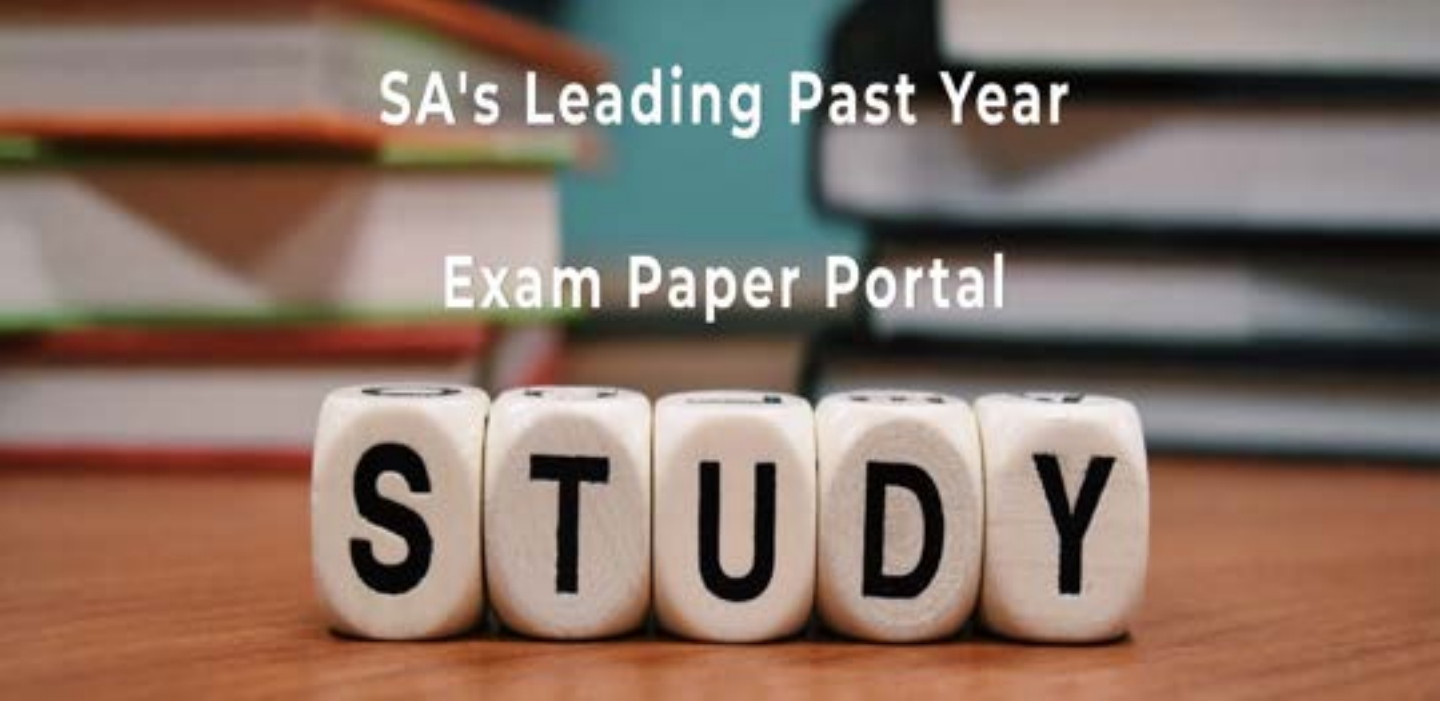

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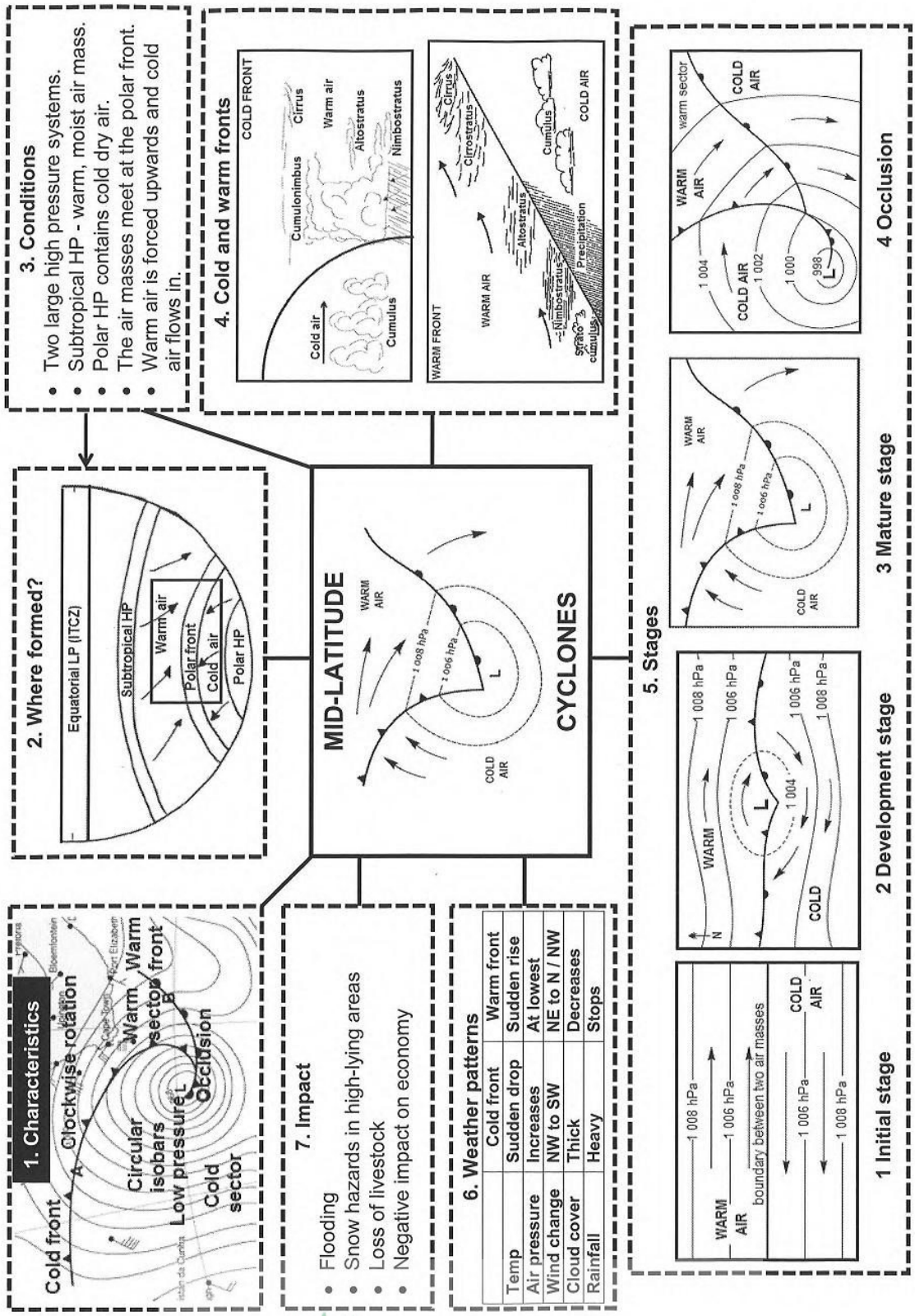
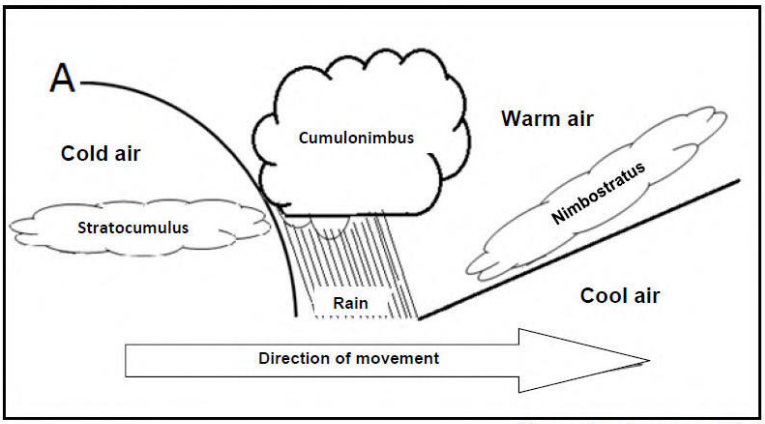


Mid-latitude Cyclones

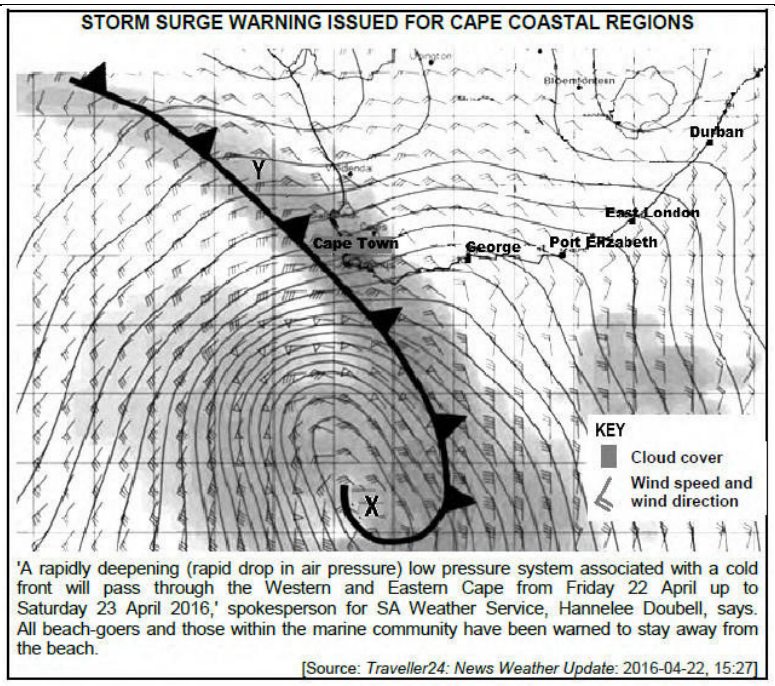
Activity 1 Time frame- 12 minutes

N15 1.4	**FIGURE 1.4: CROSS-SECTION OF A COLD FRONT**  [Source: Examiner's own sketch] Study FIGURE 1.4, which shows a cross-section of a cold front, and answer the questions that follow.		
1.4.1	Give ONE point of evidence that **A** shows a cross-section of a cold front.	(1 x 1)	(1)
1.4.2	Why do cumulonimbus clouds develop along front **A**?	(1 x 2)	(2)
1.4.3	Once the cold front passes over, air pressure will increase. Explain why this is the case.	(2 x 2)	(4)
1.4.4	With reference to the diagram in FIGURE 1.4, write a paragraph of approximately EIGHT lines in which you explain the development of a cold front occlusion.	(4 x 2)	(8)

	Memo	
1.4.1	Shape of front/convex (1) Steep gradient of front (1) Cloud – cumulonimbus (1) Cold air behind the cold front (1) [ANY ONE]	(1 x 1)
1.4.2	Cold air undercuts the warm air (2) Warm air is forced to rise very high (2) Large scale condensation takes place (2) Steep gradient causes rapid/strong upliftment of air (2) [ANY ONE]	(1 x 2)
1.4.3	Cold air/drop in temperature behind the cold front (2) Cold air heavy and dense thus increasing air pressure (2)	(2 x 2)
1.4.4	Air behind the cold front is colder than the air in front (2) Cold air moves faster than warm air (2) Cold front catches up with the warm front (2) Catches up at the apex, because it is the shortest distance between the fronts (2)	(4 x 2)

	Cold front undercuts the warm front (2) Warm sector is lifted off the surface (2) [ANY FOUR]	

Activity 2 Time frame 12 minutes

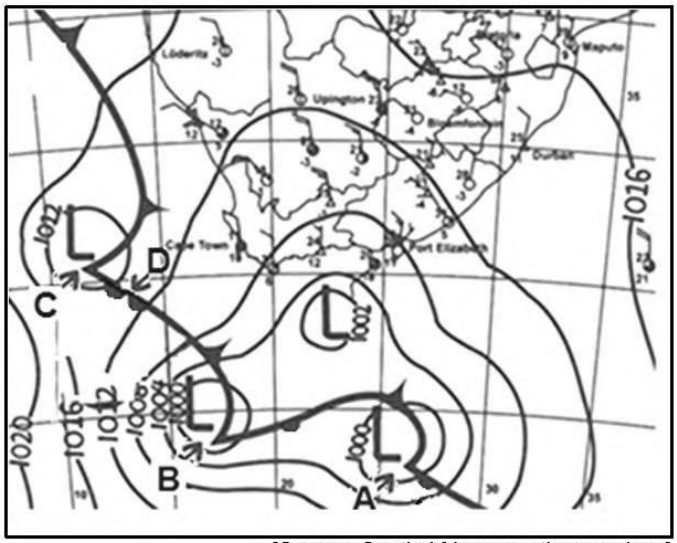
N17 1.3	 'A rapidly deepening (rapid drop in air pressure) low pressure system associated with a cold front will pass through the Western and Eastern Cape from Friday 22 April up to Saturday 23 April 2016,' spokesperson for SA Weather Service, Hannelee Doubell, says. All beach-goers and those within the marine community have been warned to stay away from the beach. [Source: *Traveller24: News Weather Update*: 2016-04-22, 15:27] Refer to FIGURE 1.3 based on a cold front.		
1.3.1	What evidence in the diagram indicates that **X** is a rapidly deepening low pressure?	(1 x 1)	(1)
1.3.2	Describe the predicted change in temperature and air pressure that Cape Town will experience.	(2 x 1)	(2)
1.3.3	Account for the cumulonimbus cloud that will form at Y.	(1 x 2)	(2)
1.3.4	Why have beach-goers been warned to stay away from the beach?	(2 x 2)	(4)
1.3.5	How can residents of the Cape coastal regions reduce the negative impact of the cold front?	(2 x 2)	(4)

MEMO

N17 1.3	Refer to FIGURE 1.3 based on a cold front.		
1.3.1	Isobars closely spaced together (1) Steep pressure gradient (1) Station models show high wind speed (1)	(1 x 1)	(1)
1.3.2	Temperatures will decrease/drop (1) Air pressure will increase/rise (1)	(2 x 1)	(2)
1.3.3	Cold air undercuts the warm air, forcing it to rise rapidly and (very) high (2)	(1 x 2)	(2)

	Steep gradient of the cold front forces warm air to rise (very) high (2)		
1.3.4	Storm surges/high waves will make the sea rough/dangerous (2) Coastal flooding is likely to occur (2) Possibility of sandstorms (2) Strong winds (2) Possibility of thunder and lightning/hail (2) Heavy rain (2) Strong possibility of injury OR loss of life for people (2)	(2 x 2)	(4)
1.3.5	Residents should stay indoors/delay travelling/seek shelter (2) People living in low-lying areas should vacate their homes and seek shelter on higher ground (2) NGOs and shelters can provide homeless people with shelter/blankets (2) People can stock up on food/water/candles (2) Stock up on medical supplies (2) People engaged in livestock farming make provisions to shelter livestock (2) Secure belongings/property (2) Boarding up windows (2) Placing sandbags (2) Maintenance of electricity connections (2) Maintain drainage systems (2) Secure boats and vessels in harbours (2) Listen to media broadcasts to prepare for storm (2) Having generators on standby (2) Evacuation plans in place (2)	(2 x 2)	(4)

Activity 3 Time frame 12 minutes

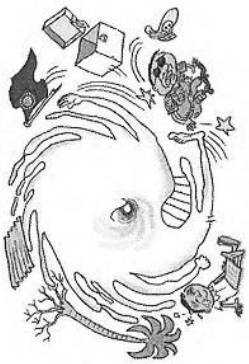
Nov 18 1.3	 [Source: South African weather services] Study FIGURE 1.3 showing mid-latitude cyclones on a synoptic weather map of southern Africa.		
1.3.1	Give the term used to describe the linked mid-latitude cyclone	(1 x 1)	(1)
1.3.2	What evidence suggests that mid-latitude cyclone A is the oldest	(1 x 2)	(2)
1.3.3	Why is front D NOT associated with heavy rain?	(1 x 2)	(2)
1.3.4	What causes the dissipation of mid-latitude cyclones?	(1 x 2)	(2)
1.3.5	Write a paragraph of approximately EIGHT lines explaining the weather conditions that will be experienced by a tourist visiting Cape Town with the approach of a cold front.	(4 x 2)	(8)

Memo

Nov 18 1.3	Study FIGURE 1.3 showing mid-latitude cyclones on a synoptic weather map of southern Africa.		
1.3.1	Family of cyclones/depressions	(1 x 1)	(1)
1.3.2	It is further east/south/south-east (2) Movement is eastwards, therefore A is ahead of B and C (2)	(1 x 2)	(2)
1.3.3	Less moisture causes less/no rainfall (2) Warm air from the warm sector is uplifted slowly and more gently (gentle gradient) (creating stratus/altostratus/cirrus and cirrostratus clouds, and causes no rain) (2) Softer rainfall from nimbostratus clouds (2)	(1 x 2)	(2)
1.3.4	The cold front catches up to the warm front/two fronts merge (2) Warm air is displaced off the earth's surface (occluded)/Occlusion has taken place (2) Warm and cold air masses move horizontally past one another again (2)	(1 x 2)	(2)

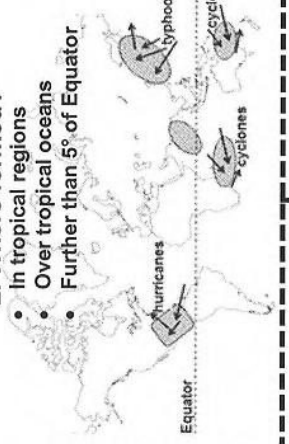
1.3.5	**Once passed over** Lower temperatures as a result of cold air behind the cold front (2) Strong winds due to strong pressure gradient (2) West to south westerly winds/backing as a result of clockwise spiralling air (2) Dense cloud cover due to strong uplift of warm air (2) Cumulonimbus clouds will result in heavy rainfall/thunderstorms/hail (2) Atmospheric pressure will be higher due to the cold, dense air following the cold front (2) Decreasing humidity due to cold air being more dense (2) Snowfalls may occur as dewpoint temperature is reached below freezing point (2) OR **While approaching** Fairly high temperatures will remain as one is still in the warm sector (2) Gentle to moderate winds as the pressure gradient is weak (2) Northwest to westerly winds as a result of the clockwise spiralling of air (2) Low stratus clouds with clear patches as a result of the slow rising air (2) Stratus clouds could result in scattered rain (2) Atmospheric pressure will be low as a result of the warm, less dense air (2) Humidity will be relatively low as warm air is less dense (2) [ANY FOUR. CREDIT CANDIDATE FOR ANY VALID FACTOR GIVEN]	(4 x 2)	(8)

TROPICAL CYCLONES



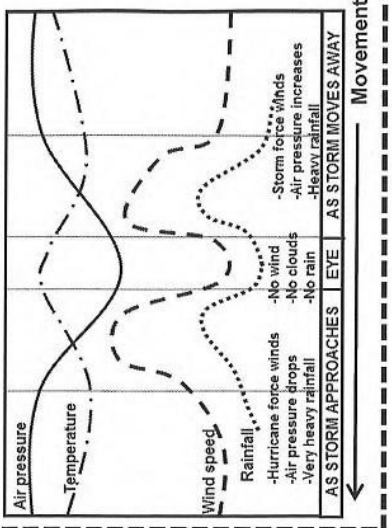
1. General characteristics
- Intense low pressures.
- Named in alphabetical order.
- During late summer or autumn.
- Move from EAST to WEST. AWAY from the equator. Turns EAST at 30°.
- Causes destruction by hurricane force winds, storm surges and heavy rainfall.

2. Where formed?
- In tropical regions
- Over tropical oceans
- Further than 5° of Equator

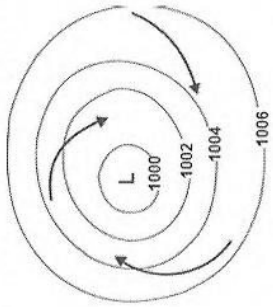


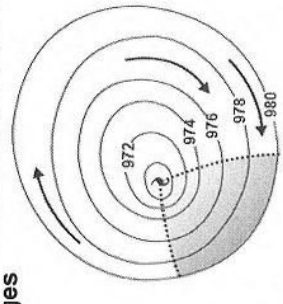
3. Conditions
- Sea temperature at least 26°C.
- High humidity.
- Unstable air.
- Little surface friction.
- Light variable winds
- Air pressure below 950 hPa
- Air divergence in upper levels

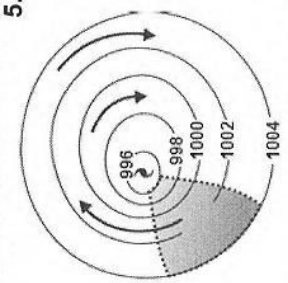
4. Weather patterns

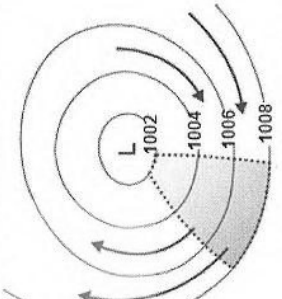


5. Stages









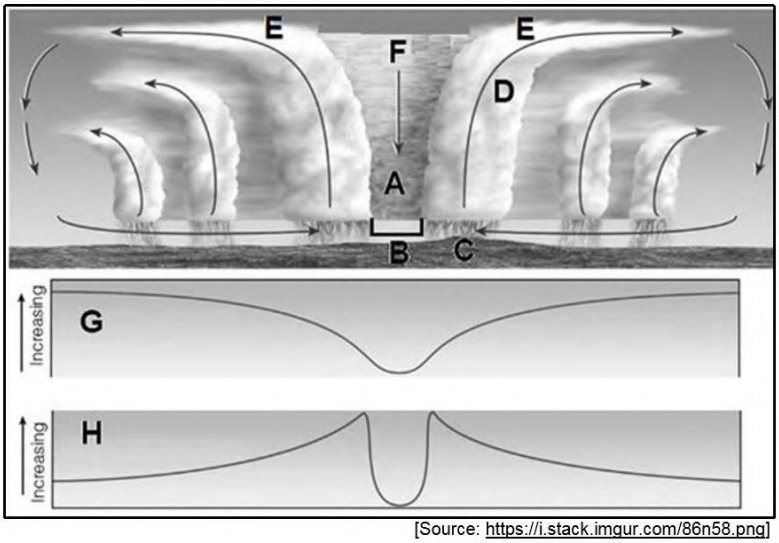
1 Formative stage(above 1000hpa) 2 Immature stage(below 1000hPa) 3 Mature stage(far below 1000hPa) 4 Degenerating stage(rises 1000hPa)

6. Impact
- *Infrastructure:* Roads/bridges/pipelines
- *Economy:* Business/crops/costs
- *Social:* Deaths/property damaged
- *Environment:* Erosion/water polluted

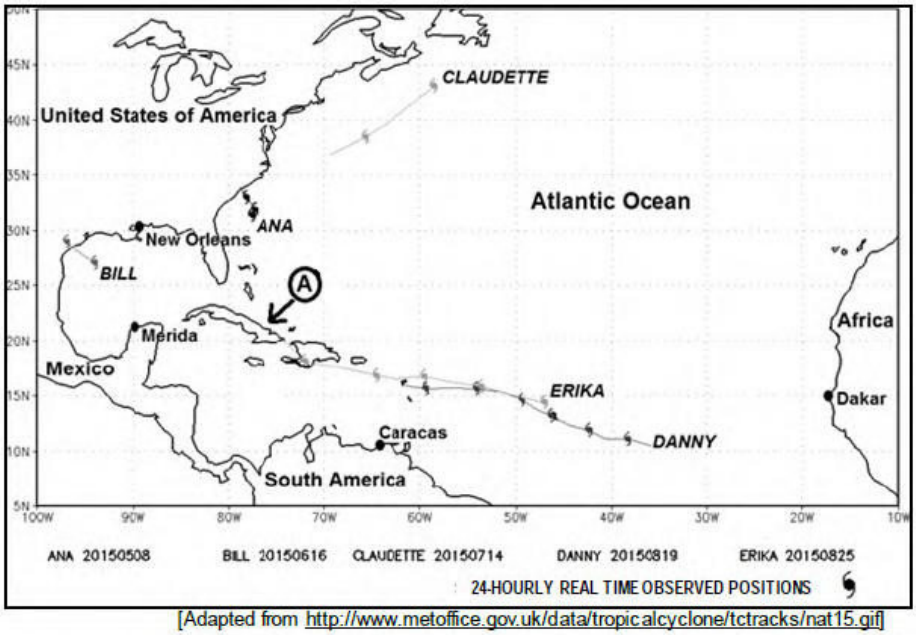
7. Strategies
- Good weather forecasts.
- Keep public informed by tracking storm
- Early warning systems.
- Medical- and rescue services on alert.
- Build houses with strong materials.
- Evacuation routes and procedures
- Avoid crossing strongly flowing rivers

Tropical Cyclones

Activity 4 Time frame 6 minutes

N18 1.1	 [Source: https://i.stack.imgur.com/86n58.png] Study FIGURE 2.1, a cross-sectional view of a tropical cyclone. Choose the correct word(s) from those given in brackets which will make each statement geographically CORRECT. Write only the word(s) next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK.	
2.1.1	The (eye/vortex) at A is characterised by descending air.	**eye**
2.1.2	The area at B is an area of (high/low) air pressure.	**low**
2.1.3	(Light/Heavy) rainfall occurs at C.	**Heavy**
2.1.4	The vertical movements of air at D are known as (updraughts/down draughts).	**updraughts**
2.1.5	The upper air at E is (converging/diverging).	**diverging**
2.1.6	F is associated with (low/high) air pressure.	**high**
2.1.7	The graph (G) shows air (pressure/temperature) with the passage of the tropical cyclone.	**pressure**
2.1.8	Surface (air temperature/wind speed) is depicted by graph H.	**Wind speed**

Activity 5 Time Frame 12 minutes

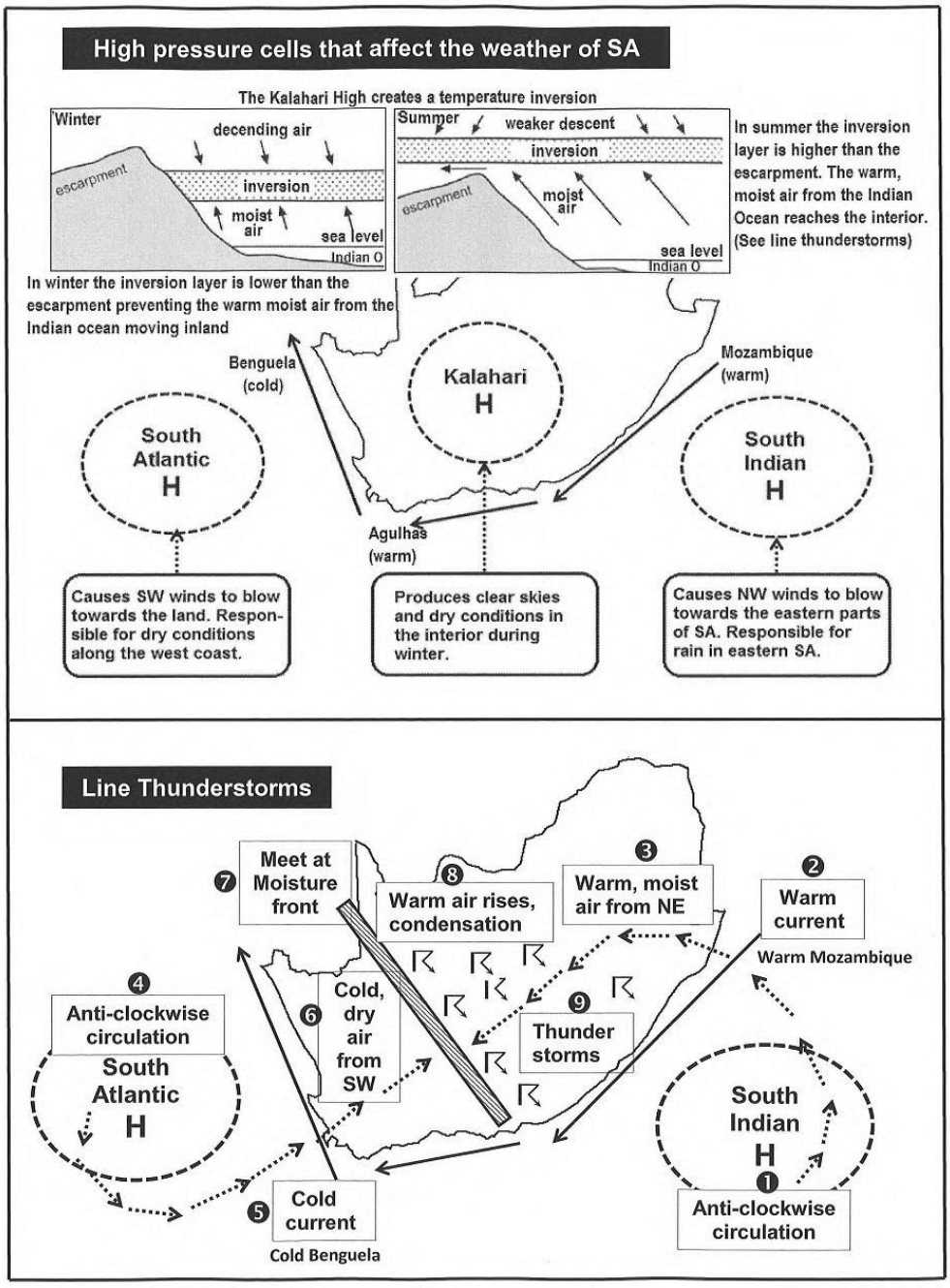
M17 2.3	 [Adapted from http://www.metoffice.gov.uk/data/tropicalcyclone/tctracks/nat15.gif] Study FIGURE 2.3 showing the observed tracks of tropical cyclones in the USA.		
2.3.1	How many tropical cyclones occurred in the 2015 season?	(1 x 1)	(1)
2.3.2	Why do tropical cyclones move in a westerly direction?	(1 x 1)	(1)
2.3.3	Give the term used to refer to tropical cyclones in this part of the world.	(1 x 1)	(1)
2.3.4	Discuss TWO conditions that promote the development of tropical cyclones.	(2 x 2)	(4)
2.3.5	The path of a tropical cyclone can be very erratic (unpredictable). In a paragraph of approximately EIGHT lines, give possible reasons for the erratic path they follow and why this creates problems for disaster management teams to effectively manage the impact of tropical cyclones.	(4 x 2)	(8)

Memo

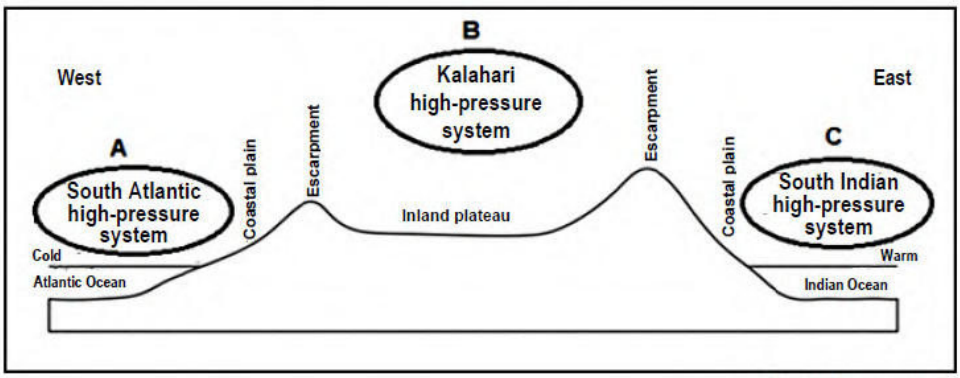
M17 2.3	Study FIGURE 2.3 showing the observed tracks of tropical cyclones in the USA.		
2.3.1	5/Five (1)	(1 x 1)	(1)
2.3.2	Steered by the tropical easterlies/trade winds (1)	(1 x 1)	(1)
2.3.3	Hurricanes (1)	(1 x 1)	(1)
2.3.4	Ocean surface temperatures of 26°C 0r higher (2) High humidity/High evaporation rate (2) Little surface friction (2)	(2 x 2)	(4)

	Light variable winds/wind shear (2) Calm conditions needed for the convergence of air (2) Upper air divergence to create a low pressure on the surface (2) In spiralling clouds lead to the development of the eye (2) Unstable atmospheric conditions for convection (2) Rapid condensation releases latent heat (2) Between latitudes of 5° and 25° N/S – active Coriolis force (2)		
2.3.5	**ERRATIC PATH** Ocean waters are heated and cooled differently and this influences the path taken by the cyclone (2) Wind direction varies from day to day thus influencing the path taken by the cyclone (2) Cyclones experience friction over landmasses and lose momentum (2) Combination of wind direction in the tropical cyclone and the direction of the winds in the wind belt (2) **PROBLEMS THIS POSES FOR THE DISASTER MANAGEMENT TEAMS** Don't know where cyclone will hit next (2) Insufficient time to predict location of storm surges (2) They have insufficient time to evacuate people from high risk areas (2) Don't have sufficient time to gather emergency services (2) Insufficient time to plan for effective evacuation plans in advance (2) Unable to give people advance notice to stock up on emergency food/water/medical supplies (2) Farmers are not given sufficient time to move livestock to areas of safety/higher ground (2) Cost implications if areas are evacuated unnecessarily (2) [ANY FOUR – MUST REFER TO ERRATIC PATH AND PROBLEMS]	(4 x 2)	(8)

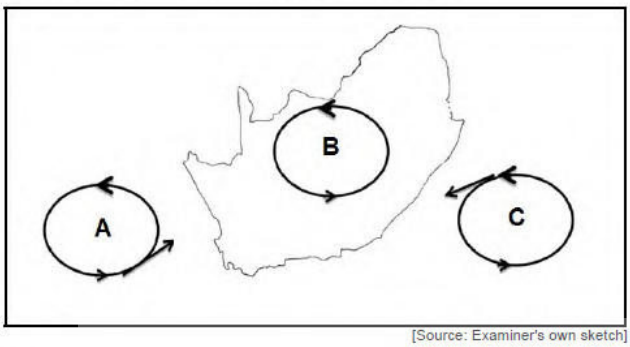
Subtropical Anticyclones and Associated Weather Conditions



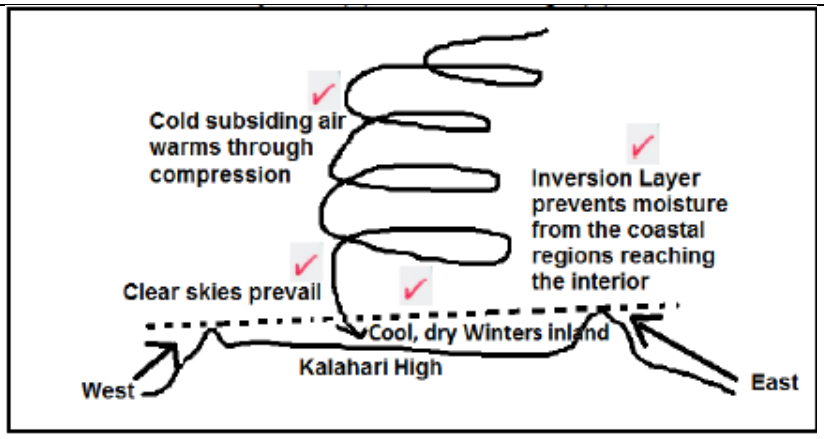
Activity 6 Time frame 6 minutes

N15 1.1	**FIGURE 1.1: ANTICYCLONES OVER SOUTH AFRICA**  [Adapted from cnx.org] Refer to FIGURE 1.1, which shows the position of anticyclones over South Africa. Indicate whether each of the statements below refers to anticyclone **A**, **B** or **C**. Write only the letter (**A**, **B** or **C**) next to the question number (1.1.1–1.1.7) in the ANSWER BOOK.	
1.1.1	The subsiding air causes semi-arid conditions on the West Coast of South Africa.	A (South Atlantic High)
1.1.2	In summer this pressure cell is found at a higher altitude due to surface heating.	B (Kalahari High)
1.1.3	The subsiding air forms an inversion layer in winter that prevents moist air from reaching the interior.	B (Kalahari High)
1.1.4	The ridging of this pressure cell results in rainfall over the South-western Cape.	A (South Atlantic High)
1.1.5	Interaction with a coastal low results in berg wind conditions.	B (Kalahari High)
1.1.6	Sometimes this pressure cell is known as a blocking high when it is in the path of a mid-latitude cyclone.	C (South Indian High)
1.1.7	This pressure cell is generally associated with fog and reduced visibility.	A (South Atlantic High)

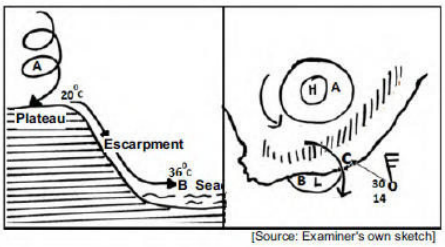
Activity 7 Time frame 12 minutes

M16 1.4	**FIGURE 1.4: ANTICYCLONES OVER SOUTH AFRICA**  [Source: Examiner's own sketch] Study FIGURE 1.4, showing anticyclones over South Africa.	

1.4.1	Name each of anticyclones **A**, **B** and **C**.	(3 x 1)	(3)
1.4.2	Anticyclones are associated with stable weather conditions over the interior of South Africa, particularly during winter. Draw a labelled sketch to illustrate the influence of the interior anticyclone on South Africa's weather.	(4 x 1)	(4)
1.4.3	In a paragraph of approximately EIGHT lines, explain the influence of the intertropical convergence zone (ITCZ) on the changing position of the three anticyclones, relative to South Africa.	(4 x 2)	(8)

	Memo		
1.4.1	A: South Atlantic Anticyclone (1) or St Helena High (1) B: Kalahari Anticyclone (1) or Continental High (1) C: South Indian Anticyclone (1) or Mauritius High (1)	(3 x 1)	(3)
1.4.2		(4 x 1)	(4)
1.4.3	**THE IMPACT OF ITCZ ON ANTICYCLONES** The Earth is tilted 23½° to the vertical, as it faces the sun (2) This causes the ITCZ to shift north and south of the equator from season to season (2) Pressure belts follow the apparent migration of the sun (2) In summer the 3 anticyclones are located further south (2) In winter the 3 anticyclones are located further north (2) [ANY FOUR]	(4 x 2)	(8)

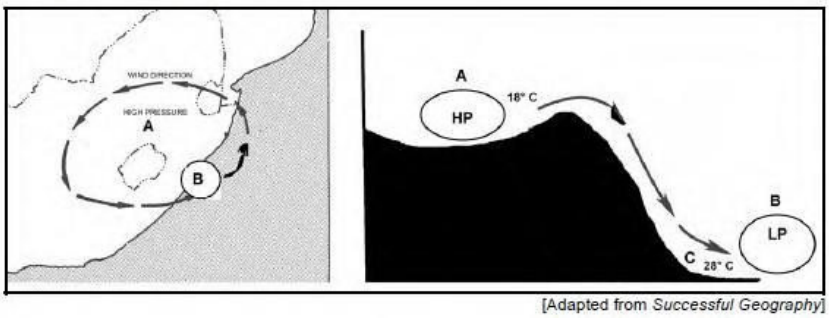
Activity 8 Time frame 12 minutes

1.4	FIGURE 1.4: BERG WIND CONDITIONS  [Source: Examiner's own sketch] FIGURE 1.4 shows berg wind conditions.		
1.4.1	Name high pressure cell **A**.	(1 x 1)	(1)
1.4.2	In which season do berg winds generally occur?	(1 x 1)	(1)

1.4.3	With reference to the diagram, state TWO conditions under which berg winds originate.	(2 x 2)	(4)
1.4.4	Give ONE reason for the change in the temperature of berg winds as they blow from the interior (**A**) to the coast (**B**).	(1 x 2)	(2)
1.4.5	Refer to the weather station at **C** and give ONE reason for the clear skies.	(1 x 2)	(2)
1.4.6	Why are berg winds associated with veld fires in winter?	(2 x 2)	(4)

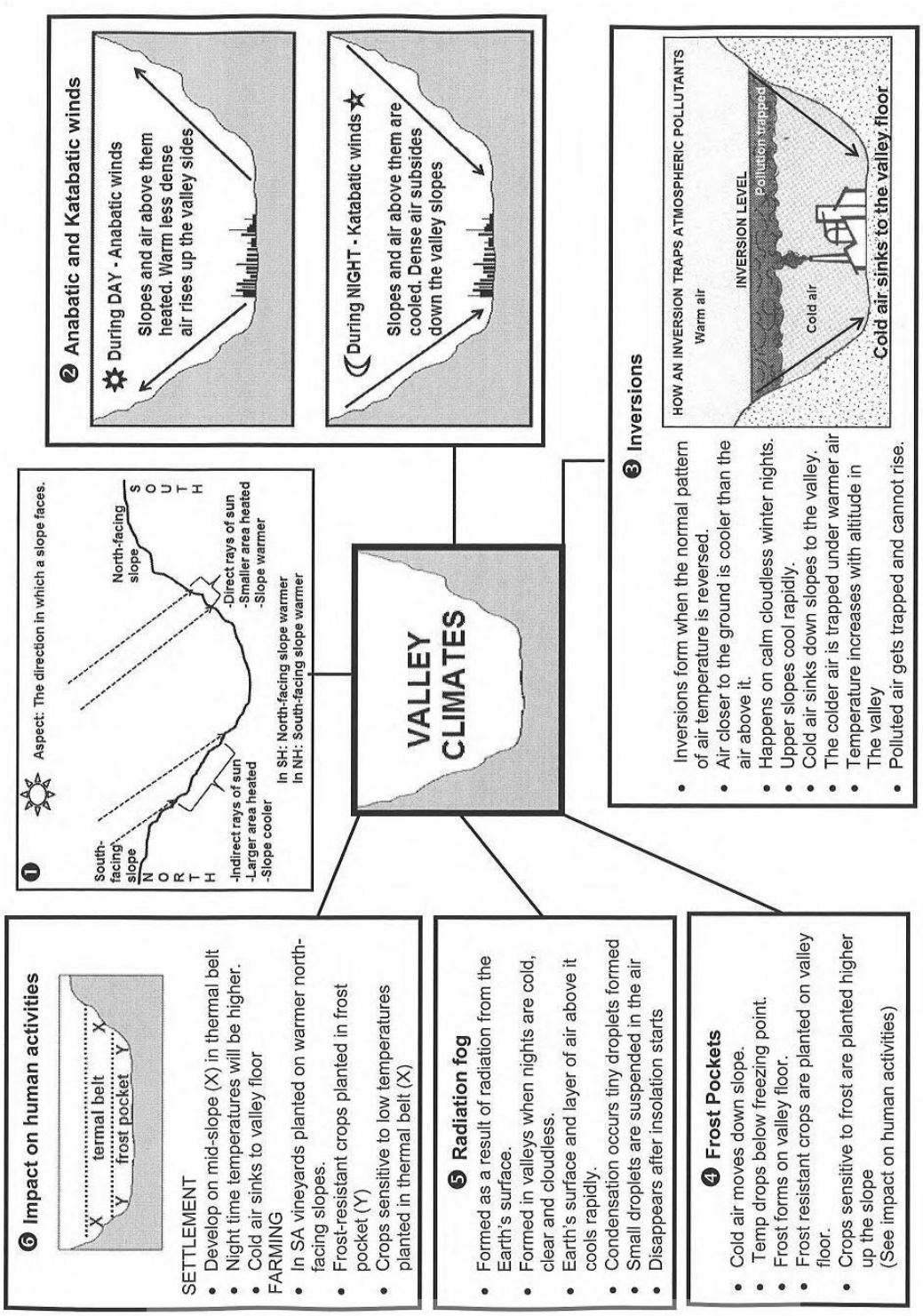
	Memo		
1.4.1	Kalahari High Pressure/Continental High Pressure (1)	(1 x 1)	(1)
1.4.2	Winter (1)	(1 x 1)	(1)
1.4.3	The dominance of the (Kalahari/Continental) High Pressure over the interior of the subcontinent, during winter (2) A low pressure cell (coastal low/mid-latitude cyclone) along the southern or eastern coast (2) Wind that moves down slope as a result of pressure gradient along the escarpment (2) [ANY TWO]	(2 x 2)	(4)
1.4.4	Air subsiding down the escarpment heats up at the DALR (2) 1°C temperature increases per 100 m of descent (2) [ANY ONE]	(1 x 2)	(2)
1.4.5	Clear skies at **C** are as a result of moisture evaporating when air warms up adiabatically (through compression) (2) 16ºC/Large difference between air temperature and dew point temperature, therefore air is dry (2) Relative humidity is low (2) Stable conditions are experienced due to subsiding air (2) [ANY ONE]	(1 x 2)	(2)
1.4.6	During Winter the vegetation is dry (2) Berg winds are warm, dry winds (2) Veld fires can easily be sparked (2) Strong winds fan these fires (2) [ANY TWO]	(2 x 2)	(4)

Activity 9 Time frame 12 minutes

M16 2.3	**FIGURE 2.3: BERG WINDS**  [Adapted from *Successful Geography*] Refer to FIGURE 2.3, showing a plan view and cross section of a South African berg wind.	

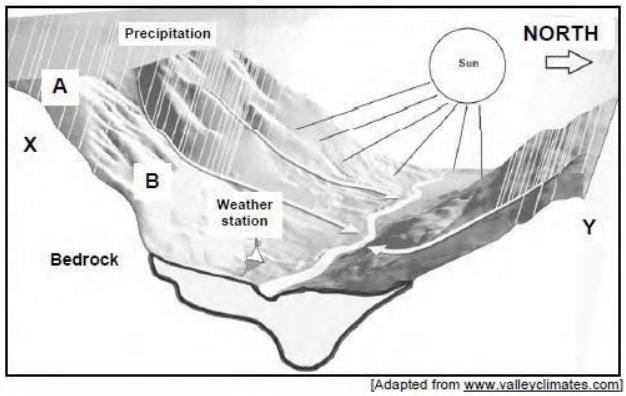
2.3.1	Give TWO pieces of evidence from the sketch to support the statement that FIGURE 2.3 shows a berg wind.	(2x 1)	(2)
2.3.2	Why do berg winds mainly develop during winter?	(2x 1)	(2)
2.3.3	Give reasons for the high temperature and low humidity of a berg wind when it reaches the coast.	(2 x 2)	(4)
2.3.4	Explain why berg winds are viewed as having a negative influence on humans and farming.	(3 x 2)	(6)

	Memo		
2.3.1	The Kalahari High Pressure can be seen over South Africa (1) and the coastal low along the east coast (1) The anticlockwise circulation of air (1)	(2x 1)	(2)
2.3.2	The Kalahari High is more dominant over South Africa in winter (1) The coastal low moves easier along the coast during winter (1) A steep pressure gradient exists between the interior and the coast (1)	(2x 1)	(2)
2.3.3	The air has heated by 1°C/100m of descent – according to the dry adiabatic lapse rate – and increased the air temperature (2) Any moisture is evaporated as the air heats up through descent lowering the humidity (2)	(2 x 2)	(4)
2.3.4	Winter in South Africa is generally dry (as a result of little or no rain), so this warm, dry wind can cause veld fires (2) People are susceptible to the risk of runaway fires – putting people's lives in danger (2) Farmers lose crops and suffer financially as a result of this environmental hazard (2) Urban settlements on mountain slopes are threatened (2) People suffer from the hot conditions (2) During berg winds people suffer from discomfort and skin irritations (2) [ANY THREE.]	(3 x 2)	(6)

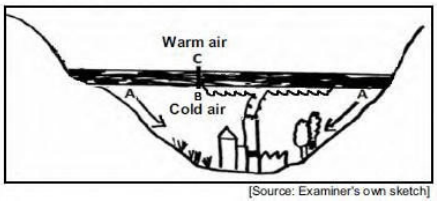


Valley Climates

Activity 10 Time frame 6 minutes

M16 2.1	FIGURE 2.1: ASPECT  [Adapted from www.valleyclimates.com] FIGURE 2.1 shows the influence of aspect on different valley slopes located at 24°16'S.	
2.1.1	Is the influence of aspect on the valley slopes more evident in summer or in winter?	Winter
2.1.2	Will slope **X** or slope **Y** receive direct rays of the sun?	X
2.1.3	Which slope, **X** or **Y**, will have the highest groundwater content?	Y
2.1.4	Will slope **X** or slope **Y** be more suitable for crop farming?	X
2.1.5	Which slope, **X** or **Y**, is called the shadow zone?	Y
2.1.6	Are settlements more likely to be located at **A** or **B**?	B
2.1.7	Would valley slopes closer to the equator be more or less influenced by aspect?	Less
2.1.8	Are forests more likely to be found on slope **X** or slope **Y**?	Y

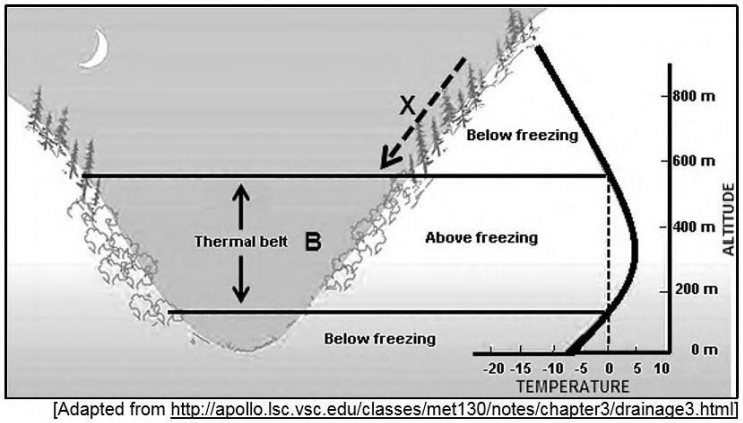
Activity 11 Time frame 12 minutes

November 2014			
Temperature inversion: FIGURE 1.3: TEMPERATURE INVERSION  [Source: Examiner's own sketch] Study the sketch in FIGURE 1.3 showing a temperature inversion in a valley and answer the questions that follow.			
1.3.1	Define the term *temperature inversion* indicated by **B** and **C**.	(1 x 1)	(1)
1.3.2	Name the wind at **A**.	(1 x 1)	(1)
1.3.3	Explain why the wind in QUESTION 1.3.2 commonly occurs at night in valleys.	(1 x 2)	(2)

1.3.4	Explain why radiation fog is likely to develop in the valley at night time.	(2 x 2)	(4)
1.3.5	In a paragraph of approximately EIGHT lines, evaluate the likely impact of the wind at **A** on farming and settlements on the valley floor.	(4 x 2)	(8)

	MEMO		
1.3.1	Air temperature INCREASES with an INCREASE in altitude (height) (1) WARM air is found above the COLD air in the valley (1) [CONCEPT]	(1 x 1)	(1)
1.3.2	Katabatic wind/Downslope wind/Gravity winds	(1 x 1)	(1)
1.3.3	After sunset, the valley slopes cool down through terrestrial radiation throughout the night (2) Air in contact with the valley slopes cools down (2) Cold air sinks under the influence of the force of gravity (2) Cold heavy dense air will sink (2)	(1 x 2)	(2)
1.3.4	Cool air subsides to the valley floor (2) Warm air that rises is cooled down to dew point temperature (2) Air at the bottom of the valley condenses (2) [ANY TWO]	(2 x 2)	(4)
1.3.5	**<u>Impact on Farming</u>** Katabatic wind at night causes cold air to move down slope, causing a frost pocket to develop in the valley (2) Frost resistant crops are grown on the valley floor (2) The cold conditions and FROST kill pests (2) Cold conditions suits the growing conditions of these crops (2) The crops that are not frost resistant cannot be planted on the valley floor/ die (2) Acid rain can damage crops (2) **<u>Impact on Settlements</u>** Valley floor is cold and damp and therefore not suitable for settlement development (2) Smog (pollution) is trapped by the descending colder air (2) This leads to respiratory problems (such as asthma) (2) Visibility is reduced (2) The rate of accidents increase (2) Acid rain can damage buildings (2) [ANY FOUR. MUST REFER TO BOTH ASPECTS. CAN INCLUDE POSITIVE ASPECTS.	(4 x 2)	(8)

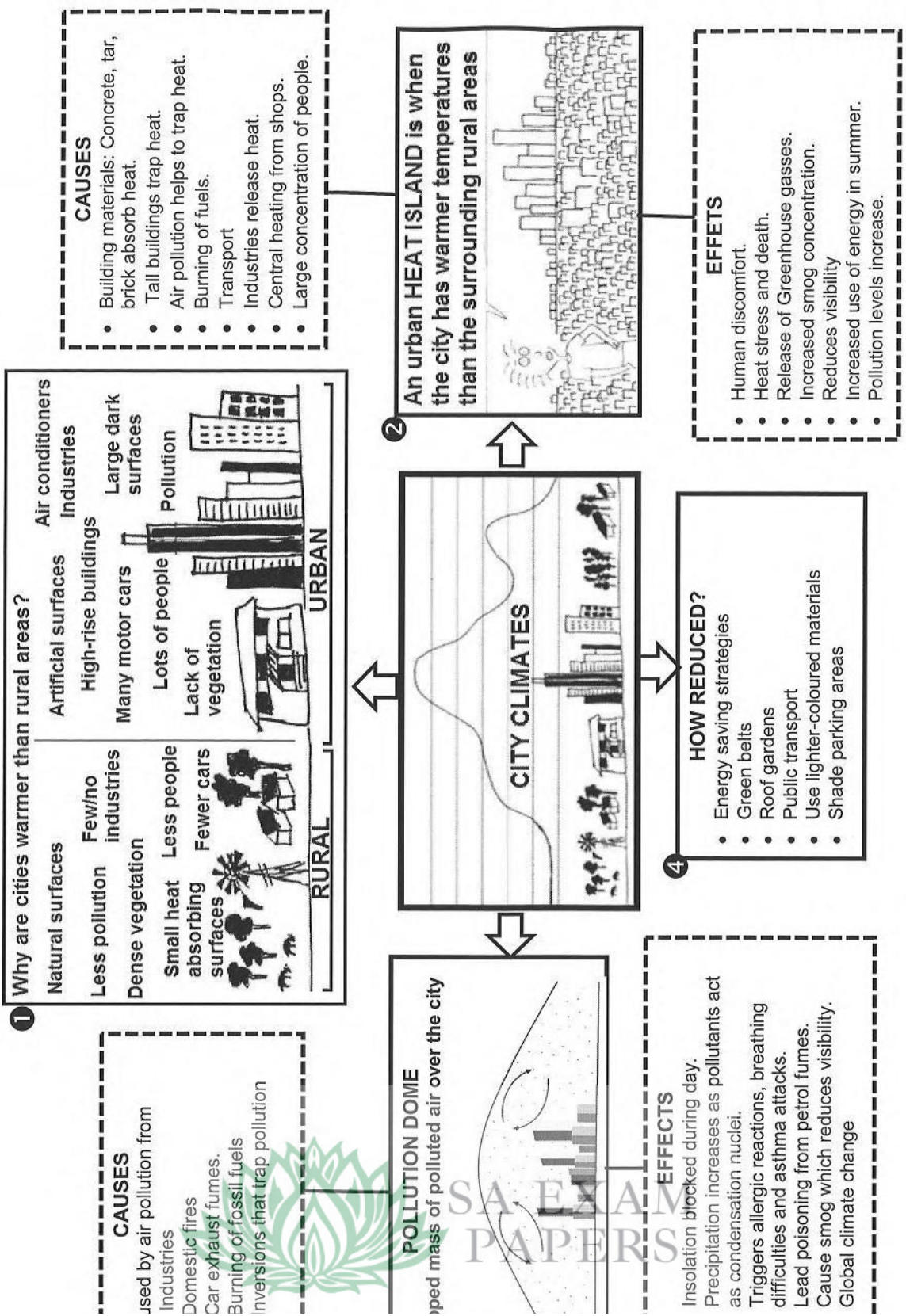
Activity 12 Time frame 12 minutes

N18 1.4	 [Adapted from http://apollo.lsc.vsc.edu/classes/met130/notes/chapter3/drainage3.html] Study FIGURE 1.4 showing a diagram on valley climates.		
1.4.1	Is the slope wind at X an anabatic or a katabatic wind?	(1 x 1)	(1)
1.4.2	Other than the label, what evidence indicates that B is the thermal belt?	(1 x 1)	(1)
1.4.3	What is the term used to describe an increase in the temperature as the height increases in the valley?	(1 x 1)	(1)
1.4.4	Explain why slope wind X will be more intense in winter.	(2 x 2)	(4)
1.4.5	Account for the low temperature that is likely to be experienced on the valley floor during winter.	(2 x 2)	(4)
1.4.6	How will farmers have to adapt their farming techniques (methods) due to the temperature change on the valley floor?	(2 x 2)	(4)

Memo

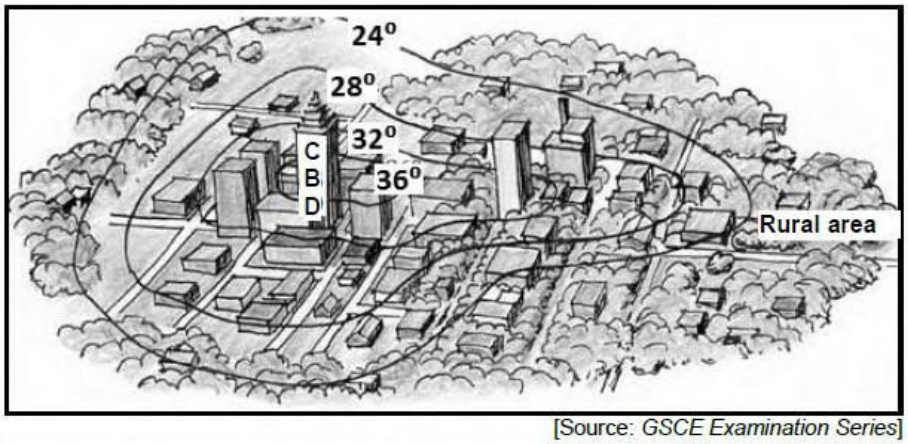
N18 1.4			
1.4.1	Katabatic wind (1)	(1 x 1)	(1)
1.4.2	Air temperature increases with height/temperature inversion (1) The highest temperature is found mid-slope (1) Air temperature is warmer (1) Temperature is above freezing (1)	(1 x 1)	(1)
1.4.3	(Temperature) inversion/Valley inversion/Negative lapse rate	(1 x 1)	(1)
1.4.4	Air temperatures are much lower (2) Air is heavier and denser (2) Increased intensity of downward movement of air/Cold air moves down the slope quickly (2)	(2 x 2)	(4)
1.4.5	Collection of cold, dense air at the bottom of the valley (2) Warm air is displaced from the valley floor (2) Frost forms on the valley floor (2) Gravity causes cold air to drain towards the valley floor (2) Dew point temperature below freezing point (2)	(2 x 2)	(4)
1.4.6	Only frost resistant crops can be planted here/Grow fruit with thick resistant skin, e.g. citrus (2) Genetically modified seeds adapted for frost conditions (2) Torches and fire drums (heating systems) to keep air circulating so that temperatures do not drop below 0 °C/anti-frost heating to protect crops (2) Fans to keep air circulating (2)	(2 x 2)	(4)

	Mechanisms to divert subsiding wind (diversion walls) away from crops (2) Straw in between crops to reduce terrestrial radiation (mulching) (2) Glass houses (greenhouses) can be built to create an artificial micro-climate for sensitive crops (2) Cover plants with frost covers (2)		



Urban Climates

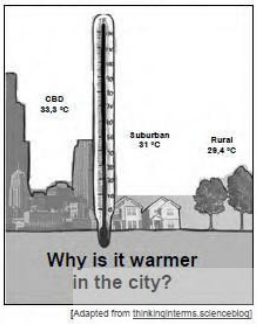
Activity 13 Time frame 12 minutes

N14 2.4	**FIGURE 2.4: URBAN HEAT ISLAND**  [Source: *GSCE Examination Series*]		
2.4.1	What is the name given to the lines that show the temperature readings over the city?	(1 x 1)	(1)
2.4.2	What is the temperature difference between the CBD and the rural area?	(1x 2)	(2)
2.4.3	How do high-rise buildings contribute to the CBD having a higher temperature?	(1x 2)	(2)
2.4.4	Suggest TWO possible reasons why the temperature lines mentioned in QUESTION 2.4.1 are not circular.	(2 x 2)	(4)
2.4.5	Each statement below describes a typical urban microclimate. Give a reason why each of these conditions are experienced in an urban area.		
	(a) Relative humidity is lower above the city than above the surrounding rural area.	(1x 2)	(2)
	(b) The city has more days on which precipitation occurs than the surrounding rural area.	(1x 2)	(2)
	(c) Wind speed in the CBD is stronger than in the surrounding countryside.	(1x 2)	(2)

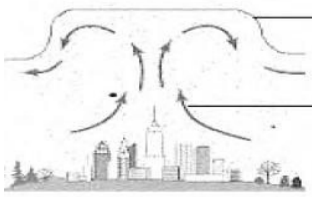
	Memorandum		
2.4.1	Isotherms (1)	(1 x 1)	(1)
2.4.2	Warmer/ Higher in the CBD (2) Cooler/ Lower in the rural area (2) Between 8ºC and 12ºC (2) [ANY ONE]	(1x 2)	(2)
2.4.3	Larger surface area that can be heated (2) Heat trapped between buildings due to high building density (2) Tall buildings prevents wind from removing heat out of the city (2)	(1x 2)	(2)

	Early in the morning/late afternoon sun`s rays hit buildings at 90° angle concentrating heat on the buildings (2) Material used to construct tall buildings absorb more heat (2) More heat is trapped inside the buildings (2) Air conditioning and lighting generate more heat (2) [EMPHASIS ON TALL BUILDINGS] [ANY ONE]		
2.4.4	There is a cluster of high rise buildings away from the original CBD which results in an irregular shape (2) More vegetation in the surrounding rural area which lowers the temperatures as you move away from the original CBD (2) Isotherms follows the profile of the city (2) [ANY TWO]	(2 x 2)	(4)
2.4.5	Each statement below describes a typical urban microclimate. Give a reason why each of these conditions are experienced in an urban area.		
	(a) Cities have less water bodies (dams/lakes/rivers etc.) (2) Fewer plants/vegetation in urban areas thus less evapo-transpiration (2) Water removed from cities by storm water drainage (2) Artificial surfaces drain water out of cities (2) [ANY ONE]	(1x 2)	(2)
	More heat in cities thus more convection which encourages the build-up of precipitation (2) More pollution in cities allows for more hygroscopic nuclei in cities (2) Higher pressure in surrounding rural areas will result in convergence of air in CBD with lower pressure (2) Large scale upliftment of warm air results in convergence thunderstorms (2) [ANY ONE]	(1x 2)	(2)
	(c) Wind speed and direction affected by layout and orientation of high-rise buildings (2) Buildings can channel prevailing winds in certain directions (2) **If indicated winds are stronger in the rural area, reasons must be given (2)** [ANY ONE]	(1x 2)	(2)

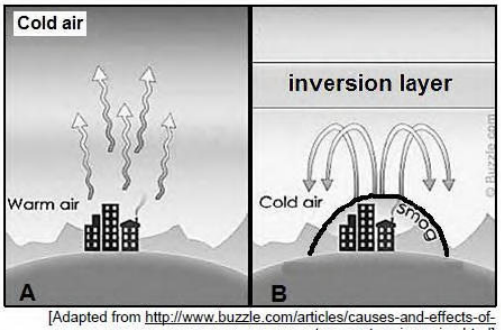
Activity 14 Time frame 12 minutes

N15 2.4	FIGURE 2.4: CITY CLIMATE 	

	Refer to FIGURE 2.4, showing the difference in temperature between the CBD and the surrounding rural area of a South African city, and answer the questions that follow.		
2.4.1	Calculate the difference in temperature between the CBD and the rural area.	(1 x 1)	(1)
2.4.2	Give a term that describes this difference in temperature between the CBD and the rural area.	(1 x 1)	(1)
2.4.3	Discuss how building density contributes to the CBD having higher temperatures.	(2 x 2)	(4)
2.4.4	Draw a labelled diagram showing the structure of the urban heat island during the day for FIGURE 2.4.	(2 x 2)	(4)
2.4.5	Give TWO sustainable solutions to reduce the temperature in the CBD.	(2 x 2)	(4)

	Memo		
2.4.1	3,9 (1)	(1 x 1)	(1)
2.4.2	Urban heat island (1)	(1 x 1)	(1)
2.4.3	Heat is trapped by the buildings due to closely spaced building (2) Reflective heat is transferred between the buildings (2) Limited air flow to disperse of heat (2) Heat that cannot escape is absorbed by building (2) [ANY TWO. ANSWERS MUST RELATE TO BUILDING DENSITY AND NOT BUILDING MATERIALS ACCEPT OTHER REASONABLE ANSWERS]	(2 x 2)	(4)
2.4.4	 2 marks for level high above city/great vertical dimension 2 marks for air movement that shows rising and divergence	(2 x 2)	(4)
2.4.5	Planting more trees in the urban areas to absorb carbon dioxide (2) Establishment of the roof gardens (2) The use of white reflective paints or surfaces to prevent heat from being absorbed (2) Commercial decentralisation to move shoppers/workers to outlying areas (2) Industrial decentralisation to prevent pollution in cities (2) Limit industrial activities to daytime only (2) Legislation to limit pollution (2) Chimney stacks tall enough to release smoke above inversion layer (2) Increase the number of water features (2) Promote public transport to reduce the number of vehicles in the CBD (2) Increase eco-friendly buildings (2) [ANY TWO. ACCEPT OTHER REASONABLE ANSWERS]	(2 x 2)	(4)

Activity 15 Time frame 12 minutes

N17 2.4	FIGURE 2.4: CITY CLIMATE  [Adapted from http://www.buzzle.com/articles/causes-and-effects-of-temperature-inversion.html] FIGURE 2.4 is a representation of a city's climate.		
2.4.1	Which sketch, **A** or **B**, represents the daytime city climate?	(1 x 1)	(1)
2.4.2	Give ONE reason to support your answer to QUESTION 2.4.1.	(1 x 2)	(2)
2.4.3	Give ONE reason for the occurrence of smog in sketch **B**.	(1x 2)	(2)
2.4.4	Suggest ONE reason for the absence of smog in sketch A.	(1 x 2)	(2)
2.4.5	In a paragraph of approximately EIGHT lines, discuss various sustainable solutions to limit the formation of smog in a city.	(4 x 2)	(8)

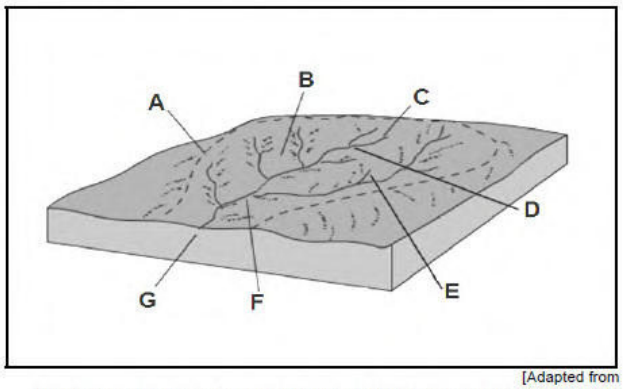
Memo

N17 2.4	FIGURE 2.4 is a representation of a city's climate.		
2.4.1	A (1)	(1 x 1)	(1)
2.4.2	Rising warm air (convection currents) has a greater vertical dimension in A (2) No evidence of subsiding air (2) Inversion layer not visible in A (2) Cold air is high above city (2) A low lying inversion layer is evident at B (2) Warm air is blocked from rising at B (2)	(1 x 2)	(2)
2.4.3	Higher concentration of pollution trapped close to the earth's surface (2) Pollution trapped close to the ground mixes with fog/ground based cloud (2)	(1x 2)	(2)
2.4.4	Convection/rising air disperses pollution to upper levels of the atmosphere (2) No inversion layer close to surface to trap pollution (2)	(1 x 2)	(2)
2.4.5	**SUSTAINABLE SOLUTIONS TO LIMIT SMOG FORMATION IN CITY** Roof top gardens/green lungs (2) More natural environments e.g. green belts within the city limits (2) Taller chimneys to release pollution higher in the atmosphere (2)	(4 x 2)	(8)

	Regulate industrial activity at night to reduce the concentration of emissions within the CDB (2) Bylaws/restrictions to carbon emissions by various pollution producing industries in the city (2) Penalties/Fines for exceeding smog restrictions by industries located closer to the city (2) More decentralised industrial growth points away from the CBD (2) Filters on chimneys to reduce toxicity of emissions (2) Use of green/clean source of energy (2) Car-pooling/lift clubs (2) Filters/catalytic converters on motor vehicle exhaust pipes (2) Hybrid/solar powered/electric/battery-operated vehicles (2) Improved public transport/dedicated bus lanes will result in less private vehicles within the limits of the CBD (2) Park-and-ride facilities (2) Promote use of bicycles in city centre (2) Pedestrianise the city centre (2) Increased public awareness/education (2) [ANY FOUR]		

Geomorphology

Activity 16 Time frame 6 minutes

<table>
<tr><td>M16
1.2</td><td colspan="2">FIGURE 1.2: DRAINAGE BASIN
 

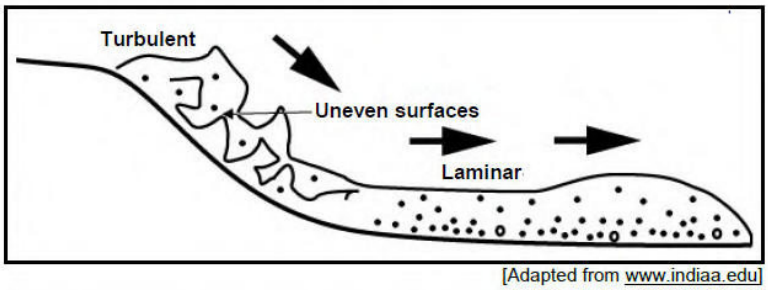
[Adapted from
http://www.earthonlinemedia.com/ebooks/tpe_3e/fluvial_systems/drainage_basin.jpg]
Refer to FIGURE 1.2 and label the diagram by completing the statements below. Write only the answer next to the question number (1.2.1–1.2.7) in the
ANSWER BOOK.</td></tr>
<tr><td>1.2.1</td><td>A is a/an …, which is a mountain range that separates one
catchment area from another catchment area.</td><td>Watershed</td></tr>
<tr><td>1.2.2</td><td>B is a/an …, which is a high-lying area within a catchment area, which separates tributaries.</td><td>Interfluve</td></tr>
<tr><td>1.2.3</td><td>C is the …, which shows the origin of a river system in mountainous high-lying areas.</td><td>Source</td></tr>
<tr><td>1.2.4</td><td>D is the … where two or more streams join.</td><td>Confluence</td></tr>
<tr><td>1.2.5</td><td>E is a/an …, which provides water to the main river.</td><td>Tributary/Stream</td></tr>
<tr><td>1.2.6</td><td>F is in the … course of the river.</td><td>Lower</td></tr>
<tr><td>1.2.7</td><td>G is the … where the river flows into the sea.</td><td>Mouth</td></tr>
</table>

Scan me

How rivers form animation – 1min 07sec

https://www.youtube.com/watch?v=ednXhLcwZz0

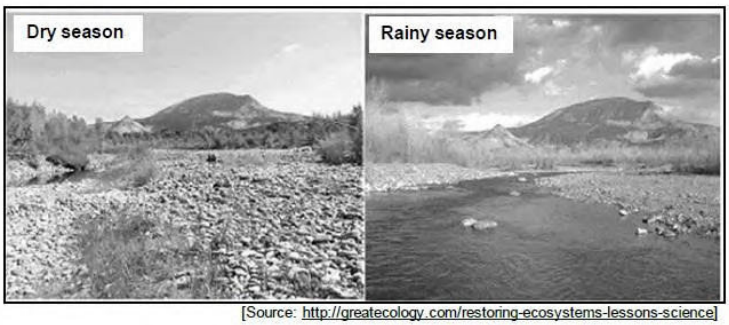
Activity 17 Time frame 6 minutes

N14 2.2	**FIGURE 2.2: RIVER FLOW PATTERNS**  [Adapted from www.indiaa.edu] Refer to FIGURE 2.2 showing river flow patterns. Indicate whether each of the following statements refer to turbulent or laminar flow in a river. You may use the same answer for more than one question.	
2.2.1	Associated with a river bed that is level and even	Laminar
2.2.2	Associated with an irregular and swirling flow	Turbulent
2.2.3	Effective in eroding and transporting sediment	Turbulent
2.2.4	Commonly occurs in the upper course of a river	Turbulent
2.2.5	Water flows in thin layers	Laminar
2.2.6	Associated with a higher river velocity	Laminar
2.2.7	Occurs where rapids are visible in the river's course	Turbulent
2.2.8	Has a larger stream load-carrying capacity	Laminar

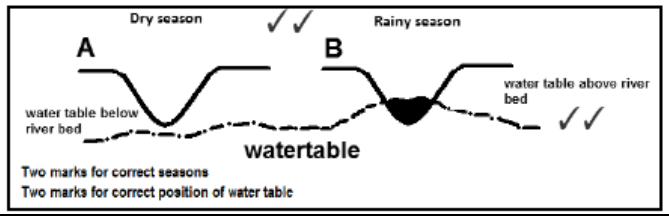
Activity 18 Time frame 6 minutes

J18 1.2	Choose the correct word from those given in brackets which will make the sentence TRUE. Write down only the word next to the question numbers (1.2.1 to 1.2.8).	
2.2.1	Rivers that flow all year round are (permanent/periodic) rivers	permanent
2.2.2	(Exotic/Periodic) rivers flow during the rainy season only.	periodic
2.2.3	Rivers that only flow after heavy rainfall are known as (episodic/exotic) rivers.	episodic
2.2.4	The majority of rivers in South Africa are (periodic/permanent).	permanent
2.2.5	In (permanent/episodic) rivers the river bed is always below the water table.	episodic
2.2.6	The water table is always below the river bed in (exotic/episodic) rivers.	episodic
2.2.7	(Periodic/Exotic) rivers flow all year round because they are fed by tributaries in high rainfall areas.	exoctic
2.2.8	(Permanent/Periodic) rivers are characteristic of interchanging seasons of high and low rainfall.	periodic

Activity 19 Time frame 12 minutes

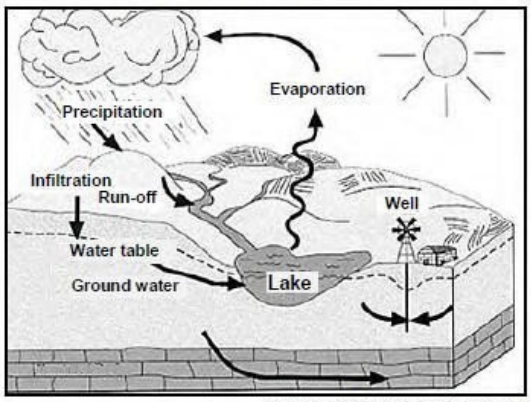
M17 1.5	FIGURE 1.5: A RIVER  [Source: http://greatecology.com/restoring-ecosystems-lessons-science] FIGURE 1.5 shows the amount of water in a river in the dry season and the rainy season.		
1.5.1	Name the type of river in the photograph.	(1 x 1)	(1)
1.5.2	Provide evidence from the photograph to support your answer to QUESTION 1.5.1.	(1 x 1)	(1)
1.5.3	Define the term *water table*.	(1 x 1)	(1)
1.5.4	Draw TWO labelled diagrams to show the different positions of the water table in the dry season and the rainy season.	(2 x 2)	(4)
1.5.5	In a paragraph of approximately EIGHT lines, explain the influence of precipitation and gradient on the amount of deposited material evident on the river bed.	(4 x 2)	(8)

Memo

M17 1.5	FIGURE 1.5 shows the amount of water in a river in the dry season and the rainy season.		
1.5.1	Periodic/Non-perennial/Seasonal (1)	(1 x 1)	(1)
1.5.2	The water level in the river changes from one season to another (1) The river does not flow in the dry season, and flows in the rainy season (1)	(1 x 1)	(1)
1.5.3	The upper layer of the underground water surface (1)	(1 x 1)	(1)
1.5.4	 	(2 x 2)	(4)
1.5.5	**PRECIPITATION** In the dry season the amount of precipitation is low resulting in low river discharge (2)	(4 x 2)	(8)

	The carrying capacity (volume of water) of the river is low and deposits the materials (2) In the rainy season the river has greater volume of water and less deposition takes place (2) The carrying capacity (volume of water) of the river is high and erodes the river channel (2) **GRADIENT** A gentle gradient reduces the velocity of a river and its ability to carry the load (2) A gentle gradient results in more deposition on the river bed (2) [ANY FOUR – MUST REFER TO PRECIPITATION AND GRADIENT		

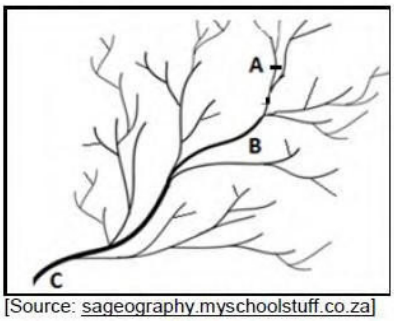
Activity 20 Time frame 12 minutes

N15 2.5	**FIGURE 2.5: GROUND WATER**  [Adapted from www.pcastate.mn] Refer to FIGURE 2.5, which illustrates factors that could influence the amount of ground water in the soil, and answer the questions that follow.		
2.5.1	Define the term *ground water.*	(1 x 1)	(1)
2.5.2	Differentiate between the terms *infiltration* and *run-off*.	(2 x 1)	(2)
2.5.3	What role does ground water play in the discharge (stream flow) of a permanent river during the dry season?	(1 x 2)	(2)
2.5.4	What effect would the construction of the well have on the water table?	(1 x 2)	(2)
2.5.5	Explain, in a paragraph of approximately EIGHT lines, FOUR natural factors that can cause the water-table level to rise.	(4 x 2)	(8)

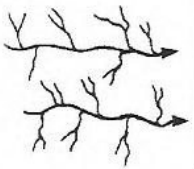
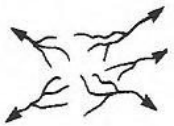
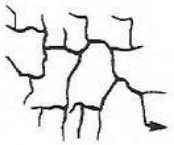
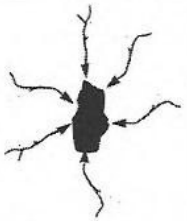
	Memo		
2.5.1	Water that is found below the surface (1)	(1 x 1)	(1)
2.5.2	Infiltration – Water on the ground enters/seeps into the soil (1) Run-off – Water flowing overland/ overland flow (1)	(2 x 1)	(2)
2.5.3	It will add water to the stream to allow it to continue flowing (2)	(1 x 2)	(2)
2.5.4	Water table will drop/lowered (2)	(1 x 2)	(2)
2.5.5	**Topography (relief):** Gentle slopes promotes infiltration of water and leads to a higher water table (2) **Rock type:** Permeable rock promotes infiltration and will lead to high water table (2)	(4 x 2)	(8)

	Soil moisture: Dry soil leads to high water table due to infiltration (2) Saturated soil feeds the water table and lets it rise (2) **Type of rainfall:** Prolonged and gentle rain leads to a higher water table (2) **Vegetation cover:** Lots of/dense vegetation promotes infiltration and leads to high water table (2) **Evaporation rate:** Low evaporation rates increases the rate of infiltration and leads to a rise of the water table (2) [ANY FOUR. ACCEPT ANY OTHER REASONABLE ANSWERS]		

Activity 21 Time frame 6 minutes

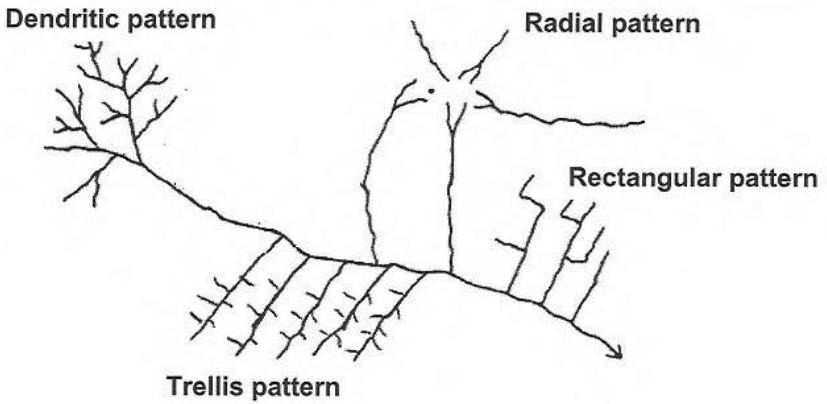
N14 1.2	**FIGURE 1.2: DRAINAGE BASIN**  [Source: sageography.myschoolstuff.co.za] Refer to the drainage basin in FIGURE 1.2 and answer the questions that follow.	
1.2.1	Name the drainage pattern shown in the diagram.	Dendritic
1.2.2	At which angle do the tributaries join the main stream?	Acute angles
1.2.3	State whether this drainage pattern is associated with a surface that has a uniform or varied resistance to erosion.	Uniform
1.2.4	Is the dominant process at **A** on the sketch erosion or deposition?	Erosion
1.2.5	State the stream order at point **A**.	Stream Order
1.2.6	Is area **B** an interfluve or a watershed?	Interfluve
1.2.7	Is the discharge of the river greater at **A** or at **C**?	C

DRAINAGE PATTERNS

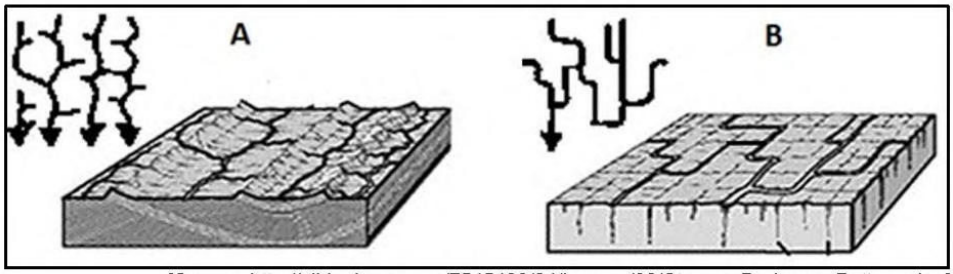
	Dendritic	Trellis	Radial	Rectangular	Centripetal	Deranged	Parallel
							
n	Looks like branches of a tree. Tributaries join at acute angles.	Strong main stream joined by short tributaries at right angles	Looks like spokes of a wheel when viewed from above	Tributaries join at right angles and have bends of 90°	Opposite of radial pattern.	Small streams that have no specific pattern	Streams flow parallel to each other
g s	Uniform rocks of similar hardness	Gently sloping alternating layers of hard and soft rock	Rivers flow away from a high central point such like a butte or mesa	In areas with hard rock that is well jointed.	Streams flow towards a central basin such as a marsh or lake	Very flat areas that have experienced recent glaciation	Common along a ridge or hills.

u must be in a position to do the following:

- Identify each of the patterns on diagrams.
- Identify stream patterns on topographic maps.
- Give a description of the patterns.
- Describe the underlying structures that caused the stream pattern.



Activity 22 Time frame 12 minutes

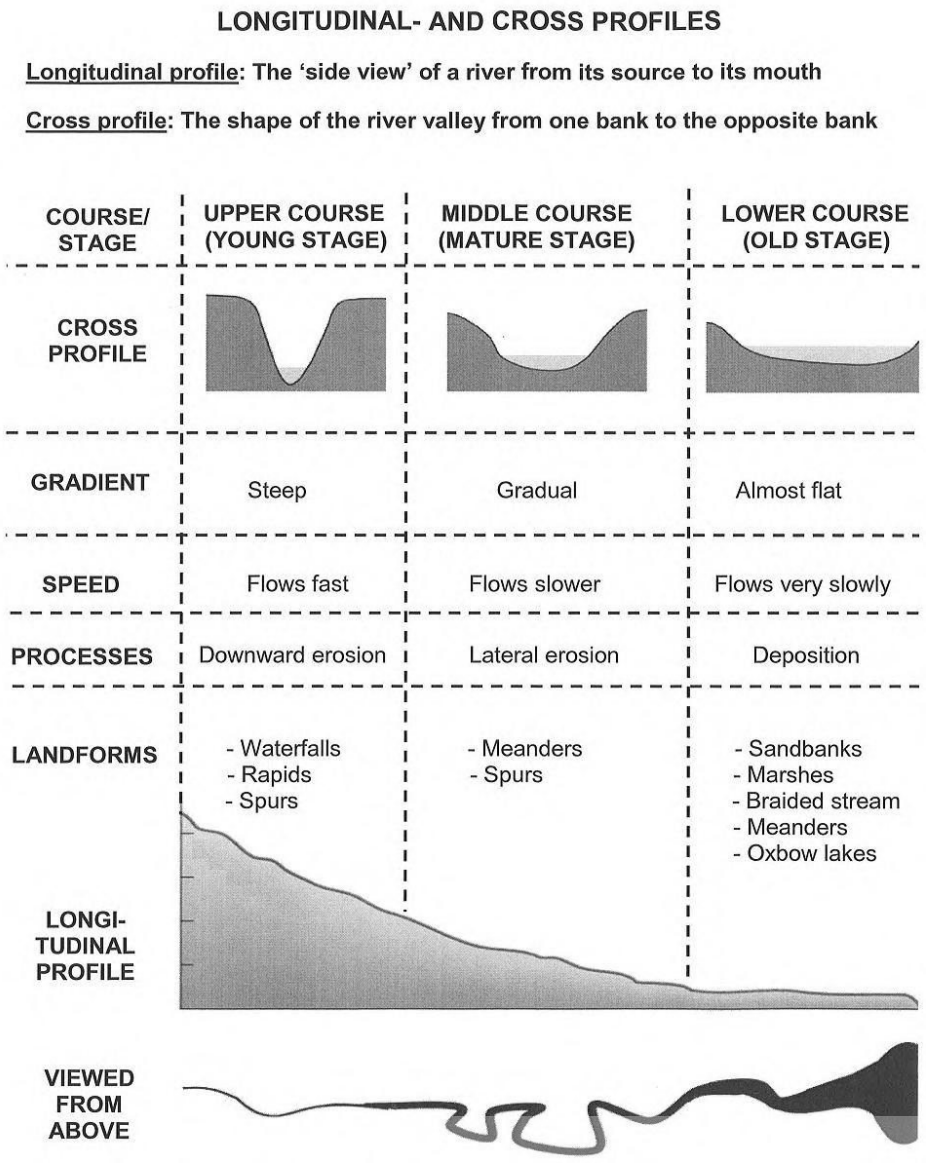
J18 1.5	**FIGURE 1.5: TYPES OF DRAINAGE PATTERNS**  [Source: http://slideplayer.com/7545408/24/images/30/Stream+Drainage+Patterns.jpg] Study FIGURE 1.5 which shows two types of drainage patterns (A and B).			
1.5.1	Name the drainage patterns labelled A and B.		(1 x 1)	(1)
1.5.2	Name the underlying rock structure that gives rise to drainage patterns A and B.		(2 x 1)	(2)
1.5.3	State ONE of the following:			
	(a)	Similarity between drainage patterns A and B	(1 x 2)	(2)
	(b)	Difference between drainage patterns A and B	(1 x 2)	(2)
1.5.4	Why are the tributaries in drainage pattern A short in comparison to the length of the main river?		(1 x 2)	(2)
1.5.5	Account for the main streams in drainage pattern B having 90° bends.		(2 x 2)	(4)

Memo

J18 1.5	Study FIGURE 1.5 which shows two types of drainage patterns (A and B.			
1.5.1	A – trellis (1) B – rectangular (1)		(1 x 1)	(1)
1.5.2	A – folded sedimentary rocks/alternating hard and soft rock layers (1) B – rocks with joints/cracks/faulted rocks (1)		(2 x 1)	(2)
1.5.3	State ONE of the following:			
	(a)	Both have tributaries that join the main stream at a 90° angle	(1 x 2)	(2)
	(b)	In A the main streams follow more or less a straight path and in B the main stream follows an irregular path	(1 x 2)	(2)

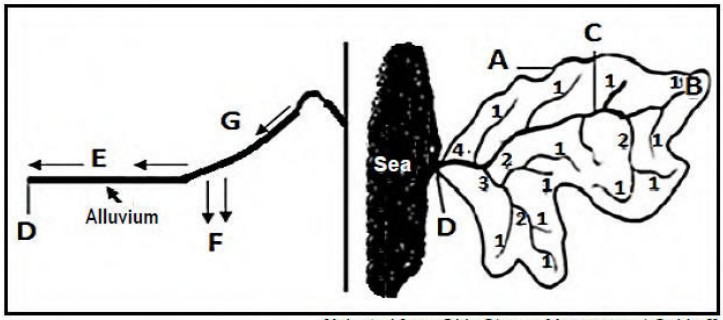
		(90° angles) (2) A has more than one drainage basin while B has only one drainage basin evident (2) Tributaries in A shorter than in B (2)		
1.5.4	Short, steep slopes (of anticlines) cause short tributaries and the main river is longer because it flows along the length of the valley (2)		(1 x 2)	(2)
1.5.5	The river flows along the joints and cracks within the rocks (2) It is easier for the river to erode along existing fault lines rather than cutting a new path (2)		(2 x 2)	(4)

Fluvial Processes

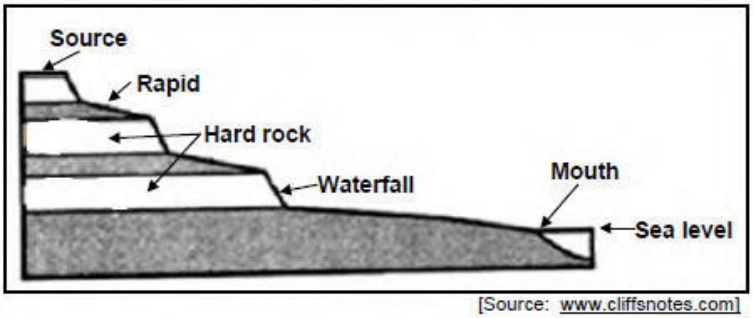


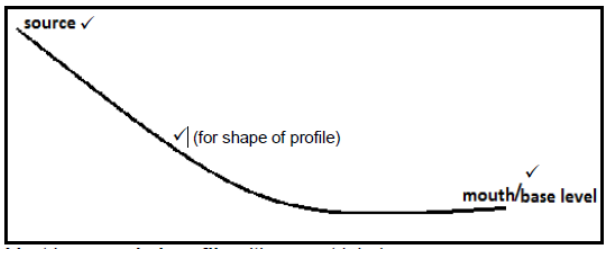
Fluvial Processes

Activity 23 Time frame 6 minutes

N15 1.2	**FIGURE 1.2: DRAINAGE BASIN AND ITS PROFILE**  [Adapted from *Ohio Stream Management Guide 3*] Refer to the drainage basin and its profile in FIGURE 1.2 and answer the questions that follow.	
1.2.1	Name ONE source of water for drainage basin A.	Rainfall/Precipitation (1) Melting snow Groundwater Springs River/surface run-off
1.2.2	Give a term that best describes **B**.	Catchment/Source
1.2.3	Name the stream order at point **C**.	Third order
1.2.4	Name a fluvial feature that is likely to form at point **D** in the river.	Delta/fluvial island /alluvial island
1.2.5	Name the process that gave rise to alluvium being found at point **E**.	Deposition
1.2.6	Give a term that describes the movement of water at **F**.	Infiltration/percolation/seepage
1.2.7	Give the term that describes the high-lying area surrounding drainage basin **A**.	Watershed/Drainage divide
1.2.8	Give the term that describes the lowest point to which a river erodes	Permanent base level/ Ultimate base level

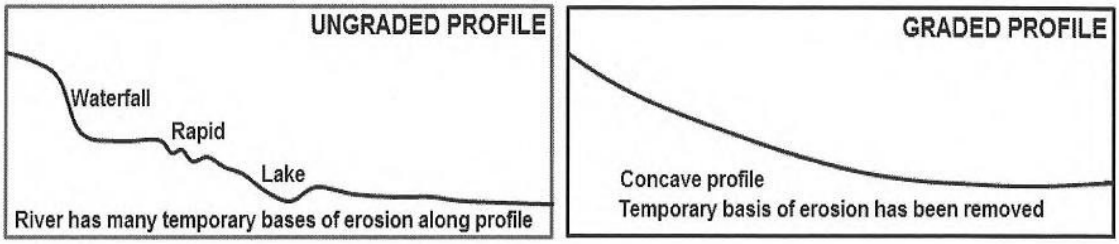
Activity 24 Time frame 12 minutes

N14 1.5	**FIGURE 1.5: LONGITUDINAL RIVER PROFILE**  [Source: www.cliffsnotes.com] FIGURE 1.5 shows a longitudinal river profile.		
1.5.1	Explain the term *longitudinal profile*.	(1 x 1)	(1)
1.5.2	Name a temporary base level of erosion evident on the sketch.	(1 x 1)	(1)
1.5.3	Draw a labelled free-hand sketch of a graded longitudinal profile.	(1 x 3)	(3)
1.5.4	State ONE characteristic of the river bed of a graded river.	(1 x 2)	(2)
1.5.5	In a paragraph of approximately EIGHT lines, explain the processes that the profile in FIGURE 1.5 must undergo to change from an ungraded to a graded profile.	(4 x 2)	(8)

	Memo		
1.5.1	Shows the side view of a river from its source to its mouth (1) It is the changing gradient of a river from its source to its mouth (1) It is the representation of the gradient down which a river flows (1) [CONCEPT]	(1 x 1)	(1)
1.5.2	Waterfall (1) rapid (1) hard rocks (1)	(1 x 1)	(1)
1.5.3	 Must be a **graded profile** with correct labels. Award 1 mark for shape only	(1 x 3)	(3)
1.5.4	Almost smooth river bed (2) Concave shaped profile (2) [ANY ONE]	(1 x 2)	(2)
1.5.5	**<u>Processes that the river profile must undergo to be graded</u>** Downward erosion must increase in the upper and middle course (2) The upper course must assume a steeper slope (2) In the upper course discharge must increase and overcome friction (2) Headward erosion must increase to remove temporary base levels of erosion (2) Retreat of waterfalls to remove temporary base levels of erosion (2) Flattening of rapids remove temporary base levels of erosion (2) Filling in of lakes remove temporary base levels of erosion (2)	(4 x 2)	(8)

	Stream carrying capacity must increase to carry additional stream load (eroded particles) (2) Gradient in the lower course must decrease in order for carrying capacity to decrease (2) In the lower course the stream discharge must be reduced (2) Deposition occurs in the lower course lowering the gradient (2) The river now assumes a steep gradient in the upper course and a gentle gradient in the lower course (2) [ANY FOUR]		

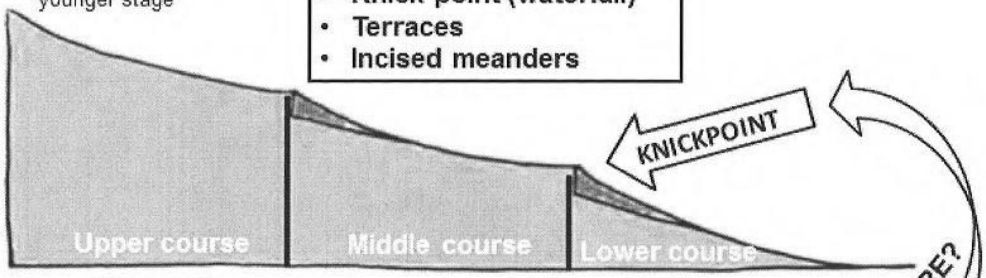
GRADED AND UNGRADED RIVER PROFILES



RIVER REJUVENATION

REJUVENATED:
Made to look younger.
River showing renewed characteristics of a younger stage

FEATURES/LANDFORMS
- Knick point (waterfall)
- Terraces
- Incised meanders



Young river flows fast

Mature river flows slower

Old river flows very slow

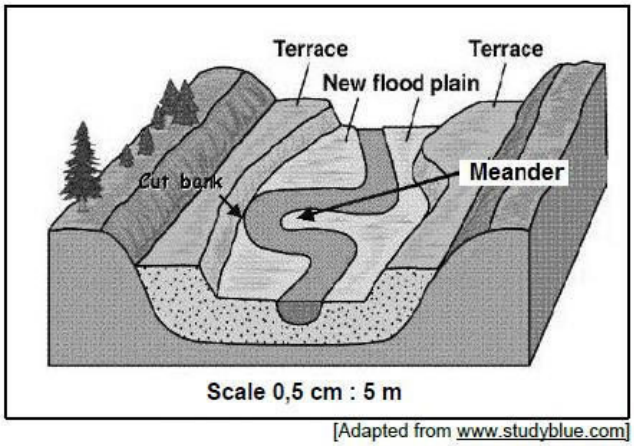
REJUVENATION
River starts to flow faster. Has renewed energy and increased erosion.

HOW?

- Drop in sea level
- Land rises
- Increase in rainfall
- Fast flowing tributary
- Stream piracy

You must be in a position to do/answer the following:
- Identify the process of rejuvenation on a diagram.
- Define the concept, rejuvenation.
- Explain how rejuvenation occurs.
- Identify/describe the features/landforms of rejuvenation.

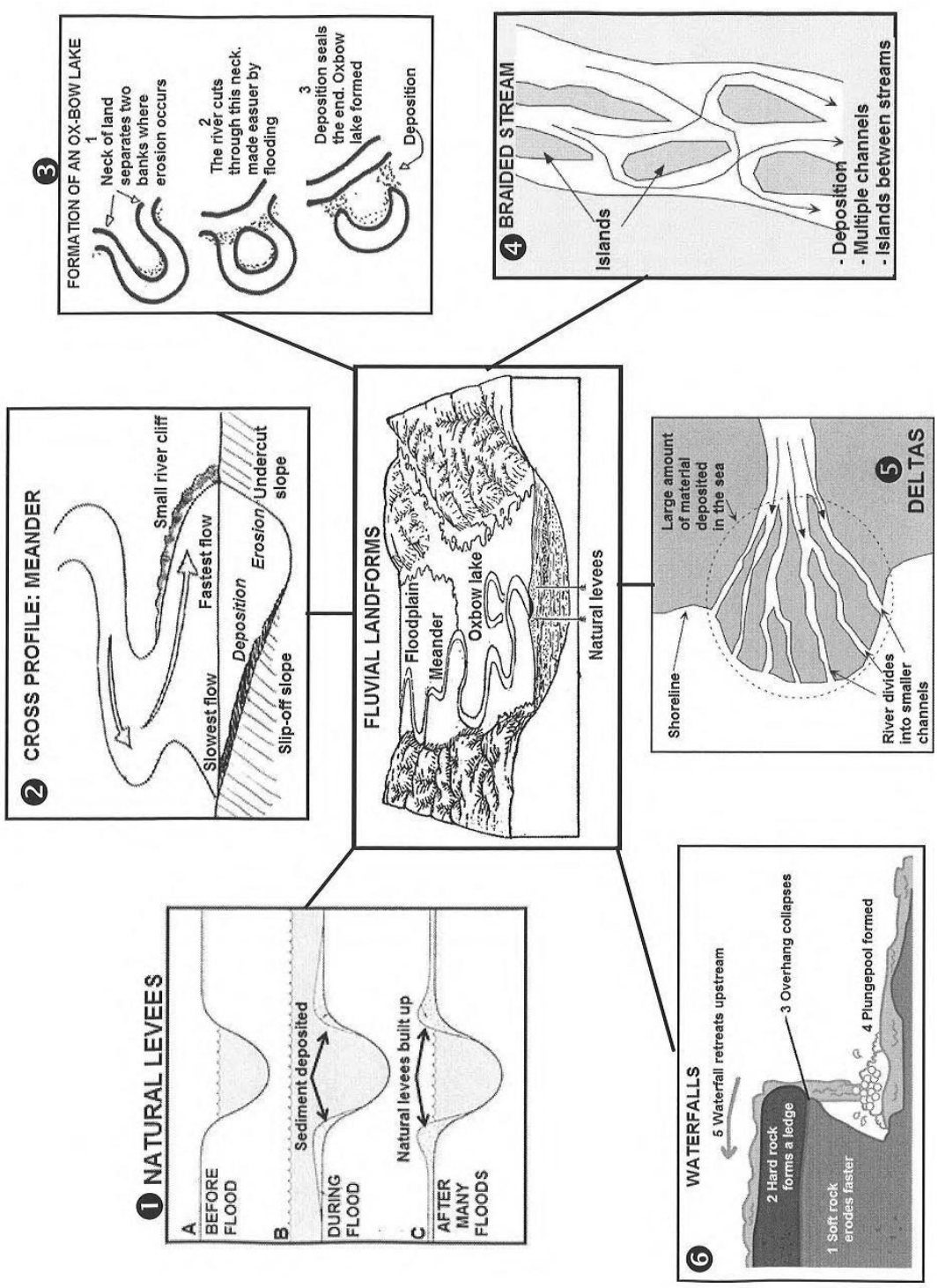
Activity 25 Time frame 12 minutes

N 17 2.6	**FIGURE 2.6: RIVER REJUVENATION**  [Adapted from www.studyblue.com] Study FIGURE 2.6 based on river rejuvenation in the lower course of a river.		
2.6.1	State ONE characteristic of a rejuvenated river.	(1 x 1)	(1)
2.6.2	What evidence in the sketch indicates that the river has been rejuvenated?	(2 x 1)	(2)
2.6.3	Give TWO possible causes of river rejuvenation.	(2 x 2)	(4)
2.6.4	Describe the impact that rejuvenation will have on the meander in FIGURE 2.6.	(1 x 2)	(2)
2.6.5	Suggest ONE negative impact of rejuvenation on the future development of infrastructure.	(1 x 2)	(2)
2.6.6	Give evidence in FIGURE 2.6 to support the statement that terraces, even though they are flat, are not always suitable for farming.	(2 x 2)	(4)

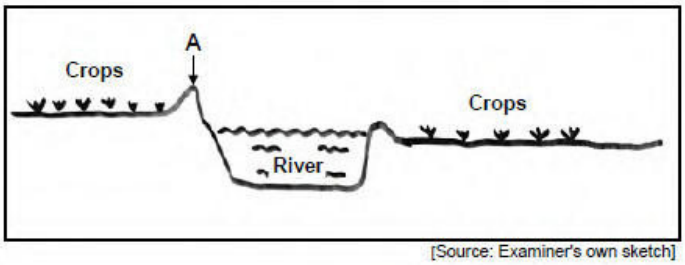
Memo

N 17 2.6	Study FIGURE 2.6 based on river rejuvenation in the lower course of a river.		
2.6.1	Rejuvenated rivers are 're-energised' (1) Display aspects of both vertical and horizontal erosion (1) Rivers that actively erode downward again (1) The carrying capacity of the river increases (1)	(1 x 1)	(1)
2.6.2	Terraced slopes/river terraces (1) New flood plain (1) Valley within a valley (1) Incised/entrenched meander (1)	(2 x 1)	(2)
2.6.3	River capture increases the water volume (2) Fast flowing tributary which joins the main river (2) Sustained/prolonged increase in rainfall within a catchment area (2) Climate change that results in an increased rainfall (2) Tectonic shifts in the landscape (uplift) changes the base level of the river (2) Drop in sea-level changes the base level of the river (2) Sudden change in gradient (2) Clearing of vegetation increase run-off (2)	(2 x 2)	(4)
2.6.4	Incised meanders/entrenched meanders (2)	(1 x 2)	(2)
2.6.5	Construction of bridges will be more expensive and need to cover the width of the valley (2)	(1 x 2)	(2)

	Steep slopes will make it difficult to build roads/railway lines (2) It will be difficult to provide services (power/water) (2) More time consuming to develop infrastructure (2) Difficult to use heavy machinery in the construction of infrastructure (2)		
2.6.6	Meanders may undercut the terrace causing it to collapse/slope instability (2) Terraces too high lying to access water to the farmed areas (2) Steep terrace slopes limits access to terraces (2) Narrow terraces limit cultivation (2) No more flooding to deposit fertile silt (2) At risk to mudslides/mudflows (2)	(2 x 2)	(4)

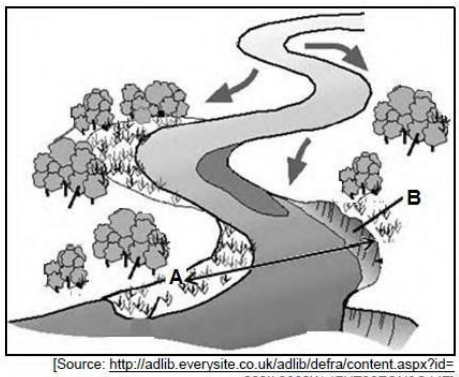


Activity 26 Time frame 12 minutes

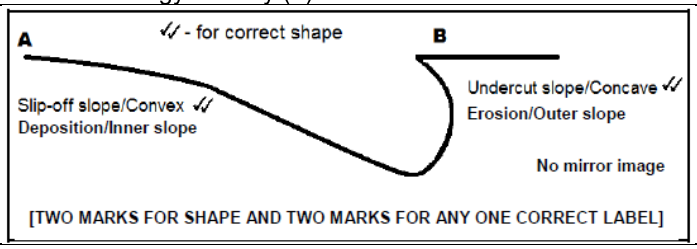
N 14 1.6	FIGURE 1.6: LEVEE  [Source: Examiner's own sketch] Refer to FIGURE 1.6 showing a levee.		
1.6.1	Identify the fluvial landform on which crops are grown.	(1 x 1)	(1)
1.6.2	Why is the landform in QUESTION 1.6.1 more likely to flood in the lower course?	(2 x 2)	(4)
1.6.3	Identify the natural feature **A** that protects crops from flooding	(1 x 2)	(2)
1.6.4	Briefly describe the formation of the natural feature in QUESTION 1.6.3.	(2 x 2)	(4)
1.6.5	Discuss the negative impacts on the farmer, should the river break through feature **A**.	(2 x 2)	(4)

	Memo		
1.6.1	Flood plain (1)	(1 x 1)	(1)
1.6.2	The gradient is more gradual/reduced velocity of the water in the river (2) Shallow river channel makes it easier for the river to burst its banks (2) The volume of water increases in the lower course of the river (2) [ANY TWO]	(2 x 2)	(4)
1.6.3	Levée (2) Raised embankment (2) Raised river bank (2) Natural dyke (2) [ANY ONE]	(1x 2)	(2)
1.6.4	When a river overflows its banks (floods) (2) Heavy material is deposited on the river banks (2) Successive flooding results in this feature increasing in height (2) [ANY TWO]	(2 x 2)	(4)
1.6.5	Damage to crops from flooding (2) Loss of fertile soil through soil erosion (2) Oversaturated soil (2) Swamp conditions start to develop (2) No longer suitable for original crops that were grown (2) Loss of income (2) Small scale and/or subsistence farmers will have no food (2) [ANY TWO]	(2 x 2)	(4)

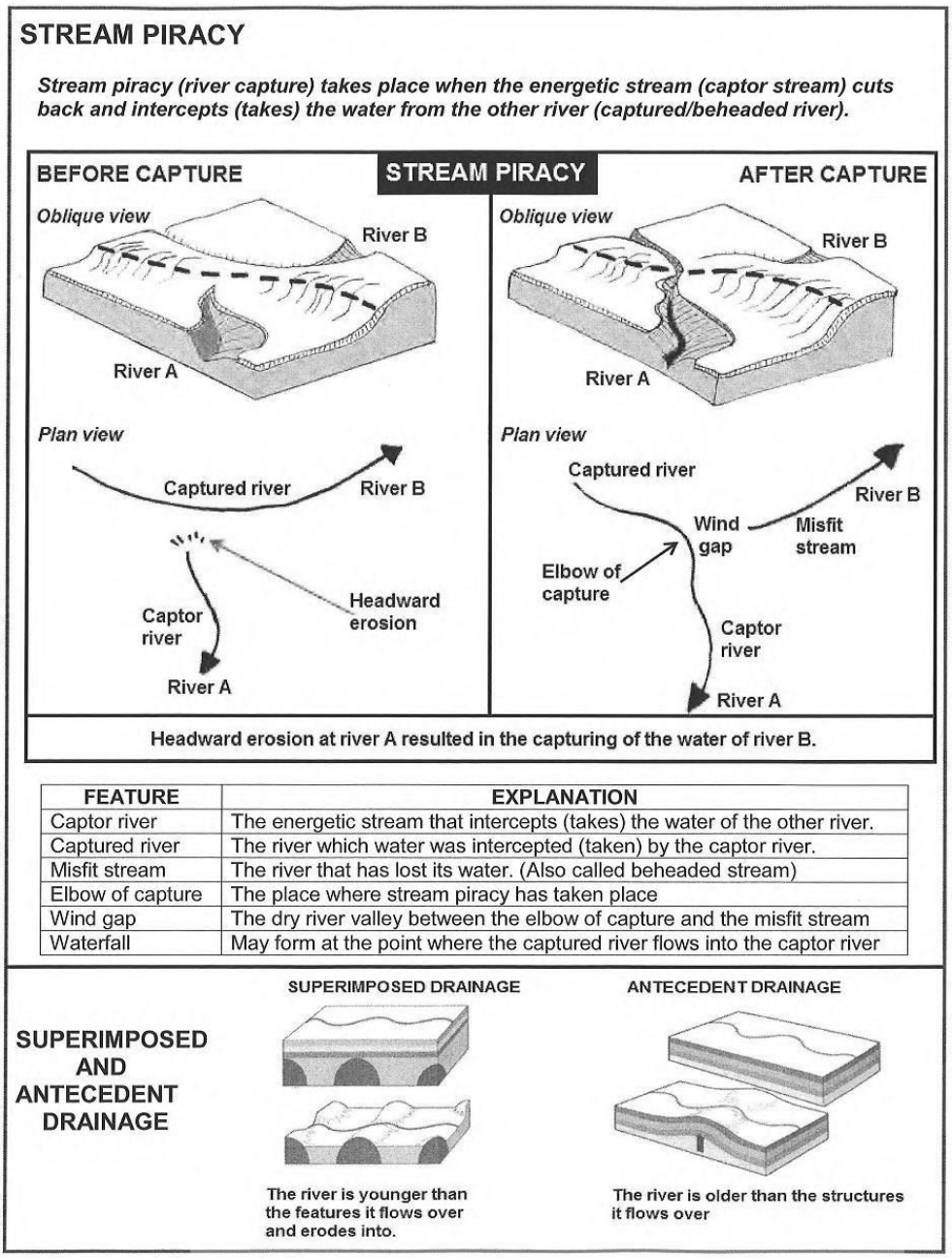
Activity 27 Time frame 12 minutes

M17 1.6	FIGURE 1.6: STREAM CHANNEL  [Source: http://adlib.everysite.co.uk/adlib/defra/content.aspx?id=000IL3890W.17UT30ZOH8G447] Refer to FIGURE 1.6 showing a stream channel.		
1.6.1	Identify the stream channel pattern shown in FIGURE 1.6.	(1 x 1)	(1)
1.6.2	In which course of the river is the illustrated stream channel pattern most likely to be found?	(1 x 1)	(1)
1.6.3	Give ONE reason why the illustrated stream channel pattern will develop in the course of the river named in QUESTION 1.6.2.	(1 x 2)	(2)
1.6.4	Draw a simple, labelled cross-section of the meander between points **A** and **B**.	(2 x 2)	(4)
1.6.5	You would like to develop a campsite along the banks of the illustrated river. After careful consideration, you choose a site along slope/bank **A** rather than along slope/bank **B**. In a paragraph of approximately EIGHT lines, explain why the site along slope/bank **A** is the better choice.	(4 x 2)	(8)

Memo

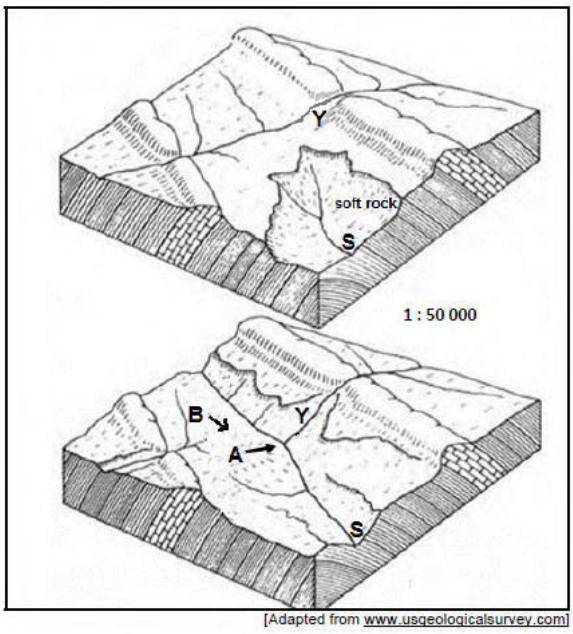
M17 1.6	Refer to FIGURE 1.6 showing a stream channel.		
1.6.1	Meandering (1)	(1 x 1)	(1)
1.6.2	Lower/Plain/Middle	(1 x 1)	(1)
1.6.3	Gradient is more gentle (2) Reduced energy/velocity (2)	(1 x 2)	(2)
1.6.4	 [TWO MARKS FOR SHAPE AND TWO MARKS FOR ANY ONE CORRECT LABEL]	(2 x 2)	(4)
1.6.5	**SLOPE A – MOST SUITABLE FOR THE CAMPSITE** Has a gentle convex shape (2) Gentle slope ideal for building and camping (2) Easy access to river for fishing or collecting water (2) Flow rate is lower and therefore safer (2) Over time deposition will allow the campsite to increase in size (2) Easier to launch small boats and canoes (2)	(4 x 2)	(8)

	It creates a shallow point to access the river (2) Soil is fertile therefore more vegetation (2) More trees for shade (2) **SLOPE B** Constant erosion/undercutting results in concave/steep slope (2) Undercutting leads to the formation of a river cliff which is unstable (2) The position of camp sites will retreat and cause facilities to be damaged (2) Reduced access to water (2) Faster flowing water will be more dangerous (2)		



FEATURE	EXPLANATION
Captor river	The energetic stream that intercepts (takes) the water of the other river.
Captured river	The river which water was intercepted (taken) by the captor river.
Misfit stream	The river that has lost its water. (Also called beheaded stream)
Elbow of capture	The place where stream piracy has taken place
Wind gap	The dry river valley between the elbow of capture and the misfit stream
Waterfall	May form at the point where the captured river flows into the captor river

Activity 28 Time frame 12 minutes

M16 2.5	**FIGURE 2.5: RIVER CAPTURE**  [Adapted from www.usgeologicalsurvey.com] FIGURE 2.5 indicates river capture (stream piracy).		
2.5.1	Label **S** and **Y** with the terms 'captor stream' and 'captured stream' respectively.	(2 x 1)	(2)
2.5.2	Name the features of river capture at **A** and **B** respectively.	(2 x 1)	(2)
2.5.3	Give TWO reasons for river **S** eroding at a faster rate.	(2 x 2)	(4)
2.5.4	In a paragraph of approximately EIGHT lines, explain the impact of river capture on the volume of water and the erosive ability of rivers **B** and **S** respectively.	(4 x 2)	(8)

	Memo		
2.5.1	S: Captor Stream (1) Y: Captured Stream (1)	(2 x 1)	(2)
2.5.2	A: Elbow of capture (1) B: Wind gap (1)	(2 x 1)	(2)
2.5.3	Higher rainfall causing increased headward erosion (2) Larger stream volume increase erosion (2) S is flowing through softer rock (2) S has a steeper gradient (2) [ANY TWO]	(2 x 2)	(4)
2.5.4	**THE IMPACT OF RIVER CAPTURE ON THE VOLUME OR WATER AND EROSIVE ABILITY** **River B** The headwaters of B is captured (2) The volume of water in B will decrease (2) The abovementioned reduces the erosive ability (2) It will become a misfit stream (2)	(4 x 2)	(8)

	River S River S captured the headwaters of river B (2) Water added to river S increases its volume (2) The abovementioned increases the erosive ability (2) The river becomes rejuvenated (2) [ANY FOUR. MUST REFER TO BOTH RIVER B AND RIVER S]		

Catchment and River Management

Activity 29 Time Frame 12 Minutes

M16 2.6	**FIGURE 2.6: MANAGING CATCHMENT AREAS AND DRAINAGE BASINS** South Africa needs to balance the demand for water with the availability of water. There are a number of ways in which to prevent the overexploitation of water resources: 1. Removing alien vegetation 2. Interbasin transfer schemes 3. Managing groundwater supplies 4. Recycling water 5. Conserving wetlands 6. Preserving vegetation cover [Adapted from www.dwaf.gov.za] Study FIGURE 2.6, which lists some tips from the Department of Water Affairs for the sustainable management of catchment areas and drainage basins in South Africa, and then answer the questions that follow.		
2.6.1	Define the term *overexploitation.*	(1 x 1)	(1)
2.6.2	What is a *catchment area*?	(1 x 1)	(1)
2.6.3	Explain how removing alien vegetation will help prevent the overexploitation of water resources in South Africa.	(2 x 2)	(4)
2.6.4	How does the conservation of wetlands contribute to the sustainable management of a drainage basin?	(1 x 2)	(2)
2.6.5	Discuss the importance of preserving vegetation cover in a drainage basin.	(3 x 2)	(6)

	Memo		
2.6.1	Over-exploitation means to overuse and potentially destroy a resource (1)	(1 x 1)	(1)
2.6.2	A catchment area is the whole drainage basin, where a river system is found/the entire area drained by a river system (1)	(1 x 1)	(1)
2.6.3	Alien plants reproduce at a high rate (2) Alien plants take over indigenous vegetation (2) These plants use too much water (2) By removing alien vegetation, less water will be used up (2) [ANY TWO]	(2 x 2)	(4)
2.6.4	Wetlands are a natural storage place for water and supply water to drainage basins (2)	(1 x 2)	(2)

	Wetlands help to purify water (2) Water will be available during dry times in a wetland (2) [ANY ONE]		
2.6.5	Slows down flow of water (2) Allows for infiltrations (2) Maintains groundwater levels (2) Plant roots anchor soil (2) Prevents erosion plus silting of rivers (2) Prevent sheet flow plus flooding (2) [ANY TWO.	(3 x 2)	(6)

Activity 30 Time frame 12 minutes

N15	**FIGURE 1.6: IMPACT OF HUMANS ON DRAINAGE BASINS** **VAAL RIVER UNDER PRESSURE** Sipho Masondo | The Times Live **The Vaal River and its catchment system are becoming increasingly toxic/ poisoned – posing a threat to health, the economy and food production in four provinces.** Water scientists and other experts describe the Vaal River – which supplies water to Gauteng, the country's economic and industrial powerhouse, as well as to farmers in Gauteng, North West, the Free State and Northern Cape – as 'in crisis' and 'under siege' by polluters. Since the 1990s, the Department of Water Affairs has pumped water from the Lesotho Highlands into the river to supplement the water supply. This water is increasingly needed to dilute the pollution. Said Krige: 'We are using expensive drinking water to sort out the problem of pollution. Dilution is not a solution to pollution.' The water in the Vaal River system will eventually cost far more to treat, leaving companies such as Sasol and Eskom to pay more for the chemicals needed to treat the water before they use it. This will increase their costs. [Adapted from www.timeslive.co.za]		
1.6.1	Name TWO provinces that are dependent on the Vaal River as a water source.	(2 x 1)	(2)
1.6.2	Give TWO possible reasons why the Vaal River is becoming increasingly toxic/poisoned.	(2 x 1)	(2)
1.6.3	According to the article, water is pumped into the Vaal River to dilute/reduce the pollution. Explain why this is not a sustainable solution.	(2 x 2)	(4)
1.6.4	Explain, in a paragraph of approximately EIGHT lines, why the cost of food and electricity could increase in future if pollution of the Vaal River is not controlled.	(4 x 2)	(8)

	Memo		
1.6.1	Gauteng (1)/North West (1)/Free State (1)/Northern Cape (1) [ANY TWO]	(2 x 1)	(2)
1.6.2	Mining waste dumped in the river (1) Industries pollute the river (1) Chemicals used for farming flows into the river (1)	(2 x 1)	(2)

	Untreated sewage entering the river (1) Domestic waste from settlements along the river (1) [ANY TWO]		
1.6.3	Water that should be used as drinking water is wasted (2) Pollution continues on daily basis (2) The problem will not be solved, only lessened/temporary solution (2) It is a costly process (2) **[ANY TWO]**	(2 x 2)	(4)
1.6.4	**FOOD (AGRICULTURE)** Costly to buy purified water (2) Farmers will have to buy more chemicals to purify water (2) Chemicals costly to purchase (2) Production costs increase (2) Cost of chemicals will be included in food prices (2) Polluted water will reduce productivity for the farmers (2) Food more costly to maintain profit margins (2) Polluted water reduces soil fertility (2) Reduction in crop yields creating a greater demand for food (2) Costly to purchase fertilisers to maintain soil fertility (2) Less food produced (2) Food prices increase (2) **ELECTRICITY (ESKOM)** Costly to purify water for use in electricity generation (2) Cost will be included in electricity prices (2) Costs will increase the price of electricity during production (2) Less clean water to generate hydro electricity (2) Electricity shortage will inflate the price (2) [ANY FOUR - ACCEPT OTHER REASONABLE ANSWERS. MUST REFER TO BOTH ESKOM AND AGRICULTURE]	(4 x 2)	(8)

Activity 31 Time frame 12 minutes

Nov 14 2.5	**FIGURE 2.5: IMPROVING WATER PRODUCTIVITY** **STRATEGY FOR IMPROVING WATER PRODUCTIVITY** There has been a change in thinking concerning water resource management. Attention is being paid to activities that affect the upstream area of a river (catchment area) and the impact that this has on the lower reaches of the river. Some of the ways in which humans interfere with the river include building dams, water transfer, regulation, pollution, purification, et cetera. This changes the natural flow of the river. All of the above have one common effect, and that is that they impact on those who live downstream. The Upper Modder River is close to the relatively densely populated and industrialised greater Mangaung municipal area that includes Bloemfontein, Botshabelo and Thaba Nchu. The area is known to be marginal for crop production due to low and erratic rainfall. This, combined with clay soils, results in high water losses caused by run-off and evaporation. [Source: YE Woyessa, M Hensley and LD van Rensburg (Department of Soil, Crop and Climate Sciences, University of the Free State)]		
2.5.1	Give the meaning of the term *water resource management*.	(1 x 1)	(1)
2.5.2	Name ONE settlement in the article that has a negative impact on the Upper Modder River.	(1 x 1)	(1)

2.5.3	State TWO ways in which humans are interfering with water productivity from the Upper Modder River.	(2 x 1)	(2)
2.5.4	Name TWO factors that cause the high water run-off.	(2 x 2)	(4)
2.5.5	In a paragraph of approximately EIGHT lines, explain how human interference along a river impacts on those that live further downstream.	(4 x 2)	(8)

	Memo		
2.5.1	Water Resource Management: the sustainable and responsible use of water	(1 x 1)	(1)
2.5.2	Mangaung (1) Bloemfontein (1) Botshabelo (1) Thaba Nchu (1) [ANY ONE]	(1 x 1)	(1)
2.5.3	Building dams (1) Water transfer (1) Water regulations (1) Water pollution (1) Water purification (1) [ANY TWO]	(2 x 1)	(2)
2.5.4	Clay soil (2) Settlement development (2) Sparse vegetation (2) [ANY TWO]	(2 x 2)	(4)
2.5.5	**<u>Human interference along a river</u>** Reduces the amount of clean water available for domestic use in rural area (2) The possibility of water pollution increases/water quality decreases (2) An increase in the amount of water borne diseases e.g. cholera (2) Reduces amount of water available for crop cultivation in the lower reaches/ Food insecurity (2) Disturbance of aquatic life (2) Increase the costs of water due to higher demand (2) More controlled flooding (2) Impact negatively on their income (2) More costly to buy clean water in the informal settlement (2) Natural flow of river is reduced (2) More costly to irrigate downstream (2) Less water for recreational activities (2) Less water for industrial purposes (2) Greater reliance on groundwater (2) [ANY FOUR]	(4 x 2)	(8)

Study of Settlements

Activity 32 Time frame 6 minutes

M16 4.1	Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (4.1.1–4.1.8) in the ANSWER BOOK.	
4.1.1	A group of people, buildings, infrastructure and communication links that function together as a single, integrated system	Settlement
4.1.2.	The position of a settlement in relation to its surrounding Environment	Situation
4.1.3.	The piece of land on which a settlement is built	Site
4.1.4	This settlement is found in an area where water is scarce and people live close to the water supply	Wet-point settlement
4.1.5	A name given to a city with dependent towns surrounding it	Metropolis
4.1.6	A settlement that develops close to an opening through a physical barrier	A gap town
4.1.7	The point where one mode of transport is replaced by another	Break-of-bulk
4.1.8	A town that develops where there is a bridge across a river	Bridge town

Activity 33 Time frame 6 minutes

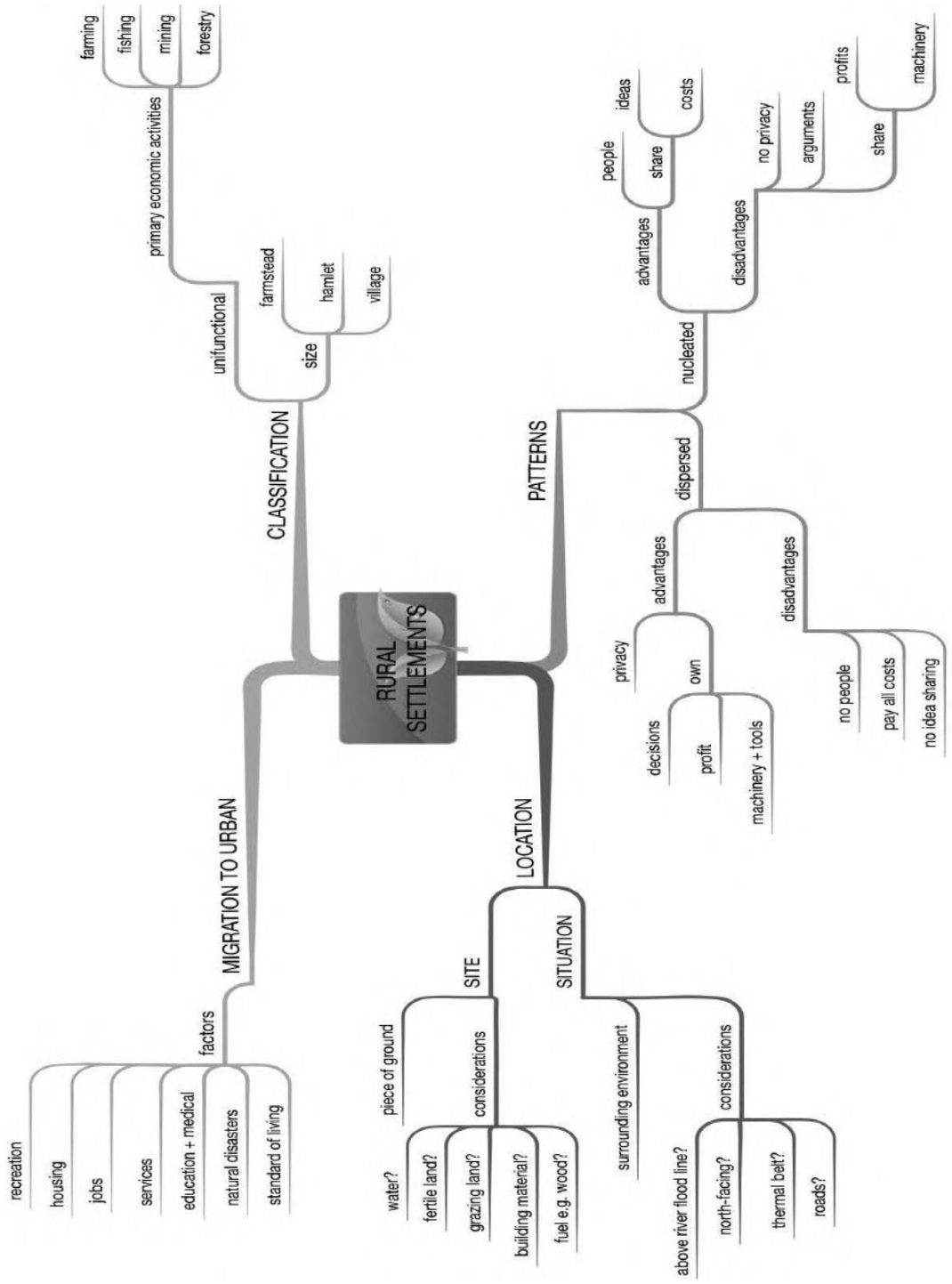
N14 3.1

FIGURE 3.1: TYPES OF SETTLEMENTS

[Source: toxtown.nlm.nih.gov]

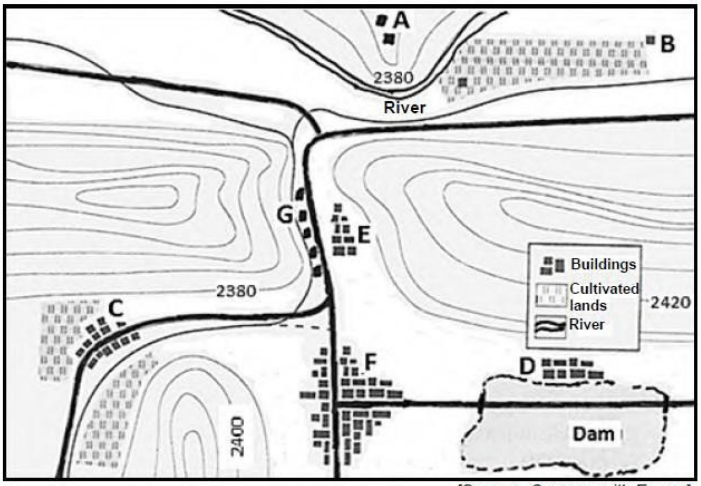
Refer to FIGURE 3.1 which shows two types of settlements (**A** and **B**). Match the settlement types **A** and **B** to the statements below.

3.1.1	This type of settlement is unifunctional	A
3.1.2.	Associated with tertiary activities	B
3.1.3.	The smallest of all the settlement types	A
3.1.4	These settlements are always nucleated	B
3.1.5	This settlement has a dispersed pattern	A
3.1.6	An overconcentration of activities	B
3.1.7	A metropolis is an example of this type of settlement	B
3.1.8	An example of a central place	B



Rural Settlements

Activity 34 Time frame 6 minutes

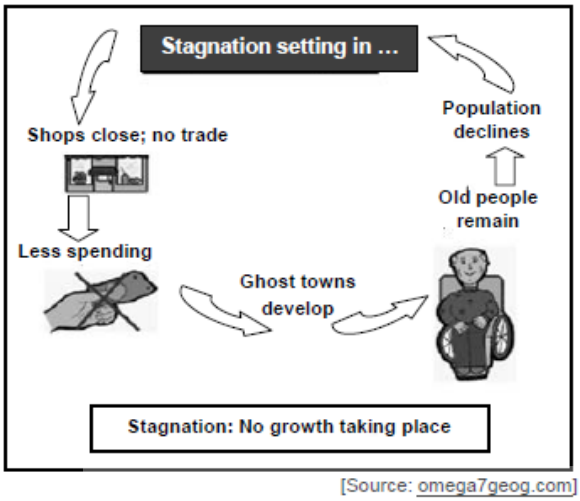
N14	**FIGURE 4.1: SETTLEMENT PATTERNS**  [Source: *Success with Exams*] Study FIGURE 4.1 which shows different settlement patterns.	
4.1.1	What is the name given to settlement **A** which is located away from water because water is seen as a threat?	Dry Point Settlement
4.1.2.	Name the settlement pattern at **B**.	Isolated/Dispersed
4.1.3.	Why is settlement **C** referred to as a nucleated settlement?	Buildings are grouped together and located close to one another
4.1.4	What evidence suggests that settlement **D** is a wet point settlement?	It is located next to a water source (the dam)
4.1.5	Give the name of settlement **E**.	Gap Town/ Gateway Village Nucleated/compact Any example of a gap town
4.1.6	Identify the factor that has influenced the shape of settlement **F**.	The road network (a T-junction
4.1.7	Describe the shape of settlement G.	Linear

Activity35 Time Frame 6 minutes

M16 3.1	FIGURE 3.1: A SETTLEMENT  [Source: http://www.heneb.co.uk/images/12llangowerv2cropshort6461.jpg] Refer to FIGURE 3.1, a photograph of a settlement. Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question number (3.1.1–3.1.7) in the ANSWER BOOK, for example 3.1.8 tertiary.	
3.1.1	The photograph is an example of a/an (rural/urban) settlement.	rural
3.1.2	This settlement is known as a/an (isolated farmstead/village).	village
3.1.3	The physical factor responsible for the choice of site of the settlement is the (flat land/river).	flat land
3.1.4	The agricultural lands in this photograph are cultivated by (machines/labourers).	machines
3.1.5	The settlement depicted is (dispersed/nucleated).	nucleated
3.1.6	The agricultural product grown in this area is most likely (grains/fruits).	grains
3.1.7	This settlement is (unifunctional/multifunctional).	unifunctional

Rural Settlement Issues

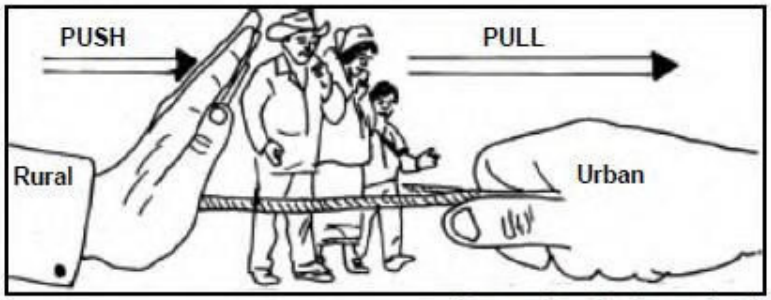
Activity 35 Time frame 12 minutes

N 15 4.3	FIGURE 4.3: CHARACTERISTICS OF RURAL DEPOPULATION  [Source: omega7geog.com] Refer to FIGURE 4.3, which shows characteristics of rural depopulation.		
4.3.1	Define the term *rural depopulation*.	(1 x 1)	(1)

4.3.2	Which age group is the first to migrate to cities?	(1 x 1)	(1)
4.3.3	State ONE characteristic of a ghost town.	(1 x 2)	(2)
4.3.4	Give TWO reasons why stagnation (no growth) occurs in rural towns.	(2 x 2)	(4)
4.3.5	Write a paragraph of approximately EIGHT lines in which you make suggestions on how this cycle of stagnation can be broken.	(4 x 2)	(8)

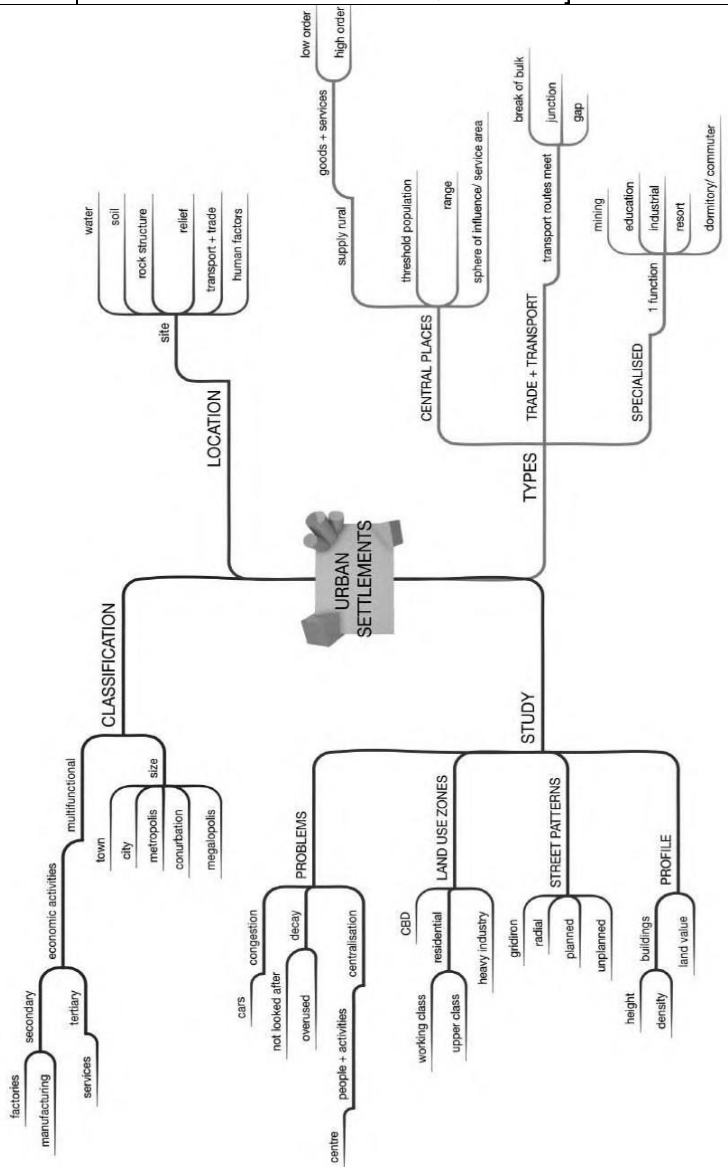
	Memo		
4.3.1	A decrease in the number of people living in the rural areas (1)	(1 x 1)	(1)
4.3.2	Young adults/Between 18 to 35 years (Range) (1)	(1 x 1)	(1)
4.3.3	Abandoned buildings (2) Empty or closed shops (2) Aged population (2) Reduced/Declining population (2) Unemployed people (2) Physical blight (2) Crime (2) [ANY ONE]	(1 x 2)	(2)
4.3.4	No growth of economic activities due to lack of skills (2) No investment opportunities/Withdrawal of investments (2) No infrastructure development to attract economic activities (2) Lack of services hampers the growth of rural town (2) Young and economically active people leave (2) Reduced buying power (2) [ANY TWO]	(2 x 2)	(4)
4.3.5	**SOLUTIONS TO ATTRACT GROWTH TO RURAL AREAS** Industrial decentralisation to provide jobs in rural areas for young people/Cheap industrial sites to attract employment opportunities (2) Implementation of GEAR/NDP to create sufficient jobs to people in rural areas (2) Implementation of the RDP/NDP to provide basic services for rural population (2) Integrated rural development to improve farming and meet the basic needs of people (2) Establishment of parks and recreational facilities in rural areas to provide for leisure activities (2) Organise festivals that will bring money into the small town (2) Attract commuters to come and live in small towns (2) Maximise eco-tourism/cultural tourism/ heritage tourism (2) Agricultural schools to attract people/learners (2) Introduction of local agenda 21 [ANY FOUR]	(4 x 2)	(8)

Activity 36 Time frame 12 minutes

J18 4.4	**FIGURE 4.4: RURAL-URBAN MIGRATION**  [Source: Examiner's own sketch] FIGURE 4.4 is a cartoon on rural-urban migration.		
4.4.1	Define the term *rural-urban migration*.	(1 x 1)	(1)
4.4.2	Name TWO environmental push factors responsible for rural-urban migration	(2 x 1)	(2)
4.4.3	How will rural-urban migration cause the economy of rural areas to stagnate (stop growing)?	(2 x 2)	(4)
4.4.4	Write a paragraph of approximately EIGHT lines and explain why pull factors are a burden on urban municipalities (local governments).	(4 x 2)	(8)

J18	**Memo**		
4.4.1	The movement of people from rural to urban areas (1)	(1 x 1)	(1)
4.4.2	Drought (1) Floods (1) Infertile soils (1) Soil erosion (1) Diseases and pests (1)	(2 x 1)	(2)
4.4.3	Rural depopulation causes a reduction in labour force (2) Insufficient threshold population to sustain basic services (2) Closure of businesses/services because of less customers (2) Decline in quality of service delivery (2) Fewer job opportunities/unemployment (2) Aging population because young leave the area (2) Brain drain as educated people leave the rural areas (2) Poor use of resources/farm lands (2) Lack of productivity (declining profits) with an older labour force (2) Fewer investments due to decrease in buying power (2)	(2 x 2)	(4)
4.4.4	Higher municipal budgets/more money needed to cater for increased populations (2) Increased pressure on municipal services (or give examples) (2) Understaffing of medical personnel (2) Not enough specialist for the increased population numbers (2) More demand for public transport (2) Need to improve/increase infrastructure as population numbers increased (2) Increased congestion on the roads/higher levels of traffic (2) More accidents/increased rate of accidents (2) More demand for low cost housing (2) More informal settlements (2) Overcrowding as a result of influx of people (2) Higher unemployment/lack of jobs (2) Higher levels of crime and other social ills (2) Higher levels of air/noise/land/water pollution (2) More difficult to control waste management (2) More landfill sites created resulting in despoliation (2) Increased pressure on education/overcrowded schools in urban areas (2) More money required to maintain urban areas e.g. policing and creating	(4 x 2)	(8)

	buffer zones (2) Municipal by-laws must be adjusted (2) Increase in service delivery protests (2) Increased number of people that are unwilling/reluctant to pay for services (2) [ANY FOUR – ISSUE MUST BE QUALIFIED]		



Urban Settlements

Activity 37 Time frame 6 minutes

N15 4.1	Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (4.1.1–4.1.8) in the ANSWER BOOK, for example 4.1.9 E.	
4.1.1	The smallest nucleated settlement is called a/an … A hamlet. B isolated farmstead. C town. D conurbation	C
4.1.2.	The distance people are prepared to travel to use a service is referred to as the ... A sphere of influence. B range. C ranking of services. D threshold population	B
4.1.3.	The movement of people away from the city into the rural areas is known as … A urbanisation. B rural-urban migration. C rural depopulation. D counter-urbanisation.	D
4.1.4	An urban hierarchy classifies a settlement according to … A size. B complexity. C function. D pattern.	C
4.1.5	Break-of-bulk points are settlements that … A develop where one mode of transport is changed for another. B originate where there are physical barriers such as mountains. C specialise in one dominant function. D provide goods and services to the surrounding rural areas.	A
4.1.6	Suburban businesses are becoming more popular because they are A located in the CBD. B subjected to urban blight. C located close to heavy industrial zones. D more accessible.	D
4.1.7	The largest highly urbanised area made up of several cities which are merged into one continuous built-up area is known as a … A conurbation. B metropolis. C megalopolis. D megacity.	C
4.1.8	Businesses located along the main roads leading to the CBD, with a constant flow of traffic, are known as … A isolated store clusters. B commercial ribbon developments. C planned shopping centres. D regional shopping centres.	B

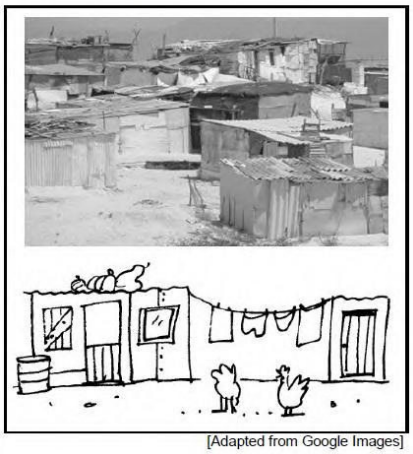
Activity 38 Time frame 12 minutes

N14 3.4	**FIGURE 3.4: URBANISATION** **SOUTH AFRICAN CITY PLANNERS FACE MANY CHALLENGES** [By Suren Naidoo] Durban – South Africa and the African continent are likely to experience high levels of urbanisation in the next few decades. It was reported that around half of the world's population is already living in cities, and the number looks set to rise. In South Africa we estimate that 8 million more people will live in cities by 2030. Our settlement patterns place a large financial burden (strain) on the poorest members of society. This pattern increases the cost of getting to or searching for work and lengthens travelling times. [Source: *The Mercury*, 18 September 2012]		
3.4.1	Which sector of the population has been most affected by the lack of planning?	(1 x 1)	(1)
3.4.2	Give TWO reasons why the sector of the population in QUESTION 3.4.1 has been most affected by the lack of planning in terms of transportation.	(2 x 2)	(4)
3.4.3	How will the increased travelling cost impact on household budgets?	(2 x 2)	(4)
3.4.4	Suggest THREE measures that urban planners can implement (put in place) to reduce traffic congestion between people's homes and places of work.	(3 x 2)	(6)

	Memorandum		
3.4.1	The poorest members of our society	(1 x 1)	(1)
3.4.2	Residential areas are on the outskirts of urban areas (2) Living further from work (2) Takes longer to get to work (2) Higher transport costs (2) Causes traffic congestion (2) Lack of proper public transport systems (2) [ANY TWO. ACCEPT ANY OTHER QUALIFIED REASONABLE ANSWER]	(2 x 2)	(4)
3.4.3	Increases financial burden on household budget (2) More of the budget will be used for travelling costs (2) Less money for basic necessities/examples (2) [ANY TWO]	(2 x 2)	(4)
3.4.4	Build more housing nearer to people's place of work, this would reduce travelling times, costs and the carbon footprint (2) Create better quality public transport to allow people to more efficiently and more easily get to work e.g. BRT (Bus Rapid Transport) and Gautrain (2) Create more jobs in or close to densely populated, urban townships (2) Create more cycle lanes (2) Planned irregular street pattern to facilitate easier flow of traffic (2) Create flexi times (2) Ring roads (2) One way streets (2) Synchronised traffic lights (2)	(3 x 2)	(6)

	Bus lanes (2) Park-and-ride (2) Lift clubs (2) Bridges and flyovers (2) [ANY THREE. ACCEPT ANY OTHER REASONABLE ANSWERS]		

Activity 39 Time frame 12 minutes

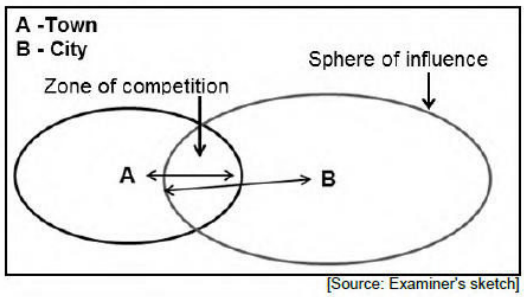
N 14 3.3.	FIGURE 3.3: URBANISATION FEATURE  [Adapted from Google Images] FIGURE 3.3 shows a feature that has resulted from rapid urbanisation in South African cities.		
3.3.1	Identify the feature shown in FIGURE 3.3.	(1 x 1)	(1)
3.3.2	Name TWO building materials used to construct the shelters/ houses in FIGURE 3.3.	(2 x 1)	(2)
3.3.3	Give TWO reasons why the building materials in QUESTION 3.3.2 were used.	(2 x 2)	(4)
3.3.4	Write a paragraph of approximately EIGHT lines to advise the local authorities on how to improve living conditions in these settlements.	(4 x 2)	(8)

	Memo		
3.3.1	Informal settlement (1) Squatter settlement (1) Shanty town (1) Shacks (1) [ANY ONE]	(1 x 1)	(1)
3.3.2	Bits of wood/Planks(1) Corrugated iron/Zinc (1) Cardboard/Paper(1) Plastic (1) Mud (1) [ANY TWO. ANY OTHER]	(2 x 1)	(2)
3.3.3	The materials are readily/easily available (2) Easy to assemble using this material (2) Most informal dwellers cannot afford to purchase proper building materials (2)	(2 x 2)	(4)

	Lack of transport to transport materials (2) Easy to take down and move to a different area (2) [ANY TWO. ACCEPT OTHER]		
3.3.4	**Improvement of living conditions in informal settlements** Provide basic services such as water/sewerage/electricity/waste disposal (2) Construct low cost (RDP) houses for the inhabitants (2) Giving informal settlers legal ownership of the land they are living on (2) Increase access to amenities (2) Improvement of transport/roads (2) Provision of employment opportunities to the people (2) Create open spaces/parks (2) Promote gardening (2) [ANY FOUR. CAN DISCUSS ONE OR MORE IN DETAIL. ACCEPT OTHER]	(4 x 2)	(8)

Urban Hierarchies

Activity 40 Time frame 12 minutes

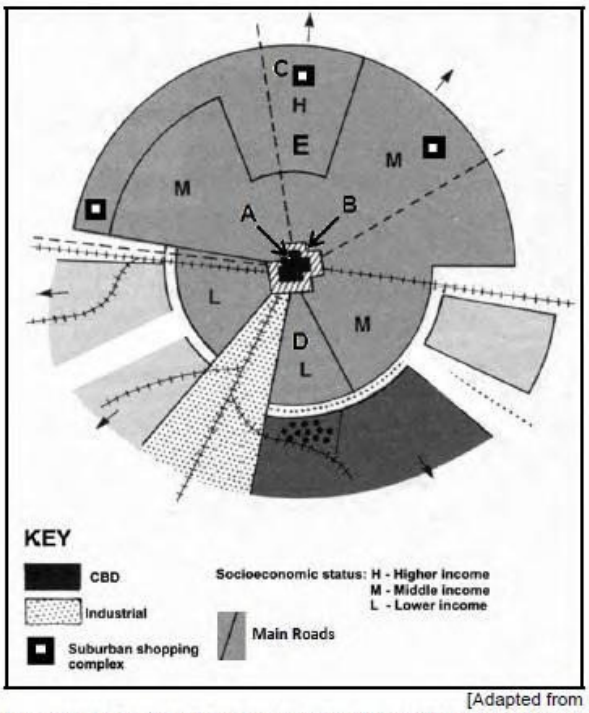
M17 4.3	FIGURE 4.3: SPHERE OF INFLUENCE  [Source: Examiner's sketch] Refer to FIGURE 4.3 based on high- and low-order urban centres and their spheres of influence.		
4.3.1	Define the term *sphere of influence*.	(1 x 1)	(1)
4.3.2	Compare the size of the city's sphere of influence with that of the town.	(1 x 1)	(1)
4.3.3	What determines the size of the sphere of influence of an urban settlement?	(1 x 1)	(1)
4.3.4	Give TWO possible reasons for the overlap of the town's sphere of influence with that of the city.	(2 x 2)	(4)
4.3.5	Explain why the range (distance) of different goods and services offered in city **B** is not the same.	(2 x 2)	(4)
4.3.6	According to the urban hierarchy of settlements, why are there more low-order centres (towns) than high-order centres (cities)?	(2 x 2)	(4)

Memo

M17 4.3	Refer to FIGURE 4.3 based on high- and low-order urban centres and their spheres of influence.		
4.3.1	Market area from where an urban settlement/business draws customers (1)	(1 x 1)	(1)
4.3.2	City larger/bigger/wider than the town (1) OR Town smaller/narrower than the city (1)	(1 x 1)	(1)
4.3.3	The order of the goods sold in a particular service area/order of services provided/degree of specialisation of services/goods (1) Number of functions/goods that are offered (1) Type of functions offered/goods sold (1) Variety of goods/services offered (1) Price of goods/services (1)	(1 x 1)	(1)
4.3.4	Zone of competition/where people can choose which place to shop at (2) Personal choice/convenience of where to go (2) Travel to place which offers better services (2) If there is little impact on travelling time and cost for the product they want to purchase (2) Going to either town or city for another purpose and shopping while there (2) En-route to place of work/residence (2) Offering of cheaper goods/services (2) Variety of goods offered (2) For high order/speciality goods/services customers can choose to go to the city (2) For low order/daily goods/services customers will most likely go to the town	(2 x 2)	(4)
4.3.5	Distance travelled (range) will depend on the order of the goods/service (2) High order goods/services/consumer goods have a greater range and draw customers from farther away (2) Low order goods/services/basic commodities/convenience goods have a shorter range therefore people not prepared to travel very far (2) Cost of goods/services – the cheaper, the shorter the distance/the more expensive, the farther the distance (2)	(2 x 2)	(4)
4.3.6	People not prepared to travel long distances to obtain lower order goods/services/convenience goods/functions (2) More low order centres will exist to provide for the daily needs of people/goods/functions that are frequently needed (2) Increased costs to obtain low order goods/services/functions if you have to travel to high order centres for daily needs (2) Low order centres serve a small area (2) High order goods and services are not required daily/less frequently (2) Fewer outlets provide high order goods/services/functions/not regular use of services (2) People are prepared to travel long distances to obtain high order goods/services/functions therefore fewer high order centres needed (2) High order centres serve a large area (2) Economic progression - as economic development takes place, some smaller centres will grow into larger centres (as number of goods/services/functions increases, that town will grow) (2)	(2 x 2)	(4)

Urban Structure and Patterns

Activity 41 Time frame 12 minutes

M16 4.4	**FIGURE 4.4: LAND-USE ZONES IN A SOUTH AFRICAN CITY**  [Adapted from http://people.uwec.edu/ivogeler/Travel/Southern%20Africa/aparth3.gif] FIGURE 4.4 shows a simplified model and land-use zones of a city in South Africa.		
4.4.1	Name land-use zone **A**.	(1 x 1)	(1)
4.4.2	Give a possible reason why the transition zone (**B**) doesn't fully enclose zone **A**.	(1 x 2)	(2)
4.4.3	Why is land-use zone **D** likely to be a low-income residential area?	(1 x 2)	(2)
4.4.4	State ONE factor that would have promoted the location of shopping centre **C**.	(1 x 2)	(2)
4.4.5	Write a paragraph of approximately EIGHT lines in which you discuss the negative factors in land-use zone **A** that resulted in the relocation of businesses to **C** and its surrounding area.	(4 x 2)	(8)

	Memo		
4.4.1	Central Business District (CBD) (1)	(1 x 1)	(1)
4.4.2	Expansion of the CBD in an uneven manner (2)	(1 x 2)	(2)
4.4.3	Cheaper land (2) closer to industries (2) Easy for some workers to walk to work (2) [ANY ONE]	(1 x 2)	(2)
4.4.4	Access via roads – suit the motorists (2)	(1 x 2)	(2)

	Open land and space for a large mall, with parking and underground parking (2) Close to outlying residential areas (clientele and a market-base) (2) [ANY ONE]		
4.4.5	**RELOCATION OF BUSINESSES** Crime and grime in the inner-city (2) Forces many businesses to relocate to safer and cleaner; more well maintained outlying business districts like at C (2) Very expensive land and rentals in A (2) Initially causes businesses to relocate to cheaper land rentals at C (2) Overcrowded at A (2) Traffic congestion at A (2) Reduced access at A (2) Lack of parking at A (2) Limited expansion prospects at A (2) [ANY FOUR	(4 x 2)	(8)

Urban Settlement Issues

Activity 42 Time frame 12 minutes

N15 3.4	**FIGURE 3.4: INFORMAL SETTLEMENTS** **BUCKETS, PITS AND POVERTY** 26 September 2014, 00:00 By Tiisetso Makube  The first thing you notice as you enter Tsakana Extension Six is that the road, or whatever they call it, is almost impassable. But we *hesh* (as they say in the township, meaning 'hustle') in our small car, to get around. But the going is not easy. There are furrows here and there from soil erosion. There are stones, small boulders even, that really make driving here a difficult exercise. Thousands of residents in various informal settlements across the Western Cape also have no proper access to water and sanitation. Many households, mostly in rural areas and townships, continue to use the bucket system, or remain without access to adequate sanitation services. [Source: *Mail & Guardian*, Tiisetso Makube, 26 September 2014] Refer to FIGURE 3.4, an extract from a newspaper article on an informal settlement in the Western Cape, and answer the questions that follow.		
3.4.1	Name ONE basic service mentioned in the newspaper article that the informal settlement has a shortage of.	(1 x 1)	(1)
3.4.2	Why is there an increasing number of informal settlements in the Western Cape?	(1 x 1)	(1)
3.4.3	Name ONE cause of soil erosion in Tsakane Extension Six.	(1 x 2)	(2)
3.4.4	Explain why it is difficult to provide assistance when there is an emergency in Tsakane Extension Six.	(2 x 2)	(4)

3.4.5	In a paragraph of approximately EIGHT lines, give sustainable solutions to improve the living conditions of people living in Tsakane Extension Six.	(4 x 2)	(8)
	Memo		
3.4.1	Roads (1) Water (1) Sanitation (1) Waste removal (1) [ANY ONE]	(1 x 1)	(1)
3.4.2	Increased urbanisation (1) Rural depopulation/Rural-urban-migration/Examples of push and pull factors (1) Poor planning by local governments (1) Poverty (1) Provision of proper housing/facilities demand exceeds supply (1) No choice because there is no formal housing available (1) Influx of immigrants/migrants from other provinces (1) Overpopulation (1) Increasing number of people due to industrial growth (1) [ANY ONE]	(1 x 1)	(1)
3.4.3	Removal of vegetation to build houses (2) Flooding due to poor drainage (2) No proper storm water drainage (2) No tarred roads/increase of vehicles (2) Furrows form due to dirt roads (2) Lack of natural vegetation (2) Lack of education regarding soil erosion/poor systems of soil management (2) [ANY ONE]	(1 x 2)	(2)
3.4.4	Lack of effective transport routes (2) Lack of proper telecommunication infrastructure (2) Furrows in roads difficult to cross (2) Roads are impassable/Boulders in road make it difficult to drive (2) Low accessibility (no street names or numbers for houses) (2) Lack of planning (no street names or numbers for houses) (2) No proper water sources for fire emergency (2) Service providers are reluctant to go into informal settlements due to high rates of crime (2) [ANY TWO]	(2 x 2)	(4)
3.4.5	**<u>SUSTAINABLE SOLUTIONS TO IMPROVE LIVING CONDITIONS</u>** Provision of proper low cost houses/RDP houses(2) Provide tarred roads with better drainage systems (2) Provision of water points and piped water in the houses (2) Provision of storm water drainage (2) Regular refuse removal (2) Provision of the dumping sites (2) Access to recycling facilities (2) Provision of electricity in a form of solar panels (2) Provision of sanitation facilities in the community (2) Job creation to improve standard of living (2) Site-and-service facilities (2)	(4 x 2)	(8)

	Increase more self-help schemes (2) Consulting and involving community stakeholders in decision making (2) [ANY FOUR}		

Activity 43 Time frame 12 minutes

J18 4.3	**INFORMAL SETTLEMENTS** Ivan Turock: Executive Director, Human Sciences Research Council One in five residents of South African cities lives in a shack, most of which is densely clustered in informal settlements. These areas present the country with its biggest challenges. Shack dwellers are exposed to hardship, insecurity and hazards from living in unhygienic and overcrowded conditions on un-serviced and sometimes unsuitable land. They believe they deserve better, which adds to their growing discontent (unhappiness) and violent protests in recent years. [Adapted from www.hsrc.co.za] FIGURE 4.3 is an extract on informal settlements.		
4.3.1	What percentage of residents in South African cities live in shacks?	(1 x 1)	(1)
4.3.2	Give a reason for the dense clustering of shacks in informal settlements.	(1 x 2)	(2)
4.3.3	Outline TWO ways in which shack dwellers often show their growing discontent (unhappiness) in South Africa.	(2 x 2)	(4)
4.3.4	Write a paragraph of approximately EIGHT lines and suggest why people that live in informal settlements find it difficult to improve their standard of living.	(4 x 2)	(8)

Memo

J18 4.3	**INFORMAL SETTLEMENTS** Ivan Turock: Executive Director, Human Sciences Research Council One in five residents of South African cities lives in a shack, most of which is densely clustered in informal settlements. These areas present the country with its biggest challenges. Shack dwellers are exposed to hardship, insecurity and hazards from living in unhygienic and overcrowded conditions on un-serviced and sometimes unsuitable land. They believe they deserve better, which adds to their growing discontent (unhappiness) and violent protests in recent years. [Adapted from www.hsrc.co.za] FIGURE 4.3 is an extract on informal settlements.		
4.3.1	20% (1)	(1 x 1)	(1)
4.3.2	Lack of space in informal settlements (2) Great demand for informal housing which is cheaper/affordable (2) Too many people who cannot afford formal housing that chose to live in informal settlements (2) Built in a piecemeal manner, with no planning (2) [ANY ONE]	(1 x 2)	(2)

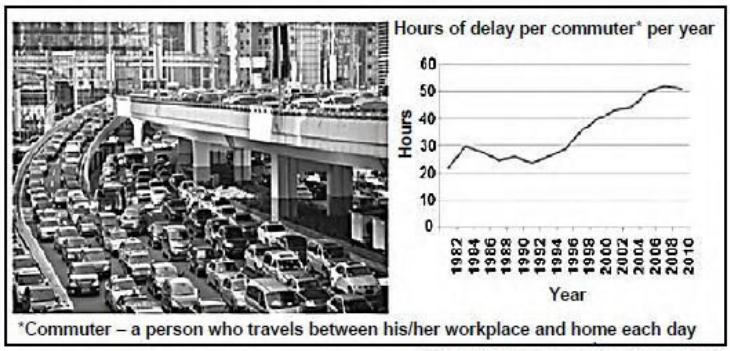
4.3.3	Protest actions that can turn to violence/can lead to violence (2) Burning of tyres (2) Blocking of roads (2) Littering of roads (2) Looting and damaging businesses/shops (2) Burning down shacks (2) Burning down government/municipal buildings (2) Disruption of service provision (2) Destruction of infrastructure e.g. water/power meters (2) Stoning of motor vehicles (2) Illegal marches (2) Land grabs (2) Picketing outside government buildings (2)	(2 x 2)	(4)
4.3.4	Exposed to poor service delivery or give examples (2) Ill-health due to unhygienic conditions or examples of diseases (2) Exposed to hazards and poor weather conditions due to poor housing (2) Lack of privacy due to overcrowding (2) Exposed to violence and other social ills e.g. prostitution, drug trafficking (2) People lack the necessary life skills, therefore not employed in high end jobs (2) Lack of money restricts people from furthering their studies (2) People end up being unemployed (2) People are poverty stricken (2) Dependent on family and friends (2) Due to lower income paid work resulting in more debt (2) Cannot afford formal housing (2) People possibly tempted to get involved in crime (2) Due to lack of skills, lack of knowledge, lack of access to resources etc. people are unable to achieve a better life (2) [ANY FOUR]	(4 x 2)	(8)

Activity 44 Time frame 12 minutes

N14 4.3	**FIGURE 4.3: URBAN PROBLEMS** **JOHANNESBURG BURSTING AT THE SEAMS** Johannesburg is in the midst of urban renewal. An amount of R2 billion has been allocated to get rid of the rot and grime in the inner city. Currently the inner city is the main entrance point for immigrants, with more than 200 000 now living there. A task team will look at rehabilitating buildings, waste management and by-law enforcement. Provision has also been made for inner city 'green lungs'. [Adapted from an article by David Jackson] Refer to the newspaper extract in FIGURE 4.3 on urban problems and answer the questions that follow.		
4.3.1	Give a phrase from the extract that explains the meaning of urban renewal.	(1 x 1)	(1)
4.3.2	With reference to the newspaper extract, explain why the inner city of Johannesburg has become overcrowded.	(2 x 2)	(4)
4.3.3	Suggest TWO reasons why the provision and the quality of services to the inner city of Johannesburg is steadily declining.	(2 x 2)	(4)
4.3.4	What do the 'green lungs' in the extract refer to?	(1 x 2)	(2)
4.3.5	Suggest TWO advantages of 'green lungs' in a city.	(2 x 2)	(4)

	Memo		
4.3.1	To get rid of the rot and grime (1) Rehabilitating buildings (1) [ANY ONE]	(1 x 1)	(1)
4.3.2	Accessibility to jobs (2) Rural – Urban migration (2) The inner city is overcrowded; due to an influx of many immigrants/migrants (2) Sub-rental of rooms within apartments (2) Low rentals as a result of dilapidated nature of buildings (2) High levels of multi-occupancy in buildings (2) [ANY TWO].	(2 x 2)	(4)
4.3.3	The city of Johannesburg suffers from water and power shortages due to the increasing population (2) Old infrastructure cannot support the growing population (2) The cost of basic services is increasing in the city – people don't pay, which causes a further decline in services (2) Illegal electricity connections compromises services (2) Demand is greater than supply (2) The lack of employment opportunities means services cannot be paid for (2) [ANY TWO]	(2 x 2)	(4)
4.3.4	Open spaces/parks within the inner city that serve as green belts (2) Areas with the inner city that are not reserved for commercial development (2) [ANY ONE]	(1 x 2)	(2)
4.3.5	Reduces carbon dioxide(2) Reduces pollution dome (2) Supplies more oxygen to urban areas (2) Beautifies the city/aesthetic purposes (2) Clean environment attracts tourists (2) Creates recreational areas (2) Absorbs noise (2) Reduces urban heat island effect/temperatures(2) Creates habitat for other living organisms (2) Reduces urban sprawl (2) [ANY TWO]	(2 x 2)	(4)

Activity 45 Time frame 12 minutes

N15 3.3	**FIGURE 3.3: TRAFFIC CONGESTION**  [Source: www.chron.com/the guardian.com] Refer to FIGURE 3.3, showing traffic congestion, and answer the questions that follow.		
3.3.1	Define the term *traffic congestion*.	(1 x 1)	(1)
3.3.2	State ONE negative effect of traffic congestion on the physical environment.	(1 x 1)	(1)
3.3.3	What is the trend shown by the graph from 1982 to 2010 with regard to the hours of delay per commuter per year?	(1 x 2)	(2)
3.3.4	Give a possible reason for your answer to QUESTION 3.3.3.	(1 x 2)	(2)
3.3.5	Describe TWO negative effects that this delay may have on commuters.	(2 x 2)	(4)
3.3.6	Suggest TWO possible ways in which traffic congestion in urban areas can be reduced.	(2 x 2)	(4)

	Memo		
3.3.1	Overconcentration (too many) of vehicles on the road (1)	(1 x 1)	(1)
3.3.2	Air pollution (1) Noise pollution (1) Global warming (1) Acid rain (1) Reduced visibility (1) Destruction/damage of roads e.g.potholes (1) [ANY ONE]	(1 x 1)	(1)
3.3.3	There was an increase in the hours of delay per person (2) An increase, then a decrease, then an increase, then constant (2) [Accept specific trends on graph for each year] 1982 – 1984: increase 1984 – 1988: decrease 1988 - 1990: increase (2) Full description; NOT PER YER GROUP 1990 – 1992: decrease 1992 – 2008: increase 2008+: constant [ANY ONE]	(1 x 2)	(2)
3.3.4	In 2010 there were more private vehicles as compared to 1982 (2) Rural-urban migration has escalated (2) Urban growth (2) Increase in commuter population (2) Unreliable public transport (2) [ANY ONE]	(1 x 2)	(2)

3.3.5	They arrive late at work (2) Related impacts e.g. lose jobs/salary/decrease in productivity/deductions (2) Time wastage due to being delayed in traffic (2) High fuel consumption (2) Anger and frustration/Road rage/Accidents (2) Impact on health/Stress/Exposure to pollution (2) [ANY TWO - ACCEPT OTHER REASONABLE ANSWERS]	(2 x 2)	(4)
3.3.6	Improve public means of transport (2) Park and ride systems (2) Lift clubs (2) Impose high parking fees to private cars in the city (2) Establishment of cycle lanes (2) One-way streets to speed up traffic flow (2) Decentralise offices and shops (commercial decentralisation) (2) Working flexitime (2) Synchronised robots (2) Traffic points man/officers at more intersections (2) Closing certain lanes during peak hours (2) Building outer ring roads (2) Traffic circles (2) Traffic monitors through radio stations/helicopters (2) Increase the number of lanes (2) Adjust traffic flow according to traffic density and times (2) Tolling (2) [ANY TWO] -	(2 x 2)	(4)

Economic Geography of South Africa

Structure of the Economy

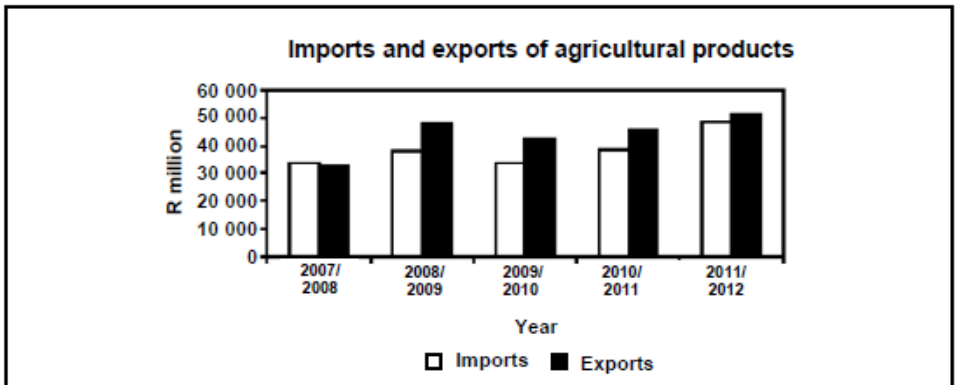
Activity 46 Time frame 6 minutes

M16 3.2	Choose an example from COLUMN B that matches the term in COLUMN A. Write only the letter (A–I) next to the question number (3.2.1–3.2.8) in the ANSWER BOOK, for example 3.2.9 J.			
	COLUMN A	**COLUMN B**		**ANS**
3.2.1	Primary activity	A	information technology	**C**
3.2.2 .	Secondary activity	B	roads, railways and communication	**G**
3.2.3 .	Export market	C	mining	**H**
3.2.4	Quaternary activity	D	local trade	**A**
3.2.5	Small-scale farming	E	gross domestic product	**F**
3.2.6	Home market	F	vegetable garden	**D**
3.2.7	Large-scale farming	G	manufacturing	**I**
3.2.8	Infrastructure	H	international trade	**B**
		I	sugar cane plantation	

Agriculture

Factors favouring (promoting) farming	Factors hindering (restrict/limit) farming	Importance of farming in South Africa (role of farming in SA)
• There is a high demand (market) for farming products so farmers sell their crops more easily. Farmers' profits rise when they can sell for a higher price to overseas markets with a demand for their crops or stock. • The fertile floodplains of rivers allow farmers to produce more crops or grazing land (pastures) in these areas. This supports farming and increases profits. • The eastern half of the country gets more than 500 mm of rain a year. This makes it possible to produce more crops and ensures greener pastures for stock farming, therefore increasing profits. • The relatively high summer temperatures help crops to grow and increase crop production. It also ensures greener pastures for stock farming. • Availability of labour (workers)	• Rainfall is low and unreliable on the plateau, which limits crop production and decreases available pastures for stock farming. • Soil erosion due to incorrect farming methods increases farming costs and decreases profits. • Natural hazards such as droughts, floods and hail storms damage crops and stock and decrease production and profits. • HIV and AIDS have a negative impact on the health and productivity of farm workers. • Price fluctuations (when prices go up and down) make it difficult for farmers to stay in business and make a profit. • Pests which affect crops and stock are costly to control and cause a decrease in production and profits.	• Farming provides jobs to people and so decreases unemployment. • Farming provides food to the country so less food needs to be imported. Food that is supplied locally is less expensive than imported food. • Farming equipment is expensive because much of it is imported, but South Africa has reduced these costs by manufacturing some equipment locally, for example irrigation systems. • Farming involves moving crops to the markets, which in turn leads to improving the country's infrastructure (roads, railways and communication systems). • South African farming products are exported to other countries earning us foreign exchange. This improves the country's economy.

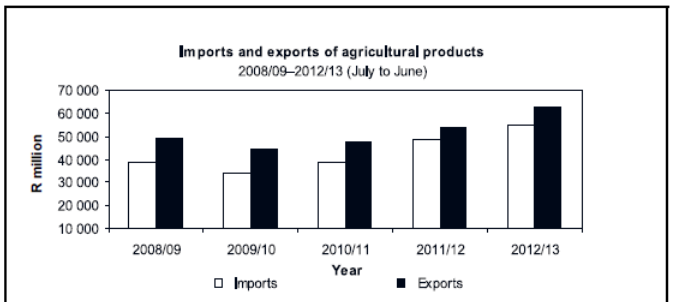
Activity 47 Time frame 12 minutes

N 14 3.5	**FIGURE 3.5: CONTRIBUTION OF AGRICULTURAL PRODUCTS TO SOUTH AFRICA'S ECONOMY**  The estimated value of imports for 2011/2012 amounted to R48 790 million, an increase of 25,7% from R38 815 for 2010/2011. The value of exports increased by 12,3% from R45 721 million in 2010/2011 to R51 357 million in 2011/2012. [Source: www.nda.agric.za] Refer to FIGURE 3.5 showing the contribution of agricultural products to South Africa's economy.		
3.5.1	Did South Africa import or export more agricultural products in 2011/2012?	(1 x 1)	(1)
3.5.2	Under which economic sector does agricultural production fall?	(1 x 1)	(1)
3.5.3	By what percentage did South Africa's exports of agricultural products increase between 2010/2011 and 2011/2012?	(1 x 1)	(1)
3.5.4	State TWO benefits for the South African economy of a strong home market in terms of agricultural production.	(2 x 2)	(4)
3.5.5	Suggest TWO ways in which agricultural activities contribute to the development of infrastructure in South Africa.	(2 x 2)	(4)
3.5.6	Evaluate how unreliable rainfall contributes to food insecurity.	(2 x 2)	(4)

	Memo	
3.5.1	Export (1)	(1 x 1)
3.5.2	Primary (1)	(1 x 1)
3.5.3	12,3% (1)	(1 x 1)
3.5.4	Cheaper food (2) Greater variety of food (2) Development of rural areas (2) Provides raw materials for the manufacturing industry (2) Development of processing industries (2) Employment opportunities (2) Food security (2) Promotes small-scale farming (2) Promotes more exports (2) Improves the GDP/Balance of trade (2) Provides nutritious/fresh products (2) Empowerment of women in rural areas (2)	(2 x 2)

	[ANY TWO]	
3.5.5	New transport networks created (2) Transport networks have been improved (2) Specialised transport facilities created (2) Water irrigation schemes were developed (2) Electricity grids developed (2) Specialist harbour facilities (2) [ANY TWO]	(2 x 2)
3.5.6	Unreliable rainfall increases the risks of soil erosion (2) Unreliable rainfall creates a risk in crop yields (2) Farmers become unreliable suppliers of food to the markets (2) Causes increased food costs (2) Increases cost of food production (2) Results in food shortages (2) Increases food imports (2) [ANY TWO]	(2 x 2)

Activity 48 Time frame 12 minutes

M16 3.5	**FIGURE 3.5: AGRICULTURAL PRODUCTS**  According to the 2012/13 export values, citrus fruit (R7 981 million), wine (R6 965 million), maize (R5 294 million), apples, pears and quinces (R5 172 million) and grapes (R4 576 million) were the most important agricultural export products. [Source: http://www.daff.gov.za/docs/statsinfo/EcoReview1213.pdf] FIGURE 3.5 is a bar graph that compares South Africa's imports and exports of agricultural products from 2008 to 2013, with an accompanying statement.		
3.5.1	Indicate whether South Africa imported or exported more of its agricultural products in 2008/2009.	(1 x 1)	(1)
3.5.2	Indicate the general trend of imports/exports from 2009/2010 to 2012/2013.	(1 x 1)	(1)
3.5.3	Which agricultural product earned the greatest income for South Africa in 2012/2013?	(1 x 1)	(1)
3.5.4	South Africa could earn more money by exporting the agricultural product in QUESTION 3.5.3 in a processed form. Explain why this is the case.	(1 x 2)	(2)
3.5.5	Explain TWO factors related to trade that have encouraged people to buy South African agricultural products.	(2 x 2)	(4)
3.5.6	Discuss the importance of agriculture to the South African economy.	(3 x 2)	(6)

	Memo		
3.5.1	Exported (1)	(1 x 1)	(1)
3.5.2	Increased (1)	(1 x 1)	(1)
3.5.3	Citrus fruits (1)	(1 x 1)	(1)
3.5.4	Manufacturing a product from a raw material makes it more valuable (2)	(1 x 2)	(2)
3.5.5	South Africa close relationship with many African countries (2) High quality of agricultural products Reliability in provision Agricultural products relatively cheap (2) [ANY FOUR]	(2 x 2)	(4)
3.5.6	It provides employment opportunities (2) It earns foreign exchange (2) Contributes to the GDP of the country (2) Promotes the establishment of infrastructure (2) Provides raw materials to the manufacturing industry (2) It leads to food security and imports will be less (2) [ANY THREE]	(3 x 2)	(6)

Activity 49 Time frame 12 minutes

N15 4.5	**FIGURE 4.5: CATTLE FARMING** **SOUTH AFRICA'S BEEF INDUSTRY: WHAT DOES THE FUTURE HOLD?** 12:00 (GMT+2), Saturday 31 August 2013 By Lloyd Phillips While South Africa has what appears to be a thriving beef industry, its average productivity, compared with that of other countries, shows that it is not achieving its full potential. This is partly due to the low productivity of our informal beef farming sector. This problem needs to be corrected. The South African beef industry is in a position to take advantage of Africa's increasing middle-class expenditure and increased population growth from one billion to two billion people by 2050 – and the associated demand for red meat. In recent years there have been worldwide improvements in beef feeding practices and herd quality through the use of modern technologies. These technologies have failed to find their way into South Africa's informal beef farming sector. Due to several factors, including environmental concerns, the national beef herd cannot be increased, and existing production methods therefore need to be improved. [Adapted from *Farmer's Weekly*, 31 August 2013] Study FIGURE 4.5 based on cattle farming and answer the questions that follow.		
4.5.1	Why, according to the article, is South Africa's beef production not at the same level as that of other countries?	(1 x 1)	(1)
4.5.2	Why is there a need to increase beef production in future?	(1 x 1)	(1)
4.5.3	Why does South Africa have such a large informal cattle farming sector?	(1 x 2)	(2)
4.5.4	Suggest TWO ways in which the South African government can assist informal cattle farmers to improve their productivity levels.	(2 x 2)	(4)
4.5.5	State TWO environmental concerns associated with cattle farming.	(2 x 2)	(4)
4.5.6	Besides being a source of food, give ONE other reason why the beef industry is important to the South African economy.	(1 x 2)	(2)

	Memo		
4.5.1	Low productivity (1) Informal beef farming (1) [ANY ONE]	(1 x 1)	(1)

4.5.2	Increasing middle class expenditure and consumption (1) Projected population growth from one billion to two billion people by 2050 (1) [ANY ONE]	(1 x 1)	(1)
4.5.3	Large rural population practicing subsistence farming (2) In certain cultures the wealth of the family is determined by the number of cattle (2) Domestic use of cattle does not allow for commercial use of cattle (2) Emerging farmers lack training (2) [ANY ONE]	(1 x 2)	(2)
4.5.4	<u>The South African government can:</u> Increase education/training of small scale farmers in land and financial management (2) Promote the use of agricultural extension officers to small scale farmers (2) Promote land ownership by creating more land tenures and restitution(2) Increase access to bonds from the development bank to small-scale farmers to increase access to funding (2) Promote open markets for fair and equitable pricing of beef and beef products (2) Promote grants for technical and scientific advisors to assist small scale farmers (2) Increase tariffs on the import of beef products to improve trade in the home markets (2) Speed up land distribution programme (2) [ANY TWO]	(2 x 2)	(4)
4.5.5	Increase in soil erosion/degradation due to larger herds (2) Removal of vegetation (overgrazing) (2) Increase in air pollution due to release of methane gas (2) Increases global warming (2) Desertification (2) Compacting of soil which reduces infiltration (2) [ANY TWO]	(2 x 2)	(4)
4.5.6	Contributes to the GDP through export products (2) Provides employment (2) It is a source of raw material to industries e.g. canned meat (2) Used in the manufacturing of dairy products (2) [ANY ONE]	(1 x 2)	(2)

Activity 50 Time frame 12 minutes

N15 3.6	**Food Security** On national level, 45,6% or approximately two out of four households in South Africa are food secure.		
3.6.1	Define the term *food security.*	(1 x 1)	(1)
3.6.2	Give the percentage of the South African population that is food insecure.	(1 x 1)	(1)
3.6.3	Discuss TWO natural factors that contribute to food insecurity.	(2 x 2)	(4)

3.6.4	Write a paragraph of approximately EIGHT lines in which you propose measures that can be put in place to improve food security in South Africa.	(4 x 2)	(8)

	Memo		
3.6.1	When people in a country have access to enough food supplies (1)	(1 x 1)	(1)
3.6.2	54,4% (1)	(1 x 1)	(1)
3.6.3	Climatic factors (environmental hazards): droughts, floods and soil erosion affects agriculture negatively and leads to food insecurity (2) Rainfall: low or unreliable rainfall leads to food insecurity (2) Soil fertility: infertile soil leads to less production and food insecurity (2) Hail: hail storms damage crops and kill livestock (2) Diseases/pests: Plant diseases destroy crops/animal diseases kill livestock (2) El Niño can cause droughts or floods increasing desertification and lowering food security (2) Natural veld fires/berg winds can destroy grazing and crops/livestock (2) [ANY TWO – NOT JUST LISTING. MUST BE A DISCUSSION]	(2 x 2)	(4)
3.6.4	**MEASURES TO IMPROVE FOOD SECURITY** Introduction of national food security strategy (2) Encourage farmers to use modern methods of farming to increase output (2) Growing mixture of crops or practising mixed farming (2) Storing food to be used during the dry season (2) Use of genetically modified crops (2) Government to provide incentives and subsidies to farmers (2) More research on how to improve food production for local conditions (2) Construction of dams in dry areas to encourage cultivation (2) To enable more people to have access to land for farming/land reform policies (2) Improving trade relations to have access to cheaper foods (2) Consolidation of farms to increase productivity (2) Agricultural officers to assist with improving food production (2) Encourage land ownership (2) [ANY FOUR]	(4 x 2)	(8)

Mining

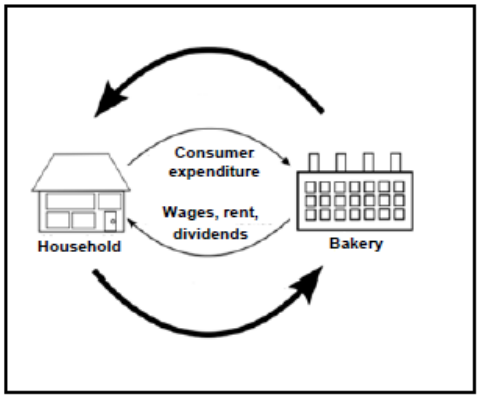
Activity 51 Time frame 12 minutes

M16 4.5	**FIGURE 4.5: MINING** **COAL MINING IN SOUTH AFRICA** Coal mining in South Africa plays a significant role in the country's economy, as it is responsible for nearly three quarters of Eskom's fuel supply. It also supplies coal to SASOL, who produces around 35% of the country's liquid fuel. Coal mining in South Africa is centred on the Highveld, with roughly 60% of the country's deposits located in eMalahleni (Witbank) and surrounding areas. [Source: http://www.projectsiq.co.za/coal-mining-in-south-africa.htm] Read the extract in FIGURE 4.5 on coal mining in South Africa.		
4.5.1	Name the province in which most of South Africa's coalfields are found.	(1 x 1)	(1)
4.5.2	Name TWO of South Africa's major industries that are dependent on coal as a raw material.	(2 x 1)	(2)
4.5.3	State TWO environmental problems resulting from coal mining in South Africa.	(2 x 2)	(4)
4.5.4	Mining and coal-dependent companies should work together to rectify environmental injustices associated with coal mining. In a paragraph of about EIGHT lines, explain how this can be achieved.	(4 x 2)	(8)

	Memo		
4.5.1	Mpumalanga (1)	(1 x 1)	(1)
4.5.2	ESKOM (1) SASOL (1)	(2 x 1)	(2)
4.5.3	Land degradation (2) OR Opencast mining an eyesore (2) Air pollution from the burning of coal to generate electricity (2) [ANY TWO]	(2 x 2)	(4)
4.5.4	**RECTIFYING ENVIRONMENTAL INJUSTICES** Land mined as open cast coal mines need to be rehabilitated (2) Re-vegetation and the restoration of local fauna in the area where mining occurred must be monitored (2) Applying the polluter pays principle and fining companies responsible for high levels of air pollution (2) Applying scrubbing and clean technology to smoke stacks (2) Offsetting carbon footprints with carbon credits (2) Planting of more trees to offset carbon emissions (2) [ANY FOUR	(4 x 2)	(8)

Secondary and Tertiary Sectors

Activity 52 Time frame 12 minutes

N15 3.5	**FIGURE 3.5: MARKET-ORIENTATED SECONDARY ECONOMIC ACTIVITY**  [Source: www.atmo.arizona.edu] Refer to FIGURE 3.5, showing a market-orientated secondary economic activity, and answer the questions that follow.		
3.5.1	Define the term *secondary economic activity*.	(1 x 1)	(1)
3.5.2	What is a *market-orientated industry*?	(1 x 1)	(1)
3.5.3	Why is this bakery market orientated?	(1 x 2)	(2)
3.5.4	State TWO characteristics of the bakery that make it a light industry.	(2 x 2)	(4)
3.5.5	Discuss TWO factors that are likely to influence production costs at this bakery.	(2 x 2)	(4)
3.5.6	Explain the economic importance of light industries for the economy of South Africa.	(2 x 2)	(4)

	Memo		
3.5.1	Manufacturing of goods/Processing of raw material (1)	(1 x 1)	(1)
3.5.2	An industry that is located close to the consumer/customer (1)	(1 x 1)	(1)
3.5.3	Bread products are perishable and need to be consumed within a specific period (2) Cannot be stored for a long period and needs to be transported on a daily basis (2) Short lifespan due to sell-by dates being put on products (2) [ANY ONE]	(1 x 2)	(2)
3.5.4	No air pollution (2) No noise pollution (2) No bad odours (2) Manufactured from light raw materials (2) Located close to the customers (2) No use of heavy machinery (2) Occupies a smaller space (2) Can be located in the CBD (2) Clients can buy directly from a light industry (2) Locate in multi-storey buildings (2) [ANY TWO]	(2 x 2)	(4)
3.5.5	Transport: Effective and efficient transport for raw materials/Increase in fuel costs increases the costs of production (2)	(2 x 2)	(4)

	Availability of raw material: Ingredients should be available nearby (2) Cost of the raw materials/drought/increase in imports of raw materials(2) Labour: Availability of unskilled labour/labour strikes (2) Electricity: Sustainable supply of electricity (2) Water: Availability of water (2) Maintenance of equipment (2) Factory rentals (2) [ANY TWO]		
3.5.6	Provides an accessible market for the buying and selling of goods (2) Consumers have access to stores which sell products (2) Factories are located close to the markets and results in job creation to skilled and unskilled labourers (2) Provides important markets for the raw materials from primary sector (2) Development of infrastructure between factories and market areas (2) Profits from finished products is reinvested in the market area (2) Contributes to the GDP (2) Improves trade relations/foreign capital (2) Strengthens the retail sector (2) [ANY TWO]	(2 x 2)	(4)

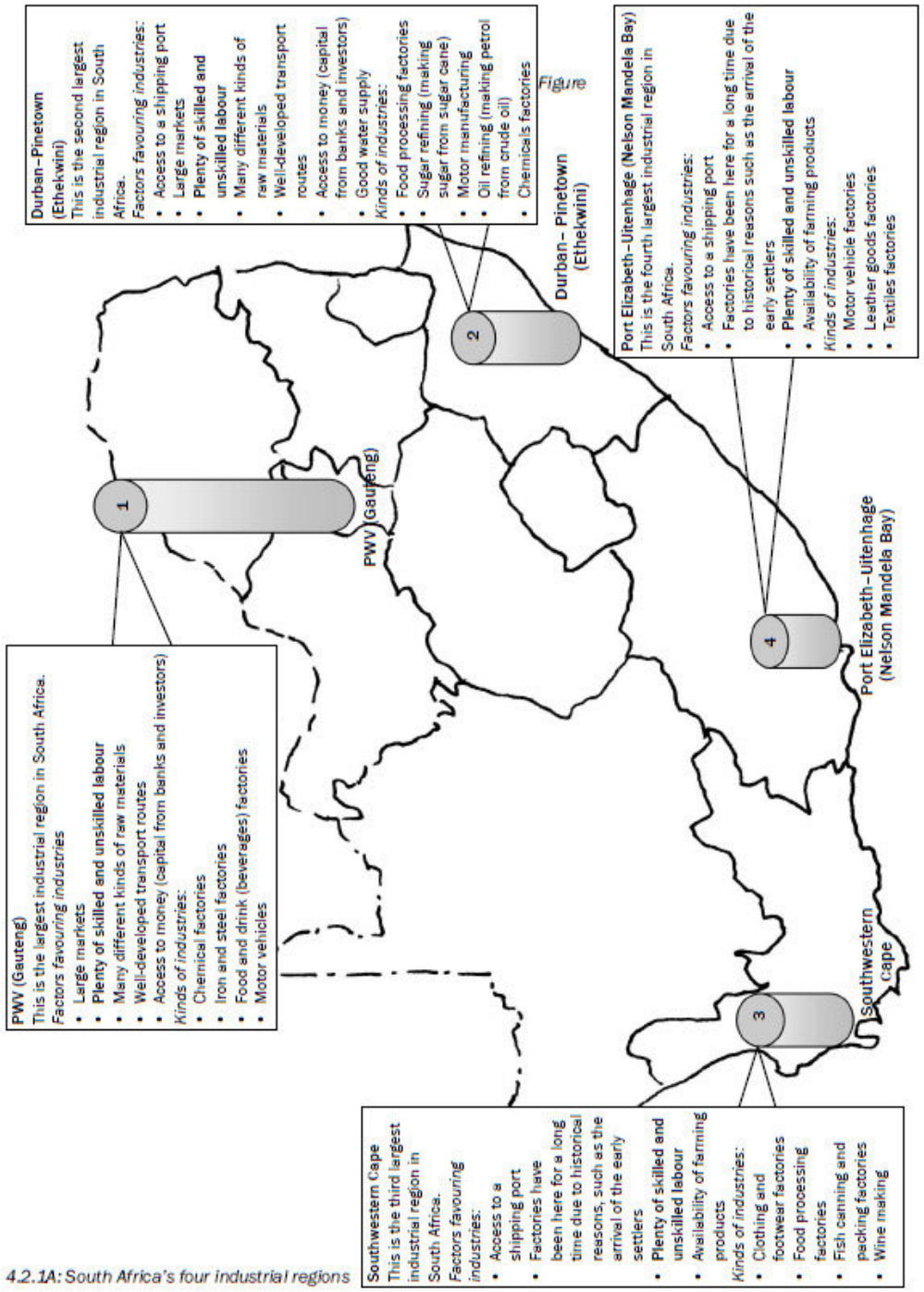


Figure 4.2.1A: South Africa's four industrial regions

Strategies for Industrial Development

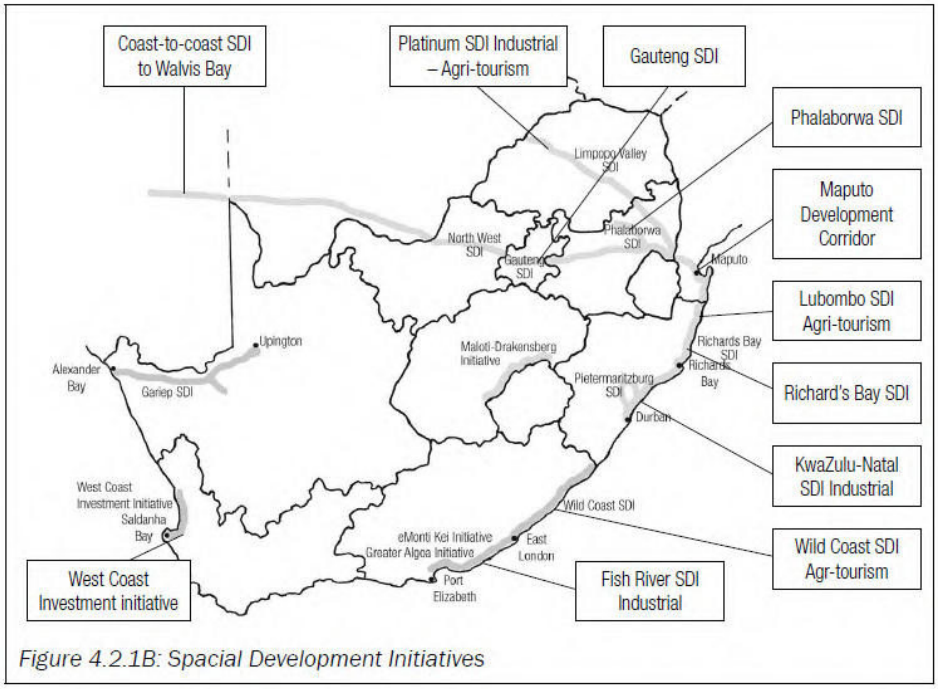


Figure 4.2.1B: Spacial Development Initiatives

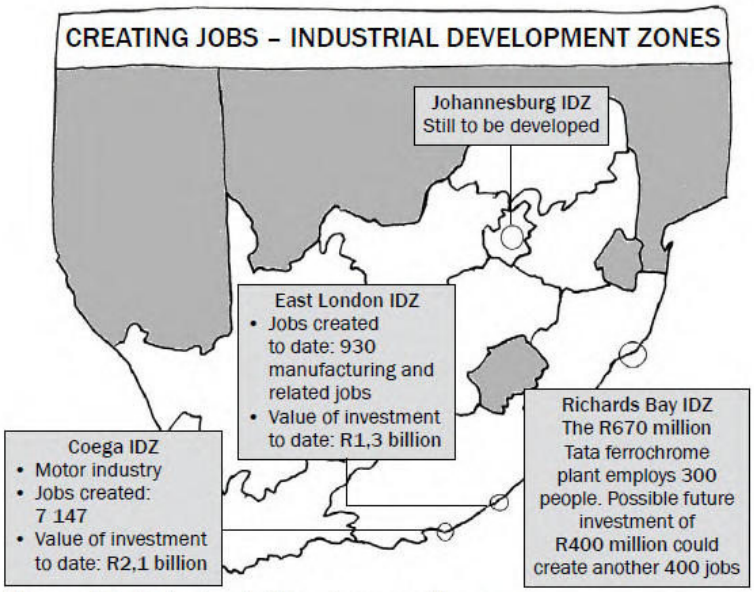


Figure 4.2.1C: Industrial Development Zones

Activity 53 Time frame 12 minutes

N14 3.6	**FIGURE 3.6: SPATIAL DEVELOPMENT INITIATIVES** Spatial Development Initiatives (SDIs) were introduced in post-apartheid South Africa. The SDI programme was developed by the Cabinet in 1995 in order to improve the functioning of government in certain regions of the country, especially in those areas where the greatest potential for growth existed. Eleven SDIs throughout South Africa were planned in the first phase: the Maputo Development Corridor, the Phalaborwa SDI, the Platinum SDI, the West Coast Investment Initiative, the Gariep SDI, the Fish River SDI, the Wild Coast SDI, the Richards Bay SDI, the Durban and Pietermaritzburg nodes, the Lubombo SDI and the Gauteng Special Economic Zones. [Source: www.rosalux.co.za] Read the extract in FIGURE 3.6 on spatial development initiatives (SDIs).		
3.6.1	What is a *spatial development initiative (SDI)*?	(1 x 1)	(1)
3.6.2	Discuss the importance of SDIs for economic development in South Africa.	(2 x 2)	(4)
3.6.3	Give ONE reason why the infrastructure around the newly developed SDIs needed to be upgraded.	(1 x 2)	(2)
3.6.4	With reference to ONE SDI that you have studied, explain in a paragraph of approximately EIGHT lines how improved infrastructure supported tourism and how it has led to the upliftment of the local community.	(4 x 2)	(8)

	Memo		
3.6.1	A Spatial Development Initiative is a programme developed by the cabinet to improve the functioning of government in certain regions of the country, especially in those regions where there is a potential for growth (1)	(1 x 1)	(1)
3.6.2	SDIs are important because they increase the productivity and wealth of marginal areas in South Africa (2) SDIs raise the standard of living in the local area (2) SDIs help to upgrade the local infrastructure (2) Increased public and private sector investment (2) Increase employment (2) Reduce rural-urban migration (2) Foreign investment through tourism (2) [ANY TWO]	(2 x 2)	(4)
3.6.3	To improve internal trade for export (2) Transportation networks improve accessibility for trade between SDIs (2) Networking (2) Movement of raw materials by road and rail (2) Movement of finished goods by road and rail (2) Accessibility to markets- virtual and actual (2) Money transfers (2) SDI`s were developed in underdeveloped areas (2) More people so a greater need for infrastructure (2) Improved technology (2)	(1 x 2)	(2)

	Will attract more tourists (2) [ANY ONE]		
3.6.4	**Tourism** Growth in tourism is enabled by efficient infrastructure (2) Effective transportation networks enable access to tourism destinations (2) Effective communication networks enable tourist destinations to become more accessible on the internet (2) Access to remote locations enables tourists to travel further into the SDI (2) Promoting safe travelling (2) **Upliftment of Community** Transportation networks improve accessibility for trade to the SDI (2) Communication networks enable growth of the SDI through technology (2) Generates economic growth where local communities are able to sell their wares (2) Generates employment opportunities in local communities (2) Enables the growth of SMME (Small Medium Micro Enterprises) (2) Upgrades local infrastructure (2) Different ethnic groups working together in the SDIs to support tourism have been united promoting more cooperation amongst them (2) Greater income for local communities (2) Money generated is used to develop community projects (2) Develop ethnic/cultural pride (2) [ANY FOUR. MUST REFER TO BOTH ASPECTS	(4 x 2)	(8)

Informal Sector

Activity 54 Time frame 12 minutes

N14 4.5	**Informal Sector** South Africa's informal sector is growing at a rate of 7,7%, making it the fastest growing economic sector. This is closely linked to unemployment.		
4.5.1	Define the concept *informal sector.*	(1 x 1)	(1)
4.5.2	State the percentage by which the informal sector is growing in South Africa.	(1 x 1)	(1)
4.5.3	Give ONE example of informal trading.	(1 x 1)	(1)
4.5.4	Give a possible reason why there has been such a rapid increase in the informal sector in South Africa recently.	(1 x 2)	(2)
4.5.5	Why are people in the informal sector reluctant to apply for trading permits?	(1 x 2)	(2)
4.5.6	In a paragraph of approximately EIGHT lines, prepare a response from the City Council to explain why it is necessary to have trading permits.	(4 x 2)	(8)

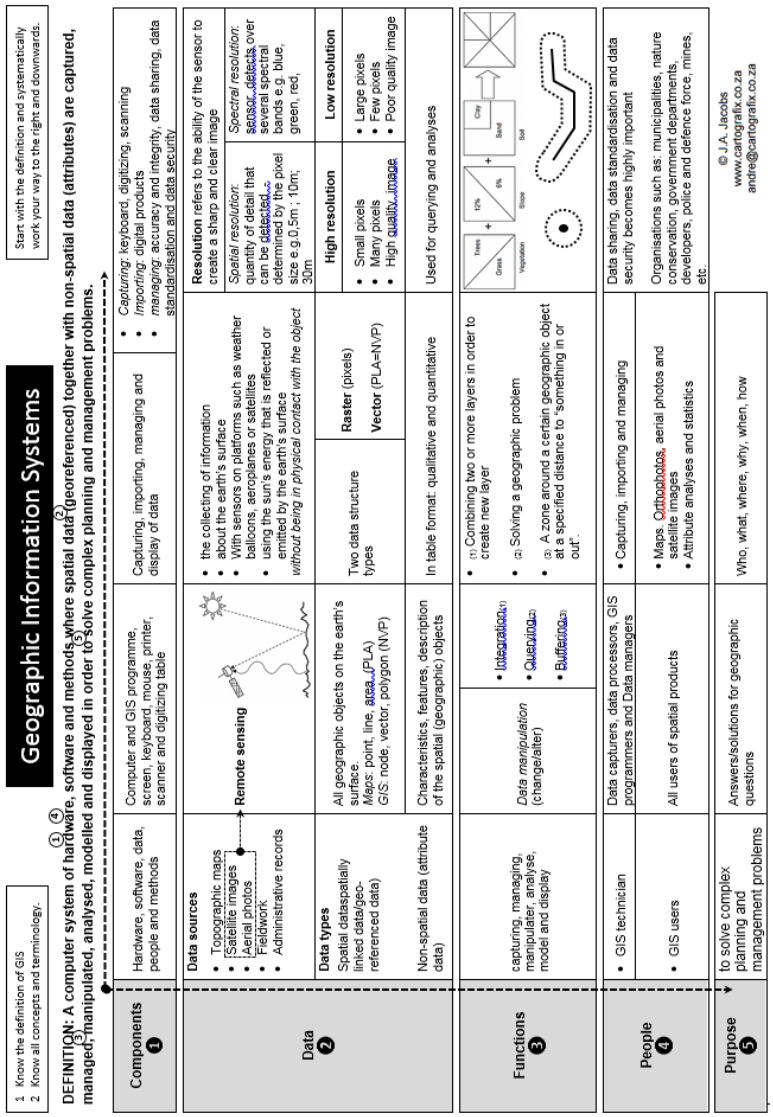
	Memo		
4.5.1	Informal sector is whereby someone makes a living through an unregistered business, or who provides services without a licence (1)	(1 x 1)	(1)
4.5.2	7,7% (1)	(1 x 1)	(1)
4.5.3	Street vending – selling vegetables (1)	(1 x 1)	(1)

	Flea Market – selling variety of goods (1)		
4.5.4	Poor socio-economic status faced by most of the South Africans (2) High unemployment rate/ Retrenchments (2) Relaxed bylaws (2) Lack of skills/ School drop-outs (2) Mechanisation of farming operations and climatic hazards has caused unskilled rural people to abandon farming and join informal sector (2) Many large businesses has contributed to the growth of informal trade by sub-contracting to the informal sector (2) Immigrants are not able to find legal employment and enter into the informal trade to survive (2) [ANY ONE.]	(1 x 2)	(2)
4.5.5	They don't want to pay tax (2) They don't want to be recognised as illegal immigrants (2) Non-compliance with regulations (2) Costly to apply for permits (2) [ANY ONE]	(1 x 2)	(2)
4.5.6	**Trading permits are required in order to** Regulate the business (2) Allocate the businesses specific areas for trading (2) Encourage partnership between private sector and the informal trader (2) Provide infrastructure (hawker stall/carts) in areas zoned for informal trading (2) Assist small businesses to play an active role in providing training (2) Provide easier access to bank loans (2) For insurance purposes (2) Provide storage facilities (2) Contribute to the income of the city by paying taxes (2) Provide ablution facilities (2) Ensure clean/hygienic facilities (2) Statistical analysis for planning (2) Prevention of harassment by city officials/ law enforcement officials (2) [ANY FOUR.]	(4 x 2)	(8)

Activity 55 Time frame 12 minutes

M16 3.6	Informal trade is a common feature in developing countries.		
3.6.1	Define the term *informal sector*.	(1 x 1)	(1)
3.6.2	State the relationship between the unemployment rate and the percentage of people working in the informal sector.	(1 x 2)	(2)
3.6.3	Why is informal trade common in developing countries?	(1 x 2)	(2)
3.6.4	How would formalising businesses impact positively on the economy?	(1 x 2)	(2)
3.6.5	Write a paragraph of approximately EIGHT lines in which you suggest ways in which informal traders can be empowered to make a meaningful contribution to the South African economy.	(4 x 2)	(8)

	Memo		
3.6.1	The informal sector is the part of our economy that does not pay tax or is not necessarily registered as a company (1)	(1 x 1)	(1)
3.6.2	There is a correlation between the unemployment rate and the percentage of people employed as informal traders (2) As unemployment increases, so too does the proportion of people working in the informal sector increase (2) [ANY ONE]	(1 x 2)	(2)
3.6.3	Developing countries have higher population numbers and lower levels of available employment (2) Some people have to make a living working for themselves by selling goods informally (2) People are uneducated and less skilled (2) Unskilled labourers cannot be absorbed into the labour force easily (2) [ANY ONE]	(1 x 2)	(2)
3.6.4	More income would be created from the tax companies would need to pay (2) More formal job creation (2) [ANY ONE]	(1 x 2)	(2)
3.6.5	**EMPOWERMENT OF INFORMAL TRADERS** Granting the same rights and privileges of formal business (2) Loans and capital being provided to small businesses or entrepreneurs (2) Financing would facilitate business development and growth (2) Provision of facilities to informal traders could provide a more sustainable platform in which businesses can function (2) Education and training around basic business skills and financial management (2) Partnering with established businesses (2) [ANY FOUR.]	(4 x 2)	(8)



GEOGRAPHICAL SKILLS AND TECHNIQUES

The questions in this paper are based on the 1: 50 000 topographical map extract 2527 DB BRITS as well as the 1 : 10 000 orthophoto map extract 2527 DB 11 BRITS which is a section of the mapped area.

RESOURCE MATERIAL

1. An extract from topographical map 2527 DB BRITS.
2. Orthophoto map extract 2527 DB 11 BRITS.

INSTRUCTIONS AND INFORMATION

1. Write your name, surname and class section in the spaces provided on the front cover.

2. Answer ALL the questions in the spaces provided in this question paper.
3. Some of the questions can only be answered if the topographical map and orthophoto map are studied together.
4. Show ALL calculations and formulae where applicable. Marks will be allocated for this.
5. Use the blank page at the end of this question paper for rough work and calculations. Do not detach this page from the question paper.
6. You may use a non-programmable calculator.
7. The following English terms and their Afrikaans translations appear on the map:

ENGLISH	AFRIKAANS
Nature Reserve	Natuurreservaat
Diggings	Uitgrawings
Hiking Trail	Voetslaanpad
Holiday Resort	Vakansie oord
Crocodile river	Krokodilrivier
Furrows	Vore
Golf Course	Gholfbaan
Caravan Park	Karavaanpark
Sewage Works	Rioolwerke
Prison	Gevangenes
Johann Rissik Estate	Johann Rissik Landgoed

GENERAL INFORMATION ON BRITS

Brits is a large town and district situated in a fertile, citrus, vegetable and grain-producing area that is irrigated by the waters of the Hartbeespoort Dam in North West Province of South Africa. It is close to the City of Tshwane Metropolitan Municipality in Gauteng, which includes Pretoria and it has the same dialling code as Pretoria. In addition to being a centre for agriculture, the town is home to several heavy industries. A factory of the Italian car manufacturer Alfa Romeo produced cars for the domestic market and export to Asia from 1974 to 1985. The town also plays an important role in the South African mining industry: 94% of South Africa's platinum comes from the Rustenburg and Brits districts, which together produce more platinum than any other single area in the world. In addition, there is a large vanadium mine in the district.

FIGURE 1

Activity 56 Time frame 18 minutes

QUESTION 1 MULTIPLE- CHOICE QUESTIONS

1	The following questions are based on the 1:50 000 topographical map **2527 DB BRITS** as well as the orthophoto map **2527 DB 11 BRITS** which is a section of the mapped area. Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A - D) in the block next to each statement	
1.1	In which Province is Brits situated? A. North west Province B. Gauteng Province C. Kwazulu Natal Province D. Northern Province	**A**
1.2	Brits is an example of a **...** town. A. Transport & recreation B. Mining & central place C. Recreation & academic D. Dormitory & recreation	**B**

1.3	The land- use type marked **1** on the orthophoto map is recreational and is usually found in the ……. A. Industrial zone B. The zone of decay C. The rural – urban fringe D. Low income residential area	**C**
1.4	What type of river pattern is found on the high lying area in block **G2** on the topographical map? A. dendritic B. trellis C. radial / centrifugal D. rectangular	**C**
1.5	The slope at **C – D** on the MAGALIESBERG mountain in block **C10** on the topographical map is ... A. convex & gentle B. concave & steep C. convex & steep D. concave & gentle	**B**
1.6	The type of building at **2** on the orthophoto map, is a .... A. School B. Factory C. Silos D. Store	**C**
1.7	The exact location (co-ordinates) of trig.beacon **Δ 16** in block **E2** on the topographic map is ... A. 25° 36' 45" S, 27° 50' 55" E B. 25° 35' 10" S, 27° 54' 45" E C. 27° 36' 40" E, 25° 50' 40" S D. 27° 25' 45" E, 25° 55' 45" S	**A**
1.8	The type of settlement pattern at **E** on the topographical map, is : A. Dispersed B. Nucleated C. Round D. Triangular	**B**
1.9	The predominant stream channel feature in block C7 on the topographical map is a / an ... A Oxbow lake B Braided stream C Meander D Dendritic pattern	**C**
1.10	The map index / reference of the topographical map immediately to the south-west of 2527 DB Brits is **...** A. 2527 DA B. 2527 DC C. 2527 DD D. 2527 AD	**C**
1.11	Hartebeespoort dam is to the **...** of the town of Brits on the topographical map. A. South-west B. South C. East D. South-east	**D**

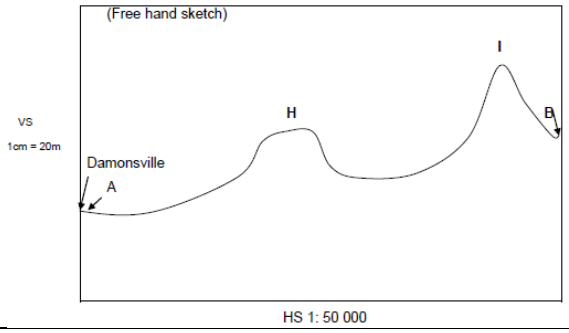
1.12	On the topographical map, Schoemansville in block **G9** is an example of a / an **….** residential area. A. High-income B. Middle-income C. Low-income D. Informal	**A**
1.13	Feature **5** on the orthophoto map is a **...** A. excavation B. dam wall C. fence D. mine dump	**B**
1.14	The length of the landing strip in **D7** on the topographical map is approximately A. 0,5 km B. 0,75 km C. 2,0 km D. 3,0 km =	**B**
1.15	Identify the feature at **G** in **E9** on the topographical map which engineers used in the construction of the road to overcome the uneven topography. A. bridge B. dam wall C. tunnel D. valley	**C**
		(1x15)

[15]

Activity 57 Time frame 24 minutes

QUESTION 2 GEOGRAPHIC TECHNIQUES & CALCULATIONS

2.1	Refer to the orthophoto map and calculate the area of (**Block 1**) in km². Show all calculations. Marks will be awarded for calculations and the formula.	(4 x 1)	(4)
	Convert the scale = 1: 10 000 ***= $\frac{10\ 000}{100\ 000}$*** ***= $\frac{1}{10}$km or 0,1 km*** ***Area of rectangular = Length x Width*** ***= 2,5 cm x 1,2 cm*** ✓ ***L = 2,5 cm x 0,1 km*** ***= 0,25 km*** ✓ ***W = 1,2 cm x 0,1 km*** ***= 0,12 km*** ✓ ***. . = 0,25 km x 0,12 km*** ***= 0,03 km²*** ✓		
2.2	Calculate the average gradient of the slope between trig. beacon **Δ 9** in block (**C10**) to the spot height **.1302** in block (**B10**) on the topographic map. Show all calculations. Marks will be allocated for calculations.	(4 x 1)	(4)
	Gradient = VI (vertical interval) **HE (horizontal equivalent)** ✓		

	VI = 1562,6m – 1302m = 260,6m ✓ **HE = 3,1cm x 50 000 cm = 155 000cm ÷100 = 1550 m** ✓ **= 260,6 m / 1550 m** **= 1 : 5,947 or 1 : 5,95**		
2.3	Refer to the information on the topographical map **2527 DB BRITS** and determine the magnetic bearing from **A** in block **E4** to **B** in block **G1** for 2015. Show all the calculations/steps followed. (*Use the mean annual change of 2' westwards as indicated on the map for entire number of years*)	(5 x 1)	(5)
	Step 1: Difference in years **= 2015 - 1997** **= 18 years** ✓		
	Step 2: Total annual change **= 2' west x 18 years** **= 36' west**✓		
	Step 3: Magnetic declination for 2015: **= 16° 3'west + 36' west** **= 16° 39' west** ✓		
	Step 4: Magnetic Bearing **= TB + MD** **= 33° + 16° 39' west** ✓ **= 49° 39' west** ✓		
2.4	Refer to the cross-section below from **A** in block **E4** to **B** in block **G1** on the topographical map and answer the following questions. The vertical scale for the cross-section is 1cm represents 20m.  		
2.4.1	Identify the landform **H** on the cross-section above.	(1 x 1)	(1)
	H = Hill ✓		
2.4.2	Comment on the intervisibility of landform **I** in block **G1** from Damonsville in block **E3** on the topographical map	(1 x 2)	(2)
	Landform I is not visible from Damonsville/ because of the obstruction of the hill. ✓✓		
2.4.3	Calculate the vertical exaggeration of the above cross-section. Show all calculations.	(4 x 1)	(4)
	Vertical excaggeration = VS / HS ✓ **VS = 1 cm = 20 m** **= 1: 2 000** **HS = 1cm : 50 000** ✓ **VE = VS / HE** **= 1 / 2 000 X 50 000 / 1** ✓ **= 25 times** ✓		

[20]

Activity 58 Time frame 30 minutes

QUESTION 3 APPLICATION & THEORY / MAP AND PHOTO INTERPRETATION

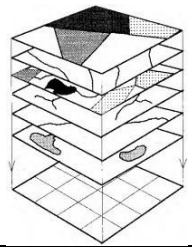
3.1	Gradient refers to the steepness of slopes. How will the gradient impact on the transport and the site location of KOSMOS in block **E 10** on the topographical map?	(2 x 2)	(4)
	At Kosmos in block E10 the gradient of the mountain slope is steep ✓✓ **It is difficult to build roads along the mountain slope ✓✓** **The site location of Kosmos can experience rock falls ✓✓** **The steep slope make the soil not suitable for agriculture ✓✓**		
3.2	The central part of the landscape immediately north of the MAGALIESBERG mountain on the topographical map can be described as ideally suited for large scale farming. Give evidence from the topographical map to support this statement.	(2 x 2)	(4)
	There is a soft gradual slope north of the Magaliesberg mountain ✓✓ **Level land ✓✓**		
3.3			
3.3.1	State the general flow direction of the perennial river (Crocodile river) in block **E9** on the topographical map.	(1 x 1)	(1)
	North west ✓		
3.3.2	Give ONE reason from the topographical map for your answer to Question **3.3.1**.	(1 x 2)	(2)
	The tributaries connect in a north westerly direction with the main stream of the Crocodile river ✓✓ Water flow from the Hartebeespoort dam into the Crocodile river ✓✓ The dam wall in the Crocodile river in block B2 facing north west ✓✓		
3.4	**Refer to the farm on Johann Rissik Estate in block E7 on the topographical map and answer the following questions**:		
3.4.1	Identify the shape of the settlement at **J** on the topographical map.	(1 x 1)	(1)
	Linear shape ✓		
3.4.2	What is the main agricultural activity practice on this farming Estate in block **E7**?	(1 x 1)	(1)
	Orchards and vineyards ✓		
3.4.3	Does the farm on Johann Rissik Estate practice small-scale or large –scale farming? Motivate your answer with ONE reason from the topographical map.	(2 x 1)	(2)
	Large-scale farming ✓✓ **Big farming area ✓✓** **Enough water for irrigation ✓✓** **Roads for transporting agricultural products ✓✓** **Soft gradual slopes for farming activities ✓✓**		
3.5	Refer to point **3** on the orthophoto map and answer the following questions:		
3.5.1	Identify the land-use zone at point **3** on the orthophoto map.	(1 x 1)	(1)
	CBD (central business district) ✓		
3.5.2	Identify the street pattern on the above mentioned land-use zone at point **3** on the orthophoto map	(1 x 1)	(1)
	Grid iron street pattern ✓		

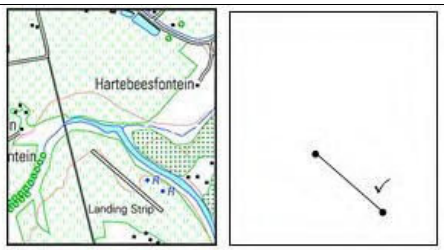
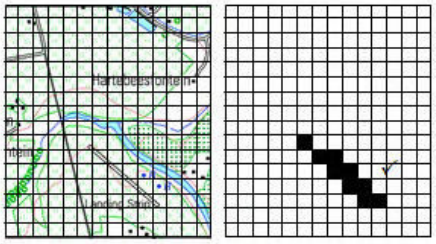
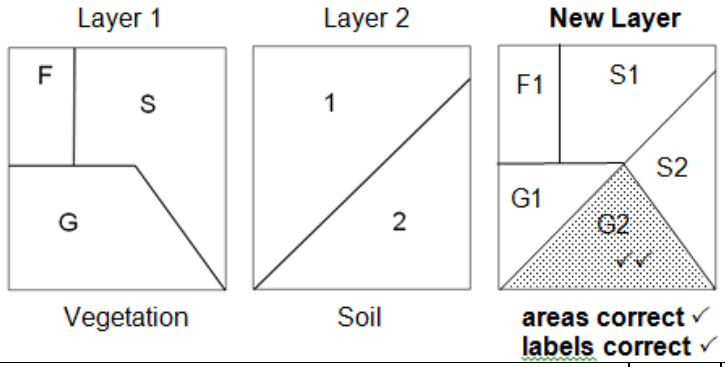
3.5.3	Give ONE advantage and ONE disadvantage of this street pattern mentioned in Question **3.5.2**	(2 x 2)	(4)
	Advantage: **Easy lay out of streets and street blocks ✓✓** **Easy to find your way✓✓** **Easy to divide into plots✓✓** **Maximum use of land ✓✓**		
	Disadvantage: **Delays in traffic flow because of many stop streets ✓✓** **Many accidents** **Time consuming and frustrating** **Boring outlay**		
3.6	Give ONE piece of evidence visible from the topographic map indicating that conservation is practised in this region.	(1 x 2)	(2)
	Magaliesberg Protected Natural Environment ✓✓		
3.7	Give a reason why the industrial area in blocks B4 and C4 on the topographical map is ideally situated in this area.	(1 x 2)	(2)
	The outskirts of town ✓✓ **Large land ✓✓** **Near to transport – roads and railway lines✓✓** **Near to raw materials ✓✓**		

[25]

Activity 59 Time frame 18 minutes

QUESTION 4 GEOGRAPHIC INFORMATION SYSTEMS

4	*All spatial data whether it is in vector or raster format are displayed as separate layers in a GIS. This characteristic enables a GIS to manipulate, integrate and query data.* 		
4.1.	What is spatial data?	(1 x 2)	(2)
	Data which <u>describes the shape</u> and the <u>absolute and relative position</u> of all geographical features (objects) ✓✓		
4.2	*Spatial data are displayed in a GIS by means of two data structures known as vector and raster structures.* Use the blocks below and indicate how the landing strip (Block **D7**) would be represented in each of the data structures. Label each data structure accordingly.		

	Type: **Vector** ✓ (1) 	(1 x 1)	(1)
	Type: **Raster** ✓ (1) 	(1 x 1)	(1)
4.3	Explain the concept data integration.	(1 x 1)	(1)
	The combination of two or more data layers in order to create a new one. ✓		
4.4	*You are a Nature Conservation Officer and have to create a new layer that consist of both soils and vegetation. You are going to use the integration function of the GIS to create this new layer.*		
4.4.1	Draw your answer in the block below labelled **New Layer**.	(1 x 2)	(2)
4.4.2	On the **New Layer** identify the area where grassland occur on sandy soil by colouring the correct area.	(1 x 2)	(2)
	F – Forest G – Grassland S – Shrubland 1 – Clay soil 2 – Sandy soil 		
4.4.3	Not all the data necessary to create this **New Layer** was available to you and you had to buy the Soil Layer from another GIS company. Give TWO reasons why data standardisation is important.	(2 x 2)	(4)
	There is an increasing need to share/exchange data between organisations ✓✓ **All data are created to the same specifications** ✓✓ **Shared data becomes cheaper and also prevents duplication** ✓✓		

[15]
[75]