these different unique ecosystem from page 81 Sasollnzalo The teacher give learners opportunity to compare the unique of South African ecosystem with the others. Learners compare the two ecosystems	• Books • Smart board / chalkboard • Materials / tools • Worksheet • Books • Smart board / chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
  Picture showing unique South African Ecosystem (Thunderbolt.co.za) South Africa is famous for its Fynbos - it does not grow naturally anywhere else in the world! Fynbos plants are especially adapted to survive the climatic conditions and frequent fires. The low bushes can survive the harsh windy conditions and the plants produce seeds that can very often only germinate once they had been scorched by fire.		

CONTENT		TEACHING & LEARNING ACTIVITIES		Resources
ASSESSMENT TEACHER REFLECTION		Good practices		
		Good learner participation.		Effective use of appropriate LTSM.
		Learners worked well and completed activities.		Lesson outcomes/objectives successfully achieved.
		Conducive learning environment.		Learners maintained good discipline.
		Class organisation effective.		Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)
		Areas of improvement		
		Learners did not participate.		Possible teacher interventions
		Class organisation.		Scaffold: break down task into smaller activities
		Over-crowded classroom.		Straddle: Change complexity of content presentation.
		Inappropriate/insufficient LTSM.		Enhance lesson presentation by employing concrete/visual resources.
		Learner discipline.		Cater for multiple intelligences by using varied teaching methodologies
		Teaching methodology.		Change learner's seating arrangements.
		Assessment strategies		Use LTSM that is more appropriate.
				Maximise learner participation.
				Use of grade appropriate language.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Ecosystems And Food Webs		- Be able to classify things as living or non-living. - Explain the 7 life process of living and non-living things.		
Subtopic: Living and non-living things ecosystems				
Terminology	Biodiversity, Respiration, excretion, reproduction, adaptation microorganisms, biotic abiotic, habitats, shelters, nests			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying	✓	Doing Investigations
Observing	✓	Raising Questions	✓	Recording Information
Comparing	✓	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying	✓	Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Living and non-living things in ecosystems. In an ecosystem there are certain relationships between living things (plants, animals, people, microorganisms), and non-living things (air, water, sunlight, soil) in a particular area. A healthy ecosystem is one in which there is a balance between the nonliving and living things. A healthy ecosystem also depends on sufficient biodiversity of plants, animals and their habitats. We saw at the beginning of the term that	The teacher revise what are living and non-living things and what characteristics living things have. Use the pictures from introductory lesson (or other suitable pictures on ecosystems) to generate discussion on how living things depend on each other and on non-living things in the environment/ecosystem. Teacher leads class discussion and give examples of living things and explain new concepts. Learners complete the attached activity sheet	- Textbooks - Smart board / chalkboard - Worksheet - Books - Smart board / chalkboard - Internet

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
plants depend on air, water and sunlight in order to make their food. Do you remember what this process is called? Animals also depend on the non-living things in their ecosystem. All animals need oxygen from the air to breathe and to drink water. Some animals also use the non-living things to make their shelters. For example, ants rely on the soil and sand to build their nests in.		
ASSESSMENT	Informal : questions	
TEACHER REFLECTION	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)
	Areas of improvement	
	Learners did not participate.	Possible teacher interventions
	Class organisation.	Scaffold: break down task into smaller activities
	Over-crowded classroom.	Straddle: Change complexity of content presentation. Enhance lesson presentation by employing concrete/visual resources.

CONTENT	TEACHING & LEARNING ACTIVITIES				Resources
		Inappropriate/insufficient LTSM.		Cater for multiple intelligences by using varied teaching methodologies	
		Learner discipline.		Change learner's seating arrangements.	
		Teaching methodology.		Use LTSM that is more appropriate.	
		Assessment strategies		Maximise learner participation.	
				Use of grade appropriate language.	

CLASSROOM ACTIVITY:

QUESTIONS

1. What are some of the non-living things in an ecosystem?

2. What does the term biodiversity mean?

ASSESSING THE BALANCE BETWEEN LIVING AND NON-LIVING THINGS

INSTRUCTIONS:

1. Look at each of the following photographs of different ecosystems in which the balance between living and nonliving things has become upset. Answer the questions on each picture.

In this river ecosystem, the water has dried up due to a drought. How does this affect the biodiversity of the plants and animals in this ecosystem?



In this photograph the soil has started to erode. Why do you think this happened?



6. In this man-made forest, there is not much life under the canopy of the trees. Why do you think this is so?



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ECOSYSTEMS AND FOOD WEBS		• Explain and describe the importance of ecosystems in general		
Subtopic: Living and Non-living things in ecosystem: The importance of ecosystem				
Terminology	Organisms, reproduction, dispersed			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
Observing		Raising Questions	✓	Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Without water life as we know it cannot exist.  Picture showing importance of ecosystem (Thunderbolt.co.za)	Use the adjacent pictures as well as content found in Sasol Inzalo books on Page 85 (or other suitable information, content, pictures from other sources including reference books, textbooks, internet, magazines etc.) to initiate class / group discussion around the general importance of water to all life on Earth and specifically to ecosystems.	• Textbooks • Smart board / chalkboard • Worksheet • Smart board / chalkboard • Magazines /

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Water provides a habitat for many different organisms and allows plants and animals to survive and breed. - Water is a universal solvent and allows important chemical reactions to take place. It is a key ingredient for photosynthesis where plants create glucose (sugars) from sunlight, water and carbon dioxide. - Water plays an important role in plant reproduction as some seeds need to be dispersed by water. (Try and remember which seeds get dispersed by water.)		internet
Informal : Questions		
ASSESSMENT TEACHER REFLECTION	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)
	Areas of improvement	
	Learners did not participate.	Possible teacher interventions
		Scaffold: break down task into smaller activities
	Class organisation.	Straddle: Change complexity of content presentation.
	Over-crowded classroom.	Enhance lesson presentation by employing concrete/visual resources.

TEACHING & LEARNING ACTIVITIES		Resources
Inappropriate/insufficient LTSM.		Cater for multiple intelligences by using varied teaching methodologies
Learner discipline.		Change learner's seating arrangements.
Teaching methodology.		Use LTSM that is more appropriate.
Assessment strategies		Maximise learner participation.
		Use of grade appropriate language.

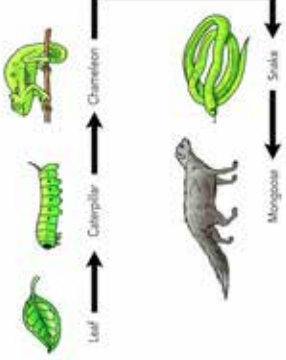
HOMEWORK

1. Explain the importance of water in ecosystem.

[illegible]

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ECOSYSTEMS AND FOOD WEBS		- Explain what is a food chain and a food web and how are they different - Identify the different living things according what they do & how they feed - Sort and classify animals according to what they eat			
Subtopic: Food webs					
Terminology	herbivores, carnivores, omnivores, decomposers, Insectivores , Scavengers, decomposers				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing		Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting		Interpreting Information	
Measuring		Hypothesizing		Communicating	✓
Sorting & Classifying	✓	Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
In an ecosystem plants and animals are connected by their feeding relationships. This is called a food web. A food web consists of: - Plants (producers) which produce food for themselves and animals. - Animals (consumers) which are herbivores, carnivores, omnivores. - Microorganisms (decomposers) that break down dead plant and animal matter and return nutrients to the soil.	The teacher explain food chains and food webs and how they are different. The teacher must ensure that the terminology and concepts associated with this topic needs to be internalised effectively by learners. Learners can be shown a variety examples of food chains(p87 Sasol Inzalo or other suitable sources) Place learners in groups of 4 to 6 and give them pictures (inside a sealed envelope) of different animals and plants and allow them to construct as many different food chains combinations with the given pictures.	- Smart board - Posters Internet - Textbooks - Sasol Inzalo

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
There are different types of consumers. • Herbivores only eat plants and plant products. • Carnivores only eat meat and meat products (eggs). • Omnivores eat plant and animal products. • Insectivores only eat ... can you guess what? • Scavengers eat dead animal matter. • decomposers are micro-organisms like bacteria and fungi, as well as mushrooms, that break down animal and plant material into tiny particles and recycle it into the ground ready for the plant to use.	They should also write down (or draw as per the example given on page 88) of the above food chains. Some time should be allowed for learners to demonstrate their combinations to the rest of the class. As an extension activity (and if time allows) you can request each group to construct the largest possible food chain using the given pictures / resources.	
ASSESSMENT TEACHER REFLECTION	Asking questions during discussion	
	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
	Class organisation effective.	Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)
	Areas of improvement	
	Learners did not participate.	Possible teacher interventions
	Class organisation.	Scaffold: break down task into smaller activities
	Over-crowded classroom.	Straddle: Change complexity of content presentation.
		Enhance lesson presentation by employing concrete/visual resources.

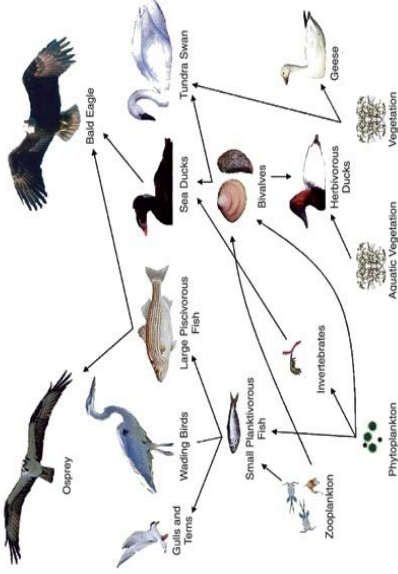
CONTENT	TEACHING & LEARNING ACTIVITIES				Resources
		Inappropriate/insufficient LTSM.			Cater for multiple intelligences by using varied teaching methodologies
		Learner discipline.			Change learner's seating arrangements.
		Teaching methodology.			Use LTSM that is more appropriate.
		Assessment strategies			Maximise learner participation.
					Use of grade appropriate language.

CLASSROOM ACTIVITY

1. Complete the table below by writing the correct answer in the table.

Living thing	What it is called? (Producer, Consumer, Decomposer)	Why it is called that?
1.People		
2.Micro-organism		
3.Plants		
4. Animals		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
A food web consists of many thousands and thousands of food chains that are connected to each other. A food web in a savanna ecosystem 	Revision of previous lesson on Food Chains. Learners use the same pictures that were provided in the previous lesson on food chains to draw up / construct a Food web as outlined in their textbooks (or Sasol Inzalo Books on page 89 / 90)	- Smart board - Posters - Internet - Books - Sasol Inzalo

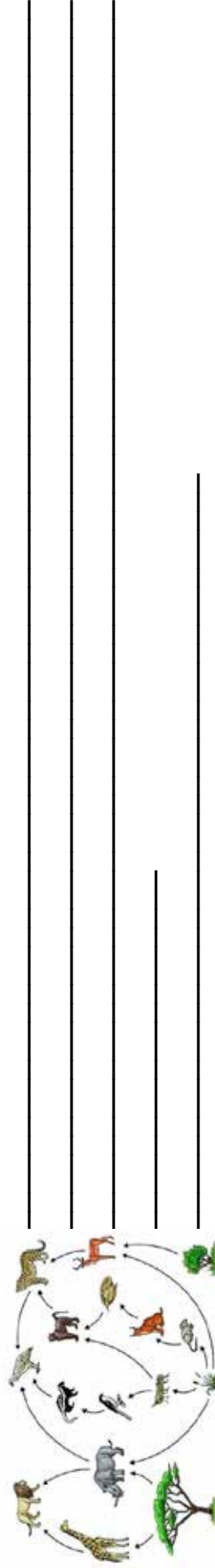
CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
CONTENT  Picture showing food chain (Thunderbolt.co.za) There are also different levels of consumers in an ecosystem: • Primary consumers are the herbivores which eat the plants, such as the mice and grass in this savanna food web. • Secondary consumers eat primary consumers. • Tertiary consumers eat the secondary or primary consumers.		
ASSESSMENT	Informal assessment	
	Good practices	
	Good learner participation.	Effective use of appropriate LTSM.
	Learners worked well and completed activities.	Lesson outcomes/objectives successfully achieved.
	Conducive learning environment.	Learners maintained good discipline.
TEACHER REFLECTION	Class organisation effective.	Easy to grasp new concepts they have seen in real life (e.g. ocean, grassland, etc)

CONTENT	TEACHING & LEARNING ACTIVITIES			Resources
	Areas of improvement		Possible teacher interventions	
	Learners did not participate.		Scaffold: break down task into smaller activities	
	Class organisation.		Straddle: Change complexity of content presentation.	
	Over-crowded classroom.		Enhance lesson presentation by employing concrete/visual resources.	
	Inappropriate/insufficient LTSM.		Cater for multiple intelligences by using varied teaching methodologies	
	Learner discipline.		Change learner's seating arrangements.	
	Teaching methodology.		Use LTSM that is more appropriate.	

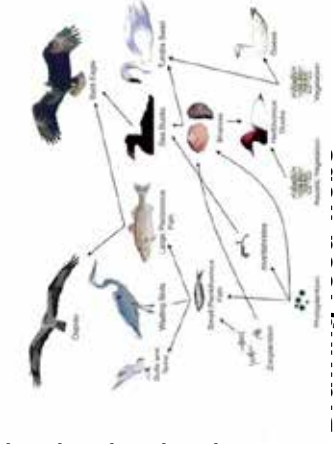
ACTIVITY

QUESTIONS

- Study the food web and identify the producers and the consumers. Distinguish between the primary, secondary and tertiary consumers. You can write your answers (in pencil in case you make a mistake) on the food web illustration.



2. Below is another food web consisting of plants, fish and birds. What kind of ecosystem do you think this food web describes?



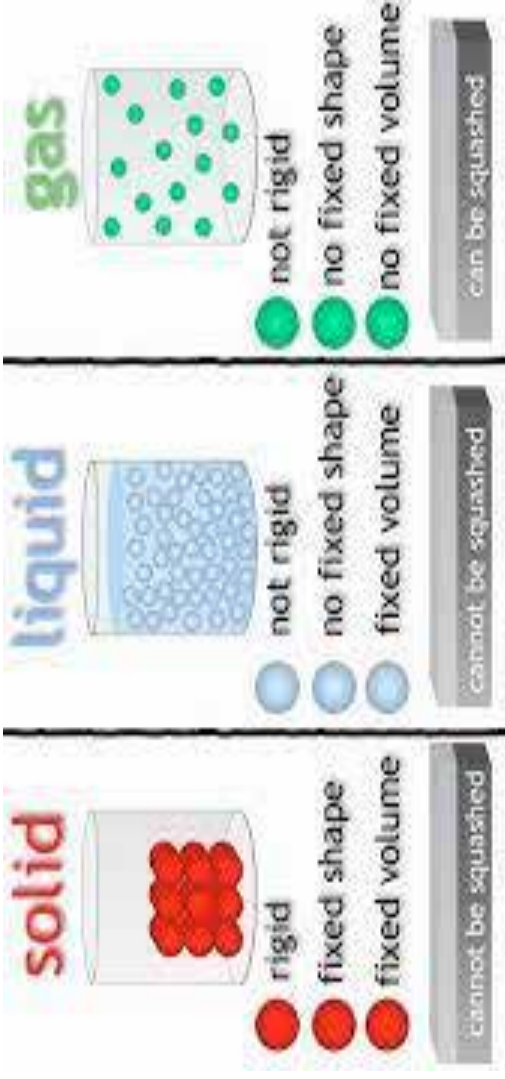
INSTRUCTIONS:

1. Use the following lists of organisms in a sea and forest ecosystem to draw a food web for each ecosystem.

Sea ecosystem: phytoplankton, sea weed, zooplankton, crab, lobster (scavenger), prawn, small fish, turtle, seal, dolphin, killer whale.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solids, liquids & Gases		• Differentiate between solids, liquids and gases. • Describe solids, liquids and gases in terms of the arrangement of their particles			
Content & Concepts/Subtopic: Arrangement of Particles.					
Terminology					
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
✓	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Particles: Very small parts that make up matter. Particles move around all the time. The particles in solids, liquids and gases are all arranged differently. Solids, Liquids and Gases Solids. Solids have a fixed shape. In solids the particles are closely packed in a regular pattern (shape). Spaces between the particles are small	INTRODUCTION – 30 Mins Educator will ask probing questions in order for learners to identify the different phases of matter viz: Solids, liquids and gases. This serves to establish possible relevant previous knowledge of learners. Educator will show practical examples of each phase of matter. https://www.youtube.com/watch?v=wcY8F-UoTE – If internet is available Educator facilitates while learners discuss the content and concepts using the above examples.		Textbook Chalkboard Sasol Inzalo Workbook Internet Concrete examples

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
and particles vibrate in one place Liquids. Matter in a liquid state is able to flow. The substance will take the shape of the container it is in. In liquids the particles are closely packed in no fixed pattern (shape). Spaces between the particles are small but particles can move around each other. Gases When matter is in a gas state, it fills all the available space around it. The particles in the gas are far apart from each other and move very fast and in all directions. Air is a gas that fills a room or even the whole atmosphere.	Learners will complete the attached worksheets: Activity 1 – 30 mins (Draw and write about solids, liquids and gases) 	of objects within the different phases of matter Pictures sourced from the internet
ASSESSMENT		
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity 1

Instructions to learners: Complete the table by answering the given questions.

Container	What matter / material is inside the container	Is the material a solid, liquid or Gas
		
		
		
		

		
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Find 2 pictures (in magazines, newspapers, internet etc.) of each phase of matter and stick these in the space below. Don't forget to label each picture.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Date: _____

Grade 6 _____ Activity 1

Instructions to learners: Complete the table by answering the given questions.

Container	What matter / material is inside the container	Is the material a solid, liquid or Gas
	AIR / HYDROGEN	GAS
	WATER	LIQUID
	WATER	SOLID
	MILK	LIQUID

	AIR	GAS
---	-----	-----

Find 2 pictures (in magazines, newspapers, internet etc.) of each phase of matter and stick these in the space below. Don't forget to label each picture by writing what material it is made of as well as what phase of matter it belongs to.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solids, liquids & Gases		- Differentiate between solids, liquids and gases. - Describe solids, liquids and gases in terms of the arrangement of their particles			
Content & Concepts/Subtopic: Arrangement of particles.					
Terminology					
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

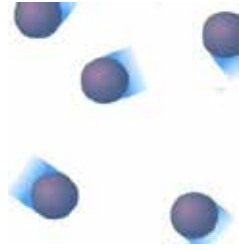
CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Particles: Very small parts that make up matter. Particles move around all the time. The particles in solids, liquids and gases are all arranged differently. Solids, Liquids and Gases Solids. Solids have a fixed shape. In solids the particles are closely packed in a regular pattern (shape). Spaces between the particles are small	Educator will ask probing questions as an informal assessment in order to gauge learners knowledge of the different phases of matter viz: Solids, liquids and gases. This serves to establish assimilation of relevant previous knowledge of learners from introductory lesson Learners will complete the attached worksheets: Activity 2 – 30 mins (Draw and write about solids, liquids and gases)		Textbook Chalkboard Sasol Inzalo Workbook Internet Concrete examples

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
and particles vibrate in one place <u>Liquids.</u> Matter in a liquid state is able to flow. The substance will take the shape of the container it is in. In liquids the particles are closely packed in no fixed pattern (shape). Spaces between the particles are small but particles can move around each other. <u>Gases</u> When matter is in a gas state, it fills all the available space around it. The particles in the gas are far apart from each other and move very fast and in all directions. Air is a gas that fills a room or even the whole atmosphere.	https://www.youtube.com/watch?v=bMbmQzV-Ezs	of objects within the different phases of matter
ASSESSMENT	Consolidation of concepts. Informal assessment task to enhance consolidation of concepts taught and also to check on overall understanding	
TEACHER REFLECTION	Progress:	
	Challenges:	

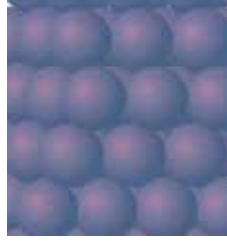
Learners Name: _____ Date: _____

Grade 6 _____ Activity 2

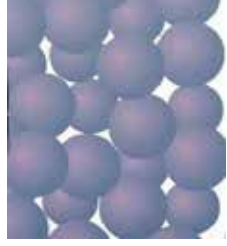
Instructions to learners: Study the drawings below. They show how scientists think the particles are arranged in Solids, Liquids and Gases.



A



B



C

1. Copy and draw each picture into your workbook (one beneath the other). Each drawing should be no bigger than four lines in your book.
2. Identify which drawing shows a solid, which one shows a liquid and which one shows a gas.
3. Write down TWO sentences (choose one from “properties” and one from “Reasons” given below) in the space next to each picture that you have drawn.

Properties

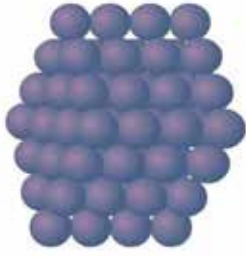
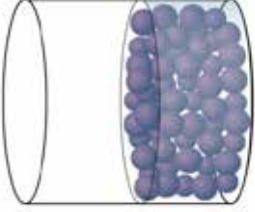
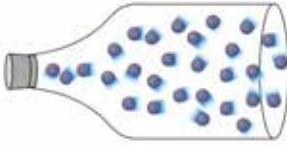
1. Solids have a fixed shape and cannot flow.
2. Liquids flow and take up the shape of their container.
3. Gases flow and completely fill their containers.

Reasons

- a. The particles can move quickly in all directions
- b. The particles cannot move from place to place
- c. The particles can move around each other

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solids, liquids & Gases		• Differentiate between solids, liquids and gases.			
Content &Concepts/Subtopic: Arrangement of particles		• Describe solids, liquids and gases in terms of the arrangement of their particles			
Terminology		Solids, Liquids, gases, matter, particles, vibrate			
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing	✓	Raising Questions	✓	Investigate
✓	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
✓	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Scientists use the word <u>matter</u> to talk about what everything around you is made of. All materials and substances are made of matter. Matter is made of very small <u>particles</u>. Matter: Any substance in a solid, liquid and gas. Particles: Very small parts that make up matter. Particles move around all the time.	Activity 3– 30 mins *** Solids, liquids and gas particles (video) goo.gl/CcDTr *** Use the above link as a revision /consolidation of concepts taught Consolidation of concepts. Learners work in groups of four to complete the attached activity sheet. Educator will supervise and if necessary guide and support as and when the need arises.	Textbook Chalkboard Sasol Inzalo Workbook Internet Concrete examples

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
The particles in solids, liquids and gases are all arranged differently. Solids, Liquids and Gases <u>Solids.</u> Solids have a fixed shape. In solids the particles are closely packed in a regular pattern (shape). Spaces between the particles are small and particles vibrate in one place <u>Liquids.</u> Matter in a liquid state is able to flow. The substance will take the shape of the container it is in. In liquids the particles are closely packed in no fixed pattern (shape). Spaces between the particles are small but particles can move around each other. <u>Gases</u> When matter is in a gas state, it fills all the available space around it. The particles in the gas are far apart from each other and move very fast and in all directions. Air is a gas that fills a room or even the whole atmosphere.	Informal assessment task to enhance consolidation of concepts taught and also to check on overall understanding  Particles in a Solid  Particles in a liquid  Particles in a Gas	of objects within the different phases of matter Relevant Charts Pictures sourced from internet Activity Sheets
ASSESSMENT Learners should read, write, draw and do practical tasks regularly.	Consolidation of concepts. Informal assessment task to enhance consolidation of concepts taught and also to check on overall understanding	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Check learner's knowledge that they are able to describe solids, liquids and gases in terms of the arrangement of their particles.	Enrichment **** Follow the link below and watch the video. goo.gl/ya8f3 to see how water can exist as a solid, liquid and gas	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity 3: Solids, Liquids and gases (Revision)

Instructions to learners:

A. Use the words in the given block to complete the sentences below. You may need to use some of the words more than once.

Solids	Gases	Particles	big	Liquids	small	regular
--------	-------	-----------	-----	---------	-------	---------

1. Matter is made up of tiny _____ that are constantly moving.

2. In _____, the particles are packed close together in a _____ pattern and cannot move freely. They have _____ spaces between them.

3. In _____, the particles have _____ spaces between them but can move around each other.

4. In _____, the particles have _____ spaces between them and can move in all directions.

B. Complete the table below by writing two examples each of solids, liquids and gases that you may use in your daily lives

	SOLIDS	LIQUIDS	Gases
Example 1			
Example 2			

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Date: _____

Grade 6 _____ Activity 3: Solids, Liquids and gases (Revision)

Instructions to learners:

A. Use the words in the given block to complete the sentences below. You may need to use some of the words more than once.

Solids	Gases	Particles	large	Liquids	small	regular
--------	-------	-----------	-------	---------	-------	---------

1. Matter is made up of tiny particles that are constantly moving.
 2. In solids, the particles are packed close together in a regular pattern and cannot move freely. They have small spaces between them.
 3. In liquids, the particles have small spaces between them but can move around each other.
 4. In gases, the particles have large spaces between them and can move in all directions.
- B. Complete the table below by writing two examples each of solids, liquids and gases that you may use in your daily lives

	SOLIDS	LIQUIDS	Gases
Example 1			
Example 2			

*** Learners responses will differ based on their own ambit of experience.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Mixtures		• Combine a variety of substances to form a mixture			
Content & Concepts/Subtopic: Mixtures of materials		•			
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
✓	Measuring		Hypothesizing		Make / Construct
✓	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>Vocabulary</u> <u>Mixtures:</u> When two or more different substances (or materials) are combine. <u>Visible:</u> Something that is able to be seen	  	Pictures & Activity Sheets sourced from internet and Sasol Inzalo learners books	Textbook Chalkboard Different examples of solids and consumable

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Content What is a mixture? When two or more different substances or materials are combined the result is a mixture. The different substances can be in the solid, liquid or gas state.	Lesson 1: Introduction As an introductory activity, use the given pictures (or other suitable charts, pictures or videos) where definitions and vocabulary can be mediated and discussed. Learners will show their understanding by drawing or finding pictures of the different types of mixtures discussed.	liquids that are available in learners homes that are easily brought to school. Sasol Inzalo Book
ASSESSMENT	Attached Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity: Making Mixtures

MATERIALS:

- 500 g bag of barley (beans or lentils will also do)
- 500 g bag of rice
- Small packet of sugar
- Clean sand (from the beach or from a building site)
- Plastic spoons for scooping
- Small yoghurt tubs or paper cups for mixing
- Sieve (the type used for sieving flour)

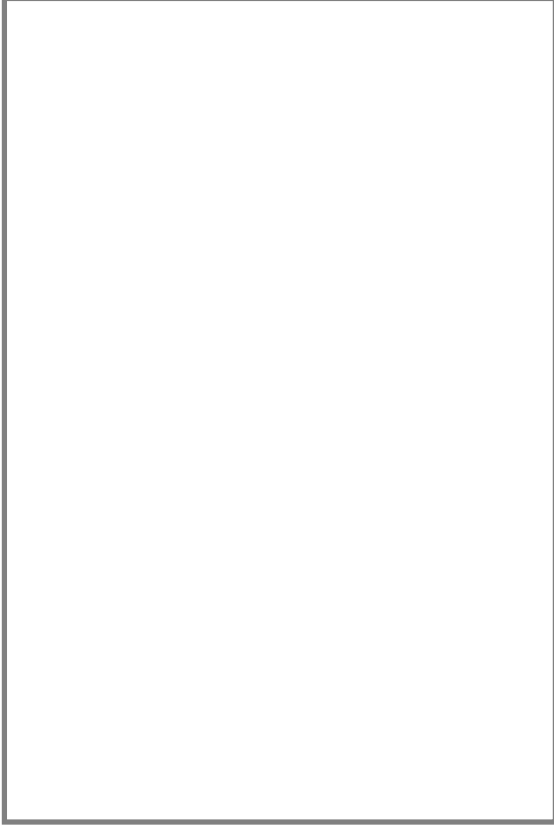
INSTRUCTIONS (Part 1):

1. Place 10 scoops of barley in the mixing tub.
2. Place 10 scoops of rice in the same mixing tub.
3. Stir the barley and rice until they are mixed.
4. Answer the questions below.

QUESTIONS

1. Can you still see the individual rice and barley grains? _____

2. Draw a picture of the mixture.



3. Did the barley and rice grains change in any way, or do they still look the same as before they were mixed?

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mixtures		• Show understanding that a mixture may contain more than two substances		
Content & Concepts/Subtopic: Examples of Mixtures				
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations / Experiments
✓	Observing		Raising Questions	Investigate
✓	Comparing		Predicting	Design
✓	Measuring		Hypothesizing	Make / Construct
✓	Sorting & Classifying		Planning Investigations	Evaluate
	Interpreting Information	✓	Recording Information	Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>Vocabulary</u> <u>Mixtures:</u> When two or more different substances (or materials) are combine. <u>Visible:</u> Something that is able to be seen <u>Settling:</u> Is a process where particulates / substance sink (or settle) at the bottom of a liquid. <u>Decanting:</u> Allowing a mixture of solid and liquid or two immiscible liquids to	Examples of Mixtures. (Continuation of previous lesson) The Educator will should remind learners (well in advance / before this lesson) to bring along different solids and liquids that they may have at home. Educator will explain and demonstrate the concepts of different types of mixtures as per content.		Textbook Chalkboard Coins, Peanuts, sugar, salt, tea leaves, chalk, small pebbles, jelly beans, curry powder, coffee, milk, water, juice,

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
separate and settle by gravity. Immiscible: Liquids that is incapable of being mixed together. Oil and water are example of this. Content <u>Examples of mixtures</u> If you mix two (or more) solids together you can usually see the different solids after mixing. For example, if you mix sand and sugar together, you will be able to see and identify both the sand and sugar grains. Other mixtures can be a combination of solid and liquid. Sometimes the solid can still identified. For example: mixing sand and water. Two or more liquids can also be combined to form a mixture. Sometimes the liquids are visible after mixing, for example oil and water, since they do not mix well. Sometimes the one liquid will become invisible, such as in water in a juice concentrate ASSESSMENT	Learners should be placed in groups and allowed to mix different substances together and complete the attached Activity Sheet ** Depending on class size and available resources this activity should be conducted over a double period **	laboratory apparatus as outlined in the activity sheets.
	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations.	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity Sheet

Instructions to learners: In this activity you will:

1. Make different kinds of mixture from substances that you have been given.
2. Work as a group of 6 to compare and identify the different substance before and after you have mixed them.
3. Record your observations on the given worksheet.

Materials - You will need:

- A Glass Beaker (plastic Jug or plastic bowl) for mixing.
- Jelly bean sweets
- Peanuts
- Sand
- Sugar
- Chalk
- Water
- * Dried beans
- * Raisins
- * salt
- * Tea Leaves
- * Curry Powder
- * Milk

Method:

Step 1: Make the mixtures according to the measurements given in the table.

Mixture	Substance / Material 1	Substance / Material 2
A	1/4 cup of dried beans	1/4 cup of peanuts
B	1/4 cup of sand	1/4 cup of salt
C	1/4 cup of sugar	1/4 cup of tea leaves
D	1/8 cup oil	3/4 cup of water

E	$\frac{1}{8}$ cup of sugar	1 cup of water
F	1 teaspoon crushed chalk	1 cup of water
G	1 teaspoon curry powder	1 cup of water
H	5 or 6 coins	$\frac{1}{8}$ cup of raisins
I	$\frac{1}{8}$ cup of juice	1 cup of water
J	$\frac{1}{2}$ cup milk	5 teaspoons sugar

Step 2: Mix each of the above separately and in a clean clear beaker / bowl so that you can observe the mixture. Use a spoon to stir the mixtures in order to mix the materials.

Step 3: Draw a diagram of a mixture of two solids

Step 4: Draw a diagram of a solid and a liquid mixture

Step 5: In each of the above drawings label the substances if you can see them.

Results: Record your observations by completing the table below.

Mixture	Is Material 1 Visible or Invisible	Is Material 2 Visible or Invisible
A		
B		
C		
D		
E		
F		
G		
H		

I			
J			

Based on the above observation, what can you conclude?

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Mixtures of materials		• Demonstrate different ways in which mixtures can be separated.			
Content & Concepts/Subtopic: Separating mixtures					
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vocabulary Settling: Is a process where particulates / substance sink (or settle) at the bottom of a liquid. Decanting: Allowing a mixture of solid and liquid or two immiscible liquids to separate and settle by gravity. Immiscible: Liquids that are incapable of being mixed together. Oil and water are	  		Textbook Chalkboard Activity Sheets, Raw materials and laboratory apparatus as

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
example of this. Filtering: To pass a liquid, gas light (or sound) through a device to remove unwanted material Sorting: To arrange systematically in groups or to separate according to specific type. Content Separating Mixtures. In some of the mixtures the materials / substances are clearly visible and in other mixtures it seems as if the materials have disappeared. Ways of separating mixtures: 1. Hand Sorting 2. Sieving 3. Settling / Decanting 4. Filtering.	Pictures & Activity Sheets sourced from internet and Sasol Inzalo learners books Lesson: Investigation: Different methods to separate Mixtures. The teacher should introduce learners to different concepts of how to separate different types of mixtures. Allow learners to generate a discussion without giving too much information. Learners should use this concept knowledge to draw a hypothesis as to the best (most efficient) way to separate the mixtures as outlined in the activity sheet. Educator should explain the concept of a “hypothesis” (if learners have not internalised this concept) and demonstrate the how to answer the first part of the activity sheet) Allow learners to use / apply the concept of “hypothesis” (as part of a group of 4 to 6 learners) to the first part of the attached activity. Discussions around the reasons for different hypothesis will allow for greater understanding of the concept as well as the content. The “results” part of the activity is used as consolidation.	outlined in the activity sheets. Sasol Inzalo Workbooks
ASSESSMENT	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____

Activity: Methods of separating mixtures

Aim: In this activity you will determine through hypothesis which method of separating visible substances in mixtures is most suitable for specific mixtures:

1. Make different kinds of mixture from substances that you have been given or that you have brought from home.
2. Work as a group of 6 to compare and identify the different substance before and after you have mixed them.
3. Record your observations on the given worksheet.

Hypothesis: Write your hypothesis for this activity by stating what you think is the best method to separate each of the following mixtures.

- A. Peanuts and raisins: _____
- B. Sand and Salt: _____
- C. Sugar and tea leaves: _____
- D. Sand and water: _____
- E. Oil and water: _____

Results–Compare your hypothesis from above with the results given below.

Say whether the following are **correct** or **incorrect**

- A. Peanuts and raisins are best separated by hand _____
- B. Sand and Salt are best separated using a sieve _____
- C. Sugar and tea leaves are best separated by using a sieve _____

D. Sand and water are best separated by using a funnel and filter _____

E. Oil and water are best separated by settling and decanting _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Date: _____

Grade 6 _____

Activity: Methods of separating mixtures

Aim: In this activity you will determine through hypothesis which method of separating visible substances in mixtures is most suitable for specific mixtures:

4. Make different kinds of mixture from substances that you have been given or that you have brought from home.
5. Work as a group of 6 to compare and identify the different substance before and after you have mixed them.
6. Record your observations on the given worksheet.

Hypothesis: Write your hypothesis for this activity by stating what you think is the best method to separate each of the following mixtures.

*** Learners' responses for A to E could include any of the way to separate mixtures within the ambit of their experience since this part of the activity asks for their hypothesis.

- A. Peanuts and raisins: _____
- B. Sand and Salt: _____
- C. Sugar and tea leaves: _____
- D. Sand and water: _____
- E. Oil and water: _____

Results – Compare your hypothesis from above with the results given below.

Say whether the following are **correct** or **incorrect**

- F. Peanuts and raisins are best separated by hand - **CORRECT**
- G. Sand and Salt are best separated using a sieve - **INCORRECT**
- H. Sugar and tea leaves are best separated by using a sieve - **INCORRECT**
- I. Sand and water are best separated by using a funnel and filter - **CORRECT**
- J. Oil and water are best separated by settling and decanting - **CORRECT**

Date:	OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Mixtures of materials	Demonstrate different ways in which mixtures can be separated			
Content & Concepts/Subtopic: Separating Mixtures				
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting			
SPECIFIC AIMS	1. DOING SCIENCE			
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS				
✓ Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
Observing		Raising Questions		Investigate
✓ Comparing		Predicting		Design
✓ Measuring	✓	Hypothesizing		Make / Construct
✓ Sorting & Classifying		Planning Investigations		Evaluate
Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>Vocabulary</u>	Lesson: Separating mixtures		Textbook
<u>Settling:</u> Is a process where particulates / substance sink (or settle) at the bottom of a liquid.	Method 1: Sorting by hand.		Chalkboard
<u>Decanting:</u> Allowing a mixture of solid and liquid or two immiscible liquids to separate and settle by gravity.	Hand sorting is physically picking out one material and separating from other materials. This method works best when the mixture has large solid particles such as beans, peanuts, raisins, small pebbles, sweets etc.		Activity Sheets, Raw materials
<u>Immiscible:</u> Liquids that are incapable of being mixed together. Oil and water are	This involves pouring the mixture onto a sifting tray (or newspaper) or a piece of plastic, using a tweezers or your fingers and picking out one material / substance from the other.		and laboratory apparatus as
	Learners can complete the attached activity sheet in groups of four to avoid time wasting		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
example of this. Filtering: To pass a liquid, gas light (or sound) through a device to remove unwanted material Sorting: To arrange systematically in groups or to separate according to specific type. Content Separating Mixtures. In some of the mixtures the materials / substances are clearly visible and in other mixtures it seems as if the materials have disappeared. Ways of separating mixtures: 1. Hand Sorting 2. Sieving 3. Settling / Decanting 4. Filtering	 Pictures & Activity Sheets sourced from internet and Sasol Inzalo learners books	outlined in the activity sheets. Sasol Inzalo Workbooks
ASSESSMENT	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations.	
TEACHER REFLECTION	Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
	Progress:	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Challenges:	

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity: Separating Mixtures

MATERIALS:

- 500 g bag of peanuts (dry beans or lentils will also do)
- 500 g bag of jelly bean sweets (or other suitable solid substance)
- Plastic spoons for scooping
- Small yoghurt tubs or paper cups for mixing
- Sieve (the type used for sieving flour)

INSTRUCTIONS:

1. Place 10 scoops of peanuts in the mixing tub.
2. Place 10 scoops of jelly bean sweets in the same mixing tub.
3. Stir the peanuts and raisins until they are mixed.
4. Answer the questions below.

QUESTIONS

1. Can you still see the individual peanuts and raisin? _____
2. Separate the mixture into a pile of rice grains and a pile of barley grains. Write a sentence to explain how you separated the mixture.

3. Did the barley and rice grains change in any way, or do they still look the same as they were before they were mixed?

4. Can you think of a quicker (other than what was used above) way to separate the mixture? Describe what you would do to separate the mixture. Describe what would happen to the mixture.

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____

Activity: Separating Mixtures

MATERIALS:

- 500 g bag of peanuts (dry beans or lentils will also do)
- 500 g bag of jelly bean sweets (or other suitable solid substance)
- Plastic spoons for scooping
- Small yoghurt tubs or paper cups for mixing
- Sieve (the type used for sieving flour)

INSTRUCTIONS:

1. Place 10 scoops of peanuts in the mixing tub.
2. Place 10 scoops of jelly bean sweets in the same mixing tub.
3. Stir the peanuts and raisins until they are mixed.
4. Answer the questions below.

QUESTIONS

1. Can you still see the individual peanuts and raisin? **Yes I can still see each of the individual peanuts and raisins within the mixture**
2. Separate the mixture into a pile of rice grains and a pile of barley grains. Write a sentence to explain how you separated the mixture.

I separated the mixture using my hand / fingers

OR

I separated the mixture using a pair of tweezers

3. Did the barley and rice grains change in any way, or do they still look the same as they were before they were mixed?

The barley and rice grains did not change. They looked the same as they were before they were mixed

4. Can you think of a quicker (other than what was used above) way to separate the mixture of rice and barley? Describe what you would do to separate the mixture. Describe what would happen to the mixture.

*** Learners answers for the above might differ depending their experience and understanding.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mixtures and materials		• Demonstrate different ways in which mixtures can be separated •		
Content & Concepts/Subtopic: Separating Mixtures				
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations / Experiments
	Observing		Raising Questions	Investigate
✓	Comparing		Predicting	Design
	Measuring	✓	Hypothesizing	Make / Construct
✓	Sorting & Classifying		Planning Investigations	Evaluate
	Interpreting Information	✓	Recording Information	Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>Vocabulary</u> <u>Settling:</u> Is a process where particulates / substance sink (or settle) at the bottom of a liquid. <u>Decanting:</u> Allowing a mixture of solid and liquid or two immiscible liquids to separate and settle by gravity. <u>Immiscible:</u> Liquids that are incapable of being mixed together. Oil and water are	Lesson: Separating mixtures Method 2: Separating using a sieve (Sieving) This method refers to pouring mixture through a sieve to separate smaller solids from larger ones. This involves pouring a mixture through a sieve into a bowl and shaking the sieve so smaller particles fall through. For example if you mix coffee and flour. The larger coffee granules remain in the sieve and the flour falls through.		Textbook Chalkboard Activity Sheets, Raw materials and laboratory apparatus as

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
example of this. Filtering: To pass a liquid, gas light (or sound) through a device to remove unwanted material Sorting: To arrange systematically in groups or to separate according to specific type. Content Separating Mixtures. In some of the mixtures the materials / substances are clearly visible and in other mixtures it seems as if the materials have disappeared. Ways of separating mixtures: 1. Hand Sorting 2. Sieving 3. Settling / Decanting 4. Filtering ASSESSMENT	Learners should be placed in groups and allowed to mix different substances together and complete the attached Activity Sheet. ** If there is a lack of resources, the educator can demonstrate the mixing activity, making a few examples of the mixtures and allowing learners to observe the mixture and interact with it.	outlined in the activity sheets. Sasol Inzalo Workbooks
	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations.	
	Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Leaners Name: _____ Date: _____

Grade 6 _____ **Activity:** Mixing and separating a solid and a liquid

MATERIALS YOU WILL NEED:

- Clean sand (from the beach or from a building site)
- Plastic spoons for scooping
- Glass Beaker, Small yoghurt tubs or paper cups for mixing
- sieve (the type used for sieving flour)
- Kitchen towel or paper towel

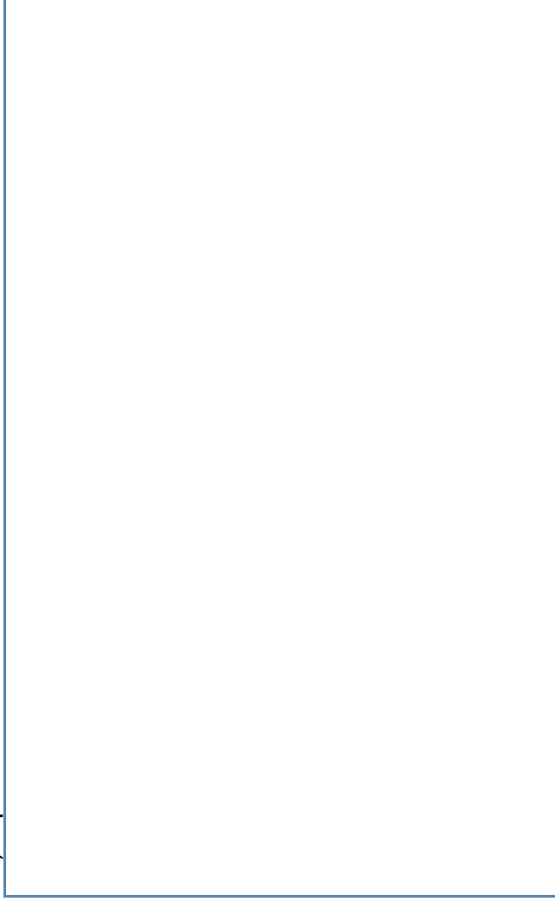
Instructions to learners:

1. Place 5 scoops of sand in the mixing tub.
2. Pour water into the mixing tub until it is half-full.
3. Stir the sand and water until they are mixed.
4. Answer the questions below.

QUESTIONS:

1. Can you still see the individual sand grains?
-

2. Draw (or find) a picture of the mixture.



3. Can you separate the mixture into a pile of sand grains and water?

4. How long do you think it would take if you picked the sand grains out of the water one by one?

5. Would it be possible to separate the sand from the water using the sieve? Say why or why not.

6. Would it be possible to separate the sand from the water using the paper towel? If you think it would be possible, explain what you would do.

7. Do you think it would be possible to separate sugar and water in the same way (by filtering the mixture through a towel)? Say why or why not.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity:** Mixing and separating a solid and a liquid

MATERIALS YOU WILL NEED:

- Clean sand (from the beach or from a building site)
- Plastic spoons for scooping
- Glass Beaker, Small yoghurt tubs or paper cups for mixing
- sieve (the type used for sieving flour)
- Kitchen towel or paper towel

Instructions to learners:

1. Place 5 scoops of sand in the mixing tub.
2. Pour water into the mixing tub until it is half-full.
3. Stir the sand and water until they are mixed.
4. Answer the questions below

QUESTIONS:

1. Can you still see the individual sand grains?

Yes. Some individual grains are still visible

2. Draw (or find) a picture of the mixture.



3. Can you separate the mixture into a pile of sand grains and water?

Yes it is possible to separate the mixture into a pile of sand grains and water

4. How long do you think it would take if you picked the sand grains out of the water one by one?

*** Learners answers for the above might differ depending their experience and understanding

5. Would it be possible to separate the sand from the water using the sieve? Say why or why not.

Yes it will be possible to separate the sand from the water using the sieve however, some of the finer grains of sand may go through depending on the size of the hole in the sieve being used.

6. Would it be possible to separate the sand from the water using the paper towel? If you think it would be possible, explain what you would do.

Yes it be possible to separate the sand from the water using the paper towel but the paper towel might break / tear. If we fold it and use it by placing it in the sieve or possibly a funnel it may also work better.

7. Do you think it would be possible to separate sugar and water in the same way (by filtering the mixture through a towel)? Say why or why not.

I do not think it would be possible to separate sugar and water in the same way because sugar dissolves completely in water and you cannot see the particles of sugar, unless the sugar crystals used are larger and remain undissolved.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mixtures of materials		• Demonstrate different ways in which mixtures can be separated •		
Content & Concepts/Subtopic: Separating Mixtures				
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting			
SPECIFIC AIMS		1. DOING SCIENCE		
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓ Doing Investigations / Experiments
	Observing		Raising Questions	Investigate
✓	Comparing		Predicting	Design
	Measuring		Hypothesizing	Make / Construct
	Sorting & Classifying	✓	Planning Investigations	Evaluate
✓	Interpreting Information	✓	Recording Information	Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Vocabulary</u> <u>Settling:</u> Is a process where particulates / substance sink (or settle) at the bottom of a liquid. <u>Decanting:</u> Allowing a mixture of solid and liquid or two immiscible liquids to separate and settle by gravity. <u>Immiscible:</u> Liquids that are incapable of being mixed together. Oil and water are	Lesson: Separating mixtures Method 3: Settling and Decanting Settling refers to letting the mixture sit and waiting for it to separate on its own. This is easy to see when we mix oil and water and sand and water. This involves: Stirring the mixture, Leaving the mixture in the container, Allowing the mixture to stand (undisturbed) until the two materials / substances separate and finally pouring the top material / substance from the other material.	Textbook Chalkboard Activity Sheets, Raw materials and laboratory apparatus as

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
example of this. Filtering: To pass a liquid, gas light (or sound) through a device to remove unwanted material Sorting: To arrange systematically in groups or to separate according to specific type. Content Separating Mixtures. In some of the mixtures the materials / substances are clearly visible and in other mixtures it seems as if the materials have disappeared. Ways of separating mixtures: 1. Hand Sorting 2. Sieving 3. Settling / Decanting 4. Filtering ASSESSMENT Learners should read, write, draw and do practical tasks regularly. Check learner's knowledge that they are able to: Identify and explain different ways of separating mixtures	If time and resources are available, allow learners to conduct the investigation as outline on the attached activity sheet. Learners should observe while the educator performs the investigation and explains the concept. They will complete Activity Sheet 6 (attached) as a solo activity.	outlined in the activity sheets. Sasol Inzalo Workbooks
	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity: Settling and Decanting

MATERIALS YOU WILL NEED:

- water
- cooking oil
- plastic spoons for scooping
- small glass or transparent plastic cup for mixing

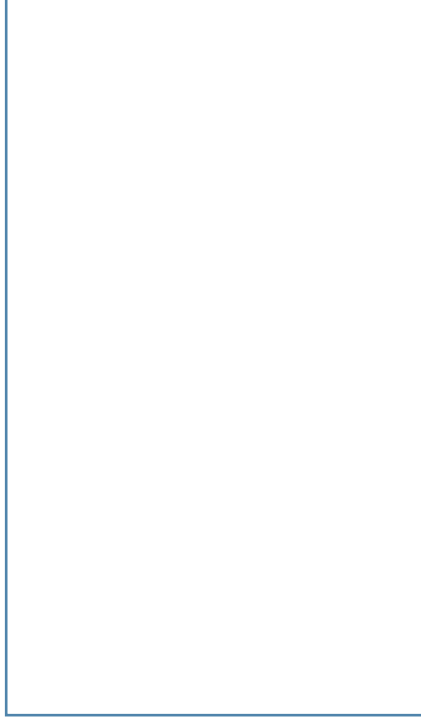
Instructions to learners:

1. Place 10 scoops (table spoons) of water in the mixing tub.
2. Place 10 scoops (tablespoons) of cooking oil in the mixing tub.
3. Stir the oil and water until they are mixed.
4. Let the mixture stand for a few minutes, then answer the questions below.

QUESTIONS:

1. Did the liquids mix? Describe what the mixture looks like.

2. Draw a picture of the mixture.



3. Do you think it would be possible to scoop all the oil out of the water? How long do you think it would take?

4. Would it be possible to separate the liquids using a sieve or a filter? Say why or why not.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **Memorandum**

Date: _____

Grade 6 _____ **Activity: Settling and Decanting**

MATERIALS YOU WILL NEED:

- water
- cooking oil
- plastic spoons for scooping
- small glass or transparent plastic cup for mixing

Instructions to learners:

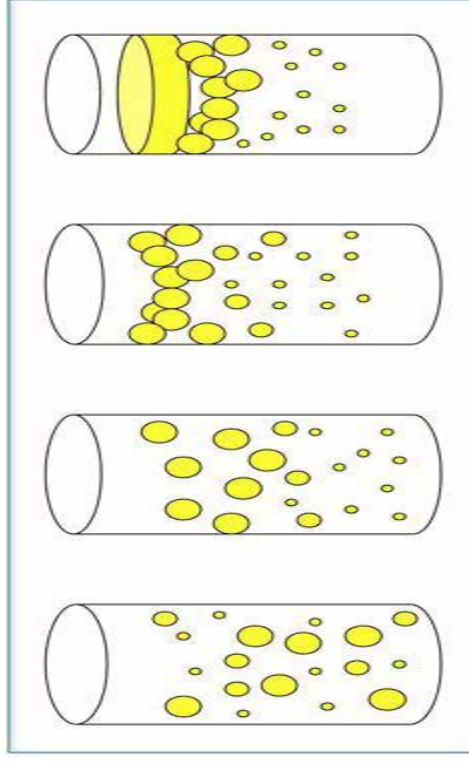
1. Place 10 scoops (table spoons) of water in the mixing tub.
2. Place 10 scoops (tablespoons) of cooking oil in the mixing tub.
3. Stir the oil and water until they are mixed.
4. Let the mixture stand for a few minutes, then answer the questions below.

QUESTIONS:

1. Did the liquids mix? Describe what the mixture looks like.

No the liquids did not mix. The water has become murky. At first there was oil throughout the water and after a while the oil has settled on the top of the water.

2. Draw a picture of the mixture.



3. Do you think it would be possible to scoop all the oil out of the water? How long do you think it would take?

It may be possible but it would take a very long time and possibly other equipment which we may not have.

4. Would it be possible to separate the liquids using a sieve or a filter? Say why or why not.

It is not possible to separate the liquids using a sieve or a filter since all the liquid (or both liquids) would simply pass straight through the holes of the sieve.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Mixtures of materials		• Demonstrate different ways in which mixtures can be separated •			
Content & Concepts/Subtopic:					
Separating Mixtures					
Terminology	Mixture, Visible, Settling, Decanting, Filtering, Sorting				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing	✓	Predicting		Design
✓	Measuring		Hypothesizing		Make / Construct
✓	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>Vocabulary</u> <u>Mixtures:</u> When two or more different substances (or materials) are combine. <u>Visible:</u> Something that is able to be seen <u>Settling:</u> Is a process where particulates / substance sink (or settle) at the bottom of a liquid. <u>Decanting:</u> Allowing a mixture of solid and liquid or two immiscible liquids to separate and settle by gravity. <u>Immiscible:</u> Liquids that are incapable of	Lesson 6: Separating mixtures Method 4: Filtering Some mixtures are separated by pouring the mixture through paper or other materials. This can best be seen with a mixture of sand and water or a mixture of curry powder and water. This involves placing a funnel in a bottle (or beaker), placing filter inside the funnel, pouring the mixture through the funnel and allowing the liquid mixture to flow through the filter. The solid material will remain in the filter or on the filter paper. NB. If time permits and there adequate availability of resources and / or raw materials,		Textbook Chalkboard Activity Sheets, Raw materials and laboratory apparatus as outlined in the

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
being mixed together. Oil and water are example of this. Filtering: To pass a liquid, gas light (or sound) through a device to remove unwanted material Sorting: To arrange systematically in groups or to separate according to specific type. Content Separating Mixtures. In some of the mixtures the materials / substances are clearly visible and in other mixtures it seems as if the materials have disappeared. Ways of separating mixtures: 1. Hand Sorting 2. Sieving 3. Settling / Decanting 4. Filtering.	learners should be given an opportunity to conduct the investigation in groups. If not the educator will demonstrate and explain while learners observe and record their finding on attached Activity sheet	activity sheets. Sasol Inzalo Workbooks Pictures have been sourced from the internet.
ASSESSMENT Learners should read, write, draw and do practical tasks regularly. Check learner's knowledge that they are able to: Identify and explain different ways of separating mixtures	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

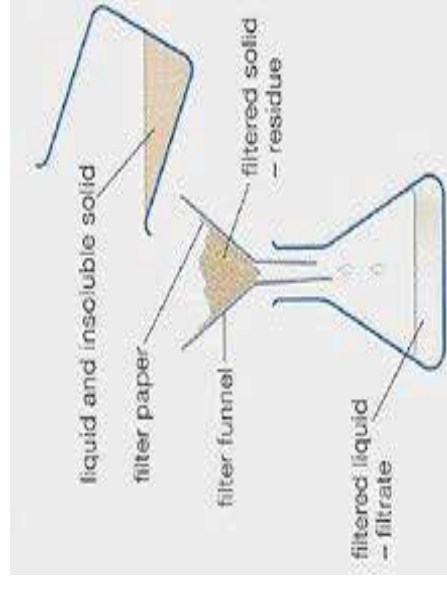
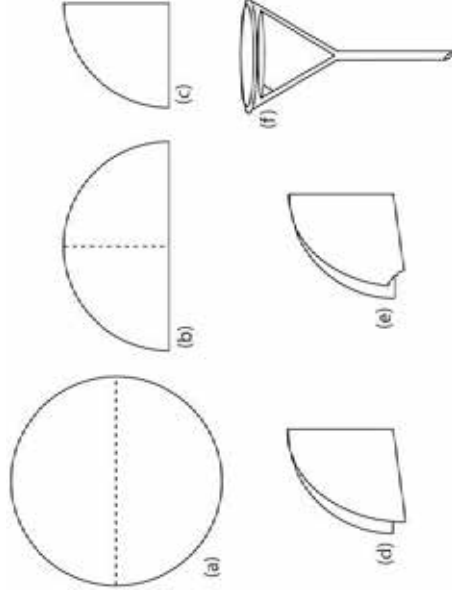
Grade 6 ____ Activity: Filtering insoluble substances.

MATERIALS YOU WILL NEED:

- A mixture of sand and water or a mixture of curry powder and water
- One glass (or clear plastic) beaker and a stirrer (or spoon)
- One funnel and some filter paper

Instructions to learners:

1. Fold the filter paper so that it forms a cone shape. Follow the instructions in the picture below. Place the cone shape on the inside of the funnel as illustrated.
2. Place the funnel (with the filter paper) inside a glass or clear plastic beaker.
3. Mix $\frac{1}{4}$ cup of sand with 1 cup of water. Stir the substances until it is mixed well.
4. Pour the mixture of sand and water is through a filter.



QUESTIONS

1. Why do the sand grains stay behind on the filter paper, but the water passes through it?

2. What is the mixture of sand and water called? (Hint: It is a special kind of mixture)

3. Name three other mixtures that can be separated using the above method.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

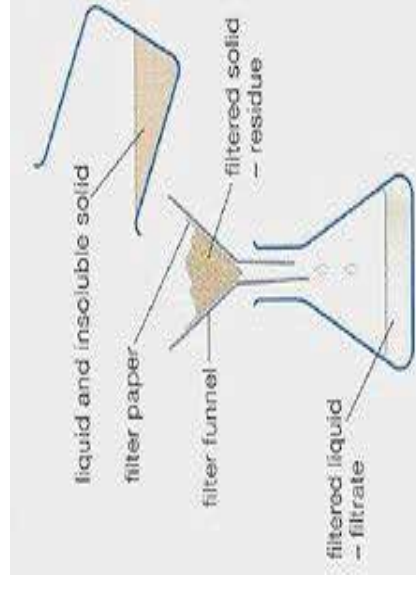
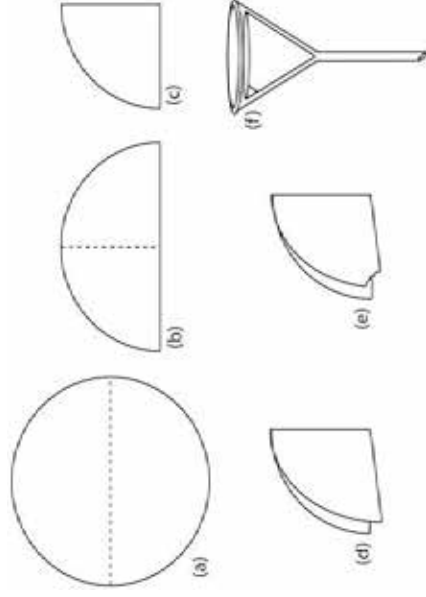
Grade 6 _____ **Activity: Filtering insoluble substances.**

MATERIALS YOU WILL NEED:

- A mixture of sand and water or a mixture of curry powder and water
- One glass (or clear plastic) beaker and a stirrer (or spoon)
- One funnel and some filter paper

Instructions to learners:

1. Fold the filter paper so that it forms a cone shape. Follow the instructions in the picture below. Place the cone shape on the inside of the funnel as illustrated.
2. Place the funnel (with the filter paper) inside a glass or clear plastic beaker.
3. Mix $\frac{1}{4}$ cup of sand with 1 cup of water. Stir the substances until it is mixed well.
4. Pour the mixture of sand and water is through a filter.



QUESTIONS

1. Why does the sand grains stay behind on the filter paper, but the water passes through it?

The water is able to pass through since the particle in the water are smaller than the holes in the filter paper (much like those in the sieve used in previous investigations) and the sand particle are larger so they become trapped on the filter paper.

2. What is the mixture of sand and water called? (Hint: It is a special kind of mixture)

It is called an insoluble (heterogeneous) mixture

3. Name three other mixtures that can be separated using the above method.

*** Learners answers may vary depending on their experiences.

Answers can be used to generate lively discussions to draw out suitable conclusions.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		- Identify different types of solutions			
Content & Concepts/Subtopic: Solutions are also mixtures					
Terminology	Solution	Dissolve	Solvent	Solute	Insoluble
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
✓	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>VOCABULARY</u> <u>Solution:</u>A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing.	INTRODUCTION Educator will facilitate while learners are given an opportunity to actualise the new words / vocabulary through the use of dictionaries and Textbooks. Learner will discuss and finalise the most suitable definition of each of the given words. Educator will facilitate the feedback session where the proper definitions are mediated and explained to avoid any ambiguity / misunderstanding.	Textbook Laptop and Projector Chalkboard Activity Sheets,

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved CONTENT When is a mixture also a solution? When two substances are mixed it will be possible to still see each substance in the mixture. Is sugar and sand a mixture? Yes! A solution is a special type of mixture. What makes a solution so special? When is a mixture also a solution?	When is a mixture also a solution? Educator will explain the content / concept Educator to demonstrate one example of how the investigation should be carried out. Learners can be divided into groups of between 4 to 6 learners and be given the necessary apparatus and raw materials in order to complete the activity sheet. Learners should be allowed some time to copy down the content knowledge summary from the chalkboard before commencing with the practical task. ** How water mixes with a solute to make a solution (video) goo.gl/zH7FY	Raw materials and laboratory apparatus as outlined in the activity sheets. Sasol Inzalo Workbooks
ASSESSMENT Learners should read, write, draw and do practical tasks regularly. Check learner's knowledge that they are able to:	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 ____ **Activity:** When is a mixture also a solution?

In this activity we are going to mix substances with water to see which ones make solutions.
How do you think will we know when a substance has made a solution with the water?

MATERIALS:

- small quantities of the following substances:
 - sugar
 - salt
 - sand
 - oil
 - vinegar
 - flour
 - copper sulfate
 - tap water
 - clean yoghurt tubs (small)
 - plastic spoons for scooping and stirring

INSTRUCTIONS:

1. Half-fill a yoghurt cup with tap water.
2. Place one small scoop of sugar in the water and stir it well.
3. Look at the mixture and discuss what it looks like.
4. At the top of the table below, a few possible observations are given. Choose the one that is the best description for what you observed, by making a cross in the matching column. (You may also choose more than one column.) The first substance (sugar) has been filled in to show you what you should do.
5. Once you have recorded your observation (Place an X), you can empty the yoghurt tub.
6. Repeat steps 1 - 5 until you have tested all the substances on the list.

Table: Mixing substances with water

SUBSTANCE	OBSERVATIONS	
	It looks as though none of the substance has disappeared	It looks as if all or most of the substance has disappeared
SUGAR		
SALT		
SAND		
OIL		
VINEGAR		
COPPER SULPHATE		

QUESTIONS:

1. Which of the substances seemed to disappear when they were mixed with the water?

2. Which of the substances in this activity did NOT form solutions with water?
(Hint: which ones did not look as if the 'disappeared' into the water?)

3. Name three other substances (not listed above) that you may have used that you think would form a solution with water.

4. Name three other substances (not listed above) that you may have used that you think would NOT form a solution with water.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____

Activity: When is a mixture also a solution?

In this activity we are going to mix substances with water to see which ones make solutions.
How do you think will we know when a substance has made a solution with the water?

MATERIALS:

• small quantities of the following substances:

- sugar
- salt
- sand
- oil
- vinegar
- flour
- copper sulphate
- tap water
- clean yoghurt tubs (small)
- plastic spoons for scooping and stirring

INSTRUCTIONS:

1. Half-fill a yoghurt cup with tap water.
2. Place one small scoop of sugar in the water and stir it well.
3. Look at the mixture and discuss what it looks like.
4. At the top of the table below, a few possible observations are given. Choose the one that is the best description for what you observed, by making a cross in the matching column. (You may also choose more than one column.) The first substance (sugar) has been filled in to show you what you should do.
5. Once you have recorded your observation (Place an X), you can empty the yoghurt tub.
6. Repeat steps 1 - 5 until you have tested all the substances on the list.

Table: Mixing substances with water

SUBSTANCE	OBSERVATIONS	
	It looks as though none of the substance has disappeared	It looks as if all or most of the substance has disappeared
SUGAR	NO	YES
SALT	NO	YES
SAND	YES	NO
OIL	YES	NO
VINEGAR	NO	YES
COPPER SULPHATE	YES	NO

QUESTIONS:

1. Which of the substances seemed to disappear when they were mixed with the water?

The salt, sugar, vinegar and copper sulphate all seem to disappear.

2. Which of the substances in this activity did NOT form solutions with water?
(Hint: which ones did not look as if the 'disappeared' into the water?)

The SAND and OIL did not form solutions / did not disappear.

3. Name three other substances (not listed above) that you may have used that you think would form a solution with water.
*** Learners answers may vary depending on their experiences.

FLOUR

MILK

JUICE

Other reasonable answers should also be considered

4. Name three other substances (not listed above) that you may have used that you think would NOT form a solution with water.
*** Learners answers may vary depending on their experiences.

CHILLI POWDER

MIELIE MEAL

CHALK POWDER

Other reasonable answers should also be considered

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Identify different types of solutions • Investigate how solution are made			
Content & Concepts/Subtopic: Which mixtures are solutions					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
✓	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
✓	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles.eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Lesson: Consolidation of previous lesson. Educator to demonstrate the different combinations of mixtures and solutions as outline in the activity sheet Learners should observe carefully, discuss their observations and record their observations on the given activity sheet. How water mixes with a solute to make a solution (video) goo.gl/zH7FY	Textbook Chalkboard Activity Sheets, Raw materials and laboratory apparatus as

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved CONTENT CONTENT When is a mixture also a solution? When two substances are mixed it will be possible to still see each substance in the mixture. Is sugar and sand a mixture? Yes! A solution is a special type of mixture. What makes a solution so special? When is a mixture also a solution?		outlined in the activity sheets. Sasol Inzalo Workbooks
ASSESSMENT	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____

Date: _____

Grade 6 _____

Activity: Which mixtures are solutions?

In this activity we will use our observations from the previous activity (*When is a mixture also a solution?*) to decide which of the mixtures we made were solutions.

QUESTIONS:

In the activity “*When is a mixture also a solution?*” We mixed different substances with water. We saw that some of the substances looked as if they had disappeared in the water.

1. What name do we give to the substance that looks as if it has disappeared? _____
2. What name do we give to the substance that we can still see? _____
3. What name do we give to these mixtures? _____

Complete the table using the information about the sugar – water mixture as an example.

MIXTURE	Is the mixture a solution after stirring?	
	Yes	No
Sugar and water	X	
Salt and water		
Sand and water		
Oil and water		
Vinegar and water		
Copper sulphate and water		

In the activity above, we mixed different substances with water.

1. Which substance is the **solvent** in all the mixtures? _____

2. From the mixtures above, choose an example of a solution that consists of a **solid solute** and a **liquid solvent**.

3. From the mixtures above, choose an example of a solution that consists of a **liquid solute** and a **liquid solvent**.

4. From the mixtures above, choose an example of a **mixture of two liquids** that is NOT a solution.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Date: _____

Grade 6 _____

Activity: Which mixtures are solutions?

In this activity we will use our observations from the previous activity (*When is a mixture also a solution?*) to decide which of the mixtures we made were solutions.

QUESTIONS:

In the activity “*When is a mixture also a solution?*” We mixed different substances with water. We saw that some of the substances looked as if they had disappeared in the water.

1. What name do we give to the substance that looks as if it has disappeared? Solute
2. What name do we give to the substance that we can still see? Solvent
3. What name do we give to these mixtures?

Complete the table using the information about the sugar – water mixture as an example.

MIXTURE	Is the mixture a solution after stirring?	
	Yes	No
Sugar and water	X	
Salt and water	X	
Sand and water		X
Oil and water		X
Vinegar and water	X	
Copper sulphate and water	X	

In the activity above, we mixed different substances with water.

1. Which substance is the **solvent** in all the mixtures? **The solvent is water**
2. From the mixtures above, choose an example of a solution that consists of a **solid solute** and a **liquid solvent**.
Any one of the following examples: Sugar in water, salt in water or copper sulphate in water.
3. From the mixtures above, choose an example of a solution that consists of a **liquid solute** and a **liquid solvent**.
Vinegar and Water
4. From the mixtures above, choose an example of a **mixture of two liquids** that is NOT a solution.

Oil and water

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Identify different types of solutions • Investigate how solutions are made			
Content & Concepts/Subtopic: Solutions are uniform					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
✓	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Lesson: Consolidation of concepts taught in the previous lesson. Educator will measure out specific amounts of copper sulphate (or other coloured solutes that may be substituted) for each group. Learners should follow the instructions given on the activity sheet carefully, discuss their observations and record their observations on the given activity sheet. How water mixes with a solute to make a solution (video) goo.gl/zH7FY		Textbook Chalkboard copper sulphate crystals tap water Clear container, such as a glass

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved. <u>CONTENT</u> What is a solution? When two substances make a solution, it will look as if the one substance has disappeared into the other: • The substance that looks as if it has disappeared is called the solute. • The substance that we can still see is called the solvent. • The solvent and solute together are called the solution. In the previous lesson we mixed salt with water and sugar with water. Once mixed, none of the solids were visible after being dissolved into the water.		beaker or test tube (a water glass will also do) plastic spoon for scooping and stirring.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
This is one of the most important features of a solution. Solutions are uniform in appearance. This means that the solid cannot be seen in the solution. ASSESSMENT		
	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 ____ ACTIVITY: What is a solution?

MATERIALS:

- copper sulphate crystals
- tap water
- clear container, such as a glass beaker or test tube (a water glass will also do)
- plastic spoon for scooping and stirring

INSTRUCTIONS:

1. Look at the copper sulphate crystals and the water.
Write one sentence to describe each substance in the table below.
2. Mix one small scoop of the copper sulphate with enough water to dissolve it completely (half a cup of water should be enough). Let it stand for a few minutes until it clears.
3. Look at the copper sulphate solution and write a sentence to describe it in the table below.
Save it for answering the questions that follow.

Table: Description of a copper sulphate solution in water

Substance or mixture	Description (what does it look like)
Water	
Copper Sulphate Crystals	
Copper Sulphate Solution	

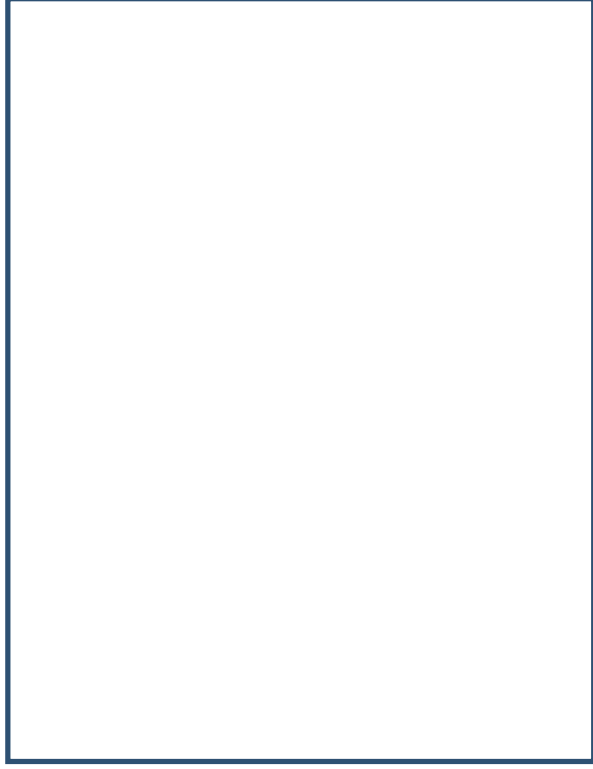
QUESTIONS:

1. Look at the solution. How can you tell that there is copper sulphate in the water? Another way to ask this question would be: What **evidence** do you have that there is copper sulphate in the water?

2. Can you see any copper sulphate crystals moving about in the water? _____

3. Explain your answer to question 2 above.

4. What do you think happened to the copper sulphate particles? Where are they now?



5. Draw a picture of the particles in the copper sulphate solution in the space below.
You can use the following symbols to represent each substance:

- Small shaded circles to represent water particles
- Small white squares to represent copper sulphate particles

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____

ACTIVITY: What is a solution?

MATERIALS:

- copper sulphate crystals
- tap water
- clear container, such as a glass beaker or test tube (a water glass will also do)
- plastic spoon for scooping and stirring

INSTRUCTIONS:

1. Look at the copper sulphate crystals and the water.
Write one sentence to describe each substance in the table below.
2. Mix one small scoop of the copper sulphate with enough water to dissolve it completely (half a cup of water should be enough). Let it stand for a few minutes until it clears.
3. Look at the copper sulphate solution and write a sentence to describe it in the table below.
Save it for answering the questions that follow.

Table: Description of a copper sulfate solution in water

Substance or mixture	Description (what does it look like) *** Learners' answers may vary***
Water	The water is a clear, colourless liquid (which also has no taste and no Smell)
Copper Sulphate Crystals	Looks like big sugar crystals but is dark blue in colour
Copper Sulphate Solution	The solution is a clear blue liquid

QUESTIONS:

1. Look at the solution. How can you tell that there is copper sulphate in the water? Another way to ask this question would be: What **evidence** do you have that there is copper sulphate in the water?

The water is blue. The water is the same colour as the copper sulphate crystals.

2. Can you see any copper sulphate crystals moving about in the water? **No. The crystals cannot be seen.**

3. Explain your answer to question 2 above.

The crystals separated into their individual particles that are too small to see with the naked eye.

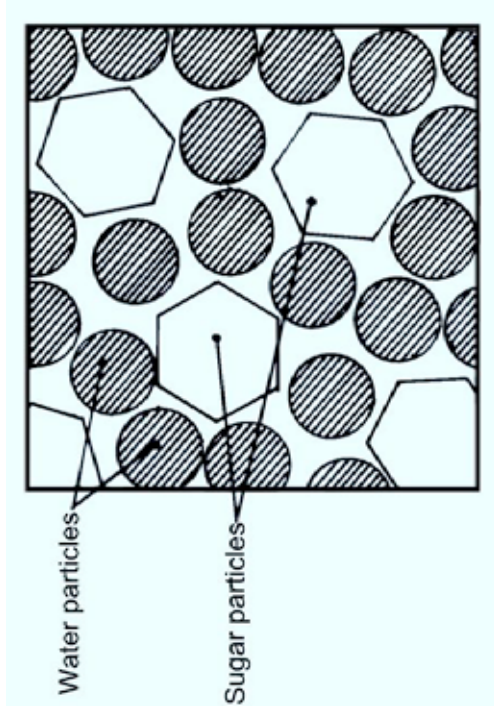
4. What do you think happened to the copper sulphate particles? Where are they now?

The copper sulphate particles have been mixed up with the water particles

5. Draw a picture of the particles in the copper sulphate solution in the space below.

You can use the following symbols to represent each substance:

- Small shaded circles to represent water particles
- Small white squares to represent copper sulphate particles



Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Differentiate between soluble and insoluble substances. • Conduct an investigation to check on solubility of substances			
Content & Concepts/Subtopic: Soluble and insoluble substances					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE 2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS 3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>VOCABULARY</u> <u>Solution:</u>A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Lesson: Consolidation of concepts taught in the previous lesson. Educator will measure out specific amounts of different types of solutes for each group. Learners should follow the instructions given on the activity sheet carefully, discuss their observations and record their observations on the given activity sheet.	Textbook Chalkboard • One teaspoon each of the following substances: Mielie Meal Flour,

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved. <u>CONTENT</u> Soluble and Insoluble substances We have a word for substances that form solutions when they are mixed with water. These substances are called soluble substances. Substances that do NOT form solutions when they are mixed with water are called insoluble substances. In the next activity we are going to use some findings from a previous activity (<i>Which mixtures are solutions?</i>) to link this new idea to what we know about solutions.		Samp, Maize Flour, Curry Powder, Custard Powder • Tap water • 6 clear containers, such as a glass beakers or test tubes (clear water glasses will also do) • Plastic spoons for scooping and stirring.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
ASSESSMENT	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity:** Soluble and insoluble substances

In this activity we are going to mix substances with water to see which ones make solutions.
How do you think will we know when a substance has made a solution with the water?

MATERIALS:

- One teaspoon each of the following substances
Mielie Meal, Flour, Somp, Maize Flour, Curry Powder, Custard Powder
- tap water
- 6 clear containers, such as a glass beakers or test tubes (clear water glasses will also do)
- plastic spoons for scooping and stirring.

INSTRUCTIONS:

1. Use separate container for each of the substances above. Mix one small scoop of each of the above substances half a cup of water.
2. Let it stand for a few minutes until it clears / settles.
3. Look at the different solutions and write a sentence to describe each in the table below.
Save it for answering the questions that follow.

Table: Description of the substances

SUBSTANCE	APPEARANCE IN TAP WATER	SOLUBLE or INSOLUBLE
Mielie Meal	Remains white & makes the water cloudy. Granules are still visible	Insoluble
Flour	Becomes off white & water becomes white and thickens into paste	Soluble
Maize Flour	Remains white & water becomes white and thickens into paste	soluble
Custard Powder	Loses some colour to the water and the water becomes thicker	soluble
Samp	No change but the water becomes slightly cloudy	Insoluble
Curry Powder	No Change but the water changes colour	Insoluble

In the table below make a list of other soluble and insoluble substances that you may use instead of those used in the activity above

SOLUBLE	INSOLUBLE

Learners answers will vary depending on their experience

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Show understanding as to how solutions are made by mixing solids and liquids • Differentiate between soluble and insoluble substances. • Conduct an investigation to check on solubility of substances			
Content & Concepts/Subtopic:					
Soluble substances					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Extension of previous activity – Soluble and insoluble substances. The Educator will demonstrate while learners observe and complete the attached activity sheet. Each solution should be prepared in a manner where learners are able to observe and record their observation.		Textbook Chalkboard Salt Sugar Vinegar

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved <u>CONTENT: Dissolving a solid</u> We have a word for substances that form solutions when they are mixed with water. These substances are called soluble substances. Substances that do NOT form solutions when they are mixed with water are called insoluble substances.	If time and adequate facilities allow it, Learners can be placed in groups of 4 to 6 learners and they are given the apparatus and substances to make any one (or two) of the solutions and they could demonstrate and explain their findings as a feedback session *** Other substances that yield the same results as outlined in the table on the attached activity sheet could also be used ***	Sand Oil Copper Sulphate Water Glass Beakers / Clear plastic containers Spoon / spatulas to stir
ASSESSMENT	Activity Sheet can be used as informal assessment activities to check for understanding of content as well as check how well learners follow instructions to carry out investigations. Educators should draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ Activity: Dissolving a solid

INSTRUCTIONS:

1. Study the information in the table below which is based on the investigation you have just observed
2. Use the extra column to say whether the substance that was mixed with water in the activity is soluble or insoluble.

Table: Soluble and insoluble substances.

Mixture	Is the mixture a solution? (Yes or No)	Is the substance that was mixed with the water soluble or insoluble?
Sugar and water	Yes	soluble
Salt and water		
Sand and water		
Oil and water		
Vinegar and water		
Copper sulphate and water		

QUESTIONS:

Complete the following sentences by writing **soluble** or **insoluble** in the open spaces.

1. Substances that do NOT form solutions when they are mixed with water are called _____ substances.
2. Substances that form solutions when they are mixed with water are called _____ substances.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____ Activity: **Dissolving a solid**

INSTRUCTIONS:

1. Study the information in the table below which is based on the investigation you have just observed
2. Use the extra column to say whether the substance that was mixed with water in the activity is soluble or insoluble.

Table: Soluble and insoluble substances.

Mixture	Is the mixture a solution? (Yes or No)	Is the substance that was mixed with the water soluble or insoluble?
Sugar and water	Yes	Soluble
Salt and water	Yes	Soluble
Sand and water	No	Insoluble
Oil and water	No	Insoluble
Vinegar and water	Yes	Soluble
Copper sulphate and water	Yes	Soluble

QUESTIONS:

Complete the following sentences by writing **soluble** or **insoluble** in the open spaces.

1. Substances that do NOT form solutions when they are mixed with water are called soluble substances.
2. Substances that form solutions when they are mixed with water are called insoluble substances.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		- Follow instructions and conduct an investigation / experiment - Write a hypothesis based on the experiment			
Content & Concepts/Subtopic:					
Physically separating salt and water					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing		Predicting		Design
✓	Measuring	✓	Hypothesizing		Make / Construct
	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>VOCABULARY</u> <u>Solution:</u>A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve	As an introduction, the teacher should gauge the relevant previous knowledge of learners by asking probing questions. This serves a revision of work done previously – Different methods of Separating Mixtures. In groups of four, each group should write down one method of separating mixtures and explain this to the class. Have diverse groups where if on group explains the concept, another group should provide an example that further explains the concept. The educator can explain the intricacies of the activity and if time and resources allow, learners should be given an opportunity to conduct the investigation by themselves.	Textbook Chalkboard Newspaper Funnel Filter paper Salt Water Four clean beakers

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved Content Over millions of years, salt from the land has been washed into the sea. The sea water tastes salty because of the dissolved salts. The sea water is the solvent and the salt is the solute. The solution is a mixture of the salt and the water. Do you think this salt can be separated from the water.	Alternatively, the educator can demonstrate what is required (in each class) and allow learners to observe and record their observations on the given activity sheet. Educator will revise and remind learners as to the proper wording and method of writing or formulating a hypothesis.	Spoon / spatula for mixing.
ASSESSMENT		
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

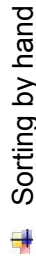
Natural Sciences and Technology

Term 2: Matter and Materials

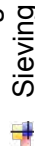
Learners Name: _____ Date: _____

Grade 6 _____ **Activity:** Physically Separate salt and water

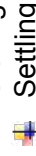
Aim: In this activity we will determine if salt and water can be separated by:



Sorting by hand



Sieving



Settling and decanting



Filtering

Hypothesis: Write the hypothesis for this activity. State which of the methods given above you think would separate salt and water

Materials needed:

Newspaper Funnel Filter paper Salt Water

Four clean beakers Spoon / spatula for mixing

Method

1. Make four solutions of salt and water in the beakers or cups. Use the same amount of salt and the same amount of water in each cup.
2. Label the cups 1, 2, 3 and 4.
3. Try and pick the salt particles out of the water in cup number 1 using your fingers or a tweezers.
Were you able to remove all the salt using this method? _____
4. Pour the solution from cup number 2 through a sieve into a bowl.
Were you able to remove all the salt using this method? _____
5. Allow the mixture in cup number 3 to stand for a while.
Were you able to remove all the salt using this method? _____

6. Pour the mixture from cup number 4 through a funnel with filter paper
Were you able to remove all the salt using this method? _____

Conclusion

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____ **Activity:** Physically Separate salt and water

Aim: In this activity we will determine if salt and water can be separated by:

-  Sorting by hand
-  Sieving
-  Settling and decanting
-  Filtering

Hypothesis: Write the hypothesis for this activity. State which of the methods given above you think would separate salt and water
Every learner should be able to write their own hypothesis by selecting one of the above methods as follows:

Hypothesis: Salt and water can be separated by means of filtering (or settling and decanting, or Sieving, or sorting by hand.

Materials needed:

Newspaper	Funnel	Filter paper	Salt	Water
Four clean beakers	Spoon / spatula for mixing			

Method

1. Make four solutions of salt and water in the beakers or cups. Use the same amount of salt and the same amount of water in each cup.
2. Label the cups 1, 2, 3 and 4.
3. Try and pick the salt particles out of the water in cup number 1 using your fingers or a tweezers.
Were you able to remove all the salt using this method? **I was unable to remove the salt**
4. Pour the solution from cup number 2 through a sieve into a bowl.
Were you able to remove all the salt using this method? **I was unable to remove the salt**
5. Allow the mixture in cup number 3 to stand for a while.

Were you able to remove all the salt using this method? I was unable to remove the salt

6. Pour the mixture from cup number 4 through a funnel with filter paper

Were you able to remove all the salt using this method? I was unable to remove the salt

Conclusion

Salt and water cannot be separated by physical means. None of the methods used above worked in order to remove the salt from the water, because the salt and water particles are very small. The particles of salt (solute) fit in the spaces between the particles of the water (solvent) so they cannot be seen.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		- Follow instructions and conduct an investigation / experiment - Show understanding			
Content & Concepts/Subtopic:					
Separating Salt from Water					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid	Extension of previous activity: Physically separating salt form water The educator should ideally revise the previous activity and the conclusion thereof as revision. Thereafter learners could work in the same groups as the previous activity and complete the given questions 		Textbook Chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved	Learner will answer the following question as an extension exercise / Homework depending on time 1. Explain why the sorting by hand method would not work to separate the salt and the water. 2. Explain why sieving the salt and water through a sieve would not work to separate the salt and the water. 3. Explain why settling and decanting would not work to separate the salt and water. 4. Explain why filtering would not work to separate the salt and the water	
ASSESSMENT	Informal Assessment and corrective work for the above questions	
TEACHER REFLECTION	Progress:	
	Challenges: Remind learners to bring clean, clear glass jars with tight fitting lids, a teaspoon and some sugar from home in order to complete the next activity.	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____ Grade 6 _____

Activity: How can we recover a solute (sugar) from the solution?

AIM (What do you want to find out?): _____

MATERIALS AND APPARATUS:

- salt solution
- funnel
- evaporating dish
- bunsen burner
- 2 beakers
- filter paper
- stand
- matches

METHOD:

1. Pour a small amount of the sugar solution into an evaporating dish.
2. Place the dish outside, or on a windowsill, in a sunny spot.
3. Leave the dish outside and check regularly to observe what is happening to the sugar solution.
4. Your teacher will demonstrate whether you can also recover the sugar by boiling the solution.
5. Record all your observations in the table below.

RESULTS AND OBSERVATIONS:

METHOD	RESULT – Could you recover the salt from the solution
Sieving or filtering	
Settling overnight	
Evaporation	
Boiling	

1. Which methods worked to recover the salt from the solution?

2. What was left at the bottom after completing these methods?

3. Why do you think this happens?

4. Which method do you think works best and why?

CONCLUSION:

What can you conclude from this investigation?

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Date: _____ Grade 6 _____

Activity: How can we recover a solute (sugar) from the solution?

AIM (What do you want to find out?): **To investigate whether salt can be removed from water by sieving, filtering, evaporation and / or boiling**

MATERIALS AND APPARATUS:

- salt solution
- funnel
- evaporating dish
- bunsen burner
- 2 beakers
- filter paper
- stand
- matches

METHOD:

1. Pour a small amount of the sugar solution into an evaporating dish.
2. Place the dish outside, or on a windowsill, in a sunny spot.
3. Leave the dish outside and check regularly to observe what is happening to the sugar solution.
4. Your teacher will demonstrate whether you can also recover the sugar by boiling the solution.
5. Record all your observations in the table below.

RESULTS AND OBSERVATIONS:

METHOD	RESULT – Could you recover the salt from the solution
Sieving or filtering	The salt could not be recovered
Settling overnight	The salt could not be recovered
Evaporation	The salt could be recovered
Boiling	The salt could be recovered

1. Which methods worked to recover the salt from the solution?

Boiling and Evaporation

2. What was left at the bottom after completing these methods?

Sugar crystals.

3. Why do you think this happens?

This is because the water evaporates or boils and turns into water vapour. The sugar cannot evaporate and is left behind as a solid in the form of crystals.

4. Which method do you think works best and why?

Learner dependent answer: They could say boiling as it is faster, or they could say evaporation as it does not require much equipment such as a Bunsen burner, etc.

CONCLUSION:

What can you conclude from this investigation?

Boiling an evaporation are the best method of separating salt from water.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		- Describe the method in which salt (solute) may be recovered from water (solvent)			
Content & Concepts/Subtopic:					
Separating salt from water using evaporation.					
Terminology	Solution Dissolve Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing	✓	Raising Questions		Investigate
	Comparing	✓	Predicting		Design
	Measuring	✓	Hypothesizing		Make / Construct
	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
VOCABULARY Solution: A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. Dissolve: The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. Soluble: When a solid is able to dissolve into a liquid		Textbook Chalkboard Internet Laptop and

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved <u>Crystallisation:</u> The slow process of forming crystals from a solution. <u>Content:</u> <u>Removing salt from water</u> As indicated in the picture, we notice that sea water is pumped into square ponds. These ponds are left open so the heat from the sun causes the water to evaporate (Remember the water cycle). When water is heated, it changes from liquid into a gas and evaporates. The salt is then left behind and harvested by scraping as indicated in the pictures.	The teacher can use the above pictures (from the internet) to explain how salt is obtained from sea water, alternatively if an internet connection is available, learners can be shown a video https://www.youtube.com/watch?v=mBE-ljDXkeg(if a laptop and projector are available.) This is an ideal opportunity to revise previous knowledge dealing with The Water Cycle. If resources are available then ideally learners should be given an opportunity to make the salt solution then be allowed to try to extract salt crystal from the prepared solution as per instructions given on the activity sheet. This investigation makes the ideal demonstration, and could even be given as a homework experiment. It also allows for the extension of learners' understanding of the concept of solubility and saturated solutions. You could heat the saturated sugar solution for the learners to show that more solute will dissolve when the solvent is at a higher temperature (this is mostly true, but not always!). If more sugar is added to the heated solution until it is saturated at the higher temperature, then the solution will be supersaturated when cooled. 1 sugar crystal can be suspended in the solution before it cools down and more sugar crystals will grow on the crystal and on the thread used to suspend the crystal. The less the solution is disturbed, the larger the crystals will grow.	Projector Pictures / Chart A Large Cup / Beaker Spoon / Spatula A deep plate
ASSESSMENT		
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity: Separate salt from water using evaporation**

Aim: In this activity you will try to separate salt from water using evaporation.

Question to Investigate: Can evaporation separate salt from water?

Hypothesis: _____

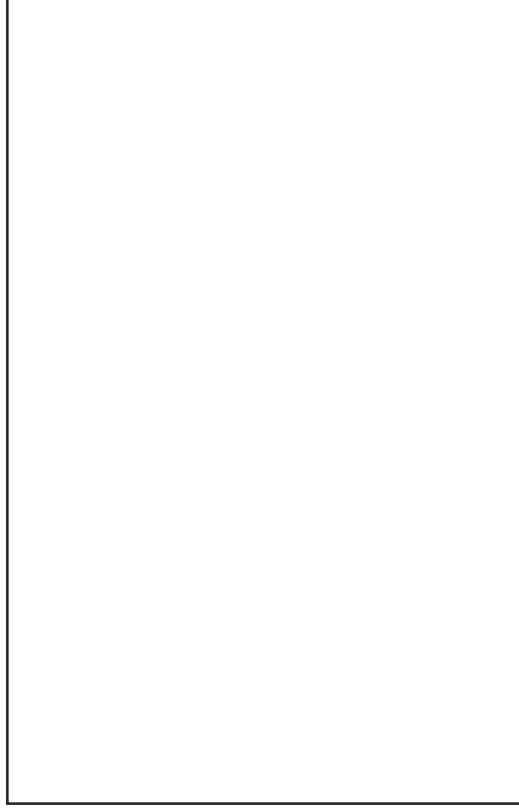
Materials: You will need

Salt A cup / beaker of water A Deep Plate

Method

1. Mix two or three teaspoons of salt in a cup or beaker that contains 250ml of water.
2. Ensure that all the salt is dissolved.
3. Pour the solution into the plate
4. Allow the plate to stand in a warm spot (that has sunlight) preferably for two days
5. Describe what you see on the plate

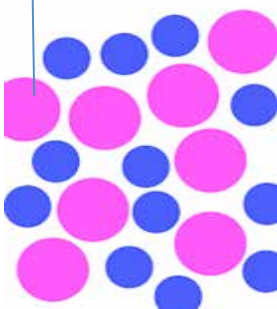
6. Draw the results of your experiment / investigation.



Results – Complete the paragraph by filling in the missing words

Once the _____ has evaporated, _____ form on the plate. The crystals are formed when the particles of _____ join together. _____ is the repeated joining of particles to form a _____.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Make a saturated solution based on given instructions • Use the above method to create crystals (as an extension exercise)			
Content & Concepts/Subtopic: Saturated solutions					
Terminology		Solution	Dissolve	Solute	Insoluble Solvent
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>VOCABULARY</u> <u>Solution</u>:-A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve</u>: The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. <u>Soluble</u>: When a solid is able to dissolve into a liquid	Teacher will use this or other suitable diagrams available on the internet or in the learners textbook to explain the content.  Solvent _____ Solute _____ https://www.youtube.com/watch?v=95ChO2oEJPA— How to make a saturated solution As per attached worksheet, learners should be given an opportunity to make a saturated	Textbook Chalkboard Beakers Warm water Sugar Spoon or spatula for measuring and mixing.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved <u>Crystallisation:</u> The slow process of forming crystals from a solution. Content: <u>Saturated Solutions</u> When substances dissolve, solute particles become dispersed in the spaces between the solvent particles. When the spaces are full, there is nowhere to go. The solute particles that are left can be seen deposited on the bottom of the beaker (or glass). Imagine if you were riding in a bus and the seats are the solvents and you and all the people that get onto the bus are the solutes. Once all the people are seated in the available seats, there will be people left standing. The bus is now saturated.	solution. They can then return home with their saturated solutions and allow these to crystallise Extra Information A natural example of a saturated solution The Dead Sea is a lake on the border of Israel and Jordan. Over thousands of years water has flowed into the lake. Salts are dissolved into the water. The water evaporates and leaves the salt behind. The Dead Sea has become more and more salty. The water in the Dead Sea is saturated and no more salts can dissolve in the water. https://www.youtube.com/watch?v=UFE4_hCe0QU. Learners can check out the internet site More Extra Information Crystals in nature(Linked to Social Science – Geography) Have you ever visited a cave? Inside, you may have seen crystal formations called stalactites and stalagmites. Stalactites and stalagmites form inside limestone caves. Stalactites hang down like icicles and stalagmites grow from the floor of the cave upwards. Stalactites and stalagmites always occur in pairs. Caves form when water slowly dissolves the limestone underground. The dissolved limestone can crystallise again when the water evaporates. This is also a slow process and it happens when water drips down from the ceiling of the cave over a long period of time. The water drops that land on the floor of the cave evaporate over time, and where they fall on the same spot repeatedly, a stalagmite eventually forms. Over many thousands of years, the stalactite and stalagmite may connect to become a column.	Sasol Inzalo Books

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	 Stalactites and stalagmites forming in a cave. (Pictures from Sasol Inzalo Resource Book)	 Cango caves in Oudtshoorn – South Africa	
ASSESSMENT			
TEACHER REFLECTION	Progress:		
	Challenges:		

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity:** How much solute will dissolve?

MATERIALS:

- clear container (a glass beaker would be best, although a large yoghurt tub would also work, but not if you decide to heat it later)
- tap water
- small packet of sugar
- plastic spoon for scooping and stirring

INSTRUCTIONS:

1. Measure half a cup (about 125 ml) of water into the container.
2. Add a teaspoon of sugar to the water. Stir until all the sugar has dissolved.
3. Add another teaspoon and stir again.
4. Keep adding teaspoons (one at a time, stirring continuously) of sugar until no more sugar can dissolve.

QUESTIONS:

1. How many spoons did you add until no more sugar dissolved? _____
2. How did you know that no more sugar could dissolve? _____

3. Complete the following sentences by writing **saturated** or **unsaturated** in the open spaces.
a) When no more solute can dissolve in a solution, we say it is a _____ solution.
b) When more solute can be dissolved in a solution, we say the solution is _____.

VISIT: Growing sugar crystals (video)goo.gl/IUP5w

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

Grade 6 _____

Activity: How much solute will dissolve?

MATERIALS:

- clear container (a glass beaker would be best, although a large yoghurt tub would also work, but not if you decide to heat it later)
- tap water
- small packet of sugar
- plastic spoon for scooping and stirring

INSTRUCTIONS:

1. Measure half a cup (about 125 ml) of water into the container.
2. Add a teaspoon of sugar to the water. Stir until all the sugar has dissolved.
3. Add another teaspoon and stir again.
4. Keep adding teaspoons (one at a time, stirring continuously) of sugar until no more sugar can dissolve.

QUESTIONS:

1. How many spoons did you add until no more sugar dissolved?

Learner dependent answer: Amount of sugar will depend on the size of the spoon, stirring, amount of water if more than 125 ml etc.

2. How did you know that no more sugar could dissolve?

The sugar stopped dissolving and sank to the bottom of the container.

3. Complete the following sentences by writing **saturated** or **unsaturated** in the open spaces.

- a) When no more solute can dissolve in a solution, we say it is a **saturated** solution.
- b) When more solute can be dissolved in a solution, we say the solution is **unsaturated**.

VISIT: Growing sugar crystals (video)[goo.gl/IUP5w](https://www.youtube.com/watch?v=IUP5w)

School Name: _____
Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity:** Making sugar crystals (Extension of previous activity)

M1T4R81LS:

- ½ cup water (about 125 ml)
- 1 cup table sugar
- clean glass jar
- food colouring
- pencil
- rough string (cooking twine works great)
- beaker or pan for boiling water and making solution
- spoon
- stove or Bunsen burner and stand

INSTRUCTIONS:

1. Tie a length of string onto a pencil. The string should be long enough to reach almost to the bottom of your glass jar.
2. Make a saturated sugar solution by boiling the water in the pan, slowly adding sugar a teaspoon at a time. If you have a Bunsen burner and stand, you can do this in a beaker over the flame.
3. Stir after each spoonful and keep adding sugar until the sugar won't dissolve any more in the water. If you do not add enough sugar, your crystals will not grow quickly. If you use too much sugar, your crystals will grow on the undissolved crystals and not on the string.
4. Pour some food colouring into your saturated solution to give the crystals a colour.
5. Pour your solution into the clear glass jar. If you have undissolved sugar at the bottom of your container, avoid getting it in the jar.
6. Place your sting inside the glass jar
7. Place your jar where it will not be disturbed and check on your string each day and observe the crystal growth.
8. Allow the crystals to grow until they have reached a size that you desire, or until they have stopped growing. You can pull the string out and allow the crystals to dry. You can eat them or keep them!

QUESTIONS:

1. How long did it take for crystals to start forming on the string? _____
2. What are the crystals made of? _____
3. Why do you think we boiled the water when dissolving the sugar in the solution?

VISIT: Copper sulphate crystal time lapse (video) goo.gl/7IL35

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		• Identify substances that cannot dissolve in water •			
Content & Concepts/Subtopic: Insoluble Substances					
Terminology					
		Solution Dissolve Solute Soluble Insoluble Solvent			
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u>A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid	Pictures sourced from the internet  http://s://ww.w.youtube.co.m/watch ?v=9FBpdaokLto	Textbook Chalkboard Laptop and projector	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved CONTENT Water is known as the universal solvent. This means that many different substances can dissolve in water. This makes water a very useful. Think of all the uses for water. We dissolve dirt and waste in water. Sewage is also dissolved in water. But there are many substances that do not dissolve in water. These substances are said to be insoluble.	As an introduction, the teacher can use pictures (or video clip if available) together with the questions that follow as a basis to start a discussion to show understanding on the part of the learners. Learners discuss each of the questions on the attached activity sheet (in pairs) and write down the most suitable answer. Verbal feedback will facilitate greater discussion towards a common understanding and serve as corrective work as well as revision.	
ASSESSMENT		
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

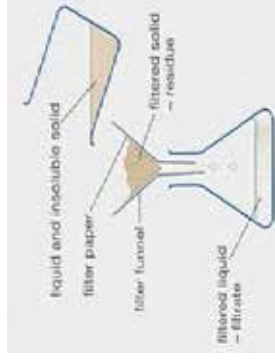
Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____ **Activity: Revision**

1. Can you remember how to separate sand and water? Briefly explain the process.

2. In the picture below a mixture of sand and water is poured through a filter. What is this process called?



3. Why do the sand grains stay behind on the filter paper, but the water passes through it?

4. What was the mixture of sugar and water called? (Hint: It was a special kind of mixture called a)

5. What would happen if the mixture of sugar and water is poured through a filter? Would it be possible to separate the water and the sugar?

6. What happens to the sugar when it dissolves in the water?

7. Why is it not possible to separate a solution through a filter?

8. Describe how you can get the solid sugar back from the sugar solution.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____

Activity:

1. Can you remember how to separate sand and water? Briefly explain the process.

In the activity "Mixing a solid and a liquid" we saw that a mixture of sand and water can be separated by passing the mixture through a paper towel.

2. In the picture below a mixture of sand and water is poured through a filter. What is this process called?



The process is called Filtering or Filtration

3. Why do the sand grains stay behind on the filter paper, but the water passes through it?

The sand grains are too large to pass through the paper. The water particles are very small and can easily pass through the filter paper.

4. What was the mixture of sugar and water called?

It was a special kind of mixture called a solution

5. What would happen if the mixture of sugar and water is poured through a filter? Would it be possible to separate the water and the sugar?

The sugar and water would pass through the filter and it would not be possible to separate them in this way.

6. What happens to the sugar when it dissolves in the water?

The sugar crystals separate into individual particles that mix with the particles of the water.

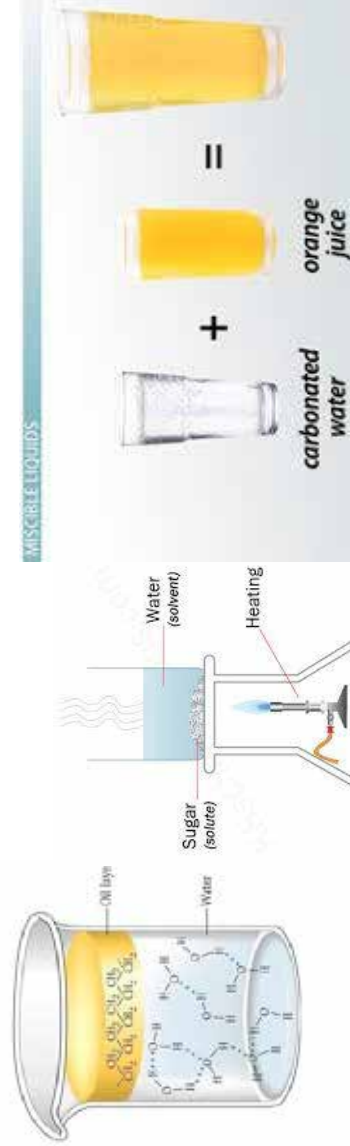
7. Why is it not possible to separate a solution through a filter?

Because the particles of the solute and the solvent are thoroughly mixed and are of roughly the same size.

8. Describe how you can get the solid sugar back from the sugar solution.

Learners must describe the process of evaporation or boiling which leaves behind the sugar crystals

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Dissolving		• Explain the concept of dissolving using concrete examples			
Content & Concepts/Subtopic: Introduction to dissolving		•			
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
VOCABULARY Dissolve: The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer visible after the mixing. Soluble: When a solid is able to dissolve into a liquid Insoluble: When a solid is not able to	 Pictures sourced from the internet.		Textbook Chalkboard Charts Pictures Activity Sheet

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
dissolve into a liquid. The solid is still visible after mixing. Solute: A solid that is able to dissolve into a liquid Solvent: A liquid into which a solute can be dissolved. CONTENT What is dissolving? What does rate of dissolving mean?	Lesson: Introduction to dissolving (60 minutes) Remember that a state change is when a substance changes from one state (i.e. solid) to another state (i.e. liquid). Check out this video to remind you. goo.gl/gf7Ck <i>The difference between melting and dissolving is very relevant, and mistaking dissolving for melting is a pervasive misconception at this stage of the learners' development.</i> REVISION: What is dissolving? How water mixes with a solute to make a solution (video) goo.gl/zH7FY When one substance become broken down or absorbed by another substance or disappears into another substance. For example when sugar becomes absorbed into water and it looks like it has disappeared. Demonstrate how copper sulphate will dissolve in ordinary tap water. Explain that we use copper sulphate since it colours the water so we are able to observe the dissolving easier. Use attached activity as revision and to test relevant previous knowledge.	Laptop and Projector
ASSESSMENT	Learners complete attached activity sheets. Their responses can be marked as informal assessments tasks to determine acquisition of knowledge and to show understanding of the concepts taught. Educator will draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

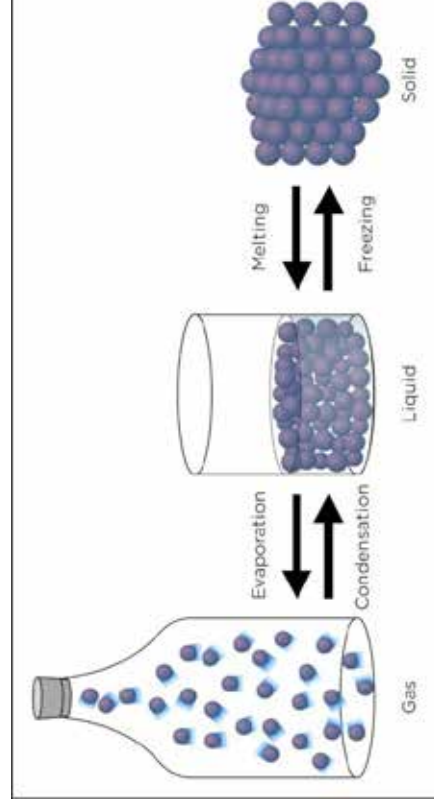
Grade 6 _____ **Activity:** Is melting and dissolving the same?

In this activity we are going to explore the differences between melting and dissolving. We have learnt that matter can exist as 3 different states: solid, liquid and gas.

REVISION

Watch the following short video clip to remind yourself how a solid, liquid and gas are different from each other. You should look out for the part where the states change. The solid changes to a liquid and then the liquid changes into a gas. Remember that a state change is when a substance changes from one state (i.e. solid) to another state (i.e. liquid).

The following picture shows how the different states of matter are related to each other. It also shows what the different state changes are called.



QUESTIONS:

1. What is needed to change a solid into a liquid?

2. What is the process called when a solid changes into a liquid?

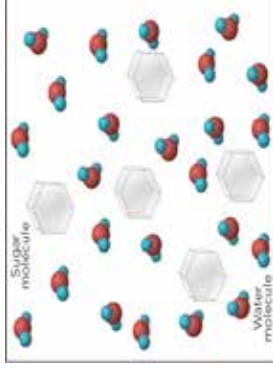
3. Fill in the missing words:

The particles in a _____ have fixed positions. When the solid melts, the particles are free to move from their positions. The state in which particles are close to each other but free to move around is called the _____ state.

INSTRUCTIONS

Do you remember dissolving sugar in water in the previous chapter?

The following picture shows what we would see if we could shrink ourselves down to the size of water and sugar particles (molecules). . . .



Solution of water and sugar molecules (particles)

Look carefully at the picture and then answer the following questions.

QUESTIONS:

1. Why is the sugar no longer visible? Give a reason.

2. How can we be sure the sugar has not "disappeared" and that it is still there?

-
3. How is the sugar and water mixture different from the picture of the liquid mixture which is shown above?
-
-
4. What do we call it when we have two or more substances combined?
-
5. Can we say that the sugar melts? Give a reason.
-
-

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: **MEMORANDUM**

Date: _____

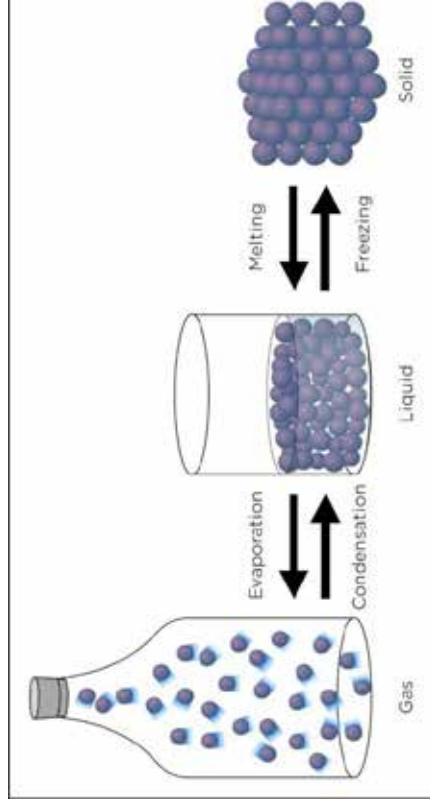
Grade 6 _____ **Activity:** Is melting and dissolving the same?

In this activity we are going to explore the differences between melting and dissolving. We have learnt that matter can exist as 3 different states: solid, liquid and gas.

REVISION

Watch the following short video clip to remind yourself how a solid, liquid and gas are different from each other. You should look out for the part where the states change. The solid changes to a liquid and then the liquid changes into a gas. Remember that a state change is when a substance changes from one state (i.e. solid) to another state (i.e. liquid).

The following picture shows how the different states of matter are related to each other. It also shows what the different state changes are called.



QUESTIONS:

1. What is needed to change a solid into a liquid?

Energy or heat is needed to change a solid into a liquid

2. What is the process called when a solid changes into a liquid?

It is called melting

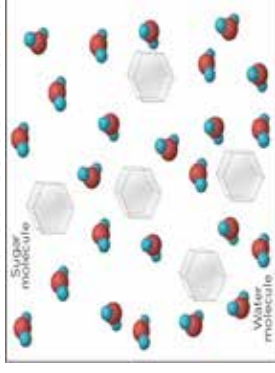
3. Fill in the missing words:

The particles in a solid have fixed positions. When the solid melts, the particles are free to move from their positions. The state in which particles are close to each other but free to move around is called the liquid state.

INSTRUCTIONS

Do you remember dissolving sugar in water in the previous chapter?

The following picture shows what we would see if we could shrink ourselves down to the size of water and sugar particles (molecules).



Solution of water and sugar molecules (particles)

Look carefully at the picture and then answer the following questions.

QUESTIONS:

1. Why is the sugar no longer visible? Give a reason.

The sugar does not disappear. It is not visible anymore as the sugar crystals have broken up into the individual sugar molecules, which we cannot see with the naked eye.

2. How can we be sure the sugar has not "disappeared" and that it is still there?

We can get the sugar back in crystal form by evaporating all the water away.

3. How is the sugar and water mixture different from the picture of the liquid mixture which is shown above?

The picture of the sugar and water has two kinds of particles.

The picture of the liquid only has one kind of particle.

4. What do we call it when we have two or more substances combined?

It is called a mixture

5. Can we say that the sugar melts? Give a reason.

No, the sugar does not melt. The sugar particles are free, but they are mixed with the water.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solutions as special mixtures		- Identify and explain the factors that affect the rate of dissolving			
Content & Concepts/Subtopic:					
Factors that affect the rate of Dissolving					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying	✓	Planning Investigations		Evaluate
✓	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Factors that affect the rate (time taken) of dissolving (60 minutes) Temperature of the mixture. Learners (in groups of no more than 6) should conduct the investigation given in the attached activity as an introduction. Use the questions as consolidation of the concepts as stated below.		Textbook Chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved. <u>Temperature:</u> tells us how hot or cold an object is. We measure temperature with a thermometer. <u>Grain size:</u> the size of the particles of the substance. A big lump has a large grain size while powder has a small grain size. <u>Variable:</u> something (an aspect of the investigation) that we change during an experiment. For instance, in an experiment to compare how fast a solute dissolves at different temperatures, we would change the temperature of the solvent. This means temperature is a variable in this experiment.	Substances will dissolve faster in warmer water than in colder water. In warm water there are more spaces between the water particles. This means that there is more space for the sugar / salt / copper sulphate (or other solute) particles. (The above explanation can be used as the conclusion for the investigation in the attached activity)	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
CONTENT What is dissolving? What does rate of dissolving mean? • How does temperature affect the rate of dissolving of a substance? • How does stirring affect the rate of dissolving of a substance? • How does the size of the solute grains affect the rate of dissolving of a substance?		
ASSESSMENT	Learners complete attached activity sheets. Their responses can be marked as informal assessments tasks to determine acquisition of knowledge and to show understanding of the concepts taught. Educator will draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____

INVESTIGATION: Does salt dissolve faster in hot or cold water?

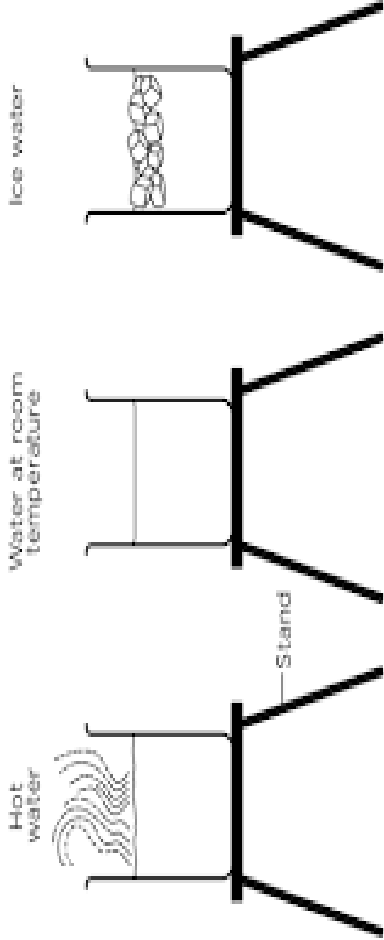
AIM (What are we trying to do): _____

MATERIALS AND APPARATUS:

- 3 clear containers (glass beakers are ideal, but small yoghurt tubs will also be suitable)
- table salt
- very hot water (not boiling)
- tap water (at room temperature)
- ice water
- teaspoon
- stopwatch or clock with second hand

METHOD:

1. Measure the same quantity (100 ml) of ice water, tap water and hot water respectively into the three containers. Label your containers COLD, WARM and HOT



2. Place one teaspoon (5 ml) of salt into the container with the hot water.
3. Stir the solution by moving the teaspoon once back and forth through the water.
4. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.
5. Repeat steps 2-4 with the tap water and record the time it takes for the salt to dissolve in the table.
6. Repeat steps 2-4 with the ice water, and record the time it takes for the salt to dissolve in the table.

RESULTS:

The effect of temperature on dissolving

Situation	Time to dissolve (in seconds)
Salt in hot water	
Salt in tap water	
Salt in ice water	

QUESTIONS: (Answer each question using complete sentences. No one word answers)

1. What did we compare in this investigation?

2. Name three things that were the same about the three situations.

3. What did we change in this investigation?

4. We measured the temperature of the water. What else did we measure?

5. In which situation did the salt dissolve the fastest?

CONCLUSION:

The salt crystals dissolved faster in the hot water than the cold water. Temperature affects the rate of dissolving. When we increase the temperature of the solvent, the rate at which the solute dissolves.

Extension question: Why do you think the salt dissolves faster in the hot water?

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 _____

INVESTIGATION: Does salt dissolve faster in hot or cold water?

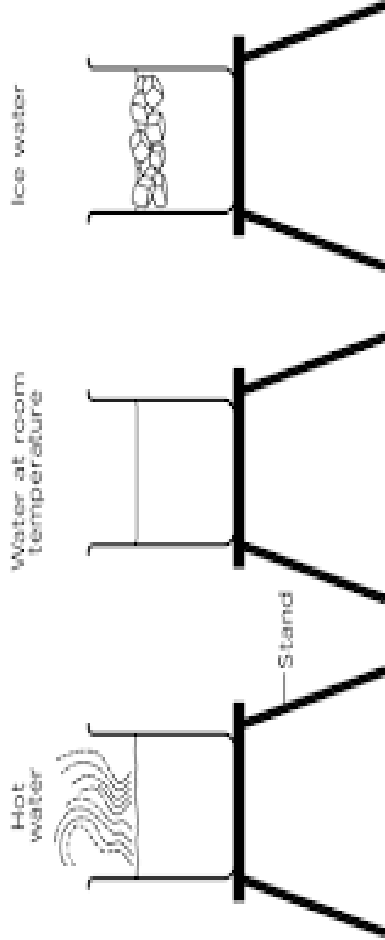
AIM (What are we trying to do): Conduct an investigation to see whether salt will dissolve faster in hot or cold water

MATERIALS AND APPARATUS:

- 3 clear containers (glass beakers are ideal, but small yoghurt tubs will also be suitable)
- table salt
- very hot water (not boiling)
- tap water (at room temperature)
- ice water
- teaspoon
- stopwatch or clock with second hand

METHOD:

1. Measure the same quantity (100 ml) of ice water, tap water and hot water respectively into the three containers. Label your containers COLD, WARM and HOT



2. Place one teaspoon (5 ml) of salt into the container with the hot water.
3. Stir the solution by moving the teaspoon once back and forth through the water.
4. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.
5. Repeat steps 2-4 with the tap water and record the time it takes for the salt to dissolve in the table.
6. Repeat steps 2-4 with the ice water, and record the time it takes for the salt to dissolve in the table.

RESULTS:

The effect of temperature on dissolving

Situation	Time to dissolve (in seconds)
Salt in hot water	Will be obtained during the
Salt in tap water	practical investigation in class
Salt in ice water	This may differ from class to class

QUESTIONS: (Answer each question using complete sentences. No one word answers)

1. What did we compare in this investigation?

We compared how fast salt dissolved in hot water, water at room temperature, and ice water.

2. Name three things that were the same about the three situations.

The amount of water we used
The amount of salt we added to the water
The amount of stirring

3. What did we change in this investigation?

The temperature of the water.

*****Teacher note: This is an opportunity to introduce the term variable (see New Words above). The variable that we change (manipulate) is called the independent variable.*****

4. We measured the temperature of the water. What else did we measure?

We measured the time it took for the salt to dissolve.

*****Teacher note: The variable that we measure is called the dependent variable. In this case time is the dependent variable.*****

5. In which situation did the salt dissolve the fastest?

The salt dissolves fastest in hot water

CONCLUSION:

The salt crystals dissolved faster in the hot water than the cold water. Temperature affects the rate of dissolving. When we increase the temperature of the solvent, the rate at which the solute dissolves.

Extension question: Why do you think the salt dissolves faster in the hot water?

Teacher note: This is an opportunity to bring the energy concept into the conversation.

Children move faster when they have more energy! Particles also move faster when they have more energy. When a solute dissolves in a solvent, the solute particles spread out among the solvent particles. This process happens much faster when all the particles are moving faster.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Dissolving		• Identify and explain the factors that affect the rate of dissolving			
Content & Concepts/Subtopic: Factors that affect the rate of dissolving					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing		Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
	Interpreting Information		Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Lesson: Factors that affect the rate (time taken) of dissolving (30 minutes) Stirring or shaking the mixture. Learners complete attached activity as an introductory activity The educator can demonstrate by first shaking the coffee solution (with three teaspoons of sugar) for a certain amount of time (10 seconds) and ask a learner to taste for sweetness. Then the educator can take the same amount of sugar in another cup of coffee and stir for the same amount of time. Ask the same learner to taste and describe the difference taste /		Textbook Chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved <u>CONTENT</u> What is dissolving? What does rate of dissolving mean? • How does temperature affect the rate of dissolving of a substance? • How does stirring affect the rate of dissolving of a substance? • How does the size of the solute grains affect the rate of dissolving of a substance?	sweetness. Stirring and shaking are both ways of mixing a solute and a solvent. But which one causes a faster rate of dissolving? Stirring is better at mixing the solute with solvent than shaking the solution / mixture.	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
ASSESSMENT	Learners complete attached activity sheets. Their responses can be marked as informal assessments tasks to determine acquisition of knowledge and to show understanding of the concepts taught. Educator will draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.		
TEACHER REFLECTION			Progress: Challenges:

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____

Date: _____

Grade 6 _____ **Activity: Rates of dissolving**

The rate of dissolving refers to how quickly a solute dissolves in a solvent. The word "rate" has many meanings. In science, when we use the word "rate" we usually mean how fast or how slow. Tom likes his coffee sweet, with 3 teaspoons of sugar. For the coffee to taste sweet, the sugar must be dissolved. Here is a picture of a cup of coffee. Answer the questions that follow.



1 cup of coffee

QUESTIONS

1. Is the cup of coffee a mixture? Give a reason.

2. Is the cup of coffee a solution? Give a reason.

3. Make a list of the components / substances in the coffee mixture.

4. Which component is the solvent?

5. Is the sugar a solute or a solvent?

6. What could Tom do to make sure that the sugar dissolves quickly?

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: MEMORANDUM

Grade 6 _____

Date: _____

Activity: Rates of dissolving

The rate of dissolving refers to how quickly a solute dissolves in a solvent. The word "rate" has many meanings. In science, when we use the word "rate" we usually mean how fast or how slow. Tom likes his coffee sweet, with 3 teaspoons of sugar. For the coffee to taste sweet, the sugar must be dissolved. Here is a picture of a cup of coffee. Answer the questions that follow.



1 cup of coffee

QUESTIONS

1. Is the cup of coffee a mixture? Give a reason.

Yes, because it is a combination of different substances.

2. Is the cup of coffee a solution? Give a reason.

No, it is not a solution as a whole. The milk is suspension, as it is cloudy, and does not dissolve in the water. The coffee granules are an infusion in the water. However, the sugar does dissolve in the water and this forms a solution.

Teacher note: This might be hard for learners to answer, but it is important to note here that "cloudiness" implies that tiny aggregates or globules are suspended in the liquid or gas base. Transparency implies the particles of the substances are separated from each other and dissolved. So the milk is a suspension and not a solution in the water.

3. Make a list of the components / substances in the coffee mixture.

Coffee, sugar and milk in water

4. Which component is the solvent?

Water is the solvent

5. 8s the sugar a solute or a solvent?

The sugar is the solute

6. What could Tom do to make sure that the sugar dissolves quickly?

Tom could stir the coffee, Tom could use finer sugar, or Tom could stir in the sugar before the milk is added (assuming the milk is not heated).

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Dissolving		- Identify and explain the factors that affect the rate of dissolving			
Content & Concepts/Subtopic:					
Factors that affect the rate of dissolving					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS	1. DOING SCIENCE				
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations / Experiments
✓	Observing		Raising Questions		Investigate
✓	Comparing	✓	Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying	✓	Planning Investigations		Evaluate
	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	Lesson 4: Factors that affect the rate (time taken) of dissolving (30 minutes) Grain size of the solute Another factor that will affect rate of dissolving is the size of the solute. A large grain of solute will take longer to dissolve in water than a smaller grain of the same solute. This is because a grain is made up of particles of the solute. It takes time for the grain to break apart. The larger the grain the slower the rate of dissolving will be.		Textbook Chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved <u>CONTENT</u> What is dissolving? What does rate of dissolving mean? • How does temperature affect the rate of dissolving of a substance? • How does stirring affect the rate of dissolving of a substance? • How does the size of the solute grains affect the rate of dissolving of a substance?	Learners complete Activity Attached herewith	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
ASSESSMENT	Learners complete attached activity sheets. Their responses can be marked as informal assessments tasks to determine acquisition of knowledge and to show understanding of the concepts taught. Educator will draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.		
TEACHER REFLECTION	Progress:		
	Challenges:		

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 ____ Activity: To investigate the rate of dissolving

AIM: To investigate the rate at which a larger grained solute dissolves when compared to a smaller grain of the same solute.

HYPOTHESIS: The size of the grain of a solute is proportional to the rate at which it dissolves.

MATERIALS AND APPARATUS:

- 2 clear containers (glass beakers are ideal, but small yoghurt tubs will also be suitable)
- Fine table salt
- Coarse / rough salt
- 250 ml tap water (at room temperature)
- teaspoon
- stopwatch or clock with second hand

METHOD:

1. Measure the same quantity (125 ml) of tap water into the two containers. Label your containers LARGE GRAIN and SMALL GRAIN.
2. Ensure that the water is the same temperature in both containers.
3. Place one teaspoon (5 ml) of fine salt into the container marked small grain.
4. Use the teaspoon to stir the solution slowly.
5. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.
6. Place one teaspoon (5 ml) of rough / coarse salt into the container marked large grain.
7. Use the teaspoon to stir the solution slowly.
8. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.

RESULTS:

The effect of temperature on dissolving

Situation	Time to dissolve (in seconds)
Fine salt in tap water	
Rough salt in tap water	

QUESTIONS: (Answer each question using complete sentences. No one word answers)

1. What did we compare in this investigation?

2. Name three things that were the same in both the situations above.

3. What did we change in this investigation?

4. We measured the amount of the water in each container. What else did we measure?

5. In which situation did the salt dissolve the faster?

CONCLUSION:

Extension question: Write down (Describe) two ways in which you could make the rough / coarse salt dissolve faster.

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____ Date: _____

Grade 6 ____ Activity: To investigate the rate of dissolving

AIM: To investigate the rate at which a larger grained solute dissolves when compared to a smaller grain of the same solute.

HYPOTHESIS: The size of the grain of a solute is proportional to the rate at which it dissolves.

MATERIALS AND APPARATUS:

- 2 clear containers (glass beakers are ideal, but small yoghurt tubs will also be suitable)
- Fine table salt
- Coarse / rough salt
- 250 ml tap water (at room temperature)
- teaspoon
- stopwatch or clock with second hand

METHOD:

1. Measure the same quantity (125 ml) of tap water into the two containers. Label your containers LARGE GRAIN and SMALL GRAIN.
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3. Place one teaspoon (5 ml) of fine salt into the container marked small grain.
4. Use the teaspoon to stir the solution slowly.
5. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.
6. Place one teaspoon (5 ml) of rough / coarse salt into the container marked large grain.
7. Use the teaspoon to stir the solution slowly.
8. Measure the time it takes for the salt to dissolve completely. Record the time in the table below.

RESULTS:

The effect of temperature on dissolving

Situation	Time to dissolve (in seconds)
Fine salt in tap water	
Rough salt in tap water	

QUESTIONS: (Answer each question using complete sentences. No one word answers)

1. What did we compare in this investigation?

We compared which dissolved faster in water, fine salt or coarse salt.

2. Name three things that were the same in both the situations above.

The amount of water we used
The temperature of the water
The amount of stirring

3. What did we change in this investigation?

The grain size of the salt

***Teacher note: Zero, you should explain the term 'grain size' by pointing out the differences in the sizes of the salt crystals. You should also try to convey that the same quantity (mass) of table salt would contain more grains if the grains were smaller. ***

4. We measured the amount of the water in each container. What else did we measure?

We measured the time it took for each type of salt to dissolve.

Teacher note: The variable that we measure is called the dependent variable. In this case the dependent variable is time, and the independent variable is grain size.

5. In which situation did the salt dissolve the faster? I

The fine salt dissolved faster

CONCLUSION:

The fine salt dissolved faster than the coarse salt. Grain size affects the rate of dissolving. When we increase the grain size of the solute, the rate at which the solute dissolves decreases.

Extension question: Write down (Describe) two ways in which you could make the rough / coarse salt dissolve faster.

Increase the temperature of the solvent / Use hot water

Increase the rate of agitation / Stir faster.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:				
TOPIC: Dissolving		- Identify and explain the factors that affect the rate of dissolving				
Content & Concepts/Subtopic:						
Consolidation of concepts - Revision						
Terminology	Solution	Dissolve	Solute	Soluble	Insoluble	Solvent
SPECIFIC AIMS		1. DOING SCIENCE				
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS				
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE				
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues		✓	Doing Investigations / Experiments
	Observing		Raising Questions			Investigate
	Comparing		Predicting			Design
	Measuring		Hypothesizing			Make / Construct
	Sorting & Classifying		Planning Investigations			Evaluate
	Interpreting Information		Recording Information			Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
<u>VOCABULARY</u> <u>Solution:</u> A mixture of a solid and a liquid where the solid fills the spaces between the liquid particles. Eg. Salt and water or Sugar and water. <u>Dissolve:</u> The process of mixing a solid and liquid until the solid becomes part of the liquid where the solid is no longer	<u>REVISION OF CONCEPTS TAUGHTS / CONSOLIDATION</u> Based on the previous 3 practical activities, learners will discuss the conclusions for each activity after which they can copy the following notes as consolidation. The time it takes for a substance to dissolve is called the dissolving rate or the rate of dissolution. • The rate at which a substance dissolves can be affected by 3 factors, namely:		Textbook Chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
visible after the mixing. <u>Soluble:</u> When a solid is able to dissolve into a liquid <u>Insoluble:</u> When a solid is not able to dissolve into a liquid. The solid is still visible after mixing. <u>Solute:</u> A solid that is able to dissolve into a liquid <u>Solvent:</u> A liquid into which a solute can be dissolved	– the temperature of the solution; – whether or not the solution is stirred (or shaken); and – the grain size of the solute. • 1 solute will generally dissolve faster if the solvent in which it dissolves is warm. • 1 solute will dissolve faster when the solution is stirred or shaken. • 1 solute will dissolve faster if the size of its grains is small.	
ASSESSMENT	Learners complete attached activity sheets. Their responses can be marked as informal assessments tasks to determine acquisition of knowledge and to show understanding of the concepts taught. Educator will draw up suitable rubrics / memos based on the specific substances / circumstances of each individual investigation / experiment / Activity sheet.	
TEACHER REFLECTION	Progress:	
	Challenges:	

School Name: _____

Natural Sciences and Technology

Term 2: Matter and Materials

Learners Name: _____

Date: _____

Grade 6 ____ Activity: Revision Activity

Instructions to learners:

Complete the following crossword puzzle:

Use the words in the box below, and the clues that are given underneath.

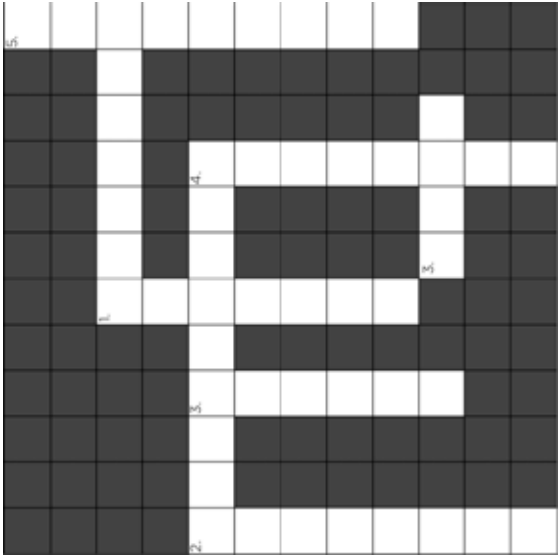
Soluble	Solute	Solvent	Dissolves
Stir	Decrease	Solution	Saturated

DOWN:

- a) When a solute can dissolve in a solvent we say it is ... (7 letters)
- b) When we lower the temperature of the solvent, the rate of dissolving of the solute will ... (8 letters)
- c) The substance that dissolves in the solvent is called the ... (6 letters)
- d) The mixture of solute and solvent is called the ... (8 letters)
- e) When we cannot dissolve any more solute in a solution, we say the solution is ... (9 letters)

ACROSS:

- a) The substance that dissolves the solute is called the ... (7 letters)
- b) The solute ... in the solvent. (9 letters)
- c) When we want the solute to dissolve more quickly we should ... the solution. (4 letters)



DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: MIXTURES AND WATER RESOURCES.		• Show an understanding of what is pollution.	
Content & Concepts/Subtopic: Water pollution			
Terminology	Pollution, solvent, sewage, effluent.		
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		✓
	3. SCIENCE, TECHNOLOGY AND SOCIETY		✓
PROCESS SKILLS			
✓ Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓ Observing	✓	Raising Questions	Recording information
Comparing		Predicting	Interpreting information
Measuring		Hypothesizing	Communicating
Sorting & Classifying		Planning Investigations	Evaluating and improving products
Designing - showing		Making/constructing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Introduction: Teacher ask learners what they think pollution is. (The introduction of harmful substances or products into the environment). Learners respond to the question and engage in conversations Teacher write answers on board. Teacher ask what are the types of pollution we found in the environment. E.g. soil, air, sound, water etc. Learners respond to the question by recalling and accessing previous year's information. Learners also raise questions and identify the reasons for all the types of pollution taking place in our world and engage in discussions.	Pictures Posters Worksheets Video clips Sasol Inzalo Book Chalk/Whiteboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Teacher writes answers on board. This whole exercise and discussion is to see what the learners understanding is of pollution and the types of pollution we found with the focus on water pollution. 	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	   	
ASSESSMENT	Teacher assesses the learners understanding of what pollution is. (Oral)	
TEACHER REFLECTION		

ACTIVITY 1.OBSERVATION SHEET:WATER POLLUTION

1. Make a list of all the objects that do not belong in the water.

2. How do you think all these objects end up in the water?

3. Looking at the pictures, do you think the water is clean. Give reasons for your answer.

ACTIVITY 1.ANSWERS OFOBSERVATION SHEET:

WATER POLLUTION

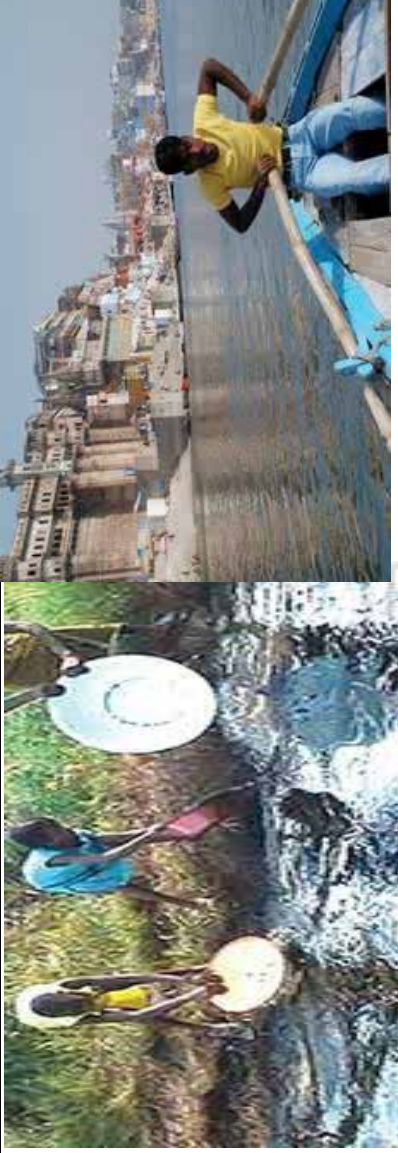
1. Make a list of all the objects that do not belong in the water.
Polystyrene, Plastic bags, paper, tyres, bottles, metal rubbish bin, tins, shopping trolley, oil.
2. How do you think all these objects, oil end up in the water?
Humans and their activities are often the reason why these objects end up in the water. Cars drop oil and other chemicals wash into the rainwater collection system and straight into rivers and seas.
3. Looking at the pictures, do you think the water is clean. Give reasons for your answer.
No. There are too many objects in the water and there are chemicals and pesticides that dissolved in the water that we can't see.

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: MIXTURES AND WATER RESOURCES				• Show an understanding that many things mix or dissolve in water that pollute the water resources in our environment	
Content & Concepts/Subtopic: Water pollution					
Terminology		Dissolve, solvent, unhealthy			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
✓	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
In the environment, many things mix or dissolve in water. We have learnt that water can dissolve many substances. Water is a good solvent. Water that has unhealthy substances in it is polluted. Polluted water is not clean.	Teacher explain the content of the work and use pictures or posters of different polluted water resources which are meant to guide the discussion of pollution. (Can make own poster or collect pictures from internet to show to learners). Teacher ask questions regarding the pictures. The questions will depend on the pictures that the teacher prepared. e.g. What do you see? What do you think pollutes the water? Refer to previous lessons about soluble and insoluble substances. (Here the teacher can see the learners understanding of insoluble and soluble substances in water).	Pictures Posters Worksheets Video clips Sasol Inzalo Book Chalk/Whiteboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Learners respond to the pictures, they observe, interpret, compare it and answer the questions. (Oral). Learners identify the problems and issues about polluted water. (Oral work). Learners also raised questions about the pictures shown to them and discussions take place. Learners can also predict what will happen if these resources are used as is. (Oral) Learners record all the findings in their workbooks. Teacher writes answers on board. 	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	 Teacher can google water pollution to find a video that's suitable for the learners and show it to them. (If resources are available). Learners watch a video clip about water pollution. Reference: goo.gl/07xDe.	
ASSESSMENT	Teacher assess learners understanding of the many things mix or dissolve in water. (Oral.)	
TEACHER REFLECTION	Teacher assess learners recordings and findings of discussions. (Workbook)	

DATE:WEEK:6 Per 3		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: PROCESSES TO PURIFY WATER		• Show an understanding of how to complete an observation sheet of what pollutes water and things that mix and pollute our water resources.		
Content & Concepts/Subtopic: Water pollution				
Terminology	Pollution, soluble, insoluble			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing		Raising Questions	✓ Recording information
	Comparing		Predicting	✓ Interpreting information
	Measuring		Hypothesizing	✓ Communicating
✓	Sorting & Classifying		Planning Investigations	Evaluating and improving products
	Designing - showing		Making/constructing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
.	The teacher hand out the observation sheet. Show the posters or pictures to the learners and do consolidation of the previous two periods. Learners are to complete the observation sheet provided. They recall information of previous lessons, observe sort and identify problems and issues and then record on their observation sheet. (Use pictures or posters provided in period 2. Marking of the observation sheet and report back. (Communication)	Observation sheet
ASSESSMENT	Teacher checks the observation sheet that learners completed. (Informal)	
TEACHER REFLECTION		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>ACTIVITY 1.OBSERVATION SHEET:WATER POLLUTION</u>		
1. Make a list of all the objects that do not belong in the water. 2. How do you think all these objects end up in the water? 3. Looking at the pictures, do you think the water is clean. Give reasons for your answer.		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>ACTIVITY 1.ANSWERS OFOBSERVATION SHEET:WATER POLLUTION</u> 1. Make a list of all the objects that do not belong in the water. Polystyrene, Plastic bags, paper, tyres, bottles, metal rubbish bin, tins, shopping trolley, oil. 2. How do you think all these objects, oil end up in the water? Humans and their activities are often the reason why these objects end up in the water. Cars drop oil and other chemicals wash into the rainwater collection system and straight into rivers and seas. 3. Looking at the pictures, do you think the water is clean. Give reasons for your answer. No. There are too many objects in the water and there are chemicals and pesticides that dissolved in the water that we can't see.		

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: MIXTURES AND WATER RESOURCES		• Identify insoluble pollutants.			
Content & Concepts/Subtopic:Water can be polluted by:Insoluble substances					
Terminology	Insoluble, pollutants				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Introduction: Teacher first ask learners if they know what insoluble substances is. (pollutants). Learners react to question and teacher write answers on board. (access and recall previous information and communicate)) Teacher then explain to the learners the terminology of insoluble substances (pollutant: substances that pollute something) and that it causes water pollution.(Refer to previous topic.)	Pictures Video clip Book Chalk/Whiteboard Sasol Inzalo Posters Worksheets

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Learners hypothesize: e.g. Curry powder will not dissolve in water, etc. The teacher now demonstrate with curry powder, cooking oil and sand mixed with water that it cannot dissolve in water and that it pollutes the water. (insoluble). Learners ask questions about the demonstration and identify problems that is the cause of water pollution. Teacher develop own observation sheet and hand it out to the learners. Learners observe, interpret and record what they see on the observation sheet.	Curry powder Sand Cooking oil Spoon Water Beaker Observation sheet.
ASSESSMENT	Teacher checks the learners understanding of insoluble substances. Observation sheet.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: MIXTURES AND WATER RESOURCES				Identify soluble pollutants that pollute our water resources	
Content & Concepts/Subtopic: Soluble pollutants					
Terminology		Soluble, fertilizers, insecticides			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
✓	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Soluble substances such as soaps, fertilizers, insecticides, acids and other poisons. Soluble substances dissolve in water which means it is difficult to know if they are in the water or not. Virtually impossible to remove which make the water undrinkable.	Tip: Teacher should keep the following substances out of reach of the learners. Teacher ask learners if they know what is the meaning soluble substances. Learners engage in a conversation about soluble substances and react to the question and teacher write answers on board. Teacher explain the content about soluble substances. Teacher demonstrate that water can be polluted by soluble pollutants like pesticides, fertilizer, soaps acids and poisons. Learners raise questions, identify problems, compare soluble and insoluble substances that cause water pollution.	Liquid washing powder Beaker Spoon Bleach Liquid pesticides (if available) Liquid fertilizers (if available) Observation

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Teacher develop own observation sheet. Learners observe and write down their answers on observations on sheet.	sheet
ASSESSMENT	Teacher check the observation sheet and asses accordingly.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: MIXTURES AND WATER RESOURCES				● Know what living germs are and where it comes from that can cause people or animals to get sick.	
Content & Concepts/Subtopic: Living germs					
Terminology		Diarrhoea, cholera, faeces			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
✓	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Living germs – it is living creatures that cannot be seen with the naked eye. Water that look clean can have germs. Toilet waste cause water-borne illnesses such as diarrhoea. Germs in the water can make people sick with diseases such as cholera and diarrhoea. Diarrhoea is when you have a	Teacher can use pictures or posters to guide the explanation of how living germs end up and pollute the water. Teacher explains the content and terminology to the learners and that some of these diseases can cause even death. Learners ask questions and others can respond to them. Discussion take place in class, problems are identified, learners predict what will happen if the situation continues, they hypothesise and discuss solutions. Learners work now in groups can come up with solutions to prevent any of these diseases and record it in their workbooks. (Paragraph)	Pictures, Posters Videos Workbooks Chalk/White board

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
runny stomach and very loose and watery faeces. Faeces is the proper name of solid toilet waste. Toilet waste is a big problem – many people don't have proper toilets at home. They also pollute water when they use rivers and streams as a toilet.		
ASSESSMENT	Teacher assess the solutions in the workbooks.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Identify insoluble pollutants, • soluble pollutants and • What living germs are and where it comes from that can cause people or animals to get sick. (Consolidation)	
TOPIC:MIXTURES AND WATER RESOURCES					
Content & Concepts/Subtopic: Water can be polluted by: Insoluble substances, soluble substances, living germs.					
Terminology		Insoluble, pollutants, soluble.			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions		Recording information
✓	Comparing	✓	Predicting	✓	Interpreting information
	Measuring	✓	Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
.	Teacher show videos if resources are available how living germs from toilet waste can cause water-borne illnesses such as diarrhoea. (Videos should be age appropriate and can be accessed from internet). Teacher can stop video clip at any stage and ask questions relevant to the content taught in the previous lessons. Learner engage in conversations and ask questions about the content of the video that is relevant..		Videos, Pictures, posters

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Learners can also watch a video clip about the BP oil spill in Gulf of Mexico. Reference: goo.gl/OCmEG	
ASSESSMENT	Teacher assess the learners knowledge of the content taught. (Oral)	
TEACHER REFLECTION		

DATE: WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: :MIXTURES AND WATER RESOURCES		• Identify insoluble pollutants, • soluble pollutants and • What living germs are and where it comes from that can cause people or animals to get sick.		
Content & Concepts/Subtopic: Water can be polluted by: Insoluble substances, soluble substances, living germs.				
Terminology		Insoluble, pollutants, Soluble, fertilizers, insecticides		
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY		
		2. UNDERSTANDING AND CONNECTING IDEAS		
		3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing		Raising Questions	✓ Recording information
	Comparing		Predicting	✓ Interpreting information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Evaluating and improving products
	Designing - showing		Making/constructing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Teacher hand out Activity sheet 1. (consolidation) Learners are to complete the Activity sheet 1 provided to them.	Workbooks Activity sheet
	Teacher hand out Activity sheet 1.2. (consolidation) Learners are to complete the Activity sheet 1.2 provided to them.	Workbooks Activity sheet

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
ASSESSMENT	Teacher assesses the activity sheets. (Informal and allocate marks to it.)	
TEACHER REFLECTION		

ACTIVITY 1 INSOLUBLE SUBSTANCES, SOLUBLE SUBSTANCES AND LIVING GERMS.

1. What are the three main categories of pollutants found in water?

2. How do you think insoluble pollutants end up in water?

3. Which pollutants would you be able to see with the naked eye?

4. How do you think bacteria that causes illness like diarrhoea and cholera end up in water?

5. What do all 3 categories of pollutants have in common?

ACTIVITY 1.ANSWERS. INSOLUBLE SUBSTANCES, SOLUBLE SUBSTANCES AND LIVING GERMS.

1. What are the three main categories of pollutants found in water?
Insoluble pollutants, soluble pollutants and disease-causing bacteria (germs).
2. How do you think insoluble pollutants end up in water?
People allow garbage to fall into the water instead of placing it in garbage bags for collection and may Even use the water as a toilet releasing germs into the water.
1. Which pollutants would you be able to see with the naked eye?
Insoluble pollutants
2. How do you think bacteria that causes illness like diarrhea and cholera end up in water?
Bacteria (germs) get into the water through people and animals using the water sources as a toilet.
People and animals have bacteria that occur naturally in the digestive tract, but outside of this environment (bodies), they can be harmful.
3. What do all 3 categories of pollutants have in common?
They do not belong in clean water.

ACTIVITY 1.2 INSOLUBLE POLLUTANTS, SOLUBLE POLLUTANTS AND LIVING GERMS.

Look at the picture below of the bird covered in oil and answer the questions.



1. How do you think the oil got into the water that this bird lives in?

2. Is oil a soluble or insoluble pollutant?

3. How will the oil damage this bird and other sea animals?

ACTIVITY 1.2 INSOLUBLE POLLUTANTS, SOLUBLE POLLUTANTS AND LIVING GERMS.

Look at the picture below of the bird covered in oil and answer the questions.



1. How do you think the oil got into the water that this bird lives in?
An oil spill from a ship or oil rig
2. Is oil a soluble or insoluble pollutant?
Oil floats on water and is insoluble.
3. How will the oil damage this bird and other sea animals?
The oil coats their feathers or skin making it hard for them to fly. It is very sticky and very difficult to Remove. The oil can get into their lungs and stomachs which will kill them. Oil also kill fish (possibly the bird's source of food) because it prevents oxygen from the air dissolving in the water (oxygen is insoluble in oil).

ACTIVITY 1 INSOLUBLE SUBSTANCES, SOLUBLE SUBSTANCES AND LIVING GERMS.

6. What are the three main categories of pollutants found in water?

7. How do you think insoluble pollutants end up in water?

8. Which pollutants would you be able to see with the naked eye?

9. How do you think bacteria that causes illness like diarrhea and cholera end up in water?

10. What do all 3 categories of pollutants have in common?

ACTIVITY 1.ANSWERS. INSOLUBLE SUBSTANCES, SOLUBLE SUBSTANCES AND LIVING GERMS.

3. What are the three main categories of pollutants found in water?
Insoluble pollutants, soluble pollutants and disease-causing bacteria (germs).
4. How do you think insoluble pollutants end up in water?
People allow garbage to fall into the water instead of placing it in garbage bags for collection and may even use the water as a toilet releasing germs into the water.
4. Which pollutants would you be able to see with the naked eye?
Insoluble pollutants
5. How do you think bacteria that causes illness like diarrhea and cholera end up in water?
Bacteria (germs) get into the water through people and animals using the water sources as a toilet.
People and animals have bacteria that occur naturally in the digestive tract, but outside of this environment (bodies), they can be harmful.
6. What do all 3 categories of pollutants have in common?
They do not belong in clean water.

ACTIVITY 1.2 INSOLUBLE POLLUTANTS, SOLUBLE POLLUTANTS AND LIVING GERMS.

Look at the picture below of the bird covered in oil and answer the questions.



4. How do you think the oil got into the water that this bird lives in?

5. Is oil a soluble or insoluble pollutant?

6. How will the oil damage this bird and other sea animals?

ACTIVITY 1.2 INSOLUBLE POLLUTANTS, SOLUBLE POLLUTANTS AND LIVING GERMS.

Look at the picture below of the bird covered in oil and answer the questions.



4. How do you think the oil got into the water that this bird lives in?
An oil spill from a ship or oil rig
5. Is oil a soluble or insoluble pollutant?
Oil floats on water and is insoluble.
6. How will the oil damage this bird and other sea animals?
The oil coats their feathers or skin making it hard for them to fly. It is very sticky and very difficult to Remove. The oil can get into their lungs and stomachs which will kill them. Oil also kill fish (possibly the bird's source of food) because it prevents oxygen from the air dissolving in the water (oxygen is insoluble in oil).

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: MIXTURES AND WATER RESOURCES		• Show understand of what wetlands are.		
Content & Concepts/Subtopic: Importance of wetlands.				
Terminology				
Wetland, waterlogged,vlei, marshes, estuaries,				
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY		
		2. UNDERSTANDING AND CONNECTING IDEAS		
		3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing	✓	Raising Questions	Recording information
✓	Comparing	✓	Predicting	Interpreting information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Evaluating and improving products
	Designing - showing		Making/constructing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
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WHAT IS A WETLAND: An area is a wetland if it has the following: • Waterlogged soil, • Water-loving plants • A high water table If soil is waterlogged, it means that it is full of water. The water table refers to the level in the ground where all the soil below this level is waterlogged (full water). If an area has a high-water table, then this level is close to the surface. This means water will not filter down into the ground but remain on the surface forming a wetland. Examples of wetlands are: • marshes • floodplains • swamps • lakes and pans • estuaries • river banks A temporary wetland is wet between 1 and 4 months of the year. A seasonal wetland is wet during the rainy season. 5 to 11 months depending on the length of the rainy season. A permanent wetland is wet throughout the year.	The teacher explains the content of the work to the learners by using pictures of examples of wetlands and showing them a video clip of South-Africa's most well-known wetlands namely the St. Lucia wetlands in KwaZulu-Natal. Learners watch the video if available or observe the pictures or posters that the teacher collected to show to the learners. Teacher divide class in two and they can set their own questions of the content taught and have a competition to test their knowledge of the work taught by the teacher. The learners recall, access information, observe when watching the video or pictures, and they compare the different wetlands. While they set the questions they can ask their opponents to make a prediction of what would happen if a wetland get destroyed. The teacher will be the judge and do the scoring on the board.	Pictures Posters Video clips Internet Worksheets Chalk/Whiteboard Sasol Inzalo Workbook
ASSESSMENT	Teacher checks to see if learners can answer the questions and have an understanding of the work	

	taught in class by recording the marks of each team. (Oral.) Group assessment.
TEACHER REFLECTION	

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Do research on the different wetlands in South Africa. • Apply their knowledge to write a report on wetlands using the questions to guide the process. • Present the report as a poster			
TOPIC: MIXTURES AND WATER RESOURCES					
Content & Concepts/Subtopic: Importance of wetlands					
Terminology	Research, rubric, report.				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions	✓	Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring	✓	Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	Teacher explain to the learners what's expected from them writing a report that should be presented as a poster. Teacher should pace the work so that it can be done in 4 periods. Hand out the question Activity and instructions 2 weeks in advance so that learners can collect information and bring it to school. (can be done individual or as group work). Teacher hand out rubric designed in advance. Instructions:(The poster should be done in class.) Learners might get to visit a wetland near the school or hear a presentation from a		Pamphlets Posters Sasol Inzalo Reading material Internet Video clips poster material cardboard Glue

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	conservationist. /Teacher can download a video from internet. Learners watch videos from the internet about wetlands. If learners do not get the opportunity, they must still complete the project by doing research in books, pamphlets and on the internet. Learners should present their report as a poster. Teacher hand out an activity sheets with questions to guide the learners with their report. Learners do research and write their report and present as a poster.(In class) In the process of their research they will raise questions, identify problems, and hypothesize. (Individual/pair/groups). Presentations included if teacher want to use it and plan around it.  Wetland project.pptx  CAPS Training on wetlands.pptx	Colour pencils Scissors pictures Question activity sheet with instructions. Rubric
ASSESSMENT	Teacher assess the poster (Rubric, informal) Teacher assess the report back by individual or group leader. (Oral Informal)	
TEACHER REFLECTION		

ACTIVITY 1. QUESTIONS TO GUIDE LEARNERS TO WRITE THEIR

REPORT ON WETLANDS.

PRESENT AS A POSTER.

1. WHAT IS A WETLAND?
2. WHAT DOES A WETLAND DO FOR THE ENVIRONMENT?
3. WHAT DOES A WETLAND DO FOR PLANTS AND ANIMALS?
4. WHAT DOES A WETLAND PROVIDE FOR HUMANS?
5. WHAT ARE THE ENVIRONMENTAL DANGERS THAT WETLANDS FACE?
6. CHOOSE A SPECIFIC WETLAND AND ASSESS THE HABITATS, BIODIVERSITY AND WATER QUALITY OF THIS WETLAND.
7. WHAT WOULD THE IMPACT BE TO BIODIVERSITY AND WATER QUALITY IF THIS WETLAND WAS LOST?

DATE: WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: PROCESSES TO PURIFY WATER		• Show an understanding of the importance of wetlands including habitats.		
Content & Concepts/Subtopic: Importance of wetlands.				
Terminology	Ecosystems, habitats			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing	✓	Raising Questions	Recording information
	Comparing		Predicting	Interpreting information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Evaluating and improving products
	Designing - showing		Making/constructing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
WETLANDS ARE IMPORTANT NATURAL ECOSYSTEMS. - Wetlands are a source of water for animals and plants. - Wetlands provide a habitat and	Teacher asks learners if they can describe why they think wetlands are important natural ecosystems? Learners will respond to the question. Teacher explains that wetlands are a source of water and habitat to plants and animals. e.g. There are different types of insects living there. Different species of plants, fishes, frogs, and birds living there that form part of a food web and ecosystem. Discussions will take place in class and in groups.	Workbooks

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
breeding ground for many different plant and animals.	Learners write a short paragraph in their workbooks why they think wetlands are important natural ecosystems. (can include food webs and food chains) Refer to the living things they observed in the pictures/posters/videos. Teacher first asks the learners if they can remember what is a habitat? Learners respond to the question access and recall information of previous grade's work and a class discussion will follow. Teacher asks learners if they know what it means to reproduce? Learners will respond and engage in a conversation. Teacher show learners pictures/posters/videos of many different animals and plants where wetlands provide a habitat and breeding ground for them. Teacher hand out Activity sheet 1. Learners to complete the activity sheet, after access and recall information, observing, comparing the wetlands, identifying possible problems that can occur, raise questions about wetlands as breeding ground for plants and animals, hypothesize what will happen if the wetlands get destroyed to the plants and animals, etc.	Activity sheet
ASSESSMENT	Teacher checks the oral work to see learner's understanding of the content. (informal) Teacher assesses the paragraph. (Informal) Teacher assesses the activity sheet. (Informal)	
TEACHER REFLECTION		

ACTIVITY 1.IMPORTANCE OF WETLANDS.

Students did a study on a river near their city. The river runs into a vlei wetland. They counted the organisms in different parts of their study area. The results are:

Area and distance from the vlei					
Organism	Frog	Water lilies	Heron	Fish	Water beetle
Vlei that river runs into	44	95	22	58	87
Next to busy road (3km from vlei).	12	57	0	34	27
Park where stream runs through (2 km from vlei).	33	62	9	39	61
Next to steel factory (1km from vlei).	2	38	0	12	22

1. Identify the study area with the most water lilies.

2. Identify the part of the study area you think is most polluted. Give a reason for your answer.

3. Explain why there are more living organisms in the vlei area, even if the water that runs through it is polluted.

4. Identify the study area where there are no Herons?

5. Explain what you think would happen to the biodiversity of the wetland if townhouse complexes were built in the area.

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DATE:		WEEK:	OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: PROCESSES TO PURIFY WATER			• Understand that wetlands remove soluble and insoluble substances and • Show an understanding that wetlands act like giant sponges and regulating the flow of water		
Content & Concepts/Subtopic: Wetlands act as natural filters.					
Terminology	Soluble, insoluble, sponges, regulating.				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- Wetlands act as a natural filter that clean the water. The plants in the wetland trap soil particles and sediments, nutrients, as well as insoluble and soluble substances (pollutants) and disease-causing organisms which make the water unsafe. - Wetlands act like giant sponges which store water and prevent flooding and except water	Teacher explain content to learners by using previous pictures/posters/videos as examples of wetlands. Teacher will hand out a content sheet with the content taught to learners which the teacher will prepare in advance. (Using the content in content column) Teacher will divide the learners in groups and the groups will compete against each other. Learners design their own quizzes in groups using the information explained to them and using the content sheet handed out to them. (at least 7 questions per group).	Content sheet.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
during storms and whenever water levels are high. It regulates the flow of water. When a river floods, a wetland provides a place for the water to spread out in the wetland and the plants in the wetland slow the floodwater down. The floodwater is no longer a threat to people living alongside the river. During a dry season when there is not much rain, water from wetlands help to keep rivers and streams flowing so that animals and plants can stay alive.	Learners use the skills ticked in the box above. A competition will take place in class between the groups (Oral) Teacher should hand out the information the learners need for their task to be done in groups or individual.	
ASSESSMENT	Teacher checks the oral work to see learner's understanding of the content. (informal) Group assessment by learners. (Informal)	
TEACHER REFLECTION		

DATE:WEEK		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Understand the impact of loss of wetlands for the biodiversity and water quality			
TOPIC: MIXTURES AND WATER RESOURCES					
Content & Concepts/Subtopic: Biodiversity and water quality.					
Terminology	Biodiversity, agriculture, industry, water quality				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions		Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
As the world's population increases, more and more land is needed for industry, agriculture and housing. The result of the growing population that needs all the resources we have lost half of the wetlands the last hundred years.	Teacher explain the content to the learners. As the teacher explained the work s/he can asked relevant questions of the previous work. Teacher prepare a content sheet in advance and hand it out after the explanation of the content. Learners will ask questions relevant to the content. Teacher hand out activity sheets 1 and 2. Activity 2 can be utilized as a fun activity.	Pictures Video clips Internet Worksheets Book Sasol Inzalo Posters Chalk/Whiteboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Wetlands and biodiversity. When wetlands are destroyed, animals and plants no longer have habitats to live in. Some animals will move away and some plants and animals will die. This have an effect on the biodiversity in the wetland ecosystem. Biodiversity is the term used to describe all the different kinds of animals, plants and other living things found in an ecosystem. When wetlands are destroyed, biodiversity decreases. Wetlands and water quality. Wetlands are important for water quality. Water quality refers to how safe our water is to use. Wetlands remove the soluble substances found in soaps, fertilizers, insecticides and chemicals that wash into the water. In the wetlands, the plants, and the soil and the gravel at the bottom of the wetland, absorbs these substances. Micro-organisms which is very tiny organisms in wetlands can break down solid toilet waste and make it harmless. All above mentioned help wetlands act as filters to clean water.	Learners to complete the activity sheet 1 and 2	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
ASSESSMENT	Teacher checks the understanding of content. (Oral by asking questions) Teacher assesses the activity sheet. (Informal)	
TEACHER REFLECTION		

ACTIVITY 1.IMPACT OF LOSS OF WETLANDS ON BIODIVERSITY AND WATER QUALITY.

Answer the following questions by recalling the information the teacher has explained to you.

1. Explain the term biodiversity.

2. When wetlands are destroyed, how does it affect the biodiversity?

3. Describe what is water quality?

4. Wetlands can remove soluble substances from water. Explain this statement.

5. Which activities can destroy wetlands?

ACTIVITY 1. ANSWERS. **IMPACT OF LOSS OF WETLANDS ON BIODIVERSITY AND WATER QUALITY.**

Answer the following questions by recalling the information the teacher has explained to you.

1. Explain the term biodiversity.
Biodiversity is the term we use for all the different kinds of plants, animals and other living things found in an ecosystem
2. When wetlands are destroyed, how does it affect the biodiversity?
The habitats of the plants and animals will no longer exist which means that the plant and animals and other living organisms will die. Animals will move to other habitats and birds will fly away.
(Learners own relevant answers).
3. Describe what is water quality?
Water quality refers to how safe the water is we use.
4. Wetlands can remove soluble substances from water. Explain this statement.
Plants, and soil and gravel at the bottom of the wetland, absorbs the insecticides, fertilizers, chemicals and soaps to remove soluble substances in water. Micro-organisms can also break down solid toilet waste and make it harmless.
(Learners own relevant answers).
5. Which activities can destroy wetlands?
Industries, agriculture and housing.

ACTIVITY 2. WETLANDS.

Search the word search puzzle for the types of animals found in wetlands.

- duck
- crab
- salamander
- fish
- dragonfly
- egret
- clam
- mosquito
- crayfish
- turtle
- shrimp
- heron
- frog

A	O	O	T	X	B	Z	T	D	A	Q	L	X	A	T	L	M
T	H	C	U	W	O	O	D	D	U	C	K	X	T	S	X	C
B	E	L	R	A	C	C	S	T	C	R	A	B	T	F	O	R
C	R	T	T	S	M	I	N	K	F	G	C	G	F	B	S	A
S	O	N	L	T	S	S	M	O	S	Q	U	I	T	O	U	Y
B	N	T	E	O	Q	R	S	T	A	O	C	U	X	N	N	F
B	L	R	T	S	O	P	X	P	P	A	B	E	A	R	F	I
A	C	C	X	T	S	H	R	I	M	P	L	L	N	A	I	S
V	D	R	A	G	O	N	F	L	Y	N	T	S	S	C	S	H
E	T	V	V	U	Q	Q	R	L	U	I	V	I	L	C	H	O
R	E	G	R	E	T	X	O	T	V	N	Z	A	T	O	X	O
V	X	S	G	N	A	Z	G	X	T	V	M	V	S	O	A	O
X	S	A	L	A	M	A	N	D	E	R	N	Q	X	N	N	L
N	L	T	F	L	O	U	N	D	E	R	L	I	T	T	O	L

ACTIVITY 2. ANSWER SHEET.WETLANDS.

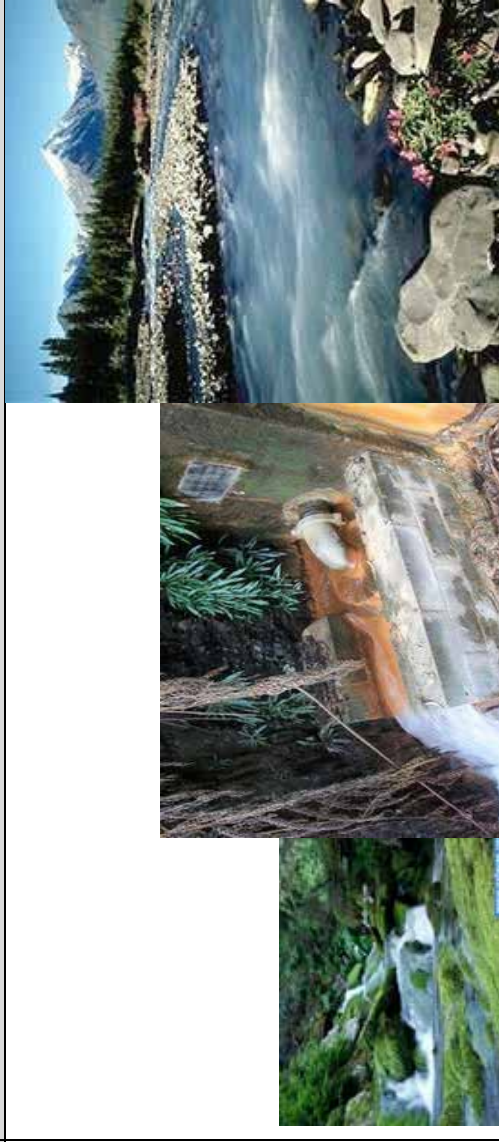
Search the word search puzzle for the types of animals found in wetlands.

- duck
- crab
- salamander
- fish
- dragonfly
- egret
- clam
- mosquito
- crayfish
- turtle
- shrimp
- heron
- frog

A	O	O	T	X	B	Z	T	D	A	Q	L	X	A	T	L	M
T	H	C	U	W	O	O	D	D	U	C	K	X	T	S	X	C
B	E	L	R	A	C	C	S	T	C	R	A	B	T	F	O	R
C	R	T	T	S	M	I	N	K	F	G	C	G	F	B	S	A
S	O	N	L	T	S	S	M	O	S	Q	U	I	T	O	U	Y
B	N	T	E	O	Q	R	S	T	A	O	C	U	X	N	N	F
B	L	R	T	S	O	P	X	P	P	A	B	E	A	R	F	I
A	C	C	X	T	S	H	R	I	M	P	L	L	N	A	I	S
V	D	R	A	G	O	N	F	L	Y	N	T	S	S	C	S	H
E	T	V	V	U	Q	Q	R	L	U	I	V	I	L	C	H	O
R	E	G	R	E	T	X	O	T	V	N	Z	A	T	O	X	O
V	X	S	G	N	A	Z	G	X	T	V	M	V	S	O	A	O
X	S	A	L	A	M	A	N	D	E	R	N	Q	X	N	N	L
N	L	T	F	L	O	U	N	D	E	R	L	I	T	T	O	L

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC:PROCESSES TO PURIFY WATER		• Investigate how to best purify dirty water in class			
Content & Concepts/Subtopic: Clean water					
Terminology		Purification, contaminated			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing	✓	Predicting		Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Introduction: The teacher introduces this topic to the learners showing pictures to them and ask relevant questions. Teacher should collect pictures/posters or show relevant videos that is age appropriate.	Pictures Posters Internet Chalk/Whiteboard Sasol Inzalo Books

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Why we need clean water. All living things such as plants and animals rely on water. Life cannot exist without water. Our bodies contain a lot of water. Blood is made up of about 55% water. Helps to carry nutrients around the animal's body. We need water every day. We lose water every day with the waste our bodies produce. Without water we will dehydrate. Water keep animals cool. Water is needed to digest food.	 Teacher ask question e.g. Which picture shows that the water is not clean? Why do you think the water in the left and right picture is clean water? What do you think has effected the water quality in the picture in the middle? What do you think are signs of good quality water? Learners answer the questions and engage in discussions in groups (class discussion) and then learners have to report back. Learners observe, identify problems, they ask questions relevant to pictures, they access and recall information from previous lessons, they predict what can happen if clean water does not exist and communicate these information. Teacher explain the content to learners. Teacher also explain that many people in South Africa do not have access to clean water and have to collect contaminated water resources close to their	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	homes. Learners discuss in groups why clean water is important to plants and animals Teacher design own rubric and can assess learners to specific skills teacher want to asses. This activity will continue in period 6 and 7 Teacher divide class in groups. The teacher will explain to the learners what's expected from them and that specific words should be included in their poems, e.g. purification, contaminated etc. Teacher hand out rubric so that learners can see on which skills they will be assessed. Learner activities: Some groups should now write a poem of the importance of water for animals. They must present it in a form of a Rap. Each learner in the group write it in their workbook. The other groups should now write a poem of the importance of water for plants. Present it as a Rap. Each learner in the group write it in their workbook.	Rubric Workbooks
ASSESSMENT	Teacher check learners understanding of the content of the poem that they Rap. Teacher assess the groups or individuals on rubric.	
TEACHER REFLECTION		

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: PROCESSES TO PURIFY WATER		• Understand the safety rules in the laboratory or when handling any glass apparatus or working with chemicals or candles(fire)			
Content & Concepts/Subtopic: Safety rules					
Terminology	Test tube, Bunsen burner, funnel,				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing		Predicting		Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Important tip: Don't let learners taste any mixture in the execution of the experiments or demonstrations. Teacher explain the safety rules of using apparatus in a laboratory and demonstrate how certain apparatus should be handled e.g. test tubes. and hand out a learner content sheet with the rules, which teacher prepare in advance. / Poster of all the safety rules against the wall in class will constantly remind learners about the safety rules.	Sieves Filter paper Funnels Containers Kettle Water Soil Leaves Little stones

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Learners ask questions about the safety rules and engage in a conversation. Teacher explain the process how to plan an experiment. Teacher can ask learners what they think will cause accidents in the class working with certain apparatus. Learners will respond and teacher will guide learners by using for e.g. a test tube and learners will say that it can break and cause cuts if learners are not careful. Bunsen burner, Chemicals mixed with water etc. It is preferred that learners do the following experiments in groups at their stations if resources permit, to expose them to the practical experience of experiments. In the process the learners will plan their experiments, do the experiments, observe, they will make predictions, they will interpret their information and record the information. At the end communication of the results will take place in class. Before the demonstrations/experiments, the teacher will hand out the observation sheets and learners will complete each section as they progress from one process to the other and from one period to the other as above is applicable for sieving, filtering, settling, decanting, boiling and adding chemicals to kill germs.	Grass Spoon Chlorine/Iodine Observation sheets
ASSESSMENT	Teacher assess the learners understanding of the safety rules.(Oral)	
TEACHER REFLECTION		

DATE: WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: PROCESSES TO PURIFY WATER		• Show an understanding of processes such as sieving to clean water			
Content & Concepts/Subtopic: Sieving					
Terminology	Sieving				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	✓			
	2. UNDERSTANDING AND CONNECTING IDEAS	✓			
	3. SCIENCE, TECHNOLOGY AND SOCIETY	✓			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Teacher should hand out the observation sheet in advance. Teacher demonstrates the process of sieving. / The learners can do the experiment depending on the resources available. Method: Mix sand, stone, leaves and grass with water in a container. Stir with a spoon. Pour water through a sieve in another container.	Sieve, sand, stone, leaves, grass, container, water, spoon.

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	 Learners observe and complete the observation sheet about sieving.	Observation sheet
ASSESSMENT	Teacher check/assess the observation sheet.	
TEACHER REFLECTION		

ACTIVITY 1.OBSERVATION SHEET.PROCESSES TO PURIFY WATER.

SIEVING.

1. What was in the container before the mixture was poured through a sieve?

2. What stayed behind after the mixture was poured through the sieve?

3. Do you think there are still organisms in the water? Explain your answer.

FILTERING.

1. What did you observe about the colour of the water and sand before pouring it out over the filter paper?

2. What stayed behind on the filter paper?

3. How does the water look after it went through the filter paper?

4. Do you think the water is safe to drink? Explain your answer.

SETTLING.

1. What happened to the soil and heavier substances in the water?

2. What is the colour of the water after the substances has settled?

3. What do you think you can add to the water to speed up the process of settling.

DECANTING.

1. How should you handle a container where dirty water has settled and explain why?

2. How can you remove the liquid from the settled part?

3. Explain what is decanting?

BOILING WATER.

1. Why do we need to boil water?

ADDING CHEMICALS.

1. What do we put in water to kill the germs if we don't have anything to boil it with?

2. How do you think the water will taste adding these chemicals in it? (Don't taste it).

3. What is the name of the chemical that kill the germs? (We use it in swimming pools as well).

ACTIVITY 1. ANSWERS. OBSERVATION SHEET. PROCESSES TO PURIFY WATER.

SIEVING.

1. What was in the container before the mixture was poured through a sieve?
Sand, stone, leaves, grass and water.
2. What stayed behind after the mixture was poured through the sieve?
Stone, leaves and grass, (Sand can stay behind depending the size of the holes of the sieve).
3. Do you think there are still organisms in the water? Explain your answer.
Yes. The soluble substances is still in the water and can be harmful.

FILTERING.

1. What did you observe about the colour of the water and sand before pouring it out over the filter paper?
It was a dirty brown colour.
2. What stayed behind on the filter paper?
Insoluble impurities, like sand.
3. How does the water look after it went through the filter paper?
The water look more clear
4. Do you think the water is safe to drink? Explain your answer.
No. There are still soluble substances in the water like pesticides, fertilizer and harmful chemicals.

SETTLING.

1. What happened to the soil and heavier substances in the water?

It sinks to the bottom of the container.

2. What is the colour of the water after the substances has settled?

It is transparent.

3. What do you think you can add to the water to speed up the process of settling.

Chopped seeds can help. The impurities cling to the seeds and sink to the bottom.

DECANTING.

1. How should you handle a container where dirty water has settled and explain why?

Very carefully otherwise the settled substances may easily mix again with the water

2. How can you remove the liquid from the settled part?

The container must carefully be tilted at an angle. The liquid part can be poured into another container.

3. Explain what is decanting?

Decanting separates a liquid from one container into another without disturbing the settled substances.

BOILING WATER.

1. Why do we need to boil water?
To kill the germs that are still in the water.

ADDING CHEMICALS.

2. What do we put in water to kill the germs if we don't have anything to boil it with?
Chemicals.
3. How do you think the water will taste adding these chemicals in it? (Don't taste it).
It will taste awful.
4. What is the name of the chemical that kill the germs? (We use it in swimming pools as well).
Chlorine / Iodine

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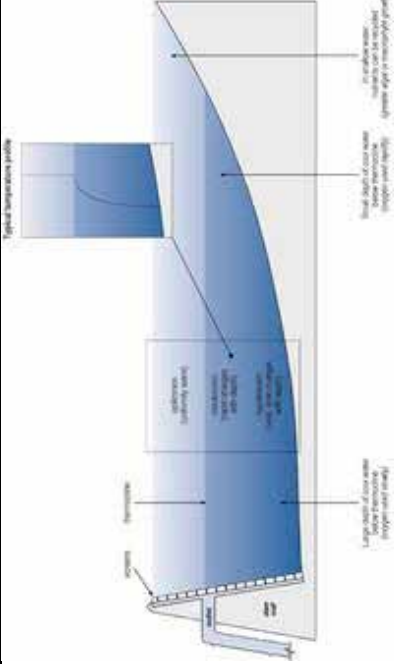
DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: PROCESSES TO PURIFY WATER				• Show an understanding of processes of filtering water.	
Content & Concepts/Subtopic: Filtering of water					
Terminology	Filtering, funnel, filter paper				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing		Raising Questions	✓	Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
.	Teacher demonstrates filtering . Learners can do the experiments depending on the resources available.	Filter paper, funnel, beaker, sand, water, grass, spoon

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	  Method: Use the water of previous demonstration. / Mix water, grass and sand. Put filter paper in a funnel. Put funnel on another container. Pour water out over the filter paper. Learners observe and complete the observation sheet.	Observation sheet
ASSESSMENT	Teacher check/assess the observation sheet.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: PROCESSES TO PURIFY WATER				• Show an understanding of processes such as settling to clean water	
Content & Concepts/Subtopic: Settling					
Terminology		Settling			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
.	Teacher demonstrate the process of settling . Learner can do the experiment depending on the availability of resources.		Water, sand, spoon, grass, beaker

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	 Method: Mix water, grass and sand in a container. Let the water stand for a while. Learners observe and complete the observation sheet	Observation sheet
ASSESSMENT	Teacher check/asses the observation sheet.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: PROCESSES TO PURIFY WATER				• Show an understanding of processes such as decanting to clean water	
Content & Concepts/Subtopic: Decanting					
Terminology		decanting			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS			
		3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing		Raising Questions	✓	Recording information
	Comparing		Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
.	Teacher demonstrate the process of decanting. Learners can do the experiment depending on the availability of resources. Method: Mix water, leaves, grass and sand in a container. Let the mixture settle for a while. Container needs to be handled carefully. Remove the liquid from the settled part by tilting the container carefully at an angle.		2xBeaker, water, sand, leaves, grass, spoon

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The liquid can now be poured to another container. Learners observe and complete the observation sheet.	Observation sheet
ASSESSMENT	Teacher check/asses the observation sheet.	
TEACHER REFLECTION		

DATE:		WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: PROCESSES TO PURIFY WATER				• Show an understanding of processes such as boiling water • Show an understand that adding chemicals to water can kill germs	
Content & Concepts/Subtopic: boiling water and adding chemicals to water.					
Terminology		Boil, chemicals, germs			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			
		2. UNDERSTANDING AND CONNECTING IDEAS		✓	
		3. SCIENCE, TECHNOLOGY AND SOCIETY		✓	
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	Teacher demonstrate that boiling water is another way to purify the water. Explain that heat kills germs and that boiled water takes a long time to cool down. 		Kettle, dirty water Beaker, bleach/purification tablets(can get it from a pharmacy.)

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Method: Boil water in a kettle of in a pot. Let it cool down. Teacher demonstrate that water can be cleaned by adding chemicals like bleach or purification tablet to the water. Learners observe and complete the observation sheet.	Observation sheet
ASSESSMENT	Teacher check/asses observation sheet.	
TEACHER REFLECTION		

ACTIVITY 1.OBSERVATION SHEET.PROCESSES TO PURIFY WATER.

SIEVING.

1. What was in the container before the mixture was poured through a sieve?

2. What stayed behind after the mixture was poured through the sieve?

3. Do you think there are still organisms in the water? Explain your answer.

FILTERING.

1. What did you observe about the colour of the water and sand before pouring it out over the filter paper?

2. What stayed behind on the filter paper?

3. How does the water look after it went through the filter paper?

4. Do you think the water is safe to drink? Explain your answer.

SETTLING.

1. What happened to the soil and heavier substances in the water?

2. What is the colour of the water after the substances has settled?

3. What do you think you can add to the water to speed up the process of settling.

DECANTING.

1. How should you handle a container where dirty water has settled and explain why?

2. How can you remove the liquid from the settled part?

3. Explain what is decanting?

BOILING WATER.

1. Why do we need to boil water?

ADDING CHEMICALS.

1. What do we put in water to kill the germs if we don't have anything to boil it with?

2. How do you think the water will taste adding these chemicals in it? (Don't taste it).

3. What is the name of the chemical that kill the germs? (We use it in swimming pools as well).

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: PROCESSES TO PURIFY WATER		• Design, make and evaluate a simple system to clean water.			
Content & Concepts/Subtopic: Process to clean water					
Terminology	Constraints, specifications				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
✓	Comparing	✓	Predicting	✓	Interpreting information
	Measuring	✓	Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations	✓	Evaluating and improving products
✓	Designing - showing	✓	Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
.	The teacher gives the learners instructions to make a sand filter (3 of them) in their groups. The pattern IDMEC (identify, design, make, evaluate and communicate) is followed in the Design Process. Scenario: You have only these specific resources to your availability to make the 3 sand filters in class. (All the requirements should be indicated on the instruction sheet and what is expected from the learners which the teacher will design.		Cotton wool; Coarse sand; Gravel; Scissors; Dirty or muddy

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	A: gravel and cotton wool, B: course sand and cotton wool, C; fine sand and cotton wool. (resources in left column) The teacher hands out a worksheet (Activity 1) that the learners can use to guide them through the process. After the whole experiment is done the learners in the groups can complete a checklist to evaluate the groups' sand filters. Teacher hand out the checklist (activity 2) and learners will complete it.	water; Three – 2litre cooldrink bottles; Clean fine builders' sand. Checklist
ASSESSMENT	Teacher assess the end product by using a rubric. Learners evaluate their sand filters. Complete checklist.	
TEACHER REFLECTION		

ACTIVITY 1. TECHNOLOGY PROJECT.

MAKE A SAND FILTER.

GROUPWORK.

Use the design process to make a sand filter.

Identify/Investigate:

What should the sand filters do? _____

Design and plan:

What are the specifications of the sand filter? (e.g. instructions, design brief). _____

What are the constraints of the 3 sand filters? (e.g. time, materials, tools) _____

What materials am I going to use to make the sand filter? _____

What tools do I have to make these sand filters? _____

Draw a diagram of what the sand filters will look like.

Make the sand filters. (add steps if you need to).

Step 1 _____

Step 2 _____

Step 3 _____

Evaluate the sand filters.

Does the sand filters work properly? _____

Do the sand filters look like the drawing? _____

How can we make the sand filters better? _____

What does my classmates say about our groups sand filters? _____

ACTIVITY 2.

EVALUATE YOUR SANDFILTERS.

CHECKLIST		YES	NO
Are there 3 filters at you work station?			
Is the filtered water clean?			
Was the sand filter cheap and easy to build?			
Can the sand filter be used at home, school or when camping?			
Can the filtering process have improved by putting all the different filtering materials into one filter?			
Did it take less than 5 minutes to filter the water?			
Did everyone in your group help to bring the requirements to school?			
Did everyone in your group help to build the sand filters?			
Did you finish the sand filters in the required time given to you in class by your teacher?			

DATE:WEEK:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: PROCESSES TO PURIFY WATER		• Show an understanding that municipality water is cleaned before and after we use it			
Content & Concepts/Subtopic: How municipalities clean water.					
Terminology	Screening, aeration, disinfection				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				✓
	2. UNDERSTANDING AND CONNECTING IDEAS		✓		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		✓		
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording information
	Comparing	✓	Predicting	✓	Interpreting information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying	✓	Planning Investigations		Evaluating and improving products
	Designing - showing		Making/constructing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
The South-African municipal water is generally clean and fresh and safe to drink. The municipalities need to have proper water purification methods in place to provided clean water to the people. The water from taps does not start out to be clean and fresh. It may come from a river or a dam, or it may even be waste water that was used by a community of in a factory.	Introduction: Teacher ask learners where they think tap water comes from? Learners respond to question by answering. Teacher explain the content to the learners – the process of how the municipalities clean water.	Sasol Inzalo Pictures Internet Chalk/Whiteboard Worksheets Books

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
The process of cleaning water is called water treatment, and the place where it happens is called a water treatment plant. There are processes to be followed in a water treatment plant. • At the purification station, dirty water passes through metal screens to tap the large objects in the water. (Screening) • From there on it passes into a spiraling funnel where where minerals are added to the water to give it a soapy feel and taste. • As the water spiral down the funnel into the container, the smaller substances stick to the funnel's sides. • The water still contains a muddy substance. This substance is called sludge and it will slowly settle at the bottom of the container, to be sucked out later. (Settling). • Air is bubbled through the water to make it taste and feel better. (Aeration). • Sand filters the water clean by removing the last remaining small water plants, animals and germs. (Filtering)	   	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
ASSESSMENT	Teacher check learners understanding of where they think tap water comes from. (Oral informal) Teacher assess the activity sheet,	
TEACHER REFLECTION		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>ACTIVITY 1.</u> <u>HOW MUNICIPALITIES CLEAN WATER.</u> Answer the following questions. 1. What gets trap to the metal screen when dirty water passes through it? _____ 2. What is added in the spiraling funnel to the water? _____ 3. How does it make the water taste and feel? _____ 4. What is the muddy substance called that settle at the bottom of the container? _____ 5. What is aeration? _____ 6. What is in the filters to remove the few remaining small plant, animals and germs? _____ 7. Before pumping the clean water into holding tanks, what is bubbled through the water to kill the last remaining germs? _____		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
<u>ACTIVITY 1.</u> <u>ANSWERS.</u> <u>HOW MUNICIPALITIES CLEAN WATER.</u> Answer the following questions. 1. What gets trap to the metal screen when dirty water passes through it? All the large objects. 2. What is added in the spiraling funnel to the water? Minerals. 3. How does it make the water taste and feel? Soapy 4. What is the muddy substance called that settle at the bottom of the container? Sludge 5. What is aeration? Air that is bubbled through the water. 6. What is in the filters to remove the few remaining small plant, animals and germs? Sand. 7. Before pumping the clean water into holding tanks, what is bubbled through the water to kill the last remaining germs? Chlorine gas. 8. Which chemical is added to the water at regular intervals? Chloramine.		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRIC CIRCUITS		• Explain how electrical energy is transferred through circuit.		
Content & Concepts/Subtopic: A simple circuit				
Terminology	Cells, battery, switch, components, circuits, wires			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
X	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
X	Observing	X	Raising Questions	Recording Information
	Comparing		Predicting\	Interpreting Information
	Measuring	X	Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
An electrical circuit is a system for transferring energy.	The teacher - Introducing the topic pre-knowledge find out if learners have basic knowledge of stored energy - Explain energy is the ability to do work is . Explain about the importance of electricity how most of us use electricity every day. - Explain electrical energy. - Energy that moves charged particles through a wire and give output energy e.g. light.		Torch posters

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	<u>The Learners</u> • Involved in the discussion. • Discuss about the importance of electricity. • Name appliances that need electricity to function. • Complete attached activity sheet (Can also be given as homework)	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: What do you know about electricity?

Think about electricity and write your answers or responses in the spaces provided below.

QUESTIONS:

1. Look for pictures of FIVE appliances in your home that need electricity to work. Paste them in your notebooks.
2. Name five applications (uses) of electricity in your neighbourhood.

3. Name five applications of electricity in your school.

4. Why is electricity important to you?

5. Why is electricity important for your city or town?

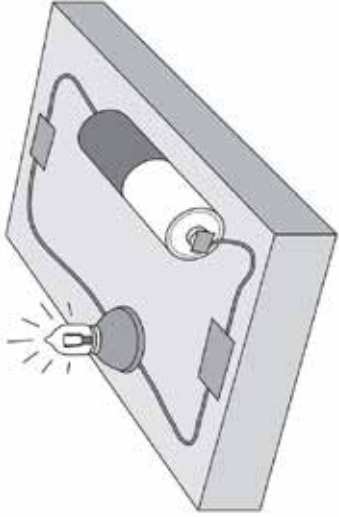
6. Why is electricity important for your country?

7. You are building a brand new house. You want an electric stove in your kitchen. Name all the things that must be done for your stove to work.

8. Cellphones work with electricity. How does your cellphonemake use of electricity?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELECTRIC CIRCUITS		• Identify the components of a simple circuit.			
Content & Concepts/Subtopic: components of the circuit.		• Mention the function of each component.			
Terminology	Cells, battery, switch, components, circuits, wires				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
X	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
X	Observing	X	Raising Questions		Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing		Communicating
X	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Components of a circuit and their function 1 simple electric circuit has at least three components: 1. A source of energy, such as a battery. 2. Conducting material, such as the	The teacher - Introducing the topic pre-knowledge find out if learners have basic knowledge of simple circuit - Discuss about how the cell, light bulb, electrical wire and switch are all components of the circuit. - Explain about the difference between a cell and battery. Explain the functions of each component.		light bulb, battery cell wires textbooks

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
electric wires. 3. A device that transfers the energy for a useful purpose, such as the bulb that provides light. 	• Battery /cell – source of energy to a circuit • Wires –gives electricity path to travel along. • Light bulb – convert electrical energy to light and heat energy • Buzzer- converts electrical energy to sound energy. • Open switch – stops the flow of electrical energy • Closed switch – lets electrical energy to travel along The learners Discussion the function of each component and give examples of appliances that use switch such as kettle, plugs, etc.	
ASSESSMENT TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELECTRIC CIRCUITS		• Understand symbols of each components			
Content & Concepts/Subtopic: Components of the circuit					
Terminology	Circuit, battery/cell, wires, switch, light bulb				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
X	Accessing & recalling Information	X	Identifying problems & issues		Doing Investigations
X	Observing	X	Raising Questions		Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing		Communicating
X	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Consolidation of previous lesson where learners have an opportunity to interact with the components before seeing them connected in a simple circuit - Introducing the topic pre-knowledge find out if learners have basic knowledge of components of simple circuit. - Explain and show learners the different components in a simple circuit - Battery - cell - Wires - Light bulb	Drawings/images of the components. Cell/battery, wires and switch

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	- Buzzer - Open switch - Closed switch	
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELECTRIC CIRCUITS		• Understand the importance of unbroken circuit pathway			
Content & Concepts/Subtopic: Components of simple circuit					
Terminology	Switches, conducting wires, cells/battery, current				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
X	Accessing & recalling Information	X	Identifying problems & issues		Doing Investigations
X	Observing	X	Raising Questions		Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing		Communicating
X	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
The importance of a switch in a circuit.	The teacher - Introducing the topic pre-knowledge find out if learners have basic knowledge of components of simple circuit. - Explain how electricity is not able to move through the circuit if it is broken in any way. - Explain about how a switch can be added to a circuit to start or stop the flow of the electric current in a circuit. - Explain how a switch can control the movement of electricity in a circuit.	Learner textbook Sasol Inzalo workbooks Circuit with a switch chalkboard

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The learner • Give examples of electrical appliances that have a switch. • Draw or describe the switches from any appliance they have seen • Discuss the importance of electrical appliances to have a switch.	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Let us look at the torch once more



Complete the answers using complete / full sentences. No one word answers

1. Is the bulb providing light all the time?

2. When does it provide light and when not?

3. What do we call the component of the flashlight that allows us to turn the light on and off?

4. A switch is used to put an electrical device on or off. But how do you think it works?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRIC CIRCUITS		• Design and make a simple switch		
Content & Concepts/Subtopic: Making a simple switch				
Terminology	Cell/battery, conducting wires, light bulb, switch			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
X	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
X	Observing	X Raising Questions		Recording Information
	Comparing	Predicting\	X	Interpreting Information
X	Measuring	X Hypothesizing		Communicating
	Sorting & Classifying	Planning Investigations	X	Making/Constructing
	Evaluating & Improving	X Designing		

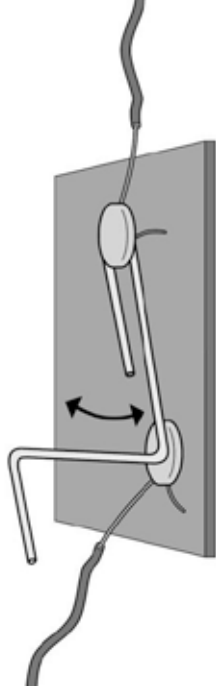
CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The teacher - Introducing the topic pre-knowledge find out if learners have basic knowledge of designing simple circuit applying the functions of each component. - Demonstrate how to make a simple switch using a paper clip. Guide learners step by step using the attached activity sheet.	1 paper clip, 3 insulated wires, torch bulb, cell, cardboard, 2 paper fasteners

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The learners Design and make a switch following the instructions given on the attached activity sheet	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Making a Switch/ Investigating how a switch works

MATERIALS:

- A paperclip
- Two thumbnails (drawing pins)
- A piece of cardboard
- A torch bulb
- Two pieces of wire
- Batteries



INSTRUCTIONS:

1. To make the switch, bend the paper clip as shown in the diagram.
2. Pin the ends of the two wires down on the cardboard with the thumbnails. One of the thumbnails should also pin down the paper clip.
3. The other end of the paper clip can be moved to make contact with the second thumbnail or not.
4. Move the paper clip away so that it does not make contact with this thumbnail.

The switch

1. We now want to use the switch. Use the same setup for a simple electric circuit with a bulb, battery and two wires as you did in the last activity.
2. Connect the paperclip switch to the battery by using a third electric wire. Remember to keep the wire ends in position with cellotape or Prestik.

The setup with the switch and simple circuit

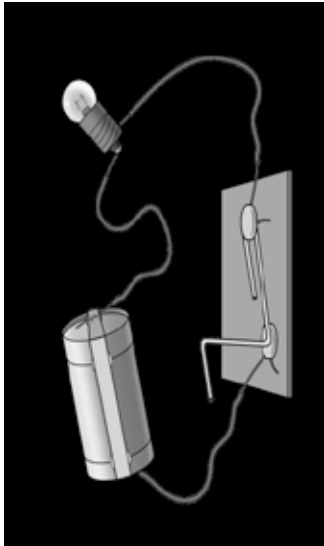
QUESTIONS: Use complete sentences to answer. No one word answers

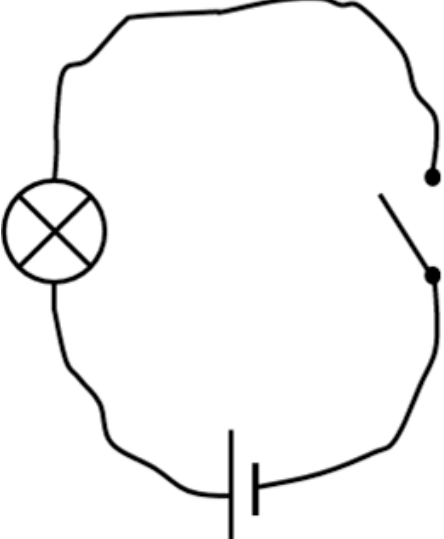
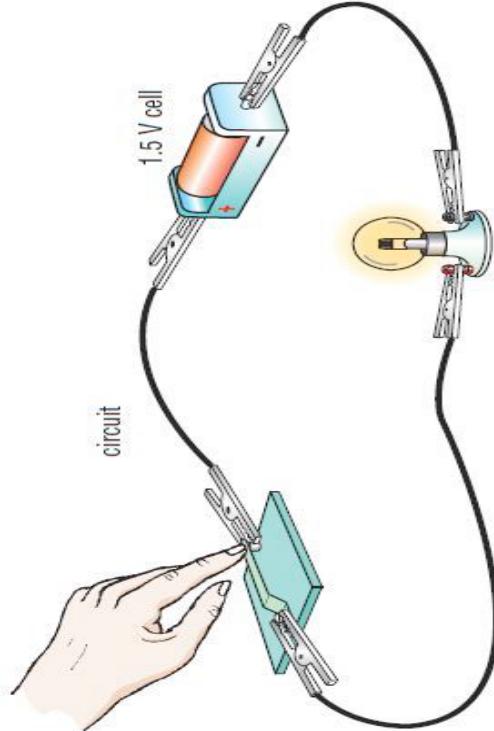
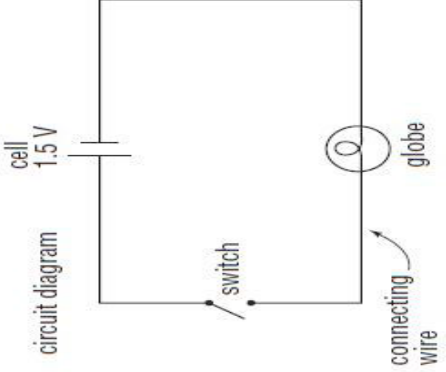
1. Move the paper clip onto the second thumbnail. What happens?

2. Move the paper clip away from the second thumbnail? What happens now?

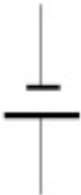
3. Explain why you think the paper clip and cardboard device can be called a switch.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRIC CIRCUITS		• Draw circuit diagrams using the symbols		
Content & Concepts/Subtopic: circuit diagram				
Terminology	Cell/battery, conducting wires, light bulb, switch			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
X	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
X	Observing	X Raising Questions		Recording Information
	Comparing	Predicting\	X	Interpreting Information
X	Measuring	Hypothesizing		Communicating
	Sorting & Classifying	Planning Investigations		Making/Constructing
	Evaluating & Improving	Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	<u>The teacher</u> Use the information as given on page 22 of the Sasol Inzalo Book (b) to explain the reason why we use symbols to draw simple electric circuits. • Explain how to draw circuit diagrams representing existing circuits	<u>The learners</u> • Build circuit and draw a diagram using the symbols.	insulated wires, torch bulb, cell, cardboard and switch

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
 To save time and to avoid bad sketches, scientists came up with a way of representing the components of a circuit with special symbols. These symbols are used all over the world. It helps scientists, engineers and technicians to draw or record circuits more quickly. It also helps everybody to understand the circuit in the same way.	 	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: As discussed, use the symbols given in the table below to draw the following simple circuits in your notebooks.

Component	Sketch	Symbol
Battery		
Bulb		
Electrical wire		
Switch		Open switch, circuit open:  Closed switch, circuit closed: 

1. One battery (cells), one light bulb and a closed switch.
2. Two batteries (cells), one light bulb and a closed switch.
3. Three batteries (cells), two light bulbs in series and an open switch.
4. Two batteries (cells), three light bulbs in parallel and a closed switch.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRIC CIRCUITS		• Understand 2 types of electrical circuit		
Content & Concepts/Subtopic: A series circuit diagrams		• 1Series circuit		
Terminology	Cell/battery, conducting wires, light bulb, switch			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
X	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
X	Observing	X	Raising Questions	Recording Information
	Comparing		Predicting\	X
X	Measuring		Hypothesizing	Interpreting Information
	Sorting & Classifying		Planning Investigations	Communicating
	Evaluating & Improving		Designing	X
				Making/Constructing

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Series circuit	The teacher - Explain and demonstrate physically how series circuit makes a simple loop for current to flow round. - Explain (and show learners by removing one light bulb) that if one bulb blows it breaks the whole circuit. - Series circuit has more than one bulb. The learners - Do research on series circuit		Insulated wires, torch bulb, cell, cardboard, 2 paper fasteners

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Build a series circuit 	
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELECTRIC CIRCUITS		• Understand 2 types of electrical circuit			
Content & Concepts/Subtopic: A parallel circuit diagrams		• 2.Paralell circuit			
Terminology	Cell/battery, conducting wires, light bulb, switch				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
X	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
X	Observing	X	Raising Questions		Recording Information
	Comparing		Predicting\	X	Interpreting Information
X	Measuring		Hypothesizing		Communicating
	Sorting & Classifying		Planning Investigations	X	Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Parallel circuit	The teacher - Explains and physically demonstrates how light bulbs in parallel circuits are connected side by side. - Explain that if one bulb of the circuit blows there will still be a complete circuit to the other bulb to the alight by removing one light bulb.		Insulated wires 2 light bulbs cells cardboard switch

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The Learner • Do research on parallel circuit. • Build a parallel circuit in groups of 4 or 6 	
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELETRICAL CONDUCTORSAND ISULATORS		Explain that conductors are metals			
Content &Concepts/Subtopic: Conductors					
Terminology	Conductors,, conduction,electricity,investigate,explain,heat,travels,metals				
SPECIFIC AIMS	1. DOING SCIENCE ANDTECHNOLOGY				
	2.UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY.				
PROCESS SKILLS					
	Accessing & recalling Information	Identifying problems & issues	X	Doing Investigations	Making/Construction
X	Observing	X	Raising Questions	Recording Information	Evaluating and improving products
	Comparing	X	Predicting	Interpreting Information	
	Measuring		Hypothesizing	Communicating	
	Sorting & Classifying		Planning Investigations	Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Suggested resources
Electricity can pass through some materials but not others. If electric current can pass through a material, the material is an electric conductor. Most metals are good electrical conductors.	The teacher - Use the attached activity sheet to explain and demonstrate (with one object at a time) how different objects can be tested to see if they are conductors or insulators The Learners - Work in groups and follow instructions on activity sheet as demonstrated by the teacher to complete the investigation on their own in groups if resources allow.		Simple electrical circuit, paper clips Glass,ceramic, cardboard, paper chalk, wood and other materials as outlined on activity sheet.
ASSESSMENT	Informal assessment		
TEACHER REFLECTION			

INVESTIGATION: What kind of materials can we use in electric circuits?

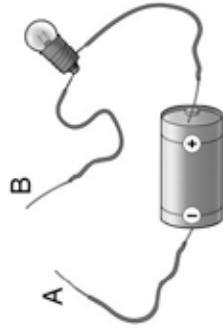
AIM: Write down an aim for this investigation.

MATERIALS AND APPARATUS:

- D-size battery (1.5 V)
- torch light bulb
- three pieces of electric wire 15-20 cm long with the ends (about 1 cm) stripped of the plastic insulating material
- adhesive tape or Prestik
- various objects made of different materials like:
 - metal paper clip (remove the plastic if covered)
 - paper clip covered with plastic
 - rubber band
 - nail
 - glass object (rod, tube or just a piece of glass)
 - pen
 - coins (brass and silver)
 - cardboard
 - pencil with both sides sharpened to expose the lead, test the lead part of the pencil
 - A piece of wood

METHOD:

1. Use three electrical wires to set up the electric circuit as shown below. Note that the ends of two of the wires are not touching. What do we call such a circuit?
2. Draw the circuit diagram for the circuit shown in the sketch in the space on the right of the sketch. **Sketch Circuit diagram**



3. Test that the circuit is connected properly by touching A and B to each other and making sure that the bulb lights up/
4. Take the first one of the objects in the list above. Put the object between the two wire ends at A and B. Make sure there is good contact between the object and the wire ends as shown below



5. Does the bulb light up or not? Write the name of the object in the left or right column of the table below, depending if the bulb lights up or not.
6. Repeat for all the other objects in the list.

RESULTS AND OBSERVATIONS:

Record your results in the table below

OBJECT	Metal Or Non Metal	Does The Bulb Shine? Yes / No	Is The Conductor Or Not?	Object A
metal paper clip (remove the plastic if covered)				
paper clip covered with plastic				
rubber band				
Iron nail				
glass object (rod, tube or just a piece of glass)				
Plastic pen				
coins (brass and silver)				
cardboard				
Pencil with both ends sharp to test the lead inside				
A piece of wood				

1. What do the objects that lit up the bulb have in common?

2. What do all the objects that did not light up the bulb have in common?

CONCLUSION:

Write a conclusion for this investigation below.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRICAL CONDUCTORS AND INSULATORS		Explain and identify which metals make good conductors of electricity		
Content & Concepts/Subtopic: CONDUCTORS				
Terminology	Conductors, properties of metals			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
x	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	x	Raising Questions	Recording Information
	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	x Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

TEACHING ACTIVITIES		Resources
A good electrical conductor is a material or substance that allows an electrical current to pass through it easily. We call the ability to conduct <i>conductivity</i>. Electrical conductors are usually metal because metals generally have high conductivity. Copper is one of the best electrical conductors and this is why it is the	The teacher - Present learners with information about the use of copper as a good conductor of electricity The learner - Learners must do research to find information on other metals that are good conductors of electricity and the reason why these metals are or are not used to transfer or conduct electricity by service providers. - Research should be presented as a Poster or chart together with a verbal presentation (individually if time permits) or as a group.	Chalkboard Learner Textbook Sasol Inzalo workbook B

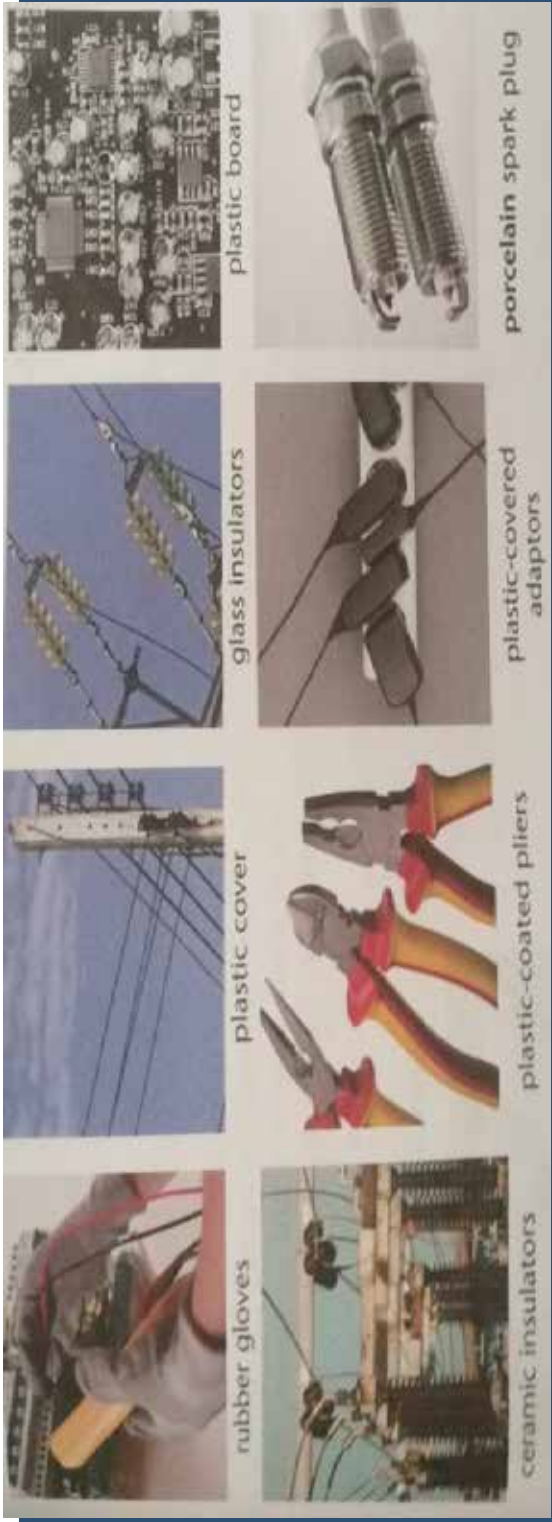
	TEACHING ACTIVITIES	Resources
most common material used for electrical wiring. Gold and silver are even better conductors than copper, but they are very expensive and only used sometimes.		Internet Magazines Newspapers Library
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Electrical conductors and insulators		• Explain that some materials do not allow the electricity to pass through them		
Content & Concepts/Subtopic: Insulators				
Terminology	Insulator, material			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	x	Raising Questions	Recording Information
	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	x Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES		Resources
Some materials do not allow electricity to pass through them. These materials are known as electrical insulators. Plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity. Insulators are used to protect us from getting an electric shock. Electricity is very dangerous and people have died from touching a live wire with bare hands.	The teacher - Revision of the investigation done where different objects were used to check if they were conductors or insulators. - Present the information / content from learner textbooks or page 41 of the Sasol Inzalo Workbooks. The Learners - Learners will be divided in to groups. Each group will discuss the given pictures and answer the questions on the attached activity sheet. - Each group will present their finding for at least two objects (in the given pictures)	Video chart / Pictures Learner Textbook Activity Sheet	

CONTENT	TEACHING ACTIVITIES	Resources
Our bodies conduct electricity so if we touch a live wire, the electricity will flow through us. Plastic as an insulator. Electric wires are covered in plastic (and other materials) that do not allow electricity to pass through them. We say that these wires have been insulated.	to the rest of the class. Groups can compare answers and do corrective work.	
ASSESSMENT		
TEACHER REFLECTION		

Activity Sheet: Study the pictures below and complete the table that follows.



Type of Material	Where will this material / object be used

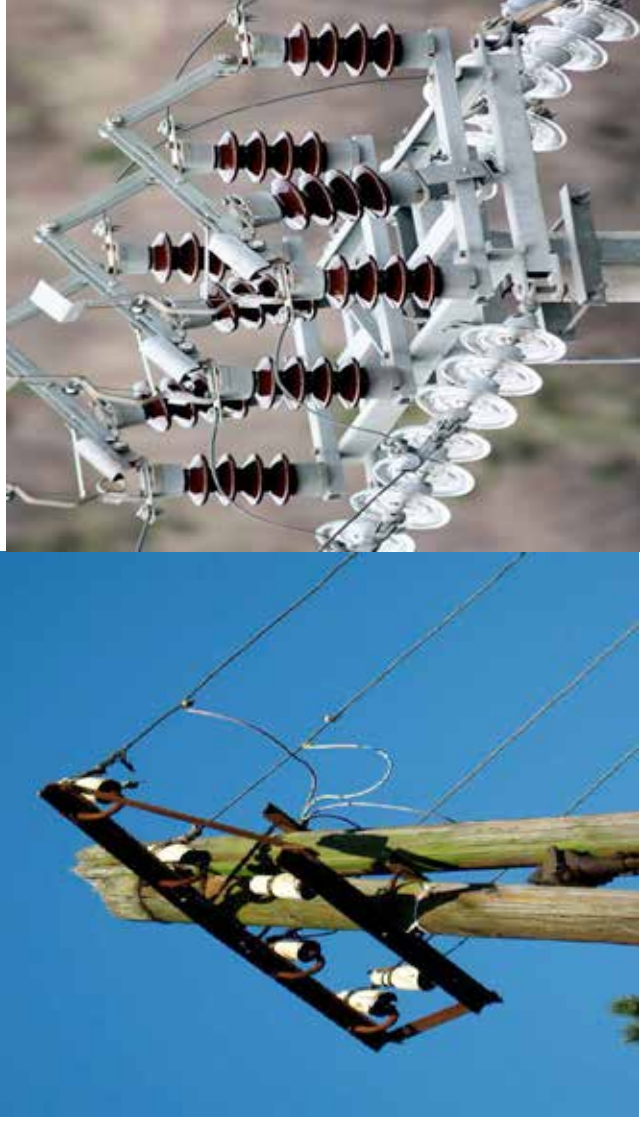
DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: ELECTRICAL CONDUCTORS AND INSULATORS		• Explain that insulators are not metals		
Content & Concepts/Subtopic: Insulators				
Terminology	Non-metal, insulator, danger			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
x	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
	Observing	x Raising Questions		Recording Information
	Comparing	Predicting		Interpreting Information
	Measuring	Hypothesizing	x	Communicating
	Sorting & Classifying	Planning Investigations		Making/Constructing
	Evaluating & Improving	Designing		

	TEACHING ACTIVITIES		Resources
Insulators are non-conducting materials that do not easily allow current to pass through them. This does not mean that current cannot pass through them at all. For example, we generally consider air an insulator, however, lightning can cause electric current to pass through air.	The teacher - Present learners with information about the use of Rubber / Plastic as a good insulator of electricity. The learner - Learners must do research to find information on other materials that are good insulators of electricity and the situations where these materials may be/ are used or needed. Research should be presented as a Poster or chart together with a verbal		video charts textbook projector screen

	TEACHING ACTIVITIES	Resources
Similarly, rubber gloves and shoes will protect you from mains electric current, but not from lightning. Examples of insulators are plastic, rubber, and wood.	presentation (individually if time permits) or as a group.	
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Electrical conductors and insulators		• Explain that some materials do not allow the electricity to pass through them			
Content & Concepts/Subtopic: Insulators					
Terminology	Insulator, material				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
	Observing	x	Raising Questions		Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing	x	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING ACTIVITIES		Resources
The importance of electrical insulators Think of the electric wires that you use in class for the activities. Why do you think they are covered in plastic? The plastic is an insulator and therefore prevents you from getting a shock. The plastic coating acts as a barrier that prevents you from getting a shock, allowing you to handle the wire when the circuit is on.	The teacher - Introducing the topic pre-knowledge find out if learners have basic knowledge of materials. - Explain what are insulators and where they are mostly used - Explain the importance of insulators The Learner - Discuss what and how insulators are used - The learners will research the importance of insulators in the use of electricity		Globe lamp wood chart video plastic

CONTENT	TEACHING ACTIVITIES	Resources
Electrical insulators are also used in other places. Have you ever looked up at power lines or telephone lines? You will see that the poles that carry the lines are sometimes made of wood. Wood does not conduct electricity so the electric current can therefore not get from the wires into the pole. Sometimes you will also see little white or coloured caps holding the wires as in the photo below. These caps are made of ceramic which also does not conduct electricity. Sometimes, it is especially important to have ceramic electrical insulators between two different metal conductors to prevent electric current from flowing between the different parts such as in the photo below.		
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: ELECTRICAL CONDUCTORS AND INSULATORS		Explain that insulators are non-metals			
Content & Concepts/Subtopic: Insulators					
Terminology	Wood, insulator				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
x	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
	Observing	x	Raising Questions		Recording Information
	Comparing		Predicting		Interpreting Information
	Measuring		Hypothesizing	x	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

		TEACHING ACTIVITIES	Resources
		Consolidation of the Key Concept taught – Conductor and Insulators Some materials allow electric current in them. They are called conductors. • Some materials do not allow electric current in them. They are called insulators. • Metals are usually conductors and non-metals are usually insulators. • Electrical insulators have important functions like insulating wires or protection from electrical shock, e.g. an electrician's rubber gloves. Learner will complete the attached activity sheet.	video charts textbook projector screen
ASSESSMENT			
TEACHER REFLECTION			

REVISION: Use complete sentences to complete the questions below. No one word answers

1. Suppose you have found a piece of material. You are not sure what the material is. You want to find out if it is a good conductor or a good insulator. Describe in words what you would do to determine if the material is an electrical conductor.

2. What is the difference between an electrical conductor and insulator?

3. What kinds of materials are used to make electric wires? What are the functions of the materials?

4. Why are insulators important?

5. List five insulating materials.



6. The man in the following picture is setting up an electric generator. Why is the man wearing gloves while he does this? Why is he also wearing boots with thick rubber soles?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: understand how systems works	
TOPIC: Systems to solve problems			
Content &Concepts/Subtopic:			
Using Electric circuits			
Terminology	system, energy, electrical system, mechanical system		
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
Accessing & recalling Information	x	Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
Comparing	x	Predicting	Interpreting Information
Measuring		Hypothesizing	Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Systems: something that is made of two or more parts that work together to do a specific job. Energy: the ability to do the work Mechanical system: system that use levers/linkages , cams, gears and pulley to convert movement Electrical system: systems that uses electrical energy to convert movement	The teacher - Introducing the topic-Pre-knowledge, finds out the level of learners' knowledge about electricity and electrical systems. - Facilitate feedback session as class discussion. The Learner - Discuss the attached activity sheets in groups of 4 or 6. - Every learners is required to write answers in their own worksheet.		
			Learner's text book. Charts Pictures Laptop Projector

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Electric circuits are used all around us, for example in lights in our homes, streets and shops. Can you imagine our world of today without electricity!	Every group is required to provide feedback after discussion and writing down the answers	Additional info and possible videos can be sourced from the internet if available.
ASSESSMENT	Baseline Assessment Oral (question and answer) Written activity-testing the understanding of systems and kinds of systems	
TEACHER REFLECTION		

ACTIVITY: A world without electricity

INSTRUCTIONS:

1. Read the following questions carefully.
2. Discuss the question and write the most appropriate answer in the spaces provided.
3. Every group will be required to give feedback to the rest of the class.
4. You have 15 minutes to complete this activity

QUESTIONS:

A. Write a short paragraph of how our world would be like without electricity.

B. Describe the three things that will be the biggest disaster for you if there was no electricity.

C. Would there be any advantages of not having electricity? Explain in full detail

D. Your group should now compare the advantages and disadvantages of electricity. What is the group's conclusion, a yes or no for electricity?
Write down your group's reasons for saying yes or no.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Systems to solve problems		Explain how electrical systems work.	
Content &Concepts/Subtopic:			
Using Electric circuits			
Terminology	Mechanical system, Input, Process and output		
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
Accessing & recalling Information	x	Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
Comparing	x	Predicting	Interpreting Information
Measuring		Hypothesizing	Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Electrical systems are often used to solve problems that require energy, such as street lighting, alarms, electric gates, traffic lights, fans and heaters. Not all electrical circuits solve problems though. Many are used for entertainment, such as toys and video games	The teacher - Introducing the topic-Pre-knowledge, the teacher finds out if learners have some basic knowledge of electrical systems. - Explanation of terminology The learner - Interpret pictures or videos		Learner textbook Charts Pictures Model toys Internet Sasol Inzalo

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
		workbooks (B)
ASSESSMENT	Baseline Assessment Oral (question and answer) Written activity-testing the understanding of systems and kinds of systems	
TEACHER REFLECTION		

ACTIVITY: Electric circuits influence our lives

INSTRUCTIONS:

1. Look at the photos or sketches below.
2. Name the appliance or device.
3. Say what it is used for and what the energy is transferred to (light, sound, heat or movement)? In some cases it might be more than one thing!

	Name: _____ Use: _____ Energy transferred from _____ energy to _____
	Name: _____ Use: _____ Energy transferred from _____ energy to _____
	Name: _____ Use: _____ Energy transferred from _____ energy to _____

	Name: _____ Use: _____ Energy transferred from _____ energy to _____
	Name: _____ Use: _____ Energy transferred from _____ energy to _____

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Systems to solve problems		Investigate, Design, Make, Evaluate and Communicate the process of making an electrical circuit used to solve problems based on a given scenario.	
Content & Concepts/Subtopic: Electric circuits			
Terminology	Electrical system, Input, Process and output		
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
Accessing & recalling Information	x	Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
Comparing	x	Predicting	Interpreting Information
Measuring		Hypothesizing	Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
SYSTEMS AND CONTROL FORMAL SBA TASK – MINI PAT.	The Teacher will read and explain the problem statement / scenario / case study and question on the attached activity sheet. The learners will read a problem statement / scenario / case study They will Identify the problem or need. Work in pairs to investigate electrical system that may be used to solve problem using light, movement and sound.		Learner's text book Charts Pictures Any example of electric system e.g. heater, radio, or fan.
ASSESSMENT	Mini PAT – Formal Assessment Task.		
TEACHER REFLECTION			

FORMAL ASSESSMENT TASK

Duration: 30 Min

TOPIC: SYSTEMS TO SOLVE PROBLEMS

CONTENT & CONCEPTS: USING ELECTRIC CIRCUITS

Name and Surname: _____ Date: _____

1. INVESTIGATION

Study the scenario below and answer the questions that follows

Problem Scenario: Mpho's parents give her money every day when she goes to school. She has planned to save some of the money. She put her savings in a money box and hid it in her room. Her brother keeps on sneaking into her room and takes money from her savings without her knowledge. She cannot be in her room all the time to watch her money box. She needs something that may warn her when the money box is being opened or tempered with.

You are requested to solve Mpho's problem by designing a warning devise, it must be able to produce sound and light. It must have a switch that will be able to switch the alarm on and off when someone is tempering with the money box or when Mpho needs to take money out.

1. What is Mpho's problem?
_____ (1)
2. How will the circuit that you will make help her?
_____ (1)
3. Which device may be used to produce sound?
_____ (1)
4. Which device may be used to produce light?
_____ (1)
5. Why do you think it is important for your circuit to have a switch?
_____ (1)

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Systems to solve problems		Investigate, <u>Design</u> , Make, Evaluate and Communicate the process of making an electrical circuit used to solve problems based on a given scenario.		
Content & Concepts/Subtopic: Electric circuits				
Terminology	Electric circuits			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
Accessing & recalling Information	x	Identifying problems & issues		Doing Investigations
Observing	x	Raising Questions		Recording Information
Comparing		Predicting	x	Interpreting Information
Measuring		Hypothesizing	x	Communicating
Sorting & Classifying		Planning Investigations		Making/Constructing
Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Electric circuits: circuits that use electrical energy.	The educator will explain what is required on the attached worksheet / Activity sheet.	Learner textbook
We use electric circuits in our lives every day to solve problems and satisfy needs that require energy.	Learners will begin the work in class and complete it as homework should they run out of time.	Activity Sheet
	*** Remind learners to bring all the relevant raw materials (for the next lesson) required to build the model based on the investigation and design ideas.	
ASSESSMENT	An appropriate rubric should be drawn up by the educator.	
TEACHER REFLECTION		

FORMAL ASSESSMENT TASK

Duration: 30 Min

Name and Surname: _____ **Date:** _____

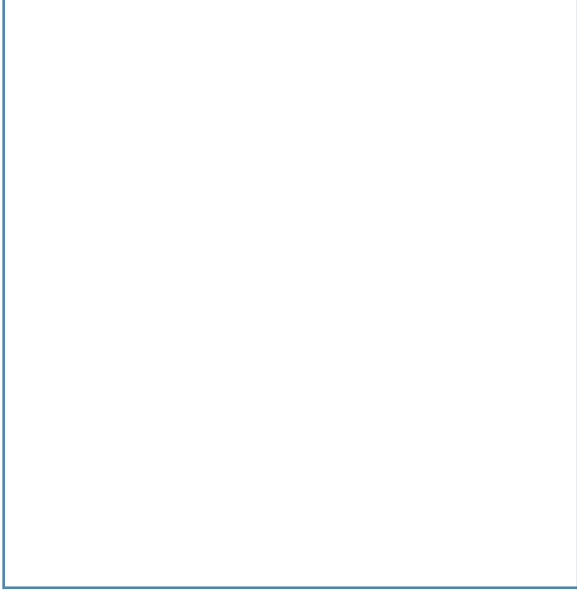
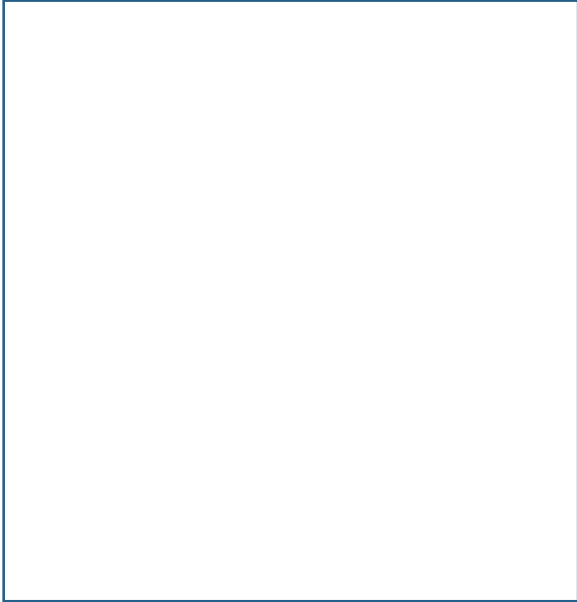
TOPIC: SYSTEMS TO SOLVE PROBLEMS
CONTENT & CONCEPTS: USING ELECTRIC CIRCUITS

1. Design

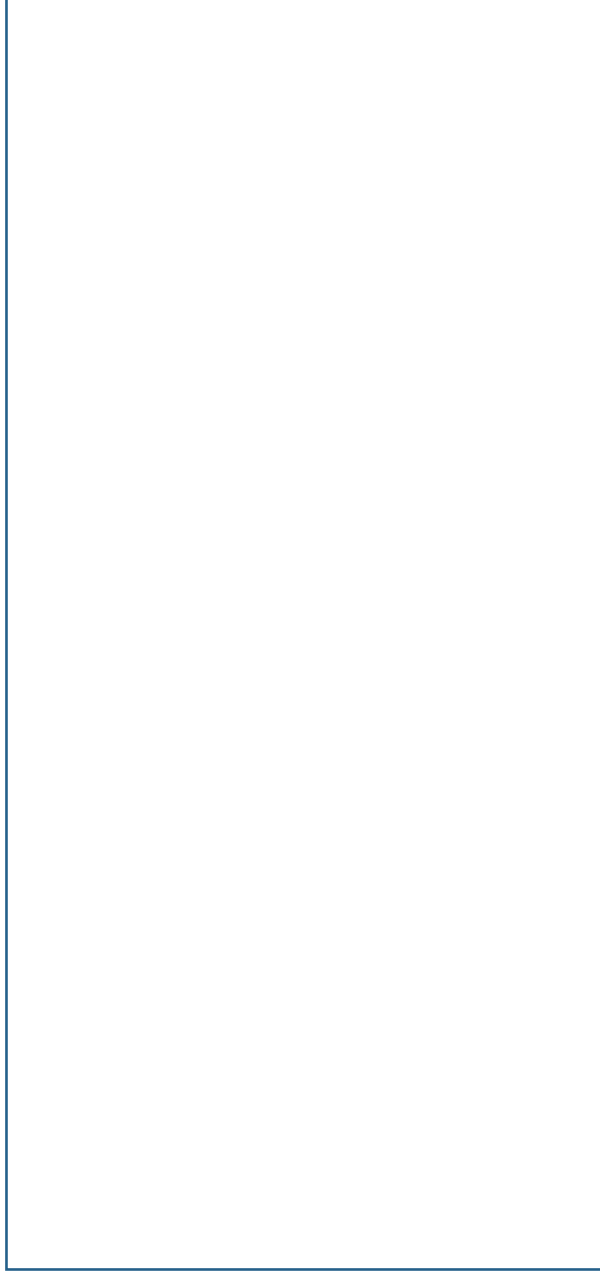
2. 1 Explain in short statement what you are going to make to solve Mpho's problem.

_____ (1)

Use the blocks below to draw your initial design of what your solution will look like



Use the block below for your final design



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Systems to solve problems		Investigate, Design, <u>Make</u> , Evaluate and Communicate the process of making an electrical circuit used to solve problems based on a given scenario.			
Content &Concepts/Subtopic: Electric circuits					
Terminology	Electric circuits, electric motor				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
Accessing & recalling Information	x	Identifying problems & issues		Doing Investigations	
Observing	x	Raising Questions		Recording Information	
Comparing	x	Predicting	x	Interpreting Information	
Measuring		Hypothesizing	x	Communicating	
Sorting & Classifying		Planning Investigations		Making/Constructing	
Evaluating & Improving		Designing			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Electric circuits: circuits that use electrical energy.	The educator will explain what is required on the attached worksheet / Activity sheet. Learners will begin the work in class and complete it as homework should they run out of time. Learners will be required to build their model at school using recyclable materials brought from home. Teachers can decide if it should be individual, pair or group work depending on their circumstances		Learner textbook Activity Sheet Appropriate Recyclable materials needed to construct the model
ASSESSMENT	An appropriate rubric should be drawn up by the educator. An exemplar (that can be adapted) has been provided below.		

TEACHER REFLECTION

Criteria	Poor (1)	Fair (2)	Good (3)	Total=15
Originality (does it look like an alarm system/electric circuit?)				
Creativity? Components were assembled skillfully				
Does it meet all specifications? (size and shape)				
Can it serve the purpose? It can produce sound and light, the switch is functional.				
Does it look attractive?				
Total (15)				

FORMAL ASSESSMENT TASK

Duration: 30 Min

Name and Surname: _____ **Date:** _____

TOPIC: SYSTEMS TO SOLVE PROBLEMS

CONTENT & CONCEPTS: USING ELECTRIC CIRCUITS

Make a Model

1. List of materials and tools

- Choose Materials and tools needed when making your electrical system
(**Switch, Ruler, Scissor, Bulb, Buzzer, Insulation Tape, Cell, Screw driver, Pencil, Bulb holder, Copper wire**)
- Based on your choices above, complete the table below

Components of electric circuit	Functions
4.1	To produce sound
4.2	To produce light
4.3	To control the circuit
4.4	To conduct electricity
4.5	Act as a source of energy

2. In 5 steps, write down (explain) how you will go about making your model.

Step 3: _____

Step 4: _____

Step 5: _____

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Systems to solve problems		Investigate, Design, Make, <u>Evaluate</u> and Communicate the process of making an electrical circuit used to solve problems based on a given scenario.		
Content & Concepts/Subtopic: Electric circuits				
Terminology	Electric circuits, buzzer			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
Accessing & recalling Information	x	Identifying problems & issues		Doing Investigations
Observing	x	Raising Questions		Recording Information
Comparing		Predicting	x	Interpreting Information
Measuring		Hypothesizing	x	Communicating
Sorting & Classifying		Planning Investigations		Making/Constructing
Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Electric circuits that produces sound A buzzer- converts electrical energy to sound energy Alarms use electrical circuits to produce sound energy-help us to protect our homes and cars and also as a reminder of important activities like birthdays	The educator will explain what is required on the attached worksheet / Activity sheet. Learners will begin the work in class and complete it as homework should they run out of time. Learners will be required to evaluate their model at school against a set of criteria (an exemplar, that can be edited) has been provided below. Teachers can decide if it should be peer or self-evaluation.	Learner's text book
ASSESSMENT	An appropriate rubric should be drawn up by the educator.	
TEACHER REFLECTION		

FORMAL ASSESSMENT: PRACTICAL TASK – EVALUATE

Name and Surname: _____ Grade: 6 ____ Date: _____

Duration: 30 minutes

Marks: 10

Specific Aims:

1. Use the rubric below to evaluate your model

	CRITERIA	YES	NO
1.	Is your model similar to the drawing?		
2.	Can you model stand on its own?		
3.	Have you followed all the instructions?		
4.	Did you submit your model on time?		
5.	Does it serve the purpose? Is it useful for preserving meat		
6.	Does it meet all specifications? (size and shape)		

2. If you had to re-do your project, what would you improve next time. (2)

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Systems to solve problems		Investigate, Design, Make, Evaluate and <u>Communicate</u> the process of making an electrical circuit used to solve problems based on a given scenario.		
Content &Concepts/Subtopic: Electric circuits				
Terminology	Investigation, problem statement			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
Accessing & recalling Information	x	Identifying problems & issues	x	Doing Investigations
Observing		Raising Questions		Recording Information
Comparing	x	Predicting		Interpreting Information
Measuring		Hypothesizing		Communicating
Sorting & Classifying		Planning Investigations		Making/Constructing
Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	The educator will explain what is expected as outlined on the attached activity sheet. Learners will carry out instructions and do the presentation.		Learner's text book Charts Model of the electric circuit built previously.
ASSESSMENT			
TEACHER REFLECTION			

FORMAL ASSESSMENT TASK

Duration: 30 Mins

Name and Surname: _____ **Date:** _____

TOPIC: SYSTEMS TO SOLVE PROBLEMS

CONTENT & CONCEPTS: USING ELECTRIC CIRCUITS

Communication Task

1. Each team/group presents the design sketches' to the class (2)
2. Presenting working drawing (3)
3. Presenting the functioning model to class (5)

During Presentation consider the following

Criteria	Explanation
Audibility	how well the class can hear your presentation
Visibility	Your sketches and information must be visible at least 2m away from the viewers.
Knowledge and information	The person presenting must have the knowledge and information about sketches, working drawings and the model.
Team work	Group may share responsibilities
Reinforcement	What will you do to enhance the product in future? Consider the areas of weakness.

Date:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Energy and change		Recall previously acquired knowledge and show understanding of the concepts taught.			
Content & Concepts/Subtopic:					
Revision					
Terminology	Solution Dissolve Solute Soluble Insoluble Solvent				
SPECIFIC AIMS		1. DOING SCIENCE			
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS			
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE			
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations / Experiments
	Observing		Raising Questions		Investigate
	Comparing	✓	Predicting		Design
	Measuring		Hypothesizing		Make / Construct
	Sorting & Classifying		Planning Investigations		Evaluate
✓	Interpreting Information	✓	Recording Information		Communicate

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	The teacher will read over and explain the questions on the attached activity sheet that will assess learners understanding of previously taught concepts. Learners should work alone to complete all the answers within 20 minutes. 10 minutes can be used to discuss learner answer and to do corrective work	Learner Textbook Chalkboard Activity Sheet
ASSESSMENT	Informal Assessment	
TEACHER REFLECTION	Progress:	
	Challenges:	

Term 3: Energy and change

Leaners Name: _____ Date: _____

Revision Activity: Use full sentences to complete the questions below.

1. Name five things that we would not be able to do without using electricity. Explain why you think each of these things is important to us.

2. Mpho builds an electric circuit that includes a bulb and battery for his bedside table so that he can read at night, but the bulb does not light up. List three things that could be wrong.

3. Mpho does not want the battery in his bedside light to run out of energy. What could he do?

-
4. List three electrical devices that use energy from a battery.

5. List three electrical devices that use energy from a mains supply.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Explain how coal was formed • Explain what fossil fuels are		
TOPIC: Mains electricity				
Content & Concepts/Subtopic: Fossil fuels and electricity				
Terminology	Fossil fuel, matter, gas, petrol, diesel			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
Accessing & recalling Information		Identifying problems & issues		Doing Investigations
Observing	x	Raising Questions		Recording Information
Comparing		Predicting		Interpreting Information
Measuring		Hypothesizing	x	Communicating
Sorting & Classifying		Planning Investigations		Making/Constructing
Evaluating & Improving		Designing		

CONTENT	TEACHING ACTIVITIES		Resources
New Words - fossil fuels - coal - oil - natural gas - power station - turbine - generator - renewable - non-renewable	The teacher - Introducing the topic pre knowledge find out if learners have basic knowledge of mains electricity and different types of fuel. - Explain fossil fuel come from ancient plant and animal matter, burning of fuels such as coal, petrol, diesel and oil to obtain energy. The learner - Discuss how coal is formed, gathering information from the video Video on how fossil fuels are made: goo.gl/rxiVG		Learner textbook Sasol Inzalo workbook B Internet Projector and screen or Smartboard

CONTENT	TEACHING ACTIVITIES	Resources
What are fossil fuels? Coal, oil and natural gas are fossil fuels. Some people think that fossil fuels are the remains of dead dinosaurs but this is not true! Actually, most of the fossil fuels we find today were formed millions of years before even the first dinosaurs. Fossil fuels were once alive! Fossil fuels are the remains of dead plants and animals that stored energy from the sun millions of years ago.	Learners will answer the following questions based on the video and classroom discussion. 1. What is the definition of “fossil fuel”? 2. Name 3 types of fossil fuels 3. What fossil fuel is most commonly used in South Africa? Name any three.	Chalkboard
ASSESSMENT		
TEACHER REFLECTION		

DATE:1.1		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mains Electricity		• Explain what fossil fuels are		
Content &Concepts/Subtopic: Fossil fuels and electricity				
Terminology	Main electricity, generate, power stations			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
x	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	x	Raising Questions	Recording Information
	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	x Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Coal, Oil and Natural gas are fossil fuels. In South Africa coal is mostly used as a fuel in power stations. Coal was formed from fossilised plants which got their energy from the Sun originally.	The teacher - Read the information given on the attached activity sheet. - Explain what fossil fuels are and where do they originate from. - Draw up additional questions that will serve as enrichment and further enhance learners' knowledge and understanding. - Use the link below to show learners an internet based video (If possible) <i>Fossil fuel formation (video)</i>goo.gl/y04IH	Video Charts Laptops Projector

CONTENT	TEACHING ACTIVITIES	Resources
	The learner • Read the information given on the attached activity sheet. • Answer the questions in groups and provide feedback to the rest of the class	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Let's take a trip back in time, millions of years ago!

INSTRUCTIONS:

- Read the text below about how fossil fuels were formed and study the pictures
- Then answer the questions that follow.

300 million years ago...

Think about what the Earth must have looked like back then! There were swamps and marshes everywhere and it was warmer than it is today. Ancient trees, ferns and plants grew everywhere. Very weird looking animals roamed the earth, and even stranger looking fish lived in the rivers and deep in the oceans and seas.



An ancient, prehistoric world

When these prehistoric plants and animals died their bodies their bodies decomposed just in the same way as organisms decompose today. The dead organisms became buried under layers and layers of mud, rock, sand and water. Over time, these layers built up and became very deep and they pushed down with a great pressure on the layers below it.

Millions of years passed, and the dead plants and animals slowly decomposed and formed fossil fuels. Different types of fossil fuels were formed depending on different factors. For example, whether it was the remains of plants or animals or a combination and how long the remains of the organisms had been buried for. The type of fossil fuels that formed also depended on the temperature and pressure conditions during the decay of the organism

Oil and natural gas

Oil is a dark, thick liquid that can be used to make petrol to burn in vehicles, such as cars, buses and trucks. Natural gas is colourless and it is used mostly in homes for heating and cooking food.

Oil and natural gas formed from organisms (plants and animals) that lived in the oceans before there were dinosaurs.

When these organisms died, they settled on the bottom of the river bed or ocean floor and the layers built up under mud and sand (silt). Themud and sand slowly changed into rock and the rock and water pressure pushed down on the remains of the dead plants and animals.



Over millions of years of being under heat and pressure, the dead plants and animals changed into a thick liquid, called crude oil. In deeper, hotter places tiny bubbles of natural gas formed. These were trapped under the rocks.

Over time, some of the oil and natural gas began to work its way up through the rock and to the Earth's crust and into rock formations called 'caprocks'. Today, most of the oil and natural gas is collected from these caprocks by drilling down through the layers of rock.

Coal

Coal is a black rock that can be burnt to produce energy in power stations all over the world. Coal was formed from the dead remains of trees, ferns and some other plants that lived 300 to 100 million years ago. This was when the Earth was mostly covered in swampy forests. These kinds of plants were very different to the plants that we get today.

Over time, the layer of dead plants at the bottom of swamps was covered with layers of water and mud. The top layers squashed down on the dead plants. Over millions of years the heat and pressure turned the plants into the coal that we mine today.



Ferns were very common in the prehistoric world of plants.

The energy in coal originally comes from energy from the Sun. Plants on Earth used the energy of the Sun for photosynthesis and to grow. This energy was stored in the leaves, flowers and stems of the plants. As the plants died the energy was trapped.

QUESTIONS:

1. What are the three fossil fuels discussed in the above story.

2. The organisms that fossil fuels were formed from lived many years ago and are different to the organisms that we get today. How many millions of years ago was this?

3. The dead organisms are covered in sediments over time. Do you remember learning about sediments in Gr. 5 Earth and Beyond and how sedimentary rock forms? Write a description of what sedimentation is.

4. What are the two main factors which turned the remains of organisms into fossil fuels deep under the layers of rock and mud?

5. Explain why we say that all our energy originally comes from the sun, even in fossil fuels.

6. Do you remember learning about the states of matter in Matter and Materials. Each of the three fossil fuels discussed here is a different state of matter. Say what they are.

DATE: 1.7		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		• Explain that coal is fossil fuel	
Content &Concepts/Subtopic: Fossil Fuels and electricity			
Terminology			
		Fossilised plants ,stored energy	
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY	
		2. UNDERSTANDING AND CONNECTING IDEAS	
		3. SCIENCE, TECHNOLOGY AND SOCIETY	
PROCESS SKILLS			
Accessing & recalling Information		Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	x Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Coal is a fossil, formed from fossilized plants millions years ago when they trapped and stored energy from the sun. In a power station coal is used to boil water, the steam turns a turbine which turns a generator, which produces electricity.	The teacher Use information as given in Sasol Inzalo Workbook B Page 70 or learner textbooks to explain coal is trapped and stored energy from the sun. Explain same stored energy is released when we burn coal in power stations to generate electricity. Use the attached activity sheet to test understanding of the concept The learner Discuss how coal is used to generate electricity Brainstorm ideas Present the information gathered per group at a feedback session to the rest of the class	Chart Learner Textbook Sasol Inzalo Workbook B Projector and Screen Smartboard

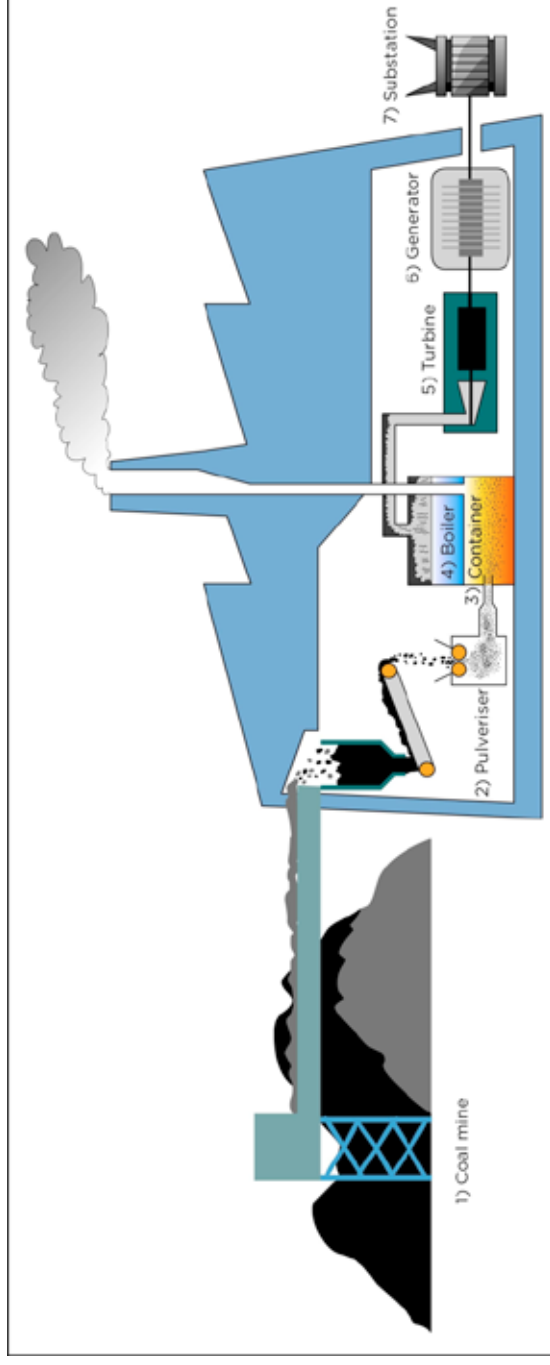
CONTENT	TEACHING ACTIVITIES	Resources
Fossil fuels are non-renewable resources of energy. This is because they take millions of years to form. Once these fuels are burnt, they cannot be recovered or reused. They are non-renewable.	As an extension activity *In groups learners brainstorm ideas that on what they think is a reason why electricity is expensive. * They write all the ideas down. * Ideas are than shared in the class. OPTIONAL ACTIVITY: Make a poster to trace the source of our electricity MATERIALS: • poster size paper or cardboard • colour pens or pencils INSTRUCTIONS 1. Design and make a poster for your classroom on which you illustrate the chain of objects and processes that allow us to use an appliance in our homes (such as a television set, stove or refrigerator). 2. Start with a picture or drawing of the Sun in the top left corner and end with the appliance in the bottom right corner of the poster. 3. Use arrows to show the sequence of objects and processes. 4. Label each object or process on your poster. 5. Decide on a heading for your poster and write it in big letters at the top.	
ASSESSMENT		
TEACHER REFLECTION		

Fossil fuels and electricity

The main supplier of electricity in South Africa is ESKOM. ESKOM uses mainly coal to produce energy for industrial and household use.

Let's look at a power station to find out how coal is used to produce electricity.

Look at the diagram and the steps which outline the process to make electricity from coal:



The steps below have been jumbled up. Re arrange them so that they match the process as shown in the diagram above.

In the space provided write down only number to show the first step (1), Second step (2) etc. Use the diagram as your guide.

_____ The heat generated from the burning coal is used to boil water in a huge boiler.

_____ The boiling water produces steam that turns a turbine (a turbine is a big wheel which turns).

_____ The ground coal then goes into a container where it is burned.

_____ Coal is transported from a coal mine to a power station.

_____ At the power station, the coal is ground into a fine powder (pulverised).

_____ From the generator the electric current is transported ("carried") by a system of electrical transmission lines (also called power lines) and substations to our homes.

_____ The turbine is linked to a generator which uses a coil to produce energy.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		• Explain why Electricity is costly	
Content &Concepts/Subtopic:			
Cost of Electricity			
Terminology	Construct Maintain Infrastructure		
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
Accessing & recalling Information		Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	x Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Why is electricity expensive? Electricity is costly because: - The production and delivery of electricity requires infrastructure (the structures and facilities) like coal mines, trucks and trains to transport coal, power stations, substations and wiring. - All of these buildings, structures, materials and processes are very	The teacher Will explain the concept / content to the learners using an appropriate source (Learner textbook or Sasol Inzalo workbooks Page 72) in conjunction with the video: https://www.youtube.com/watch?v=mjijl35rFf0 Class discussion where learners can discuss amongst other things; - The cost of coal mining - The cost of transport - The cost building / constructing and maintenance of power stations Use the above as headings to make notes / summary of what was discussed.	Projector and Screen Smartboard Text book Sasol Inzalo Workbook B Video

CONTENT	TEACHING ACTIVITIES	Resources
expensive to build and maintain.		Charts
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		• Explain why Electricity is costly	
Content &Concepts/Subtopic: Cost of Electricity			
Terminology			
		Appliance, Geyser,	
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY	
		2. UNDERSTANDING AND CONNECTING IDEAS	
		3. SCIENCE, TECHNOLOGY AND SOCIETY	
PROCESS SKILLS			
Accessing & recalling Information		Identifying problems & issues	Doing Investigations
Observing		Raising Questions	Recording Information
Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Why is electricity expensive? Electricity is costly because: - The production and delivery of electricity requires infrastructure (the structures and facilities) like coal mines, trucks and trains to transport coal, power stations, substations and wiring. - All of these buildings, structures,	The teacher Will explain the concept / content to the learners using an appropriate source (Learner textbook or Sasol Inzalo workbooks Page 72) in conjunction with the video: https://www.youtube.com/watch?v=mijl35rFf0 Continuation of previous lesson Class discussion where learners can discuss amongst other things; The cost building / constructing and maintenance of pylons, substations, wiring etc.	Video Charts / Pictures Textbook Sasol Inzalo Workbook B

CONTENT	TEACHING ACTIVITIES	Resources
materials and processes are very expensive to build and maintain.	2. The cost of running electrical appliances. Use the above as headings to make notes / summary of what was discussed.	
ASSESSMENT		
TEACHER REFLECTION		

DATE:1.4		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		• Identify the amount of electricity used by different appliances.	
Content &Concepts/Subtopic: Cost of Electricity			
Terminology			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
Accessing & recalling Information		Identifying problems & issues	Doing Investigations
Observing	X	Raising Questions	Recording Information
Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	X Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Some electrical appliances require a lot of energy, much more than others. For example, a geyser uses a lot of electricity to heat the water and so it becomes expensive. When electrical energy enters your home, it must pass through a meter. Have you ever seen a white box outside your house? This is the electricity meter. A worker from the		Poster Chart Video Learner Textbook Sasol Inzalo workbook B

CONTENT	TEACHING ACTIVITIES	Resources
city council reads the meter so that they will know how much electricity you used. They then bill you for the cost. The more electricity we use, the more we pay and the more we use up fossil fuels. Some houses now have pre-paid electricity meters where you pay for your electricity before you use it.	The teacher - Will ask leading questions (showing learners' topic appropriate pictures) in order to initiate class discussion around the concept that some electrical appliances are costly to keep running. - Explain how the calculations (From No 5 on the attached Activity sheet) should be done. The Learner - Will complete the attached activity sheet as a homework / research task.	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Research Task - Energy required by electrical appliances and devices
INSTRUCTIONS:

1. Make a list of at least 5 different electrical appliances listed in the table that you may have at home. If you do not have them in your home or school, ask family, friends or neighbours if you could look at theirs.
2. Have a look at each appliance and check for a label with information like the one below. This information is usually at the back or the bottom of the appliance. 230 V - 240 V; 50 Hz; 2 kW
3. Record the number that is followed by a W or kW on the label in column 1 of the table. This number indicates how much energy is required by the device in a certain time. It is called the power required by the device. We measure power in watt (W) or kilowatt (kW). The higher the value the more energy the device uses in a specific time.
4. Add any other three appliances or devices to the list.
5. Record all the power values in column 2 in watt. If the power is given in kW, multiply this number by 1000 to get the value in watt (W), for example:
 $3 \text{ kW} \times 1000 = 3000 \text{ W}$
If the device does not show a value in W or kW, look for two quantities given in volt (V) and milliampere (mA). Multiply these two numbers and then divide the answer by 1000 to get the power in watt, for example:
 $240 \text{ V} \times 150 \text{ mA} = 36\,000$
 $36\,000 \div 1000 = 36 \text{ W}$

Appliance or device	Power in kW, Hz	Power in watt (W)
Cellphone charger		
Electric kettle		
Television set		
Light bulb (old type)		
Energy saving light bulb		
Laptop computer		
Electric iron		

QUESTIONS:

1. What do you see in this table? Which two appliances have the lowest power requirements? What do these appliances have in common?

2. Which two appliances have the highest power requirements?
What do these appliances have in common?

DATE:1.5		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		• Describe various ways in which we can save energy / electricity	
Content &Concepts/Subtopic: Saving Energy / Electricity			
Terminology	Power station. Coal mines. Renewable. Non Renewable. Solar		
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY	
		2. UNDERSTANDING AND CONNECTING IDEAS	
		3. SCIENCE, TECHNOLOGY AND SOCIETY	
PROCESS SKILLS			
Accessing & recalling Information		Identifying problems & issues	Doing Investigations
Observing	x	Raising Questions	Recording Information
x Comparing		Predicting	Interpreting Information
Measuring		Hypothesizing	x Communicating
Sorting & Classifying		Planning Investigations	Making/Constructing
Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
The more power / electricity we use the more coal the power stations will have to burn, polluting the air, the more we will pay. Coal is a valuable and limited resource because it is non-renewable resource.	The teacher Will explain the concept / content to the learners using an appropriate source (Learner textbook or Sasol Inzalo workbooks Page 76) in conjunction with the video: https://www.youtube.com/watch?v=WSpJLpAkByo and / or https://www.youtube.com/watch?v=FS6WPAW9IZ4 Class discussion where learners can discuss amongst other things; - Solar Water Heaters - Heat Isulation - Energy Saving Bulbs	Poster / Chart Projector and Screen Smartboard Learner textbook Sasol Inzalo Workbook B

CONTENT	TEACHING ACTIVITIES	Resources
	Use the above as headings to make notes / summary of what was discussed.	
ASSESSMENT		
TEACHER REFLECTION		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mains electricity		• Describe various ways in which we can save energy / electricity		
Content &Concepts/Subtopic: Saving Energy / Electricity				
Terminology	Power station, turbine, generator, transformer, boiler,			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY		
		2. UNDERSTANDING AND CONNECTING IDEAS		
		3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS				
x	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	x	Raising Questions	Recording Information
	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	x Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING ACTIVITIES	Resources
The more power / electricity we use the more coal the power stations will have to burn, polluting the air, the more we will pay. Coal is a valuable and limited resource because it is non-renewable resource.	Learners must use the attached activity sheet that provides guidelines for drawing up an information poster about saving electricity.	Video Charts Textbook
ASSESSMENT	Informal Assessment	
TEACHER REFLECTION		

ACTIVITY: Creating a poster – Save Electricity

MATERIALS:

- Pieces of paper and cardboard.
- Coloured pens and pencils.
- Old magazines
- Scissors
- Glue

INSTRUCTIONS:

1. Based on your previous discussion in class, design a poster telling everyone in your school and your community about how they can help to save electricity.
2. Include some pictures to illustrate what you mean. You can draw these pictures or cut some out of old magazines or newspapers
3. Some points to think about when making your poster:

Is it neat and colourful?

Are the pictures / drawings appropriate?

Will it grab the attention of passers-by?

Does it have enough / too much information?

Rubric.

Criteria	Total Mark	Learners Mark
Is it neat and colourful?	3	
Are the pictures / drawings appropriate / Accurate?	7	
Does it have enough / too much information?	3	
The information suitable / appropriate / Accurate	7	

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mains electricity		• Identify and describe how illegal connections are dangerous to people		
Content &Concepts/Subtopic: Illegal Connections				
Terminology	Non-renewable resources			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
x	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
	Observing	Raising Questions		Recording Information
	Comparing	Predicting		Interpreting Information
	Measuring	Hypothesizing	x	Communicating
	Sorting & Classifying	Planning Investigations		Making/Constructing
	Evaluating & Improving	Designing		

CONTENT	TEACHING ACTIVITIES		Resources
Illegal connections We discussed a world without electricity and we all realised how dependent we are on this resource. It is illegal for anyone to use electricity that was generated by ESKOM without their permission. Some people make illegal connections because they don't want to pay for the electricity. They cut through the			video charts textbook projector screen Sasol Inzalo Workbook B

CONTENT	TEACHING ACTIVITIES	Resources
insulation in a power line and attach other cables to this line. They can then direct some electricity to their house or workplace. These connections are dangerous to people as they are often unsafe. People who make illegal connections try to get electricity for free but the dangers are not worth it. It is not worth your life! Illegal connections are dangerous because they are connected to the main power supply lines, sometimes before they have been stepped down by a substation.	The teacher will use the above (and other suitable) pictures together with information given in the Sasol Inzalo page 77 (or other suitable sources – including learner textbooks) to initiate classroom discussion about illegal electrical connections. The following video could also be used to facilitate further discussions https://www.youtube.com/watch?v=ZPLRwEMASbA Learners will work in groups and based on the previous lessons discussion they will answer the questions on the activity sheet. Feedback session will serve as remedial work / corrections	Smartboard
ASSESSMENT	Discuss what can we do touse fossil fuels sparingly	
TEACHER REFLECTION		

ACTIVITY SHEET: Illegal Electrical Connections.

Work in groups of four to six people. Discuss the question and based on your class discussion, write down the most appropriate answer.
Every person in the group should complete their own activity sheet. Answers may be the same based on your groups discussion.

Use complete sentences to answer the questions below

1. List three reasons why people use illegal electrical connections

2. Make a list of all the possible dangers that goes with illegal electrical connections

3. What do you think Eskom / Government should do to stop illegal electrical connections?

4. Imagine that you are part of the “Keep Soweto Safe” campaign team. Design and draw an eye catching poster that is bright and colourful. Your poster should encourage people to stop making use of illegal electrical connections. Your Poster should have a suitable heading, appropriate pictures (that can be drawn or cut out from newspapers and magazines or downloaded from the internet) and it should also have a catchy slogan that people will remember.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Mains electricity		•	
Content & Concepts/Subtopic: Illegal Connections / Safety with Electricity			
Terminology			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY		
	2. UNDERSTANDING AND CONNECTING IDEAS		
	3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS			
x	Accessing & recalling Information	Identifying problems & issues	Doing Investigations
	Observing	Raising Questions	Recording Information
	Comparing	Predicting	Interpreting Information
	Measuring	Hypothesizing	Communicating
	Sorting & Classifying	Planning Investigations	Making/Constructing
	Evaluating & Improving	Designing	

CONTENT	TEACHING ACTIVITIES	Resources
Electricity and safety Accidents caused by electricity happen all the time. People often get hurt or even killed by electricity because they do not use it safely. Not only is it important to know how to use electricity safely, but also what to do if someone is hurt or shocked by electricity. Accidents with electricity can be	Revision and consolidation Learners work in groups of four to six learners to discuss the pictures on the attached worksheet. Feedback session serves to consolidate answers and as revision and corrective work. Class discussion to finalise the most appropriate answer for the given questions	Pictures /charts Learner textbook projector screen Sasol Inzalo Workbook B Activity sheet

CONTENT	TEACHING ACTIVITIES	Resources
avoided. We just need to be smart about working with electricity. Let's formulate some safety rules for working with electricity.		
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY SHEET

INSTRUCTIONS: Study the pictures and answer the questions that follow. Use complete / full sentences



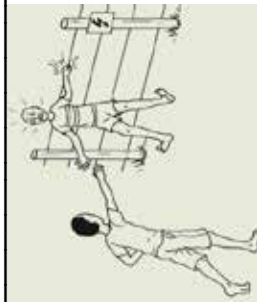
1. The person in the illustration is using a table knife to remove a coin that has fallen in the toaster before switching off the appliance. What are the dangers related to this act?

2. What safety rule can you formulate regarding this?



3. Why is this an unsafe cable to use?
Circle the area that makes it unsafe.
4. What could be done to the cable to make it safe to use?

5. What safety rule can you formulate regarding this?



6. Why is it dangerous to pull the boy from the electric wire?

7. What can the helper do to save the boy without being shocked by the electricity?

8. What safety rule can you formulate regarding this?



9. Why is this not a safe place to play?

10. What safety rule can you formulate regarding this?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Mains electricity		•		
Content & Concepts/Subtopic: Renewable ways to generate electricity				
Terminology	Renewable energy resources, non-renewable energy resources, solar, hydroelectric, geothermal, electrical power			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
x	Accessing & recalling Information	Identifying problems & issues		Doing Investigations
	Observing	Raising Questions		Recording Information
	Comparing	Predicting		Interpreting Information
	Measuring	Hypothesizing	x	Communicating
	Sorting & Classifying	Planning Investigations		Making/Constructing
	Evaluating & Improving	Designing		

CONTENT	TEACHING ACTIVITIES	Resources
Renewable ways to generate electricity We have seen above that fossil fuels are non-renewable resources of energy. So, if we are using an energy resource which is non-renewable, then this will be a problem in the future when these resources run out. Are there other sources of energy?	Renewable energy (video) goo.gl/wKyHB Use the above or other suitable video presentation in conjunction with content from Sasol Inzalo workbook B Page 83 (or learner textbook) to introduce the topic. Class discussion centre around the following two questions, after which learners can write down the answers as consolidation of their discussion. What do you understand by the word 'non-renewable'? Why do you think natural phenomena such as sunlight and wind can be considered as renewable?	video charts textbook projector screen / Smart board Sasol Inzalo Workbook B

CONTENT	TEACHING ACTIVITIES	Resources
Scientists and engineers are looking for ways to harness energy from renewable resources. A renewable resource is the opposite to a non-renewable resource. It will not run out and can be used over. Renewable energy sources include natural phenomena such as sunlight, wind, tides and plant growth. The energy comes from natural processes that happen over and over.	Learners complete the attached activity sheet as a precursor to the next lesson.	Activity Sheet
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Renewable versus non-renewable energy

What are the advantages and disadvantages of renewable and non-renewable sources? There is a lot of debate around the use of renewable and non-renewable sources for energy. Let's join this debate!

INSTRUCTIONS:

1. Work in groups of four.
2. Discuss whether your house uses renewable or non-renewable sources of energy.
3. Does anyone in the group have solar panels at home?
4. Think about the advantages and disadvantages of renewable and non-renewable sources. You can use the internet or other information sources to check for more ideas here.
5. Write some of your answers in the spaces below.

	ADVANTAGES	DISADVANTAGES
Renewable Sources of energy		
Non-Renewable Sources of energy		

6. Report back to the class and see what others think about this debate.

DID YOU KNOW?

South Africa has large reserves of uranium which are used in the Koeberg nuclear power station.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Mains Electricity		Research and write about renewable ways to generate electricity			
Content & Concepts/Subtopic:					
Examples of renewable sources of energy					
Terminology					
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
X	Accessing & recalling Information	X	Identifying problems & issues	X	Doing Investigations
	Observing	X	Raising Questions	X	Recording Information
	Comparing		Predicting	X	Interpreting Information
	Measuring		Hypothesizing	X	Communicating
X	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING ACTIVITIES		Resources
Examples of renewable energy resources are: • solar (energy from the sun), • wind, • ocean (tides and waves), • hydropower (waterfalls or fresh water dams), • biomass (energy from plants and other organic material), and • geothermal (energy from steam underneath the surface of the earth). Sun, wind and water can be used as			video charts textbook projector screen

CONTENT	TEACHING ACTIVITIES	Resources
sources of energy. Solar panels can be fitted to houses but this source of renewable energy works best on sunny days, and is less effective on cloudy days. Wind energy can be collected with a windmill or wind-turbine which can be big and noisy. Hydroelectric power stations harness the energy in water stored in high dams. It is only possible in areas where there are high mountains and rivers.	  The Teacher will use the above pictures, suitable videos (Wind energy (video) goo.gl/XthW5 and How hydroelectricity works (video) goo.gl/j6Oz1) and the content on page 84 Sasol Inzalo Workbook B (or learner textbook to introduce the topic and pique the interest of the learners.	
ASSESSMENT		
TEACHER REFLECTION		

ACTIVITY: Research and write about Renewable Energy

Scenario

You are part of a community organisation whose aim it is to provide better living condition for the people in your neighbourhood. The entire community is very angry and frustrated at all the power outages and load shedding. They have requested that you write a letter to the local authority for rural development and housing to convince them to stop using the coal burning power stations currently in use.

1. Research (Find as much information as possible) any on the following renewable sources of producing electricity:
Solar Panels, Wind Energy or Hydroelectric Power
2. List at least 3 advantages and 3 disadvantages of generating power using your chosen method.
3. Explain in full detail how electricity is generated using this method.
4. Find suitable pictures as supporting evidence for your research.
5. Present your research on an A2 poster in front of the class.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:				
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.				
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.				
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)					
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY					
	2. UNDERSTANDING AND CONNECTING IDEAS					
	3. SCIENCE, TECHNOLOGY AND SOCIETY					
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	✓
✓	Observing	✓	Raising Questions	✓	Recording Information	✓
	Comparing	✓	Predicting	✓	Interpreting Information	✓
	Measuring		Hypothesizing	✓	Communicating	✓
	Sorting & Classifying		Planning Investigations		Making/Constructing	
	Evaluating & Improving		Designing			
CONTENT		TEACHING & LEARNING ACTIVITIES				
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities		
✓ The Sun (a star) is at the centre of our Solar System		Intro		Intro		
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season?(You may add your own questions as different schools may use different textbooks).		Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.		
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)		Show learners a short video clip or picture showing how the planets orbit the solar system (YouTube, 2015). Explain important concepts such as; the number of planets, main differences between planets such as size, orbit and position (see content).				
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)						
✓ Every object has a gravitational						
				References		
				Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd.		
				Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd.		
				Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd.		
				Education, D. o. B., n.d.		

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it. ✓ The planets of the solar system are in constant motion around the sun and are constantly pulled towards the sun (sideways), this causes them to not shoot off into space or collide with the sun. the inward pull and sideways movement together cause the objects and the solar system to orbit the sun (Bezuidenhout, et al., 2013, p. 254) Notes * It is not necessary to memorize exact numbers of size of planets, number of moons, and distance from the Sun ** The number of moons around some planets may change as more are discovered *** It is not necessary to make the models of the Solar System to scale	Period 1: Teacher gave information about sun, planets and asteroids. Period 2: core of sun worksheet Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (making a model) (Bezuidenhout, et al., 2013, pp. 260-261); (Barnard, et al., 2013, p. 162), research about the planets (Adatia, et al., 2013, p. 169); (Barnard, et al., 2013, p. 165), read and answer questions about planets (Adatia, et al., 2013, pp. 172-174), answer questions based on solar system (Barnard, et al., 2013, p. 161). Learner activity 1: writing notes about sun, planets and asteroids Period : complete worksheet about core of the sun Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. If the Sun has a gravitational pull on the planets, how come they do not collide with the Sun? What keeps the planets orbiting around the Sun? What is a Star? What are Asteroids? Consolidation Learners mark their own/peer's worksheet and do corrections.	<i>Curriculum And Assessment Policy Statment:</i> Pretoria: Department of Basic Education. YouTube, 2014. Google. [Online] Available at: https://www.google.co.za/url?r=t&source=web&rc=t&i&url=https://m.youtube.com/watch%3Fv%3D5aDSYTMqYQw&ved=OahUKFwjdnK3fgZnaAhWklMAKHD5uA8sQo7QBCCswBA&usg=AOvVawIXdkbl-aMVXYIbXUjxtbk [Accessed 30 March 2018]. YouTube, 2015. Google. [Online] Available at: https://www.google.co.za/url?sa=t&source=web&rc=t&i&url=https://m.youtube.com/watch%3Fv%3DsmZkQbOn5m&ved=OahUKEwID9oaryZiaAhWIDMAKH_Rd-AikQtwllLzAA&usg=AOvVawI4dnIHtLTwQVLzHXnk_v [Accessed 28 March 2018].
ASSESSMENT TEACHER REFLECTION	Worksheet/textbook activity (Informal Assessment) <i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		



2 Planets of the Solar System _ Videos for Kids_ It's AumSum Time.mp4

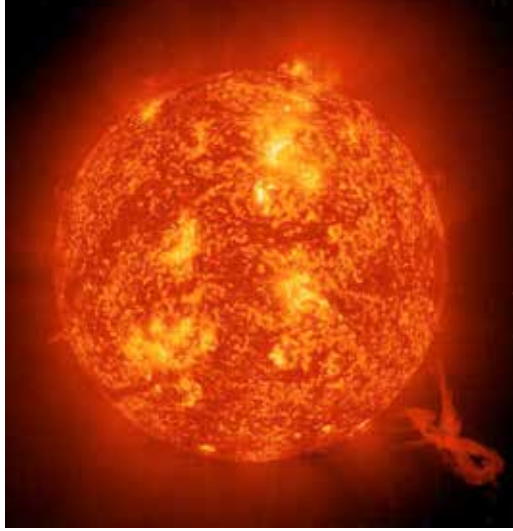
Period 1: The Solar System

The Sun, planets and asteroids

Do you remember what a solar system is? Our solar system is made up of the Sun and the planets. Let's take a look!

What is the Sun?

The Sun glows so fiercely that it is not safe to look straight at it, even though it is so far away. The sun is a ball of gases. The Sun is extremely hot: the temperature is about 15 000 000 degrees Celsius in the centre! The surface is about 5 500 degrees Celsius. That is extremely hot! Can you see the explosion from the surface of the Sun in the picture?



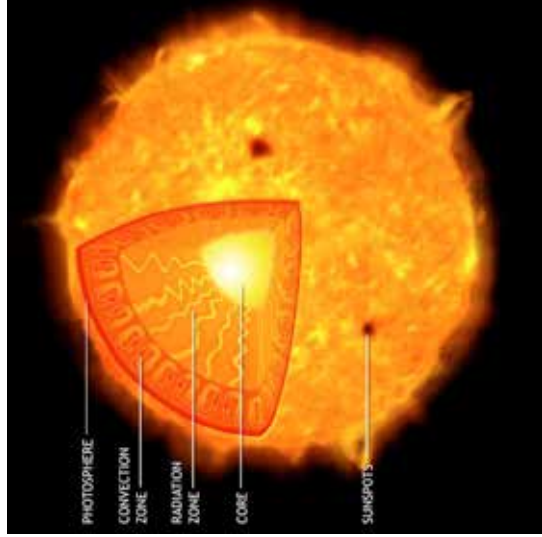
Can you see the big burst of gas from the sun in the bottom left?

The Sun is a star, because it produces its own energy. The Sun appears bigger and brighter because it is much nearer to earth than the other stars. The Sun is about 420 times bigger than the Earth and about 1700 times bigger than the Moon! The Sun is much further away than the Moon from the Earth. The Sun produces light and heat. The heat warms the surface of the Earth.

Period 2: **ACTIVITY:** The core of the Sun

INSTRUCTIONS:

1. Look at the picture of the sun showing the different layers inside.
2. Answer the questions.



QUESTIONS

1. Which is the hottest part of the Sun?

2. The Sun's energy comes from gases being squeezed together until hydrogen turns into helium. Where do you think the gases are squeezed together the hardest?

3. What are the dark spots on the surface of the Sun called?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.			
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.			
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		
CONTENT		TEACHING & LEARNING ACTIVITIES			
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities	
✓ The Sun (a star) is at the centre of our Solar System		Intro		Intro	
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season?(you may add your own questions as different schools may use different textbooks). Show learners a short video clip or picture showing how the planets orbit the solar system (YouTube, 2015). Explain important concepts such as; the number of planets, main differences between planets such as size, orbit and position (see content).		Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.	
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)					
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)					
✓ Every object has a gravitational					
				References	
				Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd.	
				Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd.	
				Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd.	
				Education, D. o. B., n.d.	

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it. ✓ The planets of the solar system are in constant motion around the sun and are constantly pulled towards the sun (sideways) Notes * It is not necessary to memorize exact numbers of size of planets, number of moons, and distance from the Sun ** The number of moons around some planets may change as more are discovered	Body Instruct learners to complete an activity about solar system Learner activity: Learners read and complete a worksheet about planets.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. If the Sun has a gravitational pull on the planets, how come they do not collide with the Sun? What keeps the planets orbiting around the Sun? What is a Star? What are Asteroids? Consolidation Learners mark their own/peer's worksheet and do corrections.	<i>Curriculum And Assessment Policy Statment:</i> Pretoria: Department of Basic Education. YouTube, 2014. <i>Google</i>. [Online] Available at: https://www.google.co.za/url?r=t&source=web&rc=t&i&url=https://m.youtube.com/watch%3Fv%3D5aDSYTMqyQw&ved=OahUKFwidnK3fgZnaAhWklIMAKHd5uA8sQo7QBCCswBA&usg=AOvVawIXdkbl-aMVXYIbXlJqxtbk [Accessed 30 March 2018]. YouTube, 2015. <i>Google</i>. [Online]
ASSESSMENT TEACHER REFLECTION	Worksheet/textbook activity (Informal Assessment) <i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

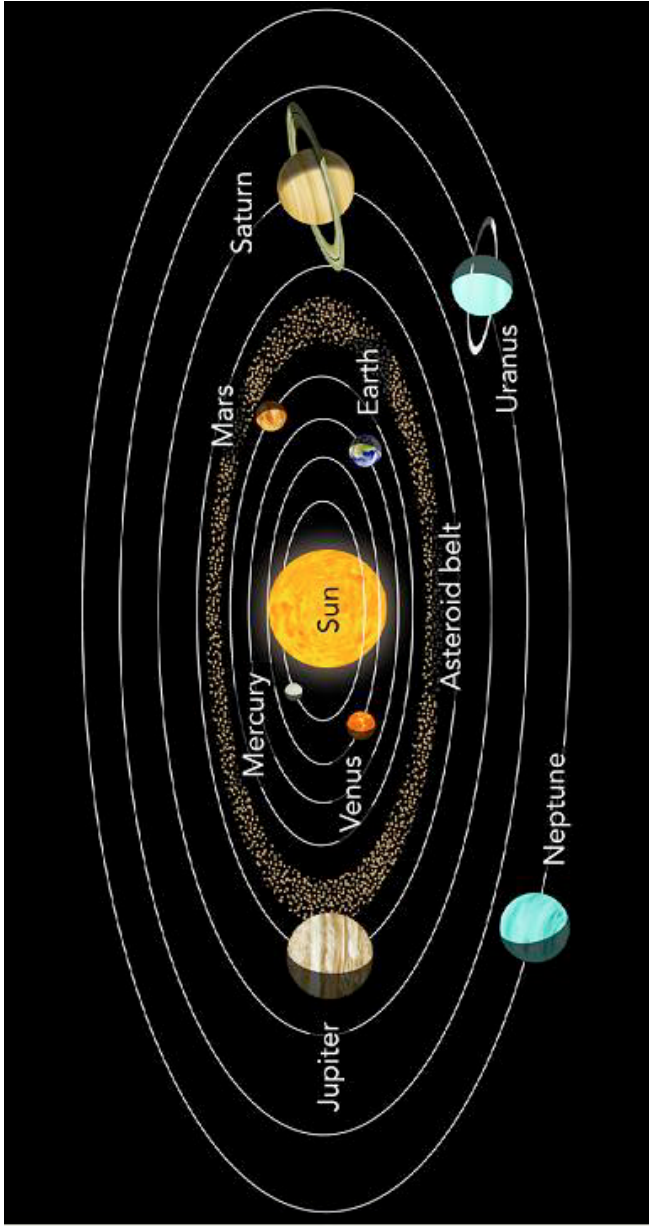
Grade 6 Worksheet

Name & Surname

Date:

The Solar System

1. Study the diagram of a Solar System below and answer the questions that follow.



(a) Define the term *Solar system* _____ (1)

(b) Write out the whole sentence below and complete it.

Use some of words from the box

☛ Mars

☛ Jupiter

☛ Venus

☛ piece of rock

☛ in orbit

☛ the Sun

Asteroids are ____ (1) ____ that move ____ (2) ____ around the Sun. The asteroid belt is in Space between the orbit of ____ (3) ____ and the orbit of ____ (4) ____.

(4)

(c) Which planet is closest to the Sun and which furthest? _____

(2)

(d) In which planet do we find life? Write a reason for your answer. _____

(2)

(e) How many days does it take the Earth to revolve around the Sun? _____ (1)

Total=10 Marks

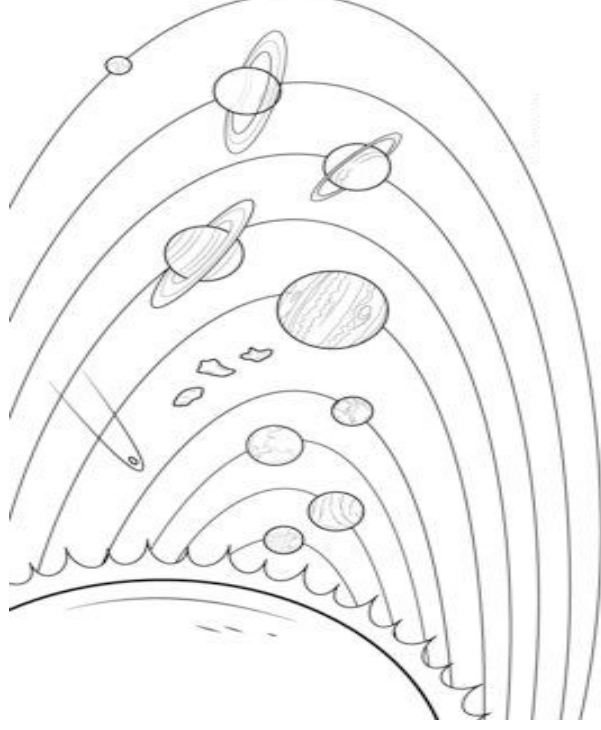
Memorandum:

(a) Solar system-(Learner dependent answer) however learners can state that it is the Sun and all the objects that travel around it. ✓
(b)

1. Piece of rock ✓ 2. In orbit ✓ 3. Jupiter/Mars ✓ 4. Jupiter/Mars ✓

(c) Mercury is closest planet to the Sun ✓ and Neptune is furthest from the Sun ✓.

(d) Planet Earth ✓. There is water, good temperature, gases (oxygen, carbon dioxide), land. ✓
(e) 364 $\frac{1}{4}$ days ✓



The Solar System Picture

ACTIVITY: Comprehension on the 8 planets of our solar system.

INSTRUCTIONS:

1. We have read a lot about the planets in our solar system.
2. Use all the information and images used in the Lesson to answer the following questions.

QUESTIONS:

1. *Name all the planets in order starting from the one closest to the Sun.*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

2. What are the 4 inner planets known as?

3. What are the 4 outer planets known as?

4. Which planet is the hottest?

5. On which planet do scientists think there might have been water long ago? Why?

6. Which planet has a "stormy" surface?

7. Venus also has an atmosphere like Earth, but we would not be able to breathe there. What gases make up the atmosphere on Venus?

8. Which is the biggest planet in our solar system? What colour is it?

9. Which planet is blue-green in colour?

10. Saturn has rings around it. What are these rings made of?

11. Draw a picture of Saturn in the space below.

A Picture of Saturn



12. Asteroids are _____ that move _____ around the Sun. The asteroid belt is in Space between the orbit of _____ and the orbit of _____.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.			
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.			
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		
CONTENT		TEACHING & LEARNING ACTIVITIES			
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities	
✓ The Sun (a star) is at the centre of our Solar System		Teacher distributed worksheets and read the story about Adventures of Halley's comet and explain difficult words		Intro Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.	
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Instruct learners to complete an activity. Suggested activities include; order and relative size of planets, answer questions based on solar system.		Learners listen to the story and answer the questions thereafter	
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)		Teacher does corrections with the learners.			
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)					
✓ Every object has a gravitational					
				References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d.	

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it.		Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	<i>Curriculum And Assessment Policy Statment. Pretoria: Department of Basic Education. YouTube, 2014. Google. [Online]</i> A
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

PLANET EARTH AND BEYOND

READING MATTER: SOLAR SYSTEM

The Adventures of Halley's Comet

“Hi! My name is Halley's Comet. I was named after Edmund Halley, the first man to notice that I was coming back around the sun again and again. In fact, you can see me in your sky every 76 years. The last time I was around was in 1986. You will see me again in the year 2062. How old will you be then? My head is made up of dirty snow. I travel around the Sun and far out into space. As I come close to the Sun, my head heats up. Some of my snow evaporates and form a long tail.

On my journeys around the Sun, I have passed all the planets in our Solar System. Over the years I have learnt a lot about them. I will tell you what I have learnt.

The study of stars, planets and moons is called astronomy. I know of nine planets that revolve around our star, the Sun. These planets with their moons, and the Sun make up a family, called the Solar System. Comets are also part of our Solar System.

The four planets that are the nearest to the Sun are rocky planets. If you could visit these planets, you would be able to walk on the ground on their surfaces. The next four planets are not rocky at all. They are much bigger than the rocky planets and they are made up of gas – huge balls of cloud. These large planets are called the Gas Giants. The outermost planet in the Solar System is another rocky planet.

Not all the planets have moons. I have counted four large moons around Saturn. There are millions of other pieces of ice and rock that go around it. This ice and rock make beautiful rings around Saturn. Jupiter has the same number of large moons as Saturn. They both have many small moons. Uranus has one large moon more than Jupiter. Neptune has three large moons, Mars has two small moons. Earth has only one, but little Pluto has at least four moons.

The planet Mercury is closer to the Sun. It has no atmosphere, so it can't hold its heat during night time. A Mercury day is so hot, you would be instantly burnt. A Mercury night is so cold you would freeze instantly.

Venus, the next planet, looks like the brightest planet in the sky, because the Sun reflects off its clouds making it shine brightly. Venus would be a terrible place for you to visit because on Venus the rain is made of Sulphuric acid. If it rained on you, you would turn to soup!

Then comes Mars. It is sometimes called the Red Planet, because the soil is an orange-red colour. Mars has the biggest volcano in the whole Solar System. The volcano is called Olympus Mons. Olympus Mons is the size of the whole South Africa, and its top is high as the top of the highest cloud.

Jupiter is next. It is the largest planet in our Solar System and has a great red spot, which is a very violent storm. The earth would fit into this great red spot. Even though Jupiter is so big, it spins very quickly. One day on Jupiter is only 10 hours long, with 5 hours of light and 5 hours of darkness.

Saturn, the second largest planet in the Solar System, is very beautiful planet to view through a telescope. You can clearly see its bright white rings.

People living on earth did not find out about Uranus until 1781. Neptune was only discovered in 1846. The furthest planet from the Sun, little Pluto, was discovered in 1930. It is so far away that it takes 250 years to travel around the Sun. Imagine only having a birthday only every 250 years!

Well that's about all I have found out on my journeys around the Solar System. Please help me to put this information into the table. Please teach me something new by reading other books and add interesting information to your table. You can tell me what you have found out when I visit you in 2062. Until I see you then, work hard and be good."

The Adventures of Halley’s Comet

Use the story “The Adventures of Halley’s Comet” and other books you may have to fill in the table below.

Order from the Sun	Name of the Planet	What is made from?	How many large moons does it have?	What other interesting information have you found out about this planet?	Would you want to live on this planet? Why?
1					
2					
3					
4					
5					
6					
7					
8					
9					

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.			
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.			
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		
CONTENT			TEACHING & LEARNING ACTIVITIES		
The Sun, Planets and Asteroids			Teacher Activities	Learner Activities	Resources
✓ The Sun (a star) is at the centre of our Solar System			Ask background questions, e.g. What is milky way? Which movement of the Earth is responsible for the season?	Intro Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.	
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun			Instruct learners to complete an activity. Suggested activities include; Quiz questions and score sheets, read and answer questions about planets (Adatia, et al., 2013, pp. 172-174), answer questions based on solar system (Barnard, et al., 2013, p. 161).	Learners' activity: learners will complete the quiz worksheet. Teacher does corrections with the learners.	
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)				Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content.	
				Learners mark their own/peer's worksheet and do corrections.	

✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.) ✓ Every object has a gravitational			
ASSESSMENT		Worksheet/textbook activity (Informal Assessment)	
TEACHER REFLECTION		Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.	

PLANET EARTH AND BEYOND

SOLAR SYSTEM

Question 1

What is the Earth's spinning motion called?

- A. Rolling
- B. Rotation
- C. Revolution
- D. Racing

Question 2

The Celestial objects like the Sun, other stars, and planets appear to move in the sky. We see them rise and set

- A. From North to South
- B. From South to North
- C. From East to West
- D. From West to East

Question 3

The moon orbits the Earth every _____

- A. 7 days
- B. 28 days
- C. 365 days
- D. 30 days

Question 4

What is the correct order of the planets in the Solar System, starting closest to the Sun?

- A. Mercury, Mars, Earth, Venus, Jupiter, Saturn, Uranus, Neptune, Pluto
- B. Mercury, Mars, Venus, Earth, Jupiter, Saturn, Uranus, Neptune, Pluto
- C. Mercury, Venus, Earth, Mars, Jupiter, Neptune, Uranus, Saturn, Pluto
- D. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto

Question 5

What elements are the atmospheres of Jupiter and Saturn primarily made of?

- A. Argon and Krypton
- B. Hydrogen and Helium
- C. Nitrogen and Carbon Monoxide
- D. Nitrogen and Methan

Question 6

Which planet is closest in size to the Earth?

- A. Mars
- B. Neptune

- C. Uranus
- D. Venus

Question 7

What is the largest planet in the solar system?

- A. Earth
- B. Jupiter

- C. Mars
- D. Neptune

Question 8

Which planet has the most extensive ring structure?

- A. Jupiter
- B. Neptune

- C. Pluto
- D. Saturn

Question 9

How many planets are there in our solar system?

- A. Eight
- B. Nine

- C. Ten
- D. Eleven

Question 10

How long does it take for light from the Sun to reach Earth?

- A. 1 minute
- B. 8 minute

- C. Instantaneous
- D. 24 hours

Question 11

The following is (are) true about Sun.

- A. It is made up of gases
- B. It has its own heat and light

- C. Sun is a star
- D. All of the above

Question 12

The different group of stars is known as

- A. Constellations
- B. Celestial bodies

- C. Asteroids
- D. Comet

Question 13

The following is called 'dwarf planet'

- A. Saturn
- B. Jupiter

- C. Mars
- D. Pluto

Question 14

Which of the following planets of the Solar System has the longest day?

- A. Mercury
- B. Jupiter

- C. Venus
- D. Earth

Question 15

Among the following planets, which is the brightest planet?

- A. Mercury
- B. Venus

- C. Mars
- D. Jupiter

Question 16

Which Planet is called the red Planet in our Solar System?

- A. Mercury
- B. Mars

- C. Jupiter
- D. Neptune

Question 17

The hottest planet is _____

- A. Mercury
- B. Venus
- C. Jupiter
- D. Saturn

Question 18

In order of their distances from the Sun, which of the following planets lie between Mars and Uranus?

- A. Earth and Jupiter
- B. Jupiter and Saturn
- C. Saturn and Earth
- D. Saturn and Neptune

Question 19

Which of the following is considered being astar?

- A. Moon
- B. Earth
- C. Sun
- D. Galaxy

Question 20

What is the name of the planet on which we are living?

- A. Jupiter
- B. Mars
- C. Pluto
- D. Earth

QUIZ QUESTIONS SCORE SHEET

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Question 1								
Question 2								
Question 3								
Question 4								
Question 5								
Question 6								
Question 7								
Question 8								
Question 9								
Question 10								
Question 11								
Question 12								
Question 13								
Question 14								
Question 15								
Question 16								
Question 17								

Question 18										
Question 19										
Question 20										
Total										

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:				
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.				
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.				
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)					
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY					
	2. UNDERSTANDING AND CONNECTING IDEAS					
	3. SCIENCE, TECHNOLOGY AND SOCIETY					
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	Resources Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. C
✓	Observing	✓	Raising Questions	✓	Recording Information	
	Comparing	✓	Predicting	✓	Interpreting Information	
	Measuring		Hypothesizing	✓	Communicating	
	Sorting & Classifying		Planning Investigations		Making/Constructing	
	Evaluating & Improving		Designing			
CONTENT		TEACHING & LEARNING ACTIVITIES				
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities		
✓ The Sun (a star) is at the centre of our Solar System		Give learners an instructional worksheet on how to make a model using different processes.		Intro Learners will listen to instructions and follow process on making the solar system model.		
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Evaluation sheet		Body Learners observe as teacher demonstrates.		
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)		Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (making a model).		Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content.		
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)		Consolidation Teacher moves around helping the learners.		Consolidation Learners will complete their planning and make their model in groups.		
✓ Every object has a gravitational						

✓ pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it.			
ASSESSMENT	Worksheet/textbook activity (formal Assessment)		
TEACHER REFLECTION	<i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

SOLAR SYSTEM

Period 1 and 2: Construct a simple model of the sun and the planets in our Solar System.

Name and Surname: _____

Class: Gr 6/_____

INSTRUCTIONS

1. All work must be handed in on the due date set by the teacher
2. Failure to submit on the due date will result in a minus 10% for each day that the work is due
3. Copying will result in an immediate 0
4. If you are absent for a formal assessment, you must bring a doctor's letter.

Make a model of the solar system in which you:

- Show all the planets and the Sun
- Make clear the different sizes of the planets
- Make clear their distances from the Sun
- Show their main features.

Plan your model

1. Review the information you have on the planets.
2. Decide which key features you want to show about each.
3. Think about and decide:
 - How to make their round shapes of different sizes
 - How to arrange the planets in the correct order from the Sun
 - How to show their main features.

You can make your model in your own way, or make one like ours.

Assemble your materials

If you are making your own model, gather all the materials you will need. You can see our model on page 99 of the Sasol Inzalo workbook

If you are making a model like ours, you will need:

- A round piece of cardboard about 30 cm across, such as a thick paper plate. You can also draw around a large round object on a piece of cardboard from a box and then cut your round shape out.
- Sheets of construction paper or light cardboard – like cereal boxes.
- Scissors; tape; string.
- Material for colouring your paper – pencil, crayons, markers or paints and a brush.
- A compass or smaller round shapes like bottle lids for making circles.
- A tool to make holes in the cardboard, such as the end of a knitting needle, the sharp point of a pair of scissors, or a large nail.

Make your model

If you are making our model, follow the steps shown below.

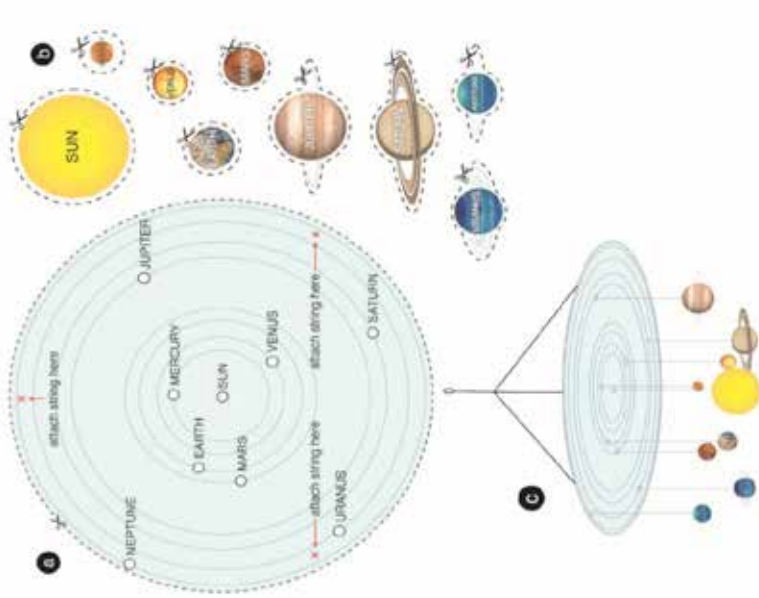
Period 3

Evaluate your model

- Does your model show the Sun and 8 planets?
- Are they arranged correctly, with the Sun in the centre and the planets in orbit around it?
- Are the planets the right sizes relative to each other and in the correct positions from the Sun?
- Are the correct features shown on each planet?

- Which members of the solar system are not shown in your model?
- Draw a line from top to bottom and from right to left across your circle. Where these two lines meet is the centre of the circle.
- Using a compass or different-sized round shapes, draw circles to show the orbits of the 8 planets. Take note of how close or far apart they are.
- Use your hole-making tool to punch 9 holes in the cardboard: – One in the centre where the Sun will hang – One somewhere on each circle (orbit) for a planet to hang from. These should not all be in a straight line from the Sun.
- Cut circles from cardboard or construction paper to represent the Sun and each of the planets. Make the Sun the biggest. Make Jupiter, Saturn, Uranus, and Neptune a bit smaller than the Sun. Make the remainder of the planets much smaller. Write the name of each planet on the back.
- Draw on and colour in each cut out circle to show the features of the planet it represents. You could also stick on some cut-out shapes of features.
- Cut out and colour a disc for Saturn's rings and fit it onto your model of Saturn.
- Tape a length of string to each planet and the Sun.
- Lace the other end of each string through the correct hole in the large cardboard circle. Tape the end of the string to the top side of the cardboard.

- To hang your model, tie three pieces of string to the top of the cardboard – then tie these three together. Tie them to a longer string (from which you'll hang your model).



Plan your model

Plan your model here in the space provided. Indicate what materials you will need.

Total: 15 Marks

`DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.			
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SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		
CONTENT		TEACHING & LEARNING ACTIVITIES			
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities	
✓	The Sun (a star) is at the centre of our Solar System	Instruct learners to complete an activity.		Learners observe as teacher demonstrates.	
✓	There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun	Suggested activities include; order and relative size of planets, answer questions based on solar system (Barnard, et al., 2013, p. 161).		Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content.	
✓	Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)	Unscramble the names of planets and arrange them in order		Learners follow instructions and complete the worksheet?	
		Consolidation			
		Teacher does corrections with the learners.			
✓	The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)			Consolidation	
				Learners mark their own/peer's worksheet and do corrections.	
✓	Every object has a gravitational				
		References			
		Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd.			
		Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd.			
		Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd.			
		Education, D. o. B., n.d.			

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it. ✓ The planets of the solar system are in constant motion around the sun and are constantly pulled towards the sun (sideways), this causes them to not shoot off into space or collide with the sun. the inward pull and sideways movement together cause the objects and the solar system to orbit the sun (Bezuidenhout, et al., 2013, p. 254)		Curriculum And Assement
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)	
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.	

Unscramble the names of the 8 planets. Identify them as rocky planets (terrestrial) or gas planets (Jovian). Arrange them in the order of their distance from the sun starting from the closest.

1. NUVSE

2. SMAR

3. PIETRUJ

4. UNNETPE

5. TAREH

6. ATSNUR

7. EYCMRUR

8. ASURNU



Sequence	Names of planets	Type of planet (Terrestrial or Jovian)
1		
2		
3		
4		
5		
6		
7		
8		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:				
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.				
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.				
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)					
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY					
	2. UNDERSTANDING AND CONNECTING IDEAS					
	3. SCIENCE, TECHNOLOGY AND SOCIETY					
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
✓	Observing	✓	Raising Questions	✓	Recording Information	
	Comparing	✓	Predicting	✓	Interpreting Information	
	Measuring		Hypothesizing	✓	Communicating	
	Sorting & Classifying		Planning Investigations		Making/Constructing	
	Evaluating & Improving		Designing			
CONTENT		TEACHING & LEARNING ACTIVITIES				
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities		
✓ The Sun (a star) is at the centre of our Solar System		Teacher did revision with the learners and summarise solar system and issued a worksheet about solar system		Body Learners listened as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content.		
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (Cross Puzzle).		Learners completed the cross puzzle		
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)		Consolidation Teacher does corrections with the learners.		Consolidation Learners mark their own/peer's worksheet and do corrections.		
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)						
✓ Every object has a gravitational						
				References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. C		

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it. ✓ The planets of the solar system are in constant motion around the sun and are constantly pulled towards the sun (sideways), this causes them to not shoot off into space or collide with the sun. the inward pull and sideways movement together cause the objects and the solar system to orbit the sun (Bezuidenhout, et al., 2013, p. 254)			
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

SOLAR SYSTEM

Solve the word puzzle by identifying the elements of the solar system concerning the following words:

ASTEROID, COMET, EARTH, JUPITER, MARS, MERCURY, NEPTUNE, PLUTO, SATURN, SUN, URANUS, VENUS

C	B	Q	X	X	J	U	W	P	A	Q	G	H	X	L	D	V	R	K	D	T	G
Y	C	J	X	X	J	U	B	A	O	W	U	S	K	U	I	I	J	L	E	I	X
I	R	U	U	K	P	Z	H	R	Y	A	W	Y	A	U	Q	O	S	M	G	W	E
T	N	U	X	R	C	M	A	D	W	B	Q	W	C	N	R	A	O	F	F	D	A
P	N	J	C	Y	A	N	N	P	R	Q	S	M	L	D	T	H	L	W	X	M	T
U	S	X	U	R	U	Z	P	K	S	M	I	G	P	L	A	O	R	O	Z	D	H
E	A	O	N	S	E	J	Q	U	Y	I	C	F	P	L	A	O	R	O	Z	D	H
V	T	E	P	C	T	M	N	C	F	K	P	L	A	O	R	O	Z	D	H	H	H
D	U	A	G	S	U	E	L	H	X	L	X	C	F	T	U	C	E	F	A	X	Q
V	R	L	F	X	V	Y	O	A	M	J	C	F	T	U	C	E	F	A	X	Q	X
R	N	L	N	X	C	Z	Q	P	D	R	M	I	X	E	G	F	N	Y	A	A	J
O	S	Z	N	L	A	O	Q	X	N	M	P	R	L	F	Y	C	G	P	J	J	X
E	E	Q	A	Z	M	W	M	T	C	U	R	K	H	C	E	P	U	K	X	X	X
N	X	T	B	Q	X	V	W	L	J	P	N	I	U	V	P	B	F	A	U	K	Q
O	T	U	Q	O	A	K	B	J	P	T	P	E	N	U	G	D	H	M	I	U	K
Q	P	W	T	X	B	E	N	U	I	I	H	Y	R	Y	P	L	C	E	S	B	U
W	J	U	B	X	G	J	R	I	I	H	Y	R	Y	P	L	C	E	S	B	U	U
S	L	F	G	W	C	X	V	F	Z	Q	U	C	I	B	M	O	P	J	N	H	N
P	U	F	V	N	Z	J	J	Y	S	C	O	J	Q	K	Y	P	C	W	H	H	N
O	K	L	K	D	C	I	C	F	M	K	J	F	N	Q	V	O	V	Y	J	J	J

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Solar system		Explain what they will be studying in strand through the medium of a word bank or quiz			
Content & Concepts/Subtopic: The Sun, Planets and Asteroids					
Terminology	Solar system, Asteroids, Asteroids belt, satellite, star, planet, orbit				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY.				
PROCESS SKILLS					
✓ Accessing & recalling Information		Identifying problems & issues		Doing Investigations	Making/Construction
Observing	✓	Raising Questions	✓	Recording Information	Evaluating and improving products
Comparing		Predicting		Interpreting Information	
Measuring		Hypothesizing	✓	Communicating	
Sorting & Classifying		Planning Investigations		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
The sun (a star) is at the center of our solar system	The teacher: - Divides the learners into equal manageable groups. (Depending on the size of the class). - Gives the learners a Passage to read about the Solar System from HartRAO Booklet. Activity Worksheet 1.1 - Moves around the class and check if learners in Groups are following instructions and are reading with understanding. - After checking with all Groups, he/she tells the learners of the Game (Quiz) the Groups are going to play for points. Activity 1.3 (General Knowledge Questions based/not based on the Passage) ☐ Quiz instructions: - The teacher asks a question and learners are given 1 minute to discuss it		Textbooks, Worksheet, Dictionary

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	and then respond. ☐ The Group that raises hands first gets the opportunity to answer the question. ☐ If the Answer is correct the Group gets a point and is recorded in Activity Worksheet 1D. ☐ At the end of the Quiz, the winning Group gets rewarded. ☐ (The rewards might be a bag of goodies, like sweets or pencils/pens or and rubbers etc. The teacher decides) 1. Learners: • Read the given passage with understanding. Activity Worksheet 1.1 • Identify unfamiliar words and write them in Activity Worksheet 1.2 to compile a Group or Class dictionary as Lesson on the Strand continues. • The learners in their respective groups discuss the answer. The first group that is ready raise their hands and respond to the question.	
ASSESSMENT	The learners will complete the quiz with understanding and the teacher will be able to pitch the level of instruction correctly	
TEACHER REFLECTION		

The solar system

1. Match the words in Column A with the description in Column B. Only write the number of your answer next to the correct alphabet letter.

Column A	Column B
a) Rotation	1. Caused by the rotation of the Earth.
b) Revolution	2. A system consisting of stars, planets, dust and gas.
c) Moon	3. layer of air that surrounds a body in space.
d) 365¼ day	4. Spinning of Earth on its axis.
e) Day and night	5. A natural satellite that orbits a planet.
f) Asteroid	6. A person who travels into space in a spacecraft.
g) Galaxy	7. Movement of Earth or other planets around the Sun.
h) 24 hours	8. A piece of rock that revolves around the Sun in an orbit.
i) Atmosphere	9. Length of time for Earth to turn once on its axis.
j) Astronaut	10. Length of time for Earth to travel around the Sun once

(10)

2. Write the names of the planets in order, beginning from the one that is closest to the Sun.

(4)

3. Which planet do you think is the coldest, and why?

(2)

4. Why do the planets all keep on moving in orbits around the Sun?

(2)

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Moons		• Investigate how the Sun lights the Moon.			
Content & Concepts/Subtopic -Moon and Sun relationship		• Explain that the moon looks different to us on different days throughout the month			
Terminology	orbit, phases, space, crater				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions		Recording Information
✓	Comparing		Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Moons 🌕 moons, including our moon do not give out their own heat and light 🌕 our moon can be seen from Earth because the light from the Sun shines onto its surface 🌕 on the moon we can see craters, lighter areas which are mountains, and darker areas which are flat plains	Teacher Activities: Introduces the topic: “ Play the Moon song” Teacher settles the learners down to create learning atmosphere and then capture learners attention by asking learners to explain what they have learned about on the previous lesson about the moon. Teacher ask about the individual research on planets with moons and planets without the moons. Body Explain that today we will investigate how the Sun lights the Moon. Teacher facilitate group formations and then distribute the resources needed for investigation. Resources- small white balls; silver papers; dark marking pen;		-Textbook: Platinum NS/Tech grade 6, page 178 -Pictures of Moon Materials for investigation: -small white balls, silver papers, dark marking pen,

	torches. Teacher hands out worksheets to learners. Activity 1-Find the main idea about the Moon. Learner Activities: -Read and find the facts about the moon -Answer and ask questions, active participation in class. -Complete the given worksheet in class.	torches
ASSESSMENT	Informal task- learners complete the worksheet on Moon. (Practical Task)	
TEACHER REFLECTION		



Moon Phases Song.mp4

THE MOON

Period 1:Activity 1

Find the Main Idea

Find the main idea in the paragraph below. Write the main' idea in your own words in the space provided. Then, write a concluding sentence for this paragraph.

Even though we can clearly see the moon at night, it is about 384 000kilometers away from the Earth! However, the moon seems very close by when you consider that the sun is about 149 millionkilometersaway. Venus, the most visible planet, is about 260 million kilometersaway from the Earth when it arrives at the furthest point along its orbit. Orion, the furthest constellation you can see without a telescope, is 32,600 light years away. A light year is the distance light travels within one year. One light year is equal to over 8 trillion kilometres!

Main idea:

Concluding sentence:



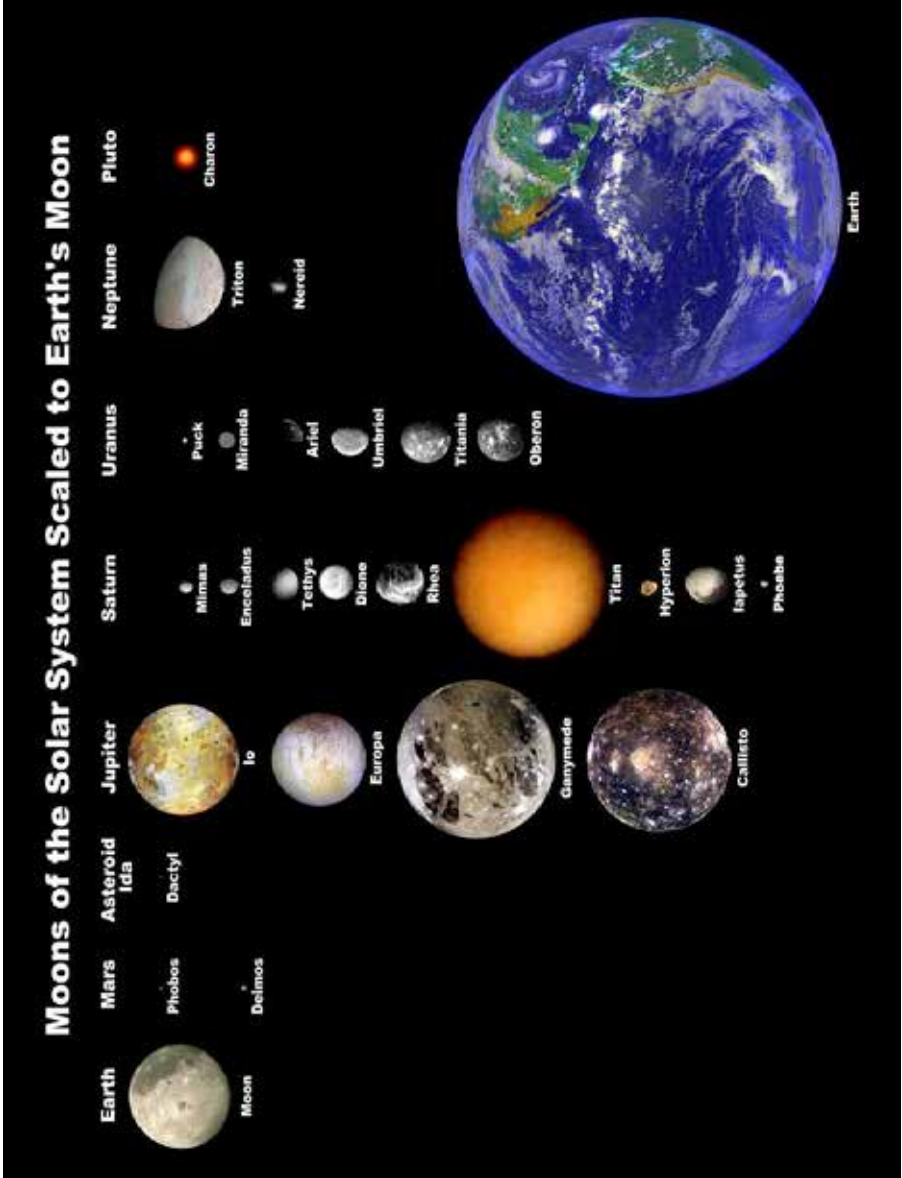
Period 2: Activity 2

PLANET EARTH AND BEYOND

SUPPLEMENTARY MATERIAL TO ACTIVITY WORKSHEET 2A

SOLAR SYSTEM

MOONS IN OUR PLANETS



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Moons		- Describe the fact that the moon has different phases. - Explain that the moon looks different to us on different days throughout the month		
Content & Concepts/Subtopic				
-Moon's surface				
Terminology	orbit, phases, space, crater			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			✓
	2. UNDERSTANDING AND CONNECTING IDEAS			✓
	3. SCIENCE, TECHNOLOGY AND SOCIETY			✓
PROCESS SKILLS				
✓	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	✓	Raising Questions	Recording Information
✓	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Moons - moons, including our moon do not give out their own heat and light - our moon can be seen from Earth because the light from the Sun shines onto its surface - on the moon we can see craters, lighter areas which are mountains, and darker areas which are flat plains	Teacher Activities: Introduces the topic: "Moon" Explain that today we will begin a discussion about the moon. Teacher ask learners to describe when the best time is to see the moon (at night). Teacher ask learners if the moon can also be seen during the day (Yes, it can be seen during the day too. At different times of the month it is easier to see). Ask if the moon looks the same every time they look at it. Ask learners to explain how it changes. (Sometimes you can only see a little white silver and sometimes you can see the whole moon). Body Teacher explains more information about the moon. We can only see half of the moon from Earth, since the other side is always turned away from us. As the moon travels around the earth, we see different fractions of the moon, as it is lit by the Sun. -Our moon can be seen from earth because the light from the sun shines onto its surface. -“Waxing” means growing and is used to describe the moon as it grows from new moon to full moon. -“Waning” means shrinking and is used to describe the moon as it gets smaller	-Textbook -Pictures of Moon http://www.spaceracers.com/pdf/moon-phases-lesson-plan.pdf Moon Demonstration: -Lamp=Sun -White ball=Moon -Head=Earth *NB: The Moon will orbit the Earth through the

	from full moon to new moon. -The “first quarter” is when the moon has completed $\frac{1}{4}$ of its orbit around the earth. This is when the moon looks like a “half-moon”. -The “last quarter” is when the moon has completed $\frac{3}{4}$ of its orbit around the earth and also looks like a “half-moon” to us. -On the moon, we can see craters, light areas which are mountains and darker areas which are flat plains. Consolidation: Teacher wraps up the lesson with asking learners questions about what they have learnt about and allow learners to ask clarification seeking questions and then give learners a worksheet to complete. Learner Activities: -Answer and ask questions, active participation in class. -Complete the given worksheet in class. -Curious about moons, learners do simple research on which planets have moon(s), the names of the moons and learners must find out that Mercury and Venus have no moon using own cell phone/computer lab/internet café.	learner holding the pencil attached to the white ball (hold straight). Learners will notice that no matter where the Moon is in its orbit, half of it will always be lit by the Sun.
ASSESSMENT	Informal task- learners complete the worksheet on Moon. Peer marking	
TEACHER REFLECTION		

The moon



Read the text and complete the table:

The moon is much smaller and lighter than the earth. So, its surface of gravity is much weaker than the Earth's. For this reason, the moon is not able to hold any atmosphere.

The moon is the only world, apart from the earth, that humans have actually walked on. The surface of the moon is covered by deep holes caused by rocks that have crashed into it from space.

The moon always shows the same face to the Earth because it takes the same time for it to spin around once as it does for it to orbit the Earth. Sometimes we can see all or most of the faces catching the sunlight, but at other times we can see a little or even none. In earlier times, humans had many different ideas about the face of the moon. The Japanese thought it was a rabbit making rice cakes. Some Europeans said it looked like a woman's face, while the Africans thought it looked like a giant crab.

Size of the moon:		Moon's surface full of:	
Atmosphere		Different ideas of the moon:	

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Moons		- Describe the fact that the moon has different phases. - Explain that the moon looks different to us on different days throughout the month			
Content & Concepts/Subtopic					
-Moon’s surface					
Terminology		orbit, phases, space, crater			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			✓
		2. UNDERSTANDING AND CONNECTING IDEAS			✓
		3. SCIENCE, TECHNOLOGY AND SOCIETY			✓
PROCESS SKILLS					
✓	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions		Recording Information
✓	Comparing		Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Moons - moons, including our moon do not give out their own heat and light - our moon can be seen from Earth because the light from the Sun shines onto its surface - on the moon we can see craters, lighter areas which are mountains, and darker areas which are flat plains	Teacher Activities: Introduces the topic: “Moon” Teacher explains more information about the moon. We can only see half of the moon from Earth, since the other side is always turned away from us. As the moon travels around the earth, we see different fractions of the moon, as it is lit by the Sun. -Our moon can be seen from earth because the light from the sun shines onto its surface. -“Waxing” means growing and is used to describe the moon as it grows from new moon to full moon. -“Waning” means shrinking and is used to describe the moon as it gets smaller from full moon to new moon. -The “first quarter” is when the moon has completed $\frac{1}{4}$ of its orbit around the earth. This is when the moon looks like a “half-moon”. -The “last quarter” is when the moon has completed $\frac{3}{4}$ of its orbit around the earth and also looks like a “half-moon” to us. -On the moon, we can see craters, light areas which are mountains and darker areas which are flat plains.	-Textbook -Pictures of Moon http://www.spacemuseum.com/pdf/moon-phases-lesson-plan.pdf Moon Demonstration: -Lamp=Sun -White ball=Moon -Head=Earth *NB: The Moon will orbit the Earth through the

	Consolidation: Teacher wraps up the lesson with asking learners questions about what they have learnt about and allow learners to ask clarification seeking questions and then give learners a worksheet to complete. Learner Activities: -Answer and ask questions, active participation in class. -Complete the given worksheet in class. -Curious about moons, learners do simple research on which planets have moon(s), the names of the moons and learners must find out that Mercury and Venus have no moon using own cell phone/computer lab/internet café.	learner holding the pencil attached to the white ball (hold straight). Learners will notice that no matter where the Moon is in its orbit, half of it will always be lit by the Sun.
ASSESSMENT	Informal task- learners complete the worksheet on Moon. Peer marking	
TEACHER REFLECTION		

The Moon

The Moon travels around the Earth. This is called an “orbit”. The same side of the Moon always faces the Earth. It takes one month for the Moon to go around the Earth. The Moon is a little more than 200,000 miles from the Earth. It is about $\frac{1}{4}$ the size of the Earth. That means the Earth is four times larger than the Moon.

The Moon is a dry land that has millions of craters with rocks and dust. The surface of the Moon is covered with about two inches of dust. The Moon has no air or atmosphere around it, so it does not stay as comfortable and warm like the Earth. The temperature on the Moon is -170°F at night which is very cold, but it is 265°F during the day which is very hot. The hottest temperature on Earth is about 130°F , so the Moon can get over twice as hot!

If you stood on the Moon, the sky would look dark even in the daytime! That is because there is no air or atmosphere. There is also no sound because sound waves go through the air. The Moon is silent. There is no wind, rain or any other type of weather on the Moon. Neil Armstrong and Buzz Aldrin were astronauts who flew on the Apollo 11 rocket and landed on the Moon. They were the first people to walk on the Moon on July 20, 1969. They and other astronauts have taken Moon rocks to study from their trips to the Moon. Scientists found that the Moon rocks are similar to the rocks on Earth. Moon rocks are very old, about 4 billion years old.

Most scientists think the Moon was made after the Earth hit something in space. A large chunk of the Earth broke off and that became the Moon. Scientists think this happened 60 million years after the Earth was formed. This is how you write 60 million:

The Moon sometimes shimmers at night when we look up at the night sky and the Moon. “Shimmer” means to shine softly or with a flickering light or glow. The Moon does not shine by its own light, but by light from the Sun. We see the Moon because the Sun is shining on it.

Sometimes the Moon passes between the Sun and the Earth. When the Moon’s shadow falls on the Earth we see some parts of the Sun covered by the Moon. This is called a “solar eclipse”. This happens about two times a year.

When the Moon passes through the Earth’s shadow and the shadow blocks the sun’s light from hitting the Moon that is called a “lunar eclipse”. We don’t see part or the entire Moon during a lunar eclipse. These happen a few times a year, too.



Draw lines between the words and their meanings.

atmosphere	hole shaped like a bowl
billion	a complete circle; a path
million	1 000 000 000
solar eclipse	1 000 000
lunar eclipse	the air around the earth
crater	partial hiding of the sun by moon
orbit	partial hiding of the moon by sun

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movements of the moon		• Learners must be able to explain the movements of the moon	
Content & Concepts/Subtopic			
Different appearances of the moon			
Lunar month vs calendar month			
Mention Muslim year according to Lunar year			
Terminology			
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY	
		2. UNDERSTANDING AND CONNECTING IDEAS	
		3. SCIENCE, TECHNOLOGY AND SOCIETY	
PROCESS SKILLS			
	Accessing & recalling Information	Identifying problems & issues	Doing Investigations
x	Observing	x Raising Questions	x Recording Information
x	Comparing	x Predicting	x Interpreting Information
x	Measuring	x Hypothesizing	x Communicating
	Sorting & Classifying	Planning Investigations	Making/Constructing/Drawing
x	Evaluating & Improving	Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
- The moon is spinning and one complete rotation takes ABOUT 28 days. - The moon revolves around the earth and one revolution is also ABOUT 28 days	Act 1: Learners start with blank calendar to draw observation of appearance of moon before the October break (Say3 September) Observe appearance of moon every night. Record individually or in groups and report to class every week. If weather does not permit....go to news 24 weather forecast. Did you notice that the moon appears different every night? Act 2: Use a lamp without a shade to represent the sun. Put it on a high table Let learners sit together a distance away, and move around them with a ball on a		Blank calendar September 2018. Print from internet. Lamp and large white ball

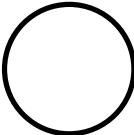
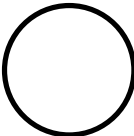
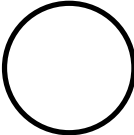
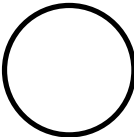
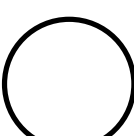
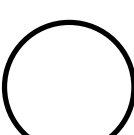
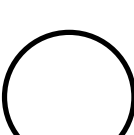
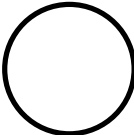
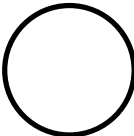
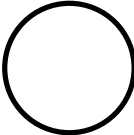
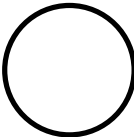
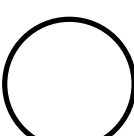
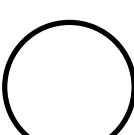
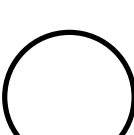
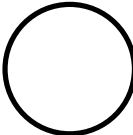
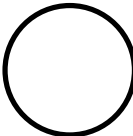
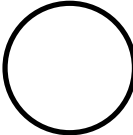
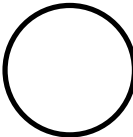
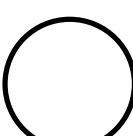
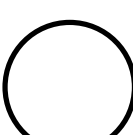
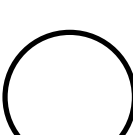
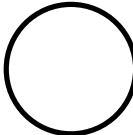
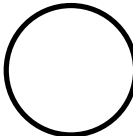
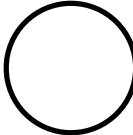
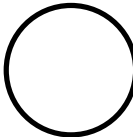
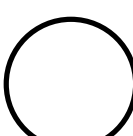
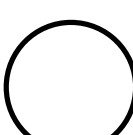
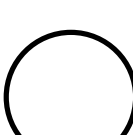
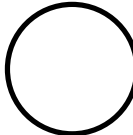
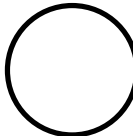
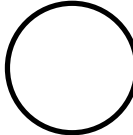
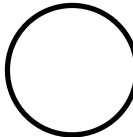
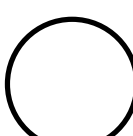
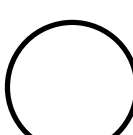
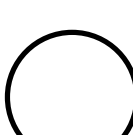
CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Together the earth and moon revolve around the sun in one year	stick. Let them note the appearance of the light part and draw in few positions. Compare with calendar in act 1 Act 3: Learners watch video on Sci-Bono Resource of 2016 about movement of moon around earth and count days. (If resource is available). Teacher explains rotation and why we see only the near side of the moon. Explain revolution of moon. Learners can also make little model of the moon, earth and sun as in Siyavula book. Draw the phases of the moon and learn their names. Make sure we do the Southern Hemisphere. Draw table of comparison of the Sun (Star), earth (Planet) and moon. Include shape, size and ability to give light.	Sci-bono resource Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Give a mark for observation sheet completed by every learner (Tick list), and questions about movements and names of phases (Memo)	
TEACHER REFLECTION	From previous experience I know that we must do observation calendar before school closes. Grade 6 camps, rainy weather and other constraints may hamper the process.	

Moon Phases Calendar

Instructions: Observe the Moon whenever you have a chance to see it. Always face the same direction (either South or North). Look from East to West to find the Moon. Draw the Moon's phase below and the date of your observation.

1. First look at the sky and find the moon.
2. Find the correct block below (Sunday-Saturday) and write down today's date on the block.

3. Decide what shape of the moon you see in the sky; draw the shape in the circle, and color the rest of the circle black..
4. Only leave white part as the moon you can see.
5. In class we will look at all the calendars and at an Internet picture of the moon from the night before. If you were not able to see the moon, you can fill in your moon calendar using the picture you see in class.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Date:	Date:	Date:	Date:	Date:	Date:	Date:
						
Date:	Date:	Date:	Date:	Date:	Date:	Date:
						
Date:	Date:	Date:	Date:	Date:	Date:	Date:
						
Date:	Date:	Date:	Date:	Date:	Date:	Date:
						
Date:	Date:	Date:	Date:	Date:	Date:	Date:
						

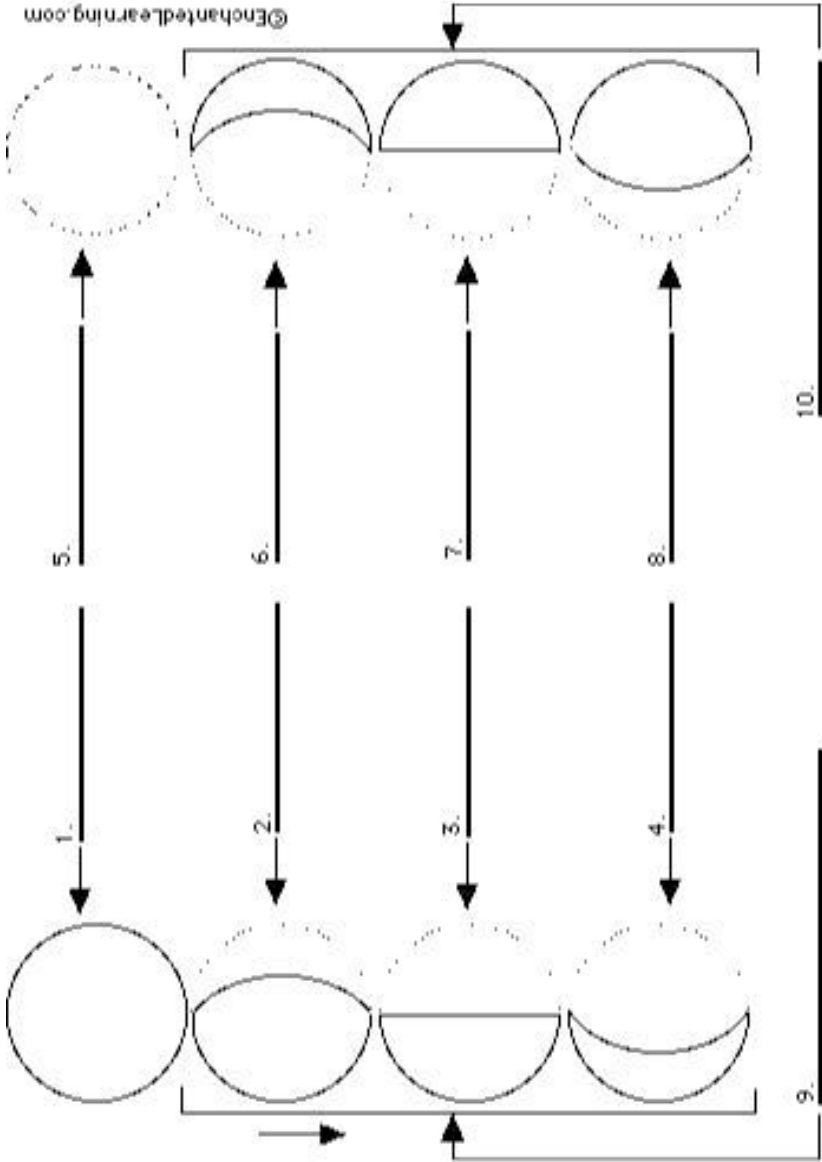
DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Movements of the moon		• Learners must be able to identify phases of the moon and explain the movements of the moon		
Content & Concepts/Subtopic				
Identify Phases of the Moon				
Terminology				
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY		
		2. UNDERSTANDING AND CONNECTING IDEAS		
		3. SCIENCE, TECHNOLOGY AND SOCIETY		
PROCESS SKILLS				
	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
x	Observing	x	Raising Questions	x Recording Information
x	Comparing	x	Predicting	x Interpreting Information
x	Measuring	x	Hypothesizing	x Communicating
	Sorting & Classifying	x	Planning Investigations	Making/Constructing/Drawing
x	Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- The moon is spinning and one complete rotation takes ABOUT 28 days. - The moon revolves around the earth and one revolution is also ABOUT 28 days - Together the earth and moon revolve around the sun in one year	Act 1: Learners start with blank calendar to draw observation of appearance of moon before the October break (Say3 September) Observe appearance of moon every night. Record individually or in groups and report to class every week. If weather does not permit....go to news 24 weather forecast. Did you notice that the moon appears different every night? Act 2: Use a lamp without a shade to represent the sun. Put it on a high table Let learners sit together a distance away, and move around them with a ball on a stick. Let them note the appearance of the light part and draw in few positions. Compare with calendar in act 1 Act 3: Learners watch video on Sci-Bono Resource of 2016 about movement of	Blank calendar September 2018. Print from internet. Lamp and large white ball Sci-bono

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	moon around earth and count days. (If resource is available). Teacher explains rotation and why we see only the near side of the moon. Explain revolution of moon. Learners can also make little model of the moon, earth and sun as in Siyavula book. Draw the phases of the moon and learn their names. Make sure we do the Southern Hemisphere. Draw table of comparison of the Sun (Star), earth (Planet) and moon. Include shape, size and ability to give light.	resource Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Give a mark for observation sheet completed by every learner (Tick list), and questions about movements and names of phases (Memo)	
TEACHER REFLECTION	From previous experience I know that we must do observation calendar before school closes. Grade 6 camps, rainy weather and other constraints may hamper the process.	

Identifying Phases of the Moon

Waxing Crescent – A little part of the moon's right side is lit.	New Moon - The moon's disk facing us is dark because the moon is between the sun and the Earth.
Full Moon - The moon's entire disk is lit because the Earth is between the sun and the moon.	Last Quarter - The left half of the moon's disk is lit.
Waxing Gibbous – About $\frac{3}{4}$ th of the right side moon's disk is lit.	Waning Crescent - A little part of the moon's left side is lit.
1 st Quarter - The right half of the moon's disk is lit.	Waning Gibbous - About $\frac{3}{4}$ th of the left side moon's disk is lit.
Waxing – Getting larger.	Waning – Getting smaller.



Are Moons 1-4 waxing or waning?

Are Moons 5-8 waxing or waning?

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Moons		- Describe the fact that the moon has different phases. - Explain that the moon looks different to us on different days throughout the month		
Content & Concepts/Subtopic				
-Moon’s surface				
Terminology	orbit, phases, space, crater			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
✓	Accessing & recalling Information		Identifying problems & issues	Doing Investigations
	Observing	✓	Raising Questions	Recording Information
✓	Comparing		Predicting	Interpreting Information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Moons - moons, including our moon do not give out their own heat and light - our moon can be seen from Earth because the light from the Sun shines onto its surface - on the moon we can see craters, lighter areas which are mountains, and darker areas which are flat plains	Teacher Activities: The teacher explained on how other moons circle the planets and give learners cross word puzzle worksheet for them to complete thereafter. Consolidation: Teacher wraps up the lesson with asking learners questions about what they have learnt about and allow learners to ask clarification seeking questions and then give learners a worksheet to complete Learner Activities: -Answer and ask questions, active participation in class. -Complete the given worksheet in class. -Curious about moons, learners do simple research on discovering the moons that circle planets. And complete the word search puzzle.	-Textbook -Pictures of Moon http://www.spacers.com/pdf/moon-phases-lesson-plan.pdf Moon Demonstration: -Lamp=Sun -White ball=Moon -Head=Earth *NB: The Moon will orbit the Earth through the learner holding the pencil

		attached to the white ball (hold straight). Learners will notice that no matter where the Moon is in its orbit, half of it will always be lit by the Sun.
ASSESSMENT	Informal task- learners complete the worksheet on Moon. Peer marking	
TEACHER REFLECTION		

Let's Discover Moons That Circle Other Planets!

[Words might be hidden horizontally, vertically and perhaps even back to front...!]

1. Most moons have no _____. They are very hot or very _____.
2. Moons were created 4.5 billion years ago when the rest of the _____ system was made.
3. Not all planets have moons. _____ and _____ have no moons.
4. Earth has only _____. _____ has two. The large gas planets have _____ moons.
5. _____ has 50 known moons, plus 16 more that haven't been confirmed yet.
6. In 1610, _____ discovered four moons of Jupiter.
7. One of the moons _____ Mars is slowly getting _____ to the planet.

E	R	E	H	P	S	O	M	T	A	C	S	E	W	I	X
G	G	C	L	O	S	E	R	E	T	I	P	U	J	T	M
K	J	Q	L	B	F	L	M	C	R	R	T	E	N	O	O
O	C	A	Y	J	Y	I	O	S	R	C	M	P	H	E	W
I	R	U	J	U	J	L	R	N	F	L	U	O	I	C	V
F	J	Q	E	G	D	A	E	Y	E	I	Y	R	C	F	H
D	F	C	E	X	M	G	Q	U	N	N	E	G	Y	Y	F
B	F	N	K	S	O	Q	A	K	H	G	O	E	N	N	G

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Movements of the earth and planets		• What cause day and night			
Content & Concepts/Subtopic: Rotation of the Earth					
Terminology	cloud, Moon, Sun, Star, Solar System, Revolve, Satellite, Atmosphere, Rotation, gravity				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation (Earth) ✓ In our Solar System, each planet rotates (spins) on its own axis ✓ The planet Earth is spinning, and one complete rotation takes about 24 hours. We experience this as a day and a night ✓ During rotation the side of the Earth facing the	Teacher Activities Intro Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season? (<i>you may add your own questions as different schools may use different textbooks</i>). Show learners a short video clip or picture	Learner Activities Answer the worksheet about day and night	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Sunexperiences daytime, and the opposite side of the Earth experiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their own orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	showing how the planets orbit the solar system. Explain important concepts such as; the number of planets, main differences between planets such as size, orbit and position (<i>see content</i>). Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (What cause day and night) Consolidation Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	<i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

Day and Night

WORD BANK

Moon Stars Clouds Sun

What can you see during the day?

What can you see at night?

Look, read and complete

WORD BANK

moon sun day Earth clouds

a. The _____ shines during the _____.

b. The _____ goes around the sun.

c. Night occurs when the _____ and _____ covers the sun.

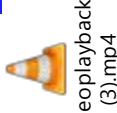
isLCollective.com

DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movements of the Earth and planets	• Explain the difference day time and night time. • Demonstrate and explain that different regions of the Earth do not experience daytime and night time at the same time.	
SUBTOPIC: Rotation of the earth		
Terminology	Solar systems, sphere, axis, rotation, spin, anti-clockwise	
SPECIFIC AIMS	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information	
Observing	✓	Predicting	✓	Designing	
Comparing		Hypothesizing	✓	Making/Constructing	
Measuring		Planning Investigations		Evaluating	
Sorting & Classifying		Doing Investigations		Communicating	
Identifying problems & issues		Recording Information			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation of the earth • In our Solar System, each planet rotates (spins) on its own axis • Because the Earth has the shape of a sphere, the Sun shines on only one side of the Earth at a time as it rotates. • The planet Earth is spinning (rotating) on its axis, and one complete rotation takes about 24 hours. We experience this as a day and a night • During rotation the side of the earth facing the	In a dark room, the teacher uses the torch as the Sun to shine light on the Earth globe while learners are observing which side has light shining on it and which side is dark. The globe is turned slowly from west to east (anti-clockwise), still shining the torch on it. The teacher stops the globe so that the light shines on Europe. The learners attempt to answer these questions: Where is it day-time? Which countries on the globe are having night-time? Find South Africa on the globe. One learner is requested to stick a paper person on South Africa after it has		Video clips Internet Globe Torch Curtains 4 paper persons

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Sun experiences daytime, and the opposite side of the Earth experiences night-time. Most places experience day-time and night-time once every 24 hours. When day-time appears, we normally say the Sun is rising. When night-time appears, we say the Sun is setting.	been found. The teacher turns the globe so that the paper person is in the light (day) and then in the dark (night). Learners have to find day and night for the person in South Africa. The teacher places 4 paper persons on the globe as follows: Australia, Brazil, England and USA. Which countries will be at work while South Africa is experiencing night-time? Have a discussion about what situation each paper person is experiencing. Set the Earth to the same level as the torch. Ask oral questions. Let the learners imagine they are the paper persons on earth. Learners watch a video clip that explores the concepts of rotation, day, night and axis. Reference: https://youtu.be/pLI8sDZRSYg video playback (3).mp4 An alternative video can also be used. Learners are to complete the activity sheet provided. This can be a homework activity.	
ASSESSMENT	Discussions; Watch video clip; Complete activity sheet.	
TEACHER REFLECTION		

TERMINOLOGY

Rotation of the Earth

- Solar system - system which consists of the Sun, the 8 planets, moons, comets, asteroids, dust and gas.
Sphere - shaped like a ball but slightly flattened on each end.
Spin - to turn round.
Axis - imaginary line that runs from North Pole region to the South Pole region of the Earth.
Rotation - the act of spinning about an axis
Anti-clockwise -

ACTIVITY WORKSHEET 1

The rotation of the Earth

1. What do the globe and the torch represent in this activity?
2. Is it possible to shine the light onto the entire globe at one time? Explain why you say so.
3. Describe how the amount of light on one part of the globe changes as it rotates.

MEMORANDUM

1. The globe represents the Earth and the torch represents the Sun.
2. No, because as the earth rotates (turn round and round). As this happens, the side of the earth facing the Sun will experience day-time while the side facing away from the Sun will experience night-time.
3. As the sun rotates, the dark side turns around into light and experiences day while the side in the light turns around into the dark and experiences night.

ACTIVITY WORKSHEET 2 (Paper persons activity)

1. Where is it day-time?
2. Which countries on the globe are having night-time?
3. Find South Africa on the globe.
4. 4 paper persons on the globe as follows:
Australia, Brazil, England and USA.
Which countries will be at work while South Africa is experiencing night-time?
5. Have a discussion about what situation each paper person is experiencing.

MEMORANDUM

1. Europe
2. Australia
3. The learners try and find SA on the globe
4. England and USA
5. Australia and Brazil will experience day-time almost at the same time, England and USA will also experience their days and nights at the same times of the day. This means when Australia and Brazil are experiencing day-time, both England and USA will be experiencing the night and vice versa.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Movements of the earth and planets		• Demonstrate how day and night occurs in the model of the earth and a light sources. •			
Content & Concepts/Subtopic: Rotation of the Earth					
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			✓	
	2. UNDERSTANDING AND CONNECTING IDEAS			✓	
	3. SCIENCE, TECHNOLOGY AND SOCIETY			✓	
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation (Earth) ✓ In our Solar System, each planet rotates (spins) on its own axis ✓ The planet Earth is spinning,	Teacher Activities Intro Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and	Learner Activities Learners attempt to answer these questions orally. They name five electrical appliances.	✓ Equipment such as cells/batteries, conducting wires, light bulbs and switches

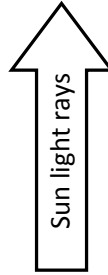
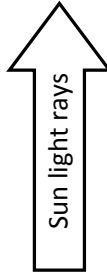
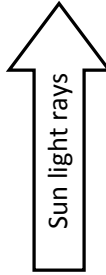
CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
and one complete rotation takes about 24 hours. We experience this as a day and a night ✓ During rotation the side of the Earth facing the Sun experiences daytime, and the opposite side of the Earth experiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their own orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	night? Which movement of the Earth is responsible for the season? (<i>you may add your own questions as different schools may use different textbooks</i>). Show learners a short video clip or picture showing how the planets orbit the solar system. Explain important concepts such as: the number of planets, main differences between planets such as size, orbit and position (<i>see content</i>). Body Instruct learners to complete an activity. Suggested activities include: order and relative size of planets (Day and Night) Consolidation Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	✓ YouTube (https://www.youtube.com/watch?v=Is7Q-r7G9ug)
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Day / Night

Day and Night

DAY

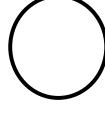
Heat and light travel from the sun to the earth's surface.



It is day time when the earth faces the sun.

NIGHT

It takes 24 hours for the earth to turn once. As the earth spins, day becomes night.



MOON

It is night time when the earth faces away from the sun.



Quick Quiz

How many hours does it take for the earth to turn once on it's own axis?

When it is day time, is the earth side facing the sun or facing away from the sun?

When it is night time, is the earth side facing the sun or facing away from the sun?

Why is it colder at night time than in the day time? Use the picture to help you.

Use a globe to find where you are in the world. Name another country that will be experiencing night time while you experience day time.

DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movements of the Earth and planets	• Define revolution • Describe the direction and rate of Earth's revolution	
SUBTOPIC: Revolution of the earth		
Terminology	Revolution, orbit, axis, elliptical, tilt, year	
SPECIFIC AIMS	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information	
Observing	✓	Predicting	✓	Designing	
Comparing		Hypothesizing		Making/Constructing	
Measuring		Planning Investigations		Evaluating	
Sorting & Classifying		Doing Investigations		Communicating	
Identifying problems & issues		Recording Information			

CONTENT		TEACHING & LEARNING ACTIVITIES		Resources
Revolution of the earth • All planets also revolve (move/travel around) the Sun in their own orbits. • The movement of the planets around the Sun in an orbit is called a revolution. • The shape of the orbit is elliptical; Even the Earth revolves around the Sun in an elliptical orbit. • The distance of the planet from the Sun determines the length of its orbit, so because mercury is the planet closest to the Sun, it has the shortest orbit. It takes the		The teacher puts the model of the Sun, Moon and Earth on the table where every learner can see it. S/he rotates the Earth on its axis. S/he then moves the Earth around the Sun in an orbit (anticlockwise). Learners observe the teacher's demonstration.		Model of the Sun, Earth and Moon that can show the Earth's movement Video clip
		Learners watch a video clip that explores the concepts of revolution, orbit, axis, elliptical, tilt, year		

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
shortest time to revolve around the Sun. • Earth is the third planet from the Sun. It takes it 365 $\frac{1}{4}$ days to revolve around the Sun. We experience this as a year. • The $\frac{1}{4}$ of the day is why we have a leap year every 4 years; we add the 4 quarters of each year to make a day to keep the calendar straight. The extra day is always 29 February. • The Earth rotates on its axis as it goes around the Sun. • For any given place on Earth the Sun goes past every 24 hours. • Shadows cast by the Sun change position and length during the course of the day. • The Earth is tilted at 23,5° to the plane of its orbit around the Sun and the angle is maintained as the earth orbits the Sun. • Seasons of the year are caused by the tilt of the Earth`s axis.	Reference: https://study.com. An alternative video can also be used.  videoplayback (27).mp4 Reference: http://m.youtube.com/watch Learners are to complete the activity sheet provided. This can be a homework activity.	
ASSESSMENT	Discussions; Watch video clip; Complete activity sheet.	
TEACHER REFLECTION		

TERMINOLOGY

Revolution of the Earth

Revolution - The length of time the Earth takes to travel around the Sun once.

Orbit - The path of one object in space around another. E.G. the path of the Earth around the Sun.

Axis - Imaginary line that runs from North Pole region to the South Pole region of the Earth.

Elliptical - Oval or egg - shaped.

Tilt - To move into a sloping position

Year - A period of 365¼ days (12 full months)

ACTIVITY WORKSHEET 1

The revolution of the Earth

1. Draw and label a diagram of the Earth orbiting around the Sun. Make sure that you include the following in your diagram:
 - The Earth
 - The tilt of the Earth's axis, always pointing in the same direction
 - The rotation of the Earth on its axis
 - The Sun
 - The movement of the Earth around the Sun

MEMORANDUM



ACTIVITY WORKSHEET 2 (Summary of Lesson 1 and 2)

1. What do we call the movement of Earth on its axis?
2. In what direction does the Earth rotate on its own axis?
3. What do we call the movement of the Earth around the Sun?
4. Match the words in Column A with the description in Column B. Write your answers like in the example given:

Column A	Column B	Answer
EXAMPLE	EXAMPLE	6. g
1. Revolution	a) Length of time for Earth to travel around the Sun once	
2. Day and night	b) Movement of Earth or other planet around the Sun	
3. Rotation	c) Caused by the rotation of the Earth	
4. 24 hours	d) Length of time for Earth to turn once on its axis	
5. 365¼ days	e) Spinning of Earth on its axis	

MEMORANDUM

1. Rotation
2. Anti-clockwise
3. Revolution
- 4.

Column A	Column B	Answer
EXAMPLE	EXAMPLE	6. m
1. Revolution	f) Length of time for Earth to travel around the Sun once	1. g
2. Day and night	g) Movement of Earth or other planet around the Sun	2. h
3. Rotation	h) Caused by the rotation of the Earth	3. i
4. 24 hours	i) Length of time for Earth to turn once on its axis	4. f
5. 365¼ days	j) Spinning of Earth on its axis	5. f

ACTIVITY WORKSHEET 3 (Summary of Lesson 1 and 2)

The rotation of the Earth

The Earth takes _____
to rotate on its axis.

During rotation, the
side of the Earth
facing away from the
Sun experiences
_____.

During rotation, the
side of the Earth
facing the Sun
experiences
_____.

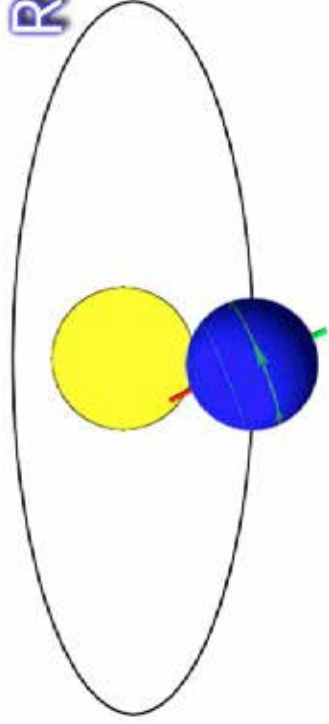


The rotation of the Earth
causes _____ and
_____.

Only half of the Earth
can be in the _____ at
any time.

The revolution of the Earth

Planet Earth _____ around the Sun in an _____



Revolution

One complete _____ around the Sun
takes _____ days. This is called
a _____

MEMORANDUM

The rotation of the Earth

The Earth takes 24 hours
to rotate on its axis.

During rotation, the side
of the Earth facing away
from the Sun
experiences night time.



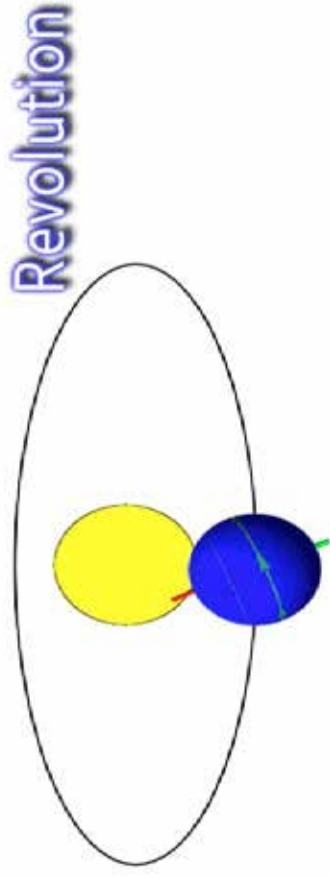
During rotation, the
side of the Earth
facing the Sun
experiences day time.

The rotation of the Earth
causes day and
night.

Only half of the Earth
can be in the Sun's
light at any time.

The revolution of the Earth

Planet Earth revolves around the Sun in an orbit.



One complete revolution around the Sun takes 365½ days. This is called a year.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Movements of the earth and planets		• Understand that the sun does not move			
Content & Concepts/Subtopic: Rotation of the Earth					
Terminology	, Moon, Sun, Star, Solar System, Revolve, Elliptical, Atmosphere, Rotation, gravity				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues		Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation (Earth) ✓ In our Solar System, each planet rotates (spins) on its own axis ✓ The planet Earth is spinning, and one complete rotation takes about 24 hours. We experience this as a day and a night ✓ During rotation the side of the	Teacher Activities Intro The teacher asked the question which one move between the earth and the sun? Explain important concepts such as; rotation, orbit and revolution (see content). Body Instruct learners to complete an activity..	Learner Activities To build the model of the earth movement around the sun.	✓ Equipment such as cells/batteries, conducting wires, light bulbs and switches ✓ YouTube (https://www.y)

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Earth facing the Sun experiences daytime, and the opposite side of the Earth experiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their own orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	Consolidation Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	outube.com/watch?v=js7Q-r7G9ug
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Practical activity 1 To make a model to demonstrate the Earth's movement around the Sun

Aim:

In this practical activity you will make a model to demonstrate the Earth's movement around the Sun.

Apparatus:

- ☐ A ball – it must be round. A bigger ball is easier to work with. You can re-use the ball again.
- ☐ Crayons or marker pens to draw lines on the ball.

Method

- ☐ Study the drawing above.
- ☐ Take a crayon or maker pen and draw the equator on the ball.
- ☐ Write the word “equator” on the line.
- ☐ Write the words “North Pole” (this will form the top of the ball) and the “South Pole” (this will form the bottom of the ball) on the ball.
- ☐ Hold the ball in your hand and tilt it slightly to the right and look at the position of the “North Pole.” Look what happens to the “South Pole” if you tilt the ball. (You can only tilt the ball to the right as the Earth orbits the Sun counter clockwise.)

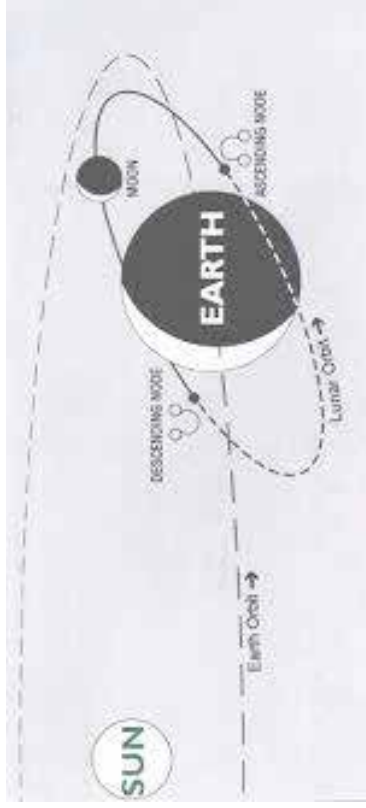
Result

Explain what happens to the North and South Poles if the Earth tilts slightly to one side.

Movement of the Earth / Moon

The earth turns on it’s own axis as well as orbiting the sun. The moon also turns very slowly on it’s own axis, orbiting the earth as well as orbiting the sun

This seems like a very complicated movement but can be understood easily when you study the picture below:

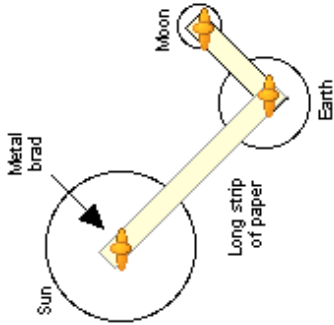


Build your own solar movement system

You will need the following:

Material	Tools
Cardboard	Pencil
Butterfly clips	Ruler
	Scissors
	Compass

- 5. Assemble all the pieces according to the sketch
- 6. Play with the model and observe the movements of the earth and moon



Instructions

- 1. Draw a long rectangle with your ruler and pencil on a cardboard
- 2. Draw a short rectangle with your ruler and pencil on a cardboard
- 3. Draw three different sized circles with your compass and pencil on a paper
- 4. The out the different shapes from the cardboard

ATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movement of the Moon		• Demonstrate the movement of earth using a model.	
SUBTOPIC: Rotation of the Moon			
Terminology		Rotation, orbit, axis, satellite, phases of the Moon	
SPECIFIC AIMS	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		✓

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information	
Observing	✓	Predicting	✓	Designing	
Comparing		Hypothesizing		Making/Constructing	
Measuring		Planning Investigations		Evaluating	
Sorting & Classifying		Doing Investigations		Communicating	
Identifying problems & issues		Recording Information			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation of the Moon • The Moon is a ball of rock in space. • There is no air or water on the Moon. (no atmosphere) • Our moon can be seen from the earth because the light from the Sun shines onto its surface. • The Moon is closer to the Earth than the Sun.	Teacher explains that in the same way as the Earth spins on its own axis, the Moon also spins on its own axis. It takes about 28 days for the Moon to turn once on its axis. S/he starts a “New Moon” with the Moon between the Sun and Earth. • The learner stands in the light of the torch and at a good distance from it. • His/her head represents the Earth so that her eyes have the view that we would see from the surface of the Earth.		Torch (Sun) Ping pong ball on a stick (Moon) A learner (his/her head represents the Earth) Video clip

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
- The Moon is smaller than the Earth. - The Moon is the Earth's only natural satellite and its closest space body. - The Moon orbits around the Earth. - The Moon does not give out its own heat or light.	- The "Moon" is held out at arm's length and in the direction of the light. - How much of the bright sunlit side of the Moon can s/he see? It takes the Moon 28 days to rotate the Earth. - To show this the learner can turn slowly on the same spot to the right. (clock-wise). - After each quarter turn, let the learner stop and see how much of the Moon's surface is having light from the Sun. - Let the learner explain to the classmates what she can see. - The learner must keep turning until s/he has done one complete turn. - When all the learners have observed what was happening, let them discuss what they have seen. E.g. why does the Moon change shape? The teacher explains that we refer to this change of shapes as the phases of the Moon each month. Reference: http://m.youtube.com/watch  videoplayback.mp4 Learners are to complete the activity sheet provided. This can be a homework activity.	
ASSESSMENT	Discussions; Watch video clip; Complete activity sheet.	
TEACHER REFLECTION		

TERMINOLOGY

Rotation – the act of spinning about an axis

Orbit - The path of one object in space around another. E.G. the path of the Earth around the Sun.

Axis - Imaginary line that runs from North Pole region to the South Pole region of the Earth.

Satellite – man-made or natural object that revolves around a planet.

Phases of the Moon – the changing shape of the bright part of the Moon.

ACTIVITY WORKSHEET 1

The rotation of the Earth

1. What is a satellite?
2. How long does it take the Moon to rotate on its own axis?
3. Does the Moon produce its own light? Substantiate your answer.
4. Why can footprints from the 1st moon landing still be seen on the surface of the Moon even today?

Memorandum

1. Man-made or natural object that revolves around a planet.
2. 28 days
3. No, The Moon shines because of the Sun`s light falling on it. The side of the Moon facing the Sun will be lit.
4. Because the Moon does not have an atmosphere, so there is no erosion by wind or water in the moon. The water on the Moon is frozen ice.

DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO: • Describe rotation and revolution • Describe the movement of earth and moon around the Sun.
TOPIC: Movement of the Earth and Planets	
Content & Concepts/Subtopic: Rotation of the earth and the moon	

Terminology	, Moon, Sun, Revolve, Elliptical, Atmosphere, Rotation, gravity			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing	✓	Raising Questions	Recording Information
	Comparing	✓	Predicting	Interpreting Information
	Measuring		Hypothesizing	Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

[illegible]

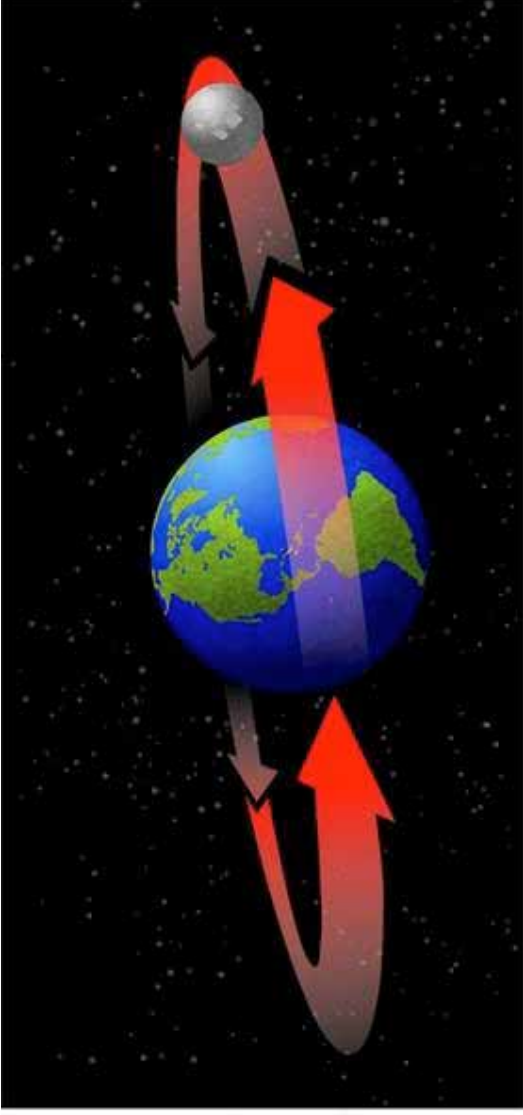
CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Sunexperiences daytime, and the opposite side of the Earthexperiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their ownorbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	r7G9ug
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	<i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

Movement of the Earth / Moon

So the person watching will say that the ball has rotated, and also revolved.
 The real Moon takes about 28 days to rotate once.

Revolution (Moon)

The Moon also revolves in orbit around the Earth, as you saw in the last activity. The Moon takes about 28 days to complete one orbit. The force of gravity between the Earth and the Moon holds the Moon so that it always faces us on Earth.



The Moon revolves around the Earth.

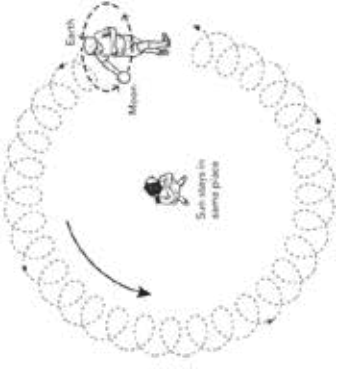
Make a model of the Earth and Moon revolving around the Sun

MATERIALS:

- a white ball
- two people who have practised the model in the previous activity

INSTRUCTIONS:

- You must use your bodies and the white ball to act out this model of the Earth and Moon revolving around the Sun.
- Work together in small groups to decide how you are going to perform this model.
- You must put together the movement of the Moon around the Earth from the last activity, and the movement of the Earth with its Moon, around the Sun.
- Then perform the movements for the class.
- So the model you must perform will be like this diagram shows.



Acting out the Moon and Earth moving around the Sun

- The Moon travels in an orbit around the Earth in about 28 days.
- The Moon rotates on an axis which also takes about 28 days.
- We always see only one side of the Moon.
- Together, the Earth and Moon revolve around the Sun.

Complete the sentences using all the words from the word box. write the sentences out in full on the lines below and number each sentence.

- The Sun stays in _____
- The Earth rotates on its own _____
- The Moon revolves _____
- The _____ revolve together in a big circle around the Sun.
- We only ever see _____ of the Moon.

Word box

Moon and the Earth
around the Earth
one side
axis
the same place

Complete the table comparing the Sun, Earth and Moon. Some answers having been filled in for you.

Question	Sun	Earth	Moon
What is the object classified as?			AMoon
What is the shape?			
What is the size relative to the other objects being discussed here?	The Sun is the biggest.		
What is the movement in relation to other objects?		The Earth revolves around the Sun.	
What is the object made of?			rock
Can this object produce light?			No, the Moon reflects the Sun's rays.
Is there water present?			

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movements of the Earth and planets		• Demonstrate the movement of Moon using a model.	
SUBTOPIC: Revolution of the Moon			
Terminology	Revolution, orbit, axis, satellite		
SPECIFIC AIMS	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information	
Observing	✓	Predicting	✓	Designing	
Comparing		Hypothesizing		Making/Constructing	
Measuring		Planning Investigations		Evaluating	
Sorting & Classifying		Doing Investigations		Communicating	
Identifying problems & issues		Recording Information			

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
Revolution of the moon • The Moon revolves in a pathway or orbit around the Earth. • It takes about 28 days for the Moon to complete a revolution around the Earth. • The movement of the Moon around the	The teacher puts the model of the Sun, Moon and Earth on the table where every learner can easily observe what happens. S/he spins the Moon on its axis. While the Moon is still spinning, s/he moves the Moon along its orbit around the Earth. The Moon should take the same amount of time to spin on its axis as it does to complete its orbit around the Earth.	Model of the Sun, Earth and Moon that can show the Moon's movement around the Earth. Video clip

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: Movements of the earth and planets		• Reading with understanding			
Content & Concepts/Subtopic: Rotation of the Earth					
Terminology					
Calendar ,axis, tilt, equinox, Moon, Revolve, Elliptical, Rotation, gravity, orbit					
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY			✓
		2. UNDERSTANDING AND CONNECTING IDEAS			✓
		3. SCIENCE, TECHNOLOGY AND SOCIETY			✓
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations	
✓	Observing	✓	Raising Questions	✓ Recording Information	
	Comparing	✓	Predicting	✓ Interpreting Information	
	Measuring		Hypothesizing	✓ Communicating	
	Sorting & Classifying		Planning Investigations	Making/Constructing	
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation (Earth) ✓ In our Solar System, each planet rotates (spins) on its own axis ✓ The planet Earth is spinning, and one complete rotation takes about 24 hours. We experience this as a day and a night	Teacher Activities Intro Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season? <i>(you may add your own questions as different per</i>	Learner Activities ; reading the passage	✓ Equipment such as cells/batteries, conducting wires, light bulbs and switches ✓ YouTube

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
✓ During rotation the side of the Earth facing the Sun experiences daytime, and the opposite side of the Earth experiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their own orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	<i>school</i> system. Explain important concepts such as, axis, orbit and position (see <i>content</i>). Body Instruct learners to complete an activity. Suggested activities include; matching column on movement of the earth Consolidation Teacher does corrections with the learners.	Learners will complete the worksheet about rotation and revolution of the earth Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	(https://www.youtube.com/watch?v=Is7Q-r7G9ug)
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Movement of the Earth / Moon

Earth in Space

How does Earth move in space?

What causes the cycle of seasons on Earth?

The study of the moon, stars, and other objects in space is called **astronomy**. Ancient astronomers studied the movements of the sun and moon. They thought Earth was standing still and the sun and moon were moving. The sun and moon seem to move mainly because Earth is rotating on its **axis**, the imaginary line that passes through Earth's centre and the North and South poles. The spinning of Earth on its axis is called its **rotation**. **Earth's rotation on its axis causes day and night. It takes Earth about 24 hours to rotate once on its axis.**

The movement of one object around another object is called **revolution**. Earth completes one revolution around the sun once every year. Earth's path as it revolves around the sun is called its **orbit**. Earth's orbit is a slightly elongated circle, or ellipse.

Many cultures have tried to make a workable calendar. A **calendar** is a system of organizing time that defines the beginning, length, and divisions of a year. This is not easy because Earth takes about 365 1/4 days to circle the sun, and 12 moon cycles make up fewer days than a calendar year.

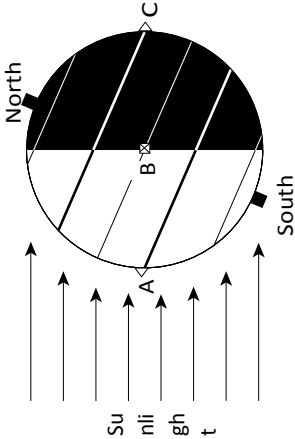
Sunlight hits Earth's surface most directly at the equator. Closer to the poles, sunlight hits Earth's surface at an angle. That is why it is generally warmer near the equator than near the poles.

Earth has seasons because its axis is tilted as it moves around the sun. Earth's axis is tilted at an angle of 23.5° from vertical. As Earth revolves around the sun, its axis is tilted away from the sun for part of the year and toward the sun for part of the year. When the north end of Earth's axis is tilted toward the sun, the Northern Hemisphere has summer. At the same time, the south end of Earth's axis is tilted away from the sun. As a result, the Southern Hemisphere has winter. The hemisphere tilted toward the sun has more daylight hours than the hemisphere tilted away from the sun. The combination of direct rays and more hours of sunlight heats the surface more than at any other time of the year.

On two days each year, the sun reaches its greatest distance north or south of the equator. Each of these days is known as a **solstice**. Halfway between the solstices, neither hemisphere is tilted toward the sun. On those two days, the noon sun is directly overhead at the equator. Each of these days is known as an **equinox**, meaning "equal night." During an equinox, the length of night time and daytime are about the same.

Earth in Space

Use the following figure to answer questions 1 through 3. Write your answers on a separate sheet of paper.



1. In the diagram, what season is it in South Africa?
2. Would a person at each of the points A, B, and C see the sun? If so, where would the sun be in the sky?
3. What movement of the sun (sunrise/sunset) does the person standing at point B see? Explain.

Match each term with its description by connecting the number of the correct term on the left to the letter beside the description on the right e.g. 9=T.

TERM		DESCRIPTION	
1	Astronomy	A	The path of Earth as it revolves around the sun
2	Axis	B	System of organizing time that defines the beginning, length, and divisions of a year
3	Rotation	C	Line passing through Earth's centre and poles

MATCH

4	Revolution
5	Orbit
6	Calendar
7	Equinox
8	Solstice

D	The study of the moon, stars, and other objects in space
E	The sun is farthest north or south of the equator at this time.
F	Movement of Earth around the sun
G	Movement of Earth around its axis
H	The noon sun is directly overhead at the equator at this time.

DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movements of the Earth and planets	• Demonstrate the rotation and revolution of Moon around the Earth using body movements • Drawing and writing about the movements of the Moon in relation to the earth and the solar system • Making a comparison table between the Sun, the Earth and the Moon	
SUBTOPIC: Rotation and revolution of the Moon		
Terminology	Revolution, rotation	✓
SPECIFIC AIMS	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information
Observing	✓	Predicting		Designing
Comparing		Hypothesizing		Making/Constructing
Measuring		Planning Investigations		Evaluating
Sorting & Classifying		Doing Investigations		Communicating
Identifying problems & issues		Recording Information		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation and Revolution of the Moon • The Moon is spinning and 1 complete rotation takes 28 days. • The Moon revolves around the Earth and 1 revolution also takes about 28 days. • Together, the Earth and the Moon revolve around the Sun.	Let the learners stand against the class walls. One learner holds the Sun, another holds the Earth and the 3rd holds the Moon. Demonstrate the Earth orbiting the Sun. The learner holding the Earth walks in an anticlockwise direction in a circle around the Sun. At the same time, this learner (Earth) should rotate slowly in an anticlockwise direction to show the Earth's rotation as it orbits the Sun. Demonstrate the Moon orbiting the Earth. The learner holding the Moon walks in an anticlockwise direction in a circle around the Earth. At the same time, this learner (Moon) should rotate slowly in an anticlockwise direction to show the Moon's rotation as it orbits the Earth.		Soccer ball (Sun) Tennis ball (Earth) Table tennis ball (Moon)

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Now demonstrate the Earth-Moon systems orbiting the Sun (this can be pretty tough). While turning, the Earth and the Moon learners should walk in an anticlockwise direction around the Sun. This demonstrates that the Earth is rotating, that the Moon is rotating and that the Earth-Moon system is revolving around the Sun. Remember that all the movements of the Moon and the Earth occur continuously at a steady speed.  videoplayback (4).mp4 Reference: http://m.youtube.com/watch	
ASSESSMENT	Discussions; Complete activity sheet.	
TEACHER REFLECTION		

ACTIVITY WORKSHEET 1

Match the movement in Column A with its description in Column B and the length of time it takes in Column C.
 You may use the options more than once:

Column A	Column B	Column C
1. Rotation of the Earth	a) Moves around the Sun in an elliptical orbit	28 days
2. Rotation of the Moon	b) The Moon rotates on its axis and revolves around the Earth. The Earth rotates on its own axis and together with the Moon revolves around the Sun	1 year 24 hours
3. Revolution of the Earth		
4. Revolution of the Moon		
5. Revolution of the Earth and Moon system around the Sun	c) Moves around the Earth in an elliptical orbit d) Spins on its axis	

Memorandum:

Column A	Column B	Column C
1. Rotation of the Earth		
2. Rotation of the Moon		
3. Revolution of the Earth		
4. Revolution of the Moon		
5. Revolution of the Earth and Moon system around the Sun		

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: Movements of the earth and planets		• Explain what an electric circuit is.		
Content & Concepts/Subtopic: Rotation of the Earth		• Recall the components of a simple electric circuit.		
Terminology	Moon, Sun, Star, Shadow, Revolve, Elliptical, Atmosphere, Rotation, gravity (Day-to-Day, 161)			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			✓
	2. UNDERSTANDING AND CONNECTING IDEAS			✓
	3. SCIENCE, TECHNOLOGY AND SOCIETY			✓
PROCESS SKILLS				
✓	Accessing & recalling Information	✓	Identifying problems & issues	Doing Investigations
✓	Observing	✓	Raising Questions	✓ Recording Information
	Comparing	✓	Predicting	✓ Interpreting Information
	Measuring		Hypothesizing	✓ Communicating
	Sorting & Classifying		Planning Investigations	Making/Constructing
	Evaluating & Improving		Designing	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Rotation (Earth) ✓ In our Solar System, each planet rotates (spins) on its own axis ✓ The planet Earth is spinning, and one complete rotation takes about 24 hours. We experience this as a day and a night	Teacher Activities Intro Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season? <i>(you may add your own questions as different)</i>	Learner Activities Learners will observe the movement of their shadow	✓ Equipment such as cells/batteries, conducting wires, light bulbs and switches ✓ YouTube

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
✓ During rotation the side of the Earth facing the Sun experiences daytime, and the opposite side of the Earth experiences night-time Revolution (Earth) ✓ All planets also revolve (travel) around the Sun in their own orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution	<i>schools may use different textbooks).</i> Show learners a short video clip or picture showing how the planets orbit the solar system. Explain important concepts such as; the number of planets, main differences between planets such as size, orbit and position (<i>see content</i>). Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (Find East and West) Consolidation Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. Consolidation Learners mark their own/peer's worksheet and do corrections.	(https://www.youtube.com/watch?v=Is7Q-r7G9ug)
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

MOVEMENT OF THE EARTH / MOON

ACTIVITY: Find East and West

- A place where you can stand in the early morning

INSTRUCTIONS:

1. Look at the picture of Sophie at sunrise and answer the questions.

QUESTIONS:

1. Which is Sophie's right hand? Show her right hand with your finger.
-

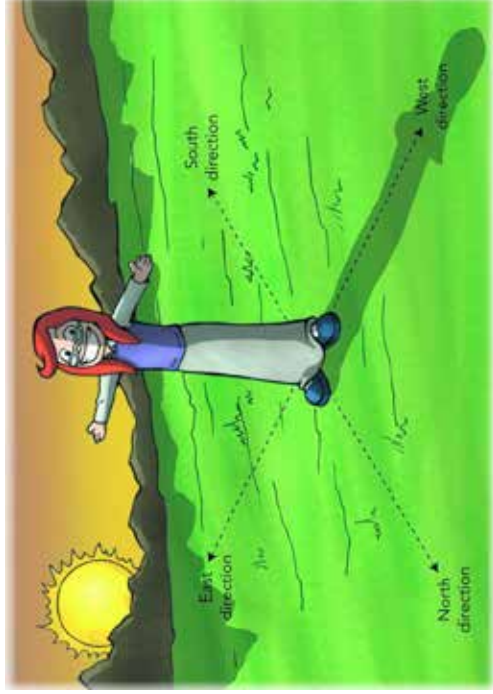
2. Why do we see a shadow of Sophie on the ground?
-

3. In which direction is her shadow pointing?
-

4. If Sophie looks straight in front of her, in which direction is she looking?
-

Now find the direction of East in your classroom. You must point to the place where you see the Sun come up in the morning. In the classroom, stretch out your arms and point in the direction of East and West. Clean the floor and stick some insulating tape on the floor so that everyone can remember which direction is East and which direction is West.

What does the word "direction" mean? You can walk in a **direction** towards a place. If the wind blows, you see leaves moving in the same **direction** as the wind. Remember, a direction is not a place that you can reach!



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:					
TOPIC: Movement of the earth and planets		• Describe the Solar System.					
Content &Concepts/Subtopic: The moon		• Describe the movement of planets around the Sun.					
Terminology	Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)						
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY						
	2. UNDERSTANDING AND CONNECTING IDEAS						
	3. SCIENCE, TECHNOLOGY AND SOCIETY						
PROCESS SKILLS							
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations		
✓	Observing	✓	Raising Questions	✓	Recording Information		
	Comparing	✓	Predicting	✓	Interpreting Information		
	Measuring		Hypothesizing	✓	Communicating		
	Sorting & Classifying		Planning Investigations		Making/Constructing		
	Evaluating & Improving		Designing				
CONTENT		TEACHING & LEARNING ACTIVITIES				Resources	
Rotation (Earth)		Teacher Activities		Learner Activities		References	
✓ In our Solar System, each planet rotates (spins) on its own axis		Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season?		Intro Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.		Text book, inzalo	
✓ The planet Earth is spinning, and one complete rotation takes about 24 hours. We experience this as a day and a night		Body Instruct learners to complete an activity. Suggested activities include; (revision about the movement of the earth and the moon).		Body Consolidation Learners mark their own/peer's worksheet and do corrections.			
✓ During rotation the side of the Earth facing the Sun experiences daytime, and the opposite side of the Earth experiences night-time		Consolidation Teacher does corrections with the learners.					
Revolution (Earth)							
✓ All planets also revolve (travel) around the Sun in their own							

orbits ✓ Planet Earth revolves around the Sun in its own orbit (pathway), and one complete revolution			
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Movement of the Earth / Moon

Multiple Choice

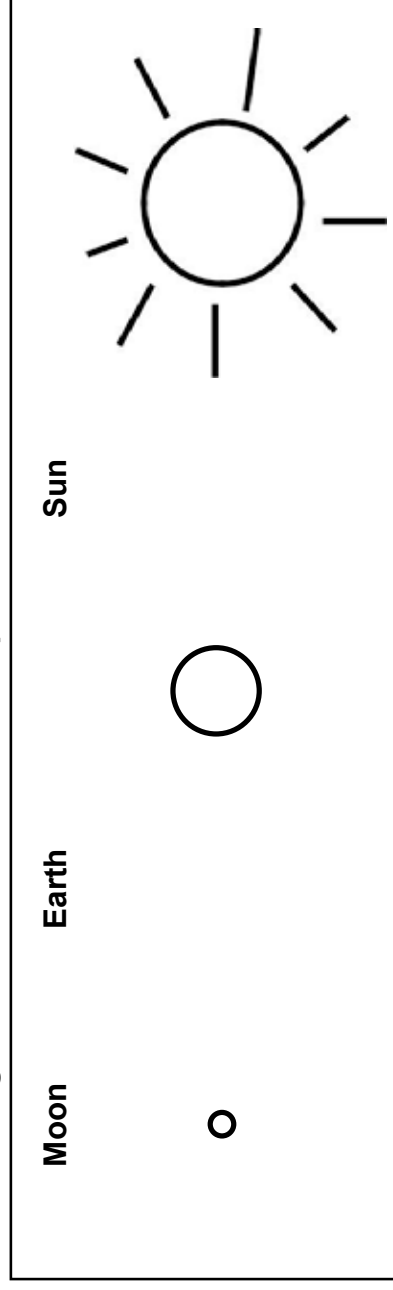
1. Why does the moon appear to move across the sky during the night?

- A. It travels around Earth every day.
- B. Earth rotates on its axis.
- C. It is extremely far away.
- D. All objects in space are moving.

2. What happens when you see the moon's "phases" change? The moon appears to change?

- A. colour
- B. location
- C. shape
- D. distance

Use this diagram to answer the next two questions.



3. What phase of the moon would you see on this night?
- A. first quarter moon
 - B. last moon
 - C. new moon
 - D. full moon
4. How many days would pass before the moon was on the other side of Earth?
- A. 7
 - B. 14
 - C. 21
 - D. 28
5. Why do we see phases of the moon during a month?
- A. We see only the lighted part of the moon as it moves around Earth.
 - B. Parts of the moon are covered by Earth's shadow.
 - C. Volcanoes on the moon change its shape.
 - D. The moon is smaller when it is farther from us.
6. Which of the following would be a way to investigate the phases of the moon?
- A. Watch it all night.
 - B. Draw it every night for a month.
 - C. Measure the moon with a ruler.
 - D. Make measurements every Wednesday for a year.

7. Which of the following correctly describes the movement of Earth, moon and sun?

- A. Moon revolves around sun, Earth revolves around moon.
- B. Sun revolves around moon, moon revolves around Earth.
- C. Moon revolves around Earth, Earth revolves around sun.
- D. Sun and moon revolve around Earth.

8. What is the movement of Earth on its axis called?

- A. phases
- B. flotation
- C. revolution
- D. rotation

9. What is the movement of Earth around the sun called?

- A. precipitation
- B. random movement
- C. revolution
- D. rotation

10. What causes the apparent movement of objects across the sky during a day or night on Earth?

- A. revolution of Earth in its orbit
- B. rotation of Earth on its axis
- C. location of Earth in space
- D. objects are moving around Earth

11. If you watched the night sky for several hours, in which direction would the stars appear to be moving?

- A. North
- B. South
- C. East
- D. West

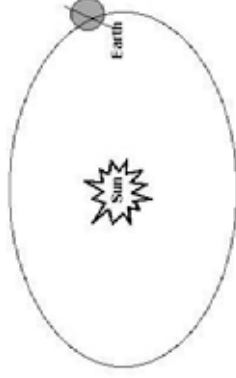
Constructed Response

1. Describe how the moon would change if you observed it every night for a month. Assume it starts as a full moon.

2. What are you seeing when you see a half moon?

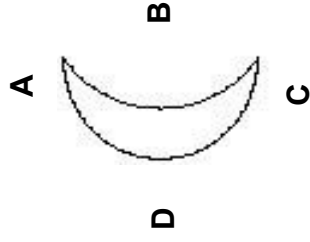
Use this diagram to answer the next two questions

Side view of Earth's orbit



3. Label Earth's orbit.
4. Label Earth's axis.
5. Draw the position of the moon on this diagram, showing where it would be in a New Moon phase.

Use this picture of the moon to answer the next two questions:



6. Which letter shows the direction of the sun in relation to the moon? _____
7. Make a drawing showing where the moon, sun and Earth would be for this phase of the moon.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: Movement of the Moon		● Compare the Sun (a star), the Earth (a planet) and the Moon w.r.t. shape, composition, size, movement in relation to other space objects and ability to produce light.	
SUBTOPIC: Sun, Earth and Moon			
Terminology		Star, planet, composition,	
SPECIFIC AIMS		1. DOING SCIENCE	
		2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
		3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS

Accessing & recalling Information	✓	Raising Questions	✓	Interpreting Information
Observing	✓	Predicting		Designing
Comparing		Hypothesizing		Making/Constructing
Measuring		Planning Investigations		Evaluating
Sorting & Classifying		Doing Investigations		Communicating
Identifying problems & issues		Recording Information		

CONTENT	TEACHING & LEARNING ACTIVITIES				Resources
Comparison between the Sun, Earth and Moon • The Sun, Moon and the Moon are objects in our Solar System. • The Sun is a star at the centre of our Solar System. • The Earth is one of the 8 planets in our Solar System. • The Moon is the Earth`s only natural satellite. • Both the Earth and the Moon revolve around the Sun. • The Sun is much bigger than all the 8 planets in the Solar System. It is more than 1 million times bigger than the Earth. • The Moon is much smaller than the Earth. It is just like a small dot if you compare it to the Sun. About 49 Moons could fit inside the Earth. • The 3 objects are the same in shape. I.e. sphere • The Sun is composed of about ¾ of hydrogen and ¼ helium. In its core, the Sun is very dense and hot. • The Earth is composed of	The teacher draws up a table about the Sun, Moon and Earth in which learners will be engaged in getting the answers for. The knowledge gained in the previous lessons should be used in getting the correct answers.				Video clips Internet Globe Torch Curtains 4 paper persons
		Sun	Moon	Earth	
	Size	420 bigger than the Earth	1 third the size of the earth	Bigger than the Moon but smaller than the Sun.	
	Shape	Round	Different shapes	Round	
	Composition	Sunspots, Core, Radiation zone, Convection zone and Photosphere	Craters, rocks, dust	Rocks	
	Rotation	No movement	28 days	24 hours	
	Revolution	No movement	28 days	365 days	
	Orbiting on own axis	No axis	Have axis	Have axis	
	Ability to produce light	Produce its own light	Reflects the sun`s light	No light of its own	

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
	Learners are to complete the activity sheet provided. This can be a homework activity. Reference: http://m.youtube.com/watch  videoplayback (31).mp4	
ASSESSMENT	Discussions; Watch video clip; Complete activity sheet.	
TEACHER REFLECTION		

ACTIVITY WORKSHEET 1

QUESTION	THE SUN	THE EARTH	THE MOON
What is the object classified as?			A moon
What is the shape?			
What is the size relative to the other objects discussed here?	The Sun is the biggest		
What is the movement in relation to other objects?		The Earth revolves around the Sun	
What is the object made of?			Rock,
Can this object produce light?			No, the Moon reflects the Sun`s light (rays)
Is there water present?			

MEMORANDUM

QUESTION	THE SUN	THE EARTH	THE MOON
What is the object classified as?	Star	Planet	A moon
What is the shape?	Round	Round	Round
What is the size relative to the other objects discussed here?	The Sun is the biggest	The Earth is bigger than the Moon and much smaller than the Sun.	The Moon is the smallest.
What is the movement in relation to other objects?	The Sun stays in the same Place.	The Earth revolves around the Sun	The Moon revolves around the rotating Earth, while the Earth revolves around the Sun.
What is the object made of?	hot gas (mostly hydrogen and helium)	solid rock, magma, water and gases in the atmosphere	Rock
Can this object produce light?	Yes	No, it reflects the Sun's light.	No, the Moon reflects the Sun's light (rays)
Is there water present?	No	Yes	No

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • State the main purpose of the telescope • Identify the main components of the telescope.
TOPIC: Systems for looking into Space		
SUBTOPIC: Telescopes		
Terminology	Astronomers, astronomy and telescope	
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

PROCESS SKILLS

Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing	✓	Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting	✓	Interpreting Information	✓
Measuring		Hypothesizing	✓	Communicating	✓
Sorting & Classifying		Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
• Telescopes • telescopes are used to look into space and gather information • South Africa has built and uses some of the largest telescopes	Teacher read the case study together with the learners in class. Activity worksheet Learners read a Case study with the teacher in class: Activity worksheet. The teacher explains as he/she reads with the learner's the difficult terminology. The PPT is used and pictures are shown and explained to learners. Learners look at the PPT with curiosity, and are allowed to ask questions that will be open for discussions. Give learners Activity worksheet and Learners work on Activity worksheet.		Worksheets Chalkboard Internet Websites such as "Mieliestronk" for Afrikaans handlenses, The scope of a microscope, clickers (Or

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
		small sound devices)
		Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Suggestion: Let learners build a simple telescope and explain how it works	
TEACHER REFLECTION		

Case Study

Telescopes

The telescope was first discovered by the Dutch. In Holland, a lot of the people were sailors and sea-explorers so they used their telescopes at sea to see if ships far away on the horizon were friends or maybe pirates. A telescope makes faraway things look bigger and closer.

Galileo Galilei was a professor of mathematics at the University of Padua, Italy. In 1609 he heard that somebody in Holland had made a telescope, and he worked out how to make one himself. Galileo used his telescope to look at the planets in the night sky, and he made careful notes of what he saw there. He was the first person to see that Jupiter had moons. He saw that Saturn has rings and he saw that Venus has phases like the Moon has. He also used his telescope to show people that the Milky Way was really made of billions of stars. He wrote books that taught people about telescopes and what they could show us in the night sky.

Today there are big telescopes in many parts of the world, and these telescopes have cameras to photograph the sky. Telescopes have shown us that there are thousands of millions of stars that we could not see with our naked eyes. Some of those stars are so far away that their light has been travelling for millions of years to reach us.

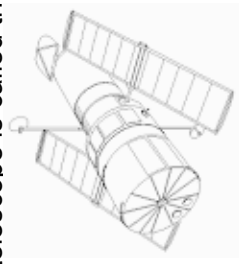
The Southern African Large Telescope

One of the biggest telescopes in the world is here in South Africa, near the town of Sutherland. The telescope is called the Southern African Large Telescope or SALT. The telescope uses lenses and a very big mirror to see the stars and take photographs of them.

The Square Kilometre Array (SKA)

The SKA is a different kind of telescope for looking at the stars. Stars send out energy in light but also in radio waves. The SKA will receive radio waves that our eyes cannot see. An array means a large number of the same items. For example, when the desks in your classroom are all lined up neatly, we can call that an array of desks.

The SKA will have an array of several thousand dishes like those in the picture. When you add together the area of all the dishes, the total area will be the same as one square kilometre. A square kilometre is an area in the shape of a square and the sides are each 1 km long. The area of the square will be 1 km^2 . That is why the telescope is called the Square Kilometre Array.



The Hubble Telescope

The Hubble Space Telescope is a large telescope in space. It was launched into orbit by space shuttle Discovery on April 24, 1990. Hubble orbits about 547 kilometres (340 miles) above Earth. It is the length of a large school bus and weighs as much as two adult elephants. Hubble travels about 5 miles per second: That is like travelling from the eastern coast of the United States to the western coast in 10 minutes. Hubble is solar-powered.

Hubble takes sharp pictures of objects in the sky such as planets, stars and galaxies. Hubble has made more than one million observations. These include detailed pictures of the birth and death of stars, galaxies billions of light years away, and comet pieces crashing into Jupiter's atmosphere.

Scientists have learned a lot about the universe from these pictures. Many of them are beautiful to look at.

What Makes Hubble different from other telescopes?

Earth's atmosphere alters and blocks the light that comes from space. Hubble orbits above Earth's atmosphere, which gives it a better view of the universe than telescopes have at ground level.

Answer the following questions:

1. What do we use a telescope for?

2. Before Galileo, nobody knew that the planet Jupiter had moons. What was the reason?

3. What does SKA stand for?

4. Why are the words 'square kilometre' in the name?

5. With a telescope we can see a lot of stars. Why did we not know about all those stars before there were telescopes?

6. Astronomers build their telescopes far away from cities. Why do you think they do this?

Discussion

Discuss the following questions with your group and report back to the class:

1. Are there more stars than we can see at night? Why?
2. How do scientists find out what stars consist of, how hot, how far and how large they are?
3. Why can't we see the planets in detail with our naked eyes but have beautiful photo's of them?



DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO:	
TOPIC: systems for looking into space		
Content & Concepts/Subtopic: Telescopes	• Understanding terminology • Recalling information	

SUBTOPIC: Telescopes		
Terminology	Astronomers, astronomy and telescope	
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS	
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Accessing & recalling Information	✓		Doing Investigations	
Observing	✓		Recording Information	✓
Comparing	✓		Interpreting Information	✓
Measuring			Communicating	✓
Sorting & Classifying				

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• Telescopes • • telescopes are used to look into space and gather information • • South Africa has built and uses some of the largest telescopes	Teacher discussed the puzzle together with the learners in class. Activity worksheet Learners complete a puzzle: Activity worksheet. The teacher explains as he/she reads with the learner's the difficult terminology. The PPT is used and pictures are shown and explained to learners. Learners look at the PPT with curiosity, and are allowed to ask questions that will be open for discussions. Give learners Activity worksheet and Learners work on Activity worksheet.	Worksheets Chalkboard Internet Websites such as "Mieliestronk" for Afrikaans handlenses, The scope of a microscope, clickers (Or small sound devices) Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Suggestion: Let learners build a simple telescope and explain how it works	
TEACHER REFLECTION		

Solve the following word puzzle as best as you can. You may team up with a friend to assist each other.



Across

- 4. Space vehicle
- 5. Machine orbiting the moon, earth or another planet
- 7. Used to take pictures of objects
- 9. Pattern of stars
- 10. Square Kilometre

Down

- 1. Space vehicle
- 2. Used to study the moon, planets and stars from earth
- 3. Discovery of Jupiter’s moons
- 6. Eight orbiting the sun
- 8. Sun outside our solar system

DATE:	OBJECTIVES: LEARNERS MUST BE ABLE TO: • Construct a model of a telescope using recyclable materials	
TOPIC: THE SOLAR SYSTEM		
Content & Concepts/Subtopic: Telescopes		

SUBTOPIC: Telescopes		
Terminology	Astronomers, astronomy and telescope	
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS	
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Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing	✓	Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting	✓	Interpreting Information	✓
Measuring		Hypothesizing	✓	Communicating	✓
Sorting & Classifying		Planning Investigations			
CONTENT	TEACHING & LEARNING ACTIVITIES				Resources

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• Telescopes • • telescopes are used to look into space and gather information • • South Africa has built and uses some of the largest • telescopes	Teacher will discuss activity worksheet and provide step by step instructions on how to build a telescope Learners need to bring all the raw materials from home in order to complete attached activity sheet. Learners can work individually or in groups. The teacher explains as he/she reads with the learner's the difficult terminology. The PPT is used and pictures are shown and explained to learners.	Worksheets Chalkboard Internet Websites such as "Mieliestronk" for Afrikaans handlenses, The scope of a microscope, clickers (Or small sound devices) Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Suggestion: Let learners build a simple telescope and explain how it works	
TEACHER REFLECTION		

Telescopes: Period 1

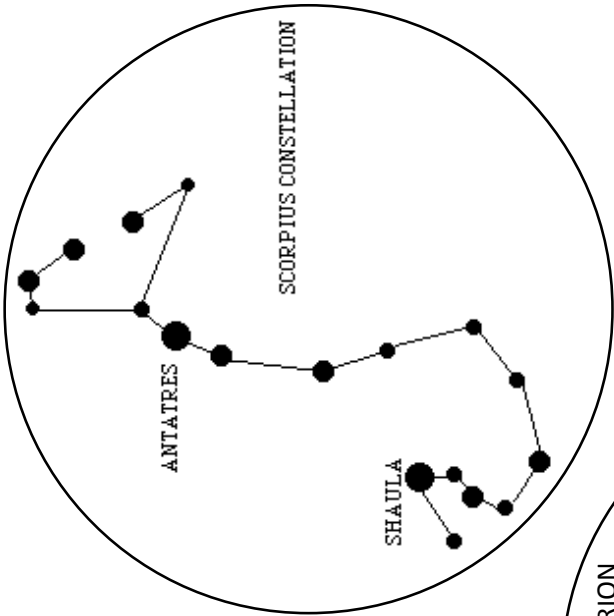
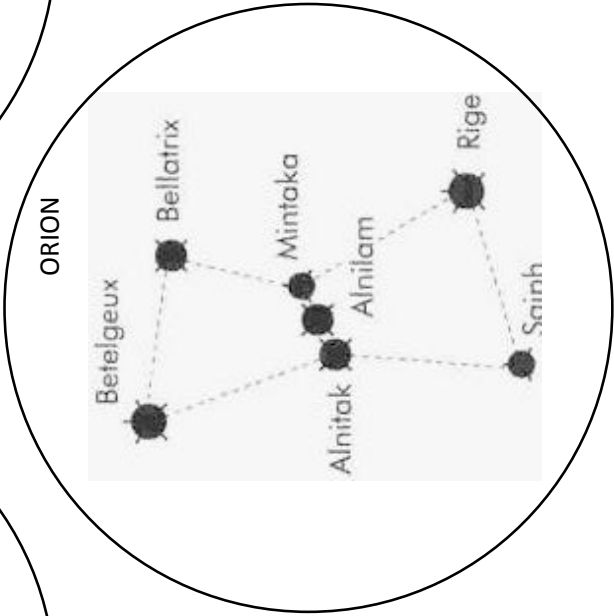
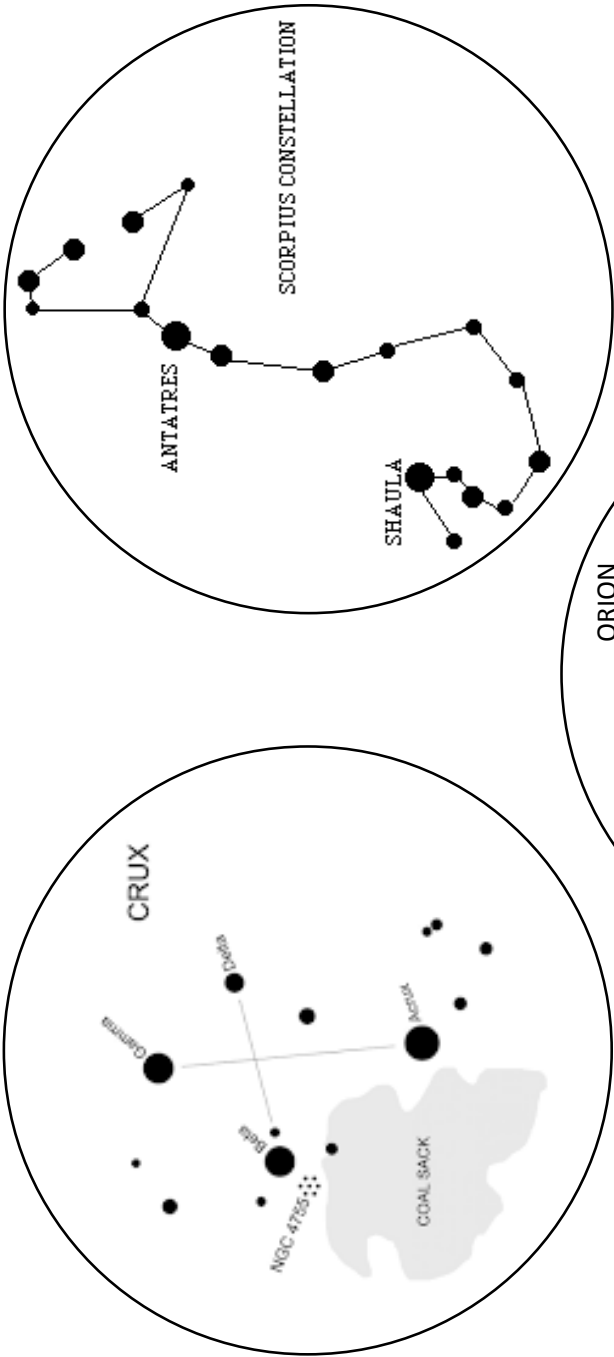
Build your own “telescope”

You will need the following:

Material	Tools
Black cardboard	Scissors
Cellotape	Small pin
Glue stick	Pencil

1. Roll the cardboard into a tube
2. Tape it with the cellotape to keep it in a tubular shape
3. Cut out the circular patterns below of the stellar constellations
4. Arrange them on another cardboard
5. Lightly paste the shape onto the cardboard so it cannot move but can be removed easily later
5. Trace the circular shape on the cardboard with the pencil
6. Use the pin and pierce very small holes through the dark spots on the circular pattern through the cardboard
7. Remove the circular shapes
8. Cut out the circular drawing on the cardboard paper
9. Tape them to the end of each tube
10. Hold up to the light, look through and observe your very own star pattern which is called constellations!





DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: THE SOLAR SYSTEM		• Describe the Solar System.			
Content &Concepts/Subtopic: The Sun, Planets and Asteroids		• Describe the movement of planets around the Sun.			
Terminology	Planet, Asteroid, Galaxy, Moon, Sun, Star, Solar System, Revolve, Elliptical, Star lore, Satellite, Atmosphere, Rotation, gravity (Barnard, et al., 2013, p. 161)				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				✓
	2. UNDERSTANDING AND CONNECTING IDEAS				✓
	3. SCIENCE, TECHNOLOGY AND SOCIETY				✓
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		
CONTENT		TEACHING & LEARNING ACTIVITIES			
The Sun, Planets and Asteroids		Teacher Activities		Learner Activities	
✓ The Sun (a star) is at the centre of our Solar System		Intro		Intro	
✓ There are eight planets and the asteroid belt (Mercury, Venus, Earth, Mars, Asteroid Belt, Jupiter, Saturn, Uranus, and Neptune) in orbit around the Sun		Ask background questions, e.g. Why can we see stars at night? Which movement of the Earth is responsible for day and night? Which movement of the Earth is responsible for the season?(you may add your own questions as different schools may use different textbooks). Show learners a short video clip or picture showing how the planets orbit the solar system (YouTube, 2015). Explain important concepts such as; the number of planets, main differences between planets such as size, orbit and position (see content).		Learners attempt to answer these questions orally. They observe the video clip, and may take down notes.	
✓ Each planet has its own features, size, orbit and position in relation to the Sun, composition (rocky and gas planets) and number of moons (some have no moons)					
✓ The planets and Asteroids take different amounts of time to revolve around the Sun(Education, n.d.)					
✓ Every object has a gravitational					
				References	
				Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd.	
				Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd.	
				Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd.	
				Education, D. o. B., n.d.	

pull towards all other objects ✓ The bigger the object, the bigger its gravitational pull towards objects around it. ✓ The sun is the biggest object in our solar system, therefore all other objects around it, including planets and asteroids, are pulled towards it. ✓ The planets of the solar system are in constant motion around the sun and are constantly pulled towards the sun (sideways), this causes them to not shoot off into space or collide with the sun. the inward pull and sideways movement together cause the objects and the solar system to orbit the sun (Bezuidenhout, et al., 2013, p. 254) Notes * It is not necessary to memorize exact numbers of size of planets, number of moons, and distance from the Sun ** The number of moons around some planets may change as more are discovered *** It is not necessary to make the models of the Solar System to scale	Body Instruct learners to complete an activity. Suggested activities include; order and relative size of planets (making a model) (Bezuidenhout, et al., 2013, pp. 260-261); (Barnard, et al., 2013, p. 162), research about the planets (Adatia, et al., 2013, p. 169); (Barnard, et al., 2013, p. 165), read and answer questions about planets (Adatia, et al., 2013, pp. 172-174), answer questions based on solar system (Barnard, et al., 2013, p. 161). Consolidation Teacher does corrections with the learners.	Body Learners observe as teacher demonstrates. Learners complete an activity from a worksheet (or textbook). Questions must be in line with prescribed content. If the Sun has a gravitational pull on the planets, how come they do not collide with the Sun? What keeps the planets orbiting around the Sun? What is a Star? What are Asteroids? Consolidation Learners mark their own/peer's worksheet and do corrections.	<i>Curriculum And Assessment Policy Statment:</i> Pretoria: Department of Basic Education. YouTube, 2014. Google. [Online] Available at: https://www.google.co.za/url?r=t&source=web&rc=t&i&url=https://m.youtube.com/watch%3Fv%3D5aDSYTMqyQw&ved=OahUKFwjdnK3fgZnaAhWklMAKHd5uA8sQo7QBCCswBA&usg=AOvVawIXdkbl-aMVXYIbXlJqxtbk [Accessed 30 March 2018]. YouTube, 2015. Google. [Online] Available at: https://www.google.co.za/url?sa=t&source=web&rc=t&i&url=https://m.youtube.com/watch%3Fv%3DsmZkQbOn5m&ved=OahUKEwID9oaryZiaAhWIDMAKHwRd-AikQtwillZAA&usg=AOvVawI4dnIHtLTwQVlzhXnk_v [Accessed 28 March 2018].
ASSESSMENT TEACHER REFLECTION	Worksheet/textbook activity (Informal Assessment)		
	<i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

Telescopes: Period 2

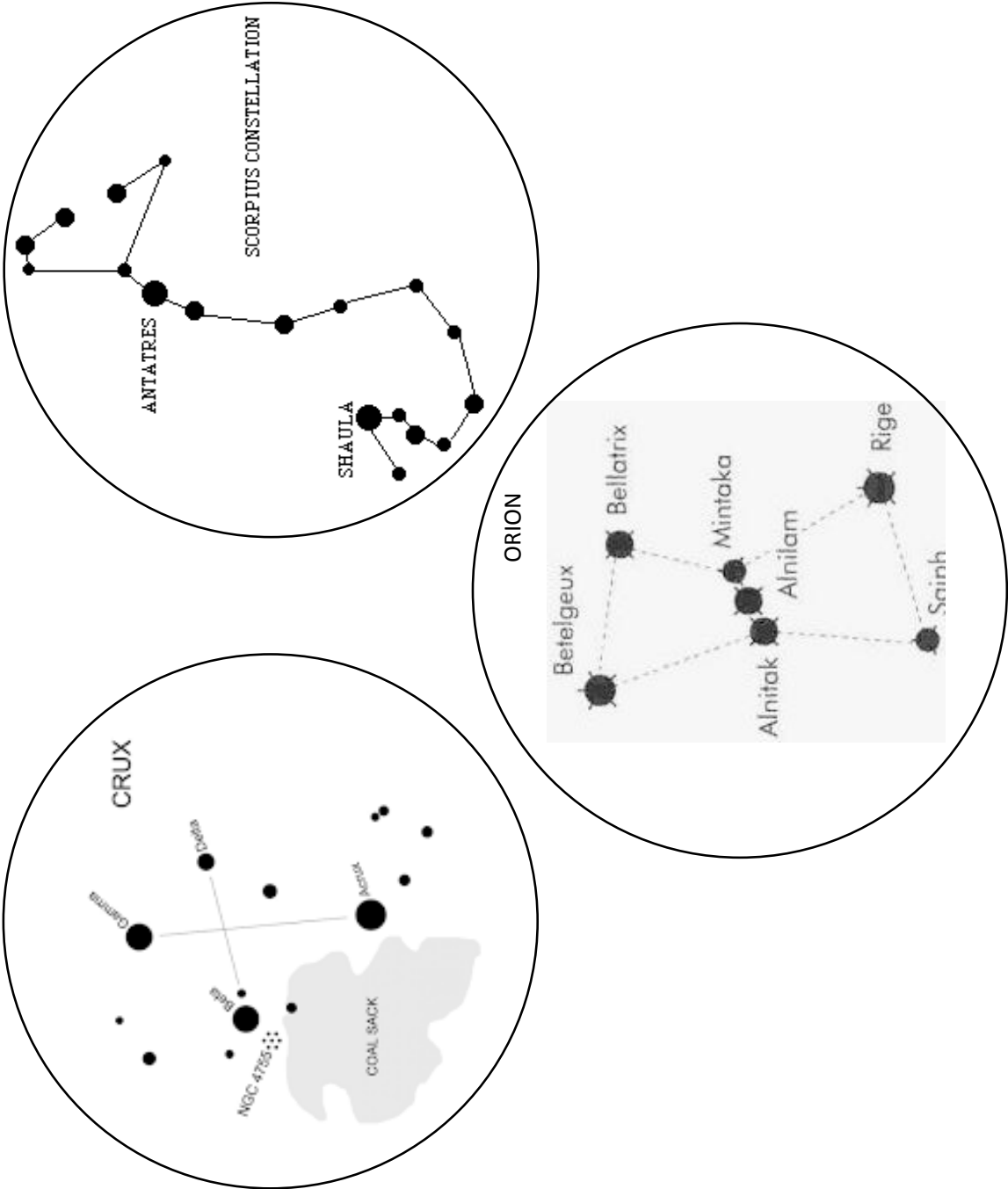
Build your own “telescope”

You will need the following:

Material	Tools
Black cardboard paper	Scissors
Cellotape	Small pin
Glue stick	Pencil

1. Roll the cardboard into a tube
2. Tape it with the cellotape to keep it in a tubular shape
3. Cut out the circular patterns below of the stellar constellations
4. Arrange them on another cardboard
5. Lightly paste the shape onto the cardboard so it cannot move but can be removed easily later
5. Trace the circular shape on the cardboard with the pencil
6. Use the pin and pierce **very** small holes through the dark spots on the circular pattern through the cardboard
7. Remove the circular shapes
8. Cut out the circular drawing on the cardboard paper
9. Tape them to the end of each tube
10. Hold up to the light, look through and observe your very own star patterns!





DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • State the main purpose of the telescope • Identify the main components of the telescope.
TOPIC: Systems for looking into Space		
SUBTOPIC: Telescopes		
Terminology	Astronomers, astronomy and telescope	
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

PROCESS SKILLS

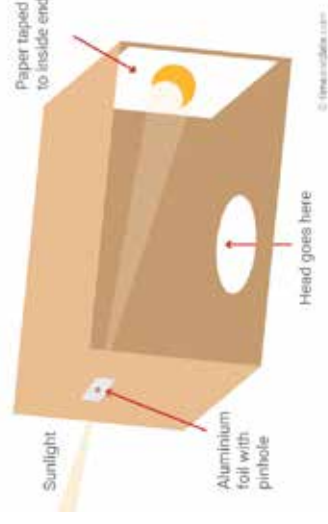
Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
Observing	✓	Raising Questions	✓	Recording Information	✓
Comparing	✓	Predicting	✓	Interpreting Information	✓
Measuring		Hypothesizing	✓	Communicating	✓
Sorting & Classifying		Planning Investigations			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
• Telescopes • telescopes are used to look into space and gather information • South Africa has built and uses some of the largest telescopes	Teacher gave instructional sheet on how to build a pin hole projector with the learners in class. Activity worksheet Learners follow instructions and build the pin hole projection in groups: Activity worksheet. Give learners Activity worksheet and Learners work on Activity worksheet.		Worksheets Chalkboard Internet Websites such as “Mieliestronk” for Afrikaans handlenses, The scope of a microscope, clickers (Or

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
		small sound devices)
		Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Suggestion: Let learners build a pin hole projector and explain how it works	
TEACHER REFLECTION		

Constructing a pinhole projector (period 1)

A simple and safe way to watch a solar eclipse is with a box pinhole projector. It is easy to make from a cardboard box and ordinary household items.



Project the Sun

Never look directly at the Sun without proper eye protection. You can seriously hurt your eyes and even go blind.

Projecting the Sun in a box projector, with binoculars or a telescope, or using only 2 pieces of cardboard is a safe and easy way to see a solar eclipse.

Projector Using a Box

This type of pinhole projector works on the same principle as a basic pinhole projector. However, the box makes this projector much sturdier and easier to set on a surface. And it only requires a few extra items to construct.

You Need:

Material	Tools
a long cardboard box or tube	scissors
duct / masking tape	a pin or a thumbtack
aluminum foil	a sharp knife or paper cutter
a sheet of white paper	

Method:

- Cut a rectangular hole at the end of the box. You can tape 2 boxes together to make a long box. The longer the box, the larger the projected image.
- Using the scissors, cut out a piece of the aluminum foil slightly larger than the rectangular hole. Make sure the foil is completely flat and not crinkled.
- Tape the foil over the rectangular hole in the box.
- Use the pin to poke a tiny hole in the center of the foil.
- Tape the sheet of paper on the inside of the other end of the box.
- Stand with your back toward the Sun. Place the box over your head with the pinhole towards the Sun. Adjust your position until you see a small projection, a reversed image, of the eclipsed Sun on the paper inside the box.

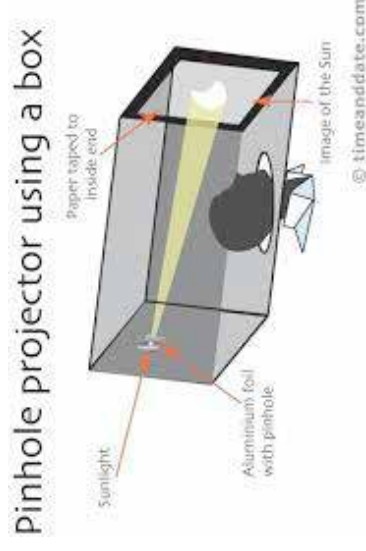
Using a Tube?

If you are using a long tube or taping 2 tubes together, cut the end of the tubes and tape the foil with a pinhole on 1 end. On the other end, tape a piece of white paper over the end of the tube. This will act as the screen. Close to this end, cut a rectangular hole using the knife. This will be your viewing window.

With your back toward the Sun, point the end with the foil toward the Sun, angling the tube along the Sun's rays. Look into the tube through the viewing window until you see a reversed image of the eclipsed Sun on the screen.

Keep Safe!

- **Never look at the Sun directly** without protective eye gear. Even sunglasses cannot protect your eyes from the damage the Sun's rays can do to them.
- Always keep your back toward the Sun while looking at a pinhole projection.
- Do not look at the Sun through the pinhole.



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • State the main purpose of the telescope and how it works • Identify the main components of the telescope.
TOPIC: Systems for looking into Space		
SUBTOPIC: How Telescopes works		
Terminology	Astronomers, astronomy and telescope	
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

PROCESS SKILLS

✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

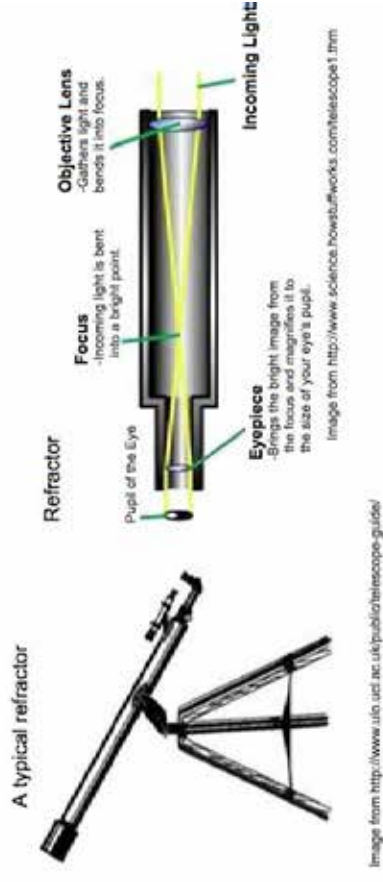
CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• Telescopes • telescopes are used to look into space and gather information • South Africa has built and uses some of the largest • How telescopes works	Teacher demonstrate /shows the learners how telescope works in class. Activity worksheet 1. Learners observed and do practical in class 2. Activity worksheet: Solve a secret code The teacher explains as he/she reads with the learner's the difficult terminology. The PPT is used and pictures are shown and explained to learners. Learners look at the PPT with curiosity, and are allowed to ask questions that will be open for discussions. Give learners Activity worksheet and Learners work on Activity worksheet.	Worksheets Chalkboard Internet Websites such as "Mieliestronk" for Afrikaans handlenses, The scope of a microscope, clickers (Or

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
			small sound devices)
			Siyavula book grade 6 B and Text book used by school
ASSESSMENT	Suggestion: Let learners observe how telescope works		
TEACHER REFLECTION			

How Do Telescopes Work?

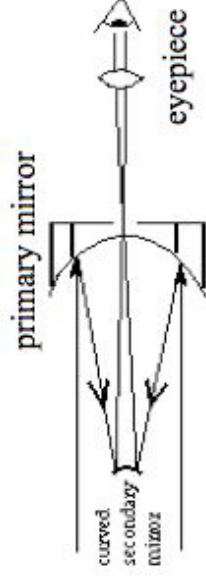
Telescopes have two main parts: the first lens and the second lens. The first lens is called the objective lens and the second lens is called the eyepiece. Telescopes that use only lenses are called refracting telescopes, or refractors. Some telescopes use a mirror, called the primary mirror, in place of the first lens. **These are called reflecting telescopes, or reflectors. Most professional telescopes are reflectors.**

The objective lens (or primary mirror in reflectors) collects light from a distant object and brings it to a point or focus. The image is bent, or focused, on a small surface called the focal plane. The eyepiece is a magnifying glass. It focuses the light from the image at the focal plane so the observer sees a larger, magnified image.



Most professional telescopes are reflectors. The main advantage of reflectors is that they can be made very large because the back of the mirror can be supported. Another advantage of reflectors is that there is no chromatic aberration, a feature of refractors where the different wavelengths of light pass through the lens at different speeds and produce a rainbow-like halo around the image. A third advantage of reflectors is that only one side of the objective (the reflecting side of the primary mirror) needs to be the right shape and smoothness to reflect the light. Because light passes through a lens, however, it needs to be perfectly shaped on both sides.

Reflector

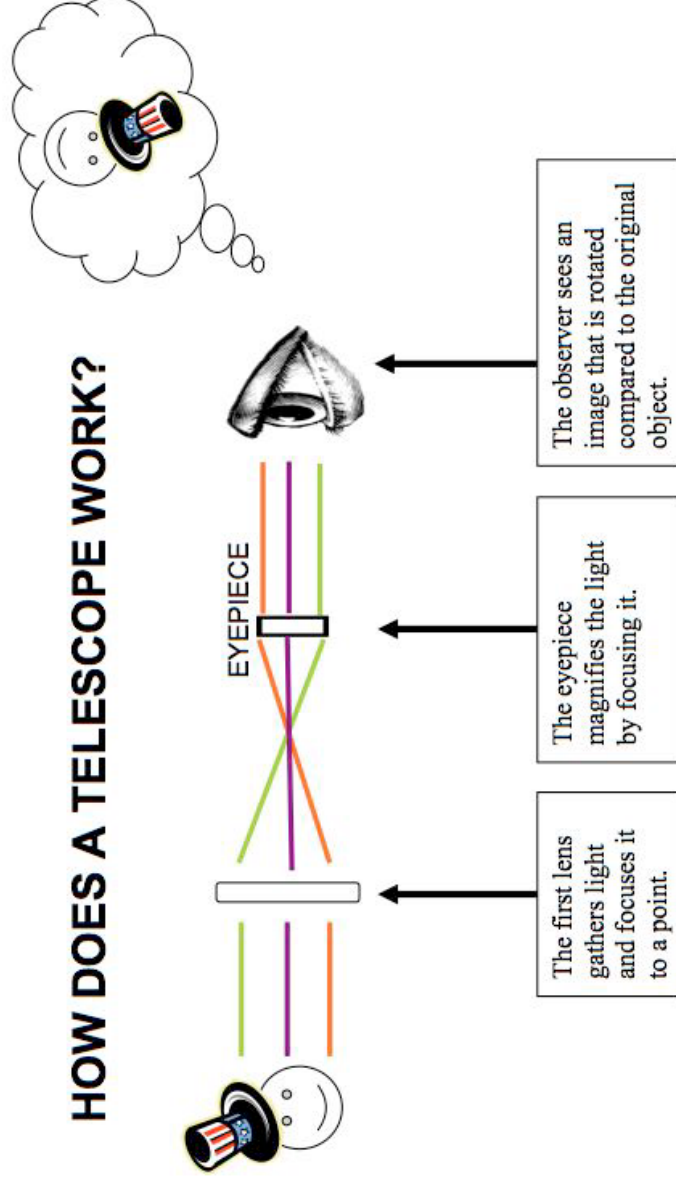


How Does a Magnifying Glass Work?

Magnifying glasses work by focusing light to create a virtual image in a location other than it would appear if the light were not focused. Just like you can see a “virtual you” who appears to stand back in the depths of a mirror, an observer sees a larger, virtual image cast by the light bent through a magnifying glass. The real image is cast on the observer’s retina, not out beyond the focal plane. To the observer, however, the image appears to be some distance beyond the surface of the magnifying glass. Magicians often take advantage of virtual images to make objects seem to appear in a seemingly empty box, or to look like they are hovering in mid air.

Professional Telescopes

Astronomers use telescopes (mostly reflectors) that observe across all wavelengths of light, from low-energy radio and microwave light to high-energy gamma rays and x-rays. The image below is of the complete light spectrum. See the lesson pdf for two images, as well as background information on professional telescopes, the Chandra X-ray observatory and the planned James Webb Space Telescope (JWST). The Chandra X-ray observatory observes x-ray light and the James Webb Space Telescope will observe primarily in infrared light.



Solve the mystery messages with the alphabet key that was recovered from a cosmic spy!

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Letter	Symbol	Letter	Symbol
a	1	n	25
b	2	o	26
c	3	p	27
d	4	q	28
e	5	r	29
f	6	s	30
g	7	t	31
h	8	u	32
i	9	v	33
j	10	w	34
k	11	x	35
l	12	y	36
m	13	z	37



Memo of secret words

telescopes are made with two lenses

lenses focus the light beams

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: System to explore the moon and mars		• Know about astronaut and their travel to the Moon			
Content &Concepts/Subtopic		• Know about Moon Rovers			
-Vehicles used on Mars and Moon					
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information		Identifying problems & issues		Doing Investigations
	Observing	✓	Raising Questions		Recording Information
	Comparing		Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on the moon  a few people have visited the surface of the moon and explored it using a vehicle called a moon Rover	Teacher Activities: Introduces the topic: "Vehicles used on the Moon" Teacher settles the learners down to create learning atmosphere and then capture learners attention by asking learners to explain about any landing that has happened on the moon. Learners are asked on how astronauts travel to Moon. Body Teacher explain that astronauts make use of a vehicle called Moon rover to explore the surface of the moon and also talk about Apollo 11 which was the spacecraft used for the first Moon landing. Teacher uses a projector screen to show learners the pictures of Moon rovers, and Apollo 11. During this lesson learners learn that Moon rovers weighs 210kg, the frame is 3,1m long with a wheel base of 2.3m and that the vehicle is low with a height of		-projector -pictures of moon rover -videos of moon rover -any NS/Tech Grade 6 CAPS aligned textbook -Internet

NATURAL SCIENCES AND TECHNOLOGY: LESSON PLAN**PERIOD/DURATION: 90 MINUTES****CAPS INTERMEDIATE****GRADE _6_
STRAND: Planet Earth and Beyond
TERM _4_**

	only 1,4m and it is therefore only 36cm off the ground. Consolidation: The lesson is ended with information that Moon Rover has a steering device which is like that of an aircraft, it is therefore discussed that when the Moon Rover is in space, it unfolds large wing-shaped structures that show panels to the Sun to power the equipment on the Moon Rover. Learner Activities: -Listen, look carefully at pictures shown -Answer and ask questions, active participation in class. -Write notes about the Moon Rover information	
ASSESSMENT	Informal task- learners go home with a task of researching more about Moon Rovers	
TEACHER REFLECTION		

Grade 6 Worksheet Name & Surname _____ Date: _____

Introduction to Moon Rovers

10 Marks

Answer the questions below:

1.1 What is a Moon Rover? _____

_____ (2)

1.2 What was the first Moon landing spacecraft? _____ (1)

1.3 Choose the correct answer by shading the correct one:

(a) Moon Rovers weighs how many kilograms (kg)? (1)

310 kg	210 kg	201 kg	305 kg
--------	--------	--------	--------

1.4 State whether the following is True or False.

(a) The frame of a Moon Rover is 3,1m long with a wheel base of 2.3m. _____ (1)

(b) The vehicle is low with a height of only 1,8m and it is therefore only 38cm off the ground (1)

1.5 Neatly draw and colour a simple sketch of a Moon Rover. (4)

Total= 10 Marks

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:				
TOPIC: SYSTEMS TO EXPLORE THE MOON AND MARS		• Learners should read, write, draw and do practical tasks • Describe objects in our Solar System (planets, moons, the Sun, Asteroids) • Researching the key features and purposes of the Mars or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications				
Content & Concepts/Subtopic: Vehicles used on the Moon and Mars						
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut, Planet, Asteroid, Solar System, Rover, Wheel, Axle					
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY				✓
		2. UNDERSTANDING AND CONNECTING IDEAS				✓
		3. SCIENCE, TECHNOLOGY AND SOCIETY				✓
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues		✓	Doing Investigations
✓	Observing	✓	Raising Questions		✓	Recording Information
✓	Comparing	✓	Predicting		✓	Interpreting Information
	Measuring		Hypothesizing		✓	Communicating
	Sorting & Classifying		Planning Investigations			Making/Constructing
	Evaluating & Improving		Designing			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on the Moon (Education, n.d.) ✓ A few people have visited the surface of the Moon and explored it using a vehicle called a Moon Rover Vehicles used on Mars (Education, n.d.) ✓ robots called Mars Rovers have been used to visit and explore the surface of Mars (people have not yet visited Mars) ✓ Researching the key features and	Teacher Activities Intro Instruct learners to conduct research about vehicles on the moon. They may answer some questions about what they have found out (Barnard, et al., 2013, p. 199), (Adatia, et al., 2013, pp. 211-212), (Bezuidenhout, et al., 2013, pp. 312-313, 316). They may answer in their workbooks or worksheets.	Learner Activities Learners take out their homework and show it to the teacher. They swap books as instructed and get ready to do corrections. They may watch a short video clip showing features of different planets.	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskeu Miller Longman (pty) Ltd. Bezuidenhout, W. et al.,

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
purposes of the Mars or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications	Body Learners must be instructed to research key features and purposes of the Mars and/or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications (Education, n.d.), (Barnard, et al., 2013, p. 199), (Adatia, et al., 2013, p. 212), (Bezuidenhout, et al., 2013, p. 316). <i>You can also show a short video clip depending on time</i>(YouTube, 2015), (NASA, n.d.). Consolidation Learners are instructed to conduct more research at home, the library, media centre or computer centre. The teacher must give them a reasonable timeframe to complete this research activity. Instruct learners to bring recyclable materials to use for practicing how to make wheels and axles for the next lesson. Answer any questions relating to the project.	Body Learners observe pictures or video clip. They complete the research activity by going through the prescribed text (Barnard, et al., 2013, pp. 195-199), (Adatia, et al., 2013, pp. 208-212), (Bezuidenhout, et al., 2013, pp. 311-316). They may ask questions. Consolidation Learners listen to final instructions and ask questions relating to the lesson and the worksheet.	2013. <i>Solutions For All Natural Sciences and Technology</i>. Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assessment Policy Statment</i>. Pretoria: Department of Basic Education. ✓ Pictures of the MoonRovers & MarsRovers
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Name and Surname:

Class: Gr 6/____

INSTRUCTIONS

1. All work must be handed in on the due date set by the teacher
2. Failure to submit on the due date will result in a minus 10% for each day that the work is due
3. Copying will result in an immediate 0
4. If you are absent for a formal assessment, you must bring a doctor's letter.

ASSESSMENT ACTIVITY

Investigate, Design, make and evaluate a model of a Moon/Mars rover. Your vehicle needs to have wheels and axels. The South African Space Agency wants to send a robotic rover to the moon. It needs to be small and light weight but strong. The rover will need to take photographs and gather soil samples.

Remember that the Technological process has certain steps that must be followed.

1. Design Brief
2. Investigation - Research
3. Design
4. Make
5. Evaluation
6. Communication

You will do certain activities individually and others you will do in pairs.

Activity 1: Investigate and Design Brief:

Research variety of cars that can go to the Mars and Moon and paste them on a Poster

Your Design brief

A Design brief for a Technology project is a short statement of what you are going to make, why you are going to make it and what you are going to make it for.

Question:

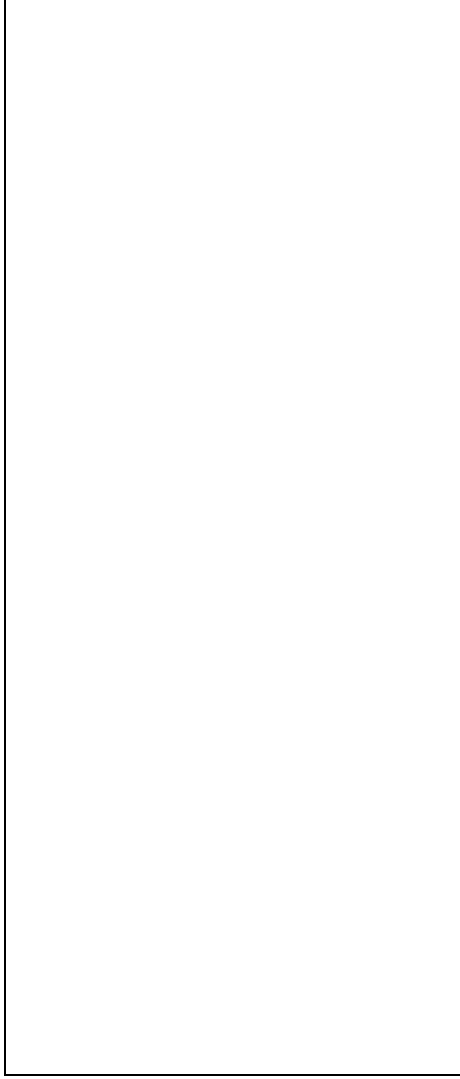
Write your Design Brief using the following phrases:

- "I am going to design and make a"
- "that will help scientists to ..."
- " the Moon/Mars"

Design specification: List of materials, size and shape

Constraints:

Designing/ your final structure



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: SYSTEMS TO EXPLORE THE MOON AND MARS		• Learners should read, write, draw and do practical tasks • Researching the key features and purposes of the Mars or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications • Make and evaluate a model vehicle featuring wheels and axles • Designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7)			
Content & Concepts/Subtopic: Vehicles used on the Moon – Wheels and Axles					
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
✓	Comparing	✓	Predicting	✓	Interpreting Information
	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
	Evaluating & Improving		Designing		

CONTENT		TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on the Moon(Education, n.d.) ✓ A few people have visited the surface of the Moon and explored it using a vehicle called a Moon Rover Vehicles used on Mars(Education, n.d.) ✓ robots called Mars Rovers have been used to visit and explore the surface of Mars (people have not	Teacher Activities Intro Introduce learners to wheels and axles. Show learners a short video clip or pictures showing different methods of making wheels and axles (Adatia, et al., 2013, pp. 213-214), (Barnard, et al., 2013, pp. 199-200), (Bezuidenhout, et al., 2013, pp. 322-324).	Learner Activities Learners take out their homework and show it to the teacher. They swap books as instructed and get ready to do corrections. They may watch a short video clip showing features of different planets.	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i>. Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i>. Cape Town: Maskew Miller Longman	

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
✓ yet visited Mars) ✓ Researching the key features and purposes of the Mars or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications ✓ designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) ✓ measuring how far the different vehicles can run down a ramp and draw bar graphs [This can be used as a possible project]	Body Instruct learners to take out the recycled materials they brought to class and prepare to make some wheels and axles using the prescribed text and/or video as a guideline. Learners activity: Learners investigate about wheels Give each learner or team a chance to display and evaluate their wheels, communicating flaws and possible solutions.	Body Learners take out their recycled materials and make wheels and axles using the different methods learnt. Consolidation Learners present their wheels and axles and discuss ways to improve them.	(pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i>. Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assessment Policy Statment</i>. Pretoria: Department of Basic Education. ✓ Pictures of the Moon ✓ Rovers and Mars ✓ Rovers ✓ Apparatus including bottle tops, round tins or cardboard ✓ circles for the wheels, sosatie sticks or dowels and straws for the axles ✓ Measuring tapes or meter sticks
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

ASSESSMENT TASK 2: INVESTIGATE:

(INDIVIDUAL WORK)

The next step in the Design Process is to do some research about the instrument that you are going to make. You can use books and the internet to do your research.

Brainstorm ideas for your design. Use the research you did in Activity 3 pg. 212. Use the Skills Focus on pages 213 and 214. **Remember to rewrite the information you find in your own words.**

Do research to find out more about the type of rover you have chosen. Use the information on pages 208 and 209 as well as the library and the internet. Then write a report with the **following headings:**

• **Historical facts**

- What the rover is designed to do.

- **Important features that allow the rover to do its job** (this should include wheels and axles, cameras, mechanical arms, communication systems (for receiving and sending messages) and solar panels for using solar energy.

[illegible]

1 | Page

systems for using solar energy and communications	and communications (Education, n.d.), (Adatia, et al., 2013, p. 212), (Barnard, et al., 2013, p. 199)", (Bezuidenhout, et al., 2013, p. 316). Body Focus on the design brief, specifications and constraints. Explain what a Rover is and also its function on the surfaces of the moon and Mars. Give learners examples of known Rovers such as the Moon Rover, Spirit Rover (Mars), and Curiosity Rover (Mars) (Adatia, et al., 2013, p. 208). Learners must identify a problem, create a design brief and come up with some specifications and constraints. Give them a guideline to bring a rough sketch of the research to class so that they may complete the research section in class. Answer any questions relating to the project.	Body Learners listen to instructions and take notes where necessary. They must be able to recall the terms design brief, specifications as well as constraints. observe pictures or video clip. They may ask questions. Consolidation Learners the design brief, specifications and constraints. They listen to final instructions and ask questions relating to the lesson and the worksheet.	<i>Technology. Northlands: Macmillan South africa (pty) Ltd.</i> <i>Education, D. o. B., n.d. Curriculum And Assement Policy Statment. Pretoria: Department of Basic Education.</i> <i>YouTube, 2014. Google. [Online]</i> <i>Available at: https://www.google.co.za/url?=&source=web&rc=t=&url=https://m.youtube.com/watch%3Fv%3D5aDSYTMqyQw&ved=OahUK_EwidnK3fgZnaAhWkIMAK_Hd5uA8sQo7QBCCswBA&usg=AOvVawIXdkbl-aMVXYIbXlIqxtbk</i> <i>[Accessed 30 March 2018].</i> <i>YouTube, 2015. Google. [Online]</i> <i>Available at: https://www.google.co.za/url?=&source=web&rc=t=&url=https://m.youtube.com/2018</i> ✓ Pictures - the Moon & Mars Rovers
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

Activity3. DESIGN:

(GROUP WORK)

Now that you know a bit more about Moon / Mars rovers, you can start the design. This is the planning phase telling people how you are going to make your rover. The specification tells one what the rover must look like and what it must be able to do. The constraints are those things that can limit our ideas in terms of design.

3.1 Specifications

The rover must:

- move using wheels and axles
- be light and strong
- be able to roll down a ramp in a straight line
- have some special features for doing its work (like cameras, robotic arms and so on).

Your moon rover has the following constraints:

- It must be made of recycled materials.

3.2 Materials needed.

See below some examples you can use to make your rover.

Things to use as wheels: You can collect snuff boxes, shoe-polish tins, the lids of bottles. You can also cut out cardboard circles.

Things to use for axles: You can find sosatie sticks, plastic straws, wooden dowel sticks, and aluminium rods. You can also use nails or wire to make axles.

3.3 Tools and materials you will need:

- Some long-nose pliers to cut and bend wire
- Hole-makers (small and big nails) and big scissors for cutting cardboard
- A small hammer to drive the nails
- Some glue
- To decorate your rover car you need crayons or paint.

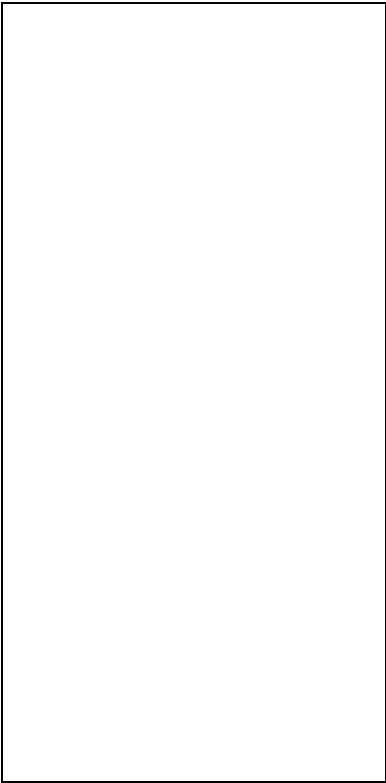
Questions

1. What materials will you need to make your rover?

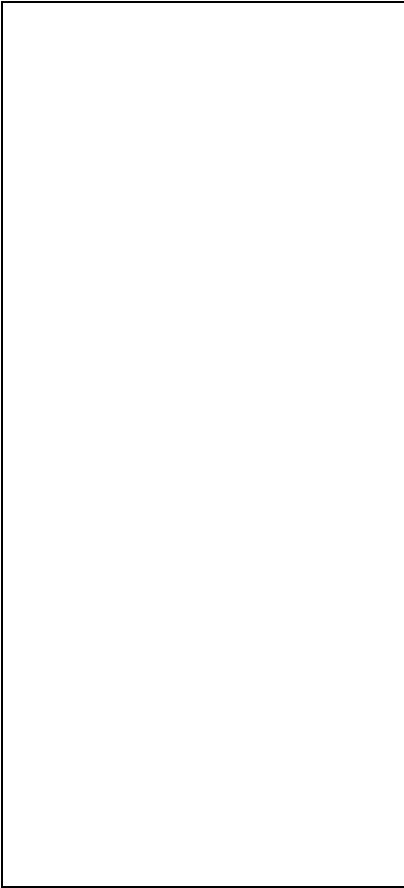
2. What tools will you need to make it? Such as pliers to cut the wire, scissors to cut cardboard. Make a list and collect some of these items from home.

3. Design drawings: Now you need to draw some designs for your system. Label your drawing showing what materials you are going to use for the different parts. Draw your own design and then you can discuss your design with your partner. You both draw the design that you agreed upon.

Own design drawings



Group design drawings



DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: SYSTEMS TO EXPLORE THE MOON AND MARS		- designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) - recall the terms design brief, specifications as well as constraints.			
Content & Concepts/Subtopic: Vehicles used on the Moon - Testing and Evaluating a Moon/Mars Rover Model					
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut, Planet, Asteroid, Solar System, Rover, Design Brief, Specifications, Constraints				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				
	2. UNDERSTANDING AND CONNECTING IDEAS				
	3. SCIENCE, TECHNOLOGY AND SOCIETY				
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
✓	Comparing	✓	Predicting	✓	Interpreting Information
✓	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations		Making/Constructing
✓	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on Mars (Education, n.d.) ✓ designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) ✓ measuring how far the different vehicles can run down a ramp and draw bar graphs [This can be used as a possible project]	Teacher Activities Intro Instruct learners to make their Rover Models, (Adatia, et al., 2013, pp. 2215-16) (Barnard, et al., 2013, p. 202), (Bezuidenhout, et al., 2013, p. 327). Body Instruct learners to write down any flaws and advantages their Models have, as well as any changes that may need to be made. They must write these down in their	Learner Activities Learners test and evaluate their Rover Models. Body Learners write down any flaws and advantages their Models have, as well as any changes that may need to be made. They must write these down in their	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and</i>

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Check the learner's knowledge and that they can: • make and evaluate a model vehicle featuring wheels and axles (Education, n.d.)	worksheets. Learners activity Learners will be making their Rover Models .	worksheets. Consolidation to present their Rover Models to the class.	<i>Technology Grade 6.</i> Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology.</i> Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assessment Policy Statment.</i> Pretoria: Department of Basic Education. Pictures (Moon & Mars Rovers) Apparatus including; bottle tops, round tins or cardboard circles for the wheels, sosatie sticks or dowels and straws for the axles Measuring tapes or meter sticks
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

ASSESSMENT TASK 4. MAKE:

(GROUP WORK)

Now make your Moon/Mars rover!

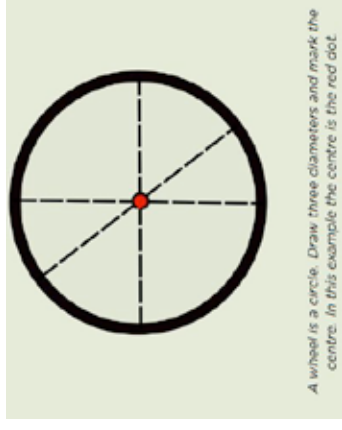
Below are some tips which will help you when making your rover. Remember that you may not have the perfect design from the start! So when making your rover, you need to go back and modify your design as you find things which work and do not work.

1. How to find the centre of a wheel - a wheel is a circle

- Some plastic lids have a small dimple or lump that shows you where the centre is.
- If your lids or discs do not have a dimple, you can use a ruler to draw diameter lines across the middle (a dimple is a small dent).
- A diameter line is the longest line you can draw across a circle. Where diameters cross, that is the centre.

2. How to make the right size hole in the centre

- If you want the wheel to **rotate** on the axle, then you must make a hole that is a little bit bigger than the diameter of the axle.
- If you want the wheel to be **tight** on the axle, then you must make a hole that is smaller than the diameter of the axle. When you push the wheel onto the axle, it will grip the axle.



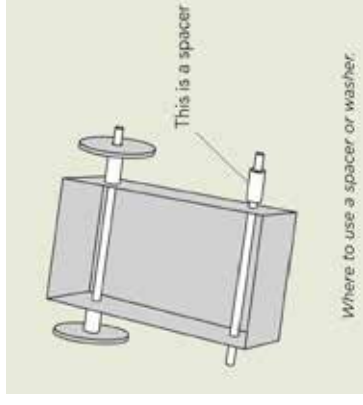
3. How to stop wheels wobbling on their axles

- If the axle goes through just one surface of the lid, this is what can happen: the wheel will wobble. You need to give the lid another surface. Glue two lids together.

- Or else, trace the shape of the lid on cardboard, mark a hole in the centre of the circle, and cut out the cardboard. Cut the cardboard so that the disc will be a tight fit in the lid. Then glue the cardboard into the lid.

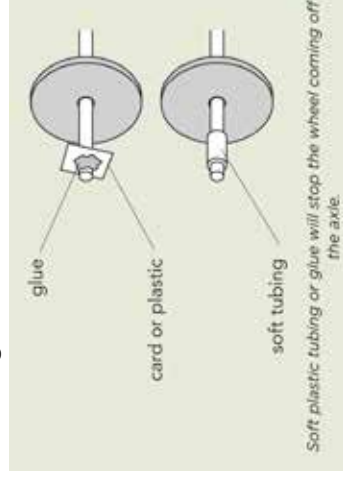
4. Does the wheel rub against the body of the rover?

- You need a spacer on the axle, to keep some space between the wheel and the body.
- You can use a bead with a large hole, or you can make plastic washers from slippery plastic. Milk bottles are good for making slippery washers.
- Use an office punch for making neat holes in a piece of milk-bottle plastic. Then cut around the holes to make washers.



5. Does the wheel come off the axle?

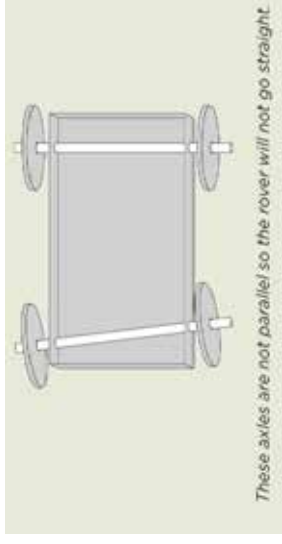
- Push a piece of soft tubing onto the end of the axle as you see in the picture.
- Or push on a flat piece of cardboard and hold it on the axle with glue.



6. Does the rover not run in a straight line?

- The axles must be parallel in your rover.

- These axles in the picture are not parallel. If your axles go through the body, then the axle holes must be the same distance apart on the left and the right side.
- If you need to make a hole in a new place, then you can glue a small piece of card with a hole in it over the old hole.



Test your rover and make it run as well as you can. Go back and draw your improved design. **Draw the rover you have made and write labels to explain what all the parts do. For example, you can write "This piece of straw stops the wheel rubbing against the body."**

Test

Work in groups. Take turns to test your rovers to see how well they work.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO: • Learners should read, write, draw and do practical tasks • Researching the key features and purposes of the Mars or Moon Rovers including wheels and axles, cameras, mechanical arms, and systems for using solar energy and communications • designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) • recall the terms design brief, specifications as well as constraints.				
TOPIC: System to explore the Moon and Mars						
Content & Concepts/Subtopic: Vehicles used on the Moon Research on Moon/Mars Rovers						
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut, Planet, Asteroid, Solar System, Rover				✓	
SPECIFIC AIMS		1. DOING SCIENCE AND TECHNOLOGY				
		2. UNDERSTANDING AND CONNECTING IDEAS				✓
		3. SCIENCE, TECHNOLOGY AND SOCIETY				✓
PROCESS SKILLS						
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations	
✓	Observing	✓	Raising Questions	✓	Recording Information	
✓	Comparing	✓	Predicting	✓	Interpreting Information	
	Measuring		Hypothesizing	✓	Communicating	
	Sorting & Classifying		Planning Investigations		Making/Constructing	
	Evaluating & Improving		Designing			

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on the Moon ✓ A few people have visited the surface of the Moon and explored it using a vehicle called a Moon Rovers Vehicles used on Mars ✓ Researching the key features and purposes of the Mars or Moon Rovers including wheels	Teacher Activities Instruct the learners to complete Evaluation worksheet. Body Instruct learners to answer research questions in their worksheets(Barnard, et al., 2013, p. 201), (Bezuidenhout, et al., 2013, pp. 320-321), (Adatia, et al.,	Learner Activities Learners study their research materials and highlight important statements and keywords as instructed.	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al.,

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
and axles, cameras, mechanical arms, and systems for using solar energy and communications	2013, p. 212). Instruct them to make sure that they properly reference their sources. Also instruct them to make drawings of their research. Consolidation ; Learners activity Complete Evaluation worksheet.	Body Learners complete the research questions using the research materials they collected. They must also reference their sources as instructed. They may ask questions. Consolidation Learnerstake further instructions. They may take notes and ask questions.	2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assessment Policy Statment</i> . Pretoria: Department of Basic Education. ✓ Pictures of Moon& Mars Rovers and Mars
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	<i>Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.</i>		

ASSESSMENT TASK 5. EVALUATE:

(INDIVIDUAL WORK)

Before we get on to presenting the projects, you need to evaluate your own project. You can then use this evaluation in your presentation to show what worked and what did not work.

Answer the following questions.

1. Does your rover meet the specifications? Write 3 sentences to describe how you made sure it met each specification.

2. What changes could you make to improve your rover's appearance and performance? Write down what worked and what did not.

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:		
TOPIC: SYSTEMS TO EXPLORE THE MOON AND MARS		• designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7)		
Content & Concepts/Subtopic: Vehicles used on the Moon - Testing and Evaluating a Moon/Mars Rover Model		• recall the terms design brief, specifications as well as constraints.		
Terminology	Spacecraft, Space, Engineers, Scientists, Astronaut, Planet, Asteroid, Solar System, Rover, Design Brief, Specifications, Constraints			
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY			
	2. UNDERSTANDING AND CONNECTING IDEAS			
	3. SCIENCE, TECHNOLOGY AND SOCIETY			
PROCESS SKILLS				
✓ Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓ Observing	✓	Raising Questions	✓	Recording Information
✓ Comparing	✓	Predicting	✓	Interpreting Information
✓ Measuring		Hypothesizing	✓	Communicating
Sorting & Classifying		Planning Investigations		Making/Constructing
✓ Evaluating & Improving		Designing		

TEACHING & LEARNING ACTIVITIES			Resources
CONTENT	Teacher Activities	Learner Activities	
Vehicles used on Mars (Education, n.d.) ✓ designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) ✓ measuring how far the different vehicles can run down a ramp and draw bar graphs [This can be used as a possible project] Check the learner's knowledge and that they can:	Intro Instruct learners to write a report in the form of Communication about a Rover Models, (Adatia, et al., 2013, pp. 2215-16) (Barnard, et al., 2013, p. 202), (Bezuidenhout, et al., 2013, p. 327). Body Instruct learners to write down any flaws and advantages their Models have, as well as any changes that may need to be made. They must write these down in their worksheets.	Learners test and evaluate their Rover Models. Body Learners write down any flaws and advantages their Models have, as well as any changes that may need to be made. They must write these down in their worksheets.	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew

CONTENT	TEACHING & LEARNING ACTIVITIES	Resources
• make and evaluate a model vehicle featuring wheels and axles (Education, n.d.)	Consolidation Instruct learners to present their Rover Models to the class while you grade them using a rubric. This may be continued in the next lesson. Consolidation to present their Rover Models to the class.	Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i>. Northlands: Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assessment Policy Statement</i>. Pretoria: Department of Basic Education. ✓ Pictures (Moon & Mars Rovers) Apparatus including: ✓ bottle tops, round tins or cardboard circles for the wheels, ✓ sosatie sticks or dowels and straws for the axles Measuring tapes or meter sticks
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)	
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.	

Activity 6. COMMUNICATE:

(INDIVIDUAL WORK)

Write a short report about your experiences in making your Moon/Mars rover.

1. Describe what they did and how you did it.

2. Describe any problems you had and how you solved them.

3. Describe how you would improve your design after testing it.

TERM 4 – TECHNOLOGY ASSESSMENT RUBRIC

Your teacher will assess you using the following rubric:

NAME: _____ CLASS: 6/ _____

	Level 1	Level 2	Level 3	Level 4	Score / 50
Design brief	No design brief written or design brief does not describe need and solution. (0)	Design brief partly describes need and solution (1)	Design brief describes need and solution (2)		/2
Investigate	No evidence of research. (0-2)	Limited evidence of research and - few notes or drawings (3-5)	Notes and drawings are evidence of research (6-8)	Detailed notes and drawings are evidence of research (9-10)	/10
Design	Materials and Tools needed not written / not appropriate (0)	Materials and Tools needed not complete (1)	Appropriate written down materials and Tools needed (2)		/2
	No design drawings made (0)	Design drawings poor and not labelled (1-2)	Design drawings neat and labelled (3-4)	Neat, clear fully labelled design drawing made (5-6)	/6
Make Does the rover move with wheels and axles, is it strong and light, can it move in a straight line, does it have special features (camera, arm ext.)	Rover not made/poorly made, does not meet any specifications (0-3)	Rover not well made, meets some specifications (4-6)	Well-made, neat rover that meets specifications (7-9)	Well-made, neat rover that exceeds specifications (10-12)	/12
	Demonstrated very little competence in working in groups (0-1)	Learners work well but could not agree on a design and were constantly arguing (2-3)	Learners work well together but did not always agree and compromised on ideas (4)	Excellent Team work. Learners worked well together and generated great ideas (5)	/5

Evaluate Did learner write a sentence describing how they met each specification? Did they suggest and make any changes to improve rover's appearance and performance?	No or very little evidence of evaluation (0-2)	Evaluation is incomplete / not appropriate (3-4)	Evaluation complete and appropriate (5-6)	Evaluation well thought out and comprehensive (7-8)	/8
Communication 1. Describe what they did and how you did it. 2. Describe any problems you had and how you solved them. 3. Describe how you would improve your design after testing it.	No attempt at communication (0-1)	System communicated with little or unclear explanation of how it works, problems experienced and room for improvements (2-3)	System adequately communicated with clear explanation of how it works, problems experienced and room for improvements (4)	System Well presented with clear, detailed explanation of how it works, problems experienced and room for improvements (5)	

Total: 50

DATE:		OBJECTIVES: LEARNERS MUST BE ABLE TO:			
TOPIC: System to explore the Moon and Mars		- designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7) - recall the terms design brief, specifications as well as constraints.			
Content & Concepts/Subtopic: Vehicles used on the Moon – Making a Moon/Mars Rover					
Terminology					
	Spacecraft, Space, Engineers, Scientists, Astronaut, axle, wheel, Planet, Asteroid, Solar System, Rover, Design Brief, Specifications, Constraints				
SPECIFIC AIMS	1. DOING SCIENCE AND TECHNOLOGY				✓
	2. UNDERSTANDING AND CONNECTING IDEAS				✓
	3. SCIENCE, TECHNOLOGY AND SOCIETY				✓
PROCESS SKILLS					
✓	Accessing & recalling Information	✓	Identifying problems & issues	✓	Doing Investigations
✓	Observing	✓	Raising Questions	✓	Recording Information
✓	Comparing	✓	Predicting	✓	Interpreting Information
✓	Measuring		Hypothesizing	✓	Communicating
	Sorting & Classifying		Planning Investigations	✓	Making/Constructing
	Evaluating & Improving		Designing		

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
Vehicles used on the Moon ✓ A few people have visited the surface of the Moon and explored it using a vehicle called a Moon Rovers Vehicles used on Mars ✓ designing, making and evaluating a model of one of these vehicles which can move by means of wheels and axles (refer to Section 2.7)	Teacher Activities Intro Instruct learners to make any last changes to their design. Body Instruct take out the recyclable materials they were instructed to bring in the previous lesson and prepare to make their Rover. They may start with whichever part of the Rover they want. They may complete this activity in the next 2 to 3 lessons. Consolidation Instruct learners to place their materials in a designated place in the class and ensure	Learner Activities Learners make any final changes to their designs. Body Learners take out their materials and begin making their Rover model using their designs as a guideline. Consolidation Learners place their materials in a	References Adatia, R. et al., 2013. <i>Platinum Natural Sciences and Technology</i> . Cape Town: Pearson South Africa (pty) Ltd. Barnard, J. et al., 2013. <i>Day-By-Day Natural Sciences and Technology Grade 6</i> . Cape Town: Maskew Miller Longman (pty) Ltd. Bezuidenhout, W. et al., 2013. <i>Solutions For All Natural Sciences and Technology</i> . Northlands:

CONTENT	TEACHING & LEARNING ACTIVITIES		Resources
	that they are marked with their names. Instruct them to bring whatever materials and equipment they still need. conduct more research if they still need information. Answer any questions.	designated place in the class and ensure that they are marked with their names. They take further instructions. They may take notes and ask questions.	Macmillan South africa (pty) Ltd. Education, D. o. B., n.d. <i>Curriculum And Assement Policy Statment</i>. Pretoria: Department of Basic Education. ✓ Pictures (Moon& Mars Rovers) Apparatus including; ✓ bottle tops, round tins or cardboardcird es for the wheels, ✓ sosatie sticks or dowels andstraws for the axles ✓ Measuring tapes ormeter sticks
ASSESSMENT	Worksheet/textbook activity (Informal Assessment)		
TEACHER REFLECTION	Reflect on the lesson. Identify what worked and what did not work. Suggest changes in future lessons.		

FINAL DESIGNING

