

GEOGRAPHY

Grade 11

Solutions to your weather focus

2021



GAUTENG PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

INTRODUCTION AND PURPOSE OF THE RELAB (REMOTE LEARNING ACTIVITY BOOKLET)

The pandemic has forced schools to resort to the implementation of rotational timetables-where learners who are at home during normal schooling must continue learning. Hence RELAB as a strategy towards the deployment of remote learning.

The RELAB is underpinned by the following Legislative demands:

- a) Responding to GDE Strategic goal 2 promoting quality education across all classrooms and schools
- b) **DBE Circular S13 of 2020** the requires the GDE to support the implementation of the Recovery Annual Teaching Plan (RATP)
- c) **GDE Circular 11 of 2020** requiring districts to issue Learning Activity Packs to support schools for lockdown learning. Understanding learning constraints at home as majority of learners do not have access to devices or data to use for online learning. Many households are depending on schools to provide them with learning resources packs

RELAB is designed in a study guide format, where the content is briefly explained with related concepts as revision, in the form of e.g. notes, mind-maps, concept progression from the previous grade/s followed by exemplar exercises then practice exercises/problems . The exercises are pitched at different cognitive levels to expose learners at Grade 10 & 11 to these different cognitive levels of questioning. The NSC diagnostic reports in different subjects have revealed that learners fail to analyse questions and as a result fail to respond accordingly.

The RELAB is intended to ensure that learners work on exercises as per topics taught while at school. These exercises must be completed at home, fully and learners will receive feedback as groups or individually at school. It is therefore of paramount importance that teachers mark the work with learners in class, as a way of providing feedback. Educators must diagnose learner responses, remediate where necessary and plan further intervention.

Educators are encouraged to create WhatsApp groups to remind learners on what is expected of them in a particular week/ day(s). There shouldn't be a backlog on curriculum coverage as content will be covered simultaneously. Feedback from learners at home will confirm usage of the RELAB material.

RELAB further prepares learners for formal assessment.

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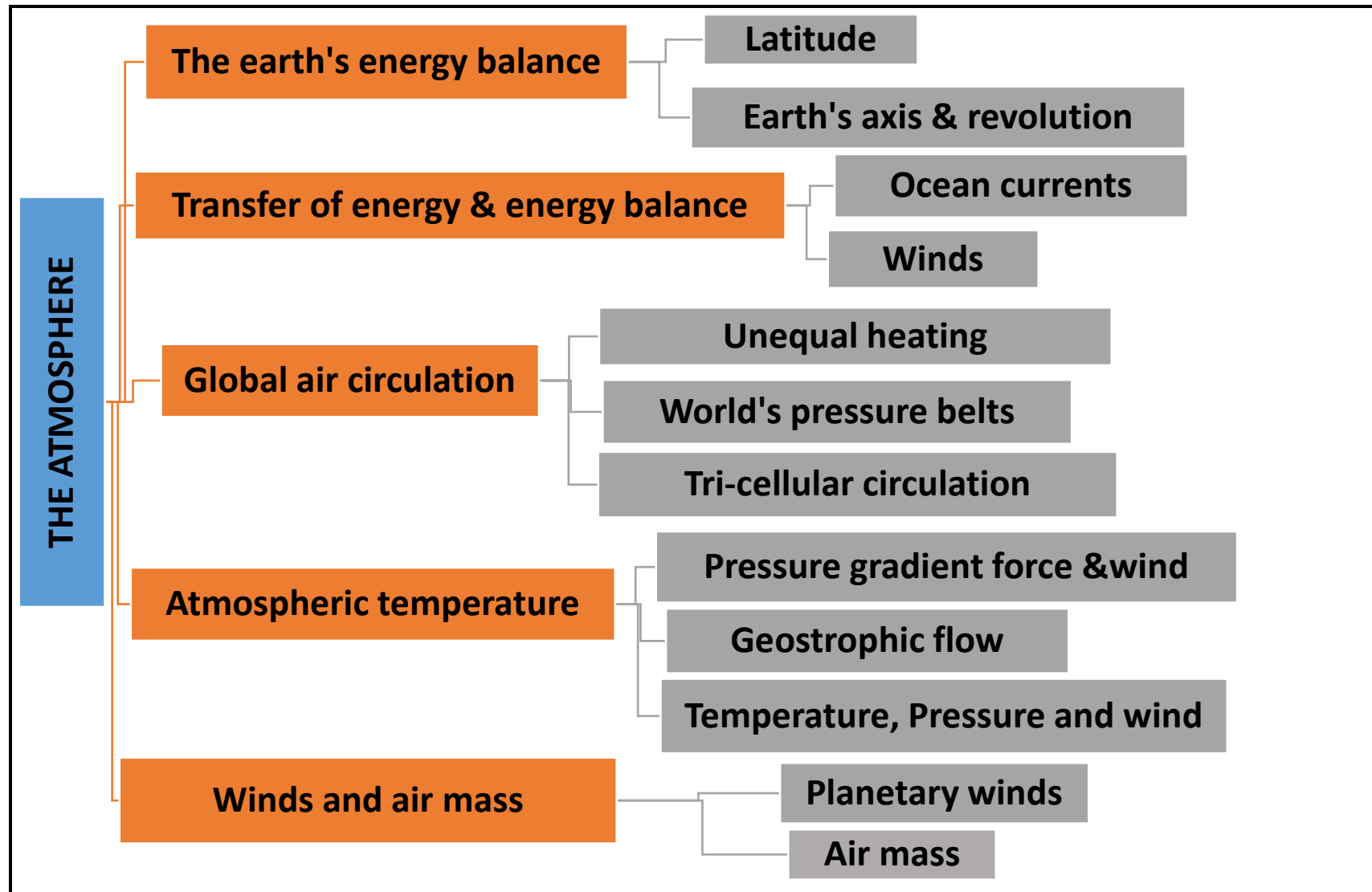
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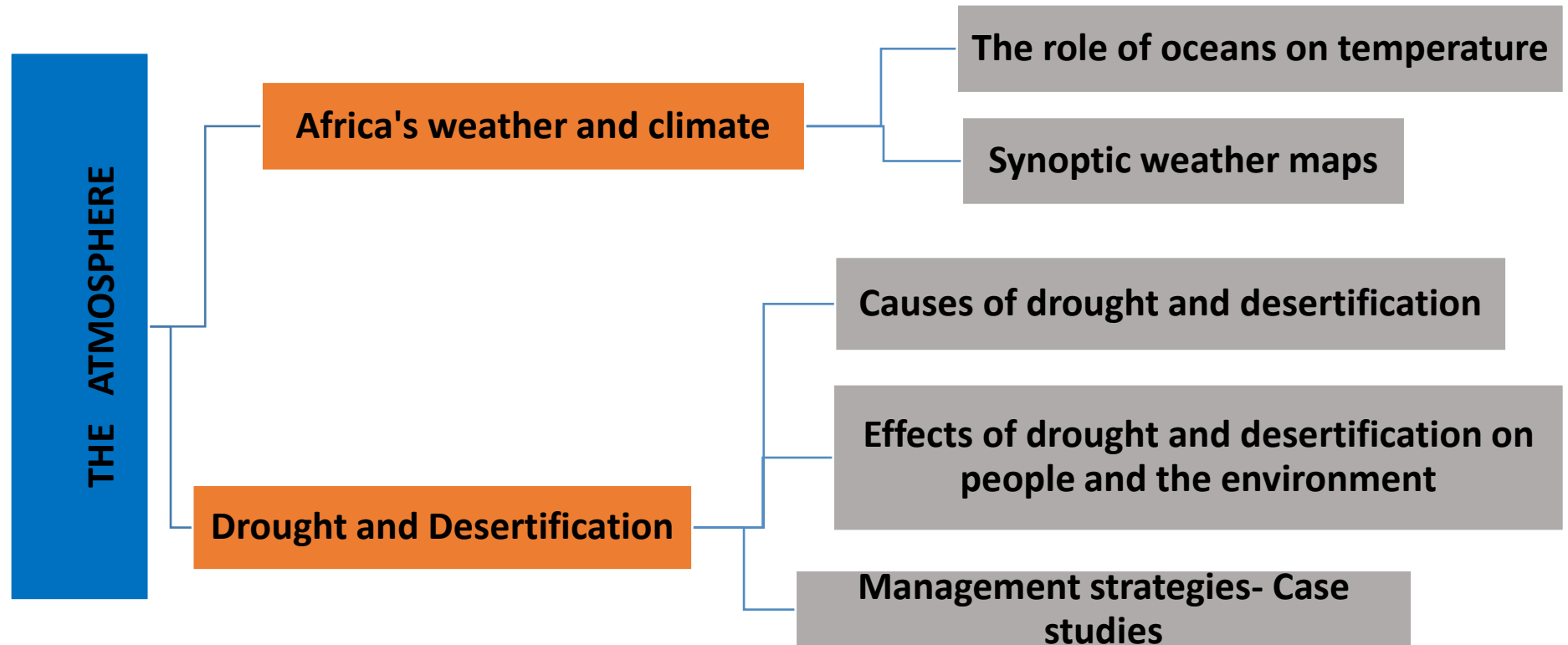
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THE ATMOSPHERE

GRADE 11: TERM 1





TERMINOLOGY

Insolation:	Incoming solar radiation
Revolution:	Movement of the Earth in an orbit around the sun.
Isotherms:	These are lines on a map joining places of equal temperature
Heat equator:	is an isotherm joining places that have the highest temperature at a particular time
Summer solstice:	It is experienced in midsummer 21 December when days are longer and shorter night
Autumn equinox:	Mid-autumn days falls on 21 March when there's equal length of day and night
Winter solstice:	Midwinter days falls on 21 June when days are shorter, and nights are longer.
Spring equinox:	Midspring days falls on 23 September both day and night are of equal length
Shortwave radiation:	It is the radiant energy produced by the sun with wavelength ranging from infrared through visible to ultraviolet
Longwave radiation:	It is electromagnetic radiation of wavelengths emitted from earth and its atmosphere out to space in the form of thermal radiation
Radiative equilibrium:	Is the condition where the total thermal radiation leaving an object is equal to the total thermal radiation entering it
Thermal radiation	Process by which energy in the form electromagnetic radiation is emitted by a heated surface in all directions
Atmospheric pressure:	Is the weight of the atmosphere on the surface of the Earth
Divergence:	Moving apart
Convergence:	Coming together
Dew point	Temperature at which water vapour starts to condense
Intertropical Convergence Zone (ITCZ):	The zone where the two sets of tropical easterlies converge
Polar front:	The front between the cold air and warmer air masses which meet at 60° north and south
Front:	Zone where two air masses of different temperatures meet
Wind:	Moving air that blows from high pressure to low pressure
Pressure gradient:	The amount of change in atmospheric pressure between high- and low-pressure areas
Pressure gradient force(PGF):	Pressure gradient force causes the air to move from a high-pressure area towards a low-pressure area along the pressure gradient
Isobars:	Lines joining places with the same atmospheric pressure.
Coriolis force:	The force which deflects winds due to the earth's rotation
Ferrell's law:	It states that because of the Coriolis force, the winds are deflected to their left in the southern hemisphere and to right in the northern hemisphere
Geostrophic flow:	Theoretical wind that would result from an exact balance between Coriolis Force and the Pressure Gradient Force
Geostrophic balance:	Condition of the atmosphere where there is a balance between Coriolis Force and the Pressure Gradient Force

Friction:	Contact with land or sea surface that slows down air movement
Planetary winds:	Major winds which blow all year round over large expanses of the Earth's surface
Air mass:	A large volume of air with similar temperature, atmospheric pressure and humidity
Monsoon:	A seasonal wind that blows in Tropical regions
Fohn:	A warm dry wind that descends the leeward side of a mountain
Leeward:	The side of a mountain where winds descend and warm up
Windward:	The side of a mountain where winds rise and cool down
Lapse rate:	The rate at which temperature changes in the atmosphere with change in height
Dry adiabatic lapse rate (DALR):	the rate at which the temperature of dry (unsaturated) air descends with an increase height (1°C per 100 metres)
Saturated adiabatic lapse rate (SALR):	the rate at which the temperature of saturated air (in which moisture has started to condense) decreases with an increase in height (averaging 0.5°C per 100 metres)
Seasonal temperature range:	difference between summer and winter temperatures
Prevailing winds:	winds that blow most often
Onshore winds:	Winds that blow from the ocean towards the land
El Nino:	Climate change brought by warmer conditions in the Pacific Ocean
La Nina:	Change conditions brought about by cooler conditions in the Pacific Ocean
Synoptic weather map:	A map showing weather conditions for a particular time on a particular day
Ridge:	High pressure extending outwards to lower pressure
Trough:	low pressure extending outwards to higher pressure
Drought:	A long period with little or no rain
Desertification:	The process whereby once fertile areas become increasingly more arid/ dry

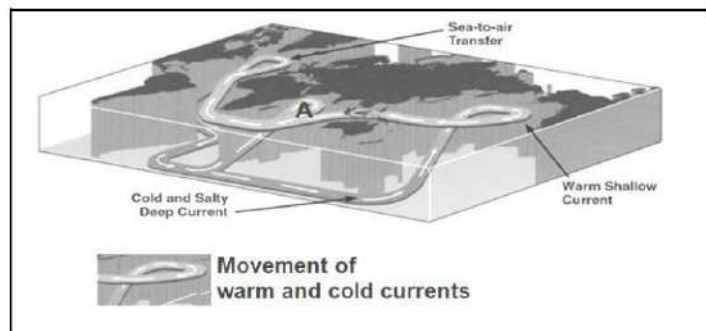
WEEK 1 : EARTH'S ENERGY BALANCE

UNEQUAL HEATING OF THE ATMOSPHERE				
		Amount of insolation which reaches the earth's surface is determined by: 1. Latitudinal temperature differences 2. Seasonal temperature differences		
DIAGRAM		IMPACT		
Latitudinal temperature			A - Direct sunrays on the equator More heat on a smaller surface area of the earth Therefore Hotter B - Less direct sunrays further towards the poles Less energy as a bigger surface of the earth is heated Therefore Cooler	
	Seasonal temperature			Day and night Earth's axis is an imaginary line between the North and South Poles Earth rotation is 24 hours – And result in Day and night Day and night are 12 hours long each  Scan the QR quodes supplied in the summaries to see videos on the topic.
Tilt of the Earth' s axis				Earth's axis is at an angle of 23½° to the vertical Different parts of the earth are tilted towards the sun This causes unequal lengths of day and night It takes 365¼ days or one year to complete one revolution and results in seasons
			Summer	Winter
			Areas towards the sun Longer days, shorter nights More insolation Hotter	Areas away from the sun Shorter days, longer nights Less insolation Cooler  VIDEO.mp4
Ocean currents				
	Origin	Warm currents	Cold currents	
		Originate at the equator	Originate at the poles	
Direction of flow	Flow along the east coasts of continents towards the poles	Flow along the west coasts of continents towards the equator		
	https://youtu.be/-DfREsJDPNY			

ACTIVITIES: THE EARTH'S ENERGY BALANCE

1.1 Refer to FIGURE 1.1, illustrating the movement of the warm and cold ocean currents.

FIGURE 1.3: MOVEMENT OF WARM AND COLD OCEAN CURRENTS

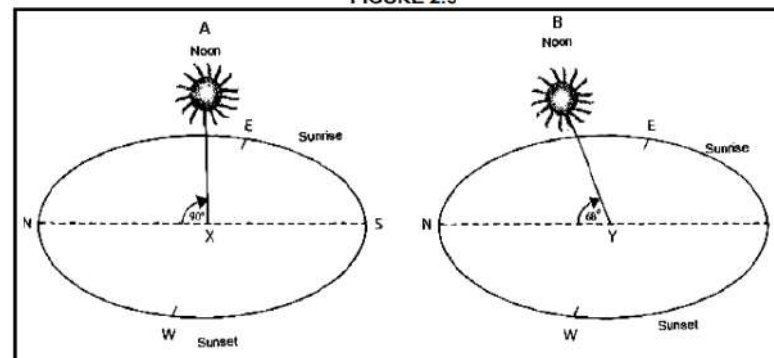


[Source: sageography.myschoolstuff.co.za]

- 1.1.1 What is an ocean current? (1 x 1) (1)
- 1.1.2 Coriolis force is one reason for the development of ocean currents. Provide TWO other reasons. (2 x 1) (2)
- 1.1.3 How does Coriolis force influence the movement of ocean currents? (1 x 2) (2)
- 1.1.4 Explain how current A will influence the weather of the nearby eastern coastal regions of Africa. (2 x 2) (4)
- 1.1.5 Refer to the movement of the warm and cold currents.
- (a) What is the climatological importance of the movement of the warm and cold currents? (1 x 2) (2)
- (b) Explain how this circular movement of the warm and cold currents stays connected. (2 x 2) (4)

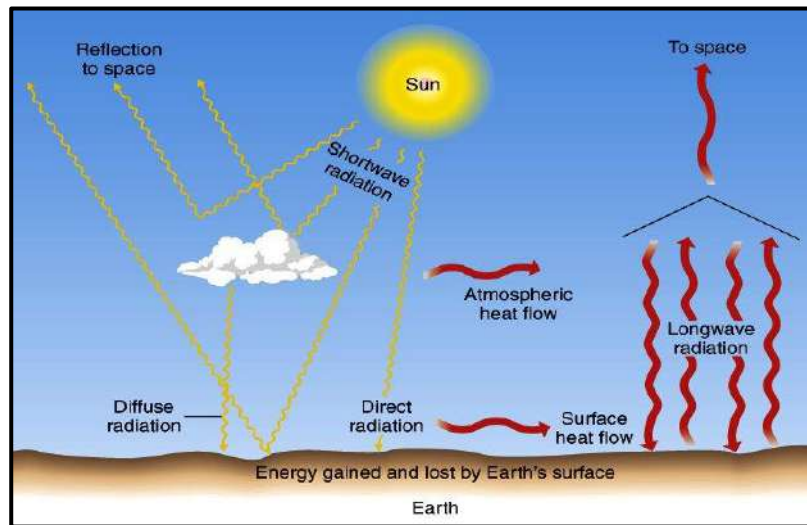
1.2 FIGURE 1.2 illustrates the position of the sun across the sky at two different places in the southern hemisphere.

FIGURE 2.3



- 1.2.1 Define the term insolation. (1 x 1) (1)
- 1.2.2 The amount of insolation is dependent on latitude and the seasons. List which ONE of the factors is illustrated in FIGURE 1.2. (1 x 1) (1)
- 1.2.3 State the factor in FIGURE 1.2 that determines the amount of insolation that the surface of the earth receives. (1 x 1) (1)
- 1.2.4 Name the heat zone of the earth that would be represented by X. (1 x 1) (1)
- 1.2.5 In FIGURE 1.2 B the sun is not directly overhead and strikes the earth at an angle that is smaller than 90°. Explain how this will result in less radiation at point Y. (2 x 2) (4)

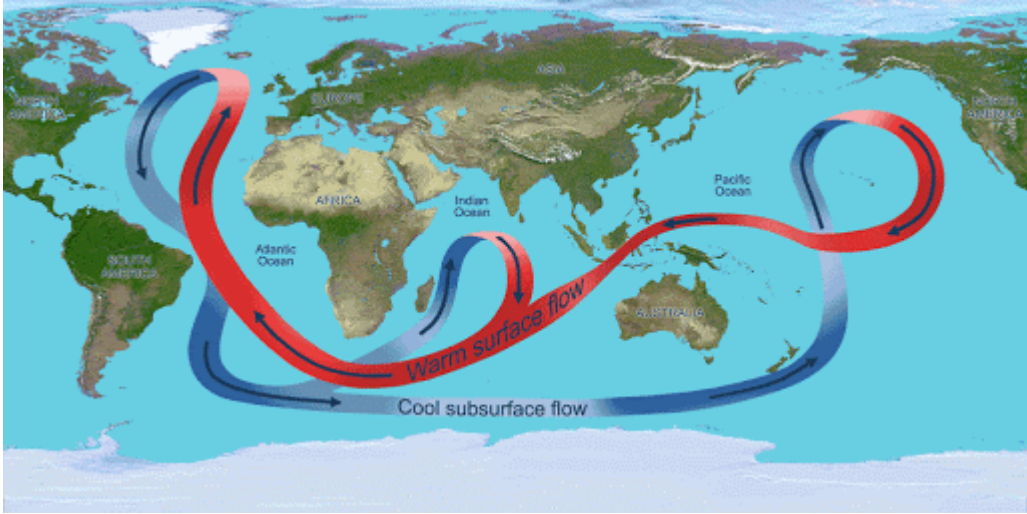
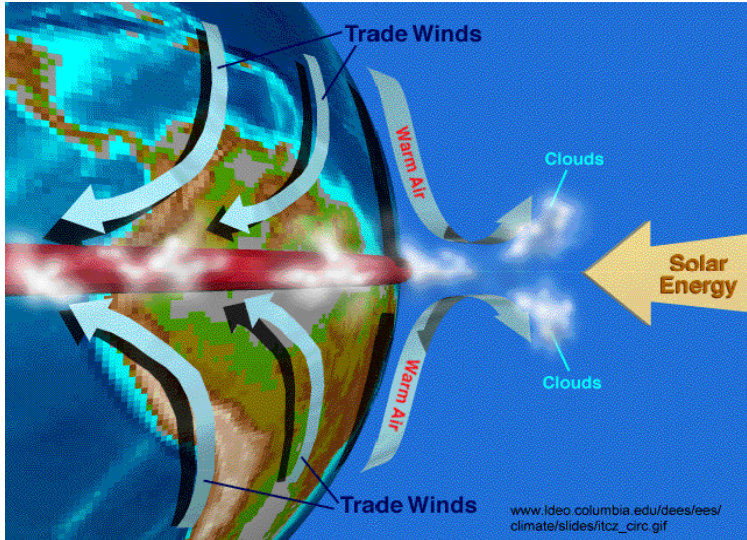
- 1.3 Refer to the diagram, **FIGURE 1.3** showing the incoming solar radiation that strikes the earth's curved surface at various angles. Choose the correct term between brackets to make the following statements true.



- 1.3.1 The sun's rays entering the atmosphere is called (insolation/radiation).
- 1.3.2 Albedo refers to the amount of insolation (reflected/absorbed) by the earth's surface.
- 1.3.3 At the (equinoxes/equator), day and night are of equal length everywhere on Earth.
- 1.3.4 Temperature (increases/decreases) with altitude.
- 1.3.5 The thermal equator is further north in (December/June).
- 1.3.6 The atmosphere is heated more directly by (terrestrial radiation/solar radiation).
- 1.3.7 The amount of solar energy received at the surface of Earth is (lowest/greatest) when the sun is directly overhead at noon.

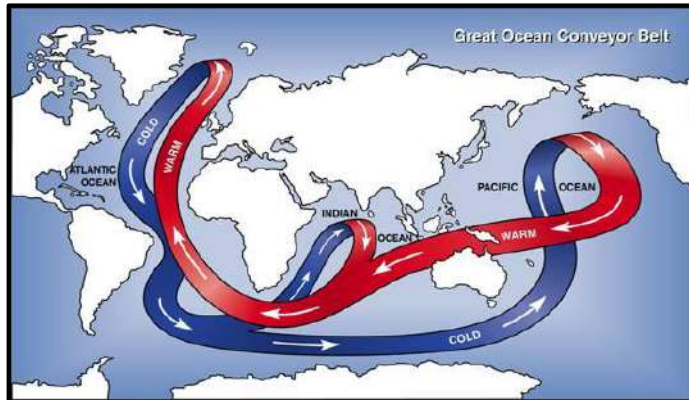
(7 x 1) (7)

WEEK 2 : WORLD'S OCEAN CURRENTS AND WIND

What does it look like? What is the role of ocean currents and winds in transferring heat?	
OCEAN CURRENTS	• Radiant energy enters the atmosphere from the sun • This energy is reflected, adsorbed and scattered throughout the atmosphere and across the earth's surface, but it is not evenly distributed • The system stays balanced because temperature differences create winds and ocean currents that transfers heat around the globe, which helps to balance out uneven distribution of insolation 
GLOBAL WINDS	• Global winds systems and ocean currents act together to transfer energy and produce the climate matters we experience on earth.   VIDEO EARTH'S ENERGY BALANCE.mj www.ldeo.columbia.edu/dees/ees/climate/slides/itcz_circ.gif

ACTIVITIES: OCEAN CURRENTS AND WIND

2.1 Refer to FIGURE 2.1, a map showing ocean currents and the creation of the Global Conveyor belt.

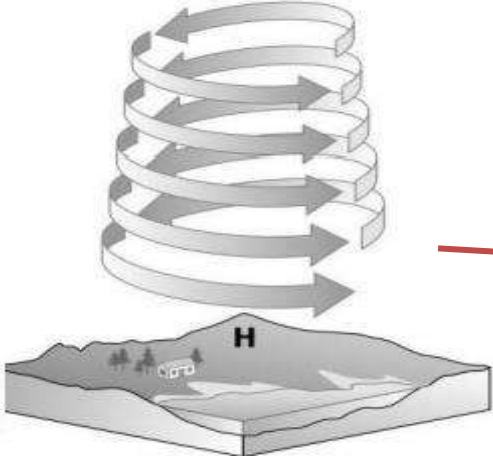
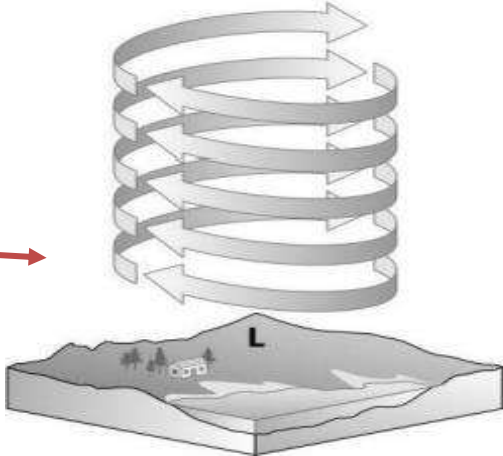
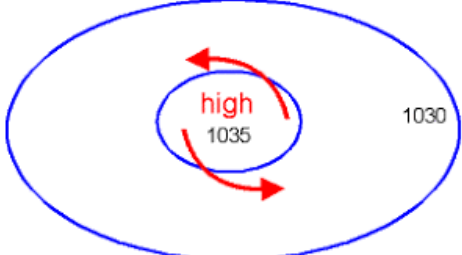
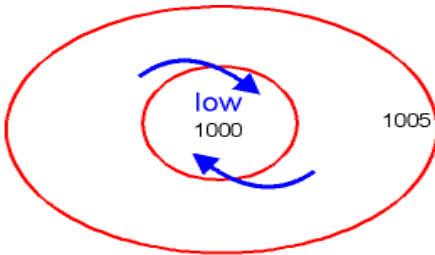


- 2.1.1 Identify the ocean current that flows along the west coast of Africa. (1 x 2) (2)
- 2.1.2 Explain the influence of the ocean current identified in QUESTION 2.1 on areas along the west coast of Africa. (2 x 2) (4)
- 2.1.3 Write a paragraph (approximately EIGHT lines) in which you discuss the relationship between the oceans and climate. (4 x 2) (8)

WEEK 3 : GLOBAL AIR CIRCULATION

IMPORTANCE OF HIGH- AND LOW-PRESSURE CELLS:

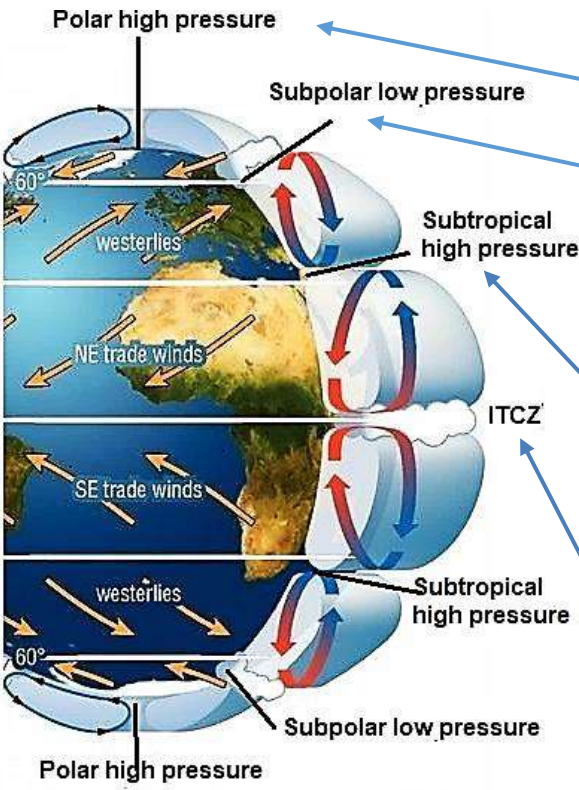
The unequal heating of the atmosphere results in the development of high- and low-pressure cells. It is important that you know the characteristics of High- and Low-pressure cells

	High pressure cell	Low pressure cell
CROSS SECTION		
PLAN VIEW		
CHARACTERISTICS	• Air subsides (decend) • Air Diverge at the centre • Clear/dry skies • No release of latent heat • No cloud formation • Oval shaped isobars • Air circulates in an anticlockwise rotation • Also kow as an anticyclone • Isobar values increase towards the centre of the low pressure • Also called an Anticyclones • Forms: - South Atlantic Anticyclone - South Indian Anticyclone - Kalahari Anticyclone	• Air ascends (rises) • Air converges at the centre • Condesation takes place • Latent heat is released during condensation • Clouds form and recipitation occurs • Circular shaped isobars • Air circulates in a clockwise rotation • Also kow as a cyclone • Isobar values decrease towards the centre of the low pressure • Also called a Cyclone • Forms: - Coastal low - Mid-Latitude cyclones - Tropical cyclones
	Wind moves from a HP to a LP on the surface of the Earth.	

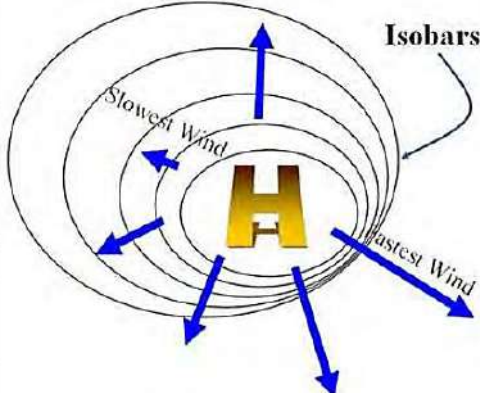
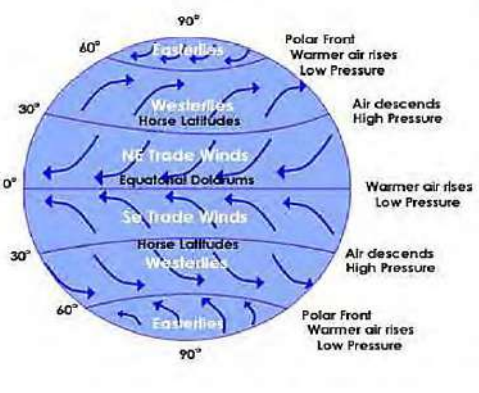
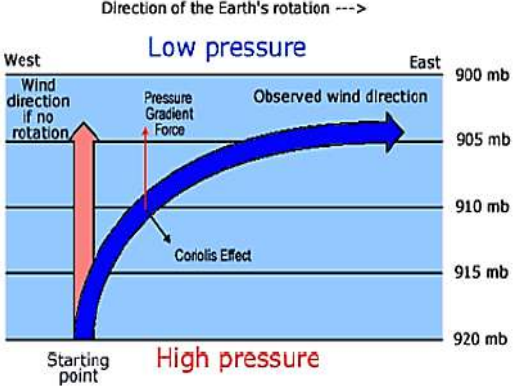
WEEK 3: WORLD PRESSURE BELTS

IMPORTANCE OF THE PRESSURE BELTS:

The development of High- and Low-pressure cells results in the development of the pressure belts at different latitudes because of pressure gradient and Coriolis force that have an impact on the global circulation of the atmosphere.

	PRESSURE BELTS	CHARACTERISTICS OF THE PRESSURE BELTS
	Polar high at 90° N and S	• Associated with cold, dense air which subsides over the poles. • Stable, clear and cold conditions prevail
	Sub-polar Low at 60° N and S	• A region of low pressure associated with the convergence of two different air masses. • The air is forced to rise. • This creates a low-pressure area. • Also called the polar front and this is where mid-latitude cyclones originate.
	Sub-tropical High at 30 °N and S	• A region of high pressure associated with subsiding air • The descending air is warm and dry. • Deserts form in these regions. • Associated with clear skies and low rainfall. • A region of high pressure associated with subsiding air. • Associated with clear skies and low rainfall.
Source: https://www.40knots.net/what-are-the-trade-winds/	Equatorial low at 0°	• Also called the inter-tropical convergence zone (ITCZ) where maximum heating takes place. • Hot air rises creating a low-pressure area at the surface. • The rising air is moisture laden. • Associated with convergence thunderstorms and high rainfall. • Confluence of NE trade winds and SE trade winds at 5° North and South results in the development of Tropical cyclones.

THE RELATIONSHIP BETWEEN AIR TEMPERATURE, AIR PRESSURE AND WIND

PRESSURE GRADIENT	CORIOLIS FORCE	GEOSTROPHIC AIR FLOW
Force that influence how strong of gentle a wind blow	Force that influence the direction that the wind blows	When
		
• Atmospheric pressure is pressure exerted by the atmosphere on earth. • Pressure gradient describes the direction and rate of change experienced by the atmospheric pressure from a HP place to a LP. • If the change in pressure between a HP and LP is great, it will have a steep pressure gradient, isobars will be drawn close together. • If the change between a HP and LP is small the pressure gradient will be gentle, and the isobars will be further apart. • The stronger the pressure gradient the high the winds https://www.youtube.com/watch?v=RVjwH4Pyz0s	• Coriolis force is caused by the rotation of the earth, this force changes the direction of air movement. • Air moving in the northern hemisphere will be deflected to the right, and air moving in the southern hemisphere will be deflected to the left. (Ferrell's law) • Coriolis force mainly affects air and water, the force gets stronger as you ascend from the surface as there is less friction.	• It's the theoretical wind that would result from an exact balance between the Coriolis force and the pressure gradient force • This condition is called the geostrophic balance • Geostrophic wind blows parallel to isobars • First air moves from high to low pressure, the Coriolis force deflects the wind, speed increases and so does the deflection • Geostrophic balance is reached, and air moves parallel to the isobars • Friction slows the flow of air and the effect of Coriolis force https://www.youtube.com/watch?v=hZR03EadBw0 https://www.youtube.com/watch?v=X_ivXm7EQP0

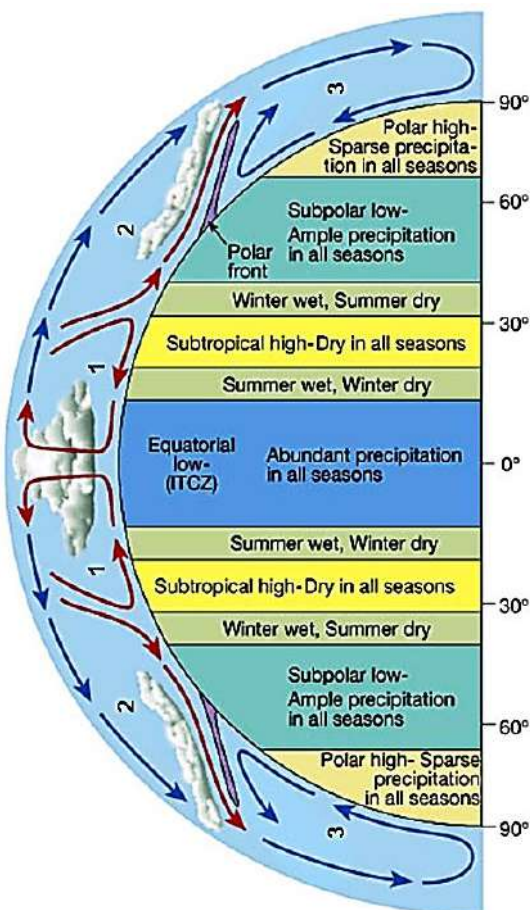
WEEK 4: TRI-CELLULAR MODEL

Wind is moving air

- Wind that blows from tropical zones towards a cooler zone will transfer heat energy and warm that cooler zone.
- Wind that blows from **polar regions** towards warmer regions it will cool the region down.
- Winds restore the energy balance over the Earth's surface.
 - **Tropical easterlies** blow from subtropical HP towards the equatorial LP. They bring cooler temps.
 - **Westerlies** blow from subtropical HP to subpolar LP, bringing warm temps.
 - **Polar easterlies** blow from polar HP to subpolar LP, they bring cool temps.

The movement of air around the planet through 3 main circulations per hemisphere:

1. Hadley cell
2. Ferrell cell
3. Polar cell



<https://youtu.be/PDEcAxfSYaI>

1. HADLEY CELLS

- These cells are found at the equator, air is heated and ascends vertically.
- As the air ascends it will reach the top of the troposphere and diverge towards the poles.
- At around 30° north & south of the equators, the air has lost heat and sinks creating a stable, high pressure zone (Sub-tropical high-pressure belt)
- The air then diverges at the surface and flows towards the equator
- Tropical easterlies occur in the Hadley cell can flow from east to west, this helps pull the diverging air at the sub-tropics back towards the equator.

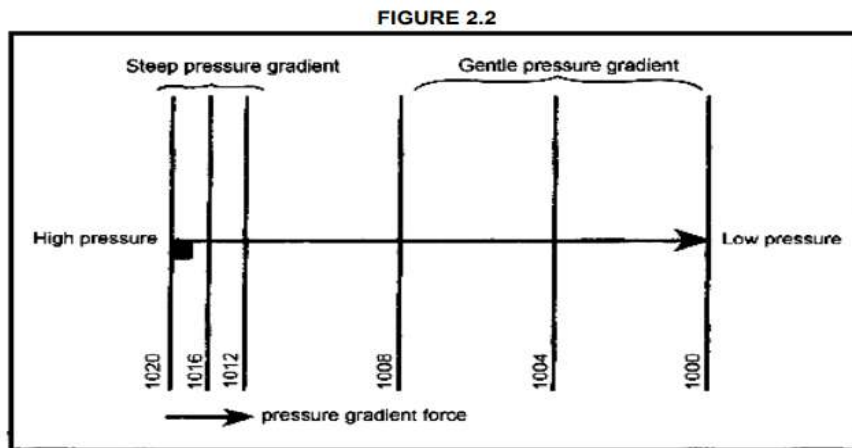
2. FERREL CELLS

- The weakest cell is called the Ferrell cell, its situated from 30° to 60° north and south of the equator.
- At the northern most edge, warm air moving out of the tropics collides with cool air from the poles creating a Polar Front.
- Warmer more moist air pushed by the subtropical westerly's overrides the cooler, dryer air drawn down by the polar easterlies.
- This creates an area of low pressure named the sub-polar low.
- The sporadic mixing of these air 2 air masses is responsible for the formation of a mid-latitude cyclone and account for the Capes frontal rainfall in winter.

3. POLAR CELLS

- Air at the poles is cold and sinks due to its greater density.
- The polar easterlies push the cold, dry sinking air back towards the polar front.
- It then collides with the arriving subtropical air.
- Some of the air is pulled back towards the poles to complete the polar cell and the remaining air be sucked back into the Ferrell cell and make its way back to the equator.

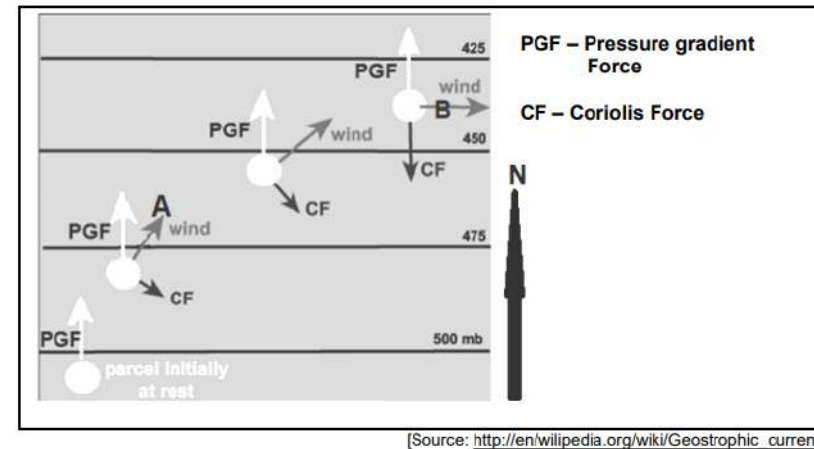
3.1 Refer to FIGURE 3.1 showing the relationship between air pressure and wind. Choose ONE term in brackets to make each of the following statements true.



- 3.1.1 We measure air pressure in (hectopascals/degrees).
 3.1.2 Lines joining places of equal pressure are known as (isotherms/isobars).
 3.1.3 The difference in pressure between two places is known as the (pressure gradient force/pressure force).
 3.1.4 Winds always blow from a (low/high) pressure to (high/low) pressure.
 3.1.5 The isobaric interval on in the sketch is (four/eight) hectopascals.
 3.1.6 Air that subsides on the surface of the earth creates a high pressure, and so (convergence/divergence) takes place.
- (7 x 1) (7)

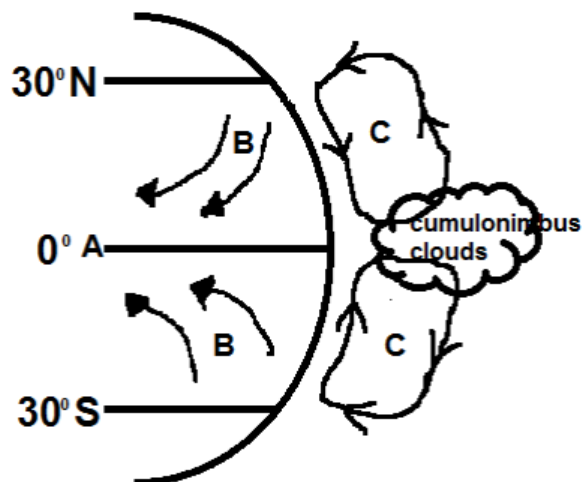
3.2 Study FIGURE 3.2, showing the development of a geostrophic wind

FIGURE 1.4: GEOSTROPHIC FLOW



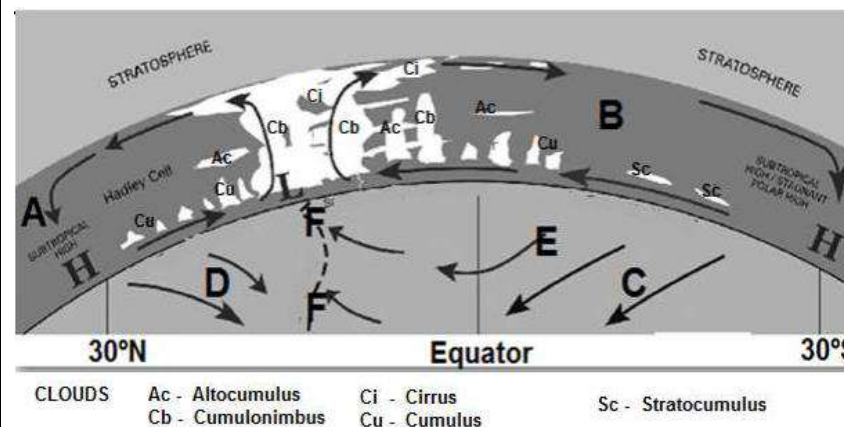
- 3.2.1 Name the force that is caused by the rotation of the earth.
 3.2.2 What is the initial movement of air in a northern direction?
 3.2.3 Provide the wind direction at A.
 3.2.4 In which hemisphere is this geostrophic wind developing? Provide a reason for your answer.
 3.2.5 The wind at B is geostrophic. Substantiate this statement.
 3.2.6 In a paragraph of approximately EIGHT lines, explain how the geostrophic wind develops.
- (1 x 1) (1)
 (1 x 1) (1)
 (1 x 1) (1)
 (1 + 2) (3)
 (1 x 2) (2)
 (4 x 2) (8)

3.3 Use the information in FIGURE 3.3 showing global air circulation and answer the questions that follow.



- 3.3.1 Name the air pressure belt at A. (1 x 1) (1)
- 3.3.2 Identify the wind belt at B. (1 x 1) (1)
- 3.3.3 Explain why the wind at B moves in a westerly direction. (1 x 2) (2)
- 3.3.4 Explain the role of the winds at B in the development of the cumulonimbus clouds. (2 x 2) (4)
- 3.3.5 In a paragraph of approximately EIGHT lines discuss how the air circulation cell at C developed. (4 x 2) (8)

3.4 Study FIGURE 3.4, showing global air circulation.



- 3.4.1 Name the atmospheric cells A and B respectively. (2 x 1) (2)
- 3.4.2 Provide ONE characteristic of cell A. (1 x 2) (2)
- 3.4.3 Suggest ONE reason why the southern hemisphere would be experiencing winter on the sketch. (1 x 2) (2)
- 3.4.4 Refer to wind belts C and D.
 (a) Name the wind belt that the arrows C and D indicate. (1 x 1) (1)
 (b) Explain why there is a difference in direction between the winds at C and D. (1 x 2) (2)
- 3.4.5 Refer to zone F.
 (a) Identify the zone at F. (1 x 1) (1)
 (b) Describe how this zone at F causes the heavy clouds in the atmosphere above it. (2 x 2) (4)

3.5 Select the correct term/concept in brackets. Write only the

3.5.1 Global air circulation is the (large/small) scale circulation of air across the globe.

3.5.2 The Inter-Tropical convergence zone is found along the (Sub-tropical high/Equatorial low) pressure belt.

3.5.3 Trade winds are winds that blow from the sub-tropical high-pressure systems north and south of the equator towards the (equatorial low/polar high) pressure system.

3.5.4 The sub-tropical high-pressure zone is commonly referred to as (doldrums/conundrums)

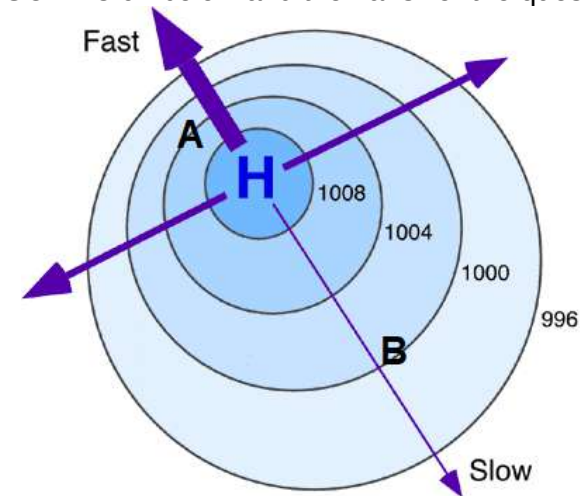
3.5.5 A polar high-pressure result from cool descending air that forms a series of high pressures at the (poles/polar front)

3.5.6 Horse latitudes are commonly referred to as an area of (calm/unstable) weather conditions.

3.5.7 The planetary wind model refers to circulation that results from air movements from the (equator to the poles/poles to the equator)

$$(7 \times 1) (7)$$

3.6 Study the FIGURE 3.6 below and then answer the questions that follow.



3.6.1 What is pressure gradient force? (1 x 1) (1)

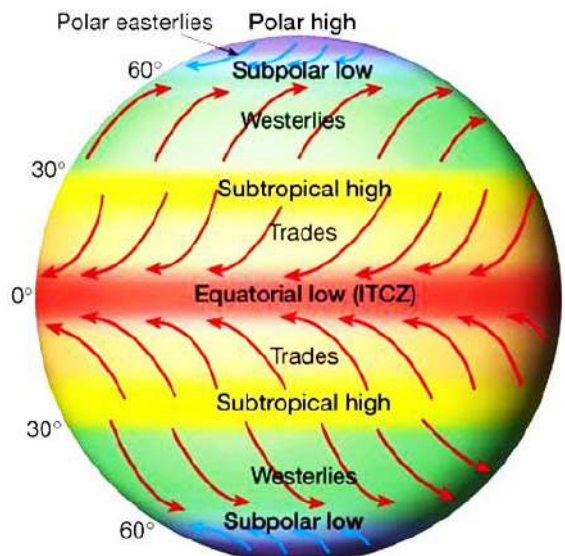
3.6.2 Label A and B as either strong or weak pressure gradient force. (2 x 1) (2)

3.6.3 Which pressure systems are associated with weak pressure and stronger pressure gradient force respectively? (2 x 2) (4)

3.6.4 Distinguish between a strong pressure gradient force and a weak pressure gradient force. (2 x 2) (4)

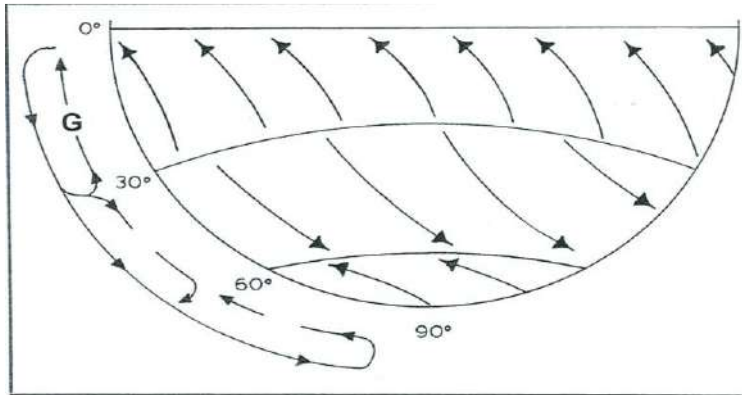
3.6.5 Describe the relationship between wind speed and pressure gradient force. (2 x 2) (4)

WEEK 4 : GLOBAL WINDS AND AIR MASSES

PLANETARY WINDS	CHARACTERISTICS OF AIR MASSES	
 • They blow all year round • They don't blow directly north-south or south-north • They are deflected to the left or right because of Coriolis force • Between 90° and 60° N/S are cold polar easterlies • Between 60° and 30° N/S are the warm westerlies • Between the 30° and 5° N/S are the Tropical easterlies / Trade winds • Land and sea heat and cool differently • Land masses heats up quickly in summer, therefore a low pressure develop over the land, on the other hand the ocean remains cooler so higher pressures are found over the oceans • Pressure pattern thus become circular rather than continuous	• An air mass is a large (usually thousands of miles across) volume of air that has horizontally uniform properties in terms of temperature, and to a lesser extent humidity • Air masses form in area called source regions. • The air mass takes on the properties of the source region. • Polar air masses become very cold, especially in the winter, because relatively little sunlight shines on the poles • "Continental polar" air mass will be somewhat colder and less humid (from being over very cold land) than a "maritime polar" air mass • A "tropical maritime" air mass will be very warm and humid. • Fronts are the boundaries between air masses of different temperature.	
	WARM AIR MASS:	COLD AIR MASS:
	• Less dense • Associated with formation of rainfall • Has high moisture content • Rising	• Heavy • More dense • Associated with dry conditions • Less ability to hold moisture • Sinking

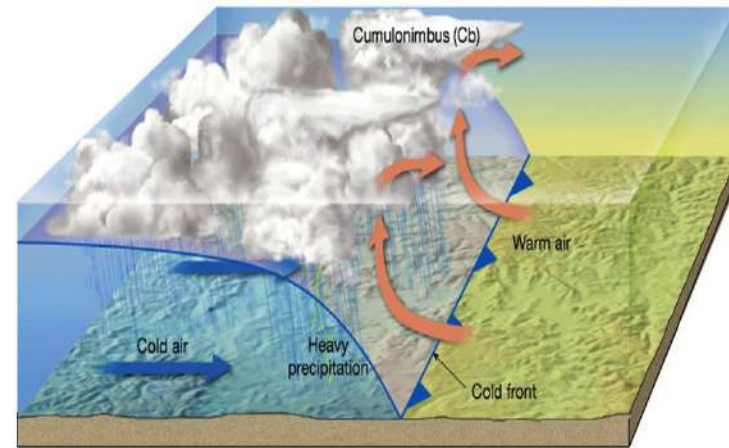
ACTIVITIES: WINDS AND AIR MASSES

4.1 Refer to the diagram above:



- 4.1.1 Provide labels for the planetary wind labelled B and C. (2 x 1) (2)
- 4.1.2 What is the name of the zone where the planetary wind B converge with wind C ? (1 x 1) (1)
- 4.1.3 Identify the wind labelled G which occurs between 0° – 30° north and south of the equator. (1 x 1) (1)
- 4.1.4 The area near the equator where the winds die out is referred to as the ... (1 x 1) (1)
- 4.1.5 Winds associated with the ITCZ are ... (1 x 1) (1)
- 4.1.6 A force that influences the speed of winds is called the ... (1 x 1) (1)
- 4.1.7 Air rises at the equator and sinks at the poles due to ... (1 x 1) (1)

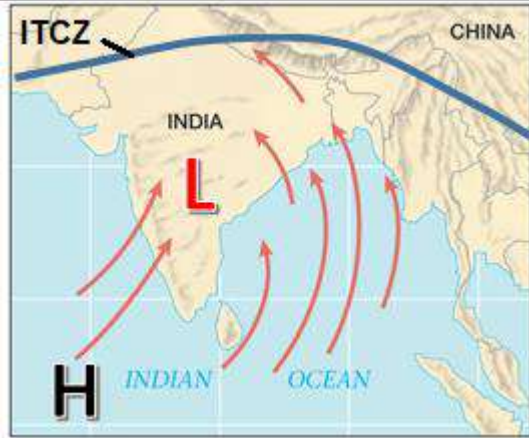
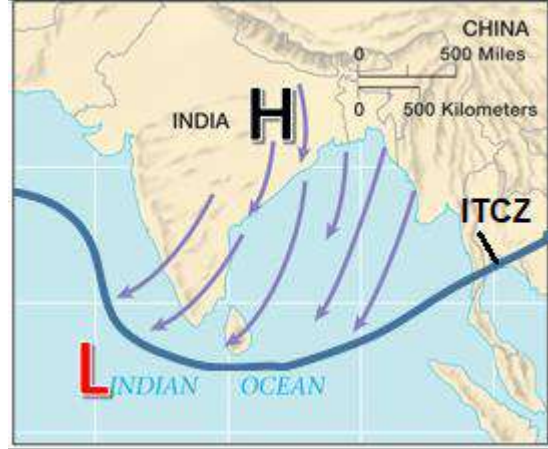
4.2 Use the information presented above on Air masses to answer the following questions:



- 4.2.1 Explain the meaning of the term air mass. (1 x 1) (1)
- 4.2.2 What is the name of the zone where two different air masses meet? (1 x 2) (2)
- 4.2.3 Name the TWO air masses that converge at 60° line of latitude. (2 x 1) (2)
- 4.2.4 What happens to the warm air mass when it converges with the cold air mass? (2 x 2) (4)
- 4.2.5 Briefly describe the weather condition that will prevail when the 2 air masses converge. (2 x 2) (4)

WEEK 5 : REGIONAL WINDS: MONSOON

- Seasonal winds in tropical regions
- Regions affected: northern Australia, Africa, South America, USA
- Mostly known in India

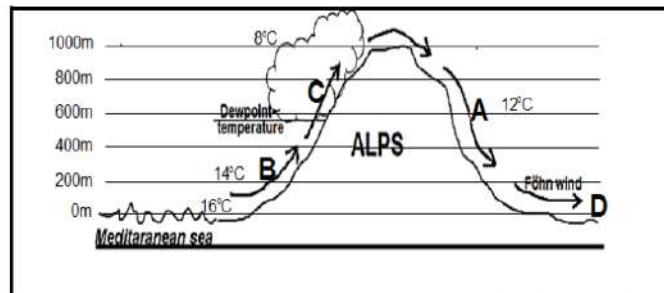
SUMMER MONSOON		WINTER MONSOON	
DIAGRAM		DIAGRAM	
CHARACTERISTICS	SUMMER MONTHS: • Hot land surfaces cause rising air and thus a low pressure • Over the ocean temperatures are not as warm and result in a higher pressure • Warm, moist winds blow onshore from the ocean towards the land mass. • Resultant weather: • Humid winds blow onto the land from the Indian Ocean.	CHARACTERISTICS	WINTER MONTHS • Cold winter temperatures cause strong subsiding air • Subsiding air is stable high-pressure area over the continent. • A low pressure develops over the ocean. • Cool, dry winds blow offshore from the interior towards the low-pressure region over the ocean. • Resultant weather: • Dry winds with very little rainfall.
IMPACT	• Flooding impact humans, environment and economy • Humans: drowning, illness e.g. cholera, destruction of homes • Environment: damage crops, mudslides, pollute water • Economy: Damage infrastructure, loss of production	IMPACT	• Dry conditions with limited rainfall  https://youtu.be/Fo8nlearLZQ

REGIONAL WINDS: FÖHN WINDS

DIAGRAMS		CHARACTERISTICS	
CROSS SECTION			
• Local topography (mountains) can influence small-scale wind systems. • FÖHN winds arise because of humid airflow over a mountain range. • As a result of the adiabatic cooling of the air, part of the water condenses leads to the formation of clouds and rain on the wind side of the mountain. • As the wind descends on the other side of the mountain, adiabatic heating takes place and the wind is warm and dry on the lee side of the mountain. The dry adiabatic lapse rate has a value of about 1°C per 100 m of vertical rise • Wet adiabatic laps rate: 0.5°C per 100 m of vertical rise The Foehn, Chinook and Berg winds form because of adiabatic heating. FÖHN WINDS ○ warm, dry winds that blow across countries to the north of the European (Switzerland and Germany). CHINOOK ○ interior west of North America and Canada BERGWINDS ○ the hot, dry and gusty winds as air descend the escarpment in winter ○ South Africa			

5.1 Study the sketch, FIGURE 5.1, which indicates the development of Föhn winds. Choose the correct answer between brackets to make the statement true. Write ONLY the correct answer next to the question number (5.1.1 to 5.1.7), for e.g. 5.1.8 climatology

FIGURE 2.1: FÖHN WINDS



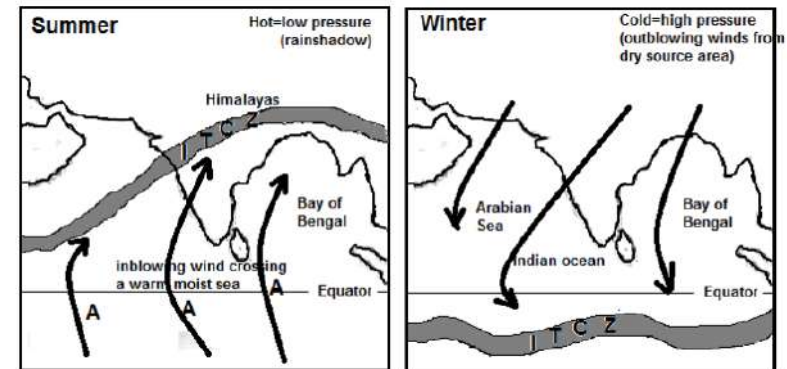
[Source: Examiners own sketch]

- 5.1.1 The descending air at **A** is on the (windward/leeward) side of the mountain.
- 5.1.2 The lapse rate at **B** is called the (wet adiabatic/dry adiabatic) lapse rate.
- 5.1.3 The lapse rate at **C** is (0,5 °C per 100 m/1 °C per 100 m).
- 5.1.4 The dew point temperature is reached at approximately (500 m/800 m).
- 5.1.5 The air temperature at **D** will be (16 °C/18 °C).
- 5.1.6 The continent where the Föhn wind occurs is (North America/Europe).
- 5.1.7 A similar type of wind as the one at **A** occurs on the coastal regions of South Africa and is called a (berg wind/chinook).

(7 x 1) (7)

5.2 FIGURE 5.2 is a representation of monsoon conditions over the sub-continent of India.

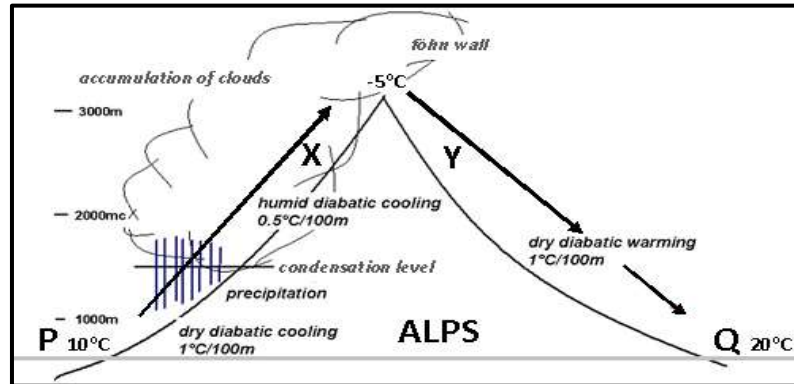
FIGURE 2.3: MONSOON CONDITIONS OVER INDIA



[Source: Examiners own sketch]

- 5.2.1 What is the ITCZ? (1 x 1) (1)
- 5.2.2 Explain how the ITCZ plays a role in the formation of monsoon conditions over India. (2 x 2) (4)
- 5.2.3 Why does the wind at **A** change direction from south east to south west? (2 x 2) (4)
- 5.2.4 Comment on the fact that the summer monsoon is both a blessing and a curse for the people of India. (3 x 2) (6)

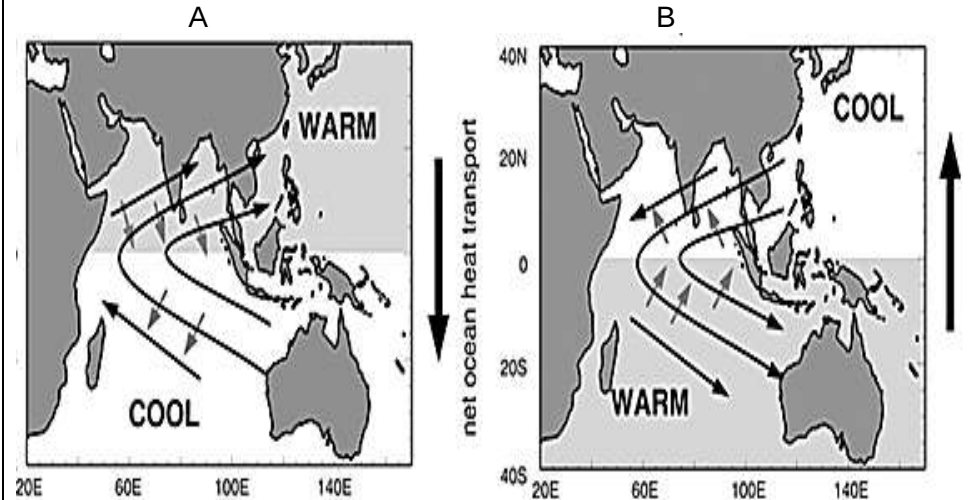
5.3 FIGURE 5.3 shows the development of a föhn wind.



[Source:
https://summitvoice.files.wordpress.com/2010/05/foehn_engl.jpg]

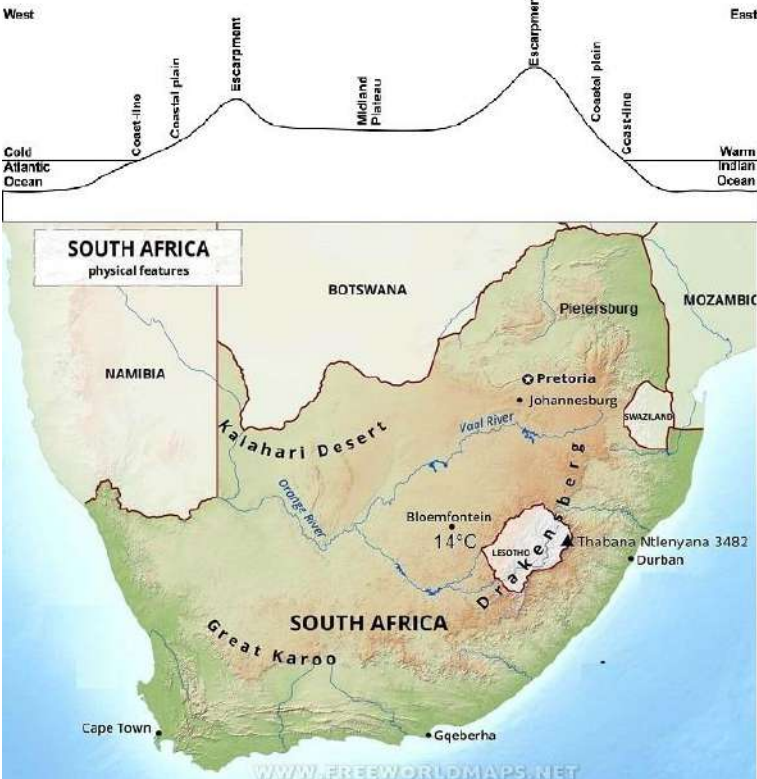
- 5.3.1 Identify **X** and **Y** as either the leeward slope or the windward slope of the Alps. (2 x 1) (2)
- 5.3.2 Why does the air rise at **X**? (1 x 1) (1)
- 5.3.3 What happens to the temperature of air as it rises at **X**? (1 x 1) (1)
- 5.3.4 Explain why precipitation occurs on slope **X** only and not slope **Y**. (2 x 2) (4)
- 5.3.5 Even though places **P** and **Q** are situated at the same altitude, it is much warmer at **Q**. Explain why this is the case. (2 x 2) (4)
- 5.3.6 Mention **ONE** way in which people living at **Q** will be affected by the change in the local weather because of the föhn wind. (1 x 2) (2)

5.4 Study **FIGURE 5.4 A** and **5.4 B** below, before answering the questions below:



- 5.4.1 Name the in-blowing winds over India in **FIGURE 5.4 A**. (1 x 2) (2)
- 5.4.2 Which season is depicted in **FIGURE 5.4 B**? (1 x 2) (2)
- 5.4.3 Where, in diagram **A** or **B**, would you predict heavy rain to fall over India? Explain your prediction. (3 x 2) (6)
- 5.4.4 Provide **ONE** positive and **ONE** negative impact of this heavy rain over India. (2 x 2) (4)

WEEK 5 : AFRICA'S WEATHER AND CLIMATE

FACTORS INFLUENCING AFRICA'S CLIMATE AND WEATHER		TEMPERATURE	RAINFALL	
SEASONAL CHANGES: - Places close to the equator experience hot temperatures and rain all year round - When moving further from the equator the difference in the temperatures of summer and winter become greater.  https://youtu.be/Xpbhd3GSEVw	LATITUDE	- Places closest to the equator is hotter - Places further away from the equator is cooler	- Convection currents are created when hot air expands and rises - Rising air cools, condensation occurs, and Convection rain occurs.	
	ALTITUDE	Parts of East Africa is above 1000m above sea level because temperature decreases with altitude	Air rises a mountain, cools and condenses resulting in Orographic rain	
	DISTANCE FROM OCEAN	- Areas closer to the ocean has moderate temperatures. E.g. Durban and Cape Town - Areas further from the ocean have a big difference between winter and summer temperatures. E.g. Pretoria	- Places closest to the ocean have more rain - More rain on the East coast because of the warm Agulhas ocean current - Less rain on the West coast because of the cold Benguela ocean current	
	OCEAN CURRENTS	- Ocean currents influence the weather of the coastal areas. - Due to evaporation from the oceans, the winds blowing from the sea to the carry moisture, (Onshore winds) to coastal areas. - Any moisture in the air condenses to form either mist or fog.	EAST COAST - warm Agulhas - Air above warmer ocean currents is warmer, moister and therefore is more likely to bring rain	WEST COAST - cold Benguela - Air above cold ocean currents holds little moisture, therefore areas washed by cold currents are drier

ACTIVITIES: AFRICA'S WEATHER AND CLIMATE

6.1 Study the table below and answer the questions that follow:

TOWN	MAXIMUM TEMPERATURE (°C)	MINIMUM TEMPERATURE (°C)
Pretoria	24	4
Johannesburg	21	3
Nelspruit/Mbombela	30	9
Polokwane	25	5
Mafikeng	24	6
Bloemfontein	21	3
Kimberley	21	6
Cape Town	19	12
East London	25	13
Durban	25	10

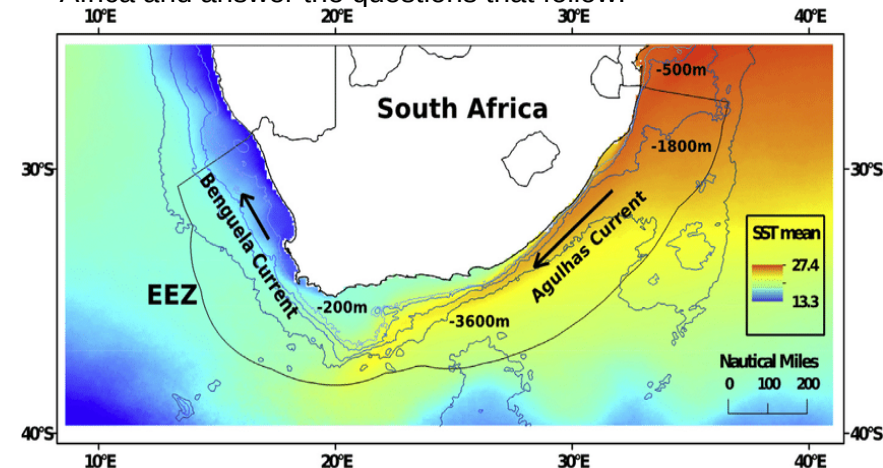
6.1.1 Which city has the greatest temperature range? (1 x 1) (1)

6.1.2 In which province would you find the city with the highest temperature range? (1 x 1) (1)

6.1.3 What was the temperature range in Pretoria on the given day? (1 x 1) (1)

6.1.4 What was the temperature range in Durban on the given day? (1 x 1) (1)

5.6 Refer to Figure 5.6 indicating the role of oceans in climate control in Africa and answer the questions that follow:



6.2.1 Name the ocean on Africa's west coast and the ocean on Africa's east coast. (2 x 1) (2)

6.2.2 Name the cold ocean current that flows along the west coast of Africa. (1 x 2) (2)

6.2.3 Explain why Pretoria has a large seasonal range in temperature. (1 x 2) (2)

6.2.4 Explain how the ocean current mentioned in QUESTION 6.2.2 influence the temperature and rainfall of the land masses along which it flows. (2 x 2) (4)

6.1.5 Explain why there is such a big difference in the temperature range between Pretoria and Durban. (2 x 2) (4)

6.2.5 Account for the warm temperature, small seasonal temperature range and high rainfall in Durban. (3 x 2) (6)

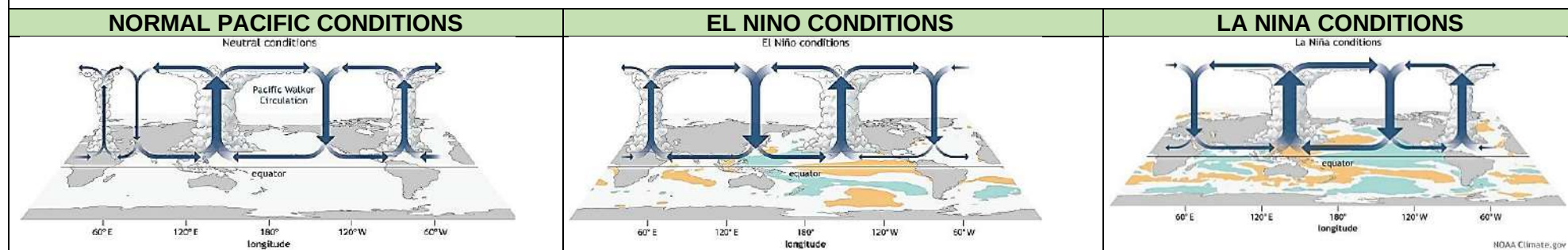
EL NIÑO AND LA NIÑA - (Basic knowledge- link to the weather conditions: not for exam purposes)

Changes in temperature of the oceans affect atmospheric circulation & rainfall patterns
This has a major impact on climates in many parts of the world.
El Nino & La Nina events are weather patterns, which cause short term climate change for Africa



The process of El Nino and La Nina

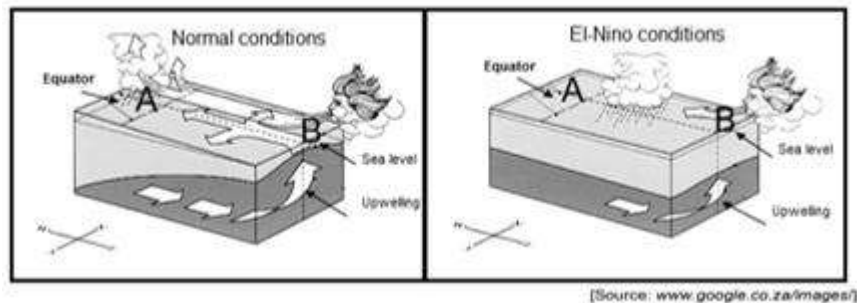
- El Nino is characterized by WARMER temps in the central & eastern Pacific Ocean - hotter drier conditions in parts of Africa,
- La Nina is characterized by COOLER temps in the central & eastern Pacific Ocean - cooler and wetter conditions in parts of Africa



Circulation over the Pacific Ocean results in tropical easterly winds blowing across the ocean in a westerly direction. • These easterly winds drag warm surface water westwards towards SE Asia • Deeper, cooler water replaces the displaced water on the eastern side (S. America) causing upwelling. • Warm temps over the western Pacific causes a LP and air will rise, this results in moist air creating clouds and rainfall over SE Asia and Australia. • Dry conditions exist over the west coast of S America, due to a HP and subsiding air	El Nino occurs when the trade winds weaken. • The movement of warm surface water stops moving westward. • The pooled warm water off Asia and Australia, starts to move back towards the east and South America. • This process reverses the LP off Asia and the HP off S America. • The upwelling of displaced water stops off the South American coast. • South America will experience warmer conditions with rain as possible flooding • Asia and Australia will experience cooler, drier conditions with possibilities of draught and wildfires	• Strong trade winds blow surface water towards east, creating colder surface temperatures off South American coast. We get strong upwelling. 
EL NINO AND LA NINA EFFECTS ON AFRICA		
• El Nina results in warmer, drier conditions with drought over Africa (poor effect on African economy = less agriculture) • La Nina results in cooler, wetter conditions over Africa (better for the African economy = full dams/ water for farming, but floods are possible which can also result in flooding and damage)		
EL NINO AND LA NINA EFFECTS ON AFRICA'S WEATHER		
1. Water resources – Africa's rainfall is not consistent, during El Nino, there is a reduction in rainfall leading to drought, during La Nina, Africa get more than average rainfall which may cause flooding. 2. Health – El Nino allows for the spreading of diseases like malaria, as the mosquitoes can move into previously unsuitable areas. 3. Agriculture – El Nino causes drought subsistence farmers battle to supply food to their families, commercial farmers gain lower yields for export. 4. The coastal zone – as temps rise, oceans expand in volume, cause a rise in sea level which could threaten infrastructure and homes.		
STRATEGIES THAT SOUTH AFRICA CAN IMPLEMENT TO REDUCE THE EFFECT OF EL NINO AND LA NINA		

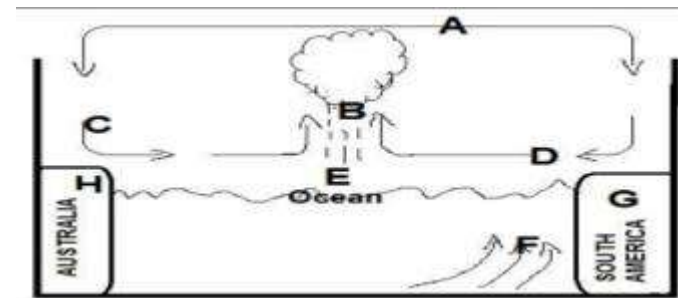
EL NINO	LA NINA
- Monitoring of the weather conditions - Store water in reservoirs to use in El Nino conditions - Plant drought resistend crops that need less water - Educate people on how to use water wisely - Use grey water for irrigation - Strict regulations on water usage	- Monitoring of weather conditions - Regulate dam levels when high rainfall is expected - Educate people on how to prepare for high rainfall and flooding - Introduce buffering next to rivers to prevent development on the floodplain

7.1 FIGURE 7.1 is a cartoonist's impression of the atmospheric conditions regarding the El-Niño occurrence. Refer to the images to answer the following questions.



7.1.1 Name the global winds represented by the blowing of the person in the sketch. (1 x 1) (1)

7.2 Refer to FIGURE 7.2, which represents the development of El Niño conditions. Choose a letter from the figure that best describes the statements below. Each letter/description refers to the processes in the development of the El Niño event.



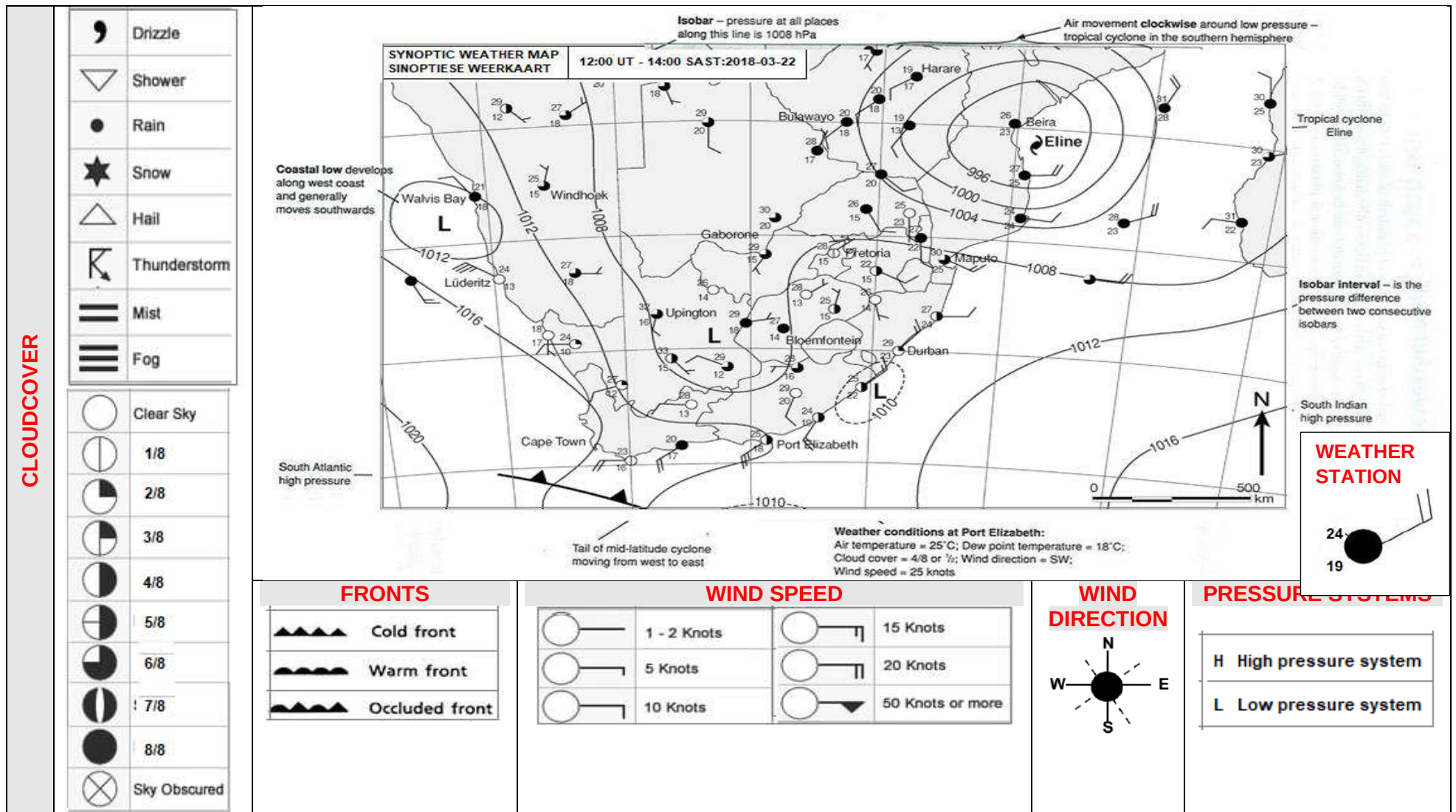
7.2.1 Rising air and rainfall occurs over the central Pacific Ocean

7.2.2

7.1.2	Explain the role that these winds (answer to QUESTION 7.2.1) play in the development of the El-Niño occurrence. (2 x 2) (4)	7.2.3	The continent where the fishing industry is negatively affected by these conditions
7.1.3	Discuss how the shifting of the clouds influences the farming activities in countries like Australia and Indonesia around A. (1 x 2) (2)	7.2.4	During El Niño years the tropical easterlies become weaker
7.1.4	In a paragraph of approximately EIGHT lines, evaluate the impact of the El Nino conditions on the farming activities in South Africa. (4 x 2) (8)	7.2.5	The Walker circulation is disturbed during El Niño years
		7.2.6	Descending, dry air occurs on the eastern parts of Australia
		7.2.7	Upwelling in the eastern Pacific Ocean decreases
			Warm air that usually converges over the Western Pacific Ocean now converges over the Central and Eastern Pacific Ocean during El Niño years (7 x 1) (7)

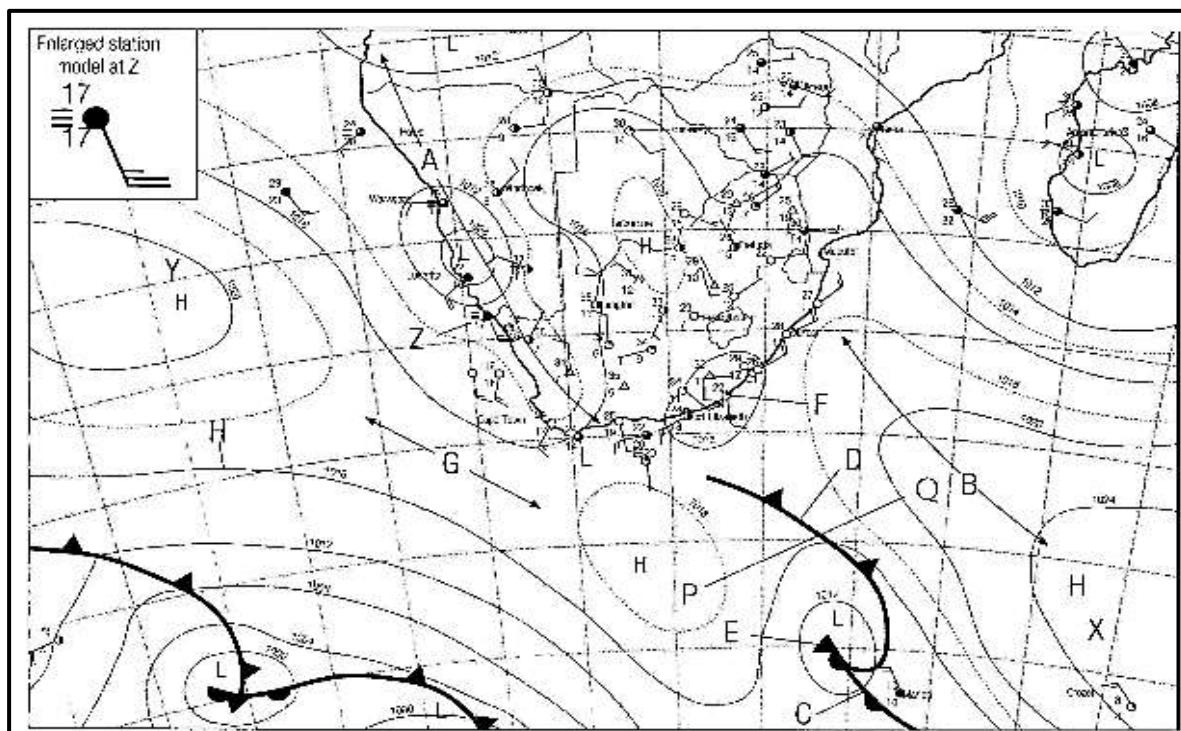
TOPIC: SYNOPTIC WEATHER MAP

WEATHER SYMBOLS		DIAGRAM
PRESIPITATION		Summer and winter conditions: Identify by looking at the temperature of places on the map and the position of the pressure system Weather symbols: Represent weather conditions at a particular place. Standard symbols are used to represent information about each of the weather elements



ACTIVITIES: SYNOPTIC WEATHER MAPS:

8.1 Refer to the synoptic weather map, FIGURE 8.1, dated 13 June 2013. Use the synoptic weather map to answer the questions below.

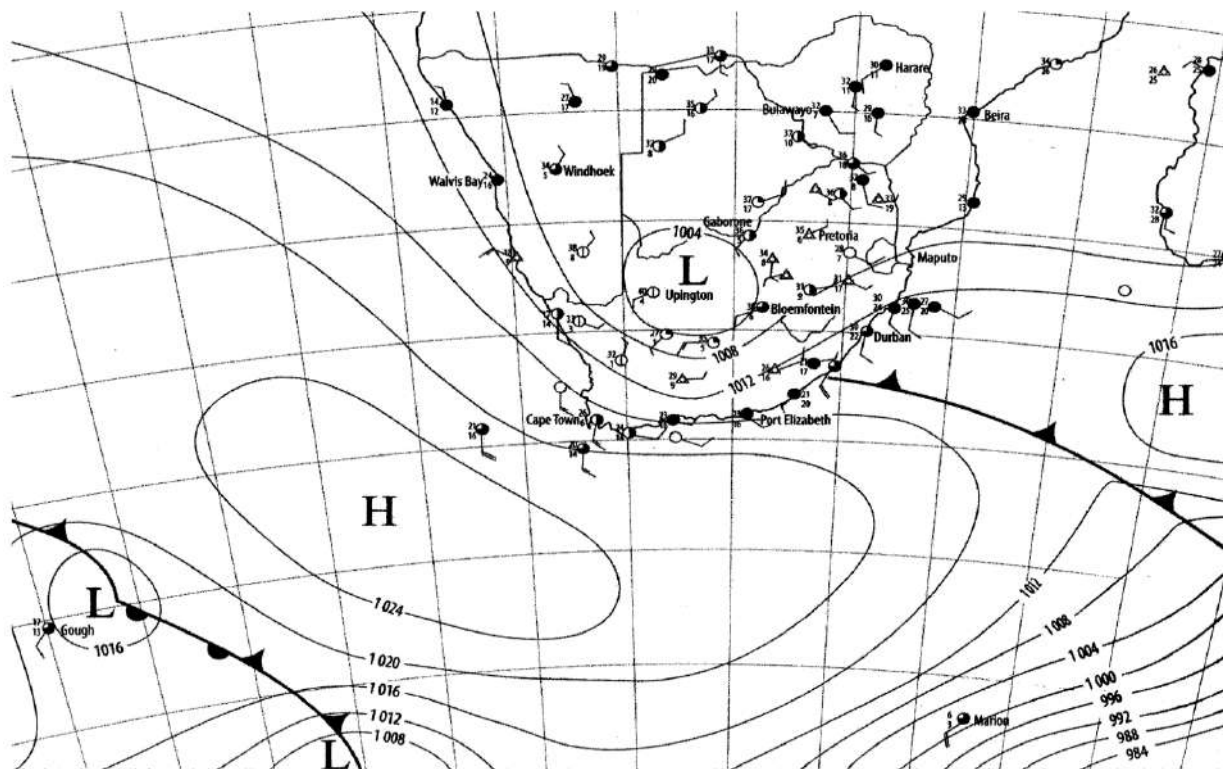


8.1.1 Give the correct terms for the features labelled A to G on the synoptic weather map. (7 x 1) (7)

8.1.2 Use the station model to describe the weather at station Z in terms of the following:
 (a) Wind direction
 (b) Wind speed
 (c) Cloud cover
 (d) air temperature
 (e) dew point temperature (5 x 1) (5)

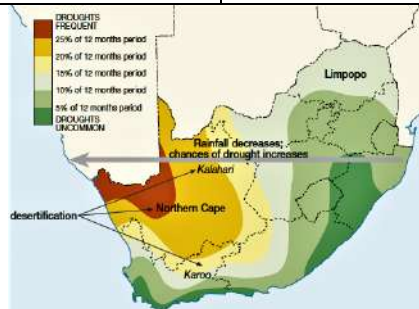
8.1.3 (a) State the season represented by the synoptic weather map. (1 x 2) (2)
 (b) Provide THREE suitable reasons for your answer (3 x 2) (6)
 (c) State the isobaric interval of the synoptic weather map. (1 x 2) (2)

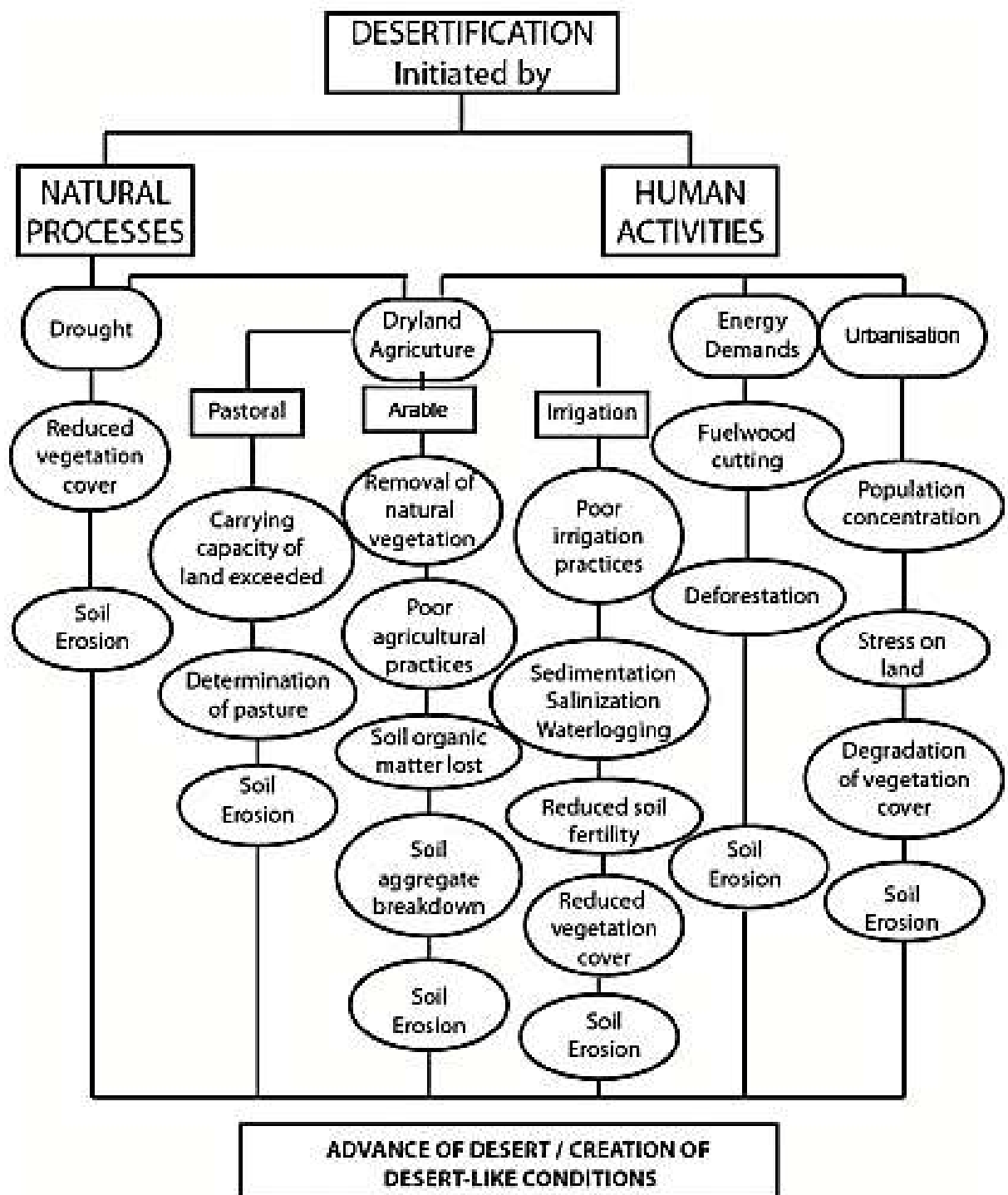
8.3 Study the synoptic weather map FIGURE 8.3 below.



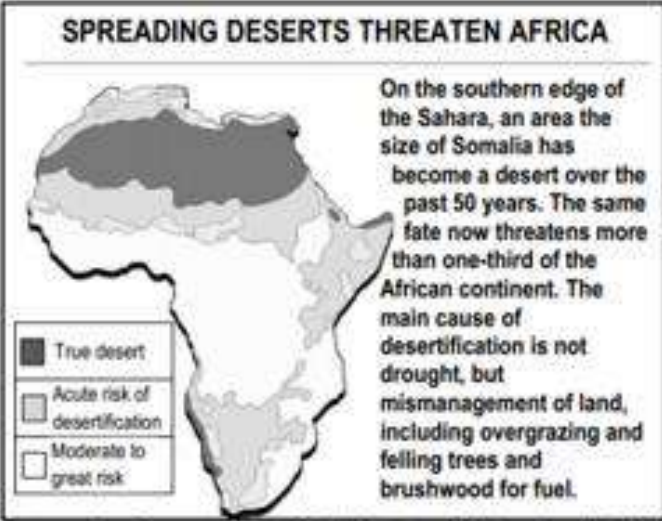
- 8.3.1 Name the high-pressure system off the west coast of South Africa. (1 x 2) (2)
- 8.3.2 This is a synoptic weather map for summer. Identify TWO reasons why this is a summer map. (2 x 2) (4)
- 8.3.3 Will the interior of Southern Africa experience strong or gentle winds? Give a reason for your answer. (2 x 2) (4)
- 8.3.4 Briefly discuss why the mid-latitude cyclone on the east coast of South Africa is unusual for this time of the year. (2 x 2) (4)

WEEK 7 : DROUGHT AND DESERTIFICATION

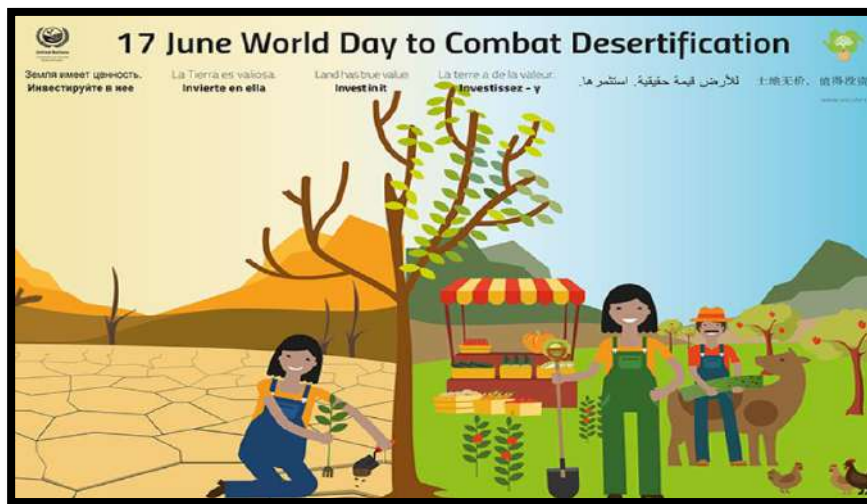
CONCEPT	DROUGHT A prolonged period of abnormally low rainfall which leads to a shortage of water		DESERTIFICATION The process in which land in semi-arid areas gradually changes into desert.	
				
Areas are at risk of droughts and desertification		South Africa's rainfall is unreliable Three regions in Africa that are most at risk of drought and desertification: • Lands bordering the Sahara Desert in north Africa, the strip of land along the southern border, known as the Sahel • The horn of Africa • Lands bordering the Kalahari Desert of southern Africa.		
CAUSES	• Global warming and climate change • High pressure systems, cold ocean currents – dry conditions • El Nino event is also a main cause of drought in Africa. • Excessive build-up of heat on the Earth's surface • Reduced cloud cover leading to great evaporation rates • The resultant effects of drought are increased by human activities such as deforestation, overgrazing and poor cropping methods. • Farmers exceed the carrying capacity of the land, through overgrazing and no crop rotation • Farmers clear land of indigenous flora for fields • Deforestation • Incorrect ploughing methods			
IMPACT of droughts and desertification:	ECONOMIC IMPACTS • Losses in the agricultural industry • Job losses • Decrease in the economic growth of a country • Many of these losses are then passed on to consumers in the form of higher commodity pricing		SOCIAL IMPACTS • Increased chance of conflict over commodities, fertile land, and water resources. • Loss of homelands • Changes in lifestyle • Increased chance of health risks	
	ENVIRONMENTAL IMPACTS • Loss in species biodiversity • Migration changes of roaming animals • Increased soil erosion that leads to desertification • Once crops fail, famine can become a major problem			
MANAGEMENT STRATEGIES	• Appropriate research plan • Drought predictions • Early warning and monitoring systems (satellite remote sensing) • Development of responsive farming plans in the sense that profitable farming is not exclusively food production, but cash crops that can be profitably sold • Improvement of research on climate change • Determination of the impact of global environmental change on drought disaster • The United Nations Convention to Combat Desertification (UNCCD)			



ACTIVITIES: DROUGHT AND DESERTIFICATION

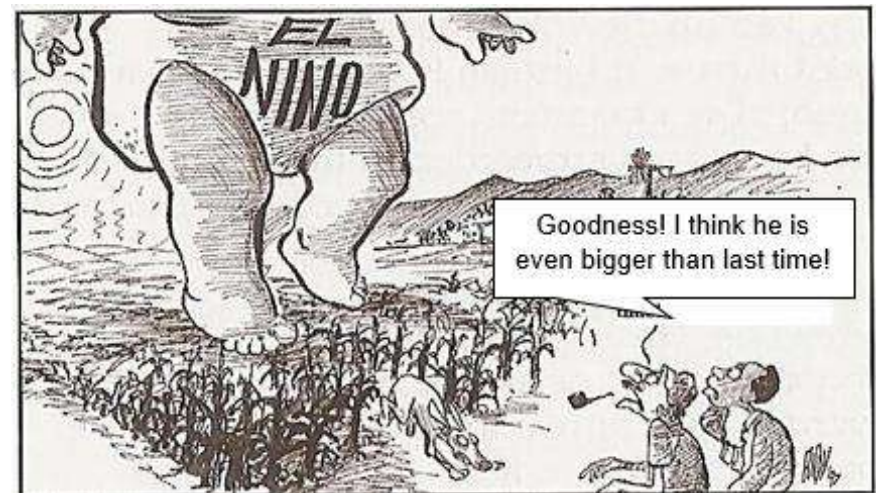
9.1 Refer to 9.1 showing decertification in South Africa  [Source: The Conservation and Rehabilitation of African Lands (FAO 1990)] 9.1.1 What is decertification? (1 x 2) (2) 9.1.2 State ONE way in which humans contribute to decertification. (1 x 2) (2) 9.1.3 Describe the extent to which South Africa is threatened by decertification. (2 x 2) (4) 9.1.4 Discuss TWO effects of decertification on the economy of South Africa. (2 x 2) (4) 9.1.5 Write a paragraph of approximately EIGHT lines in which you suggest sustainable ways to prevent and reverse decertification in Africa. (4 x 2) (8)	9.2 Read the article, Agriculture minister has renewed hope that South Africa will survive drought. Agriculture minister has renewed hope SA will survive drought Johannesburg – Agriculture Minister Senzeni Zokwana says he has renewed hope that the country will survive the current drought due to recent significant rainfall. The department says it's being estimated that the latest harvest will produce 7.4 million tons of maize - that's a shortage of 3.8 million tons of the staple food. The minister says he is extremely concerned about the food price increases linked to the drought. Zokwana says the recent heavy rain fall in much needed provinces have changed the country's bleak picture of maize supply. "Initially around November/December we may be compelled to import five and six million tons, but that has gone down because of the rains". He says the drought has hit the poor the hardest - something they tried to avoid. Zokwana says government and stakeholders in the agriculture industry need to come up with new ideas how to change the current farming methods to avoid soil erosion and other drought-related issues. 9.2 What is a drought? (1 x 1) (1) 9.2.2 Name ONE short term effect, mentioned in the article, that the drought has on the economy of South Africa. (1 x 1) (1) 9.2.3 Explain what the Minister meant when he stated that the "drought has hit the poorest the hardest". (2 x 2) (4) 9.2.4 Suggest THREE ways how the government can help to manage the negative consequences of droughts in South Africa. (3 x 2) (6)
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9.3 Refer to FIGURE 9.3 Drought and Desertification.

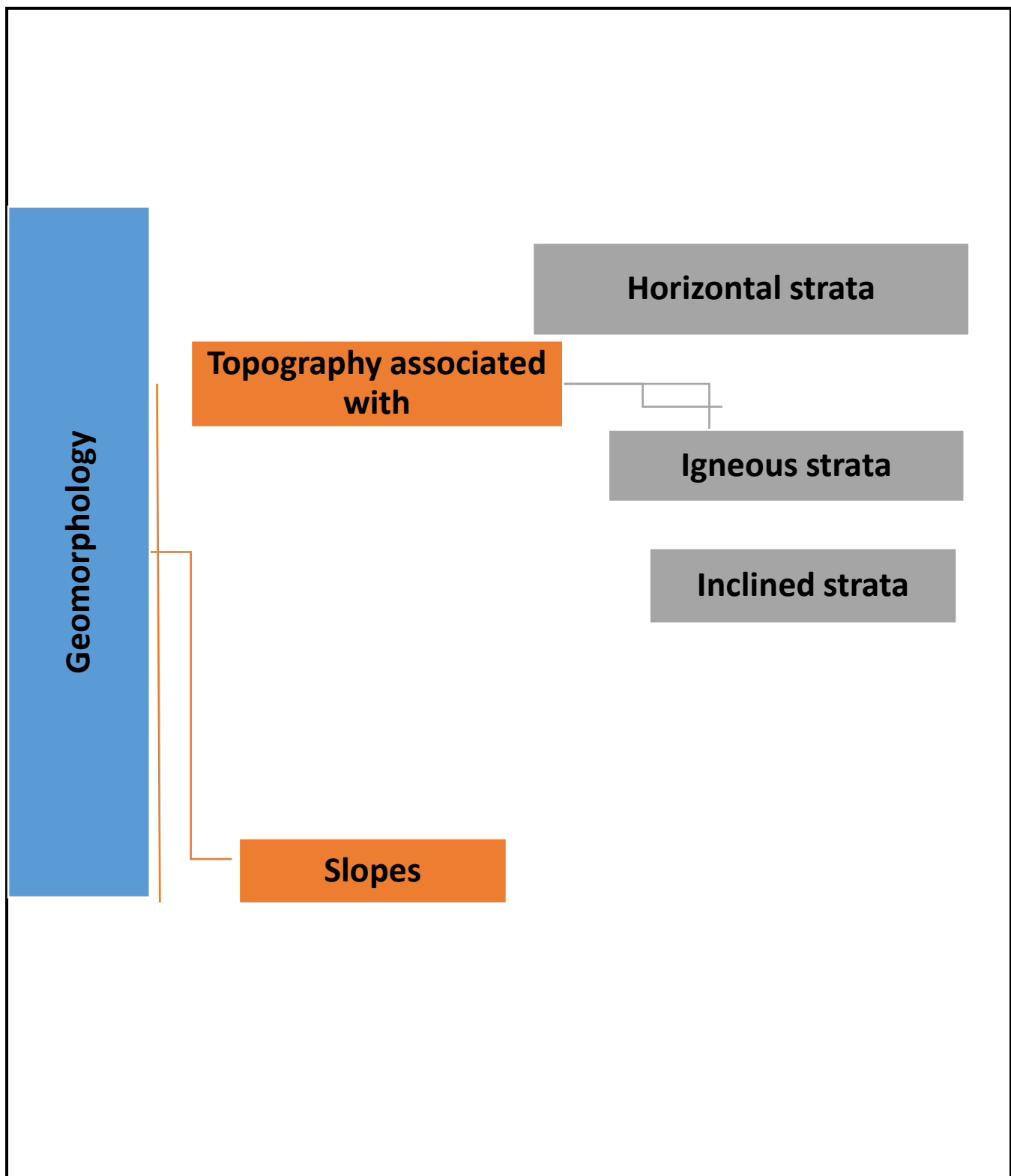


- 9.3.1 Explain the term desertification. (1 x 2) (2)
- 9.3.2 Explain the term drought. (1 x 2) (2)
- 9.3.3 Refer to the cartoon and discuss the relationship between drought and desertification. (2 x 2) (4)
- 9.3.4 What are the effects of drought and desertification on the vegetation in the area? (2 x 2) (4)
- 9.3.5 How can people manage the effects of droughts? (2 x 2) (4)

9.4 Study FIGURE 9.4 and use the information in the cartoon when answering the following questions:



- 9.4.1 What does the artist compare El Nino to? (1 x 2) (2)
- 9.4.2 Identify the main effect that El Nino has on the climate and landscape in the picture. (1 x 2) (2)
- 9.4.3 What is the opposite of the El Nino effect called? (1 x 2) (2)
- 9.4.4 Define the term drought. (1 x 2) (2)
- 9.4.5 El Nino occurs periodically in the Pacific Ocean and may cause severe droughts in Africa. Write a **paragraph** in which you predict the **effects (results)** of **drought** and how people and the economy might suffer. (4 x 2) (8)



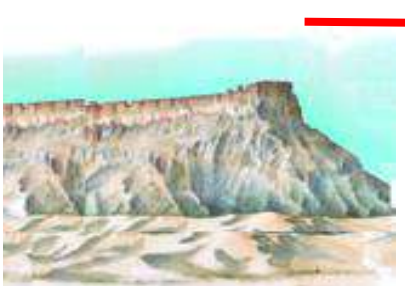
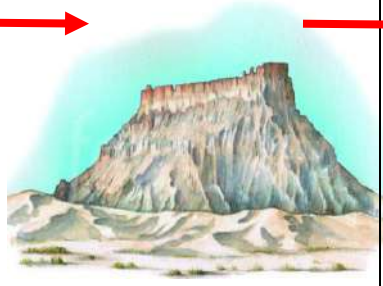
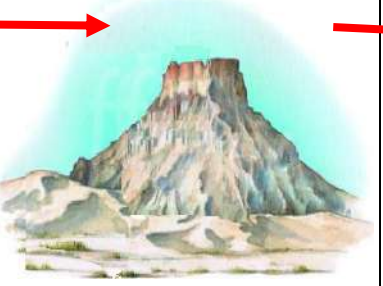
TERMINOLOGY

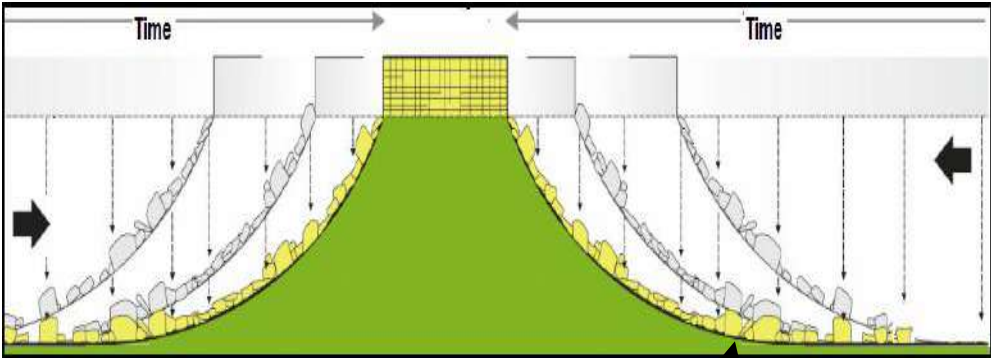
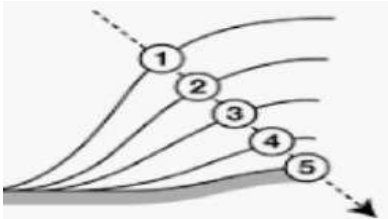
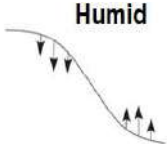
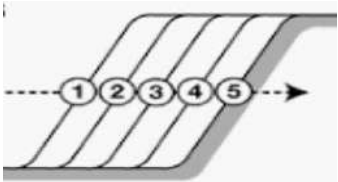
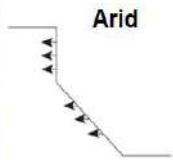
Back wasting:	erosion of a land mass in such a way that landforms become narrower
Batholith:	large dome shaped intrusions of magma deep within the earth's surface
Buttes:	flat topped hills with a greater height than width
Cap rock:	horizontal layer of hard, resistant rock at the top of a landform
Chemical weathering:	decomposition of rock due to processes involving water, CO ₂ , and oxygen
Concave slope:	a slope which is curved inwards so that the lower part of the slope is flatter and higher part of slope steeper
Convex slope:	a slope which curves outwards so that the lower part of the slope rises steeply, and the upper part of the slope steadily becomes flatter
Conical hills:	small pointed hills
Core stones:	granite boulders left after surrounding rock has been weathered
Crest:	small convex slope element at the top of the slope
Cuesta:	a ridge with a gentle dip slope and a scarp slope
Cuesta basin:	circular landform resulting from the erosion of a syncline (downward fold)
Cuesta dome:	circular landform resulting from the erosion of an anticline (upward fold)
Dip slope:	less steep slope of a ridge
Down wasting:	erosion of a landscape causing it to become lower over time
Dykes:	vertical magma intrusions
Earthflow:	clay soil particles saturated with water move down a slope
Exfoliation:	peeling of rock layers due to expansion and contraction
Freeface:	slope element greater than 80° to the horizontal
Granite dome:	erosion of overlying strata to expose a batholith
Hogsback:	ridge with steep dip and scarp slope
Homoclinal ridge:	ridges formed from inclined strata
Knickpoint:	sharp change in gradient
Laccoliths:	mushroom shaped intrusions of magma
Landslide:	large mass of land breaks loose and plunges down a slope
Lava flow:	lava pours out of earth's surface and cools and becomes solid
Lopoliths:	saucer shaped intrusions
Mass movement:	downward movement of material on a slope because of gravity
Mechanical weathering:	break down of rocks due to extremes in temperature
Mesas:	flat topped Table Mountain with a greater width than height
Mudflow:	streams of mud flowing down a slope
Pediment:	slope element with a low angle and a concave shape
Pedi plain:	flat plain formed as canyon floors become wider
Plateau:	large flat high lying area
Rockfalls:	rocks falling to the bottom of a slope
Scarp retreat:	erosion of a scarp slope backwards causing no loss of height of landform
Scarp slope:	steep slope of a ridge

Sills:	horizontal layers of magma intrusion
Soil creep:	very slow continuous movement of soil down a slope
Solifluction:	topsoil becomes saturated and slides on the frozen ground beneath it
Talus:	slope at the base of a hill consisting of weathered material
Tor:	exposed granite blocks made up of core stones

GRADE 11: TERM 2

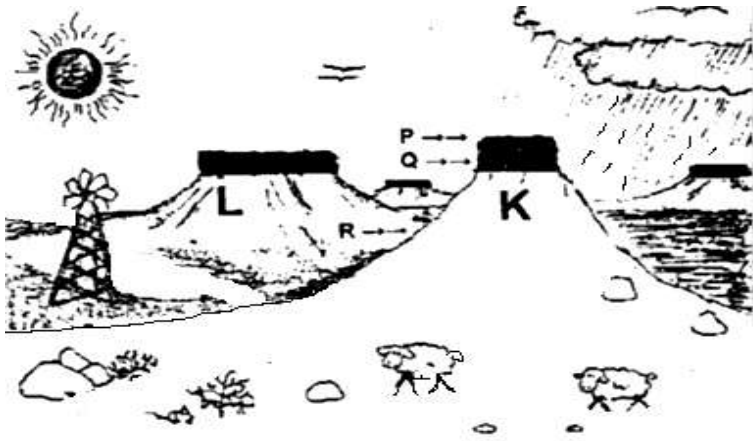
WEEK 1 : TOPOGRAPHY ASSOCIATED WITH HORIZONTAL STRATA

You must study with these questions in mind.					
HILLY LANDSCAPES		BASALTIC PLATEAUS	KAROO LANDSCAPES		
	- Areas with strata equally resistant to erosion - No layers of hard and soft rock	Lava from volcanic eruption deposited layer of basaltic igneous rock	- Starts off as a plateau - Rainfall results in vertical erosion in the weak spots/cracks - Horizontal rock strata - Arid areas with little rainfall		
	CANYON	PLATEAU	MESA	BUTTE	CONICAL HILL
LANDSCAPE					
CHARACTERISTIC	- Large area with deep steep sided valleys with narrow valley floors - Alternating layers of hard and soft rock - E.g. Grand Canyon - Most common in Arid areas with more mechanical weathering	- Flat area elevated above sea level - Escarpment leads up onto the plateau - Uniform in their resistance to erosion - Vertical erosion of weak spots in resistant layer	- Flat topped tableland - Large layer of resistant rock on the same level of the original plateau - Wider than it is high - Remnant vertical erosion E.g. Table Mountain	- Small flat-topped hill - Smaller cap of resistant rock on same level as the original plateau - Higher than it is wide - Remnant of vertical erosion of a mesa - E.g. Three Sisters	- Flat top of a Butte erodes away - Results in Isolated rounded hill - Lower than the original plateau due to the removal of resistant cap rock
PROCESSES	- Humid areas: Chemical weathering dominant - Arid areas: Mechanical weathering more dominant - Develop over long period of time - Vertical erosion dominant	Lava flow from fissures form resistant horizontal layers	- Erosion of flat plateau - Resistant cap forms cliffs - Less resistant layers form gentle slopes	Scarp retreat results in hard resistant cap of Mesa to erode backwards and resistant capped layer stays the same height but becomes smaller	Scarp retreat results in the resistant capped layer to disappear and rounded softer layers remains.

UTILISATION BY PEOPLE	CANYON	PLATEAU	KAROO LANDSCAPES (MESA, BUTTE, CONICAL HILL)
	- Slopes more angular - Arid areas limit human production of food - Less water – thinner soil, limits use of land - Steep slopes limit cultivation - Large scale erosion on slopes due to lack of vegetation - Limited valley floor space for farming - Water in valley not always accessible - Hinders infrastructure development - Tourist attraction, adventure sports 	- Fertile soil rich in iron - High rainfall and fertile soil produce good agricultural land - High altitude can be cold - Passes and mountain range reduce accessibility.	- Flat area – easy to build transport routes - Found in drier areas – limiting agricultural activities - Soils are thin and not fertile - Rainfall is limited - Thunderstorms results in sheet wash with minimal infiltration - Suitable for large scale sheep farming - Major eco-tourist destination
WHAT IS SCARP RETREAT		SLOPE DECLINE	SLOPE RETREAT
The change in the position of the scarp because of erosion  - Knick point: Shows a change in the gradient of a slope - Scarp is the cliff like face or slope between the high area and the low flat land - Scarp erodes backwards - The hard-resistant rock will maintain its form as it retreats - Scarp retreats takes place along the edges of the plateau - This results in the Mesa to erode to a Butte and over time the Butte to a Conical hill		 - Slope is steepest to begin with - Flattens over time - Angle of slope decreases - Slope is convex in the upper part and concave along the lower parts  	 - Angle of the slope remains constant over time - Slope elements remain over time - Slope retreats backwards parallel to its previous positions - Lower part of slope is concave - Pediment widens over time  

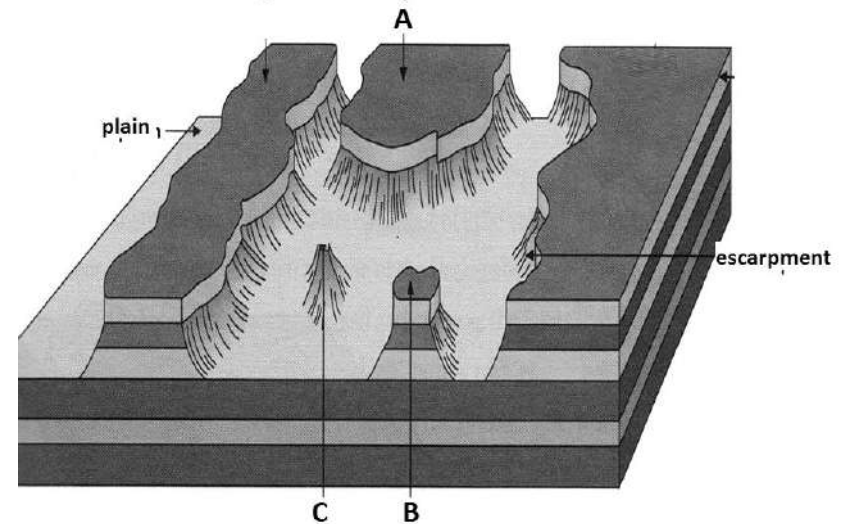
ACTIVITIES: HORIZONTAL STRATA

Refer to **FIGURE 1.1** below showing landforms associated with horizontal strata and answer the following questions.



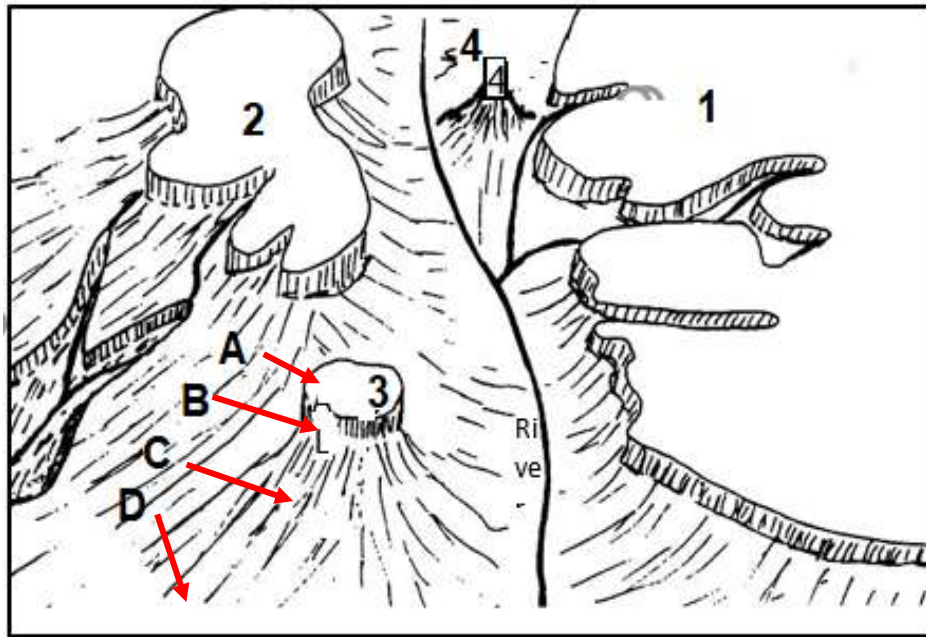
- 1.1.1 Identify landforms **K** and **L** respectively. (2 x 1) (2)
- 1.1.2 Did landforms **K** and **L** develop from horizontal or inclined rock strata? (1 x 1) (1)
- 1.1.3 (a) Which landform, **K** or **L**, is in the furthest stage of development? (1 x 1) (1)
(b) Give **ONE** reason for your answer in Question 1.1.3 (a). (1 x 2) (2)
- 1.1.4 Where in South Africa will this landscape typically be found? (1 x 1) (1)
- 1.1.5 Differentiate between slope decline and slope retreat. (2 x 2) (4)
- 1.1.6 Initially (at first) landforms **K** and **L** will be reduced from the sides and will not be lowered. Explain why. (2 x 2) (4)

Study **FIGURE 1.2** showing the development of Canyons.



- 1.2.1 Refer to **FIGURE 1.2** to identify a prominent characteristic of the rock structure from which canyons develop. (1 x 1) (1)
- 1.2.2 Identify the landforms labelled as **A**, **B** and **C**. (3 x 1) (3)
- 1.2.3 Explain the difference between landform **A** and **B**. (2 x 2) (4)
- 1.2.4 Comment on the general climate of this area. (1 x 2) (2)
- 1.2.5 a) Scarp retreat influence the development of these landforms. Explain what *scarp retreat* is. (1 x 1) (1)
b) Describe how scarp retreat causes the development of Canyon landscapes. (1 x 2) (2)
- 1.2.6 A Canyon landscape is of economic importance to an area. Explain how this landscape can be utilized to secure economic sustainability to the inhabitants. (2 x 2) (4)

Refer to FIGURE 1.3 which shows structural landforms and then answer the following questions.



- 1.3.1 Identify the landforms **2** and **3** respectively. (2 x 1) (2)
- 1.3.2 Name the rock strata (layers) represented in the sketch. (1 x 1) (1)
- 1.3.3 Briefly explain how feature **4** formed from feature **1**. (2 x 2) (4)
- 1.3.4 Write a paragraph (of approximately EIGHT lines), discussing how the landscape illustrated in FIGURE 1.3 will hinder the development of agriculture in the area. (4 x 2) (8)

DIAGRAMS A and B show hilly landscapes in different climatic regions. Match the statements below to either DIAGRAM A or DIAGRAM B. Write the number and DIAGRAM A or B only. E.g. 1.4.6. Diagram A.

DIAGRAM A

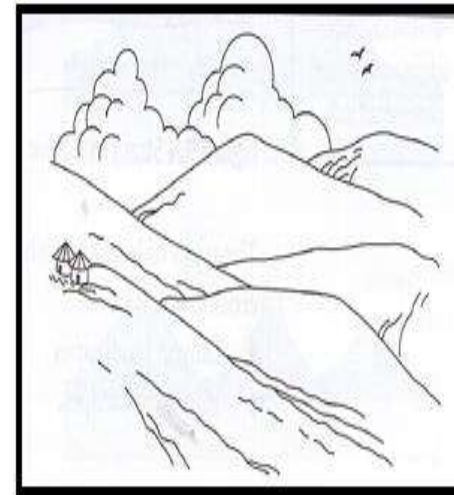
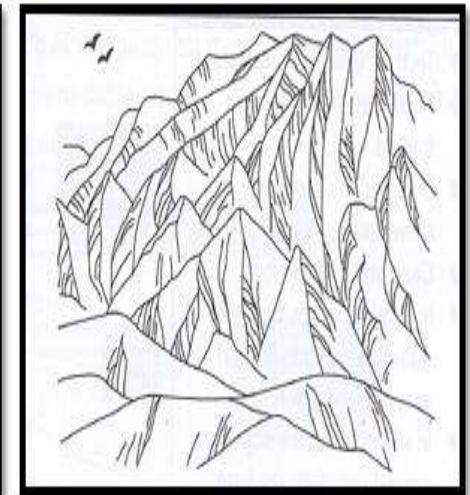
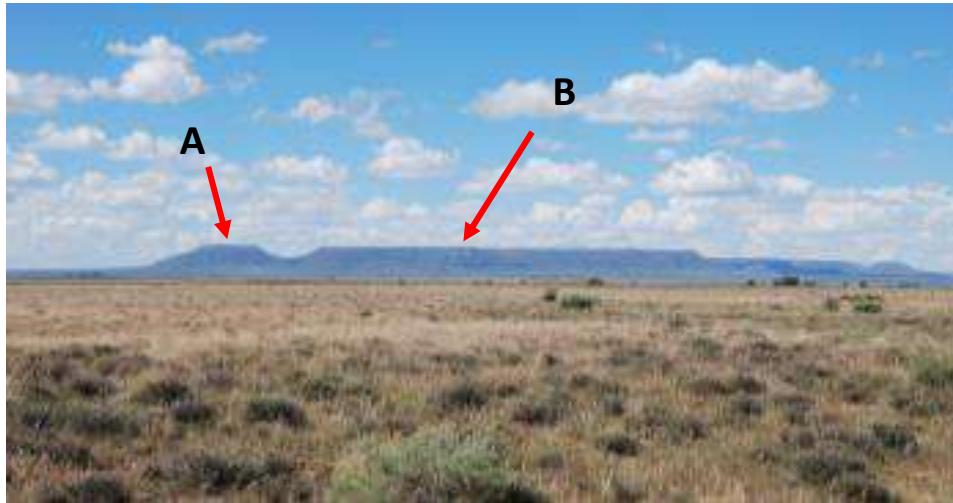


DIAGRAM B



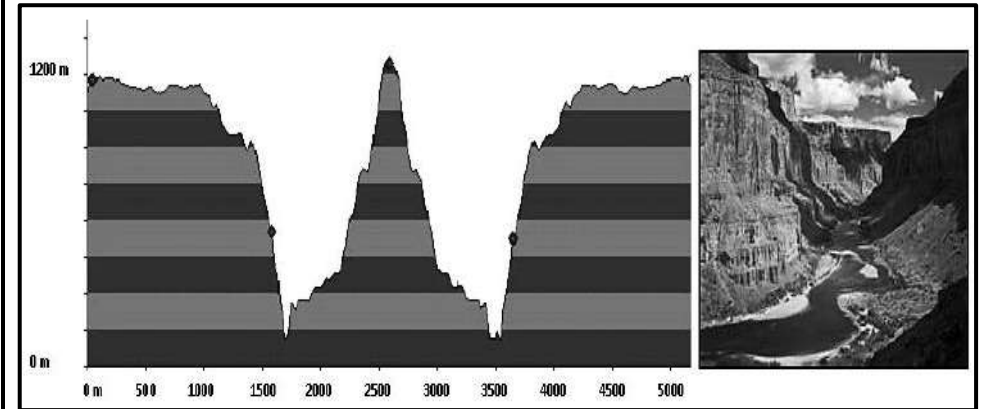
- 1.4.1 Landscape develops in arid regions
- 1.4.2 Of little use to humans
- 1.4.3 Used for agriculture
- 1.4.4 Mechanical weathering results in thin layers of soil
- 1.4.5 Chemical weathering is dominant
- (5 x 1) (5)

Refer to FIGURE 1.5 which shows structural landforms and then answer the following questions.



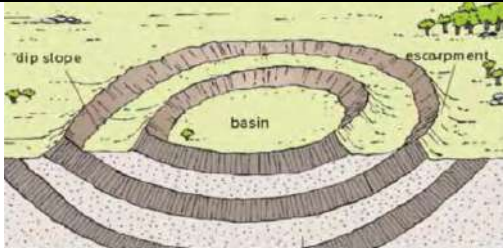
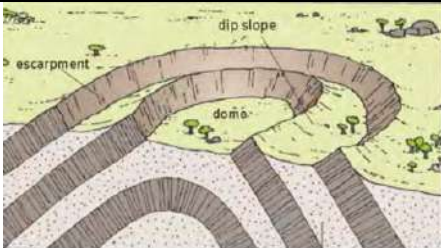
- | | | |
|-------|--|-------------|
| 1.5.1 | Label landform A and B. | (2 x 1) (2) |
| 1.5.2 | Where in South Africa are these landforms in abundance? | (1 x 1) (1) |
| 1.5.3 | Compare landform A and B with one another. Indicate ONE similarity and ONE difference between the two. | (2 x 2) (4) |
| 1.5.4 | Explain how these landforms will differ in arid and humid areas. | (2 x 2) (4) |
| 1.5.5 | Draw a labelled diagram to indicate how landform A developed from landform B. | (2 x 2) (4) |

Refer to FIGURE 1.6 showing the dimensions of the Grand Canyon in the United States of America.

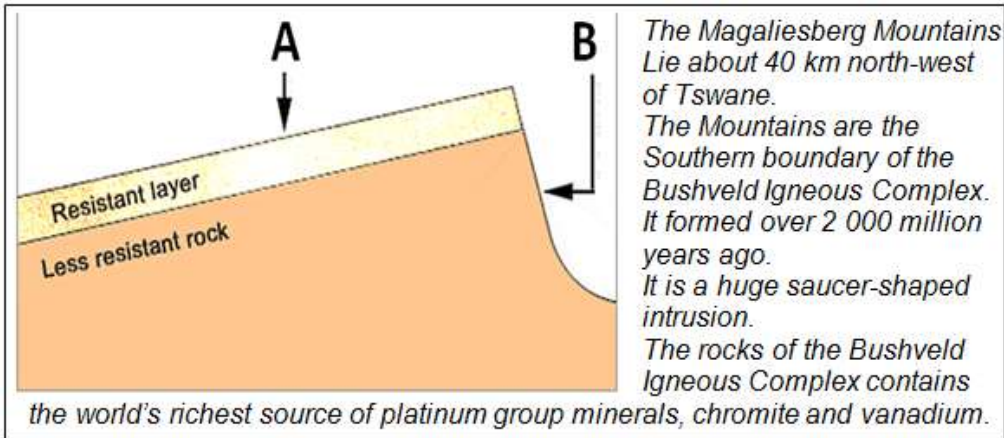


- | | | |
|-------|--|-------------|
| 1.6.1 | Name the underlying rock structure in which the Grand Canyon developed. | (1 x 1) (1) |
| 1.6.2 | In which country will you find the Grand Canyon? | (1 x 1) (1) |
| 1.6.3 | Describe the dimensions of the Grand Canyon as it can be seen in FIGURE 1.6. | (2 x 1) (2) |
| 1.6.4 | Explain the terraced appearance of the Grand Canyon. | (2 x 2) (4) |
| 1.6.5 | In a paragraph of approximately EIGHT lines, discuss the possible utilisation of the Grand Canyon by humans. Refer to positive and negative impacts. | (4 x 2) (8) |

WEEK 2: TOPOGRAPHY ASSOCIATED WITH INCLINED STRATA

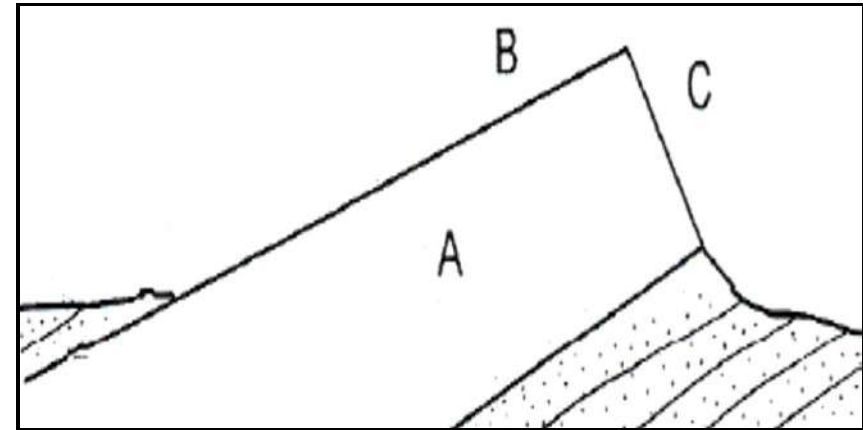
INCLINED STRATA is called a Homoclinal ridge				
Landscape	CUESTA	HOGSBACK	CUESTA BASIN	CUESTA DOME
				
CHARACTERISTICS				
Difference	- Angle of dip slope is $<45^\circ$ - Asymmetrical in shape - Gentle dip slope - Steeper scarp slope	- Angle of dip slope $>45^\circ$ - Symmetrical in shape - Dip and scarp slope equally steep - Forms a narrow-crested ridge	- Circular depressions - Magma cools down, shrinks and sags - This causes the rock strata to become tilted - Erosion and weathering results in a circular cuesta landscape - Dip slope will face inwards towards the centre - Scarp slope faces outwards	- Forms deep beneath the surface of Earth - Intruding batholiths or laccoliths cause layers to tilt upwards - Erosion and weathering results in circular cuesta dome landscape - Dip slope faces outwards - Scarp slope faces towards the centre of the dome
Similarities	- Forms in inclined strata - Alternating layers of hard and soft rocks - Dip and scarp slopes present		Sedimentary rock strata	
Utilisation of landscape	- Cuesta valleys and plains – farming - Softer rock layers form fine, fertile soil - Use gaps to build transport routes through - Build dam walls in the gaps DIP SLOPE: - Rocky with thin, coarse, infertile soil - Used for forestry SCARP SLOPE: - Very steep and cannot be used by people		- Allow for seepage of water into the centre of the basin good source of ground water - Farmers can use water for irrigation - Yield artesian water	- Domes have porous sandstone and impermeable shale – which allowed for the build-up of petroleum that can be mined - Salt domes trapping petroleum between sandstone and shale - May contain oil and natural gas

Read the case study on the Magaliesberg Mountains in FIGURE 2.1 before answering the questions that follow.



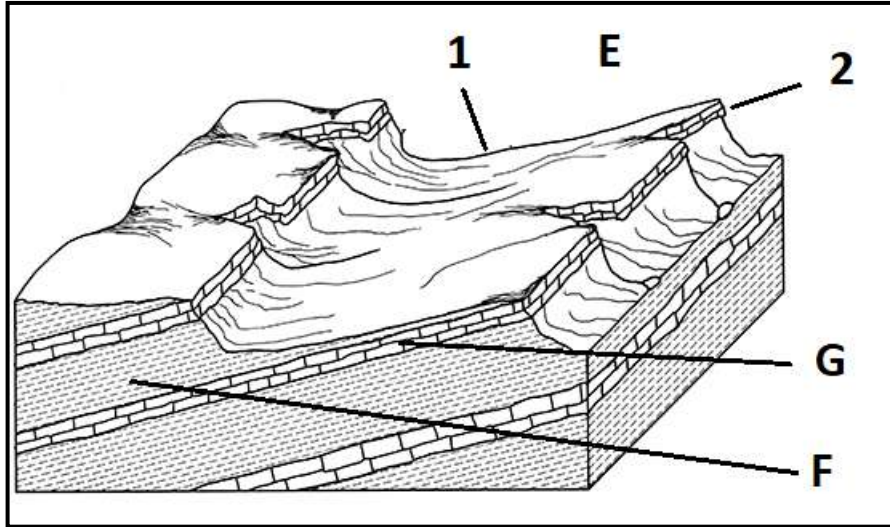
- 2.1.1 Identify the structural landform depicted in FIGURE 2.1. (1 x 1) (1)
- 2.1.2 Identify the slopes labelled **A** and **B** on the landform. (2 x 1) (2)
- 2.1.3 Which slope **A** or **B** will have a higher erosion tempo? Explain your answer. (1 + 2) (3)
- 2.1.4 In a paragraph of approximately EIGHT lines describe the influence inclined strata has on settlement, transport routes, mining, and agriculture. (4 x 2) (8)

Refer to **FIGURE 2.2** based on inclined strata. The landform below is a cuesta.



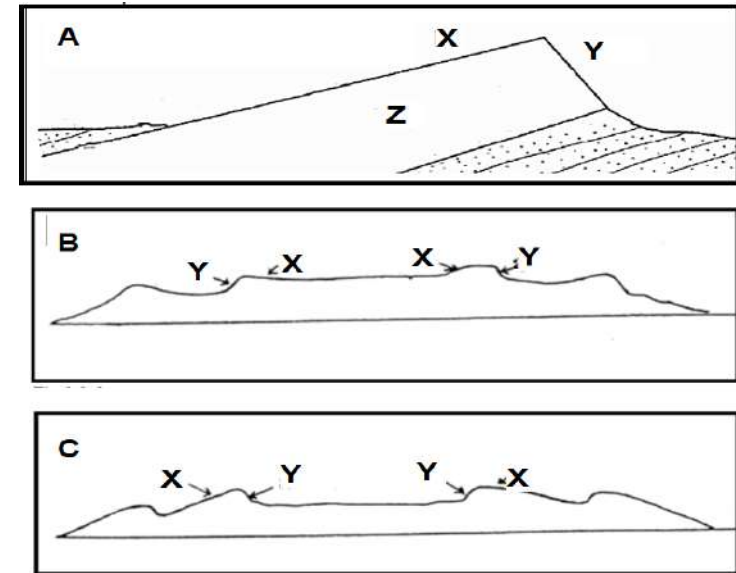
- 2.2.1 Identify slopes **B** and **C** respectively. (2 x 1) (2)
- 2.2.2 Name ONE characteristic of layer **A**. (1 x 1) (1)
- 2.2.3 Suggest TWO ways in which ridges, such as cuestas, are significant to humans. (2 x 2) (4)
- 2.2.4 Write a paragraph of no more than EIGHT lines in which you compare the similarities and differences between Cuestas and Hogbacks. (4 x 2) (8)

Study FIGURE 2.3 showing a structural landscape that developed from inclined strata.



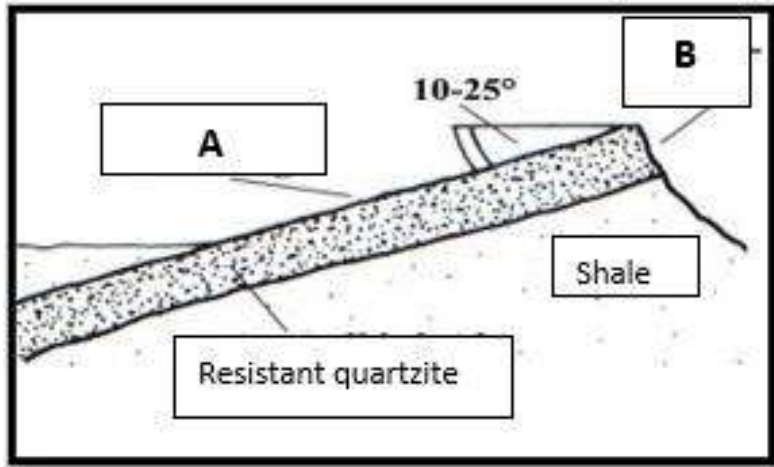
- 2.3.1 a) Identify the landform illustrated as **E** on FIGURE 2.3. (1 x 1) (1)
 b) Give evidence from FIGURE 2.3 to support your answer. (1 x 2) (2)
- 2.3.2 Differentiate between the characteristics of rock layers at **F** and **G**. (2 x 1) (2)
- 2.3.3 Label slope **1** and **2** depicted on the diagram. (2 x 1) (2)
- 2.3.4 Describe the forces that resulted in the development of the slopes identified in QUESTION 2.3.3. (2 x 2) (4)
- 2.3.5 In a paragraph of approximately EIGHT lines, discuss how the rock resistance and slopes impact the agriculture and economic development of the area. (4 x 2) (8)

FIGURE 2.4 **A** is a diagram illustrating a cuesta. FIGURE 2.4 **B** and **C** represents cuestas which formed from different landforms



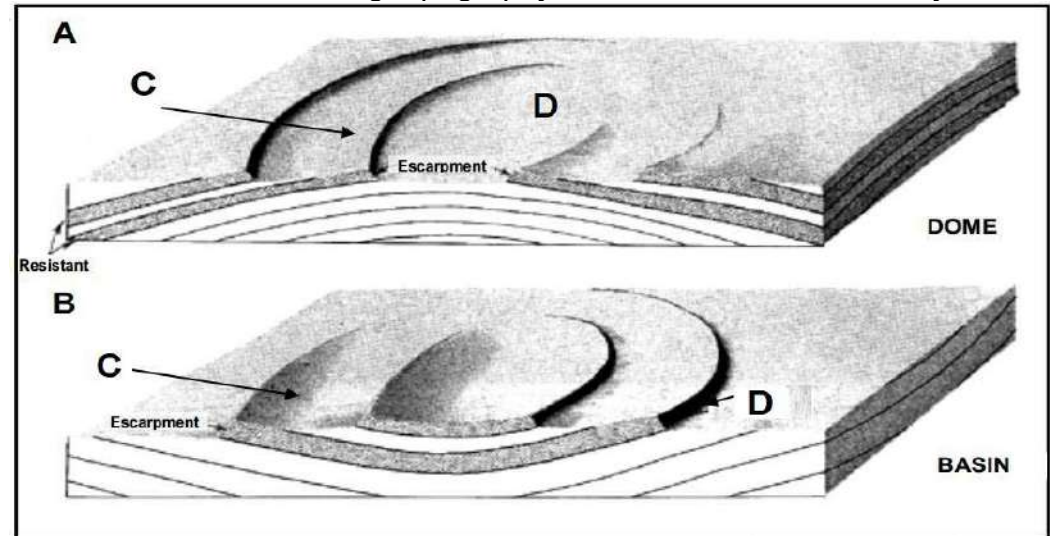
- 2.4.1 Study FIGURE 2.4. **A** and name the TWO slopes **X** and **Y** respectively. (2 x 1) (2)
- 2.4.2 Indicate whether **Z** in FIGURE 2.4 **A**. is a resistant or less resistant layer. (1 x 1) (1)
- 2.4.3 Which slope in FIGURE 2.4 **A**, **X** or **Y**, will have eroded the fastest? Give a reason for your answer. (1 + 2) (3)
- 2.4.4 Determine which figure (FIGURE 2.4 **B** or 2.4.**C** is the dome-shaped Cuesta and which one the basin-shaped Cuesta. (2 x 1) (2)
- 2.4.5 Explain briefly why little farming activities occur on cuestas. (2 x 2) (4)

Study the following diagram that represents a Cuesta and choose the correct word in brackets. Only write down the word next to the question number.



- 2.5.1 This landform forms because of (inclined / horizontal) layers.
- 2.5.2 A is the (dip slope / scarp slope).
- 2.5.3 B is the (dip slope / scarp slope).
- 2.5.4 The distinguish factor for cuestas and homoclinal ridges is mainly (type of resistant rock / angle of dip slope).
- 2.5.5 (Dip slope / Scarp slope) of a cuesta is not suitable for human usage. (5 x 1) (5)

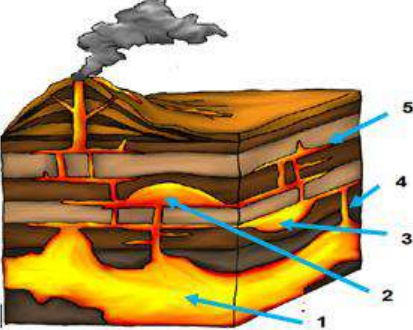
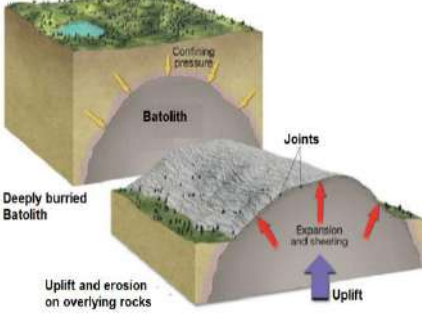
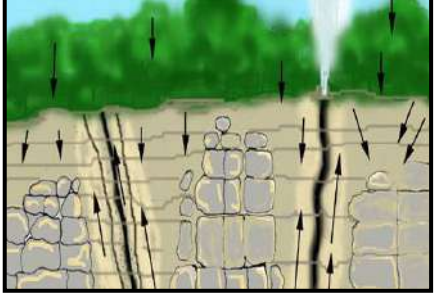
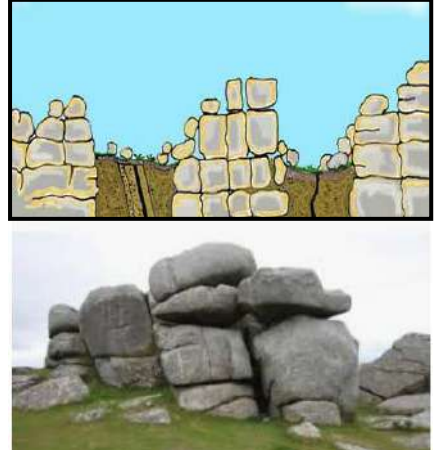
Refer to FIGURE 2.6 showing topography associated with inclined layered rocks.



- 2.6.1 Identify the type of feature in Sketch A
- 2.6.2 Identify the type of feature in Sketch B
- 2.6.3 Do these features occur in inclined or horizontal strata?
- 2.6.4 Identify Slope C as the dip or scarp slope
- 2.6.5 Identify slope D as the dip or scarp slope
- 2.6.6 Is slope C steep or gentle?
- 2.6.7 Is slope D steep or gentle?

(7 x 1) (7)

WEEK 3: TOPOGRAPHY ASSOCIATED WITH IGNEOUS STRATA

You must study with the following in mind.			
IGNEOUS STRATA			
	INTRUSIVE LANDFORMS	EXPOSURE OF INTRUSIVE LANDFORMS	
		DOME	TORS
			
CHARACTERISTICS AND PROCESSES	1. BATHOLITH: • Largest intrusion • Forms deep below surface • Irregular shape with steep sides • Granite 2. LACCOLITH: • Mushroom-shaped • Intrusion between layers of sedimentary rock • Upward bending of sedimentary rocks • Forms Cuesta dome when exposed 3. LOPOLITH: • Saucer shaped • Intrusion between layers of sedimentary rock • Collapse of overlaying sedimentary layers when cooling • Forms cuesta basin when exposed 4. DYKE: • Vertical intrusion along sedimentary rocks • Forms serrated ridge and Hogbacks when exposed 5. SILL: • Horizontal intrusion along sedimentary rocks • Dolerite in Karoo • Forms flat-topped hills	CHARACTERISTICS	
		• Round and smooth when exposed • Light in colour • Part of larger and deeper Batholiths	• Isolated, exposed pile of rocks • Rocks are rounded and stacked on top of each other • Rocks only joined at bottom • Granite or dolerite
		PROCESSES	
		• Intruding Batholiths cools down • Cooling causes contraction of magma causing joints to develop • Overlying rocks removed by weathering • Removal of overlying rocks decreases pressure on Batholith • Batholith expands • Water seeps into joints and cracks and further weathering develops • Rounded granite domes are exposed on surface • Surface weathering causes exfoliation and granular disintegration 	• Cooling of igneous rocks below surface • Cooling causes contraction of magma causing joints to develop • Seeping of water into cracks and joints results in weathering • Surface erosion results in cracks and joints to enlarge • Ground water also dissolves minerals in rocks underground • Removal of overlying rocks exposes core stone 

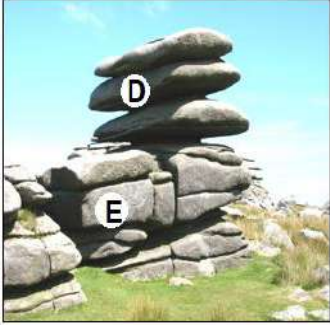
ACTIVITIES: IGNEOUS INTRUSION LANDFORMS

Match the following statements in COLUMN A with the terms or examples in COLUMN B.		Examine the photographs below FIGURE 3.2 A and FIGURE 3.2 B.	
Column A		Column B	
3.1.1	A horizontal intrusion formed as magma spread between layers	A	Batholith
3.1.2	A wall like intrusion that cuts almost vertically across existing strata	B	Laccolith
3.1.3	Large volume of magma intrudes between sedimentary layers.	C	Volcanic Pipe
3.1.4	The layer underneath cannot support the weight and sinks downwards creating a saucer shaped intrusion.	D	Dyke
3.1.5	A mushroom shaped intrusion that pushes the overlying strata upwards	E	Sill
3.1.6	The largest of all intrusive forms.	F	Lopolith
3.1.7	Leads magma from the magma source to the surface	G	Magma Pool
			(7 x 1) (7)

A



B



3.2.1 Identify the landform depicted in FIGURE 3.3 A.

3.2.2 Name the intrusive feature from the landform in A is formed.

3.2.3 Identify the landform depicted in FIGURE 3.3 B.

3.2.4 Identify the type of rock from which the topography in FIGURE 3.3 A and B develop.

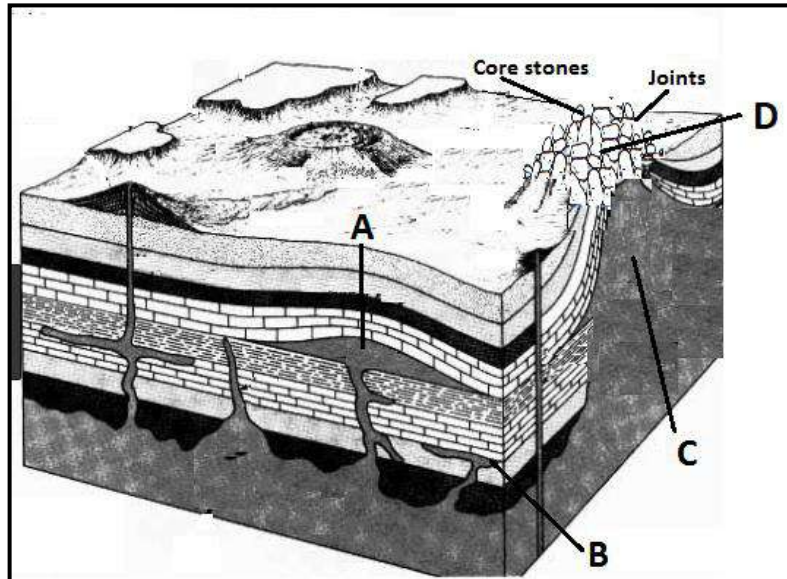
3.2.5 Which weathering process, C, results in the rounded shape of feature A?

3.2.6 Name the characteristic labelled as D, in FIGURE 3.3 B.

3.2.7 Name the characteristic labelled as E, in FIGURE 3.3 B.

(7 x 1) (7)

Study FIGURE 3.3 showing topography associated with massive igneous rocks.



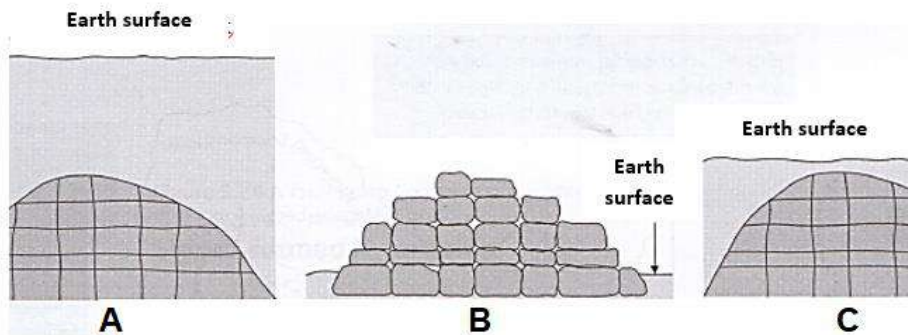
- 3.3.1 Define the term *igneous rocks*. (1 x 1) (1)
- 3.3.2 Label landform **A**, **B** and **C**. (3 x 1) (3)
- 3.3.3 Describe TWO differences between landform **A** and **B**. (2 x 2) (4)
- 3.3.4 Landform **D** is a Tor. Explain the process that landform **C** will undergo to develop in a Tor. (3 x 2) (6)

Study FIGURE 3.4 to answer the following questions.



- 3.4.1 Identify the landform in FIGURE 3.2 (1 x 1) (1)
- 3.4.2 Name the underlying rock from which this landform developed. (1 x 1) (1)
- 3.4.3 Name the intrusive landform from which this landform developed. (1 x 2) (2)
- 3.4.4 How does the intrusive landform, mentioned in QUESTION 3.4.1, become exposed to the Earth's surface? (3 x 2) (6)
- 3.4.5 Explain how landform **A** assumes its rounded shape. (2 x 2) (4)

Study FIGURE 3.5 showing a structural landscape that developed from massive igneous strata.



- 3.5.1 Predict which TWO types of weathering may be responsible for the formation of a Tor. (2 x 1) (2)
- 3.5.2 Describe TWO characteristics of the granite rock from which the abovementioned landform developed. (2 x 2) (4)
- 3.5.3 Organize the three stages from FIGURE 3.3 in the correct order of development, by writing down only the alphabetical letters. (1 x 2) (2)
- 3.5.4 Describe the characteristics of a Tor. (3 x 2) (6)
- 3.5.5 Describe ONE way in which this landscape can be used economically. (1 x 2) (2)

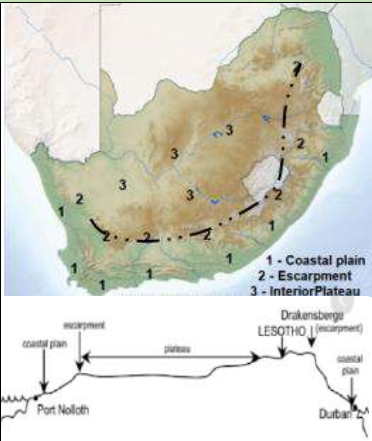
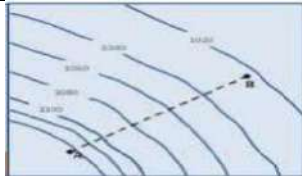
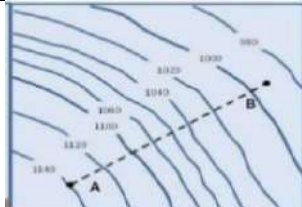
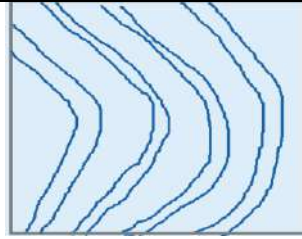
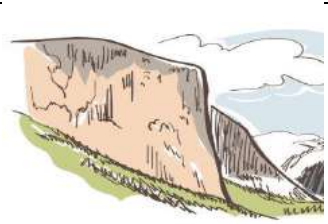
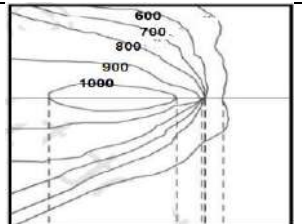
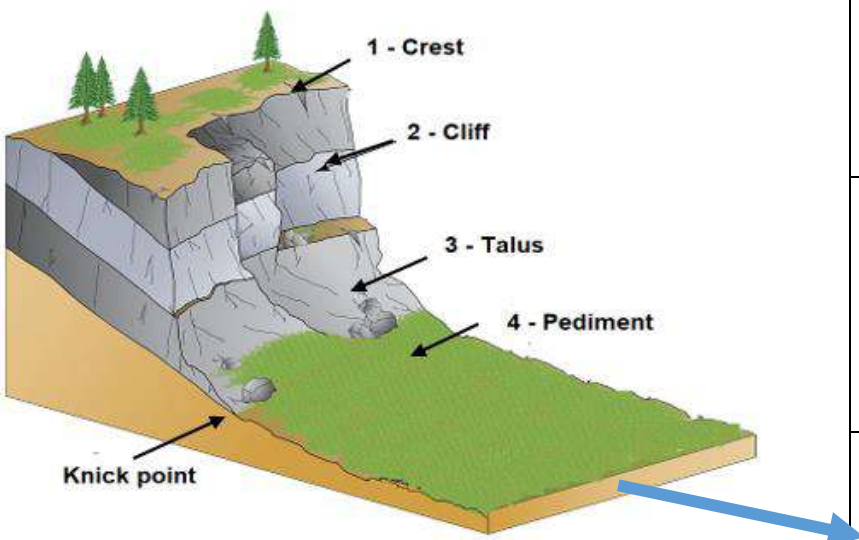
Study FIGURE 3.6



- 3.6.1 Identify the landform visible in FIGURE 3.6. (1 x 1) (1)
- 3.6.2 What do we call the rocks on top of the landform? (1 x 1) (1)
- 3.6.3 Why can this type of landform only be found in certain areas of South Africa? (1 x 2) (2)
- 3.6.4 Where do we find these landforms generally in South Africa (1 x 2) (2)
- 3.6.5 Can this landform develop during our lifetime? (1 x 1) (1)
- 3.6.6 Explain your answer in QUESTION 3.6.4. (2 x 2) (4)

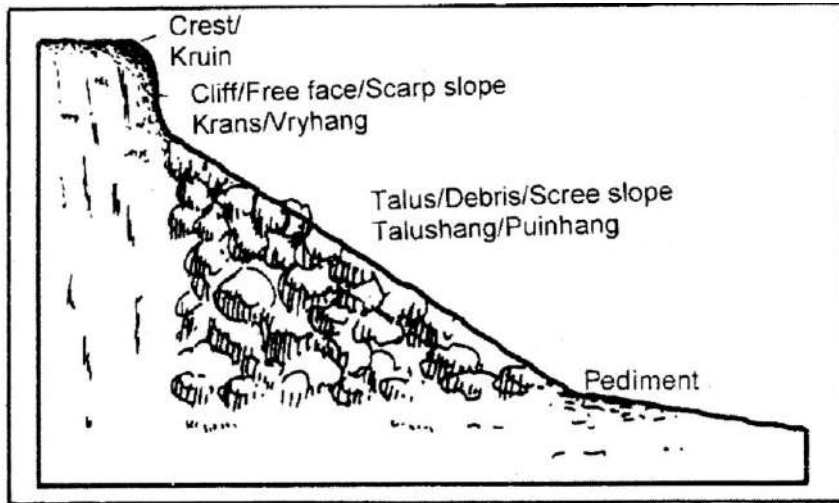
WEEK 4: SLOPES

You must study with the following in mind.

You must study with the following in mind.						
SLOPES						
SOUTH AFRICA'S TOPOGRAPHY		SLOPE ELEMENTS				
COASTAL PLAIN: - Wide on the Eastern side of the country ESCARPMENT: - Separates coastal plain from high interior - has a major effect on rivers, climate and infrastructure - is a major watershed for most rivers INTERIOR PLATEAU - lies approximately 1 000m above sea level		CHARACTERISTICS	TYPES		CONTOUR	
		1. CREST	- Convex shape - Where weathered material falls over cliff - Soil creep occurs	CONCAVE		
		2. CLIFF	- Also called free face - Vertical bare rock - Resistant rock erodes slowly forming the cliff - Cliff retreats backward due to erosion	CONVEX		
		3. TALUS	- Also, scree or debris slope - Weathered material from cliff and crest accumulates here - Angle of the slope is uniform - Fine materials washed onto the pediment	STEPPED		
		4. PEDIMENT	- Gentle slope - Covered with sediment from the talus slope - Deeper soils due to gentler angle	CLIFF		
SLOPE ELEMENTS 		- Resistant slopes erode slowly to form slopes - Conical hills do not have all the slope elements (Lacks the hard-capping rock) - Knick point separates the talus slope from the pediment and shows the change in the angle of the slope				

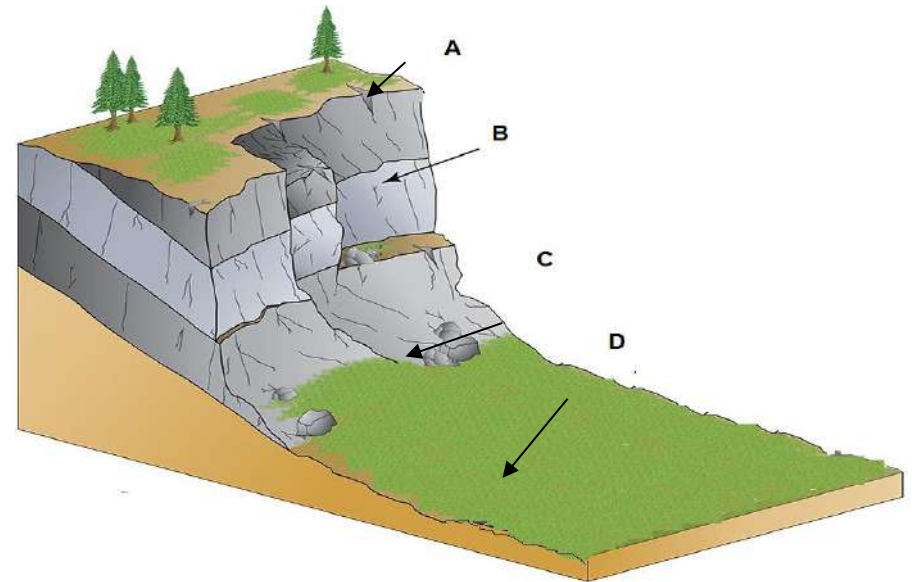
ACTIVITIES: SLOPES

Use FIGURE 4.1 below showing the four slope elements to assist you in giving ONE word or term for each of the following descriptions: Write only the term next to the question number, for example 4.1.8 base flow. The same answer may be used more than once.



- 4.1.1 Slope element with a convex shape.
- 4.1.2 Slope element with a low angle.
- 4.1.3 Slope most suitable for farming
- 4.1.4 Slope element that is a rocky outcrop.
- 4.1.5 Slope element composed mainly of weathered material.
- 4.1.6 Slope on which thickness of soil increases.
- 4.1.7 Slope element on which soil creep occurs. (7 x 1) (7)

Study FIGURE 4.2 showing slope elements.



- 4.2.1 Label the slope elements **A** to **D** as indicated on FIGURE 4.2. (4 x 1) (4)
- 4.2.2 Which of the above elements indicate the layer consisting of hard rock (1 x 1)
- 4.2.3 Between which TWO alphabetic letters will the Knick point occur? (1 x 1) (1)
- 4.2.4 Differentiate between the shapes of slopes A, B, C, D. (4 x 1) (4)
- 4.2.5 Choose ONE slope where a farmer would most likely plant maize and explain why you have chosen this specific slope. (3 x 2) (6)

Study the FIGURE showing the different slope elements and answer the questions which follow.

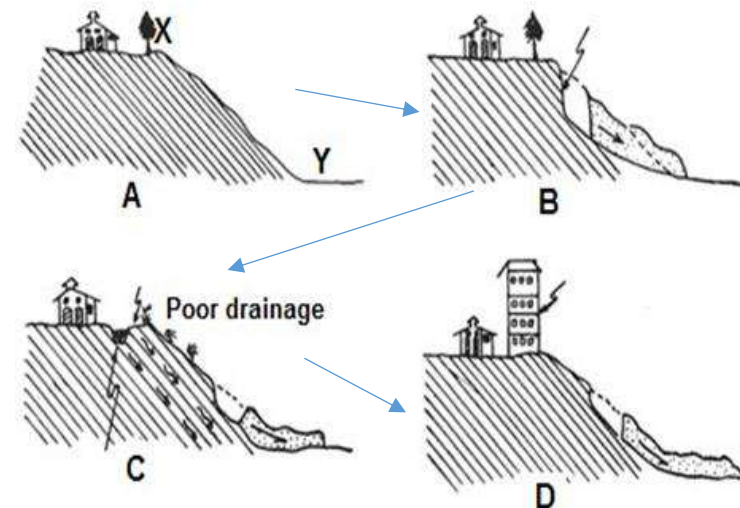


- 4.3.1 Is the landform depicted in the figure above a Mesa or Butte?
- 4.3.2 Name the slope element labelled **A**.
- 4.3.3 Name the slope element labelled **B**.
- 4.3.4 Name the slope element labelled **C**.
- 4.3.5 Name the slope element labelled **D**.
- 4.3.6 Identify the main process taking place on slope **C**.
- 4.3.7 Which slope consists of resistant rock?
- 4.3.8 This slope has a 90° angle

(8 x 1)

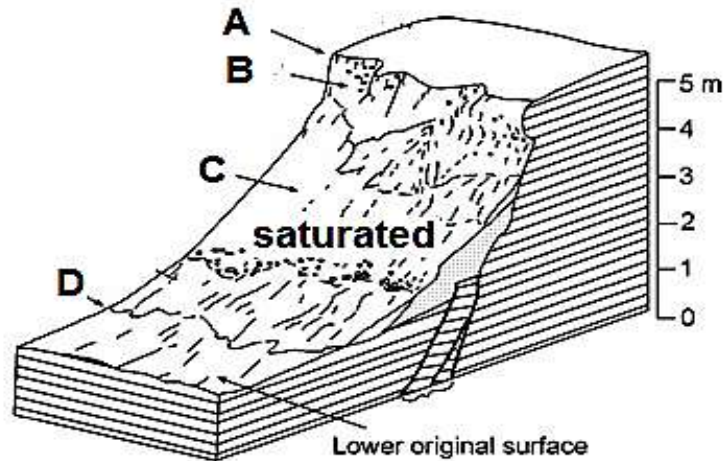
(8)

Study the diagram below to answer the following questions.



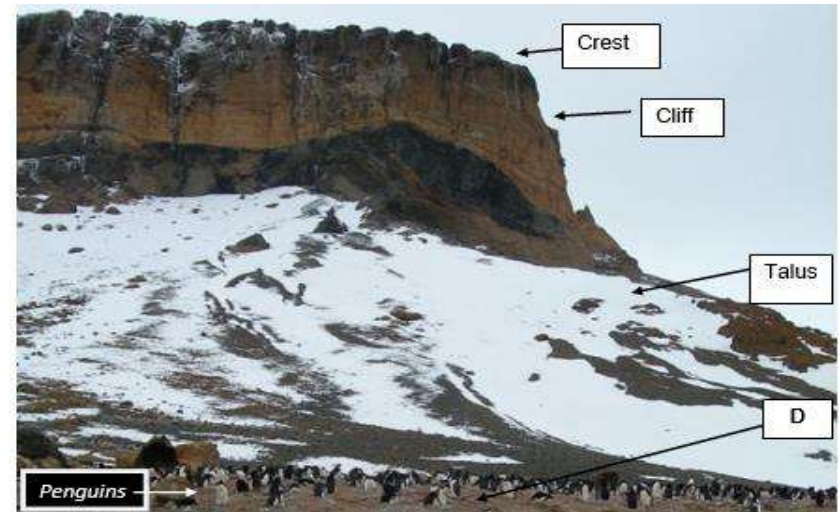
- 4.4.1 Name slope elements/forms **X** and **Y** in sketch **A**. (2 x 1) (2)
- 4.4.2 Describe the shape of slope **X**. (1 x 1) (1)
- 4.4.3 Explain why slope **D** became unstable. (2 x 2) (4)
- 4.4.4 Write a paragraph (approximately 8 lines) analysing the impact of slope instability and methods that could be used to prevent disasters associated with this instability. (4 x 2) (8)

Refer to **FIGURE 1.6** that shows the typical **slope elements/forms** associated with a slope.



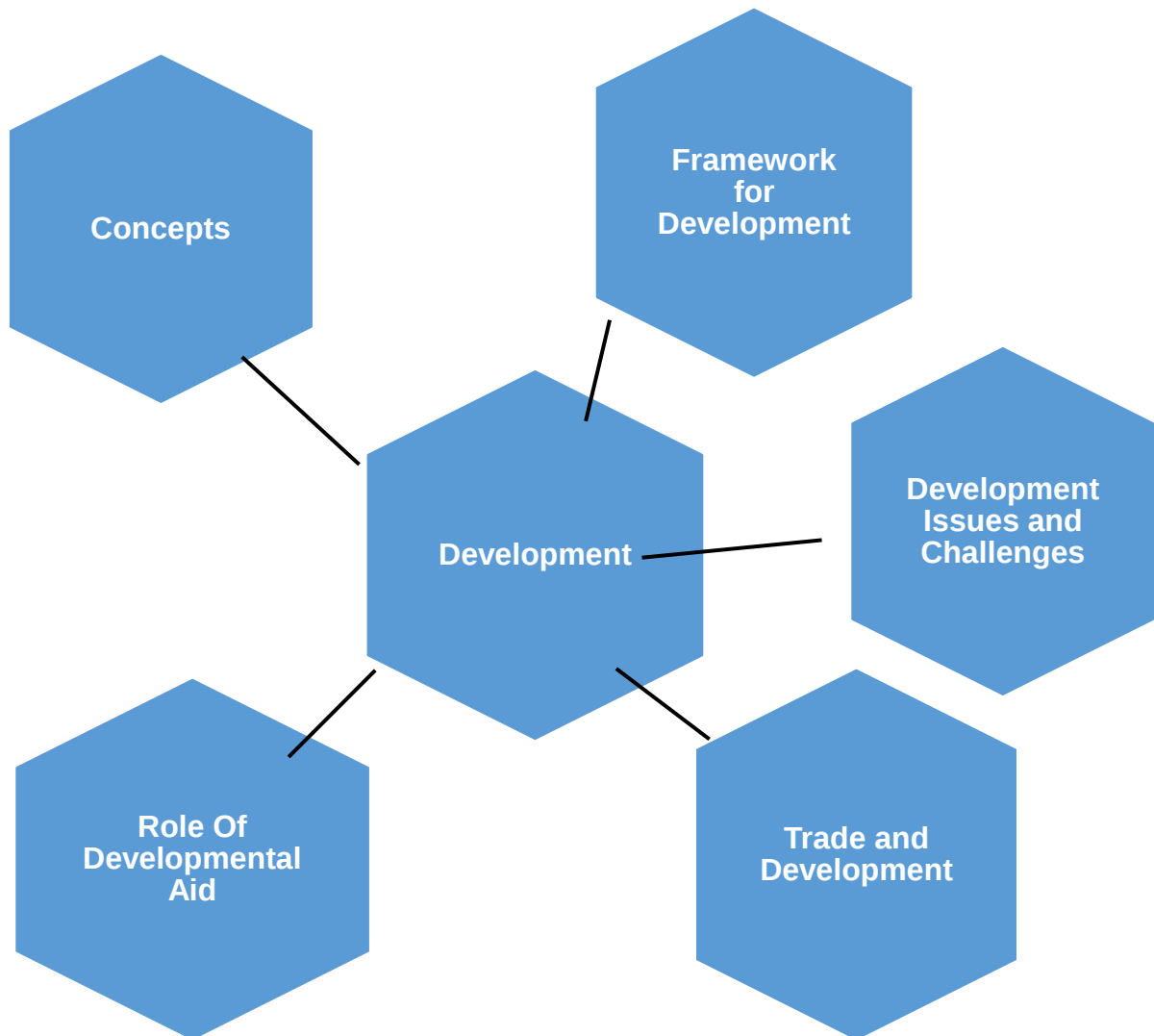
- 4.5.1 Name the slope elements from A to D. (4 x 1) (4)
- 4.5.2 Discuss **ONE** characteristic of each of the slope elements. (4 x 2) (8)
- 4.5.3 What cause the different slope elements to develop. (1 x 2) (2)
- 4.5.4 A farmer bought a farm with a butte with prominent slope elements. Advise the developer how he can utilise slope element B to generate tourism activities on the farm. (1 x 2) (2)

FIGURE 4.6 illustrates typical slope elements associated with horizontal strata.



- 4.6.1 Name the slope element labelled **D**. (1 x 2) (2)
- 4.6.2 Describe the shape of the crest. (1 x 2) (2)
- 4.6.3 Why is the cliff slope so steep? (1 x 2) (2)
- 4.6.4 Identify **TWO** ways in which a cliff can be used by humans. (2 x 1) (2)
- 4.6.5 Where did the debris fragments on the talus slope come from? (1 x 2) (2)
- 4.6.6 Suggest why vegetation grows better on slope element **D** than on the talus slope. (2 x 2) (4)

MINDMAP: DEVELOPMENT GEOGRAPHY



Terminology

Development	The use of resources and technology to bring about change. This change is positive and generally involves the improvement in people's quality of life and improving the standard of living in a country
Development Indicators	Are used to measure the level of development with regard to a countries economic, social and institutional growth. There are two main types' economic indicators and social indicators.
Brandt Line	The line dividing the world into the developed and developing world
Industrialised	The country is involved in manufacturing and processing of raw materials in factories. The more industrialised a country is the more developed the country will be.
Infant Mortality	The number of children who die because of childhood related and other diseases
Life expectancy	The average number of years a person can expect to live
Primary Activities	The extraction of raw materials from the earth's surface. For example, forestry, farming, mining, and fishing.
Secondary Activities	Involves the manufacturing and processing of goods obtained in the primary activities.
Tertiary Activities	Provision of services.
Quaternary Activities	Involves research and technology
Globalisation	A process that leads to an integrated global economy and society.
Factor	An element or cause that contributes to a result.
Model	A representation of an aspect of the real world; a simplified or generalised version of reality
Economy	The system of production and distribution in a society; the economy is made up of four sectors, primary, secondary, tertiary and quaternary.
Core	An area which has an economic advantage due to high levels of capital, infrastructure and employment opportunities. Most developed parts.
Core and Periphery Model	A model that tries to explain where economic development takes place, using the concepts of core and periphery.
Free Market Model	A model that tries to explain development based on the economy.
Periphery	An area which lacks capital, infrastructure and employment opportunities. Less developed area.
Sustainable Development	Any developments that will in the long term sustain themselves and not deplete the natural resources of the area.
Sustainable Development Model	A model of development that aims to incorporate economic and social development without harming the environment

Community Based Development Programme	A programme designed to improve the quality of life within a specific community.
Diffusion	Moving from an area of high concentration to areas of lower concentration
Multiplier effect	An increase in economic activity creates a ripple effect in the economy, resulting in increased consumption and increase in national income.
Trade	The exchange of goods, services, capital, labour and information between two parties.
Barter	To exchange goods for other goods, rather than selling them for money.
International trade	The exchange of goods, services, capital, labour and information between countries
Balance of Trade	The relationship between the value of a country's exports and its imports.
Market	The place where goods and services are bought and sold.
Commodities	The items (goods and services) that countries trade. Anything sold in large quantities.
Free Trade	Trade that occurs without any restrictions.
Tariffs	A type of tax placed on imported goods, which makes these goods more expensive than the local product.
Customs	Taxes paid on importing and/or exporting goods
Quota	A limit to the amount of imported goods that may enter a country during a fixed period of time
Subsidy	A form of financial assistance paid by government to an industry or economic sector.
Fair trade	Trade that supports farmers in developing countries by paying fair prices and encouraging social and environmental development in their communities.
Globalisation	A process that leads to an integrated global economy and society.
Multinational Corporation (MNC)	A company that owns or controls production facilities in more than one country.
Outsourcing	Having components made or assembled in a country other than where the headquarters of a company is based.
Sweatshops	Workshop or factory where people work long hours in poor conditions for low pay, often making illegal or counterfeit goods.
Gender	Male or female; way in which a society/culture treats men and women
Gender Inequality Index (GII)	UN index indicating the degree of equality/inequality between men and women in a country
Informal sector	Self-employed people trading goods on the street or working from home/backyard workshops. Not part of the formal economic sector. Workers have no contracts, fixed hours or benefits and do not pay tax

Permaculture	Type of agriculture that meets people's needs in a sustainable way.
Environmental impact assessment (EIA)	A study undertaken to assess the impact on the environment of a development project
Carbon emissions	Gases containing carbon dioxide that pollute the atmosphere
Carbon footprint	The quantity of carbon gases a person contributes to the pollution of the atmosphere through his/her daily lifestyle
Green economy	An economy that does not damage the environment
Food security	When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy active lifestyle
Agroprocessing	Industries that process agricultural products
Beneficiation	To treat and use a mineral so that the 'benefits' stay in the home country as opposed to exporting a mineral and then importing (at a greater expense) the manufactured product
Aid	Help/assistance given by one country or organisation to another country. Examples include food, medicines, money and technology
Development aid	Money, knowledge or skills that are donated to developing countries in order to assist in their economics, social, political and environmental development
Donor	A country or organisation that gives aid
Recipient	A country that receives aid
Gross National Income (GNI)	The amount of money the average person in a country can expect to have. (Low income and middle income countries are developing while high income countries are developed).
Gross National Product (GNP)	Total value of all goods and services produced by a country in one year including foreign earnings.
Gross Domestic Product (GDP)	Shows the total value of all goods and services produced by a country in one year.
Human Development Index (HDI)	This indicator is a combination of GDP per capita, life expectancy and literacy rate. Zero (0) indicates the worst quality of life, while one (1) shows an almost perfect place.
Gini-coefficient	Indicates how wealth is shared in a country. A Gini score of 0 indicates complete equality in income (every household receives the same amount of money). A Gini score of 1 indicates complete inequality (income received is not the same; one household gets more than the other).
Developed country	Countries with an economic base built largely on manufacturing and technology rather than agriculture
Developing country	A non-industrialized poor country that is seeking to develop its resources by industrialization

More economically developed countries (MEDCs)	A highly industrialized country characterized by significant technological development, high per capita income, and low population growth rates. Examples of such countries include the United States, Canada, Japan, and many countries in Europe.
Less economically developed countries (LEDCs)	Country characterized by minimal industrialization, low technological development, low per capita income, and high population growth rates. Many of these countries are found in Asia, Africa, and Central and South America
Industrialised countries	Countries whose economy is based on Industry
Birth Rate	is the term used to define the number of babies born every year per 1000 people in a population?
Death Rate	is the term used to define the number of deaths every year per 1000 people in a population?
Natural increase	in a population occurs where Birth rate is greater than death rate. That is, that there are more births than deaths in that population ion a year.
Natural decrease	occurs when death rate is greater than birth rate. This means that more deaths occur in a population than babies are born so population numbers decline

SHORT OBJECTIVE QUESTIONS BASED ON CONCEPTS.

Activity 1

Matching columns. Write the number of the question with the letter of the correct answer next to it.
Example, 2.1 A

2.1	Development	A	The total income of a country per year divided by the number of people in the country
2.2	Standard of living	B	Includes life expectancy, literacy, years in education and income per person
2.3	Gross Domestic Product per capita	C	Those things needed to satisfy people's needs
2.4	Gross National Product	D	Process of change which improves the well-being of a society
2.5	Gini-coefficient	E	Distribution of workforce in industry
2.6	Human Development Index	F	Measure of the quality of services and goods available
2.7	Resources	G	Monetary economic policies
2.8	Economic sectors	H	Degree of well-being felt by people
2.9	Quality of life	I	Development which not only meets people's needs today but also those of future generations
2.10	Sustainable development	J	The value of all the goods and services produced by a country in a year
		K	Global standard for calculating income disparity
			(10 × 2) (20)

Activity 2

- 1 Choose the correct term in COLUMN B that matches the description in COLUMN A. Write the letter (A–I) next to the question number (4.1.1–4.1.8) in your ANSWER BOOK, for example 4.1.9 J.

COLUMN A		COLUMN B	
1	Allowing more freedom of trade	A	Terms of trade
2	The relationship between the prices a country sells its exports for and the prices it pays for its imports	B	Balance of trade
3	Tax collected by government on goods coming into a country	C	Protectionism
4	A financial summary of all payments made by a country to the rest of the world	D	Liberation of trade
5	The relationship between the value of a country's exports and its imports	E	Balance of payment
6	An official ban on trade or other commercial activity with a country	F	Trade bloc
7	A control that restricts, restrains or supports trade to look after the interests of a country	G	Embargo
8	The group of countries that have agreed to trade with one another	H	Free trade
		I	Tariff

Activity 3

Provide the term from the list below, which matches the descriptions with the questions that follow. Write ONLY the correct term next to the question number (4.1.1 to 4.1.7), for e.g. 4.1.8 Development.

Embargo	Humanitarian aid	Import quotas
Balance of trade	Bilateral aid	Economic development
Protectionism		Balance of payment

- 1 The ability of a country to have access to its resources to create economic wealth.
- 2 The balance between the monetary value of a country's exports and imports.
- 3 Restrictions put on imported goods, regarding its weight, volume and amount.
- 4 The import of goods from other countries is restricted.
- 5 Trade blockages are used to prevent the influx of commodities that might threaten local production.
- 6 Direct aid from one country to another.
- 7 Aid for individuals or countries in times of natural disasters or civil conflict.
(7 × 1)(7)

Grade 11 – Term 3

Week: _____

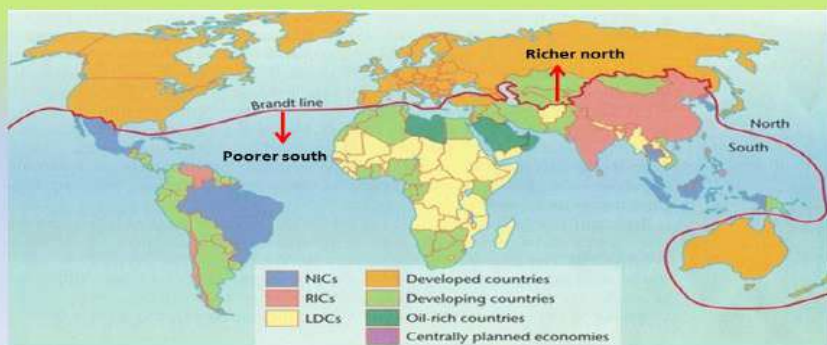
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_____ % Curriculum Coverage

Topic: Concept of Development

What is meant by development	Development includes two aspects of improvement in the life of people:	
Development refers to characteristics that describe the stage a country has reached on economic, cultural, social and technological levels	Standard of living is the value of their possessions and savings, the type of home they live in and whether they own items such as a washing machine, television, car, telephone and computer. Quality of life is the general wellbeing of a person. It includes standard of living, but it is also affected by education, health care, services, utilities, environment, and social, political and religious freedom	
Economic classification of countries in terms of their development	MEDCs	LEDs
	Use resources efficiently	Export raw materials
	Highly industrialised	Not highly industrialised
	High standard of living	High poverty levels
	Good education, health, transport systems	Inefficient education, health, transport systems
	Manufacture and export goods on world market	Import goods (cannot make them)
	Stable governments able to donate financial aid to other countries	Receive financial aid

The north /south divide



A comparative table north/ south divide - continued

Characteristic	Developed north	Developing south
Economic growth	Low rate of economic growth due to financial crisis	High rate of economic growth but total output is low
Economic activity	- Secondary economic activity – manufacturing - Tertiary economic activity	Primary economic activity: mostly agriculture and mining
Trade	- Terms of trade: positive – exports manufactured goods and services - Policy of protection for agriculture	- Terms of trade: negative – exports manufactured goods and services - No subsidies for agriculture
Environment	- Mass consumption of fossils fuels - Environmental damage	- Soil erosion - Subsistence farming - Lack of modern technology
Demographic problems	Aged population – increasing strain on health services	Young population – increasing strain on education services

A comparative table north/ south divide

Characteristic	Developed north	Developing south
World population	15% of world's population	85% of world's population
World income	87% of world's income	13% of world's income
Income gap	Small gap between rich & poor	Small gap between rich & poor
Life expectancy	70-84 years	40-60 years
Investment	High investment in capital goods and infrastructure	Low investment in capital goods and infrastructure
Infrastructure	Well developed	Poorly developed
Social conditions	High living standards	Poor living standards
Poverty	- Relative poverty – few people - High welfare support - High per capita income	- Absolute poverty – many people - Poor welfare support - Low per capita income

Countries are classified according to their level of economic and human development. There will always be poor people in rich countries and rich people in poor countries. **The Brandt Line** is used to divide the world into two halves, the developed north (rich, industrialised) and the developing south (poor). The Brandt Line may also be referred to as the North-South divide. It is important to remember that the Brandt line is not the same as the equator. There are some countries that are found in the Southern Hemisphere but are north of the Brandt Line e.g. Australia

<pre> graph TD A[Indicators of Development] --> B[Economic Indicators] A --> C[Social Indicators] A --> D[Demographic Indicators] </pre>		
Economic Indicators • Gross National Income (GNI) • Gross National Product (GNP). • Gross Domestic Product (GDP) • Human Development Index (HDI) • Gini-coefficient	Social Indicators • The percentage of the population living in urban areas • Education levels and level of literacy • Availability of services such as water, electricity and healthcare • Food and nutrition	Demographic Indicators • Birth rate • Death rate • Infant mortality rate • Life expectancy • Maternal Mortality rate(the number of mothers who dies during childbirth) • Population growth rate (the percentage by which a country's population grows each year)
Activity 1 Refer to the table below and answer the questions		Questions 1 From the development indicators given above in the table list one example of an economic, social and demographic indicator.

	GDP(U S\$)	GDP/c apita(US\$)	HDI	Gini	BR	DR	LE	IMR	Litera cy	Doctors/1 0000peopl e	
Australia	851 bn	40 000	0,94	0,35	12,4	6,8	82	4,7	99	29,9	
Brazil	2 trn	10 100	0,70	0,55	18,1	6,4	72	21,9	90	17,2	
Japan	4,2trn	32 700	0,88	0,24	7,4	9,8	82	2,8	99	20,6	
Kenya	62,6 bn	1 600	0,47	0,48	35,1	9,3	59	53,5	87	1,4	
South Africa	505,3 bn	10 300	0,60	0,57	19,6	17	49	43,8	89	7,7	
Switzerland	314,7 bn	41 400	0,87	0,33	9,6	8,7	81	4,1	99	40,7	
Thailand	540,1 bn	8 200	0,65	0,42	13	6,5	75	16,7	94	3	
USA	14,1 trn	46 000	0,90	0,40	13,8	8,4	78	6,1	99	26,7	
											2 Name the three development indicators that are used to calculate HDI. 3 Explain why birth rates, death rates tend to decrease with increased wealth in a country. 4 From the table above write down the name of the country that best suits the description below: a. Largest GDP b. Lowest GDP/capita c. Highest HDI d. Lowest Gini coefficient e. Lowest Life Expectancy f. Highest Infant Mortality Rate g. Lowest Literacy Rate 5 According to the HDI figures for Australia, Japan and Switzerland where would one expect to find these countries in relation to the Brandt Line? 6 Using information from the table, which country would be the most developed and which country would be the least developed
Activity 2 FIGURE 2.1: INDICATORS OF DEVELOPMENT											Questions 1 Study FIGURE 3.3, illustrating indicators of development. 1. What does the abbreviation HDI stand for?



COUNTRY	HDI	GINI - coefficient
X	0,35	0,72
Y	0,96	0,25

2. Name ONE of the HDI indicators of development.
3. Refer to the photo indicating Developed vs. Developing countries and the HDI and GINI-coefficient data.
 - a) Match X and Y to either developed or developing countries respectively.
 - (b) Clearly distinguish between HDI and GINI-coefficient data.
- 4 Explain how the population growth of developing countries will have a negative influence on development.

Activity 3

- 1 About what proportion of the North live in rural areas?
Select one of 12%, 25%, 50%, 88%.
- 2 According to the map, state if each of the following countries are in the North or the South.
 - 2.1 Australia
 - 2.2 South Africa
 - 2.3 New Zealand
 - 2.4 Japan
 - 2.5 Mexico
- 3 Describe the employment structure of:

Study Figure 1 below showing the North/South divide and some information of the two regions.

- 3.1 the North
- 3.2 the South
- 3.3 Give reasons for the differences in the employment structure of the North and the South.
- 4 Study the population pyramids of the North and the South. Indicate if each of the following statements are true or false.
- The North has a lower birth rate than the South.
 - The South has a smaller percentage of elderly people than the North.
 - The North has a broad based pyramid.

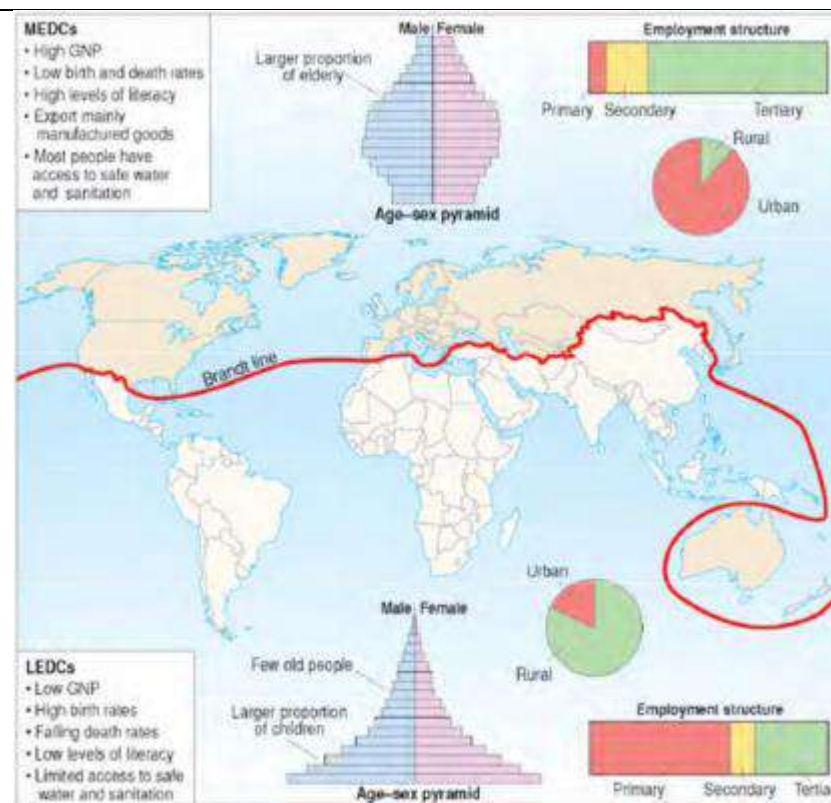


FIGURE 1 The Brandt line 'North/South divide'

Activity 4

1 Explain these indicators of development:

- GDP per capita
- Urbanisation
- Infant mortality rate

2. Study the table below showing selected indicators for a developed and a developing country

Indicator The Netherlands	Indicator The Netherlands	Indicator The Netherlands
---------------------------	---------------------------	---------------------------

% of labour in agriculture	2 %	81 %
GDP per capita	\$29 500	\$1200
Literacy rate	99 %	48 %
Life expectancy	79 years	40 years
Population Growth rate	0,25 %	1.48 %
Comment on and explain the differences in: (a) % of labour in agriculture (b) Life expectancy (c) Population growth rate		

Activity 5

FIGURE 3.3: NORTH/SOUTH DIVIDE

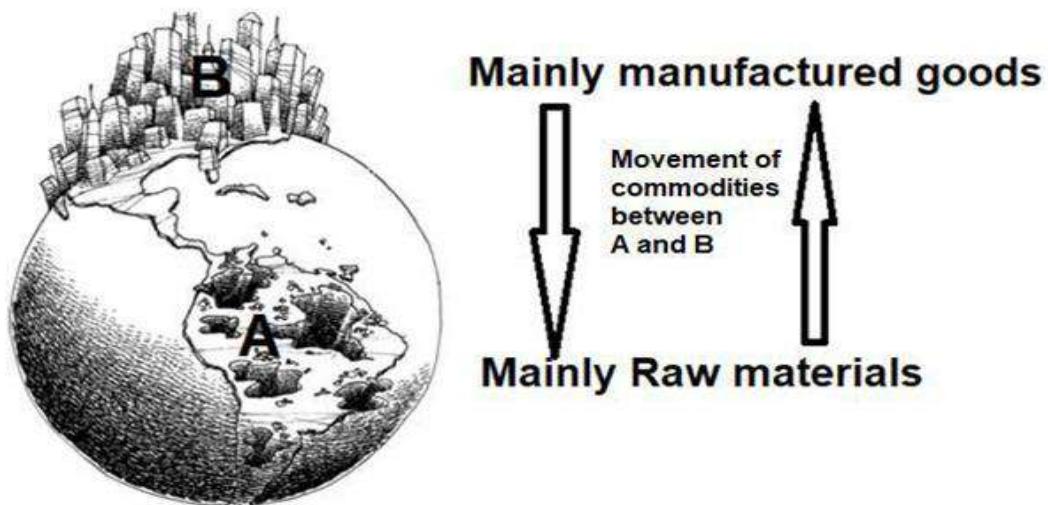


FIGURE 3.3 illustrates the economic north/south divide.

- 1 Name the continents A and B illustrated in the cartoon.
- 2 Name ONE historical factor that may have caused the illustrated relationship between the continents.
- 3 Refer to the movement of commodities (raw materials and manufactured goods) between continents A and B.

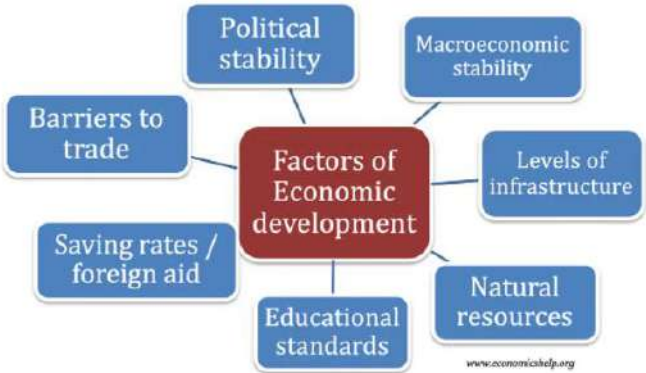
- (a) Which of the continents (A or B) in the cartoon is more developed?
- (b) Explain TWO reasons for your answer to QUESTION 3 (a).
- (c) Discuss how the illustrated movement of commodities will negatively influence continent A.

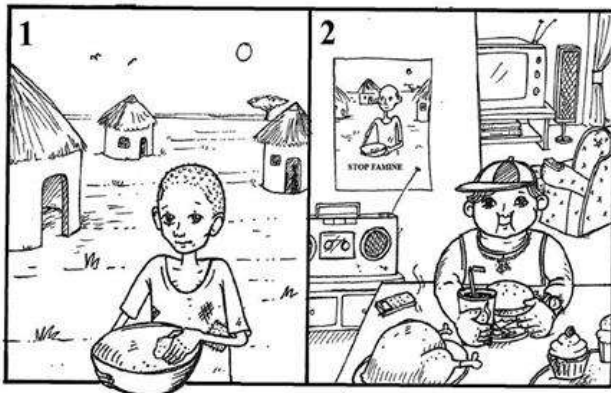
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Topic: Framework for Development – Factors That Influence Development

Political factors	Social factors	Economic factors
History • Colonisation led to the extraction of resources by developed countries. • No laws govern the use/exploitation of resources. • Large multinational companies and investors exploit natural resources, especially in developing countries. • Labour is exploited and foreign expertise is used. Local labour is not skilled. 	Population Growth • The world's population is increasing at a rapid rate. • This puts pressure on resources such as wood, water and soil. • These resources are becoming depleted or degraded	Trade Imbalances • Globalisation has made it easy for countries to trade and exchange goods. • World Trade Organisation has introduced a free market trade system in an effort to attempt to integrate developing countries into the world's trading and economic systems. • Developing countries often have to export to developed countries and suffer when orders for their goods are cut back
	Education and Training • An educated labour force is essential for transfer of technology from developed and developing countries. • High illiteracy rates hamper educational progress in a country.	Energy • More than half the world's population does not have access to clean, cheap energy. • The high use of biomass fuel in developing countries means a lack of energy for domestic use. • This slows down development. • Developed countries contribute to the world's rising CO2 levels from the use of fossils fuels for energy production.
		Natural Resources • Carrying capacity (the maximum population that resources in a given environment can support) is exceeded.

 "It's 10 p.m. Do you know where the leading economic indicators are?"	• Large populations put pressure on natural resources. Environmental Degradation • There is a lack of environmental education, government policy and effective pollution control. • There is an objective of profit at all costs.		
Access to resources • There is an uneven distribution of the world's natural resources. • Developed countries need more resources than developing countries. • There is a lack of access to water, electricity and sanitation in many developing countries. • Land ownership is prevented in some countries. • There is a lack of opportunities in business owing to government policies.			
Activity 1 	Questions 1.1 What does the cartoon say about development across the world? 1.2 Name ONE factor in the cartoon that influences development. 1.3 What form of development is represented by panel 1 and 2 of the cartoon respectively? 1.4 Which panel represents an economically more developed country and which one represents an economically less developed country? Support your answer by using geographically sound theory. 1.5 How does the development indicator 'access to food' differ in panel 1 and 2.		
Activity 2 Refer to the table below and answer the questions <table><tr><td>Japan</td><td>GDP/capita: US\$39 865 HDI: 0.088 Gini: 24.9</td></tr></table>	Japan	GDP/capita: US\$39 865 HDI: 0.088 Gini: 24.9	Questions 1. What do the environmental issues experienced by the Japan tell us about its overall level of development? 2. How is Japan's economic success negatively impacting the environment?
Japan	GDP/capita: US\$39 865 HDI: 0.088 Gini: 24.9		

Energy and environmental degradation	Demand for electricity is the fourth highest in the world. Negative environmental effects include air pollution, acid rain and decreased water quality.	

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_____ % Curriculum Coverage

Topic: Trade and Development – International Trade

What is International Trade	Commodities	Terms of Trade
Trading happens because of the uneven distribution of raw materials over the Earth's surface. No country has an adequate supply of the full range of minerals, fuels, foods, manufactured goods or services to make it self sufficient International Trade happens when a producing country is able to produce goods and services more cheaply, or of a better quality, than the consuming country. International trade is the exchange of goods and services between countries	Commodities are items that countries trade. They can either be raw materials or finished products LEDC's export mainly raw materials and unfinished goods, so their share of global trade is very small. LEDCs also earn less for their exports than MEDCs, because processed commodities fetch higher prices than raw materials do.	Terms of trade is a term used by economists to describe the relationship between the prices a country sells its exports for and the prices it pays for its imports. It makes economic sense to try and get more for what you sell, and pay less for what you buy.
Balance of Trade The balance of trade is another important term to understand. It is the relationship between the value of a country's exports and its imports. It can either be positive or negative. NEGATIVE BALANCE OF TRADE (DEFECIT) = imports are greater than exports POSITIVE BALANCE OF TRADE (SURPLUS)= exports are greater than imports <u>SURPLUS</u>  <u>DEFICIT</u> 		

Trade Relationships

Trade

Free Trade

Free Trade

Is trade that occurs without any restrictions. When there is free trade, nations open their borders to one another, and goods and services move freely between them. There are no tariffs or customs duties that might increase the process. Free trade is meant to benefit all trading partners.

Trade Barriers

This occurs in order to protect local manufacturers; governments might introduce measures to make imported goods more expensive. These include:

Import tariffs and taxes
(taxes placed on imported goods making them more expensive than local goods)

Fair Trade

Trade that supports farmers in developing countries by paying fair prices, workers enjoy better working conditions and are not exploited. This type of trade is closely linked to sustainable development. Fair trade organisations also improve infrastructure and social development (education and training) in developing countries



Subsidies for local industries (a subsidy is financial assistance paid to a business to help support that business, to create employment, stimulate business and reduce imports)

Quotas (limits that governments set to the amount of imported goods that can enter a country within a particular time frame)

Trade barriers are also used in order to protect jobs in a country, protect local products from foreign competition and to encourage local industries.



Activity 1

1 What is free trade?

- 2 What are trade barriers? Why are trade barriers necessary for protecting employment?
- 3 In what ways do subsidies, benefit activities or industries?
- 4 What is fair trade and how does it benefit the people in the production line?

Activity 2

Refer to the cartoon in FIGURE 1 showing trade and answer the questions that follow.

FIGURE 1: TRADE



- 1 Is the man with the cigar promoting free trade?
- 2 Give ONE reason for your answer to QUESTION 2.1.
- 3 Who in the cartoon represents the following:
 - (a) More economically developed countries
 - (b) Less economically developed countries
- 4 Give TWO regulations used to prevent free trade.
- 5 Explain why free trade is to the advantage of less economically developed countries.

Activity 3 - FIGURE 3. BALANCE OF TRADE

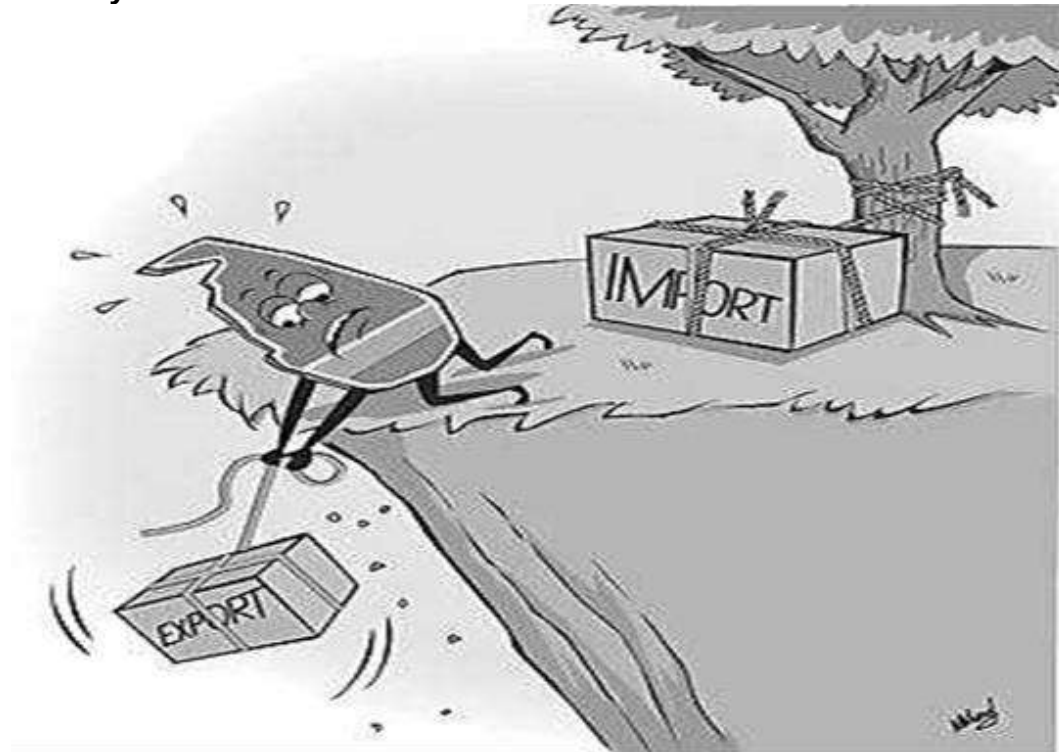


FIGURE 3 depicts a balance of trade situation.

- 1 Define the term balance of trade.
- 2 The cartoonist depicts a negative balance of trade.
 - (a) Why would you agree with the statement that the balance of trade is negative
 - (b) Provide TWO protectionist policies that more developed countries implement to restrict imports
- 3 Protectionist policies restrict fair trade. Explain how fair trade could help struggling countries to have a better balance in their trade.
- 4 In a paragraph of approximately EIGHT lines, evaluate the importance of a positive balance of trade for countries.

Activity 4

FIGURE 4.3 FAIR TRADE

Fair Trade is a global trade model and certification allows shoppers to quickly identify products that were produced in an ethical manner.

For consumers, Fair Trade offers a powerful way to reduce poverty through their everyday shopping.

For farmers and workers in developing countries, Fair Trade offers better prices, improved terms of trade, and the business skills necessary to produce high-quality products that can compete in the global marketplace. Through vibrant trade, farmers and workers can improve their lives and plan for their futures.

Today, Fair Trade benefits more than 1.2 million farming families in 70 developing countries across Africa, Asia and Latin America.

4 Read the extract on *Fair trade* (FIGURE 4.3) and answer the following questions.

- 1 Define the term *Fair trade*.
- 2 Name ONE way in which fair trade benefits farmers in developing countries.
- 3 Explain how fair trade can help consumers reduce poverty, through everyday shopping, as stated in the extract.
- 4 Discuss TWO similarities between fair trade and free trade.
- 5 To be certified as fair trade, producers need to maintain good environmental protection when developing sustainable agriculture. In a paragraph of approximately eight lines, provide FOUR criteria that producers need to maintain, to uphold environmental standards in fair trade.

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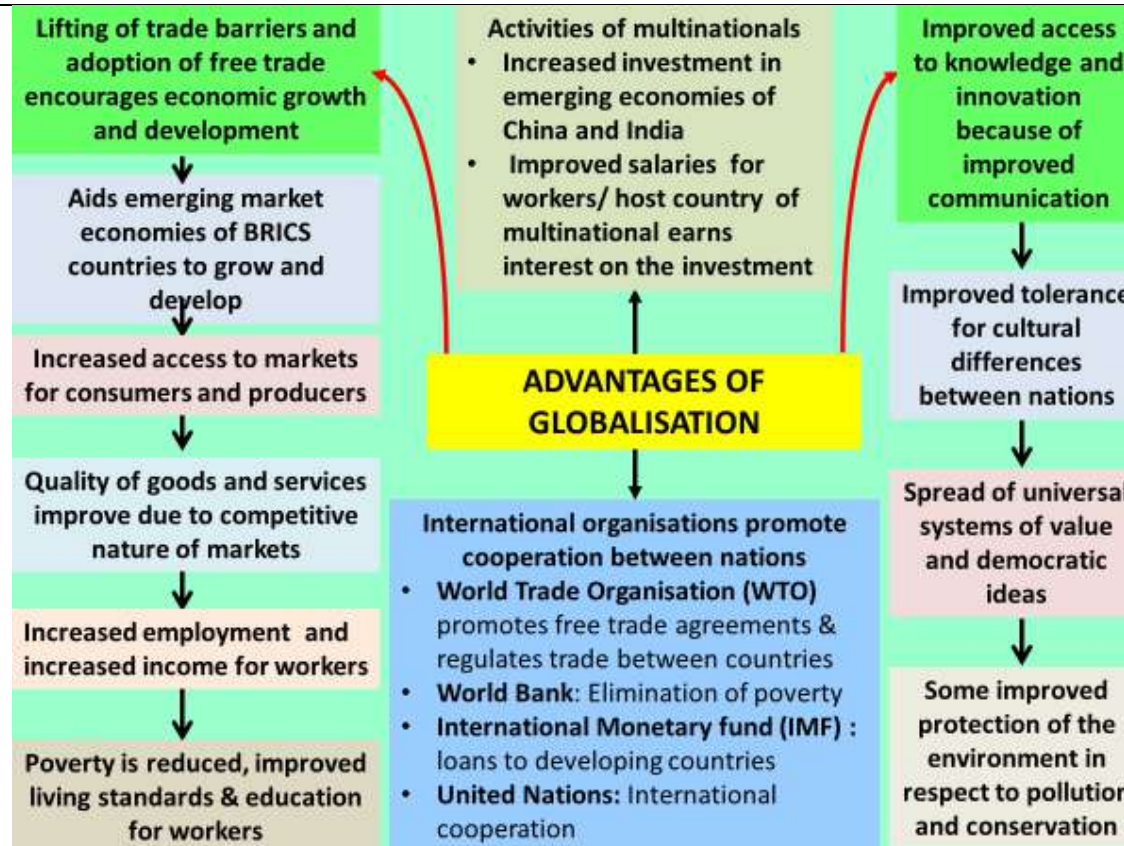
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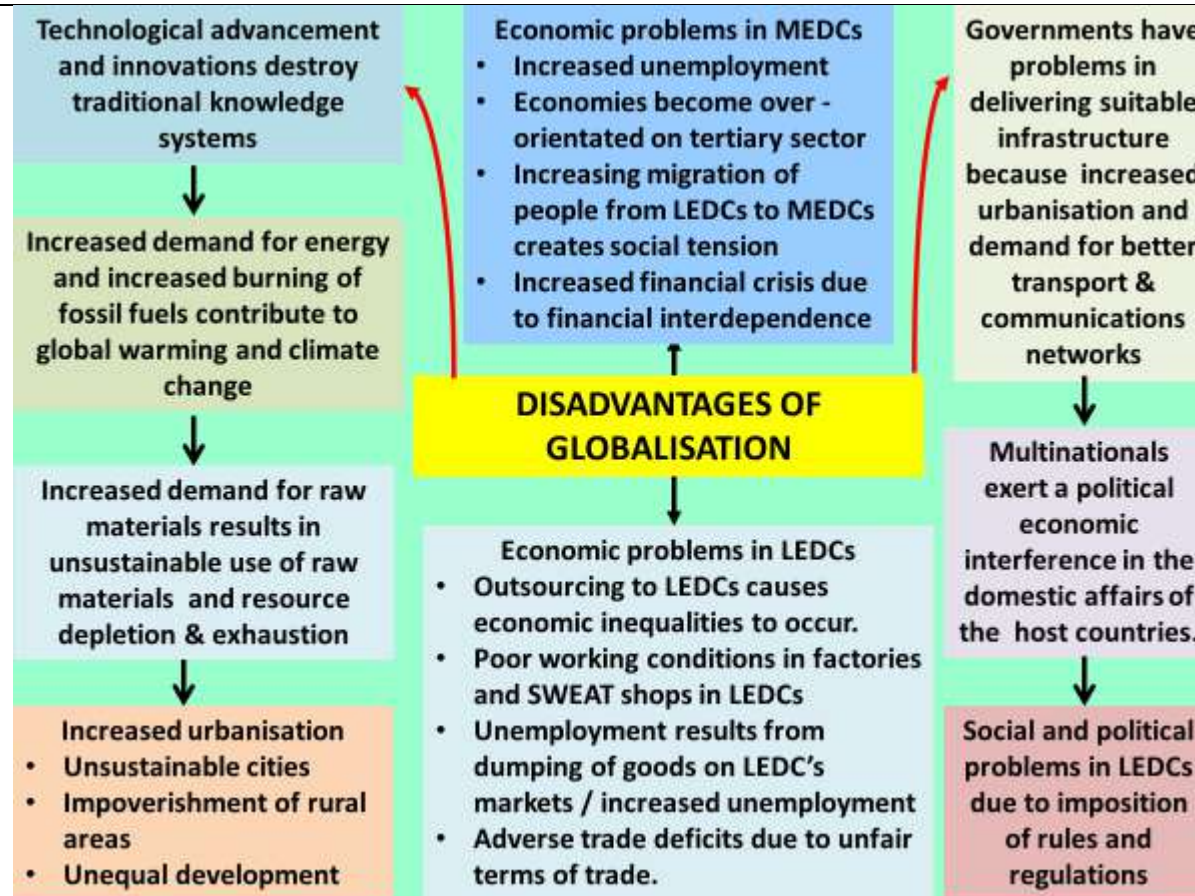
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Topic: Trade and Development – Globalisation

The concept of globalisation	Effects of globalisation
Globalisation can be defined as the process of change, increasing interconnectedness and interdependence among countries and economies. Globalisation brings countries closer through better communication, transport and trade links. This process is changing the world dramatically and quickly. Globalisation involves the flow goods, ideas and values across national boundaries	Key components of the globalisation process <pre> graph TD Globalisation[Globalisation] --> Economic[Economic] Globalisation --> Communication[Communication] Globalisation --> Cultural[Cultural] Globalisation --> Political[Political] </pre> Economic Free markets and free trade between nations. Financial markets & investments. Imports and exports – the exchange rates. The consumption throughout the world of similar types of goods. Communication Worldwide communication through electronic media e.g. Internet, cell phones etc. Television – spreads and advertises similar types of goods and services. Cultural Universal values and religious system. Respect for human rights & freedoms. English becomes a universal language. Political Democratic values and system of government. Rule of law. Elected parliamentary representatives. Pressure on non-democratic governments to change.

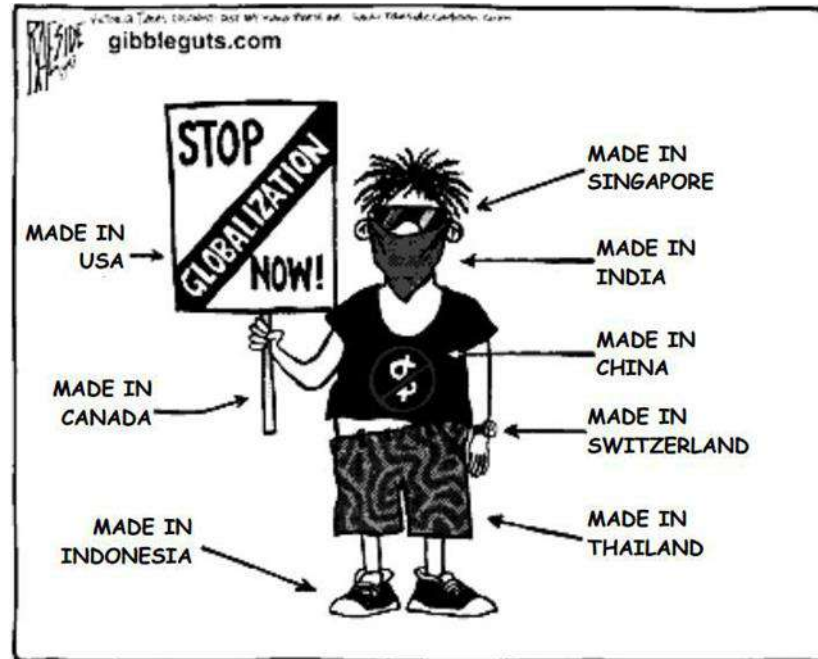




Activity 1

Refer to the cartoon in FIGURE 1 showing globalisation.

FIGURE 1: GLOBALISATION



- 1 Define the term globalisation.
- 2 What message does the cartoon portray about globalisation?
- 3 According to the cartoon, which country plays a major role in globalisation?
- 4 Give THREE reasons why many people are opposing globalisation.
- 5 In a short paragraph, give suggestions how globalisation can be more beneficial to developed countries.

Activity 2

FIGURE 2: IMPACT OF GLOBALISATION



2 Refer to FIGURE 2 depicting the impact of globalisation.

- 1 What is *globalisation*?
- 2 Explain why the worker does not seem very happy to be 'helped' by the USA.
- 3 Why do you think China is portrayed (showed) as the smallest in the cartoon?
- 4 Refer to the characters representing multinationals and local governments.
 - (a) What are *multinationals*?
 - (b) Explain why multinationals and local governments seem to be very good friends.
- 5 In a paragraph of approximately EIGHT lines, comment on the social impact of globalisation on developing countries.

Activity 3

Globalisation

It has been said that 'Globalisation has encouraged the liberalisation of trade. It is easier for countries to trade and exchange goods. This has however, harmed the textile and clothing industry in South Africa. Imported items are cheaper than locally manufactured stock.'

- 1 What do you understand by "Globalisation"?
- 2 List FOUR multinational corporations that operate globally.
- 2 Explain why South Africa's textile industry has been harmed in recent years.

Activity 4

SOUTH AFRICAN TEXTILE INDUSTRY

The South African textile industry, which is an important industry in our four major industrial areas, namely PWV (Gauteng), Durban, Cape Town and Port Elizabeth has had to adapt to the global situation. The industry has imported fabrics to keep the marginalized factories open. Between 2003 and 2005 some 67 000 jobs were lost and many factories and businesses were forced to close down.

The South African industry has had to face China's dominance in the textile industry and the flood of cheap clothing being imported or sometimes entering the country illegally.

(Source: DTI and just- style.com)

Read through the case study in FIGURE 3.4 on the South African textile industry.

- 1 Define the term globalisation.
- 2 List any TWO positive impacts of globalisation
- 3 Provide reasons why the South African textile industry has had to close down so many factories and businesses.
- 4 Evaluate why China's clothing exports has increased.

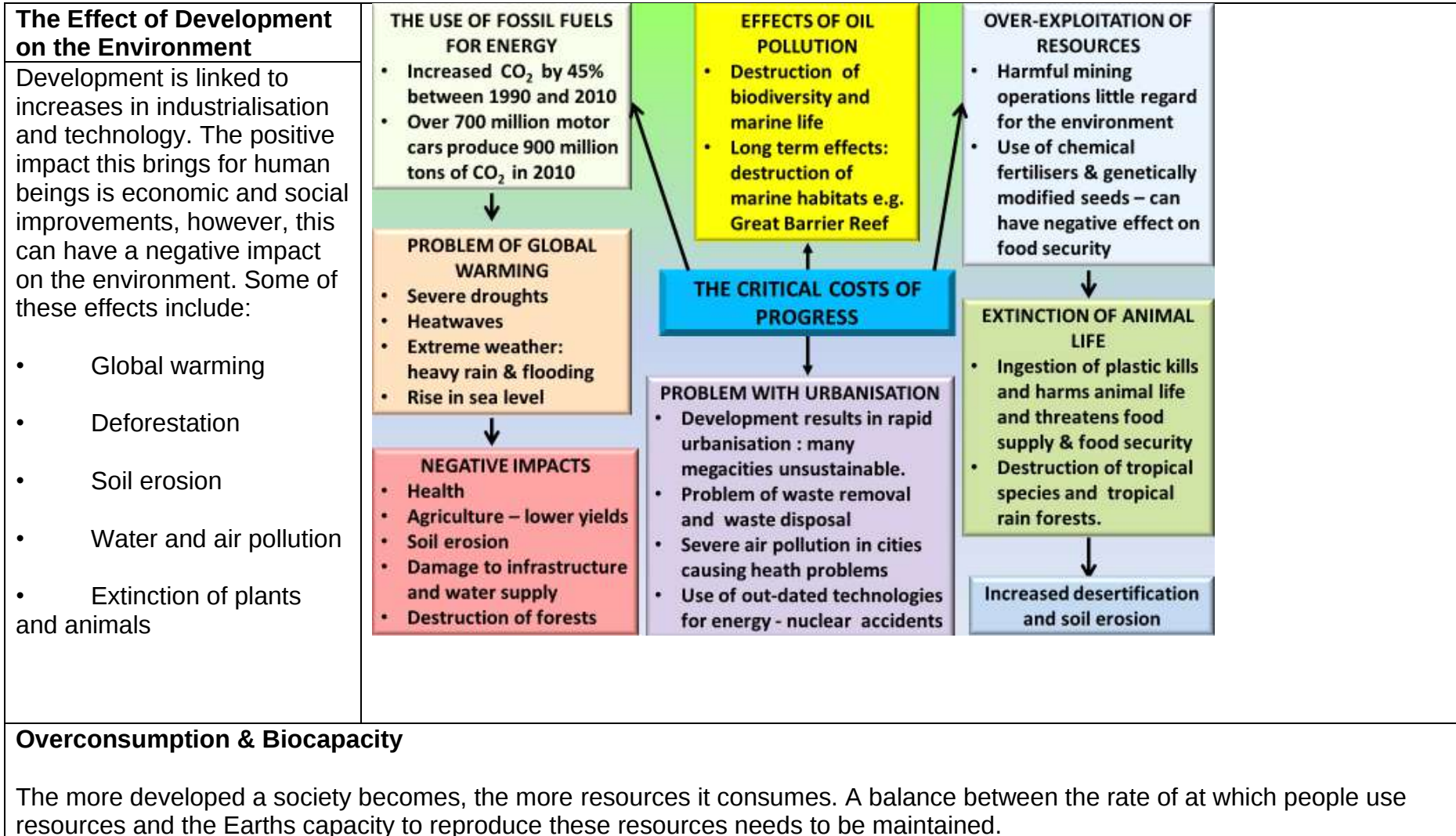
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Topic: Development issues and Challenges - The effect of development on the environment



Biocapacity is the biological ability of the Earth to reproduce resources and absorb waste generated by humans. The ecological footprint is the amount of biologically productive area humanity uses in order to meet its needs. At the current rate humanity's ecological footprint is greater than Earth's biocapacity.

Pollution

Industrial pollution has a major impact on the environment.

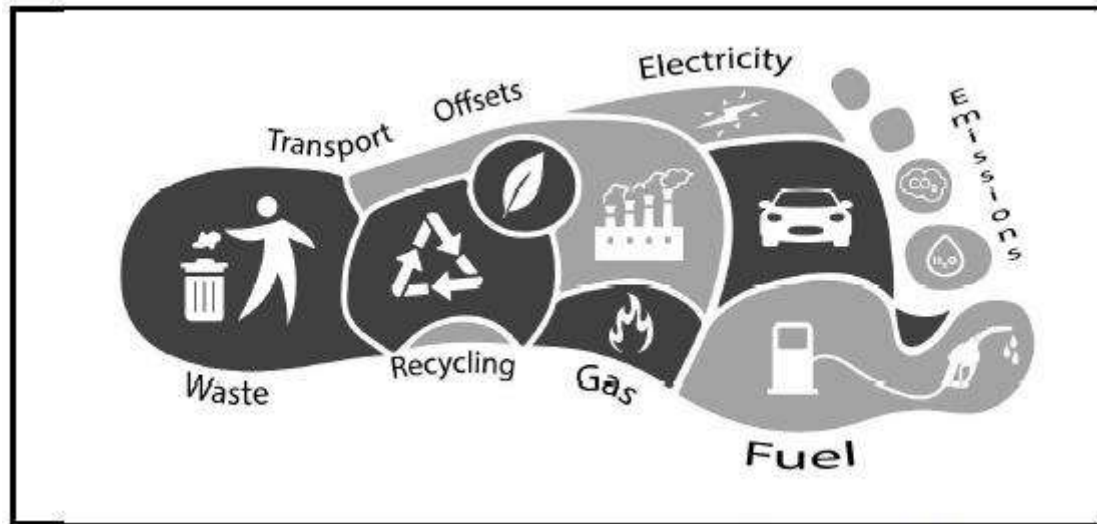
- Air pollution is caused mainly from burning fossil fuels like coal, diesel and petrol in the industrial and transport sectors, and wood for domestic use. South Africa has a major problem with air pollution. Air pollution from our coal burning power stations contributes to acid rain.
- Water pollution results from the discharge of untreated agricultural, industrial and domestic waste into rivers and dams. Polluted water is harmful to humans and plants, aquatic life and animals.
- Land pollution is caused by dumping refuse and builder's rubble, poor agricultural practices and mining. Industrial refuse includes waste from manufacturing everyday items such as glass, paper, motor vehicles and tins.



Activity 1

1.1 Study FIGURE 1.1, which illustrates ways in which the carbon footprint can be reduced.

FIGURE 1.1

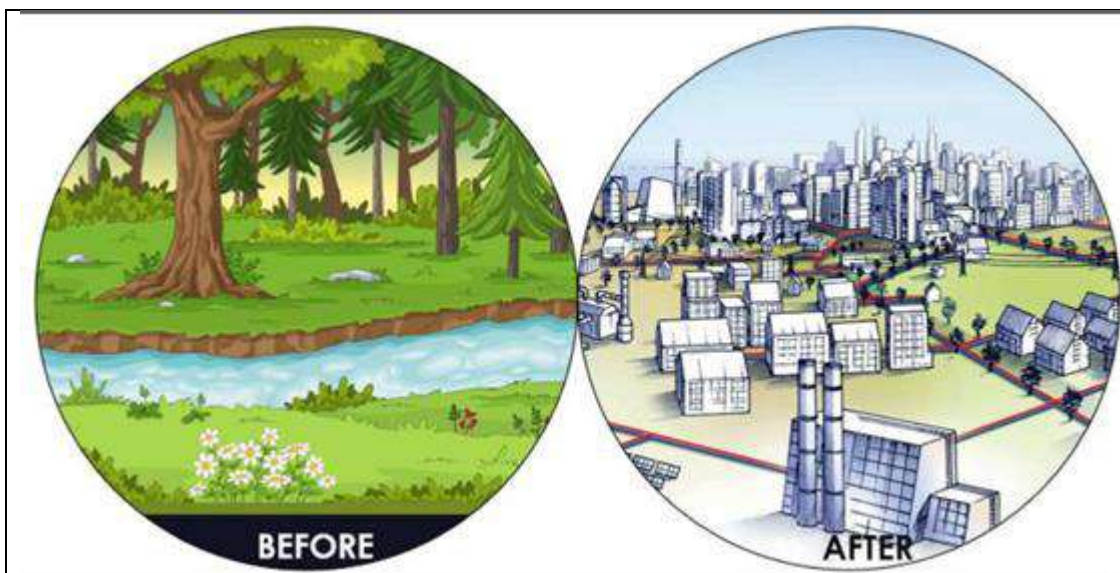


1. What is a carbon footprint?
2. Name TWO sources of CO₂ emissions from the sketch.
3. Explain TWO ways in which households can reduce their electricity use and thus reduce their carbon footprint.

Activity 2

Information:

Land–use change has a major impact on the environment. Deforestation, urban development, mining, agriculture and other human activities have substantially changed the Earth’s landscape. Urban development has been linked to many environmental problems, including air pollution, water pollution and loss of wildlife habitat.

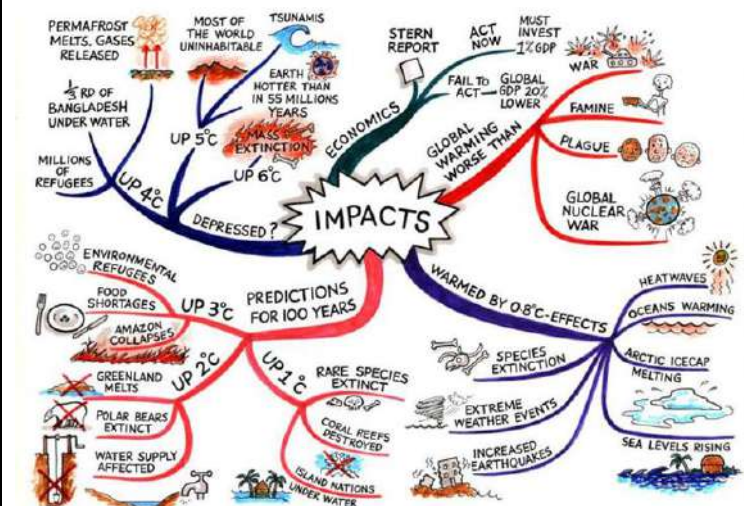


1. Define the term deforestation.
2. Give evidence, from the source, of deforestation.
3. Suggest reasons for the deforestation of the natural environment
4. Copy the table in your workbook and complete the information by following the instructions in the table. Use the source to complete the information in the table.

<i>List TWO changes that occurred in the environment</i>	<i>List One effect of these changes on the environment</i>	<i>List One solution to minimize the effect on the environment</i>
e.g. Artificial surfaces (tar and concrete) were created on the soil.	Less infiltration of water into the soil occurs, more direct runoff, flooding can occur.	Create more green areas to increase infiltration into the soil. Divert runoff into streams and rivers.

1			
2			

Activity 3 – Refer to the diagram below



1. With reference to the above diagram, discuss the impact of development on the Environment

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Topic: Role of Development Aid

In order to improve the standard of living, especially in developing countries, large sums of money are needed. International development aid is when the MEDCs help LEDCs with loans donations and assistance. The MEDCs are referred to as the donors as they are granting the aid and the LEDCs are referred to as the foreign aid recipients.

Aid is used to develop economies and improve services to better the quality of life for its population.

Aid can also be given with or without conditions.

Types of developmental aid

Developmental aid can be given in many different forms to developing nations. The diagram below outlines the main components of the different types of aid.

Financial aid	Technical aid	Conditional aid	Humanitarian aid
Transfer of money from MEDCs or international banks to LEDCs - Loans - Donations This aid can be either bilateral or multilateral aid.	- Expertise needed to promote development. - The construction, use of machinery or technology by foreign agents to promote development.	Foreign aid from a donor country that must be spent in a certain way in the country that receives the financial aid e.g. money must be spent on providing services for people.	Aid for humanitarian crises includes natural disasters and man-made disaster. Aim of humanitarian aid is to save lives, alleviate suffering, and maintain human dignity.

Financial aid

The aim of financial aid given by donor governments and other agencies is to support the economic, environmental, social, and political development of developing countries.

- Bilateral aid:** Aid given from one country directly to another.
- Multilateral:** Aid given by the donor country to an international organisation such as the World Bank or the United Nations Agencies (UNDP, UNICEF, UNAIDS, etc.) which then distributes it among the developing countries.
- NGOs:** NGOs in MEDCs provide funds for non-government organisations in LEDCs.



Technical aid (assistance)

The nature of technical assistance and technical cooperation has changed over the years. This type of aid involves the following:

- **Capacity building:** Improving the education and training of people in LEDC's governments to be better managers so development can take place. Interventions have become very task specific – see the IMF intervention on the next slide.
- **Project or programme support:** The help of skilled technical advisers in the planning and management of specific projects.



Conditional aid

Conditional or tied aid
- when one country donates money or resources to another (bilateral aid) but with conditions attached. These conditions will often be in the MEDC's favour, e.g. the controversial Pergau Dam project in Malaysia, where Britain used aid to secure trade deals with Malaysia.

Tied Aid Case Study: The Pergau Dam : Malaysia.



- Located along the River Pergau in the very most northern part of Sumatra, a Malaysian isle, near the Thai border.
- It is the most costly aid project ever funded by the British Government, over the half the total cost of £415 M was paid by the British Government
- Building began in 1981 with money from the UK foreign aid budget.

Humanitarian aid

What is Humanitarian Aid? Humanitarian Aid is aid and action designed to save lives, alleviate suffering and maintain and protect human dignity during and in the aftermath of emergencies. The characteristics that mark it out from other forms of foreign assistance and development aid are that:

1. It is intended to be governed by the principles of humanity, neutrality, impartiality and independence;
2. It is intended to be short term in nature and provide for activities in the immediate aftermath of a disaster. In practice it is often difficult to say where 'during and in the immediate aftermath of emergencies' ends and other types of assistance begin, especially in situations of prolonged vulnerability.

An example of humanitarian aid

The Haiti earthquake in 2010 required collaboration from several humanitarian groups. After complete destruction of the airport, relief efforts became complicated. However, with creative travel solutions via the French Antilles help arrived. The Red Cross organised much of it and reported that nearly \$500 million was raised. 51 humanitarian groups worked hand-in-hand and 22 000 families were helped.



The Impact of Aid on Development

ADVANTAGES OF AID	DISADVANTAGES OF AID
Education and skills training can be improved.	Government receiving aid may have secret bank accounts in which it hides the foreign aid money for private purposes.
A recipient country can receive a large sum of money to invest on the development of that country (power stations, harbours, bridges).	Food often ends up being sold privately on markets.
Money can be used to improve schools, health care and basic needs of people.	Aid sometimes has conditions attached e.g. governance and political reform.
Developing countries benefit from the expertise and modern technology of developed countries.	Some governments in LEDCs manipulate their indicators of development to make them appear poor and in this way receive extra aid payments.
Development projects create jobs, benefiting the local people and the economy.	Aid is perceived as a hand-out, not to assist in economic development.
	Debt repayments can outweigh the aid received.
	Projects encouraged are often inappropriate to the needs of the people.
	Products made in MEDCs from the LEDCs natural resources are sold back to them at higher process.

Activity 1 Match each statement below with the type of aid in the box	Activity 2 Read the extract from an article in FIGURE 1 and answer the questions that follow.
• Conditional aid • Multilateral aid • Humanitarian aid • Technical aid • NGO aid • Bilateral aid	FIGURE 1: DROUGHT IN AFRICA
1 Sweden grants financial aid to Lesotho with no conditions. 2 The UN organisation grants aid to South African farmers in rural areas. 3 The Red Cross assists flood victims in India 4 The South African public sends food and water to earthquake victims in Indonesia. 5 The Korean government assists Mozambique in building a large hydroelectric dam. 6 The Chinese government agrees to build a railway line in Angola in exchange for oil and gas.	EAST AFRICA'S DROUGHT: THE AVOIDABLE DISASTER The deaths of tens of thousands of people during the drought in East Africa could have been avoided if the international community, donor governments and humanitarian agencies had responded earlier and more swiftly to clear warning signs that a disaster was in the making, according to a new report. loom in West Africa and the Sahel, where growing food shortages are reported. [Adapted from The Guardian, Wednesday 18 January 2012] 1 What does the term development aid refer to? 2 What is the difference between bilateral aid and humanitarian aid? 3 Name ONE humanitarian aid organisation that plays an important

role in providing food to countries affected by famine.

4 Except food, name ONE other form of humanitarian aid.

5 Do you agree that humanitarian aid should be granted to avoid a humanitarian crisis in West Africa and the Sahel? Motivate your answer by discussing the advantages and/or the disadvantages of providing humanitarian aid.

Activity 3



Study FIGURE 3, which illustrates the effects of aid on the development of Third World countries.

- 1 Would you regard the type of aid in the illustration as being bilateral or multilateral?

- 2 Provide a reason for your choice in QUESTION 4.4.1.
- 3 Explain why the aid provided is unsustainable as depicted in the illustration.
- 4 Three types of aid, technical, conditional or humanitarian may be provided to recipient countries.
 - (a) Name the type of aid depicted in the illustration.
 - (b) Substantiate your answer to QUESTION 4.4.4(a).
- 5 In a paragraph of approximately EIGHT lines, describe how aid might have a positive impact on development in Third World countries.

Activity 5

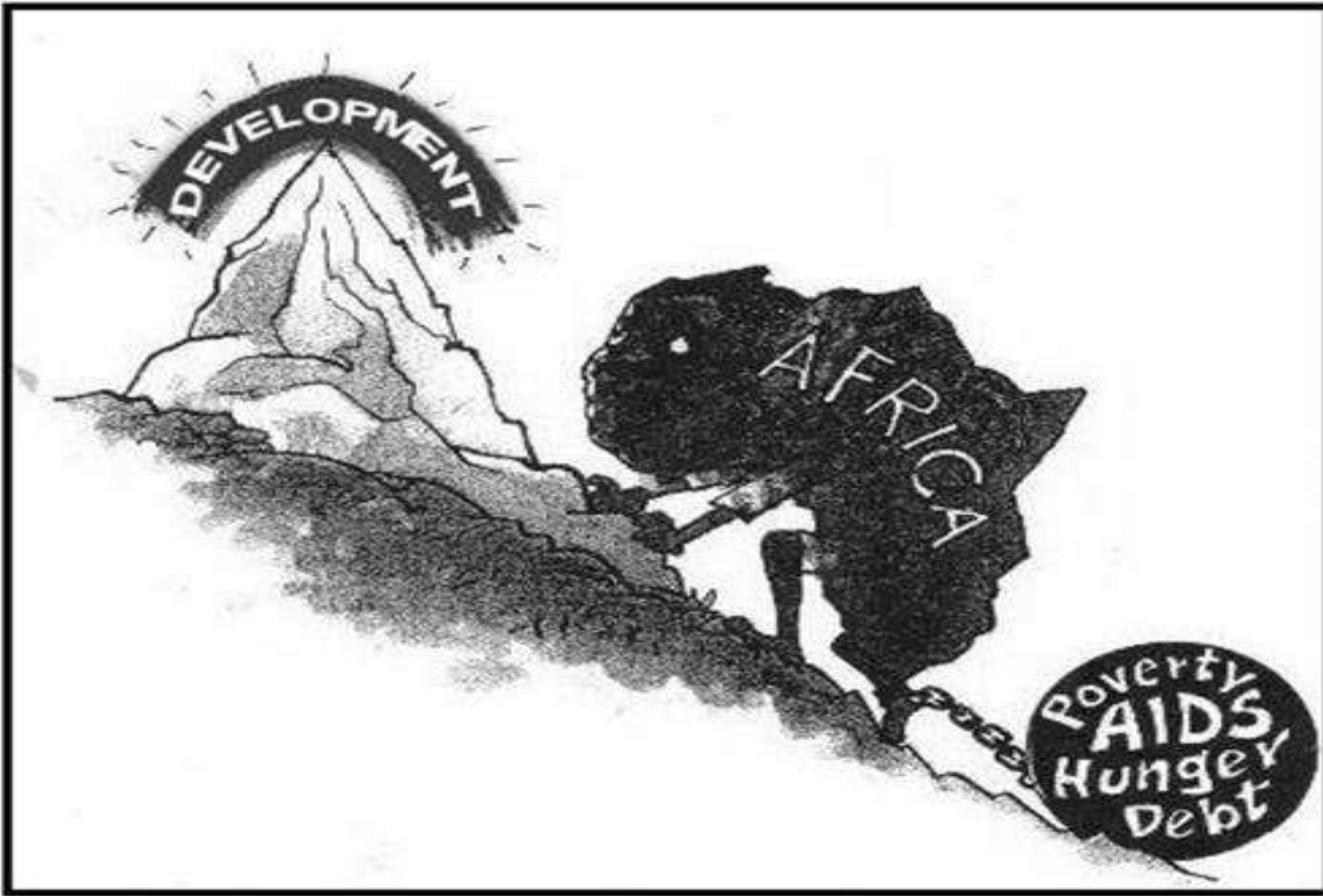
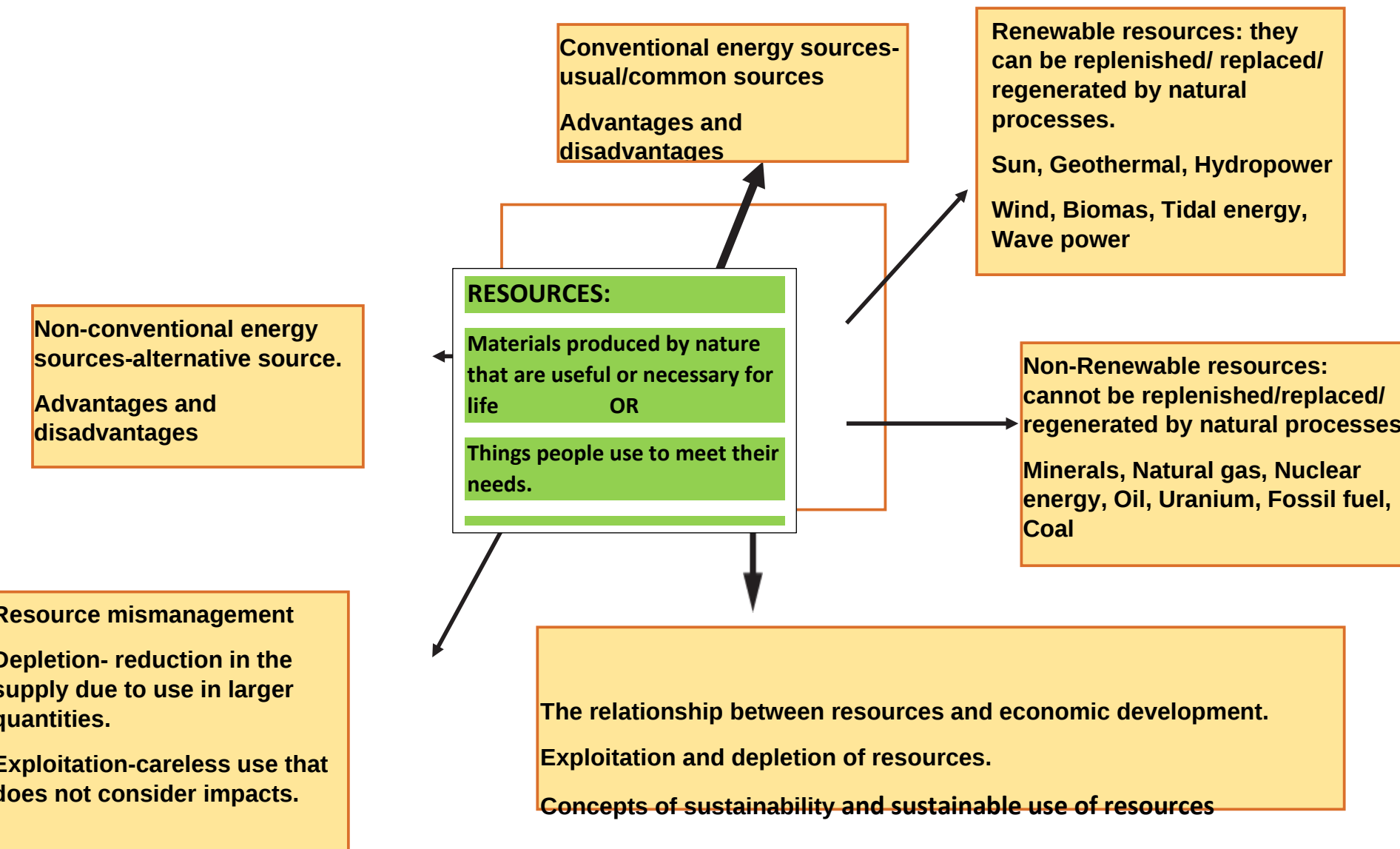


FIGURE 4.3 is a cartoon depicting development and challenges in Africa.

- 1 List any TWO challenges depicted in the cartoon affecting Africa.
- .2 Interpret how the cartoonist illustrates these challenges affecting Africa.
- 3 Development aid has been seen as a possible solution to the challenges faced in Africa. Explain what you understand by this concept.
- 4 Explain why Africa continues to have these challenges despite being a recipient of development aid.
- 5 The Ebola outbreak in West Africa claimed the lives of more than 5 000 people in 2014. Write a paragraph (approximately 8 lines) in which you analyse how humanitarian aid could prevent the spread of the disease.



IMPORTANT CONCEPTS

Biogas energy	The energy produced by the heat and methane gas that is released as plant and animal matter decompose (decay or breakdown)
Biomass energy	The energy produced by burning vegetation and organic material
Conventional energy Sources	These traditional resources include fossil fuels (coal, oil and natural gas), and nuclear power.
Fossil fuel	Fuels that have taken millions of years to form, e.g. oil and coal.
Geothermal energy	The energy produced by using the heat of underground rocks and water.
Greenhouse gases	Gases that add to the increase in temperature of the atmosphere.
Hydroelectric power	Electricity produced by using the force of running water.
MW	Abbreviation for megawatt it is 1 million watts.
National grid	The network of electricity cables, pylons and wiring which provide electricity from power stations to industries, homes and offices. To be plugged into the national grid means to be connected to the electricity supply.
Nuclear energy	The energy produced by nuclear reaction.
Pollution	A change in the characteristics or composition of air, water, soil or food that endangers our environment or us.
Radioactive fallout	Radioactive particles released into the atmosphere when, for instance, nuclear weapons are used, or a nuclear power plant explodes: these particles can enter the food chain when they settle on the ground or enter the groundwater.

Rankine cycle	The series of steps that are followed within a thermal electricity power plant.
Shaft	Vertical channel in a mine.
Solar energy	The energy produced by the heat of the sun's rays.
Thermal energy	Is creating using a resource that creates heat, (coal) called a fossil fuel.
Watt	1 unit of electrical power.
Wind atlas	A set or data on the wind speeds and direction of wind in a particular region. This data is collected over a 10 to 20-year period at a height of 30 to 100m above the ground.
Wind energy	The energy produced by using the wind to drive turbines and produce electricity
Year of commission	The year in which the plant or wind farm comes in operation.

Three Conventional energy sources and their impact on the environment.

4.1 Thermal energy production in South Africa

4.2. Hydro energy production in South Africa

4.3. Nuclear energy production in South Africa

4.1 Thermal energy production in South Africa

- Thermal energy is a fossil fuel that creates heat (also a natural gas).
- Coal is used to produce thermal energy.
- Oil is made from coal and fits into thermal energy production.
- This type of energy is harmful to the environment and releases harmful gasses that causes acid rain that contribute to climate change.



Principles

- Coal is a non-renewable energy resource for thousands of years.
- The abundance of coal reserves makes this energy source much cheaper than other forms of energy sources.
- There are numerous negative environmental issues that are associated with coal.
- The production of electrical energy using heat energy is known as thermal electrical energy production, the facility is a power station.

Processes.

If coal is quite close to the Earth's surface open cast mining is used. In this method rocks and soil are excavated to expose the coal layers beneath.

Underground mining took place if the coal is deep under the Earth's crust

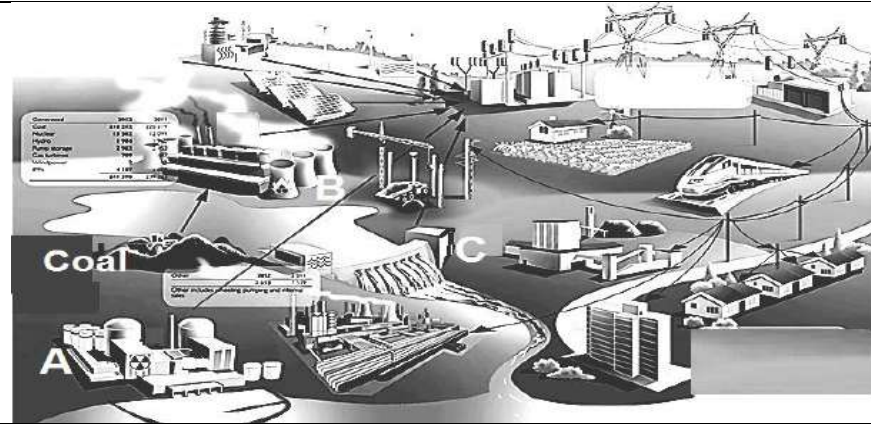
A shaft is sunk deep into the ground to transport the coal and miners. Smaller shafts allow fresh air in the mine. It helps the miners to breathe and prevents the accumulation of poisonous gases.

Transport costs are very high that is why coal mines and power plants are normally close to each other.

Coal is fed into the furnace or boiler of the power plant.

• Coal was formed millions of years ago because of plant material being buried and subject to high pressure and temperature. • Coal is extracted from the ground in one of two ways	The heat from the furnace is used to super-heat water, thus generating steam. The steam is then passed through a steam turbine and this causes the turbine to rotate, which in turn makes the electrical generator rotate, thus generating electricity. Above continuous process is known as the Rankine Cycle. It is a series of steps that are followed within a thermal electricity power plant. Electricity is transported by a series of transformers and power lines and fed in the national grid. Electricity is needed for residential, commercial and industrial spheres. The national grid: The network of electricity cables, pylons and wiring which provides electricity from power stations to industries, homes and offices.
Advantages	Disadvantages
Coal reserves are expected to last 300 years at current rates of extraction. Giant excavators helped to strip-mined coal at an economical rate. Coal is using in the iron and steel industry. Many jobs are created in coal mines	• Ash and cinders that remain after coal is burned contain pollutants and irritants. • Carbon monoxide, carbon dioxide and sulphur dioxide are the pollutants of burning coal. Sulphur dioxide causes acid rain and the other two contribute to global warming. • The easily accessible supplies of coal have been mined out. • Deeper-lying deposits are dangerous and expensive to mine. Mining accidents are common in coalmines. • Poisonous fumes are giving off many years in coal mines because of the burning of coal. • Poisonous chemicals often leach out of mine dumps and pollute water sources. • Coal is ugly, dirty and expensive to transport, that is the reason why power stations are built close to coal mines.
Activity 1 Refer to the diagram, FIGURE 1.1 illustrating the different power plants contributing to the national grid in South Africa.	

- 1.1.1 Name the types of power stations A, B and C respectively.
(3 × 1) (3)
- 1.1.2 From the sketch, identify TWO uses of electricity in South Africa.
(2×1) (2)
- 1.1.3 Discuss the impact of power station B on the environment.
(2 × 2) (4)
- 1.1.4 Use the diagram which shows how power is generated at B to explain in a paragraph of eight lines, the process of generating thermal electricity.
(4 × 2)(8)



Activity 2

Eskom says coal stocks have improved, but load shedding risk remains

[Source: Adapted from *fin24* article by Kumalo and Omarjee]



Power utility Eskom says its coal stocks improved over the festive season as it also carried out maintenance at power stations, but the country's power system is still constrained and load shedding remains a risk when businesses and industrial customers return to work next week. In December, Eskom CEO Phakamani Hadebe said in an interview with Johannesburg-based Radio 702 that there were chances the debt-laden power utility might institute stage-one load shedding from January 15, as businesses which are large users of electricity get back due to re-opening after the year end break. In late November and early December 2018, the power utility repeatedly instituted nationwide electricity rationing due to difficulties in completing scheduled and unscheduled maintenance at power plants, as well as damage to the power transmission lines linking South Africa to the Cahora Bassa hydroelectric dam in Mozambique.

1.2 Read the extract in FIGURE 1.2 referring to Eskom and load shedding.

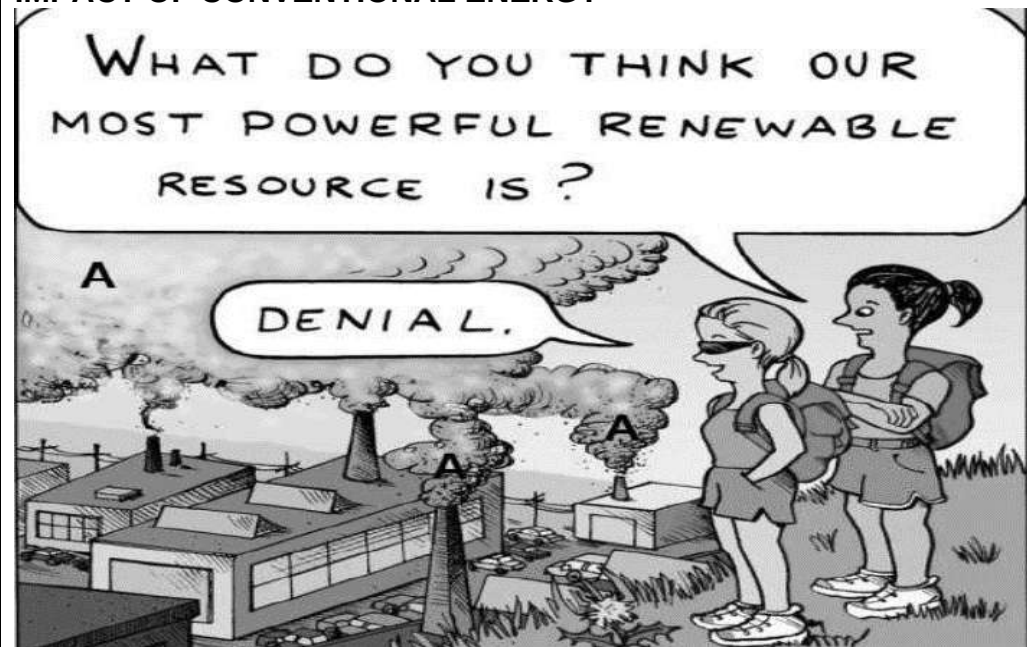
- 1.2.1 Name the type of electricity generated by Eskom. (1x1) (1)
- 1.2.2 What is *load shedding*? (1 x 1) (1)
- 1.2.3 From the extract, suggest TWO possible causes of load shedding. (2 x 1) (2)
- 1.2.4 How do the power stations (picture) harm the environment? (2x2) (4)
- 1.2.5 Why is South Africa so dependent on coal as a form of electricity? (2 x 2) (4)
- 1.2.6 Explain why reducing the country's dependency on coal would have a negative impact on the economy. (2 x 2) (4)

Activity 3

1.3. Refer to FIGURE 3.6, a cartoonist's impression of the use of a conventional energy source.

- 1.3.1 Name the type of energy that the industries in the cartoon make use of. (1 x 1) (1)
- 1.3.2 The question being asked in the cartoon is contrary (opposite) to what is depicted in the industries. Substantiate this statement. (1 x 2) (2)
- 1.3.3 Refer to the gasses at **A**, being emitted by the industries.
- (a) Name ONE type of gas being emitted by the industries. (1 x 1) (1)
- (b) Account for TWO types of atmospheric consequences that these gasses are responsible for. (2 x 1) (2)
- 1.3.4 Explain why the answer of 'DENIAL' is appropriate. (2 x 2) (4)
- 1.3.5 Despite the situation depicted in the illustration, the resource being used to generate energy is still important and vital to South Africa's economy. Explain TWO reasons why. (2 x 2) (4)

IMPACT OF CONVENTIONAL ENERGY



Activity 4 1.4 The extract in FIGURE 1.4 comes from President Zuma's, State of the Nations Address of 2015. 1.4.1 Name ONE short and medium term plans the government wants to implement to deal with South Africa's electricity challenges. (1 × 1) (1) 1.4.2 "The long-term plan involves finalising our long-term energy security masterplan", according to EX-President Zuma. Explain TWO measures that should be included in such a 'masterplan' to increase the energy output in South Africa. (2 × 2) (4) 1.4.3 Eskom is forced to use load shedding as a measure to reduce the burden on power stations. Discuss the effects that load shedding has on small businesses. (2 × 2) (4) 1.4.4 The use of diesel generators by Eskom, to fill the gap when power supply runs low, is common practice. Evaluate how sustainable this process is for the country as a whole. (3 × 2) (6)	ENERGY MANAGEMENT IN SOUTH AFRICA Bold plan to tackle South Africa's energy crisis <i>13 February 2015</i> President Jacob Zuma dedicated much of his State of the Nation Address (Sona) on 12 February to explain plans that are in motion to deal with the country's electricity challenges. Delivering the 2015 Sona in the National Assembly in Cape Town, Zuma unveiled a battle plan aimed at resolving short- and long-term energy challenges. He was speaking as Eskom's power grid remained constrained, with the power utility being forced to implement load shedding. "We have developed a plan which involves short-, medium- and long-term responses. The short- and medium-term plan involves improved maintenance of Eskom power stations, enhancing the electricity generation capacity and managing the electricity demand," said Zuma. "The long-term plan involves finalising our long-term energy security master plan. As a priority we are going to stabilise Eskom's finances to enable the utility to manage the current period. In this regard, [the] government will honour its commitment to give Eskom around R23-billion in the next fiscal year." Energy constraints hindered economic growth and were a major inconvenience to economic growth.
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4.3. Nuclear energy production in South Africa

It is halfway between a renewable and a non-renewable energy resource
 It uses uranium, which is a non-renewable mineral, yet the amount used is so small that the global uranium should not run out as a result of its use
 Therefore, it is a renewable energy source
 No immediate pollution is produced but it can have a health and environmental implication if it is not correctly managed
 South Africa nuclear energy plant is at Koeberg near Cape Town.



Advantages of a nuclear energy production:

A small amount of uranium contains a large amount of energy.
 Uranium is easily available from the USA, Kenya, South Africa, Canada and Australia.
 Running costs are cheaper than for a coal-fired power station.
 Produce lesser carbon dioxide.
 A small number of workers needed.

Disadvantages of a nuclear energy production:

Radio-active waste is produced which must be safely stored, reprocessed and disposed of
 Very expensive to build and dismantle power plants.
 Threat of radio-activity leaks.
 Although no immediate atmospheric pollution, the consequences of radioactive fallout from a leak would be devastating

NUCLEAR WASTE AND STORAGE:

Africa's only nuclear power plant is at Koeberg outside Cape Town
Here, all low-level waste is sealed in drums and sent to Vaalputs in the Northern Cape.
High level waste is stored on site at Koeberg because no adequate waste disposal site has yet been found or licenced
It takes many thousands of years to lose its (nuclear waste) radioactivity.



NUCLEAR POWER RODS

Activity 5

Read the extract in FIGURE 2.1, about the Swiss' vote against nuclear power.

2.1.1 Name the difference between renewable and non-renewable energy sources.

(2 x 1) (2)

2.1.2 State ANY TWO renewable electricity provision resources mentioned in the CASE STUDY that can be used as an alternative to nuclear power.

(2 x 1) (2)

2.1.3 The Swiss government wants nuclear power phased out. Give TWO reasons for this

SWISS VOTE AGAINST NUCLEAR POWER

Swiss voters have voted overwhelmingly in favour of a policy proposal to phase out nuclear power. Preliminary results of their referendum suggest that voters are in favour of environmentally friendly electric power.

The Swiss government, after the nuclear disaster at Fukushima in Japan, indicated that they wanted to move away from nuclear power. There is no indication when the country's five nuclear power stations will be closed.

Nuclear power currently provides a third of the country's electricity. Solar, wind and hydro power stations are beginning to play a larger role in providing electricity.

decision. (2 x 1) (2) 2.1.4 Discuss TWO negative effects of nuclear power that will support this decision of the Swiss government as mentioned in QUESTION 3.1.3. (2 x 2) (4) 2.1.5 If the Swiss government closes the five nuclear power stations, explain TWO negative impacts it could have on the Swiss economy. (2 x 2) (4)	 Source: Rose City FM (100point6.co.za)]
Activity 6 2.2 Read the fact file on nuclear power in South Africa and answer the questions. 2.2.1 Mention ANY TWO conventional sources of energy. (2x2) (4) 2.2.2 Explain why Koeberg was constructed in Western Cape and not in the interior of South Africa, e.g. Mpumalanga or Gauteng. (1x2) (2) 2.2.3 Describe TWO advantages of nuclear power.(2x2) (4) 2.2.4 Describe TWO disadvantages of nuclear power. (2x2)(4)	FACT FILE ON NUCLEAR POWER IN SOUTH AFRICA. • South Africa has one nuclear power station, Koeberg, on the Western Cape coast. • Koeberg provides 6% of South Africa's electricity supply. • Nuclear power stations provide 17% of the world's electricity supply. • Koeberg produces on average 12 300 GWh (gigawatt-hours) of electricity a year (equivalent of 4 700 giant wind turbines).

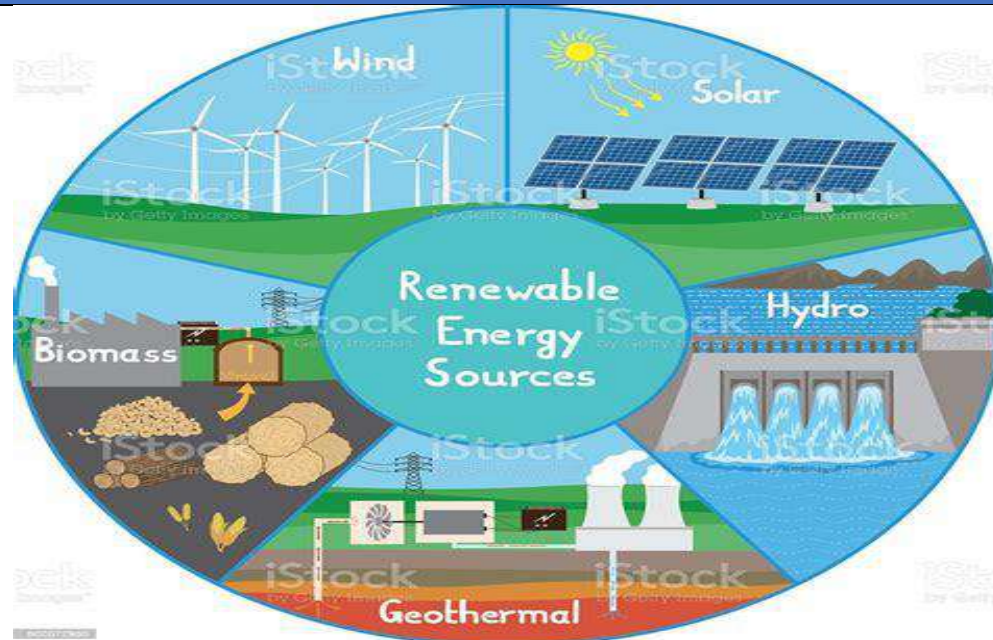
Non-conventional energy resources

(See concepts)

• Non-conventional energy is cleaner and better for the environment as well as being renewable

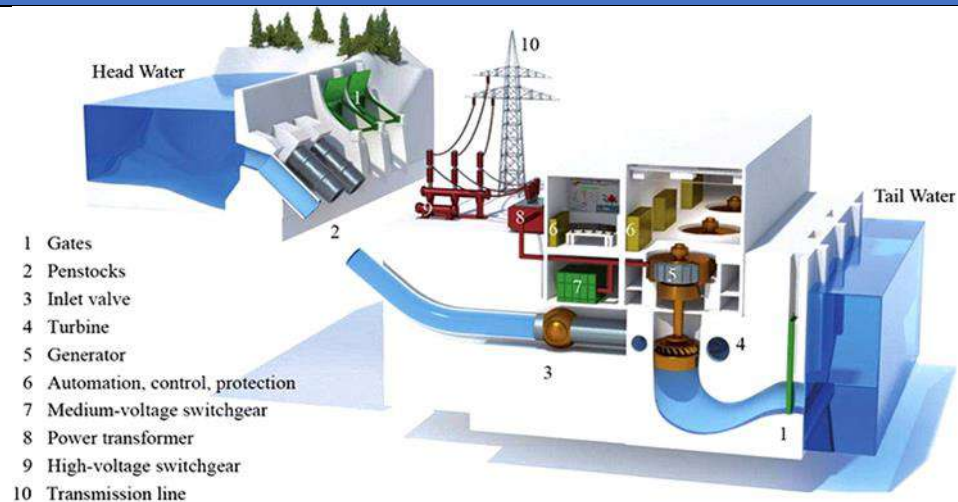
Non-conventional energy sources include:

- Solar power
- Wind power
- Hydro-electric power
- Wave and tidal power
- Biomass energy (the burning of agricultural and other waste for energy)
- Geothermal energy



Hydro energy production in South Africa

- Water is used to produce hydroelectric power or hydro energy
- It is a sustainable option and a renewable resource
- The Lesotho Highlands Water project in Lesotho provides South Africa from hydroelectric power



Activity 7 3.1 Choose the correct word in bracket to make the following statements true. 3.1.1 (5%/90%) of South Africa's energy is thermal. 3.1.2 (Water/coal) is used to produce thermal energy. 3.1.3 Hydro energy is a (non-renewable/renewable) resource. 3.1.4 (Hydro energy/nuclear) is halfway between a renewable and a non-renewable energy resource 3.1.5 Nuclear energy uses (coal/uranium) as a mineral. 3.1.6 South Africa nuclear energy plant is at Koeberg near Durban/Cape town). 3.1.7 More air pollution is produced by (nuclear energy/thermal). 3. 1.8 (Nuclear energy/Hydro energy) is generated by the Lesotho Highlands Water project. (8x1) 8	Activity 8 3.2 Match the list of terms below with the statements (3.1.–3.7). Write only the number (3.2.1–3.2.6) and the correct answer, for example 6.7 Geography. Fracking; Extraction; Thermal energy; Conventional; Biomass energy; Non-Conventional; Biogas energy 3.2.1 Energy transferred from one source to another 3.2 2The removal of raw materials from its natural environment 3.23 Energy of the usual type, normal or traditional 3.2.4 Energy sources that provide an alternative. 3.2.5 The energy produced by heat and from the methane gas that is released, as plant and animal matter decompose. 3.2.6 The energy produced by burning vegetation and organic material 3.2.7 Extracting natural gas from sedimentary rocks.
Activity 9 3.3 Read through the newspaper article <i>Solar power changes villagers</i> lives in FIGURE 3.5 and answer the following questions. 3.3.1 State what you understand by	SOLAR POWER CHANGES VILLAGES The days of cutting firewood for cooking and heating water are over for about 80 Xholobeni villagers in Mbizana who received solar panels and geysers from the Eastern Cape rural development and agrarian reform department. The project was started earlier this year by former MEC Zoleka Capa as a means providing

<i>alternative energy</i>. (1 x 1) (1) 3.3.2 Suggest a possible reason why 'Eskom had no immediate plans To electrify the village'. (1 x 2) (2) 3.3.3 Identify the device that will be used for converting solar power into energy in the village. (1 x 1) (1) 3.3.4 Explain how electricity will help eradicate poverty for the villagers. (2 x 2) (4) 3.3.5 In a paragraph of approximately 8 lines explain the benefits that solar energy has for the world. (4 x 2) (8)	alternative energy to villagers after it was become known that power utility Eskom had no immediate plans to electrify the village. The one-kilowatt solar panels provide the 80 households with enough energy for lights and to connect other household appliances and the 100-litre solar geyser ensure warm bath water daily. (Source: Daily Dispatch (28/07/2014) - Lulamile Feni)
Activity 10 3.4 Read through the newspaper article on 'Wind turbines', FIGURE 3.6, to answer the following questions. 3.4.1 Explain what <i>wind energy</i> is. (1 x 2) (2) 3.4.2 Is wind energy a form of conventional or non-conventional energy? (1 x 1) (1) 3.4.3 Interpret what is meant by the following statement: "SA to enter clean green energy era". (1 x 2) (2) 3.4.4 '... the Van Stadens project has however, not all been a breeze	Van Stadens wind turbines set for Eskom grid hook-up SA to enter clean energy era Clean green electricity will become a reality later this week when South Africa's first utility-scale, privately owned wind farm connects to the electricity grid. All eyes will be on the nine Metro's and turbines at Van Stadens near Port Elizabeth as the developers test the R500 million state-of-the-art renewable energy equipment in the build-up to the official 27MW facility to the Eskom grid in just over two months' time. Afri-Coast Engineers director Donald McGillivray – who has spent 10 years pioneering renewable wind energy in South Africa – said after a year of construction on the outskirts of Blue Horizon Bay, they were now counting the days until they started supplying much needed power to the Nelson Mandela Metro from February next year. "It is exciting to see everything coming together so quickly," he said. Mc Gillivray said the hot commissioning of the project – which will start one turbine at a time was critical to ensuring the success of the project. Erected using the biggest crane on the African continent, the Van Stadens project has, however, not all been a breeze for the developers after a handful of local residents complained about the towering wind turbines on a hill above the seaside village.

for the developers after a handful of local residents complained about ...' State TWO possible complaints that could have been levelled by the residents against these wind turbines. (2 x 2) (4) 3.4.5 In a paragraph of approximately 8 lines explain why the use of energy forms such as wind energy is increasing throughout the world. (4 x 2) (8)	The objections from a few wealthy landowners have come despite the development obtaining all environmental approvals and permits required and guaranteeing impoverished local township residents a substantial portion of the project equity and revenue over the next 20 years. Several costly legal challenges have fallen flat. "The fourth-generation wind turbines are quieter than older wind turbines and all wind farms have to comply with strict environmental authorization requirements, which include noise emissions," said McGillivray. "The wind farms will improve both the quality and reliability of the electricity supply to Blue Horizon Bay and surrounding areas." [Source: David MacGregor (Senior Reporter – <i>Daily Dispatch</i>)]
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Activity 11

3.5.1	Thermal energy	A	Energy generated from the power of tides
3.5.2	Nuclear power	B	Government is supplying panels at subsidised rates to increase this type of power usage
3.5.3	Hydro energy	C	Energy mostly from the coal burned in power stations
3.5.4	Solar power	D	Energy gathered from hot rocks below the earth's surface
3.5.5	Tidal Power	E	The use of organic material, especially plant and vegetable matter to generate electricity
3.5.6	Geothermal energy	F	Electricity produced from controlled reactions taking place in atomic nuclei
3.5.7	Biofuels	G	Power generated from falling water
3.5.8	Biomass	H	Fuel formed from natural organic matter

Activity 12

3.6 Study the Pie graph and answer the following questions.

3.6.1 Why is South Africa so dependent on coal as a source of energy? (1 x 1) (1)

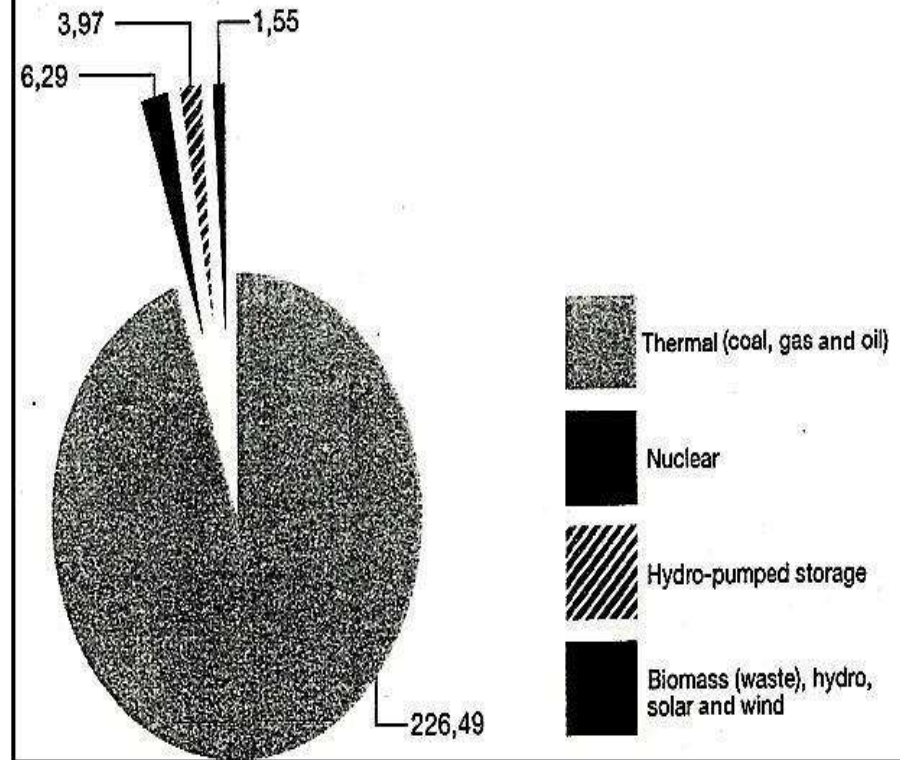
3.6.2 Refer to the expression “carbon footprint” to explain the environmental effects of coal. (2 x 2) (4)

3.6.3 Why does nuclear energy have a bad name? (1 x 1) (1)

3.6.4 Does hydropower use a renewable or non-renewable resource? Provide a reason for your answer. (2 x 1) (2)

3.6.5 Why is the generation of energy from renewable resources unreliable? (1 x 2) (2)

3.6.6 Write a short paragraph (not more than SIX lines) to suggest management strategies the South African government can put in place to help consumers reduce their carbon footprint (3 x 2) (6)



SOURCES USED:

- Excellent Geography Grade 11: Collin van Rensburg
- Solutions for All Geography Grade 11: J. Brett et. al
- Top Class Geography Grade 11: P. Esterhuysen et. al
- Via Afrika Geography Study Guide Grade 11: P.A.T Beets et. al
- Eastern Cape Papers
- JW Question papers
- D7 Papers