basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

2023/24 ANNUAL TEACHING PLANS: TECHNOLOGY: GRADE 7 (TERM 1)

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
CAPS TOPIC	**DESIGN PROCESS SKILLS**	**MECHANICAL SYSTEMS & CONTROL**	**MECHANICAL SYSTEMS & CONTROL**	**MECHANICAL SYSTEMS & CONTROL**	**DESIGN SKILLS**
CORE CONCEPTS, SKILLS AND VALUES	**Introduce the problem scenario for the Practical Assessment Task (PAT) through investigate, design, make, evaluate and communicate (IDMEC) processes:** ***Scenario:*** Impact of technology – emergency workers use "Jaws-of-Life" system to rescue trapped accident victims Learners must know and be able to apply the methodology and the purpose of the IDMEC Teachers provide two simple examples of everyday aspects to briefly explain concepts of the IDMEC	**Simple mechanisms** Levers – mechanical advantage: simple quantitative treatment – no calculations using moments Examine the relationship between load, effort and their distances from the pivot • First-class levers: Characteristics (fulcrum/pivot placed between effort and load) • First-class levers may give a mechanical advantage or not – depending on pivot position • Case study: first-class levers with mechanical advantage: ma > 1, ma = 1, ma < 1	**(1 hour) Second-class levers**: Characteristics (load is placed between effort and fulcrum), give real examples • Learners **demonstrate models of second-class** levers, which *always* give a mechanical advantage • **Third-class levers**: Characteristics (effort is placed between load and fulcrum): Give real examples • Learners to **demonstrate models of third-class levers**, which *never* give a mechanical advantage **(1 Hour) Practical investigation***:* Levers and linkages • Examine simple linked first-class levers (e.g., pair of scissors, pair of pliers, hedge trimming shears) • Examine simple linked second-class levers (e.g., office punch, nut crackers) • Examine simple linked third-class levers (e.g., most office staplers, pair of tweezers) • Examine more complex linkages (e.g., linkages with more than one pivot)	**Pneumatics and hydraulics** • Using pneumatics and hydraulics to obtain a mechanical advantage • Practical investigations: - Force transfer between two equal syringes filled with 1) air and 2) water - Force transfer between two unequal syringes filled with 1) air and 2) water	**Design:** *Design brief, specifications, constraints, initial idea sketches, choosing the best design, selecting materials* **Design considerations** **Fitness-for-purpose:** Who is it for? What is it for? Will it do the job? Is it cost effective? Is it safe? Is it easy to use (ergonomics)? Does it look good (aesthetics)? Will it affect society? Will it affect the environment? [Explain the above by using examples for learners to understand the concepts better] **Write a design brief, specifications and constraints**
REQUISITE PRE-KNOWLEDGE	Pre-knowledge of the design process in the Natural Sciences and Technology (NST) in the intermediate phase	Pre-knowledge of machines/mechanisms in Natural Sciences and Technology	Simple mechanisms from week 2	Simple mechanisms from week 2	Design process skills developed in week 1
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources Examples of the different classes of levers	Siyavula workbooks Applicable resources Examples of the different classes of levers	Siyavula workbooks Applicable resources/different sized syringes and plastic tubes	Siyavula workbooks Applicable resources
INFORMAL ASSESSMENT	Informal assessment	Informal assessment	Informal assessment		Informal assessment
SBA (FORMAL ASSESSMENT)				**PAT 1** **Formal assessment: Investigate**	**PAT 1** **Formal assessment: Investigate**

TERM 1	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CAPS TOPIC	**COMMUNICATION SKILLS**	**COMMUNICATION SKILLS**	**MAKING SKILLS**		CONSOLIDATION
CORE CONCEPTS, SKILLS AND VALUES	Introduction to graphical communication Purpose of graphics: Develop and communicate ideas Conventions: Outlines *(thin/dark), construction lines (thin/feint), hidden detail (dashed) scale, dimensioning.* Sketch: Free-hand sketching **Working drawings:** Two-dimensional drawing of ONE face of an object using conventions (dark lines, feint lines, dashed lines, dimensions, scale) • **3D oblique** – Front view with depth at 45˚ (use squared 'quadrant' paper), oblique projection used to assist with interpretation	Learners **develop a working model** of a hydraulic-syringe powered, linked-lever rescue device using simple materials • **Draw a 3D drawing** of the idea in **oblique projection** using dark and feint lines • **Draw working drawing in 2D** showing <u>one view with dimensions to scale</u>	Learners make a simple working model (At a minimum, the "Jaws-of-Life" model may be a simple device representing how any one machine in the "Jaws-of-Life" system will work using plastic tubing, syringe(s) and cardboard)		Revision and consolidation of term's work
REQUISITE PRE-KNOWLEDGE	Basic drawing skills	Communication skills developed in week 6	Mechanisms and design process skills developed in weeks 1-4		
RESOURCES (OTHER THAN TEXTBOOK) **TO ENHANCE LEARNING**	Siyavula workbooks Applicable drawing resources	Siyavula workbooks Applicable drawing resources	Siyavula workbooks Applicable resources		Siyavula workbooks Applicable resources
INFORMAL ASSESSMENT	Informal assessment				
SBA (FORMAL ASSESSMENT)		**PAT 1** **FORMAL ASSESSMENT: DESIGN**	**PAT 1** **FORMAL ASSESSMENT: MAKE**		**PAT 1** INVESTIGATE – WEEK 4/5, 15 MARKS DESIGN – WEEK 7, 20 MARKS MAKE – WEEK 8/9, 35 MARKS **TOTAL: 70 MARKS**

TERM 1	WEEK 11				
CAPS TOPIC	**CONSOLIDATION**				
CORE CONCEPTS, SKILLS AND VALUES	Revision and consolidation of term's work				
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources				

2023/24 ANNUAL TEACHING PLANS: TECHNOLOGY: GRADE 7 (TERM 2)

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
CAPS TOPIC	**STRUCTURES**	**STRUCTURES, INVESTIGATION AND IMPACT OF TECHNOLOGY**	**STRUCTURES**	**STRUCTURES**	**STRUCTURES, DESIGN SKILLS AND IMPACT OF TECHNOLOGY**
CORE CONCEPTS, SKILLS AND VALUES	• Definition and purpose of structures to contain, protect, support, span • Classification of structures: natural and man-made **Types of structures: shell, frame, solid – learners complete a worksheet**	• Investigate: A cell phone tower frame structure • Case study: Examine existing towers strengthened by triangulation, including pylons, windmills and mine headgear • Case study: Study photographs of existing cell phone towers noting structural elements, reinforcing techniques and design issues such as visual pollution, stability, base size and centre of gravity • **Class discussion:** How designers consider the needs of society in terms of technology while considering the impact on society and on the environment	**Case study 1:** Existing designs: Examine the *features* of a school desk, write the *design brief* with *specifications* for a school desk **Case study 2:** Existing designs: Examine an existing product (FM radio/cell phone), list its features and then write a design brief with specifications for that product Evaluate: Worksheet on the advantages and disadvantages of telephone systems: Landline vs. mobile: Learners complete a table	**Scenario**: Cell phone towers are everywhere and are built using materials to ensure stability, strength and rigidity (stiffness) Action research: To stiffen materials/structures • Practical activity 1: Stiffen a structural material by tubing • Practical activity 2: Stiffen a structural material by folding • Practical activity 3: Stiffen a frame structure by triangulation	• Write the design brief: Individual learners write the design brief with specifications for a new cell phone tower **Note 1:** At a minimum, the cell phone tower can consist of struts made of found materials like "elephant grass" or rolled paper dowels. It should show reinforcing using triangular webs, gussets and internal cross-bracing **Note 2:** One of the design ideas must involve disguising the tower so that it blends in with the environment, avoiding visual pollution • Sketch initial ideas: Individual learners draw free-hand sketches to show ***two*** different design ideas in 3D for a cell phone tower to be erected near the school Draw the two ideas using oblique projection
REQUISITE PRE-KNOWLEDGE	Pre-knowledge of structures in the Natural Sciences and Technology in the intermediate phase	Structures in week 1	Structures in week 2	Pre-knowledge of structures in the Natural Sciences and Technology in the intermediate phase	Design process skills
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources
INFORMAL ASSESSMENT	Informal activities	Informal activities	Informal activities	Informal activities	Informal activities

TERM 2	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CAPS TOPIC	**DESIGN SKILLS** **EVALUATION SKILLS** **MAKING SKILLS**	**MAKING SKILLS**	**REVISION AND CONSOLIDATION**	**REVISION AND CONSOLIDATION**	**REVISION AND CONSOLIDATION**
CORE CONCEPTS, SKILLS AND VALUES	• Learners form groups to examine and discuss the various design ideas of the individuals in the group They evaluate the sketches of each individual to determine advantages and disadvantages of each design • Individual learners now adapt their own design ideas in terms of the group evaluation, making any necessary improvements	•**Making:** Includes working drawings, choosing materials and tools - Each learner lists the resources to be used - Each learner draws a working drawing for the cell phone tower showing one face in 2D (working drawing) from these inputs assessed informally	Revise and consolidate term 1 and 2 content in preparation for formal test.	Revise and consolidate term 1 and 2 content in preparation for formal test	Administration of test
REQUISITE PRE-KNOWLEDGE	Structures and design process skills developed in term 1	Structures and design process skills developed in term 1			
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	
INFORMAL ASSESSMENT	Informal activities	Informal activities	Informal activities	Informal activities	**FORMAL ASSESSMENT: TEST**
SBA (FORMAL ASSESSMENT)			**MID-YEAR EXAMINATION: 30 MARKS**		

TERM	WEEK 11				
CAPS TOPIC	**CONSOLIDATION AND REVISION OF CONCEPTS/TOPICS**				
CORE CONCEPTS, SKILLS AND VALUES	• Stiffening of materials • Frame structures				
REQUISITE PRE-KNOWLEDGE	Structures				
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	DBE Sasol Inzalo workbooks/textbooks and any applicable resource (YouTube videos, etc.)				

2023/24 ANNUAL TEACHING PLANS: TECHNOLOGY: GRADE 7 (TERM 3)

TERM 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
CAPS TOPIC	**INVESTIGATION SKILLS**	**INVESTIGATION SKILLS**	**ELECTRICAL SYSTEMS AND CONTROL MAKING SKILLS**	**ELECTRICAL SYSTEMS AND CONTROL DESIGN**	**MECHANICAL SYSTEMS AND CONTROL**
CORE CONCEPTS, SKILLS AND VALUES	**Scenario:** A scrap-metal dealer sorts magnetic and non-magnetic metals into separate piles for recycling The simplest way to do this is to use a crane with a magnet BUT it is difficult to remove the metals that do stick to permanent magnets • **Case study:** Examine pictures of cranes in order to get ideas to be used in the learner's own designs	Investigate: What is magnetism? • Practical investigation: Different types of permanent magnets – bar and horseshoe • Practical investigation on magnetic and non – magnetic metals • Case study: Recycling scrap metals. Honest gleaners who collect scrap metal and deliver it to scrap metal dealers perform a valuable service to society. This good work is tainted by the criminal acts of thieves who steal copper telephone wire and steel manhole covers	• **Simple electric circuits** Demonstrate a simple electric circuit with an energy source (cell), switch, conductor and a light bulb or buzzer. Sketch the circuit showing how to use component symbols • **Practical**: Learners work in groups to make a simple circuit as demonstrated • **Circuit diagram**: Each learner draws the circuit using correct symbols for components	• **Practical demonstration:** A simple electromagnet. Make a simple electromagnet made by winding insulated copper wire around an iron nail. When an electric current flow in the wire coil (solenoid) a magnetic field is created, and this is amplified by the iron core. Switching the current off causes the magnetic field to fade away. (Note: Electromagnetism is a key to a wide range of technologies making up our modern world) • **Write a design brief** with specifications and constraints for a crane with electromagnet • **Sketch** two possible designs for a suitable crane • **Draw a circuit diagram** for the electromagnet (with a light to show when it is on)	• Introductory lesson: All complex machinery consists of combinations of simple mechanisms. Machines can be designed to give the user a "mechanical advantage" • Introduce learners to cranks and pulleys **The crank** – an adaptation of a second-class lever The **pulley** – a type of wheel and axle • Revision a) What is mechanical advantage? b) Strengthening frame structures
REQUISITE PRE-KNOWLEDGE	Investigation skills	Metals and non-metals, magnetism in the Natural sciences and Technology Subject in the intermediate phase	Electric current and circuit diagrams in the Natural sciences and Technology Subject in the intermediate phase	Design skills Electrical systems in week 3	Knowledge on simple mechanism and mechanical advantage as covered in term 1, strengthening structures done in term 2
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources
INFORMAL ASSESSMENT		Informal assessment	Informal assessment	Informal assessment	Informal assessment
SBA (FORMAL ASSESSMENT)	**PAT 2** **FORMAL ASSESSMENT: INVESTIGATE**			**PAT 2** **FORMAL ASSESSMENT: DESIGN**	

TERM 3	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CAPS TOPIC	**DESIGN SKILLS** **COMMUNICATION SKILLS** **MAKING SKILLS**	**STRUCTURES AND ELECTRICITY/CRANKS AND PULLEYS**		**STRUCTURES AND ELECTRICITY/CRANKS AND PULLEYS**	
CORE CONCEPTS, SKILLS AND VALUES	• **Revision:** Revise the 3D oblique drawing technique, line types, scale, dimensions • **Drawing:** Each learner uses the Oblique technique to draw an idea for the crane chosen from the two ideas sketched the previous week. The idea should be drawn on squared paper (quadrant) using pencil and ruler • **Flow chart:** Each learner works out a flow chart detailing the sequence of manufacture of the crane with its electromagnet	**A working model** *At a minimum the crane should be made of simple materials like elephant grass, rolled paper dowels or bought materials. It should show the learner's understanding of reinforcing techniques. The mechanisms must function, and the crane should be able either to pivot or to raise and lower its arm. The electromagnet should have a switch, a light to show when it is 'on', and should be strong enough to pick up several steel paper clips, coins or nails* • **Electromagnet:** Using an electrochemical cell, a switch, a light bulb, a "soft" iron core and a ***long*** length of insulated copper wire, the teams of learners make an electromagnet • **Crane:** Learners work safely in teams using simple materials to make a model crane with a crank and pulley system which will carry the electromagnet that will sort the ferrous metals (iron and steel) from the non-ferrous metals (copper, aluminium, lead, brass, etc.)		The learner's ability to evaluate a product or a process is developed further • Each learner develops a rubric to evaluate the models of other teams • Each team uses the rubric to evaluate the models of other teams. Assess each learner's objectivity, fairness and the validity of their comments • Teams plan a joint strategy to present their model and plans to the class. All team members must explain their ideas and roles they played when they present • Each team presents the design sketches, working drawings and functioning model to the class. They demonstrate how strong their electromagnet is and show that it releases the load when switched off. Each learner explains the role s/he played and shares the role of spokesperson. They explain the principles involved with the magnetic sorting and how their electromagnet could be made stronger. They comment on the value of recycling and explain how sorting the metals into types, improves their scrap value. They enhance their presentation using posters giving an artist's impression of their completed crane and electromagnet in use	
REQUISITE PRE-KNOWLEDGE	Graphic communication skills: 3D oblique drawing, Flow chart	Content and skills learned during the term		Evaluation and communication skills developed in term 1	
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources		Siyavula workbooks Applicable resources	
INFORMAL ASSESSMENT	Informal assessment			Informal assessment	
SBA (FORMAL ASSESSMENT)	**PAT 2** **FORMAL ASSESSMENT: DESIGN**	**PAT 2** **FORMAL ASSESSMENT: MAKE**		**PAT 2** INVESTIGATE – WEEK 4/5, 15 MARKS DESIGN – WEEK 6/7, 20 MARKS MAKE – WEEK 8/9, 35 MARKS **TOTAL: 70 MARKS**	

TERM 3	WEEK 11				
CAPS TOPIC	**CONSOLIDATION/REVISION OF TERM 3 WORK**				
CORE CONCEPTS, SKILLS AND VALUES	**Revision** • Magnetism • Simple electric circuits • Crank and pulley • Mechanical advantage				

2023/24 ANNUAL TEACHING PLANS: TECHNOLOGY: GRADE 7 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
CAPS TOPIC	**INVESTIGATION SKILLS**	**INVESTIGATION AND DESIGN SKILLS**	**MAKING AND EVALUATING SKILLS**	**INVESTIGATION SKILLS**	**IMPACT OF TECHNOLOGY, INDIGENOUS TECHNOLOGY AND INVESTIGATION SKILLS**
CORE CONCEPTS, SKILLS AND VALUES	**Learners investigate emergency situations that can lead to refugees:** • Find out what situations commonly result in people becoming refugees • Find out what initial problems are typically faced by refugees • What mix of people will usually be present? • What are their needs for shelter? • What are their needs for food and water?	**Processing food: Emergency food** **Investigate** the types of food that can be supplied to occupants of a refugee camp **Design brief** Learners write a design brief giving specifications of the types and quantities of food needed for a population of 100 refugees **Design:** List the ingredients of a meal that will be nutritious as well as tasty, and which can be prepared under conditions likely to be found in a refugee camp	• Write down the sequence of manufacture for the process of preparing one item from the meal described above • Learners prepare the item selected above. Learners evaluate the item in terms of flavour, texture and nutritional value	**Learners investigate clothing worn by people in specialized occupations like the emergency services, e.g., fire department, NSRI or dangerous professions** Learners must investigate the following: • Find out what textiles are used to make the clothing worn by fire fighters or • Find out what textiles are used to make the clothing worn by members of the NSRI	**Scenario** **Tragic shack fires or natural disasters like floods or earthquakes or political strife may create the need for emergency shelters to be erected for the victims** Learners design and make a simple emergency shelter for disaster victims. The shelter must be sturdy, waterproof, easy to erect and able to house a family of six for a month Learners must be aware of the importance of health and safety issues
REQUISITE PRE-KNOWLEDGE	Pre-knowledge on food processing in grade 6 in Natural Sciences and Technology Investigation skills	Pre-knowledge on food processing in grade 6 in Natural Sciences and Technology Investigation and design skills	Making and evaluation skills	Pre-knowledge on properties of material in grade 5 in Natural Sciences and Technology Investigation skills	Pre-knowledge on indigenous technologies in the intermediate phase Investigation skills
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Siyavula workbook/textbooks and or any other relevant resources.	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources
INFORMAL ASSESSMENT	Informal assessment	Informal assessment	Informal assessment	Informal assessment	Informal assessment

TERM 4	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CAPS TOPIC	**INVESTIGATION AND DESIGN SKILLS**	**DESIGN SKILLS**	**REVISION ON TERM 3 AND 4 WORK**	**ADMINISTRATION OF END OF YEAR EXAMINATION**	**SCHOOL CLOSURE**
CORE CONCEPTS, SKILLS AND VALUES	**Investigate** Learners investigate materials and building techniques used by indigenous people for constructing housing in rural South Africa. Materials used in such construction are typically readily available, appropriate and environmentally friendly **Investigate** Learners find out what chemicals can waterproof a textile like canvas **Investigate** Learners find out about the burning characteristics of various textiles	**Design brief:** Learners write an appropriate design brief with specifications for producing a textile suitable for use in making an emergency shelter **Design:** Learners sketch design ideas for an emergency shelter that can be transported to and erected at a site where people have become homeless			
REQUISITE PRE-KNOWLEDGE	Pre-knowledge from work done in the term	Pre-knowledge on indigenous technologies in the intermediate phase Investigation skills			
RESOURCES (OTHER THAN TEXTBOOK) **TO ENHANCE LEARNING**	Siyavula workbooks Applicable resources	Siyavula workbooks Applicable resources			
INFORMAL ASSESSMENT	Informal assessment	Informal assessment			
SBA (FORMAL ASSESSMENT)			**END-OF-YEAR EXAMINATION: 30 MARKS**		