KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 -12 DIRECTORATE

NCS (CAPS) SUPPORT

JUST IN TIME LEARNER REVISION DOCUMENT

GEOGRAPHY

GRADE 10

2025

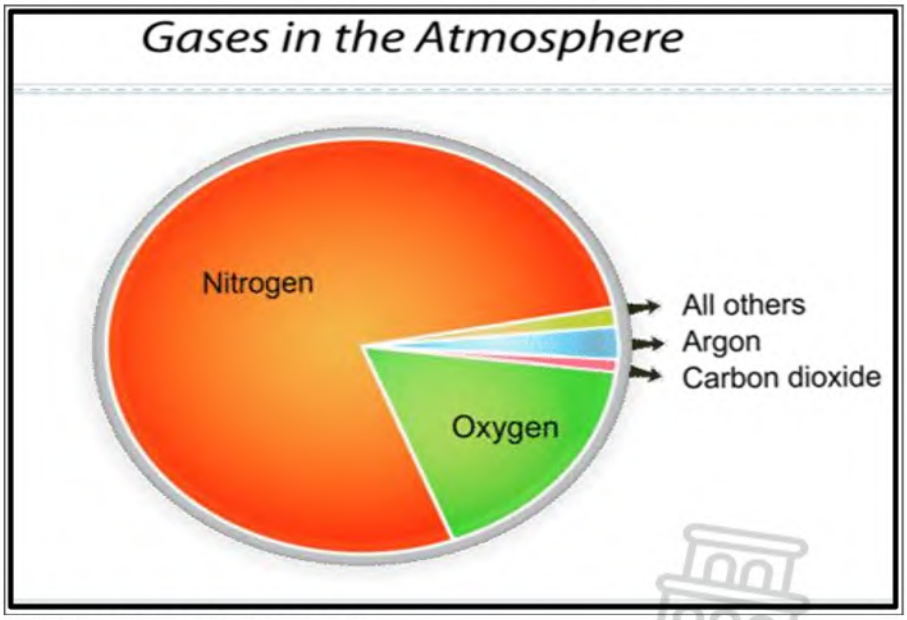
TABLE OF CONTENT

COMPOSITION AND STRUCTURE OF THE ATMOSPHERE

WHAT IS THE ATMOSPHERE ?

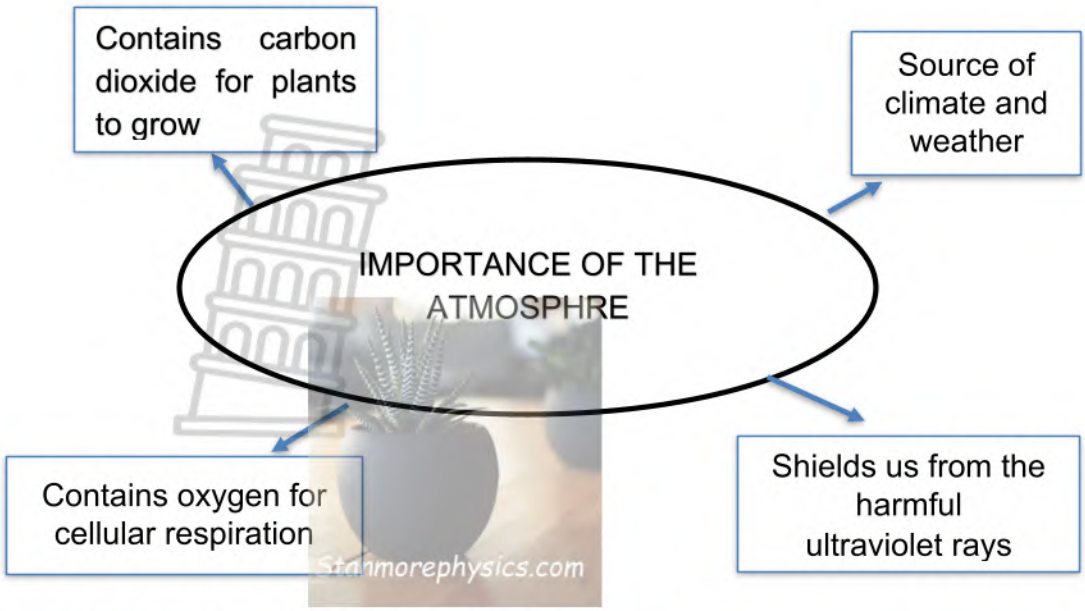
- The layer of gases surrounding the Earth's surface
- The atmosphere is made up of the following components
  - **solid particles** (ice, salt, smoke, carbon, and dust),
  - **liquid** (water) and
  - **gas** (permanent and variable)

GASES IN THE ATMOSPHERE	
PERMANENT GASES	**VARIABLE GASES**
➢ These gases occur in a fixed percentage. ○ Nitrogen (78%) ○ Oxygen (21%) ○ Argon (0,9%)	➢ These gases do not occur in fixed percentages. They are variable. i. Water vapour ii. Carbon dioxide

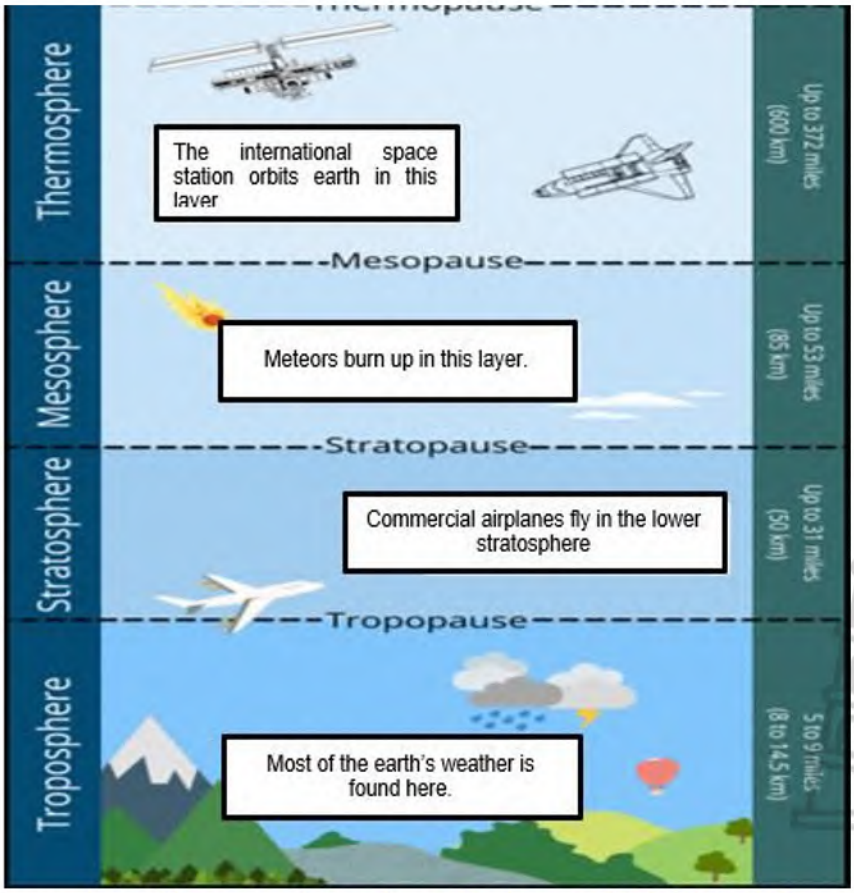


[Source: google images]

THE IMPORTANCE OF THE ATMOSPHERE



STRUCTURE OF THE ATMOSPHERE

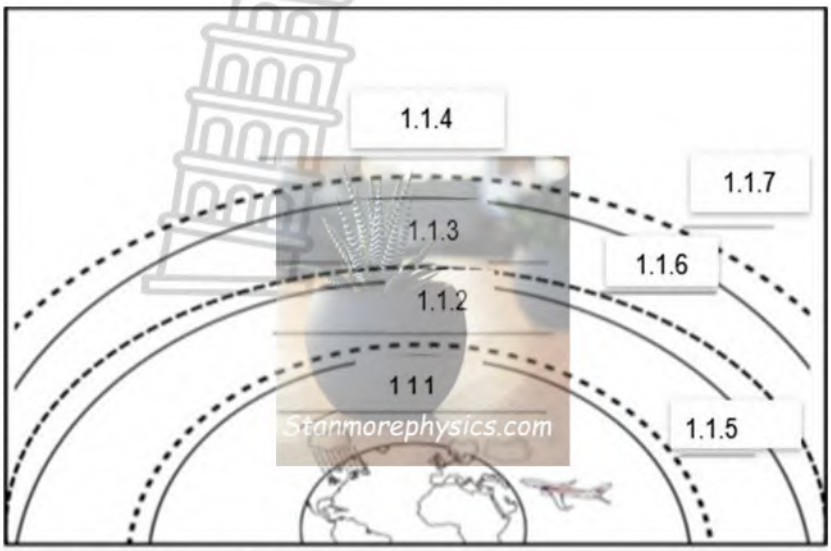


Source:https://www.google.com/imgres?q=layers%20of%20the%20atmosphere%

LAYERS OF THE ATMOSPHERE	IMPORTANCE
Troposphere • Closest to the earth's surface • Temperature decreases with altitude. • Upper limit is the tropopause.	• Produces weather • We breath oxygen from this layer • Produces weather
Stratosphere • Located above the tropopause. • Contains ozone layer • Temperature increases with altitude (negative lapse rate)	• Contains ozone which supplements our oxygen • Airplanes are flown in this layer. • Airplanes uses winds in This layer to pick-up.
Mesosphere • 50 km to 80 km above the stratosphere. • Temperature decreases with altitude.	• Prevents rocks from space entering the lower temperature.
Thermosphere • Outer layer of atmosphere • Temperature increases with altitude	• Absorbs high energy radiation from the sun • Prevents rocks from space entering the lower atmosphere

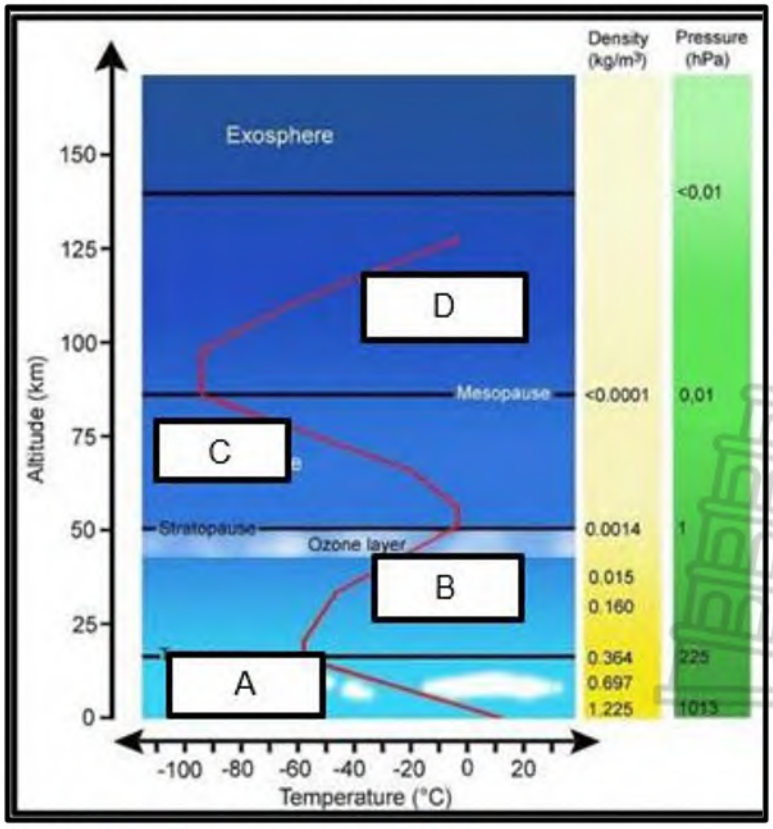
1.1. Choose one term from the following word bank to fill the labels of the following diagram.

Stratosphere, mesosphere, troposphere, stratopause, thermosphere, mesopause, ozone layer, tropopause.



[Source: google images]

1.2. Use the diagram below to answer the questions below.



[Source:https://www.google.com/url?sa]

1.2.1	Name the layers **A, B, C** and **D** respectively shown in the diagram	(4x1)	(4)
1.2.2	What gas makes up most of the atmosphere?	(1x1)	(1)
1.2.3	In which TWO layers do we find an increase in temperature with height?	(2x1)	(2)
1.2.4	Give a reason for your answer to QUESTION 1.2.3.	(1x2)	(2)
1.2.5	Explain why layer A is such an important layer.	(2x2)	(4)
1.2.6	Why is the mesosphere unfriendly for human beings?	(2x2)	(4)
			[15]

THE OZONE LAYER AND OZONE DEPLETION

CAUSES	EFFECTS	SOLUTIONS
•CFC in spray cans, refrigerators and air-conditioners. •Nitrogen fertilisers. • Greenhouse gases • chemical compounds from human activities	•Increase occurrence of skin cancer. •Increasing occurrence of eye diseases - cataracts. •Weakened immune systems •Disruption of marine food chain •Declining ocean plankton and other fish populations •Reduced photosynthesis.	• use of ozone friendly products •Reduce the production of cfcs • Plant more trees to release oxygen • Use of wind and solar energy •Use of public transport.

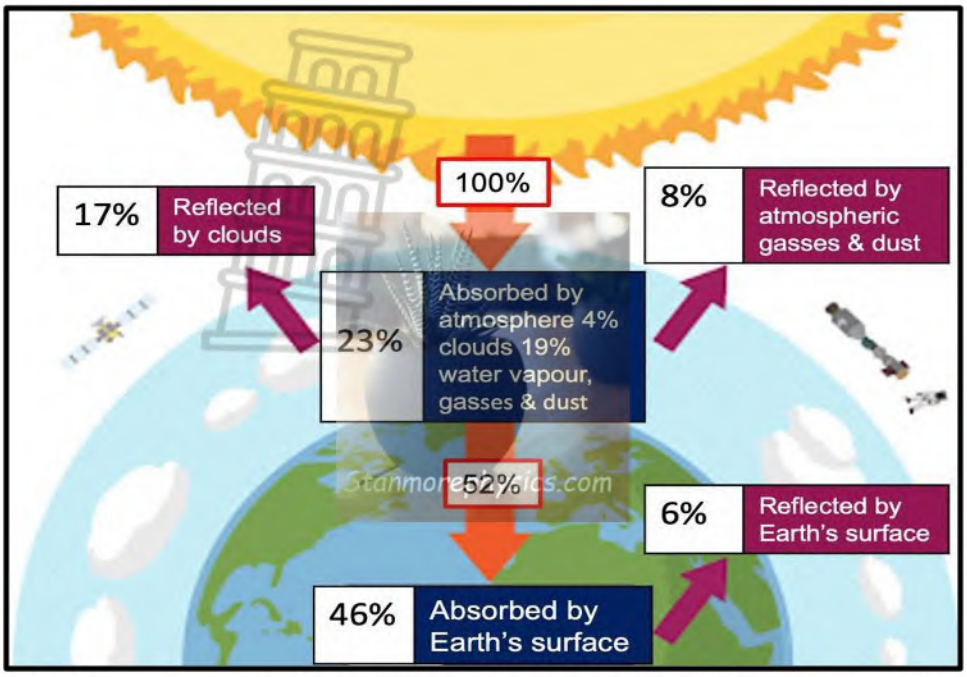
1.3. Study figure 1.3 and answer the following questions.

]Source:https://www.google.com/]

1.3.1	Define the term *ozone depletion.*	(1x2)	(2)
1.3.2	In which layer of the atmosphere is ozone found?	(1x1)	(1)
1.3.3	Explain the importance of ozone layer on earth	(1x2)	(2)
1.3.4	Briefly explain TWO consequences of ozone depletion on the natural environment	(2x2)	(4)
1.3.5	Discuss THREE strategies that could be implemented to reduce ozone depletion	(3x2)	(6)
			[15]

HEATING OF THE ATMOSPHERE AND TRANSFER OF HEAT IN THE ATMOSPHERE.

Processes associated with the heating of the atmosphere



Source:https://www.google.com/url?sa=i&url=https%3A%2F%2Fearthobservatory

Not all insolation (incoming solar radiation) is absorbed by the Earth's surface.

Some of it is:

- Absorbed (taken up)
- Scattered (sent into all directions)
- Reflected (sent back at the same angle)

Reflection	Sun's rays strike a surface and are redirected by 180° back
Insolation	Incoming solar radiation – Rays entering the atmosphere from the sun
Scattering	Sun's rays are redirected randomly into the atmosphere
Absorption	Heat taken up by gasses and water vapour
Radiation	The Earth radiates heat into the atmosphere

Conduction	Lowest parts of the atmosphere are warmed because they are in contact with warm Earth
Convection	Heated air rises. Heat is transferred higher into the atmosphere

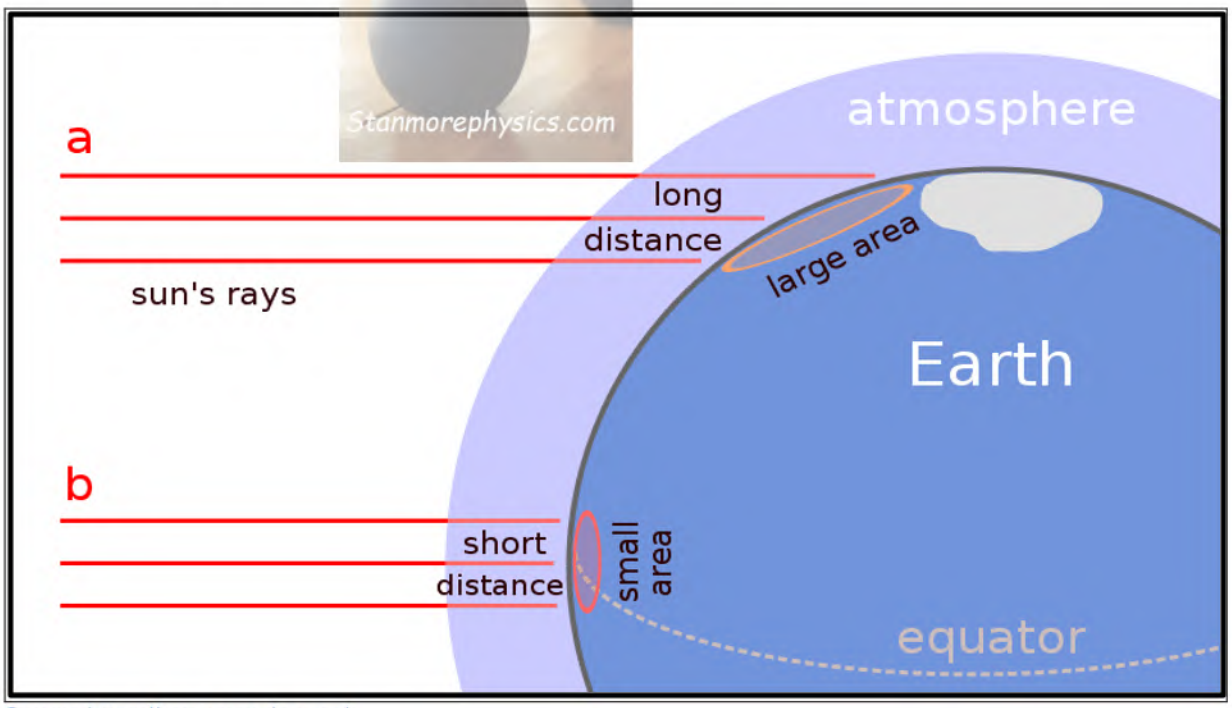
What are the factors that affect temperature?

Latitude

Definition: Latitude is the measurement of distance in degrees north or south of the Equator.

Why is the equator hotter than the poles?

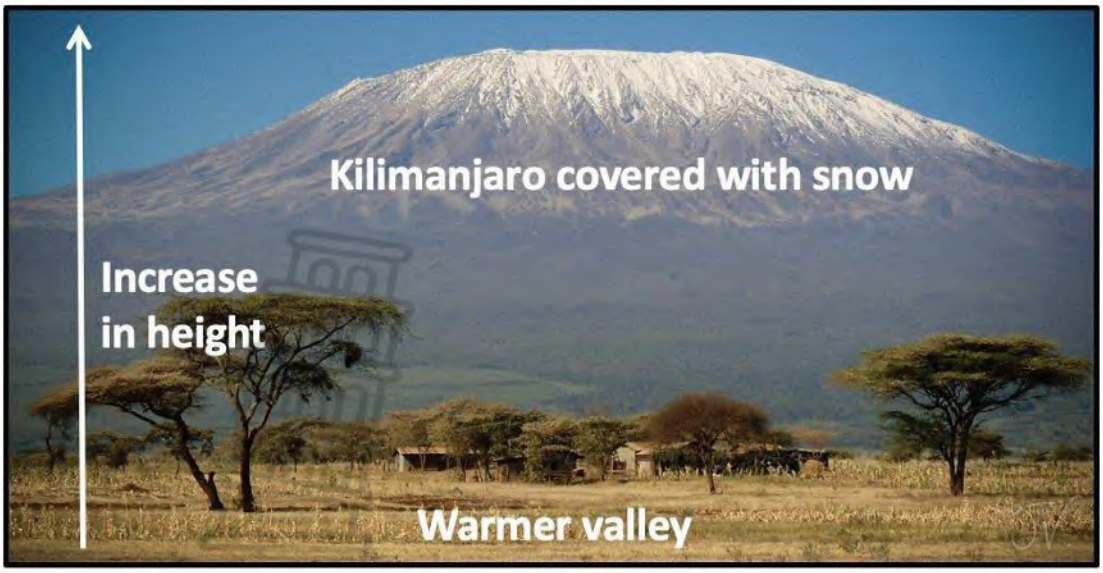
Sun's rays are more direct and are concentrated on a smaller area than the poles.



Source:https://www.google.com/

Altitude

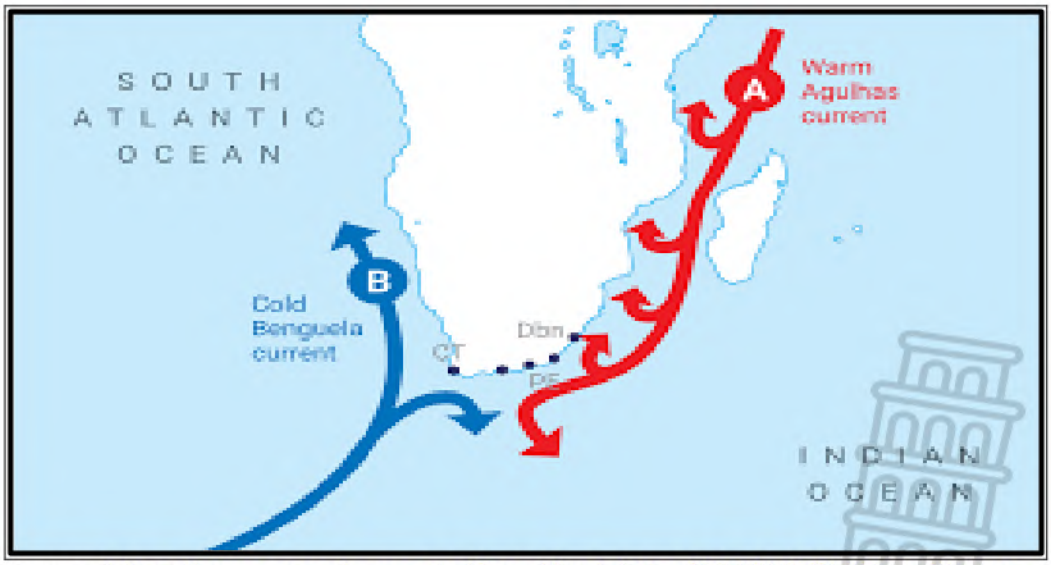
Air temperature decreases with altitude (the higher you go). Therefore, mountains are colder than low-lying areas.



Source:https://www.google.com/imgres?q=altitude%20heating%20of%20the%20atmosphere

Ocean Currents

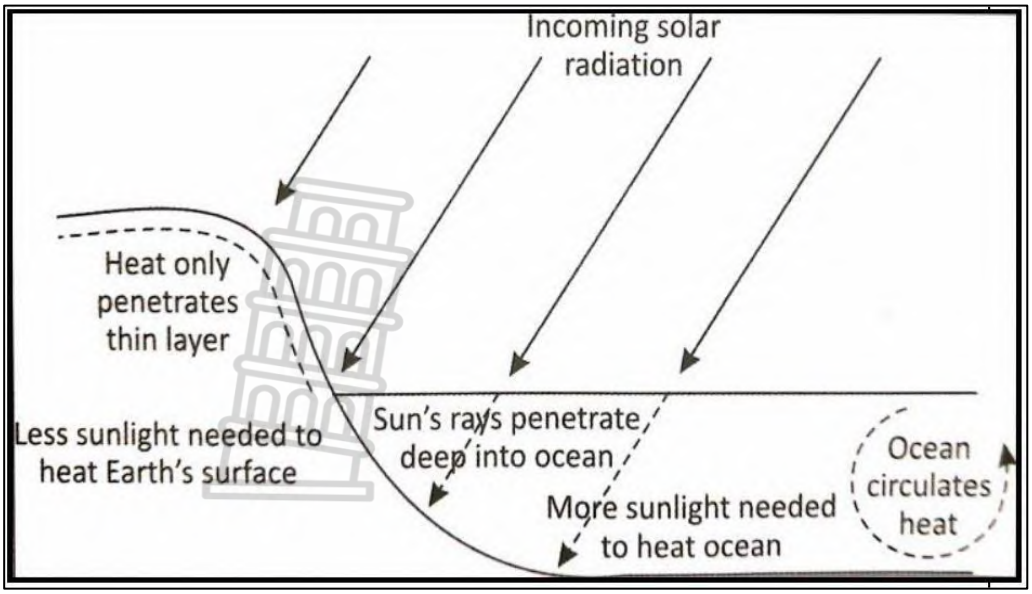
- Cold ocean currents lower water and air temperatures
- Warm ocean currents raise water and air temperatures
- The east coast has higher temperatures than the west coast in South Africa. Consult key on the map of South Africa.



Source:https://www.google.com/url?sa=i&url=https%3A%2F%2Fmaritimesa.

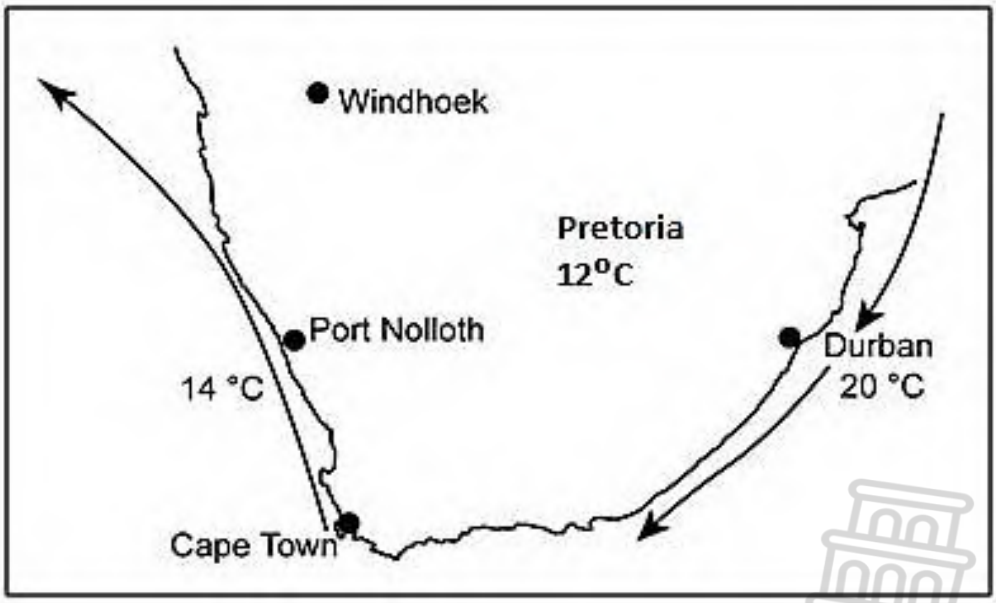
Distance from the Ocean

- Oceans heat up and cool down more slowly than the land.
- Coastal areas are cooler than inland areas during the day.
- Coastal areas are warmer than inland areas during the night



[source: google images]

1.4 Study the map of South Africa below and answer the questions that follow.

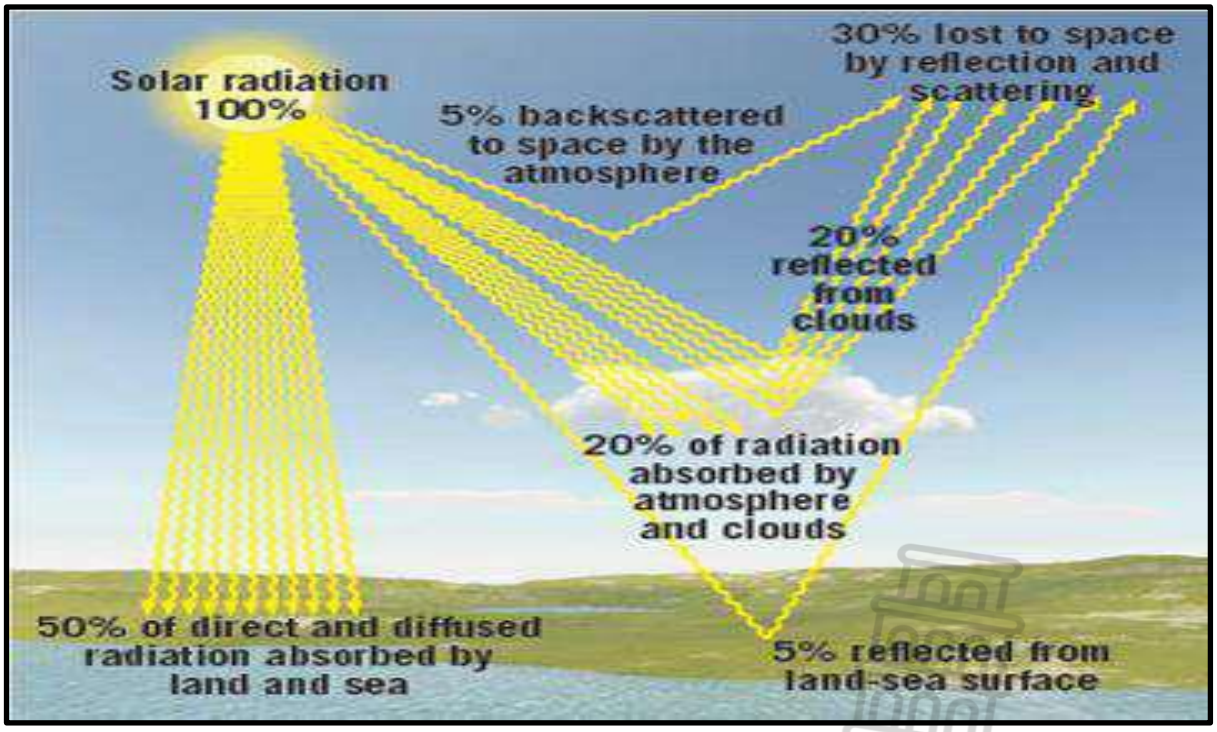


[Source: google images]

1.4.1	Warm ocean currents flow from the (**equatorial / polar**) regions and flow towards the (**equatorial / polar**) regions	(2 x 1)	(2)
1.4.2	Cold ocean currents flow from (**equatorial / polar**) regions	(1 x 1)	(1)

1.4.3	Warm ocean current flow along the (**east / west**) coastlines	(1 x 1)	(1)
1.4.4	The difference in temperature between Port Nolloth and Durban is because of the (**altitude / ocean currents**)	(1 x 1)	(1)
1.4.5	Pretoria's temperature is lower than Windhoek's because of the (**altitude / latitude**)	(1 x 1)	(1)
1.4.6	The difference between the temperature at Pretoria and Durban is the (**longitude / distance from the ocean**)	(1 x 1)	(1)
1.4.7	Ocean currents result in a (**small / large**) temperature variation of the coastal temperature.	(1 x 1)	(1)
			8

1.5 Study the figure below and answer the questions that follow.

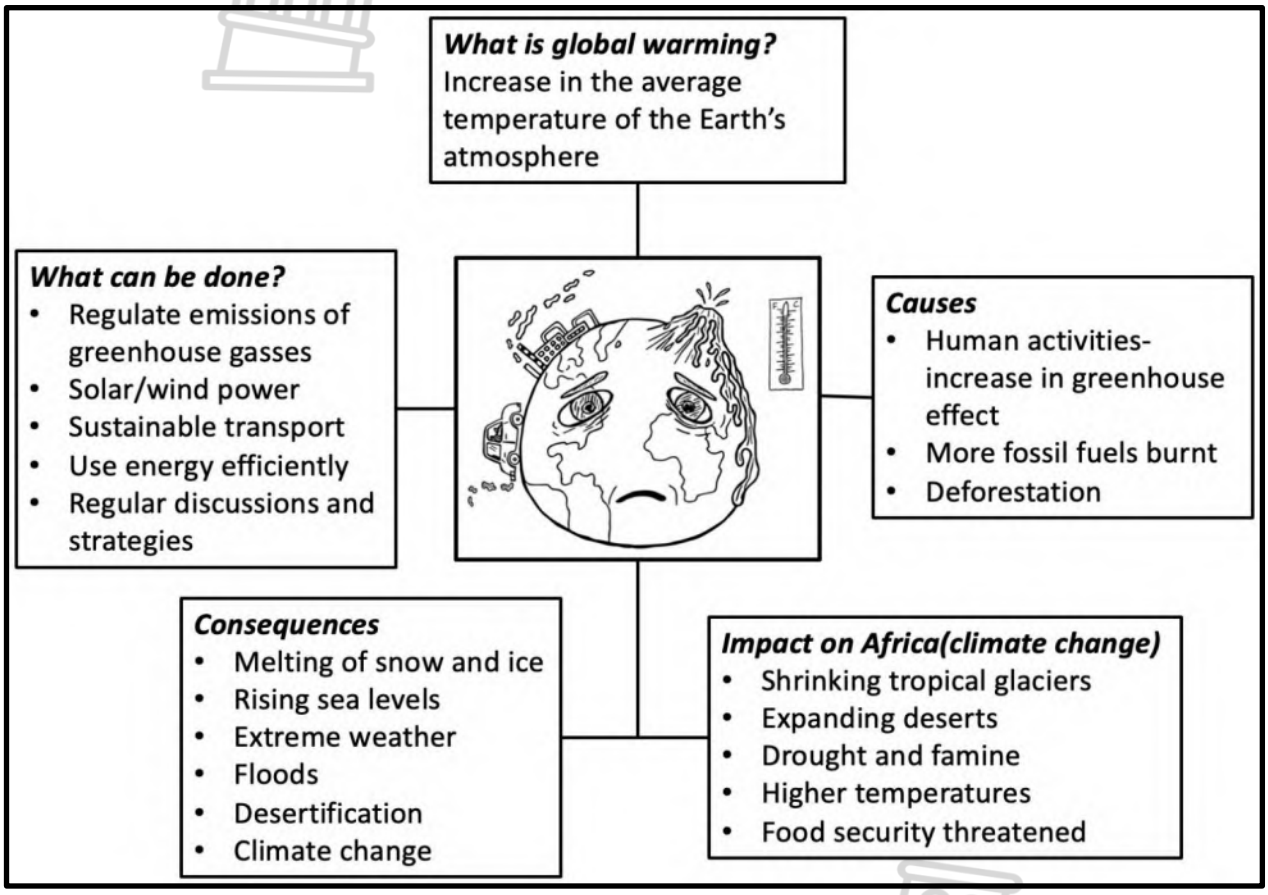


[Source: google image]

1.5.1	Name the process that prevents approximately 20% of the sun's energy from reaching the surface of the earth?	(1x1)	(1)
1.5.2	What causes the scattering of 5% of the sun's rays?	(2x1)	(2)
1.5.3	Differentiate between insolation and terrestrial radiation	(2x2)	(4)

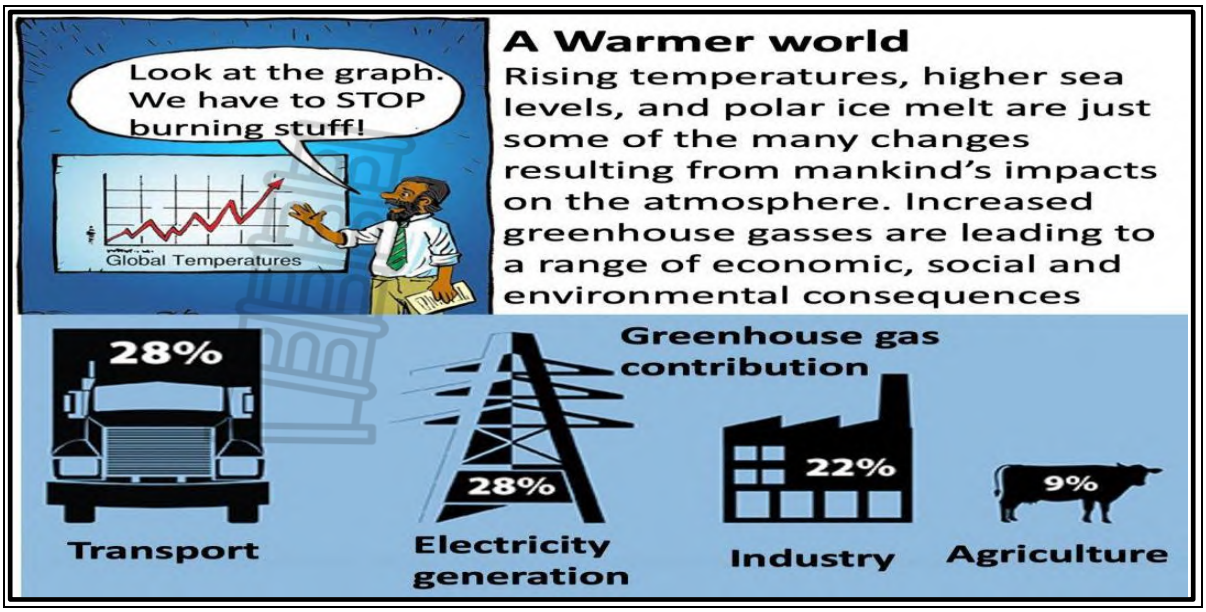
1.5.4	Determine the total amount of heat available for absorption by the earth	(1x1)	(1)
1.5.5	In a paragraph of not more than EIGHT lines, discuss ways on how the earth heats the atmosphere.	(4x2)	(8)
			[16]

GLOBAL WARMING



[Source: google image}

1.6. Study the infographic below based on global warming and answer the questions that follow



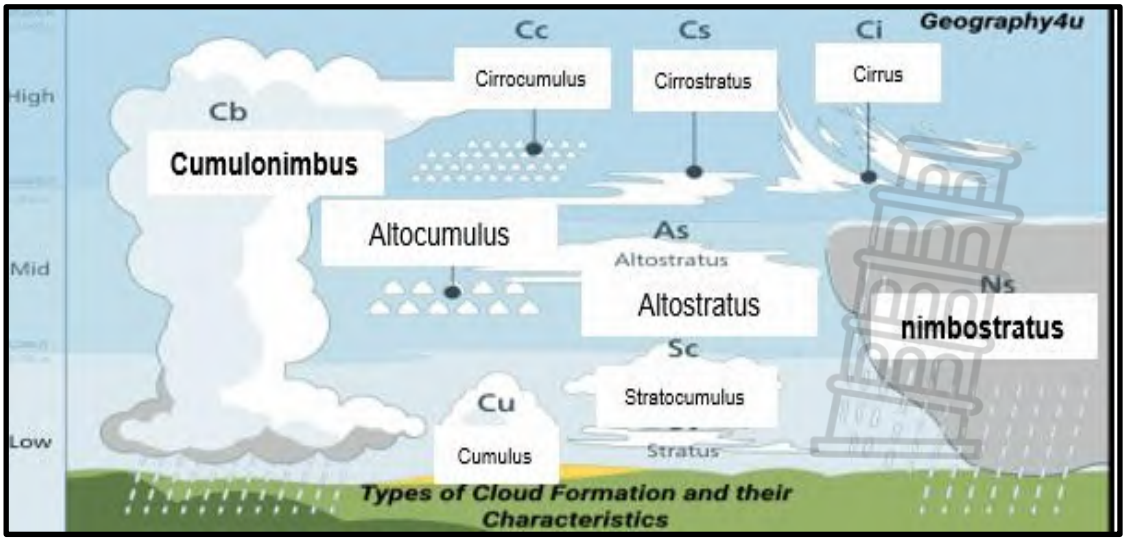
[Source:https://www.google.com/url?]

1.6.1	Define the concept *global warming*.	(1 x 2)	(2)
1.6.2	Does the graph show a rise or a drop in global temperatures? Is this positive on the environment?	(2 x 1)	(2)
1.6.3	Which greenhouse gas is the highest contributor causing global warming?	(1 x 1)	(1)
1.6.4	Briefly explain TWO causes of global warming.	(2 x 2)	(4)
1.6.5	In a paragraph of approximately EIGHT lines, discuss the negative impact of global warming on the environment.	(4 x 2)	(8)
			[17]

MOISTURE IN THE ATMOSPHERE

- Water in the atmosphere exists in three forms:
  - **Solid**: in the form of hail and snow.
  - **Liquid**: in the form of clouds, fog and rain
  - **Gas**: water vapour.
- Processes associated with evaporation, condensation and precipitation.
  - **Evaporation:** change of state of liquid water to gas (water vapour:
  - **Condensation:** is the process of water vapor changing from gas to liquid.
  - **Precipitation:** occurs when water in liquid or solid-state falls from the atmosphere.
- The concept of dew point, condensation level, humidity, relative humidity.
  - **Dew point**: refers to the temperature at which air is saturated with water vapour.
  - **Condensation level**: refers to the altitude (height) at which condensation occurs and clouds form.
  - **Humidity:** the amount of water in the air at any time.
  - **Relative humidity:** the amount of water vapour in the air relative to the air's water vapour capacity.
- Factors that affect relative humidity:
  - **Evaporation:** more evaporation there is the more water vapour there is in the atmosphere and the humidity level will be greater.
  - **Temperature:** warm air holds a greater amount of water vapour than cold air.

Types of clouds

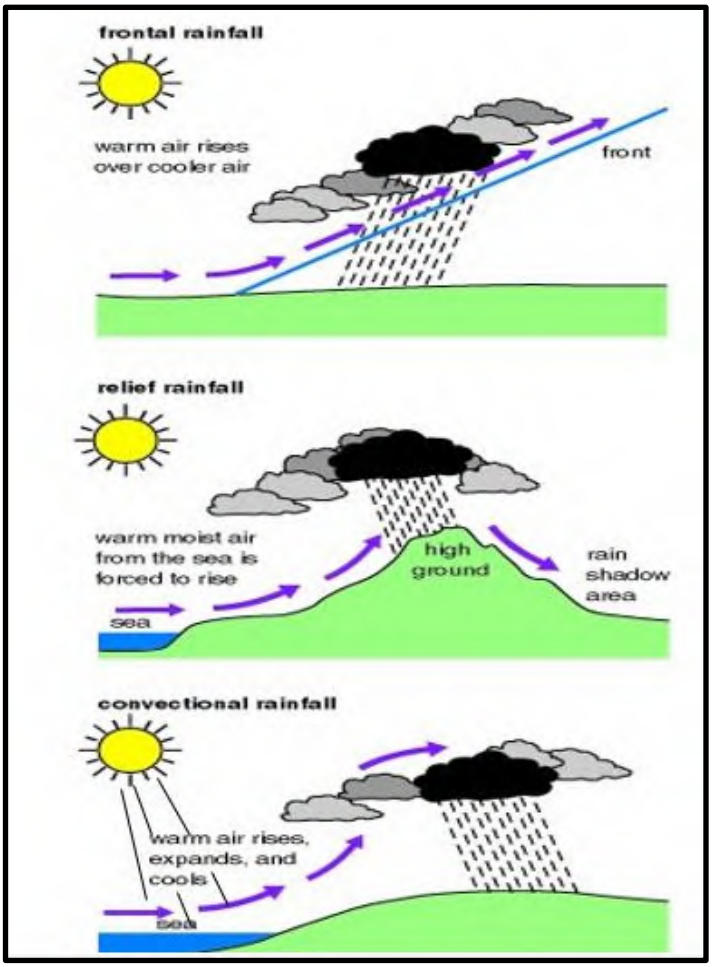


Source: https://geography4u.com/types-of-clouds-and-characteristic

Different forms of precipitation

- Different forms of precipitation are:
    - **Dew:** water which collects on plants and on the ground surface. Dew point is above 0℃.
    - **Frost**: ice that collects on plants and the ground surface. Water vapour changes directly into ice into ice as dew point is below 0℃.
    - **Hail:** is hard and solid form of precipitation. Occurs when raindrops are carried higher in the cloud where temperatures are below ℃.
    - **Snow:** occurs when water vapour condenses into minute ice crystals which join to form snowflakes as dew point is below 0℃.
    - **Rain:** water which falls from the atmosphere to the earth's surface.

Types of rainfall

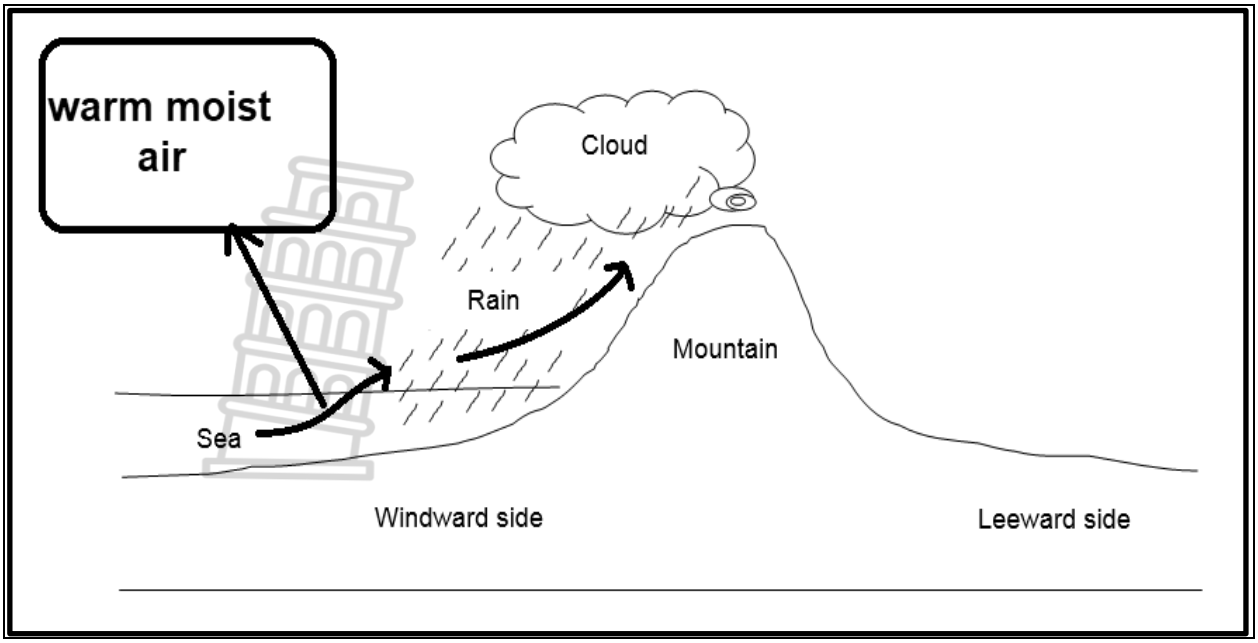
<table>
<tr>
<td rowspan="3"> 

Source:https://travellingacrosstime.com/2023/12/31/types-of-rainfall/</td>
<td>Frontal rain: occurs when warm air rises above cold air at a cold front when called air wedges underneath it. Rising air cools and condenses</td>
</tr>
<tr>
<td>Relief or orographic rain: forms when warm moist air rises on the windward side of a mountain. Rising air cools and condenses.</td>
</tr>
<tr>
<td>Convectional rain: forms when heated air expands and rises as convection currents</td>
</tr>
</table>

1.7 Match the statements in COLUMN A with the options in COLUMN B. Write the letters **Y** or **Z** next to the question numbers.

1.7.1	The temperature at which air is saturated, and condensation begins.	**Y** **Z**	Air temperature Dew point
1.7.2	Water in its gaseous form.	**Y** **Z**	Snow Water vapour
1.7.3	The process when water vapour changes into liquid.	**Y** **Z**	Sublimation Condensation
1.7.4	The amount of water vapour in the air in relation to the water vapour capacity of the air.	**Y** **Z**	Relative humidity Evaporation
1.7.5	The actual amount of water vapour in the air.	**Y** **Z**	Relative humidity Actual humidity
1.7.6	Moisture in liquid state that falls from the atmosphere.	**Y** **Z**	Rain Snow
1.7.7	The process when liquid changes into water vapour	**Y** **Z**	Evaporation Melting
			(7 x 1) (7)

1.8 Refer to the sketch showing relief rainfall.



[Source: google images]

1.8.1	Define the concept *relief rainfall*	(1 x 2)	(2)
1.8.2	Name the cloud type shown on the sketch.	(1 x 1)	(1)
1.8.3	Mention the type of precipitation shown on the sketch	(1 x 1)	(1)
1.8.4	This type of rainfall is common in (Western Cape/KwaZulu Natal) province of South Africa.	(1 x 1)	(1)
1.8.5	Explain how relief rainfall is formed.	(2 x 2)	(4)
1.8.6	In a paragraph of approximately EIGHT lines discuss the positive and negative impact of relief rainfall.	(4 x2)	(8)
			[17]

READING AND INTERPRETING SYNOPTIC WEATHER MAPS

Defining a synoptic weather map

Refers to a summary of **prevailing weather conditions** over a certain area, at a specific time. A synoptic weather map has several aspects and these include, **temperature, nature of precipitation, cloud cover, wind direction, wind speed.** They are all indicated at weather stations by means of **symbols**.

Note the following weather conditions for this weather station:	
Wind speed	15 knots
Wind direction	NW
Air temperature	27 °C
Precipitation	rain
Dew point temperature	24 °C
Cloud cover	overcast

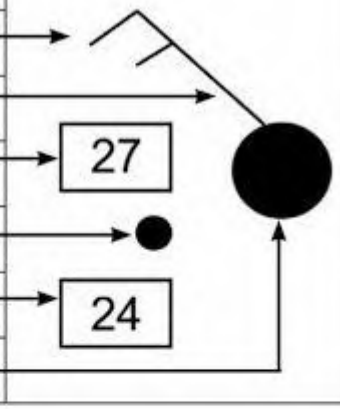
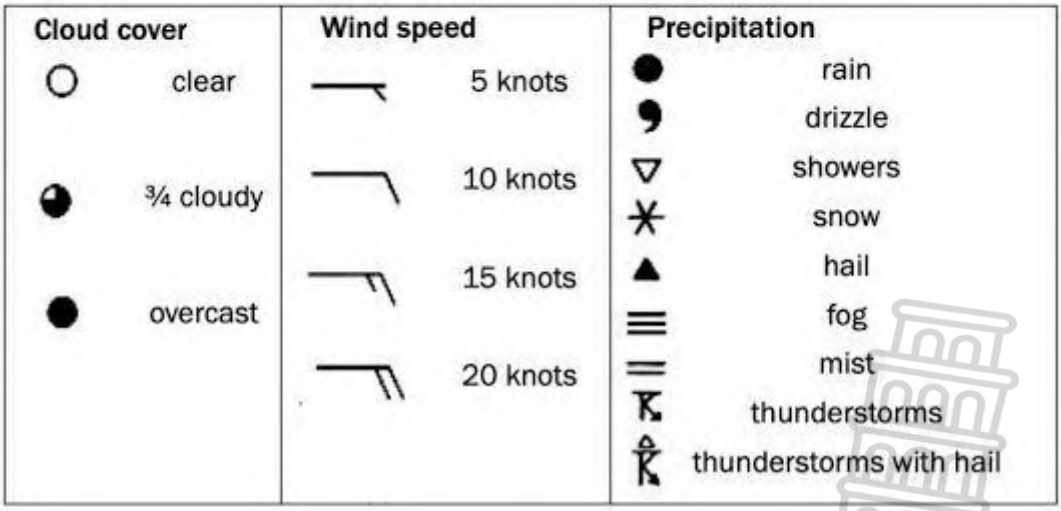


Figure 1.1.1C: An example of a weather station



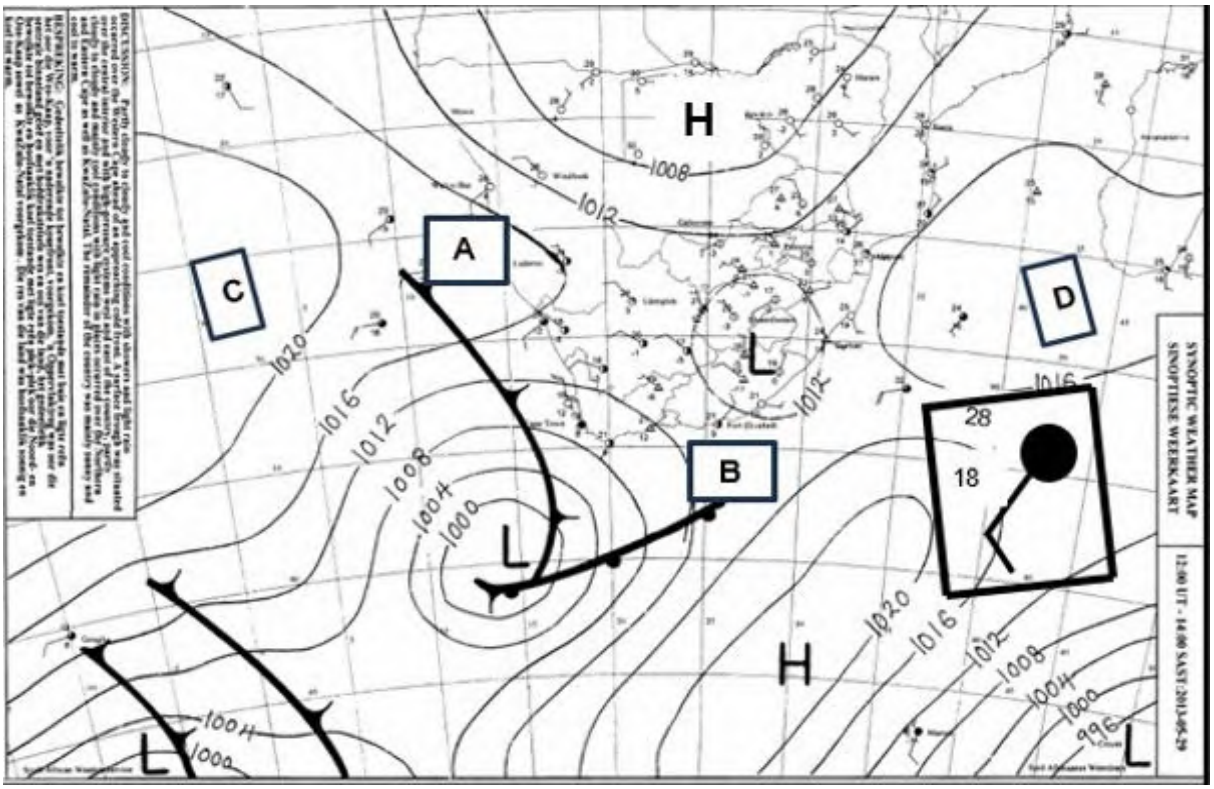
[Source: South African Weather Bureau]

Typical summer synoptic weather map	Typical winter synoptic weather map
• Presence of the tropical cyclone • Thermal low pressure over the land • Overcast conditions over the land • High temperatures over the land • South Indian High and South Atlantic High generally occupy a southerly position including the mid-latitude cyclone • Date (summer months)	• Cold front comes over the land • Kalahari high dominates the land • Generally clear skies over the land • Low temperatures over the land • South Indian High and South Atlantic High generally move closer to the land because it is cold. • Date (winter months)

Isobars: Closely spaced isobars show a strong winds. When isobars are spaced far from each other show gentle winds.

Identifying the pressure cells on a weather map: Some isobars form circle-like patterns, which indicates cells as either high or low pressure. One determines a **high pressure cell** by looking at the **increase** of air pressure towards the centre of the pressure cell. One determines a **low pressure cell** by looking at the **decrease** of air pressure towards the centre of the pressure cell.

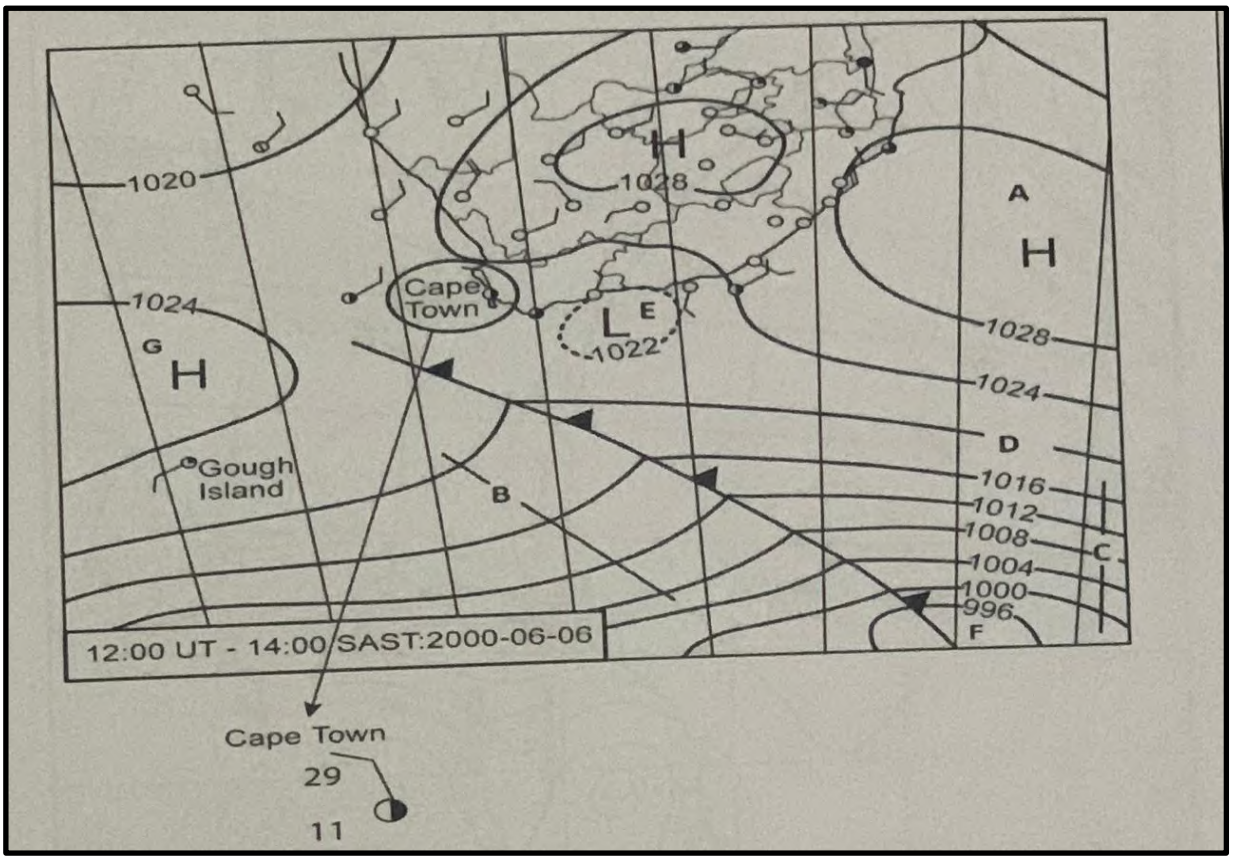
1.9 Refer to the synoptic weather map below. Use the synoptic weather map to answer the questions below.



[Source: South African Weather Services.]

1.9.1	State the isobaric interval of the map.	(1 x 1)	(1)
1.9.2	Name the ocean currents that influence ocean labelled **C** and **D** on the synoptic weather map.	(2 x 1)	(2)
1.9.3	Name the fronts labelled **A** and **B**.	(2 x 1)	(2)
1.9.4	State the season shown by the synoptic weather map.	(1 x 2)	(2)
1.9.5	Give TWO suitable reasons for your answer in QUESTION 1.9.4.	(2 x 1)	(2)
1.9.6	Using the enlarged weather station model, describe the weather conditions using the following:		
	a. Air temperature		
	b. Dew-point temperature		
	c. Wind speed		
	d. Wind direction		
	e. Cloud cover	(5 x 1)	(5)
			[15]

1.10 Study Figure 1.10 showing the Synoptic Weather Map and answer the set questions.



[Source: South African Weather Bureau]

1.10.1	Give the correct term used to describe the lines that join places of equal atmospheric pressure.	(1 x 1)	(1)
1.10.2	Is the wind speed greater at **B** or **C**?	(1 x 1)	(1)
1.10.3	Give a reason for your answer to QUESTION 1.10.2.	(1 x2)	(2)
1.10.4	The atmospheric pressure (**increases/decreases**) towards the centre at **F**.	(1 x 1)	(1)
1.10.5	The atmospheric pressure at **D** is… hPa.	(1 x 2)	(2)
1.10.6	Determine the isobaric interval on the synoptic weather used.	(1 x 2)	(2)
1.10.7	Compare the temperature differences between Durban and Cape Town according to the influence of ocean currents.	(2 x2)	(4)
			[13]

GEOMORPHOLOGY

THE STRUCTURE OF THE EARTH

RELATED CONCEPTS

Geomorphology- the study of the changing surface of the Earth by both internal as well as external forces and their resultant landforms.

Lithosphere - The uppermost solid part of the mantle and the entire crust

Asthenosphere (in between 80-200km) - is a highly viscous, mechanically weak and ductile, deforming region of the upper mantle which lies just below the lithosphere.

Crust - It is the outermost solid part of the earth, normally about 8-40 kms thick

Mantle - The portion of the interior beyond the crust is called the mantle.

Mohorovich Discontinuity or Moho discontinuity - The discontinuity between the **crust and mantle.**

SIMA - The major constituent elements of the mantle are Silicon and Magnesium.

SIAL- The main rock is granite with dominant minerals silicon and aluminium.

Core - It is the innermost layer surrounding the earth's centre

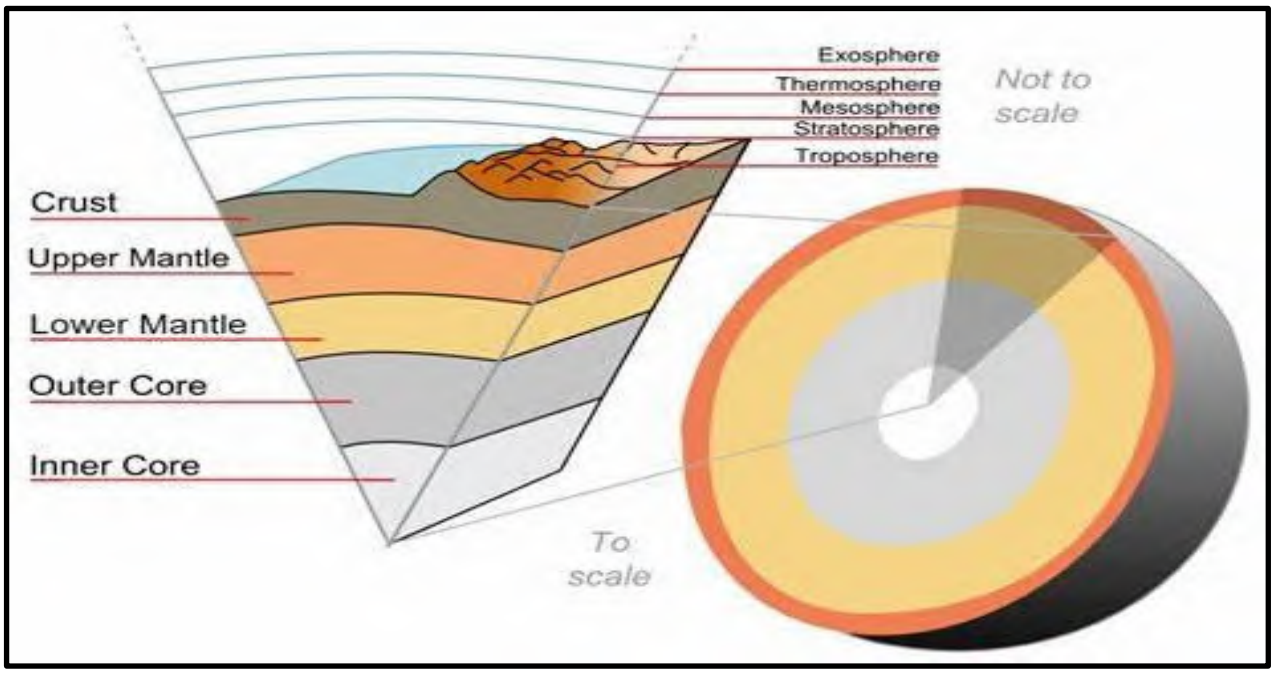
Igneous rock - form from the solidification of magma or lava

Sedimentary rock - form by the accumulation and cementation of mineral or organic particles on the Earth's surface, often in water bodies.

Metamorphic rock - start out as other rocks that are modified by heat, pressure, and chemical processes.

THE INTERNAL STRUCTURE OF THE EARTH

- The internal structure of Earth are the layers of the Earth, excluding its atmosphere and hydrosphere.
- The structure consists of an outer silicate solid crust, a highly viscous asthenosphere, and solid mantle, a liquid outer core whose flow generates the Earth's magnetic field, and a solid inner core.



(source:vulkane.net)

CLASSIFICATION OF ROCKS

Rocks are classified into three main types based on their formation processes:

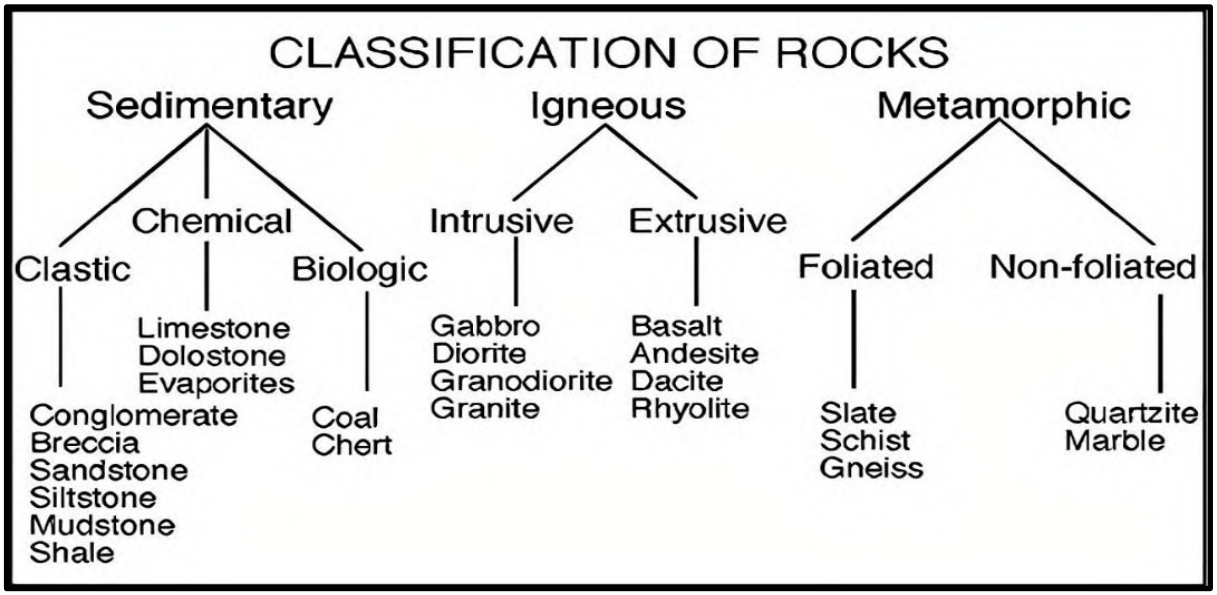
1. **Igneous Rocks**: Formed from the cooling and solidification of molten magma or lava. They can be further divided into:

Intrusive Igneous Rocks: Form below the Earth's surface (e.g., granite).

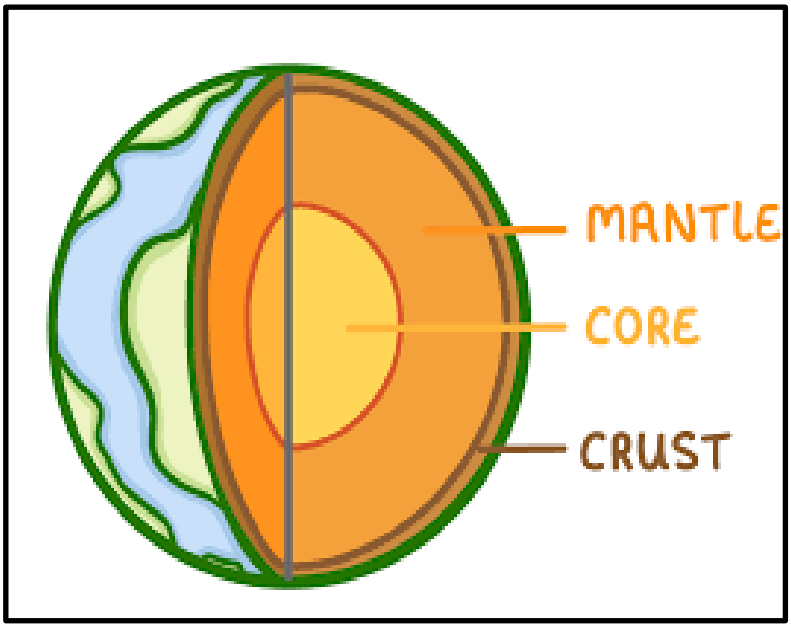
Extrusive Igneous Rocks: Form on the Earth's surface after volcanic eruptions (e.g., basalt).

2.**Sedimentary Rocks**: Created by the accumulation, compaction, and cementation of mineral or organic particles. They often form in layers and include:

3. **Metamorphic Rocks**: Result from the transformation of existing rocks (igneous or sedimentary) under heat, pressure, or chemical processes without melting. Examples include marble and schist.



(Civilsdaily.com)

2.1.			
2.1.1.	Refer to the structure below. Match each of the layers with the descriptions below.  [source: https://encrypted-tbn0.gstatic.com		
	(i) The outermost, thinnest layer of the Earth. (ii) A hot, dense layer composed of silicate materials. (iii) Made of iron and nickel, divided into liquid and solid layers.		

		(3 x 1)	(3)
2.1.2	Differentiate between SIMA and SIAL.	(2 x 2)	(4)
2.1.3	In a paragraph of approximately EIGHT lines discuss the differences between the inner core and the outer core.	(4 x 2)	(8)

RELATED CONCEPTS

- **Plate tectonics** - refers to the process of plate formation, movement, and destruction.
- **Continental drift -** describes the movements of continents over the Earth's surface
- **Sea-floor spreading**- refers to the creation new oceanic plate material and movement away from the mid-ocean ridge.
- **Divergent Boundaries:** Plates move away from each other. This can result in the formation of mid-ocean ridges and rift valleys.
- **Convergent Boundaries:** Plates move toward each other. When oceanic plates collide with continental plates, subduction zones, and mountain ranges can form. Oceanic-continental convergence can lead to volcanic arcs. Continental-continental convergence can create high mountain ranges.
- **Transform Boundaries:** Plates slide past each other horizontally. This can lead to strike-slip faults and earthquakes.

FOLDING AND FAULTING

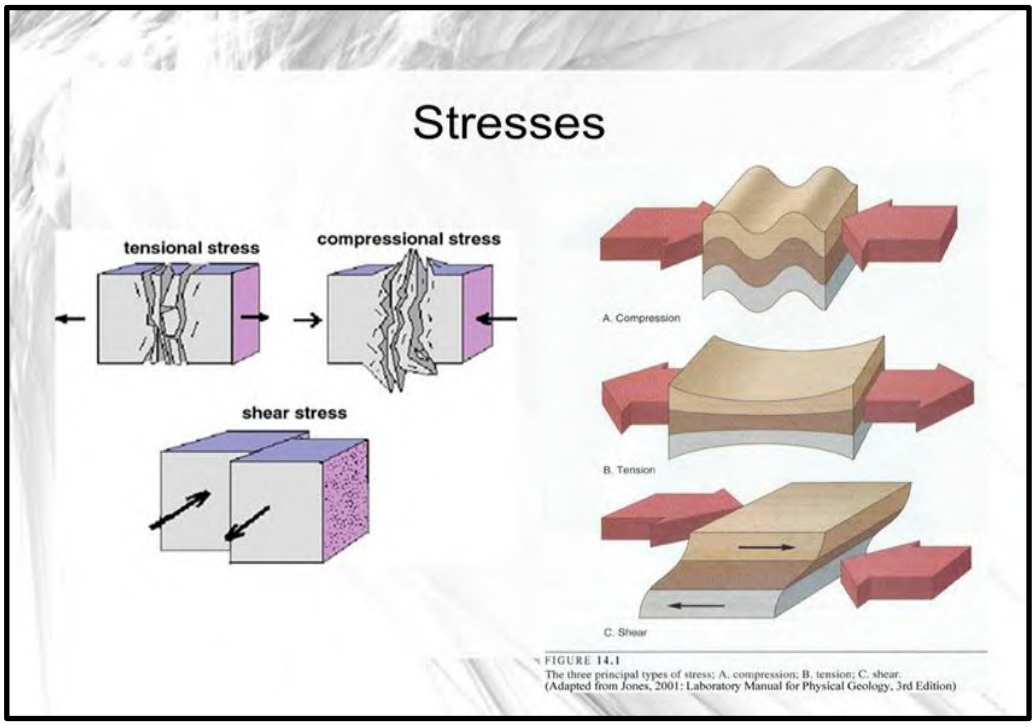
The process of rock folding

Definition

Folding: is a process whereby rock layers bend and warp due to compressional forces along colliding plate boundaries.

In South Africa the Southern Cape fold mountains are good examples. Some of the examples are the Himalayas, Alps, Rockies, Carpathains and Andes which are formed when one crystal plate collide with one another.

Compressive f**orces** are **stresses** that squeeze or push rocks together, leading to folding, faulting, and mountain building, particularly at convergent plate boundaries.



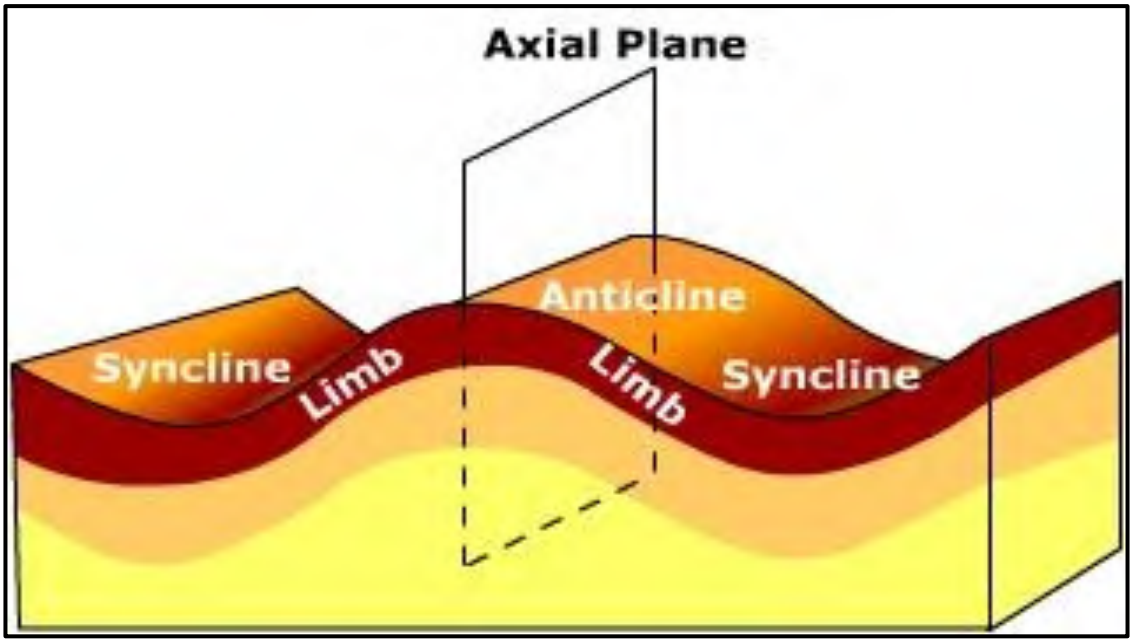
[source: google image]

Components of a fold

The resulting geological structures are:

- **Anticlines** – The fold curves upwards. These Upfolds (linear ridges/arches) can form mountains.
- **Synclines –** The fold curves downwards. These downfolds (troughs) can form valleys.

The sides of the fold are called the ***limbs***. Each fold has an ***axial plane***, an imaginary plane that runs down its length and divides the fold in half.

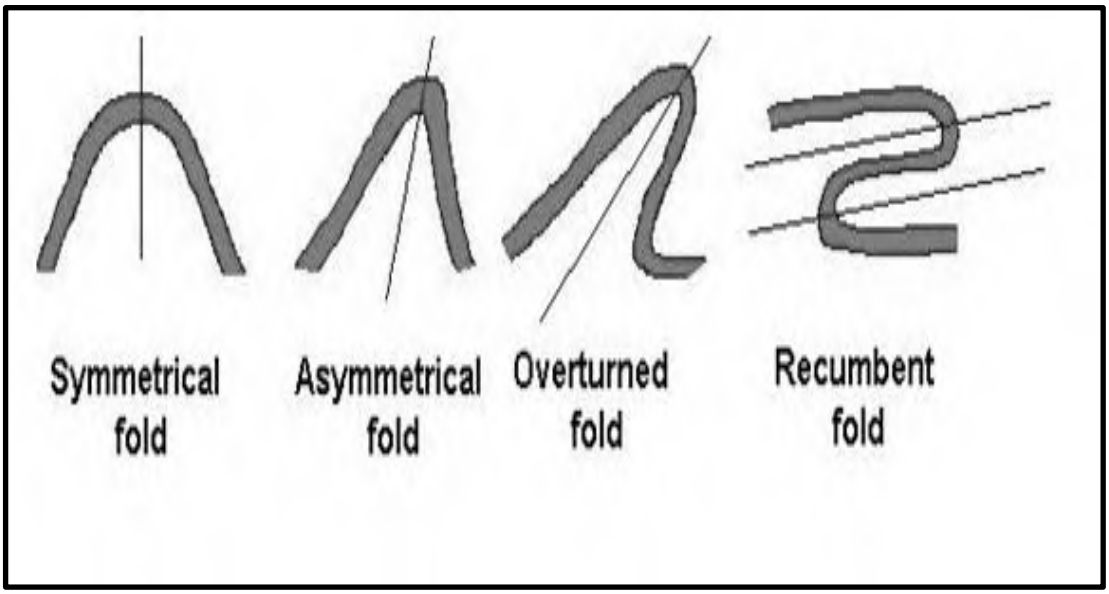


[source: google image]

Types of folds

- **Symmetrical Folds**:. Axial plane is vertical and beds dip at approximately the same angle, but in opposite directions, on either side of the plane.
- **Asymmetrical Folds**: Axial planes are inclined and one limb of the fold dips more steeply than the opposite limb, but still in opposite directions.
- **Overturned Folds**: Axial plane is inclined and both limbs of the fold dip in the same direction.

- **Recumbent fold**: an extreme directed pressure may lay the fold over with its axial plane nearly horizontal with the surface



The process of faulting

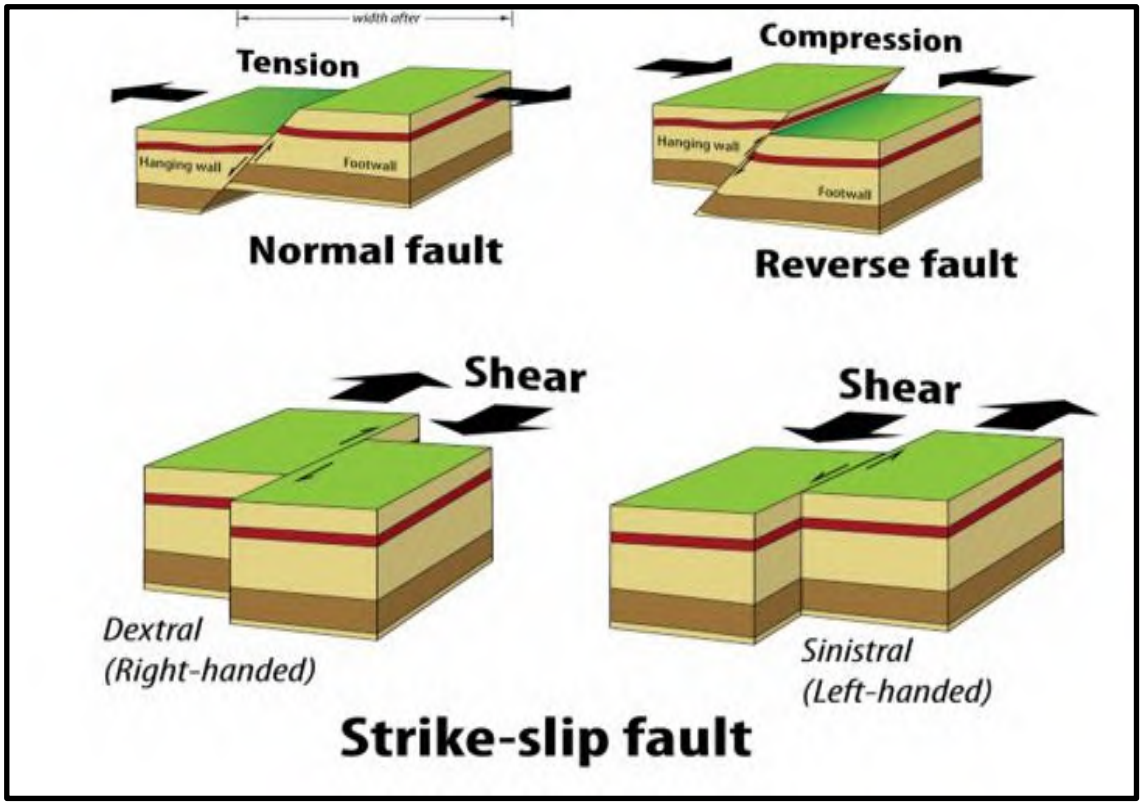
Faults are fractures in the Earth's crust caused by tectonic forces, leading to the displacement of rock blocks (compressional strain) along a fault plane.
Compression strain refers to the deformation of Earth's crust caused by forces pushing rocks together (compressional stress), resulting in folding, thickening, and potentially mountain building.

Different types of faults

Normal Fault: When the hanging wall (rock above the fault plane) moves down relative to the footwall (rock below) due to tension forces pulling the crust apart.

- **Reverse Fault:** When the hanging wall moves up relative to the footwall due to compressional forces pushing the crust together.
- **Thrust Fault:** A type of reverse fault where the fault plane has a very low angle, causing the hanging wall to be pushed up over the footwall at a shallow angle.

- **Strike-Slip Fault:** When the rocks on either side of the fault plane slide horizontally past each other, with movement parallel to the fault line. The San Andreas Fault is an example of a right lateral fault.



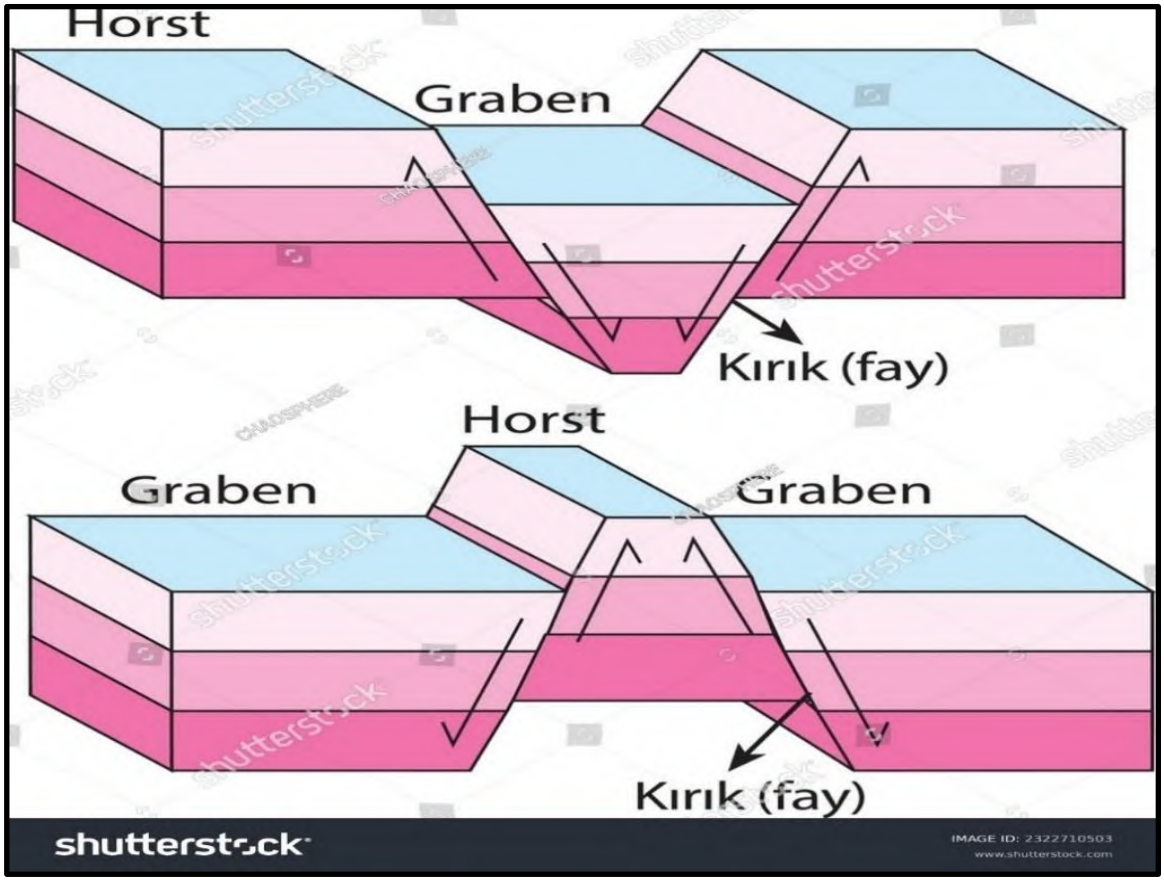
[Source: www.shutterstock.com]

Landforms associated with faulting

- **Horst/Block mountain**: an elongated, uplifted block of the Earth's crust that forms between two parallel fault lines, often found alongside grabens (downward-dropped blocks) in areas of tectonic activity.

  Examples include the Vosges mountains in France and the Serra Nevada in North America.
- **Graben/Rift valley:** a depressed block of the Earth's crust, formed by normal faults, where the central block has dropped down relative to the surrounding blocks.

The example is the East African Rift Valley which forms the boundary between the African Plate and the Arabian Plate. Since the two plates are drifting apart, this is a continental-continental divergent boundary.



[source: google image]

Difference Between Folding and Faulting		
Parameter	**Folding**	**Faulting**
Appearance	Folds will start appearing on rocks when compressional forces act on ductile rocks.	These are fissures that start appearing when tensional forces are applied in opposite directions to displace the rocks.
Rocks	You can see that folds are more common on those which lie deep inside the earth's crust. Such rocks sustain very high pressure than those lying near upper surfaces.	The faulting phenomenon is quite common on rocks that are present near the top layer of the earth's surface. Such rocks do not receive heavy force and are too rigid to have folds on them. Moreover, we can also see that these rocks break apart if there is presence of tectonic plates on the bigger side.
Causes	Some of the most common reasons for folding are temperature, gradient, or slope of the rocks. Apart from this pore pressure exerted on such rocks also leads to folding.	One of the major causes of faulting is the presence of dip-slip faults. Whenever the rocks compress against it each other in a vertical manner, there are some rocks that move downwards due to the compression and eventually developing a crack in it.
Formation	Folding occurs due to the shortening of the existing layers of rocks. Moreover, displacement on some non-planner rocks will also lead to folding.	The fractured surface of a rock is called a fault. The fault line is the place where this crack or fracture is visible.
Structure	There are two segments in a fold which are the hinge and limb. Hinge is the point where limbs converge, and	A Fault zone is an area where a group of faults lies parallel to each other.

	limbs represent flanks of folds.	
Intensity	Major rock folds can be found in dry and arid areas. On the other hand, minor folds are commonly found in outcrops.	There is a particular thickness in every fault. However, the intensity of such thickness depends on the type of rock and its characteristics.
Examples	Major mountain ranges such as the Himalayas, Alps, Andes, and Rockies have formed due to folding.	Faults lead to the development of block mountains and river valleys. Narmada and Tapi River Valleys are examples of faulting landforms.

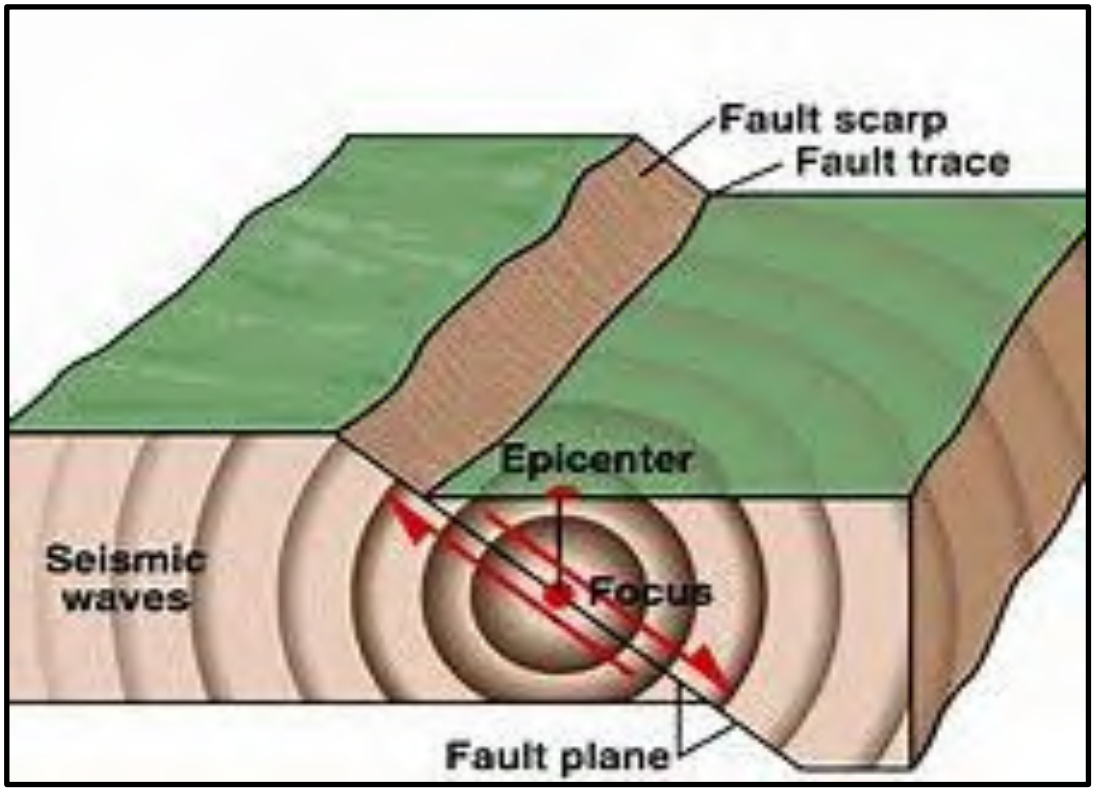
2.2.	Match column A with a correct term from column B. Write the question number from column A (2.2.1- 2.2.10) and the letter of the answer in column B e.g. 2.2.11 K	
	COLUMN A	**COLUMN B**
2.2.1	This if formed when the forces acting upon layers are not very strong	A Warping
2.2.2	Formed when compression is greater and layers are more pliable (fold easily)	B Folding
2.2.3	Occurs if the compressional force is light and the rocks stable	C Faulting
2.2.4	Formed when compression is more intense and of no longer duration	D Tear Fault
2.2.5	Formed where a block between two faults subsides in relation to the surrounding area.	E Reverse Fault
2.2.6	Formed when a block between the earth's crust is raised in relation to the surrounding area.	F Normal Fault

2.2.7	This landform is produced by compressional stress	G Graben
2.2.8	Displacement of the rock layers relative to one another	H Horst
2.2.9	Formed when the land on either side of the Fault is pulled apart by tension.	I Anticline
2.2.10	Rocks move past each other in horizontal direction	J Monocline

EARTHQUAKES

HOW DOES IT OCCUR?

A Sudden and violent movement of the Earth's crust because of a sudden release of energy.



[Source: google image]

FOCUS:

Exact point beneath the Earth's surface where the plates shift

EPICENTER:

Point directly above the focus on the Earth's surface.

FAULT SCARP:

The steep exposed rock face.

FAULT:

Crack in the Earth's crust resulting from the movement of rock.

WAVE FRONTS:

Seismic waves releasing energy through the crust.

SEISMIC WAVES:

A wave of energy generated by an earthquake.

How is it measured?

- **RICHTER SCALE:** Method to allocate a magnitude number to qualify the energy released by an earthquake.

- **SEISMOGRAPH:** Instrument used to measure and record an earthquake.
- **SEISMOGRAM:** A graph output from a seismograph.

The impact of Earthquakes

PEOPLE/SOCIAL:

- Injuries and/or death of people and animals
- Destruction of infrastructure e.g. roads, houses
- Transport and communication disrupted
- Landslides flatten and destroy buildings
- Burst water pipes reduce availability of fresh water
- Contaminated water cause health issues e.g. cholera
- Gas pipe leaks cause fires

ENVIRONMENT/ PHYSICAL/NATURAL:

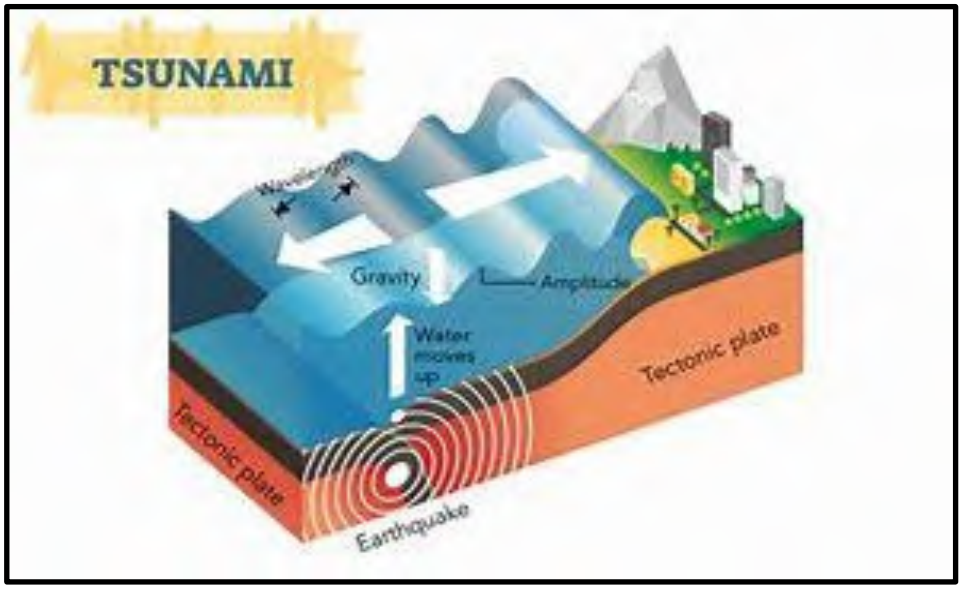
- Disruption of habitat
- Destruction of vegetation
- Landslides, mudslides
- Soil liquefaction
- Contamination of natural resources e.g. water, soil

ECONOMIC:

- Businesses destroyed
- Reduce employment
- Expenses to rebuild/fix damages to infrastructure
- Developing countries are more affected because of lower economic growth

A **TSUNAM**I can develop. A large wave produced by an Earthquake under the ocean

IMPACTS OF A TSUNAMI



[Source: google image]

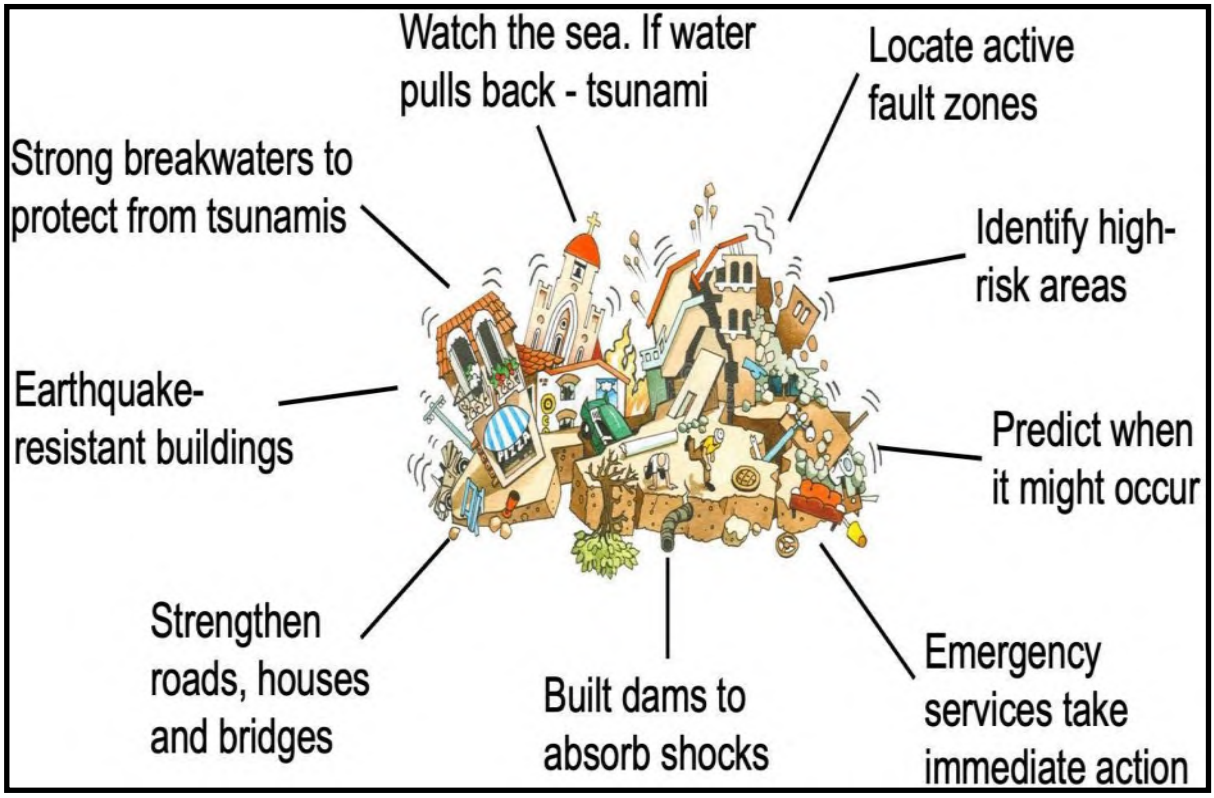
PEOPLE/SOCIAL:

- Results in flooding
- Injuries to people
- Destroys infrastructure
- Contaminates food and water
- Waterborne diseases develop

ENVIRONMENT/ PHYSICAL/ NATURAL:

- Salinisation of rivers, lakes and groundwater
- Flooding causes sewerage contamination of fresh water resources
- Pollute wetlands, coastal areas, agricultural fields and forests
- Deposition of sediments lead to changes in habitats and species

What strategies can be implemented to reduce the impact of Earthquakes and Tsunamis'?



[Source: google image]

2.3.	Match the statement in Column A with the options in Column B.W rite the **X** or **Y** next the question number.	
	COLUMN A	**COLUMN B**
2.3.1	A crack in the Earth's crust	**X. Fault** **Y. Focus**
2.3.2	Instrument that allocates a magnitude number to quantify the energy released by an earthquake	**X. Seismic wave** **Y. Richter scale**
2.3.3	A wave of energy that generates an earthquake	**X. Seismic wave** **Y. Seismogram**
2.3.4	A graph output from the magnitude of an earthquake.	**X. Seismogram** **Y. Seismic wave**
2.3.5	An instrument used to measure and record details of earthquakes	**X. Seismogram** **Y. Seismic wave**
2.3.6	A large wave caused by an earthquake under the ocean	**X. focus** **Y. Tsunami**
2.3.7	The location where the plates move under the earth	**X. Focus** **Y. Fault**

Refer to the case study below on earthquakes.

EARTHQUAKES

NEW DELHI: A mild earthquake measuring 3.5 on the Richter Scale hit Delhi and neighbouring areas around 5.45pm on Sunday.

The tremors lasted for 25 to 30 seconds. Officials from the Department of Disaster Management Authority in Delhi said there were no immediate reports of any damage. The earthquake, which occurred at a depth of 8km, was categorized in the " yellow slight " level, as according to Ajay Kumar, officer on duty at the national centre of Seismology (NCS). The earthquake was unexpected, there were no signs of it coming" said Kumar, adding he cannot say if it will be followed by another set of tremors. We will be closely monitoring the situation over the next 12 hours to assess the situation" Kumar said

The epicentre of the earthquake was reported near Sonia Viharn in north-east Delhi about 16km from the NCS head office at Lodhi Road, said Mr M Rajeevan, secretary of the earth sciences.

https://economictimes.indiatimes.com//news/politics-and-nation/earthquake-of-magnitude-3-5-strikes-delhi-neighbouring-

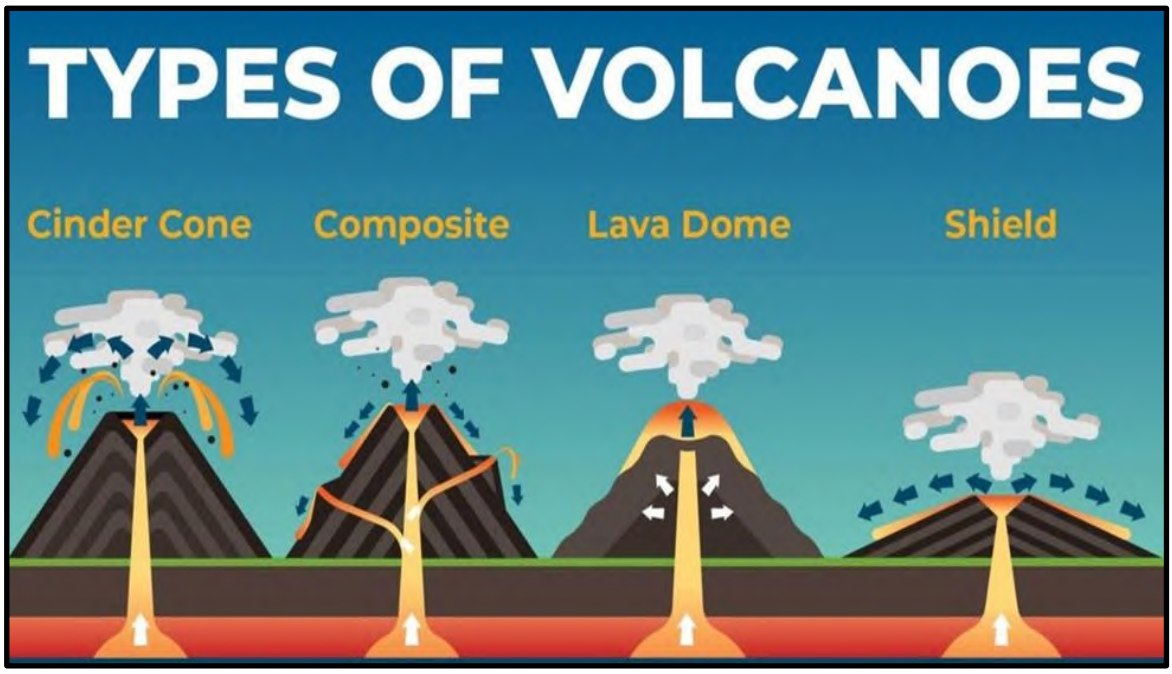
2.3			
2.3.1.	Define the following term *epicenter*	(1 x 2)	(2)
2.3.2	According to the article, where has this earthquake occurred?	(1 x 1)	(1)
2.3.3	What could be an explanation to the statement 'no immediate reports of any damage'?	(1 x 2)	(2)
2.3.4	Where was the epicenter of the earthquake?	(1 x 1)	(1)
2.3.5	On which continent is New Delhi located?	(1 x 1)	(1)
2.3.6	Why are they worried about the possibility of tremors?	(1 x 2)	(2)
2.3.7	Discuss why the earthquake was unexpected and why it is difficult to predict.	(2 x 2)	(4)

VOLCANOES

Formation of volcanoes

Volcanoes are formed when magma (i.e. molten material) rises through to the surface of the earth through vents and fissures. Magma forms deep within the earth when some rocks melt and become magma. When the magma reaches the earth surface, it solidifies and becomes lava.

Types of volcanoes



[Source: https://www.google.com]

Cinder Cone

Cinder cone are cylindrical in shape. Cinder cone volcano is formed when eruptions shoot great quantities of ash and particles of lava into the air. The eruption of magma is explosive.

Composite volcano

A composite volcano is a volcanic landform composed of thick lava flows alternated with layers of ash, cinders, and rocks. These layers form a symmetrical cone with steep concave sides that curve inward. The composite volcano is characterized by a steep-sided conical peak.

Lava dome

A lava dome volcano is volcano that forms a mound-shaped structure from viscous lava, Lava domes are often circular and steep sided. Lava domes are formed when highly viscous lava is slowly extruded from a volcano. The lava is too thick to spread out a lava flow.

Shield volcano

Shield volcanoes are formed when lava flows out of a central vent. This result to gentle slopes of enormous breadth. Bases are dozens of kilometres wide. The eruption is not explosive.

The impacts or effects of volcanoes on people

- When volcanoes erupt, they frequently have immediate and dramatic effects on people's lives.
- Lava flows and destroy everything in their path.
- Thousands of lives can be lost though volcanic eruptions.
- Volcanoes can collapse buildings, roads, and cause lung disease in humans, and animals in some cases.
- Economic activity in affected areas can suffer severely as it is hard for businesses to operate and recover after and eruption.
- People are frequently forced to abandon their land and homes when large eruptions occur.

The negative impacts or effects of volcanoes on environment

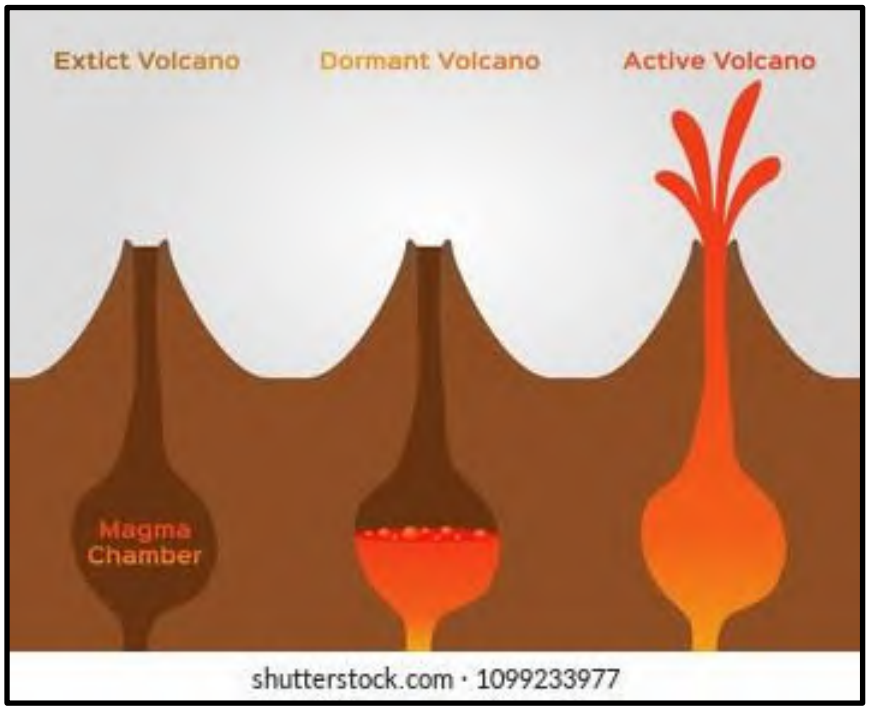
- Natural habitats are destroyed through volcanic eruptions and this result to the disruption of biosphere.
- The plants and animals can be severely affected resulting into disruption in food chain.
- Acid rain is formed when sulfurous gases emitted by volcanoes combine with water vapor in the atmosphere. Acid rain had a significant impact on the vegetation, lakes and streams.
- The organisms that lived in affected areas are forced to leave or die as the vegetation would have been destroyed.
- Volcanic ash in the atmosphere presents a considerable hazard to airplanes.

The positive impacts of volcanoes

- Volcanic ash often contains minerals that are beneficial to plants therefore volcanoes provide nutrients to the surrounding soil.
- Volcanic slopes are often inaccessible, especially if they are steep, thus they can provide refuge for rare plants and animals from the ravages of humans and livestock.
- Volcanoes serve as tourist attractions attraction, bringing in money for the local economy.
- Geothermal energy can be generated in places where the crust is thinner, and so volcanic areas can be used to harness renewable energy.

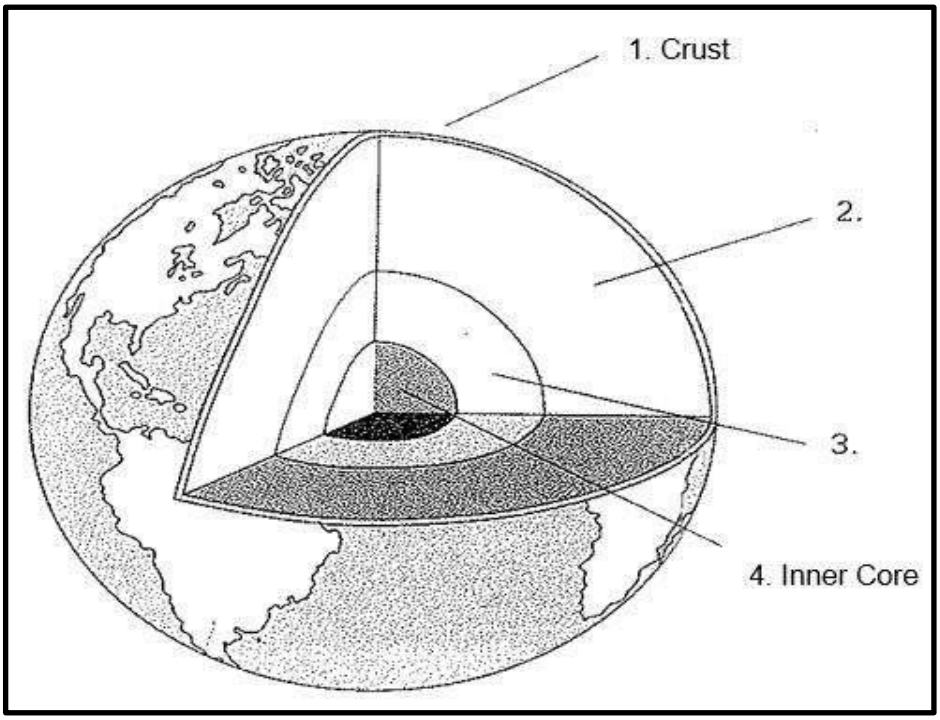
2.4. Match a concept from column B with a corresponding description in column A. Write only the letter **X** or **Y** next to the question number.

COLUMN A	COLUMN B
2.4.1 When magma from the mantle does not reach the earth's surface and solidifies in deep layers.	**X** Extrusive **Y** Intrusive
2.4.2 A volcano that consists of soft liquid lava, which rapidly flows outwards	**X** Cinder cone **Y** Composite
2.4.3 A volcano that has not erupted in recent years	**X** Dormant **Y** Active
2.4.4 Molten minerals underneath the earth's surface	**X** Magma **Y** Lava
2.4.5 A volcanic cone built up by ash, leading to concave slopes forms **…** volcano	**X** Shield **Y** Lava dome
2.4.6 The largest volcanic intrusion…	**X** Laccolith **Y** Batholith
2.4.7 One of the economic advantages of a volcano	**X** generation of geothermal energy **Y** Provides refuge
2.4.8 This type of volcan has the eruption of magma that is so explosive.	**X** Composite **Y** Cinder cone

2.5	Refer to the picture on a type of volcano below.  		
2.5.1.	What is a *dormant volcano*?	(1 x 2)	(2)
2.5.2	Explain why the fumes escaping the volcano are described as toxic.	(1 x 2)	(2)
2.5.3	Differentiate between magma and lava?	(2 x 2)	(4)
2.5.4	Explain how volcanoes positively impact to socio-economic activity.	(3 x 2)	(6)
2.5.5	In a paragraph of approximately EIGHT lines, discuss the negative impacts that the volcanic eruption will have on the surrounding environment.	(4 x 2)	(8)

ADDITIONAL ACTIVITIES

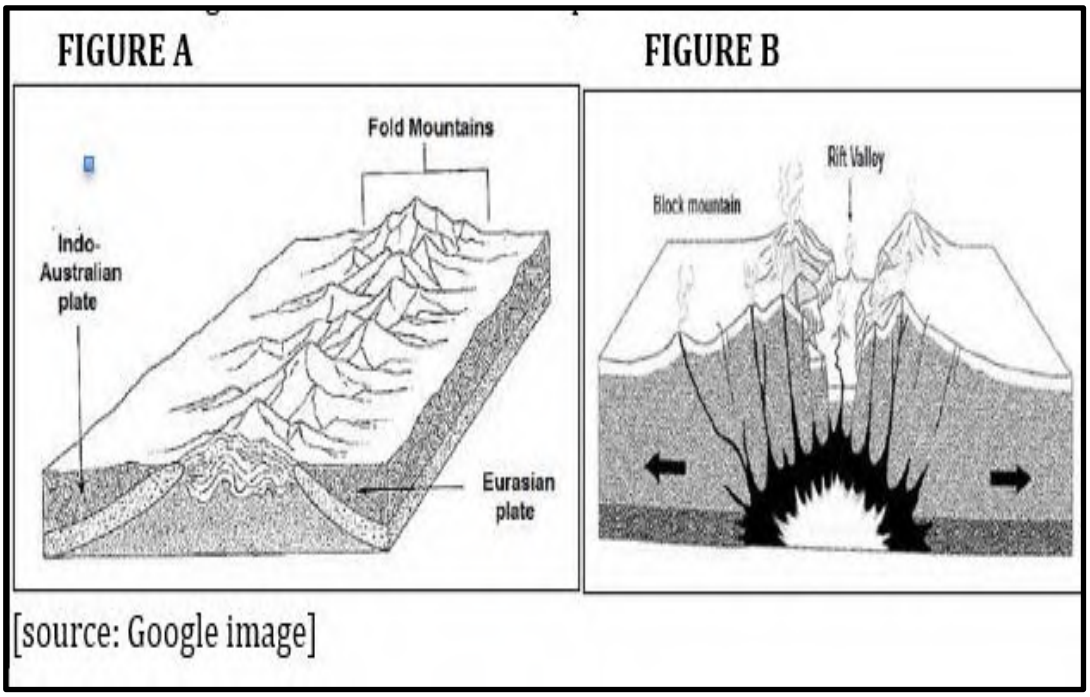
2.6. Study the illustration FIGURE 1.3 of the internal structure of the earth below and answer the questions below.



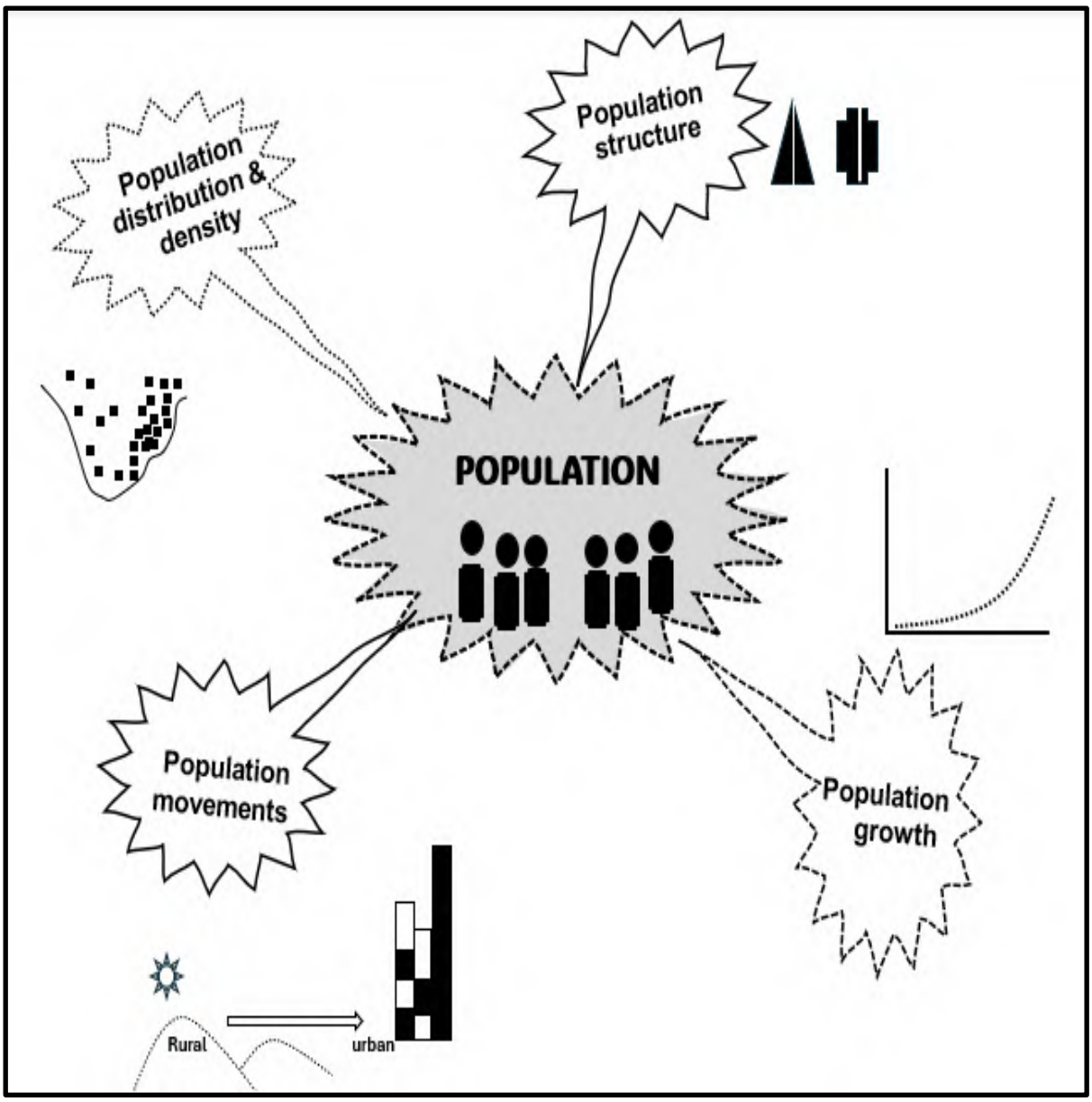
[Source: google image]

2.6.1	Give the name of the layer at **2.**	(1x1)	(1)
2.6.2	Give the name of the layer at **3**.	(1x1)	(1)
2.6.3	Name the layer of the earth that consists of SIMA and SIAL.	(1x1)	(1)
2.6.4	Identify the layer of earth that is in a semi-molten state.	(1x1)	(1)
2.6.5	Which layer experiences the hottest temperature and highest pressure?	(1x1)	(1)
2.6.6	Name the layer that we live on.	(1x1)	(1)
2.6.7	Identify the boundary that separates layer **1** and **2.**	(1x1)	(1)
			[7]

2.7. Use the diagram below to answer the questions below.



2.7.1	Identify the two crustal plates that are colliding in **FIGURE A** to form the fold mountains on the diagram	(2x1)	(2)
2.7.2	In both figures above, does convergence or divergence occur?	(2x1)	(2)
2.7.3	Classify the two plate boundaries at **A** and **B** as destructive or constructive boundaries respectively.	(2x1)	(2)
2.7.4	Explain your answer in QUESTION 2.7.3	(2x2)	(4)
2.7.5	State at which of the plate boundaries, **A** or **B**, faulting will take place.	(1x1)	(1)
2.7.6	Differentiate between folding and faulting	(2x2)	(4)
			15



POPULATION DISTRIBUTION AND DENSITY

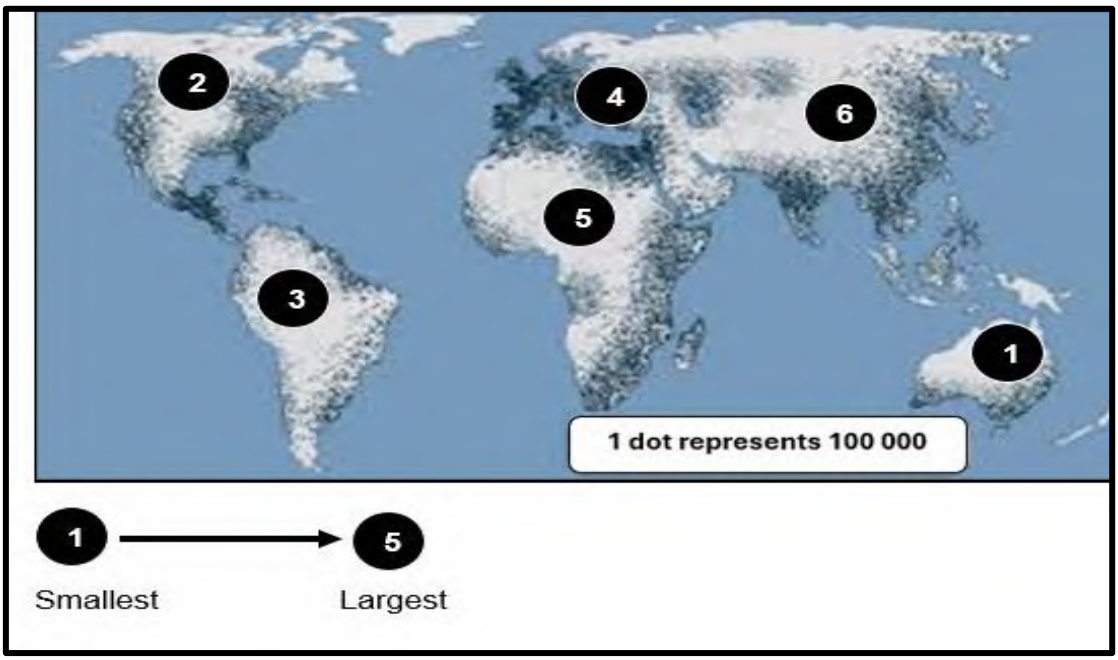
KEY CONCEPTS	DEFINITION
Population	The total number of people living in a particular area.
Population distribution	How people are spread across a region.
Population density	The number of people per unit area.

Population indicators	Different measurements which provide information about a country's population characteristics.
Population pyramid	Kind of a graph that shows population structure of a particular country.

Population distribution

- Refers to how people are spread across a region.
- The population of people is unevenly distributed across the world.

MAP SHOWING POPULATION DISTRIBUTION



[Adapted: https://www.jkgeography.com/physical-and-human-factors]

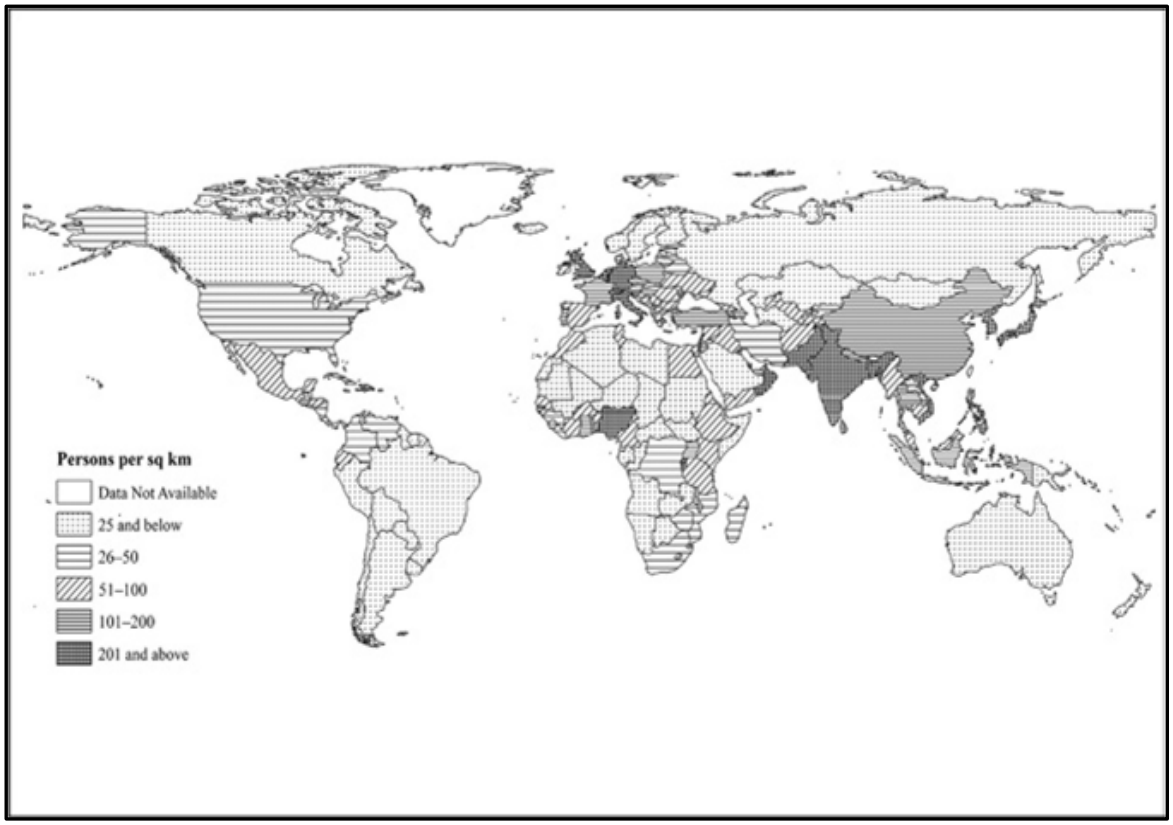
- The world map above is an evidence that the population of the world's continents is not the same.
- Australia (**1**) has the least distributed population.
- Asia (**6**) has the largest distributed population.

Population density

- Refers to the total number of people per unit area
- It is determined by dividing the total population by the area of land in km²

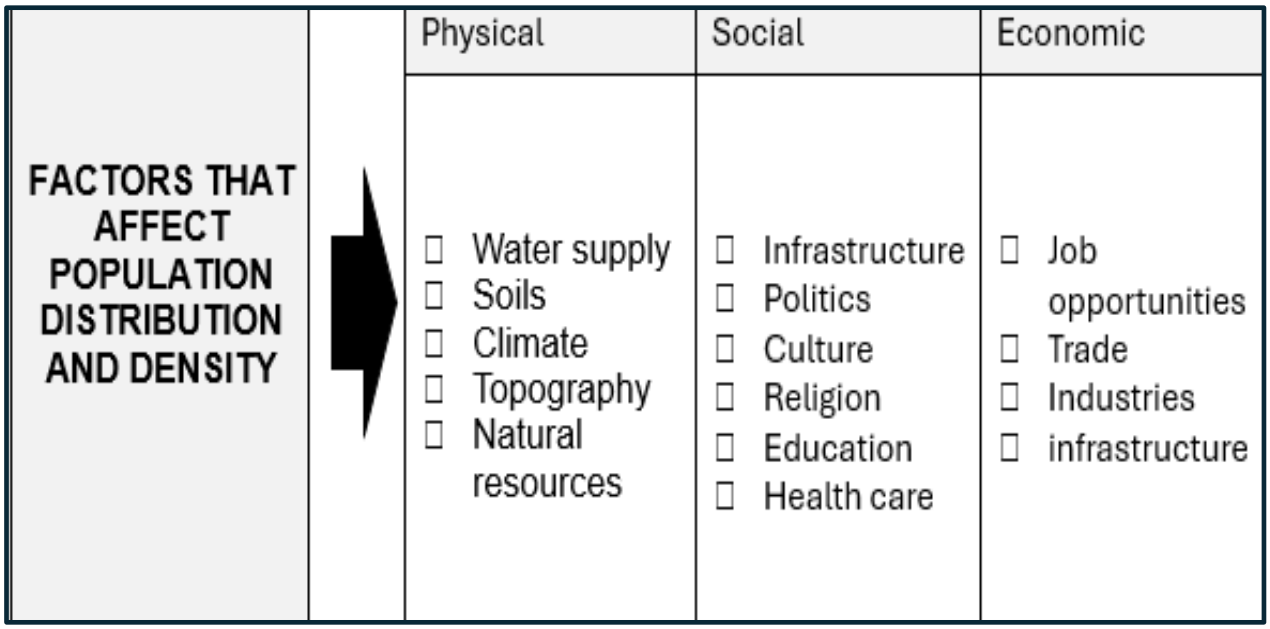
- **The world map below represents population density**
- Asia is leading with above 201 people occupying a square kilometre (201 per km²).
- Australia is dominated by 25 and above people occupying a square kilometre (25 per km²).
- Example: In late 2024, China had a population of **1,419,321,278** within **9,562,910** km².
- The population density is therefore approximately 148 people per km² (**148 per km²**)
- Population distribution and population density are influenced by physical, social and economic factors.
- Some areas around the world are densely populated while others are sparsely populated.

MAP SHOWING POPULATION DENSITY



[source: https://ebrary.net/217541/education/world_distribution_population]

FACTORS AFFECTING POPULATION DISTRIBUTION AND DENSITY



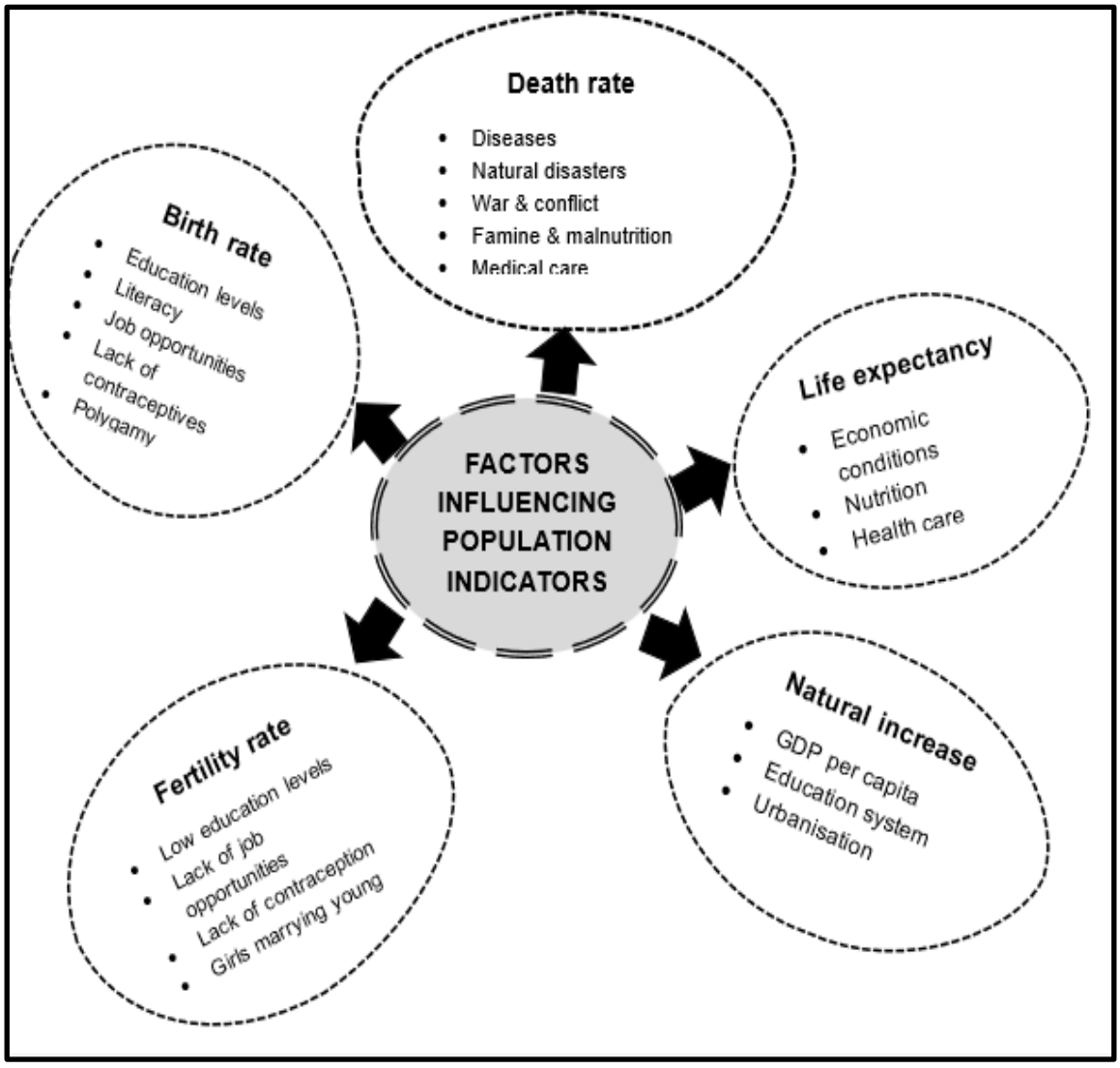
POPULATION STRUCTURE

Population indicators

- Population indicators give us information about a country's population characteristics.

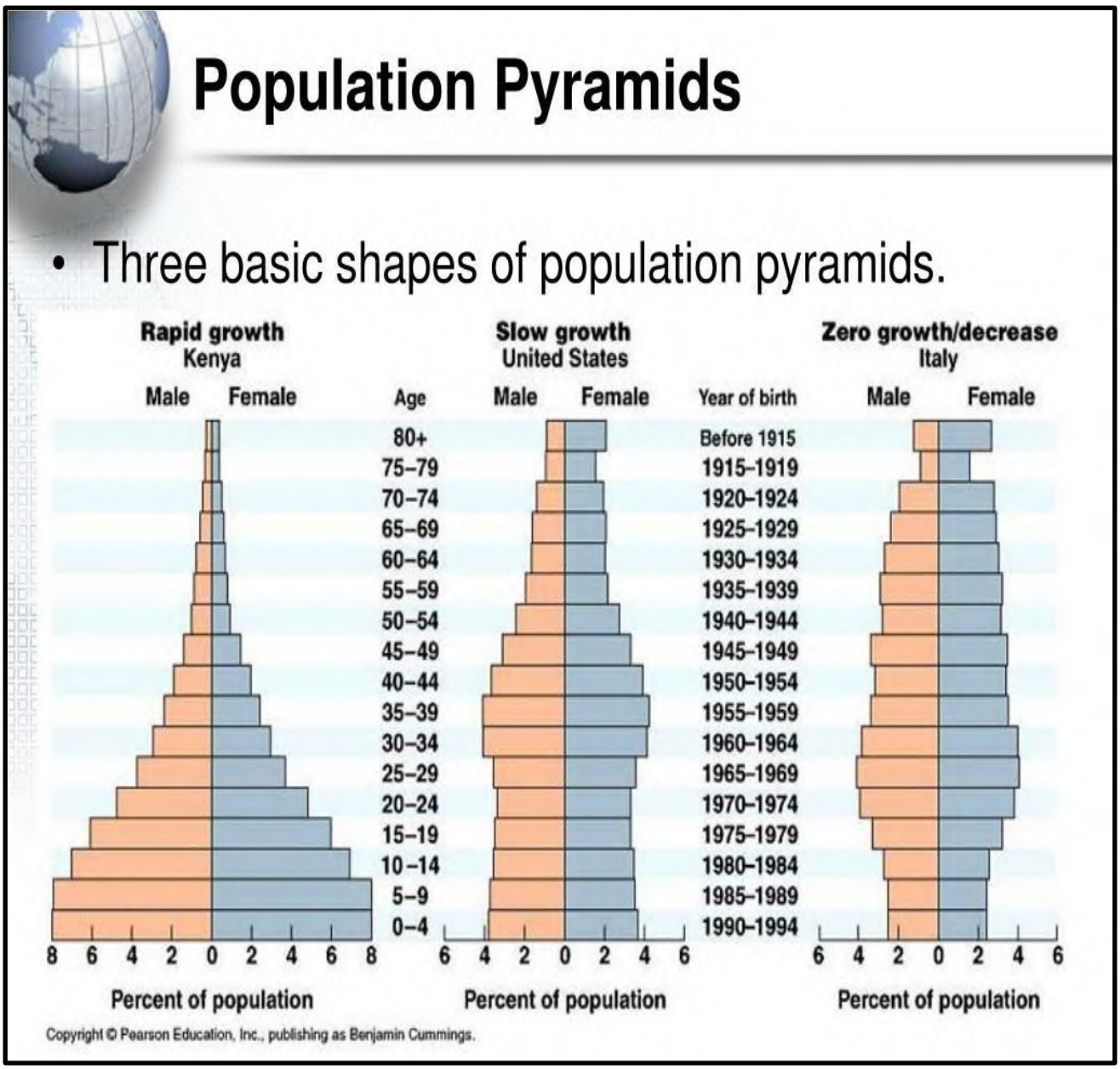
POPULATION INDICATOR	EXPLANATION
Birth rate (BR)	The number of live babies born in a year per 1000 people.
Death rate (DR)	Number of deaths in a year per 1000 people
Life expectancy (LE)	The number of years a person is expected to live
Infant mortality rate (IMR)	The number of deaths of infants less than 1 Year old per 1000 live births in a given year.
Natural increase (NI)	The rate at which the country's population is growing (birth rate minus death rate).
Fertility rate (FR)	The number of children born to each woman in her childbearing years.
Literacy rate (LR)	The percentage of the population who can read and write.
GDP per capita	The gross domestic product per person.

FACTORS INFLUENCING POPULATION INDICATORS



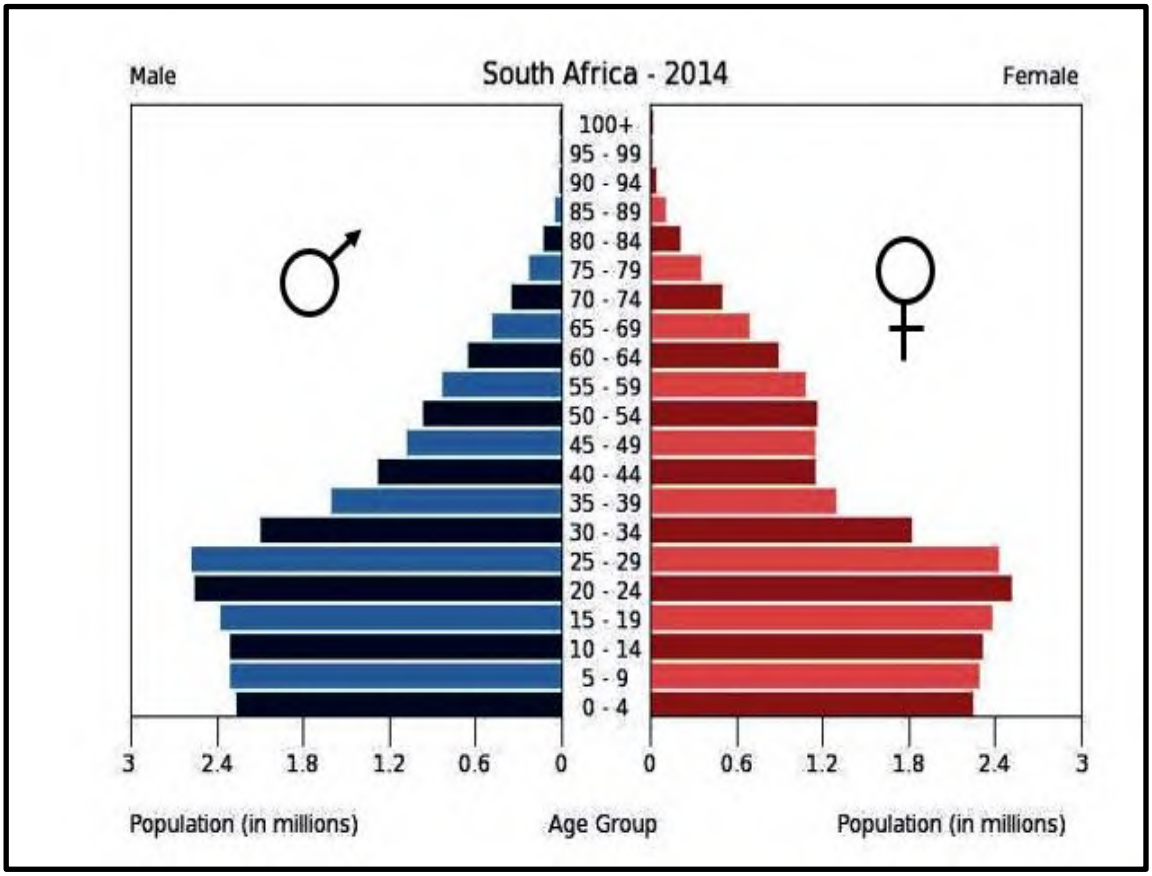
- Population structure informs us how many people there are in a certain age group and what gender they are.
- It shows how men and women are distributed across age groups of a population.
- This is demonstrated on what is referred to a population pyramid.
- A population pyramid is a graph that shows population structure of a particular country.
- **The population pyramid below is typically of a developing country i.e. South Africa**
- It is triangular in shape
- It shows a wide base (high births).
- Narrow top (low life expectancy and high death rates).

Population pyramids



[source: https://image1.slideserve.com/2814442/population-pyramids1-l.jpg]

A POPULATION PYRAMID FOR SOUTH AFRICA IN 2014



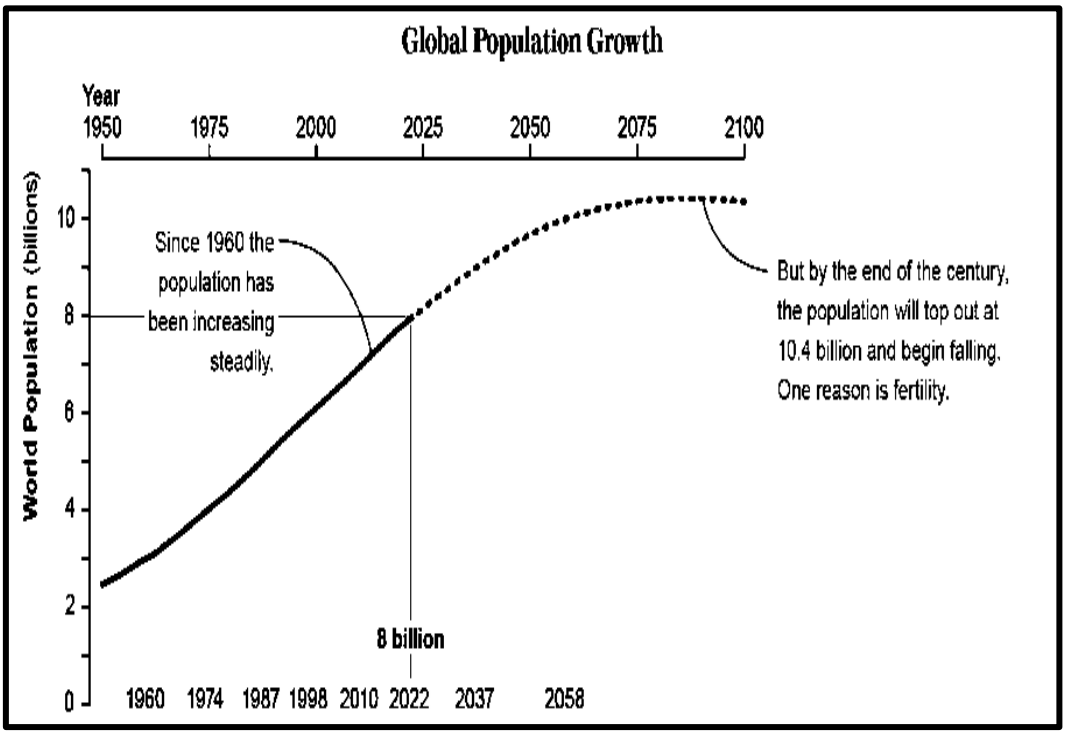
[Adapted: https://www.researchgate.net/profile/]

POPULATION GROWTH

KEY CONCEPTS	DEFINITION
Population growth	Absolute increase in the number of people.
Exponential growth	Ever more rapid growth over a short period of time.
Demographic transition model	Model explaining how a country's population changes over time.
Overpopulation	The rapid increase in the world's population.
Carrying capacity	Number of people an area can support on a sustainable basis.
Contraception	A technique of using contraceptives to prevent woman from becoming pregnant.
Contraceptive	A pill or device that is used to prevent unwanted pregnancy.
Sterilisation	An act of making a person to be unable to produce or bear children.

World population growth

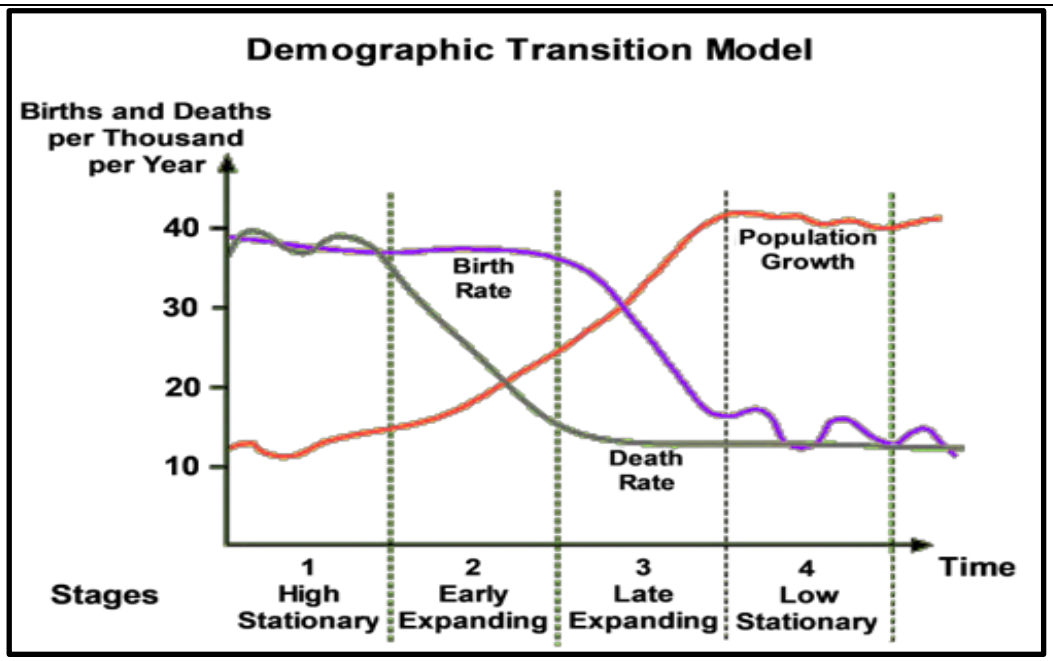
- The world's population is changing over time.
- Recently, the world's population is growing faster.
- Estimates are that by 2045, the world population will reach 9 billion.



[source:https://www.google.com/imgres?q=graph%20showing%20world%20population%20growth]

The demographic transition model

- It explains how a country's population changes over time.
- It has four stages/ phases.



[Source: http://geographyfieldwork.com]

Overpopulation

- It is the rapid increase in the world's population.

Malthusian theory on population growth	**Managing population growth**
'An essay on the principle of population' ➢ Developed by Thomas Malthus in 1978 ➢ He argued that in a growing population, the population numbers and resources must reach an equilibrium ➢ He suggested that the quantity of available resources inevitably limits population. ➢ Population usually increase with an increase in available resources	There are different methods of managing population growth. ➢ Commonly used methods are contraceptives. They include; -pills, -injection -loop -condom -femidom ➢ Sterilisation ➢ Vasectomy ➢ Abortion ➢ One child policy

➢ The factors that control the growth of populations and keep it in balance are birth control, war, poverty, diseases and famine.	➢ Family planning ➢ Infanticide

POPULATION MOVEMENTS

KEY CONCEPTS	DEFINITION
Migration	Movement of people from one place to another.
International migration	Movement of people across a country's borders.
Emigration	Movement of people out of their own country to another country.
Immigration	Movement of people into a new country of residence.
Regional migration	Movement of people within a region.
Rural-urban migration	Movement of people from rural areas to urban areas.
Urbanisation	Process whereby an increased percentage of people live in urban areas.
Counter-urbanisation	Process by which people move out of cities to the countryside.
Population depopulation	A decline in the number of people living in rural areas.
Migrant worker	A person who migrates specifically to find work.
Refugee	Political migrant who is forced to migrate to another country.
Genocide	The deliberate killing of people from a certain ethnic group or nation.
Xenophobia	A strong an unreasonable dislike or fear of people from other countries.

Rural-urban migration

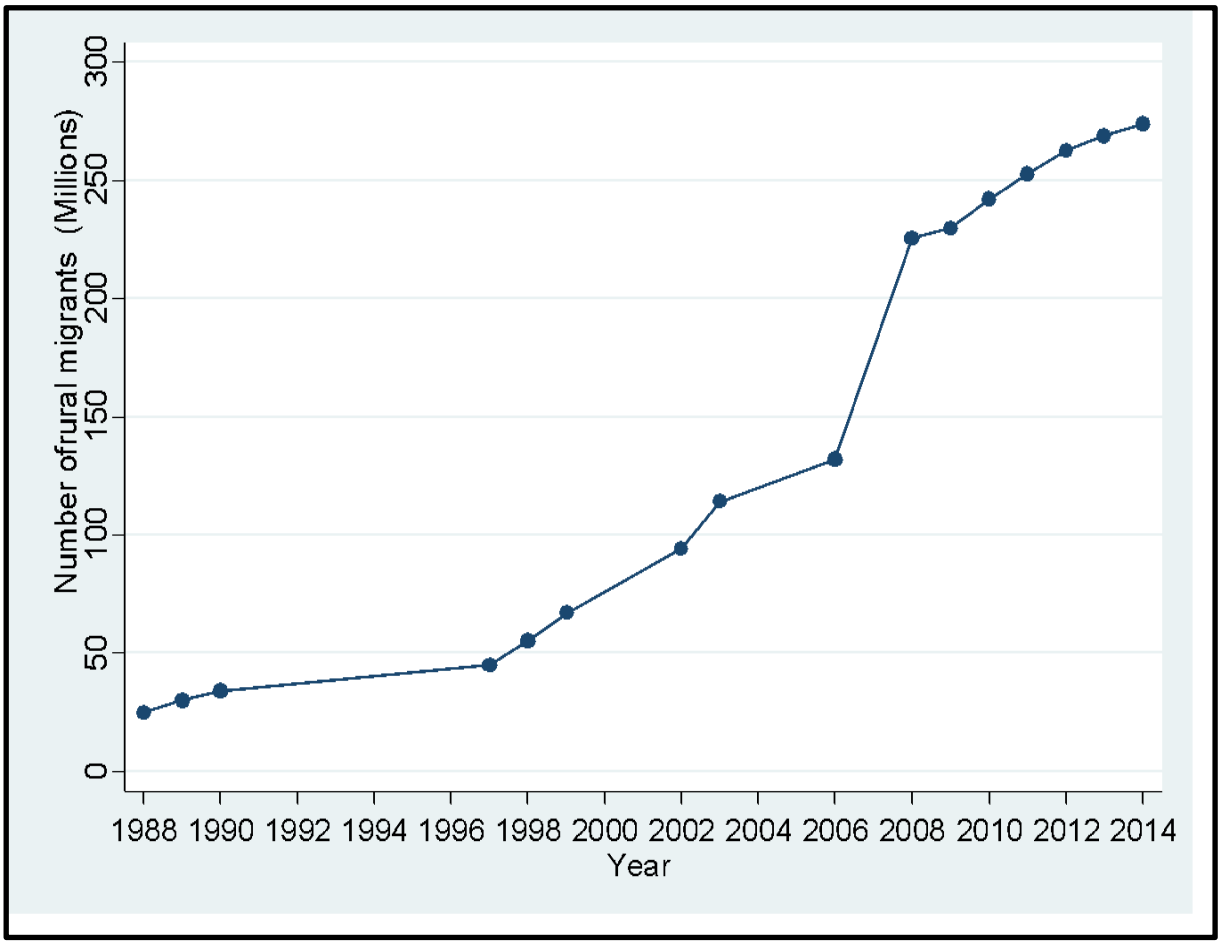
- It is the movement of people from rural areas to urban areas
- The decline in the number of people living in rural areas is termed rural depopulation.

[Adapted: https://www.bing.com]

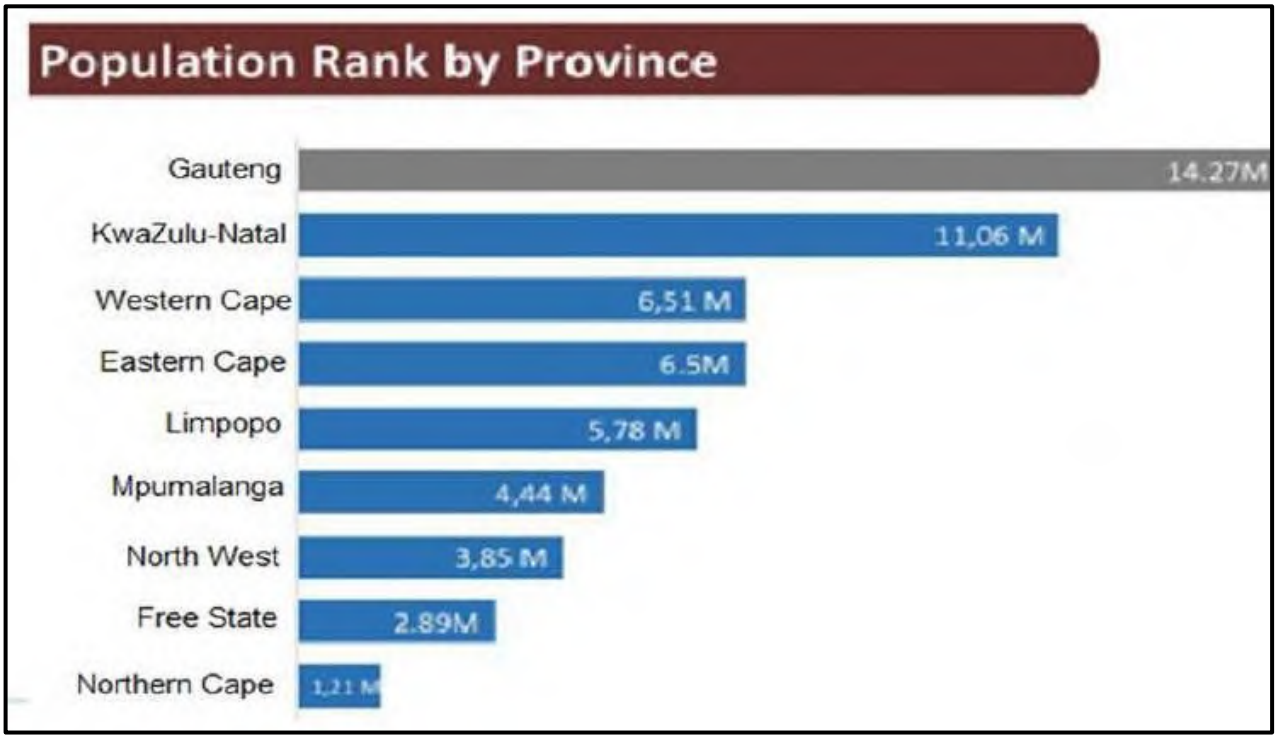
CAUSES/REASONS	CONSEQUENCES	STRATEGIES
➢ Push factors force people to leave rural areas. ➢ Pull factors draw (attract) people to urban areas.	➢ Consequences may be social, economic & environmental.	➢ Provision of basic services such as housing, water, sanitation ➢ Supporting small scale farmers ➢ Provision of jobs ➢ Improving salaries and wages
Push factors	**In rural areas**	
➢ Poverty ➢ Unemployment ➢ Poor roads	➢ Ghost settlements ➢ Closure of businesses	

Natural disasters ➢ Low wages ➢ Farm killings	➢ Lower productivity ➢ Old people left behind ➢ Abandoned farms ➢ Further unemployment	➢ Attracting secondary sector such as industries ➢ Improving transport facilities and roads
Pull factors	**In urban areas**	
➢ Availability of jobs ➢ Better health care ➢ Transport accessibility ➢ Entertainment ➢ Food security ➢ Improved education	➢ High competition for basic services ➢ Influx of informal settlements ➢ High crime rates ➢ Unhygienic conditions	

LINE GRAPH SHOWING A TREND OF RURAL-URBAN MIGRATION OVER THE YEARS



3.1. Refer to FIGURE 3.1 showing the 2022 population distribution in South Africa.

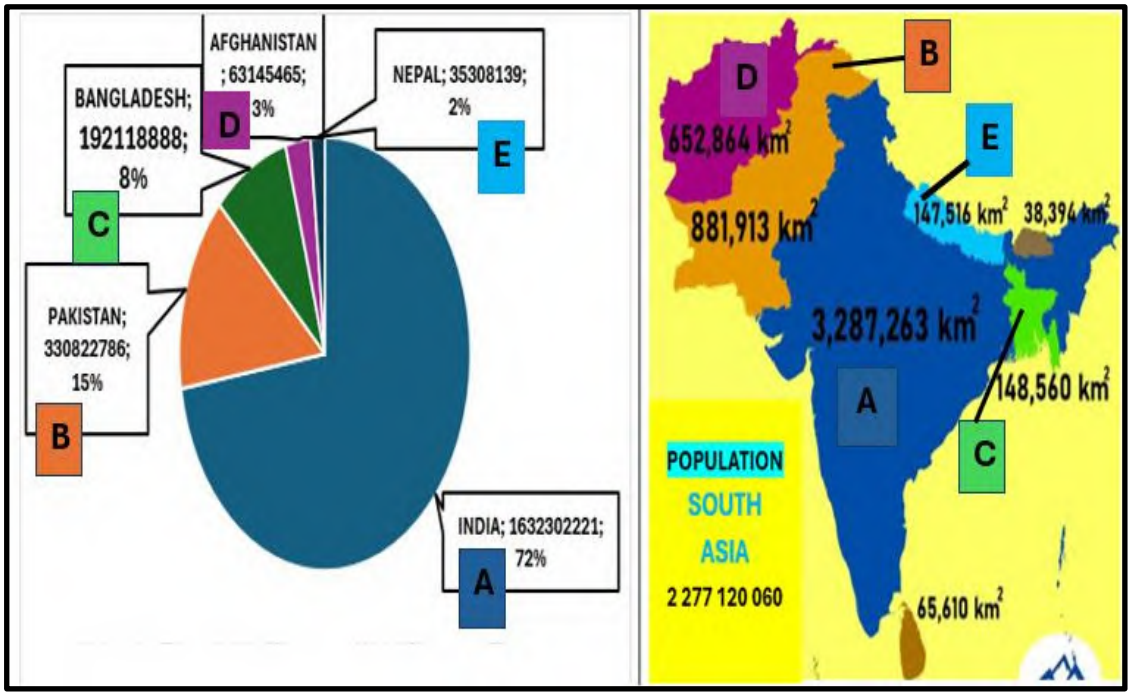


3.1.1	Define the term urbanisation.	(1 x2)	(2)
3.1.2	Name the province with the smallest population.	(1x1)	(1)
3.1.3	Based on the data from the graph, what is the total of South Africa?	(1x2)	(2)
3.1.4	Which is the most populated province in South Africa?	(1x1)	(1)
3.1.5	Provide TWO reasons for the high population in the province named in QUESTION 3.1.4.	(2x2)	(4)
			[10]

ACTIVITY 3.2.

POPULATION DISTRIBUTION AND POPULATION DENSITY

Refer to the infographic below showing the projected population of South Asia in 2047.



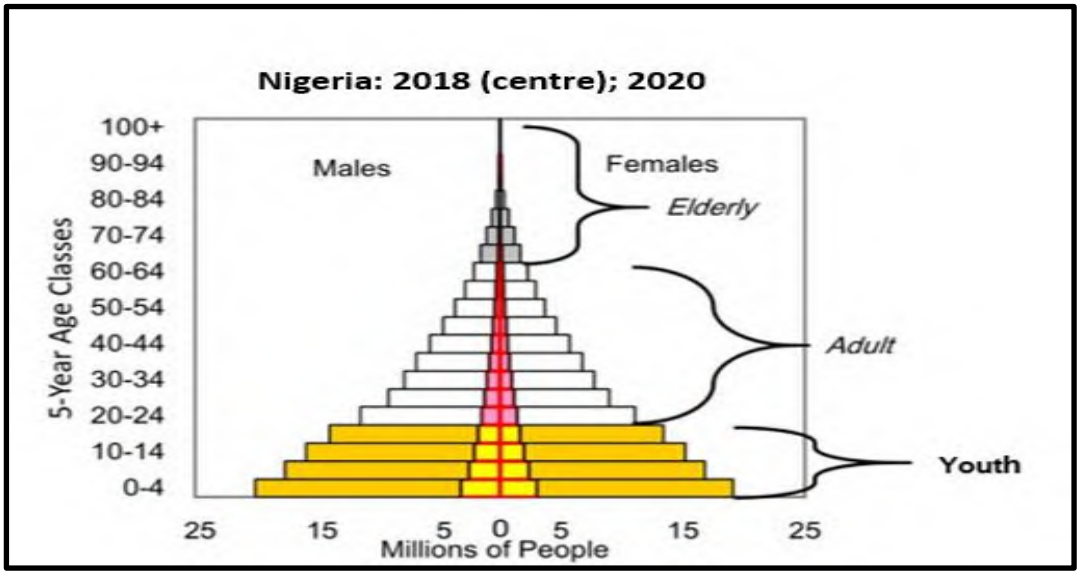
[Adapted: https://i.ytimg.com/vi/BWEeww-h23k/maxresdefault.jpg]

3.2.1	Define the concept *population distribution*.	(1 x 2)	(2)
3.2.2	The infographic shows a/an…of 330 822 786 in Pakistan and occupying a/an…of 881 913 km². iii. population distribution iv. population v. population density vi. area A. i and iii B. i and iv C. ii and iii D. ii and iv	(1 x 1)	(1)

3.2.3	The country with the largest population is…	(1 x 1)	(1)
3.2.4	Mention THREE possible factors that contribute to a high birth rate in the country named in QUESTION 3.2.3 above.	(3 x 1)	(3)
3.2.5	Calculate the population density of Bangladesh.	(2 x 1)	(2)
3.2.6	Explain THREE physical (natural) factors that influence population density.	(3x2)	(6)

ACTIVITY 3.3.
POPULATION STRUCTURE

Refer to the population pyramid below.

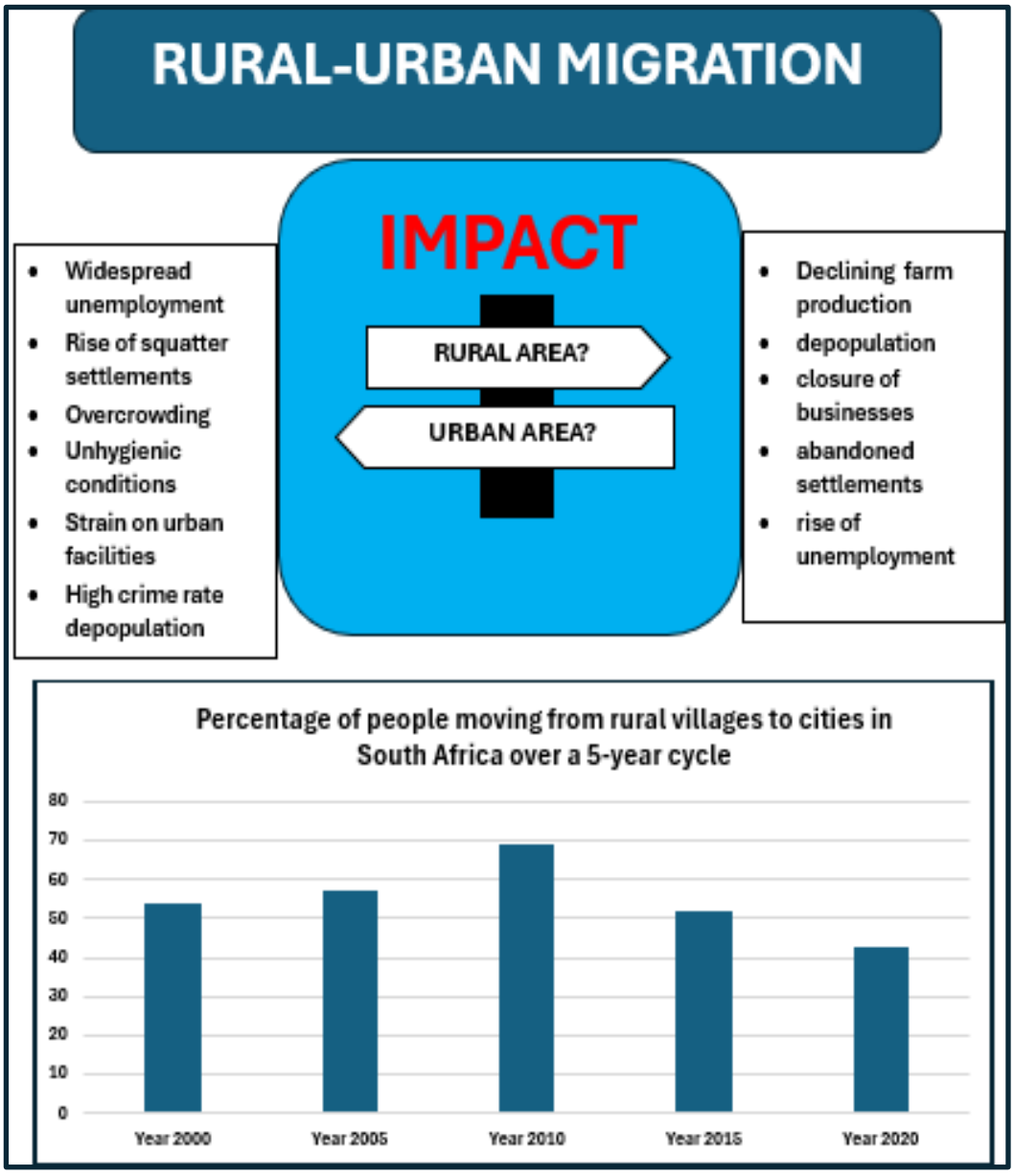


[Source: https://images.squarespace-cdn.com/content/v1/5be04d64506fbe3067f96916/1573047625833-G77GVZNMV3OOBJDL1INY/Fig_2_Oct_31.jpg]

3.3.1	Nigeria is a (developing/ developed) country?	(1 x 1)	(1)
3.3.2	Describe ONE structural characteristic of the pyramid illustrated above.	(1 x 2)	(2)
3.3.3	The youth male population between 10-14 years was (5million/ 15 million) in 2020.	(1 x 1)	(1)
3.3.4	Which female population group was the least in 2018?	(1 x 1)	(1)
3.3.5	Explain a possible reason for your answer to QUESTION 3.3.4 above.	(1 x 2)	(2)
3.3.6	The base of the pyramid demonstrate a high birth rate. Explain how education and fertility rate could contribute to high birth rate.	(2 x 2)	(4)
3.3.7	Discuss TWO measures that the government of Nigeria could employ to reduce high birth rate.	(2 x 2)	(4)

ACTIVITY 3.4.
POPULATION MOVEMENTS

Refer to the infographic on rural-urban migration.



[Adapted :https://image.slidesharecdn.com/rural-urbanmigration]

3.4.1	Define the concept *rural-urban migration*.	(1 x 2)	(2)
3.4.2	Rural depopulation leads to… A. increasing population.		

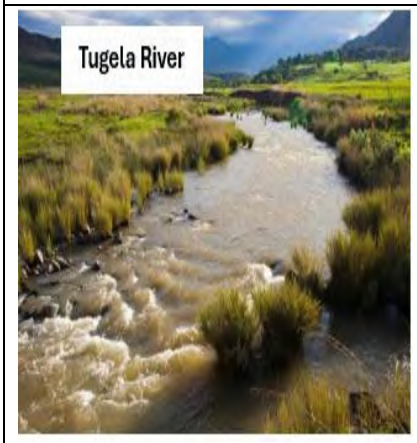
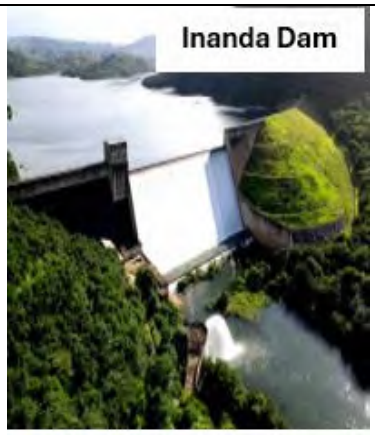
	B. stagnant population. C. declining population. D. overpopulation.	(1 x 1)	(1)
3.4.3	According to the graph, which year recorded the highest increase in population in South African cities ?	(1 x 1)	(1)
3.4.4	Account for the possible increasing trend revealed in QUESTION 3.4.3.	(1 x 2)	(2)
3.4.5	Identify ONE economic impact of rural-urban migration in cities.	(1 x 1)	(1)
3.4.6	Write a paragraph of approximately EIGHT lines in which you suggest sustainable strategies to reduce dwindling (decreasing) population in rural areas.	(4 x 2)	(8)

WATER RESOURCES

WATER MANAGEMENT IN SOUTH AFRICA

KEY CONCEPTS	DEFINITION
Water resources	are natural and artificial resources of water which can be used by humans for various purposes.
Tributary	Smaller river joining the main.
River basin/ drainage basin	Total area drained by the main river and its tributaries.
Grey water	used water which is still quite clean
Flood	sudden overflow of water which covers land that is usually dry.
Hydrographs	a graph showing a river's discharge over time
Discharge	the amount of water across the width of a river flowing past a given point.

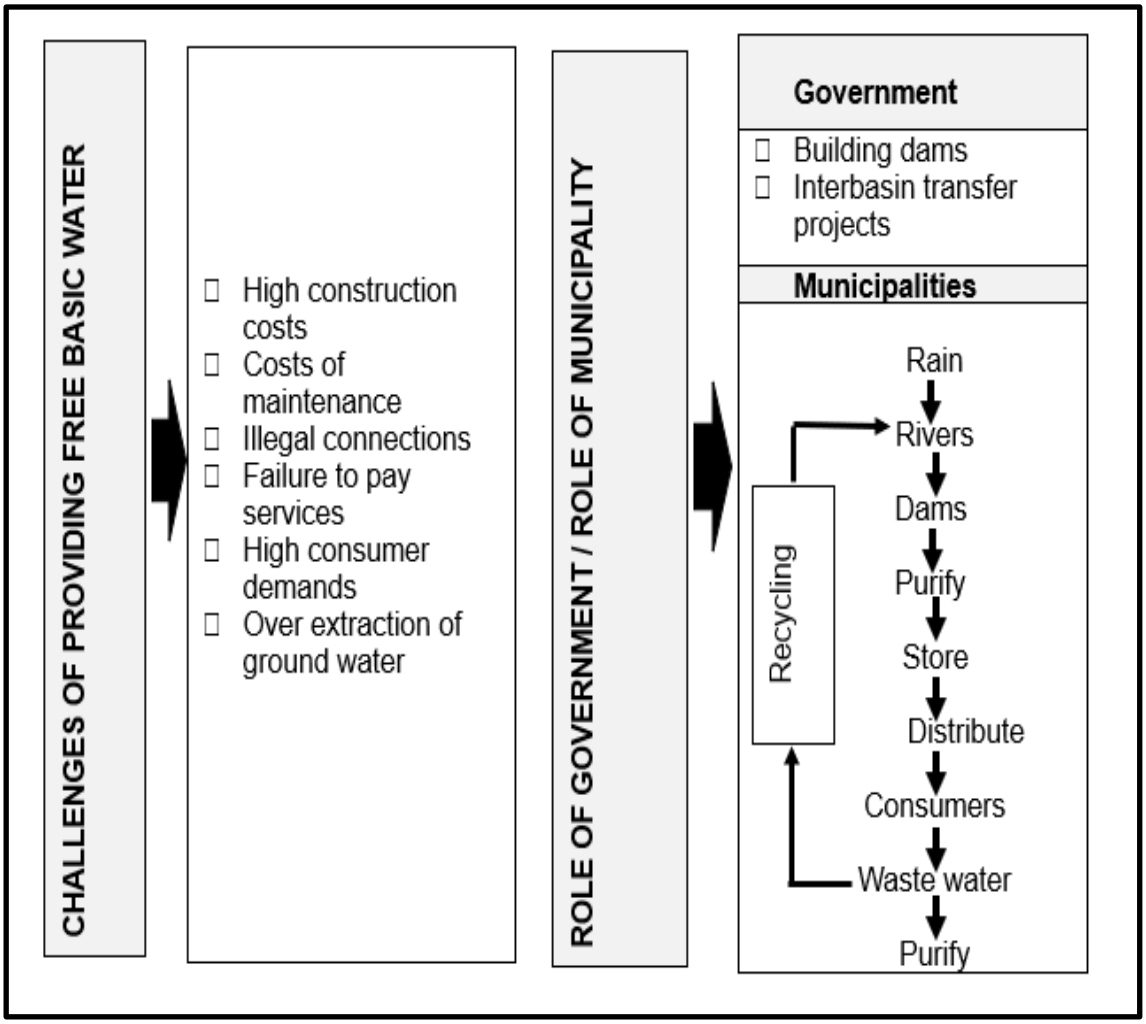
RIVERS, LAKES AND DAMS IN SOUTH AFRICA

Rivers	Lakes	Dams
A long natural flow of water across the land into sea, lake or another river.	A large body of water That is surrounded by land.	A built structure across a river to block the flow and retain water.
 [Adapted: https://southafrica.co.za/images/364547-786x524.jpg]	 [Adapted: https://isimangaliso.com/images]	 [Adapted: https://i.ytimg.com/vi/L-MgqOAvEJ4/maxresdefault.jpg

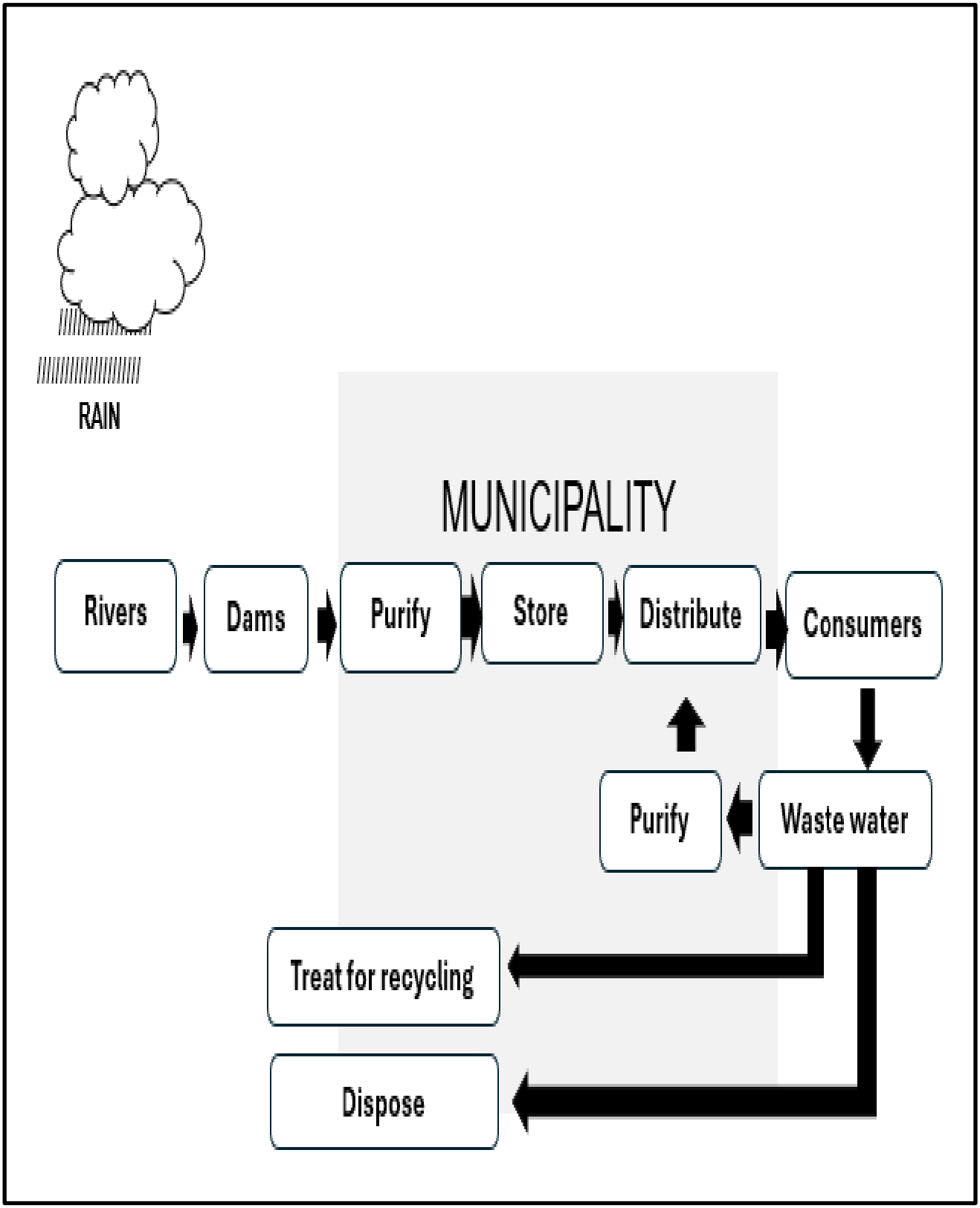
Factors influencing the availability of water in South Africa

Human (social) factors	Physical (environmental) factors
○ Population growth ○ Increased demand for food ○ Urbanisation ○ Mining and factories ○ Pollution of water sources ○ Agricultural activities	○ Rainfall ○ Alien vegetation ○ Climate change ○ Evaporation rate

Challenges of providing free basic water, the role of government initiatives towards securing water, and the role of municipality



ROLE OF MUNICIPALITY FOR WATER PURIFICATION



[Adapted Grade 10 Geography Focus textbook]

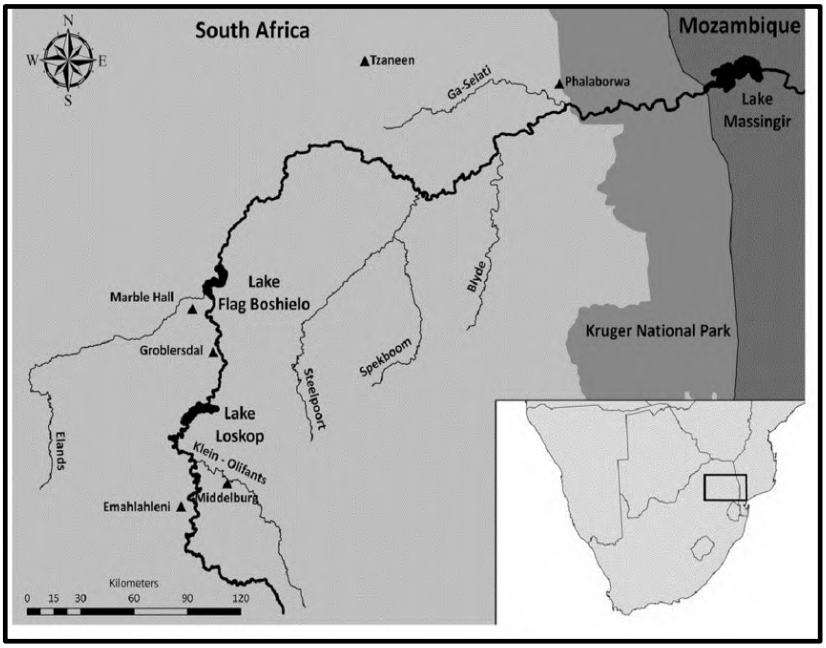
READ THE TWO CASE STUDIES BELOW ON WATER RESOURCES

POLLUTION OF THE VAAL RIVER SYSTEM

The Vaal River is one of South Africa's strongest flowing rivers. It is home to the Vaal Dam, which supplies water to the Gauteng Province, South Africa's economic hub. Over the years, the failing wastewater treatment system in the catchment area has led to continued pollution of the river, compromising this critical resource and the economy of the region. In 2018, following a public outcry, the South African Human Rights Commission instituted an inquiry into the state of affairs of the region's water and sanitation management issues as well as the level and extent of the pollution problem. The Commission discovered raw sewerage in a stream flowing through the Emfuleni Golf Course, burst sewer pipes on the banks of the Rietspruit, dysfunctional components in the Rietspruit Wastewater Treatment Works, blocked manholes, and children from a nearby school swimming in and consuming polluted water. Raw sewage was found to be discharging from dysfunctional wastewater treatment plants into the receiving Vaal River.

Source:http://www.witpress.com/elibrary/wit-transactions-on-ecology-and-the-environment/257/38294

OLIFANTS – TIME TO STAND UP FOR A RIVER UNDER SIEGE



There is an acute need for the management of human activities in the Upper Olifants River catchment to halt an increasingly serious situation of poor water quality, eutrophication and contamination. Researchers identified three main sources of impacts on the quality of the Upper Olifants River and its tributaries. These are acidic water, metals and sulphates from mining and industrial activity; excessively high nutrient input from poorly operating municipal wastewater treatment works as well as some agricultural activities; and extremely high microbial input from untreated or poorly treated sewage. Some of the adverse effects of these pollutants include widespread eutrophication of the river, toxic water quality in places, and an increase in the potential for bioaccumulation of pollutants, such as metals, in organisms through the food chain.

Source:http://www.wrc.org.za/wp-content/uploads/mdocs/WWMay2013olifants.pdf

FLOODS

[Source: https://www.bing.com/images]

[Source: https://ts2.mm.bing.net]

Physical causes of flooding	The effects of river floods (negative)	Managing flooding (rural, urban & informal settlements)
➢ The type and amount of rainfall ➢ Type of soil and underlying rock structure ➢ Vegetation cover ➢ Relief	➢ Destroy crops ➢ People and livestock drown ➢ Erosion of top soil ➢ Damage to homes and other buildings ➢ Destruction of infrastructure ➢ Financial strain ➢ Waterborne diseases ➢ Disruption of food chains ➢ Interruption of tourism activities ➢ Food insecurity	➢ Afforestation ➢ Sandbagging ➢ Building embarkments ➢ Buffering rivers ➢ Building dams ➢ Restore natural wetlands ➢ Awareness campaigns ➢ Sustainable methods of farming ➢ Banning building along rivers ➢ Storm water drains/ maintenance
Human causes of flooding • Deforestation • Urbanisation • Poor management of drainage facilities		

	POSITIVE ➢ Increase water levels in dams ➢ Contribute to soil fertility ➢ Balance health of river system ➢ Purify swamps	➢ warning systems on media ➢ flood walls built around dense settlements

CASE STUDY ON RECENT FLOODS IN DURBAN

State of disaster declared in KZN following devastating floods

At least 22 lives were lost; with widespread destruction, resulting in an estimated R3.1 billion in damages.

The province experienced severe rainfall and flooding in February. At least 22 lives were lost. Widespread destruction resulted in an estimated R3.1 billion in damages.

The state of disaster declaration, made by the National Disaster Management Centre (NDMC), allows for the mobilisation of all state organs to support affected communities and implement contingency protocols. A multi-sectoral relief and rehabilitation plan has been put in place to ensure that these communities receive the necessary assistance for recovery.

Cooperative Governance and Traditional Affairs (COGTA) spokesperson, Senzelwe Mzila said MEC Thulasizwe Buthelezi has welcomed the declaration.

"The devastating incident caused an estimated R3.1 billion in damages. The MEC for COGTA has assured the people of KZN that the department will work diligently with the NDMC, municipalities and all pertinent stakeholders to ensure the efficient coordination of response and recovery efforts. Residents across the province are strongly advised to remain vigilant and adhere to

[Source: https://www.bing.com]

4.1. Refer to the case study on a drainage basin and water management.

DURBAN CONTAMINATED DRAINAGE BASIN; WE ARE SWIMMING IN WASTE WHILE DODGING E. coli.

Rivers polluted by sewers are nothing new to Durbanites in the province of KwaZulu-Natal . The riverside residential community was fed up with the unpleasant stench of raw sewage in the air. It was no longer safe to walk along the Umgeni river or enjoy the surroundings and wildlife of the river. Informal communities that settled along riverbanks to earn a living or provide an income for their families were unable even to use the river for their daily water consumption. Industrial discharges from factories and raw sewage seeping into the rivers had become a daily occurrence. A few weeks after large numbers of fish were killed in the Isipingo River and estuary due to high levels of E.coli, another large number of fish was killed in the Umgeni River. Stringent measures such as river management was a proposed solution to the problem.

Source: http://www.greenpeace.org/africa/en/blogs/52684/ethekwini-contaminated-water-we-are-swimming-in-faeces-while-dodging-e-coli

4.1.1	Define the concept *drainage basin.*	(1 x 2)	(2)
4.1.2	In which province is Durban located?	(1 x 1)	(1)
4.1.3	Identify the bacteria that occurred as a result of the polluted Umgeni River.	(1 x 2)	(2)
4.1.4	Mention TWO sources of pollution for the Umgeni River, according to the article.	(2 x 1)	(2)
4.1.5	In a paragraph of approximately EIGHT lines discuss how pollution impact on the health system of the Umgeni River.	(4 x 2)	(8)

ACTIVITY 4.2.
WATER MANAGEMENT

Refer to the extract on water management in South Africa.

Water resource management in South Africa: A review

In South Africa, there are many challenges regarding water management. Inadequate rainfall may contribute to mismanagement, hence political breakdowns also contribute to the problem. To list some of the major challenges for effective management are limited physical resources, a long cycle of inadequate rainfall, a rapid growing population, and stagnant economies. Water resource management is crucial for human security. In South Africa, almost everyone is affected by mismanagement of water resource, hence those living in poor area are the most affected as they do not have access to potable water and proper sanitation. Many policy-makers, researchers, government, municipalities and water managers advocate that water must be managed at the level of river basins, based on the argument that river basins are a ‘‘natural’’ unit and thus the logical unit for water management.

[Source: www.ajol.info/index.php/ajest/article/view/74212]

4.2.1	What is *water resource management*?	(1 x 2)	(2)
4.2.2	Identify ONE physical factor and ONE human factor (from the extract) that contribute to mismanagement of water resources.	(2 x 1)	(2)
4.2.3	What, according to the article worsen the living conditions of the poor in rural areas?	(2 x 1)	(2)
4.2.4	Name ONE stakeholder mentioned from the extract that plays a role in water management in South Africa.	(1 x 1)	(1)

4.2.5	Explain how agriculture and population growth contribute to water shortages in South Africa.	(2 x 2)	(4)
4.2.6	Suggest TWO methods that municipalities could use to ensure sustainable management of river basins.	(2 x 2)	(4)

ACTIVITY 4.3.
FLOODS

Refer to the article on floods in KwaZulu-Natal, South Africa.

FLOODING IN KWAZULU NATAL

On Tuesday, 25 February 2025, the weather service issued a Level 2 warning for severe thunderstorms along the South Coast of KZN, warning the public of expected heavy downpours, localised flooding, damaging winds, excessive lightning and hail damage.

The eThekwini Municipality reported extensive damage in areas surrounding eThekwini, with flooding causing structural collapses, mudslides and fallen trees. About 280 families in Lamontville were affected by last night's heavy rains and will be relocated to temporary shelters as mop-up operations continue. "Our priority is the safety and wellbeing of our residents," said KZN's cooperative governance and traditional affairs MEC, Reverend Thulasizwe Buthelezi, assuring residents that disaster response teams are working around the clock to rescue residents who are trapped by the floods. Authorities urge the public to stay informed via official channels and **report emergencies to 031 361 0000**.

[Source: www.dailymaverick.co.za/article/2025-02-26]

4.3.1	Define the concept *flood*.	(1 x 2)	(2)
4.3.2	Mention TWO weather conditions that accompanied heavy downpours in eThekwini.	(2 x 1)	(2)
4.3.3	State TWO physical impact of the KZN floods.	(2 x 1)	(2)
4.3.4	The advantage of flooding to farmers is (soil degradation/ soil fertility)?	(1 x 1)	(1)
4.3.5	In a paragraph of approximately EIGHT lines, discuss measures that the eThekwini municipality could employ to reduce the severe impact of floods to the people of the city.	(4 x 2)	(8)