

J.C.E GEOGRAPHY COMPLETE WITH ALL MAP WORK



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COMPLETE J. C. E GEOGRAPHY BASED ON THE NEW 2018 SYLLABUS

FORM 1 WORK

MAP WORK & MAP COMPONENTS

Success criteria:

- Explain the term map
- Explain the components of maps
- Differentiate a map from an aerial photograph
- Explain different uses of maps
- Explain ways of expressing scale
- Explain symbols and signs on a map
- Interpret maps using different signs and symbols
- Locate features and places on a topographic map using four figure and six figure grid reference
- Explain compass points
- Explain true north, magnet north, and grid North

MAP:

It is a drawing of the representation of the earth's surface

COMPONENTS OF MAP

These include the following:

- (1) Scale;
It explains the ratio of distance on the map to that on the actual ground
- (2) Campus Rose (direction);
It tells the direction of a map's cardinal points such as North , South, East and West
- (3) Map title;
It tells us what the map is trying to represent eg political boundary, physical features etc
- (4) Frame;

It shows us the borders of the given map

(5) Symbols;

Its' a picture that represent something real in the world and is drawn to scale

(6) Legend /key;

It tells us what the symbols in the map stand for

DIFFERENCES BETWEEN A MAP & AN AERIAL PHOTOGRAPH

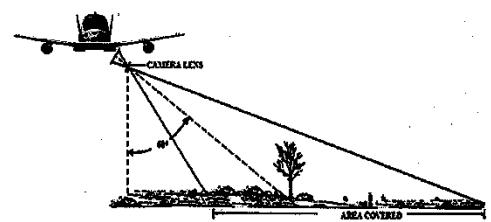
A photograph is an image or picture created by a camera, while a map is a drawing by man to represent the earth's surface

MAP	AERIAL PHOTOGRAPH
1. Uses a uniform scale	1. it has no scale
2. Uses symbols to show features	2 it clearly shows the real image of a feature
3. Shows only important features for use	3 it shows everything as viewed by the camera
4. It is easy to identify or interpret	4 features difficult to interpret, they may be hidden by others
5. Maps take long time to draw	5 very easy to take photograph
6. May show names of places and boundary	6 doesn't show names and boundary

TYPES OF AERIAL PHOTOGRAPHS

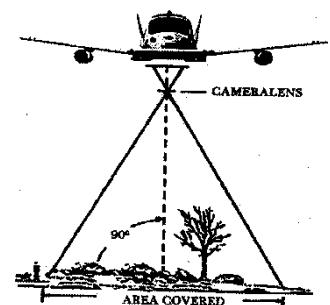
(a) Oblique aerial photograph

Its' where photographs are taken from a high ground or mountain



(b) Vertical aerial photograph

It where photographs are taken from above over-head the structure or relief and no feature may appear hidden



DIFFERENCE BETWEEN AERIAL PHOTOGRAPH & SATELLITE IMAGES

AERIAL PHOTOGRAPH	SATELLITE IMAGE
1. Taken at low altitude (within the atmosphere)	1.taken at high altitude within the earth's orbit
2. Aerial photo s taken by camera placed on an airplane	2 Image recorded by electronic scanners

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NOTE:

The process of collecting information about something from afar without physically being in contact with it is known as REMOTE SENSING

SATELLITE IMAGES

Advantages:

- ♣ Collect image data at high speed
- ♣ Can capture large volume of data within a short time
- ♣ It can capture data of image without being restricted by international political boundaries

Disadvantages:

- ♣ Satellite image are of low quality than other photo images
- ♣ The photographs may be affected by weather conditions such as clouds

AERIAL PHOTOGRAPHS

Advantages

- They contain better quality photographs than satellite
- Weather conditions have little impact on quality of the photograph

Disadvantages

- ♣ The process is slow and time consuming
- ♣ Taking photos is often restricted within political boundary

NOTE:

Aerial photographs may be accessed through computer software program such as the GOOGLE EARTH

TYPES OF MAPS

- a) Physical /Relief maps
It shows mountains rivers and lakes
- b) Topographic maps
They use contour lines in showing reliefs of the land
- c) Political boundary maps
It shows national and international boundaries of a map
- d) Land use maps

It shows activities undertaken by man such as farming, mining, construction etc

e) Distribution maps

It shows how things have spread over the earth or country such as population, vegetation, rainfall

USES OF MAPS

- Measuring and estimating distance on the actual ground
- Locating places and features on the earth's surface which assist travelers
- Showing patterns and distribution of people and things on the earth's surface
- Help by demarcating boundaries of different States, Towns and Cities
- Calculating local time by use of longitudes
- For planning purposes as an operation, such as military, building, mining

WAYS OF EXPRESSING SCALE

Scale:

Its' the ratio of the distance on the map to that corresponding on the actual ground represented by the map

EXPRESSING SCALE:

- (a) Representative fraction scale
- (b) Linear or Bar scale
- (c) Statement or Verbal scale

REPRESENTATIVE SCALE

It uses a representative fraction to describe the ratio between the map and the real world eg

1:50,000 or $\frac{1}{50,000}$

LINEAR OR BAR SCALE

It uses a line with separation marked by smaller distance for example



STATEMENT OR VERBAL SCALE

It uses words to describe the ratio between the map scale and the real world

Example:

1 centimetre represents 0.5 kilometers on the actual ground

CONVERTING ONE FORM OF SCALE TO ANOTHER

(a) STATEMENT TO REPRESENTATIVE FRACTION (RF)

Example:

2 centimeter represent 1 kilometer (100,000cm)

$$2\text{cm} = 100,000$$

Therefore 1 = less

$$\begin{aligned} & \frac{1}{2} \times 100,000 \\ &= \frac{1}{50,000} \end{aligned}$$

ANSWER = 1:50,000

(b) CONVERTING STATEMENT SCALE TO LINEAR SCALE

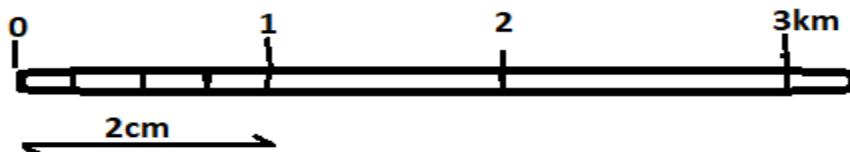
Example:

Statement scale of 2 cm to represent 1 km changed to linear scale

$$\text{Distance on the map} = 2\text{cm}$$

$$\text{Distance on actual ground} = 1\text{km}$$

$$2\text{cm} = 1\text{km}$$

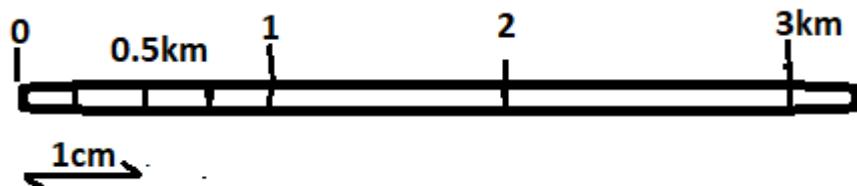


(c) REPRESENTATIVE FRACTION TO LINEAR SCALE

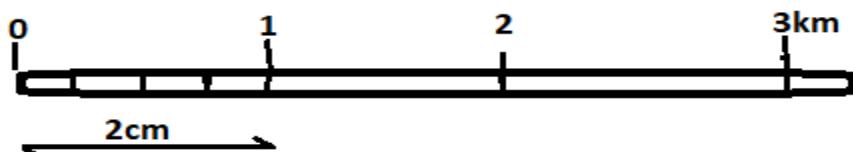
Example;

Convert a representative fraction of 1:100,000 to linear scale

$$1:100,000$$



LINEAR SCALE TO REPRESENTATIVE FRACTION



1 cm to represent 1km measures 2 cm on the leaner scale. This could be converted to 2cm to represent

2cm represent 1 km

Therefore 1cm represent 50,000 (0.5km) = 1:50,000 ($1/50,000$)

(d) REPRESENTATIVE FRACTION TO STATEMENT SCALE

Example

Convert 1:50,000 to statement scale

1cm represent 0.5km on the actual ground

WAYS IN WHICH A SCALE IS IMPORTANT

- It helps to maintain dimensional accuracy by preventing distortion when drawing maps
- It helps to calculate distance and areas accurately
- It help reduce or save paper and space
- It help save time than the actual measurements on the ground

MEASUREMENTS OF DISTANCE ON MAP

This is done in a several of ways such as ;-

- Using a straight edged paper
- Using a pair of divider
- Using a ruler
- Using a string
- Using a pair of campus

USING A STRAIGHT EDGED PAPER PIECE OF PAPER

1st step: Draw a straight line joining points A and B

2nd step: Get a piece of paper of a suitable length which has a straight edge

3rd step; Place the straight edge of the piece of paper next to the line being measured thus A and B

4th step: Mark off on the straight edged paper against those points of the feature that appears to be straight

5th step: Take the marked length of a paper to the scale

MEASURING OF A WINDING DISTANCE

Using a string:

1st step: lay the string along the route to be measured following the curves carefully

2nd step: mark the string with a pen where it ends on each side of the measured length

3rd Step: then take the measured length against the scale to find-out the distance off the measured area on actual ground (refer to the diagram above o procedure)

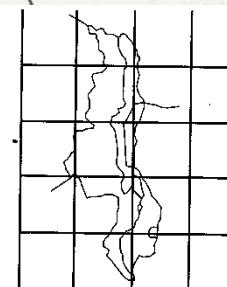
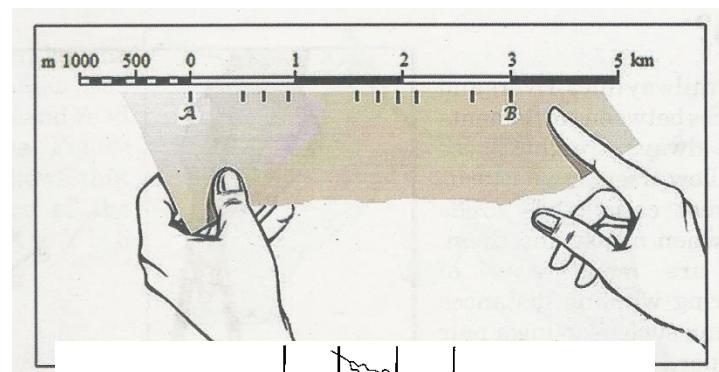
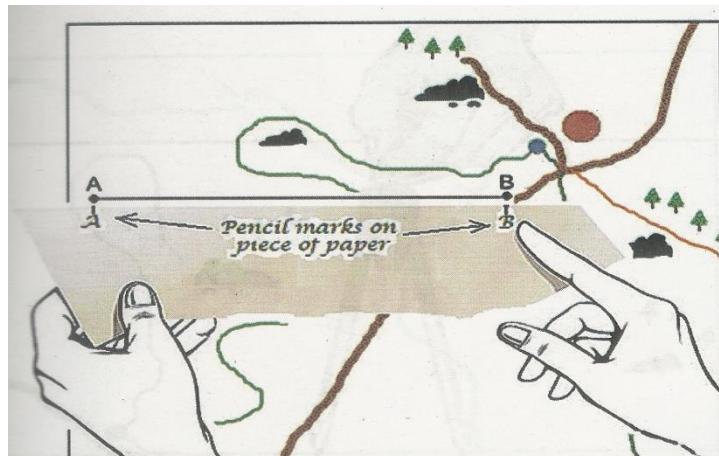
MAP ENLARGEMENT

This is much easier if the map is drawn to scale on a topographic map

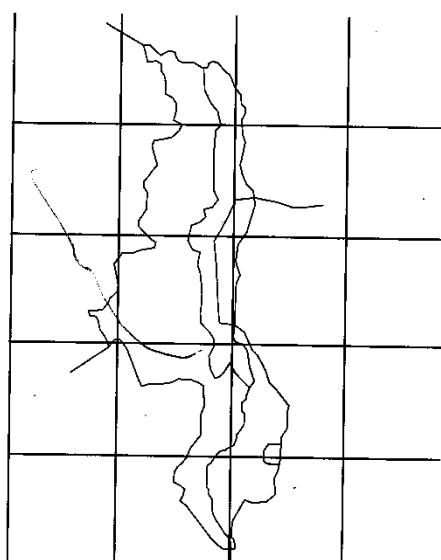
Remember to maintain the same number of boxes in the original map. However the will be slightly larger than the original boxes depending on how big your map would be

A graph paper would be used for this purpose

When enlarging the map its' scale may change depending on how big your map has grown



Scale 1:100,000



Scale 1:50,000

Enlarged map of Malawi

When finding the scale of the related map the following is the procedure:-

$$\frac{1}{25,000} \times \frac{1}{2} = \frac{1}{50,000} \text{ or } 1:50,000$$

CALCULATING AREA OF A MAP

On a topographic map each box normally represent 1km^2 (area)

Therefore if the map occupies 10 boxes, then its' area would be calculated as follows:-

$$10 \times 1\text{km}^2 = 10\text{km}^2 \text{ (number of boxes multiply by } 1\text{km}^2\text{)}$$

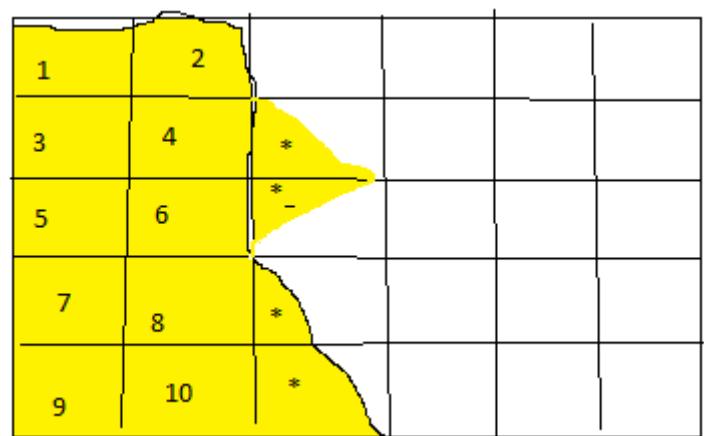
However when calculating area of an irregular shape the following would be the procedure

Example:

$$\text{No. Of full box} = 10$$

$$\text{No. Of } \frac{1}{2} \text{ boxes} = 4$$

$$\text{Area of map} = 10 + \frac{4}{2} \quad (\text{number of half boxes divide by 2 plus the number of full boxes})$$



CALCULATING THE AREA OF SHADED MAP

$$\text{No. Of full boxes} \dots$$

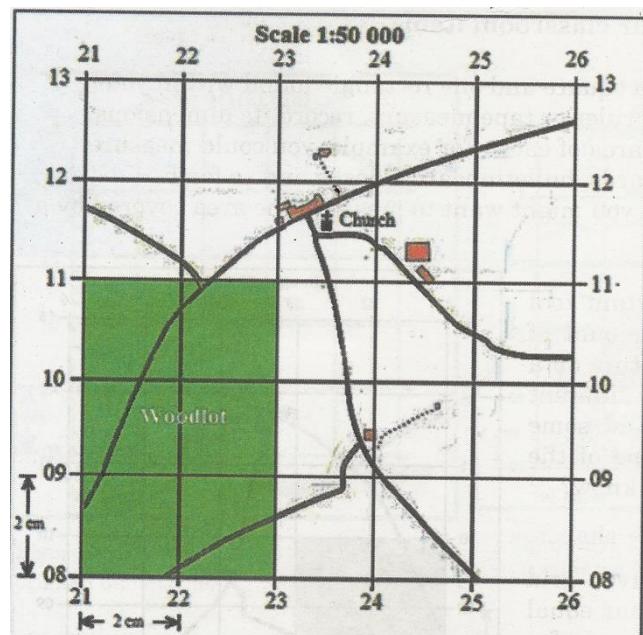
$$\text{No. Of } \frac{1}{2} \text{ boxes} \dots$$

$$\text{Area of map} = \text{Full boxes} + \text{Half boxes Divide by 2}$$

SYMBOLS AND SIGNS

TYPES OF MAP SYMBOLS:

(a) Point symbols:



Shows features such as bridges, building and trigonometrical beacons

(b) Line symbols:

Shows features that are in line form such as roads, railways rivers and power-lines

(c) Area symbols:

Shows close geographical surface features or a forests resource, estate orchard vineyard

Color may be used for this purpose

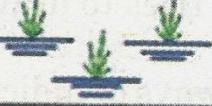
Point	School 	Church 	Bridge 	Borehole 
Line	River 	Road 	Boundary 	Railway 
Area	Built-up Area 	Forest 	Marshes 	Lake 

Figure 41: Some of the Conventional Map Symbols

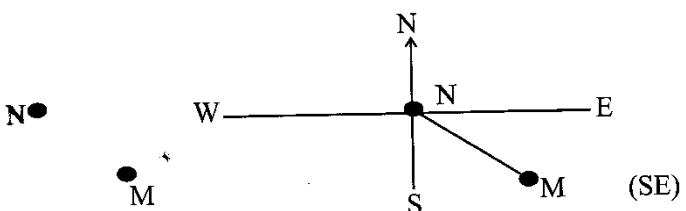
LOCATING OF PLACES & FEATURES ON A MAP

This is done using a **compass direction**

A campus direction uses cardinal points such as North, South, West and East (N, S, E, W)

Example;

What is the campus direction of point marked "M" from point "N"



Firstly draw a perpendicular line on "N" and indicate cardinal points

Secondly draw a line from the side of the perpendicular line to where it meets the feature marked "A" as shown above

TRUE NORTH, MAGNETIC NORTH & GRID NORTH

TRUE NORTH:

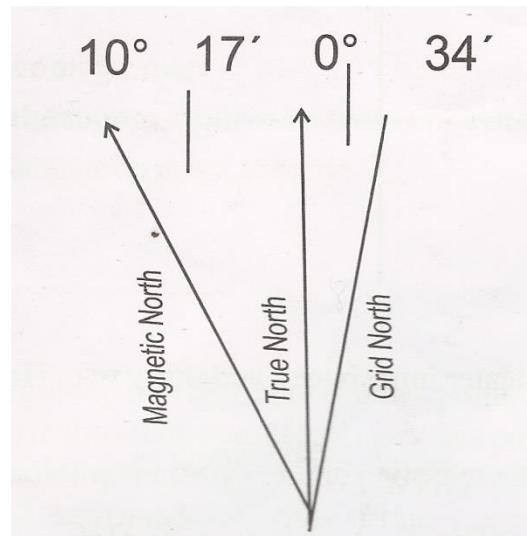
- Its' the direction of the earth's axis of rotation ie North Pole
- It is not important when navigation (travelling) is done

GRID NORTH:

- ✓ Its' the vertical line that run parallel to the Prime Meridian
- ✓ Grid North do not follow true North line because true north follows the earth's curve surface

MAGNETIC NORTH:

- Its' where the magnet needle of the campus always points
- The earth is a giant magnet and it's magnetic field flows from North to South
- It is important in navigation because its' where the campus needle always points
- The three are not the same but they are close to each other
- When the campus direction points to the magnetic north in true sense it is pointing to the North, because the declination angle is too small



BEARING

It is measured clockwise from North to some point around the complete circle (360^0)

PROCEDURE:

1st step: draw a line joining the two places A and B

2nd Step draw a line through the observing feature parallel to the feature

3rd step: place the centre of the protractor over the point where the two lines meets

4th read the bearing on the protractor against the line of the feature being observed

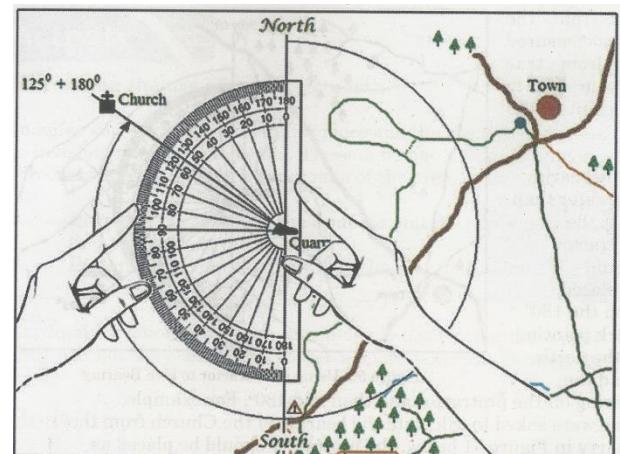
Finding the bearing of "church" from "Quarry"

Place your protractor anti-clockwise against the perpendicular line on "Quarry"

The bearing you find should be added to the total straight line data (180^0)

Example:

$$\text{Say : } 180^0 + 125^0 = 305^0$$



Therefore “church” is located 305⁰ from “Quarry”

GRID REFERENCE

- These are lines drawn on a map running from North to South or West to East
- They create boxes that are useful in locating or identifying features on topographic map
- A feature is normally identified starting with Eastings and ending with Northings

The feature “church” is shown by figures say 2311 from above

Thus “4” figure grid reference

The “L” point of meeting lines of Eastings and Northings represent the feature

When finding the SIX figure grid reference of the feature marked “church” the method is the same only that it is believed that each side of the box has “10” Units (20mm) each unit being represented by 2mm of a ruler (1 unit = 2mm)

The SIX figure grid reference is helpful because it enables one to identify the EXACT location of a feature

THE SOLAR SYSTEM

Success criteria

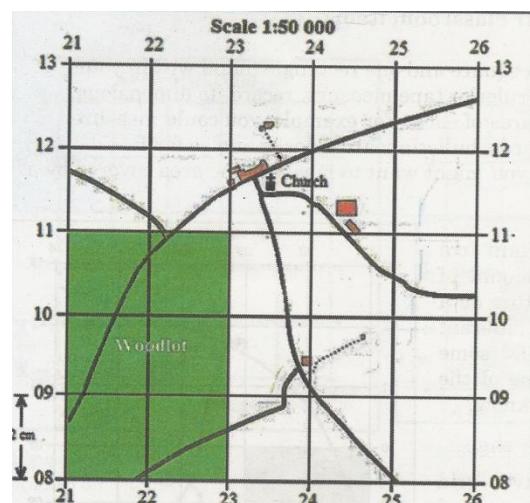
- Explain the term solar system
- Explain new developments related to the solar system
- Relate the position of the earth to the Sun
- Explain the shape of the earth
- Explain movements of the earth
- Explain the results of the movements

The solar system:-

Its’ the sun and the planets surrounding it

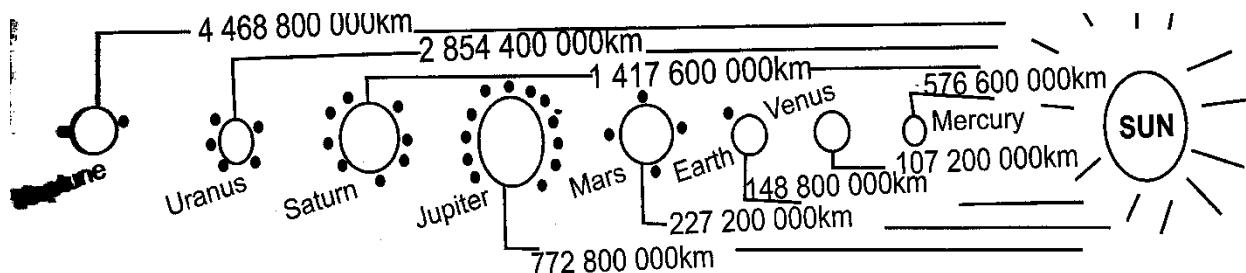
The eight planets orbiting around the sun include :-

- Mercury
- Venus



- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

However the Pluto used to be a planet but has **lost its' status** as a planet because of its' size ie it is too small.



Key

- Moon
- Planet

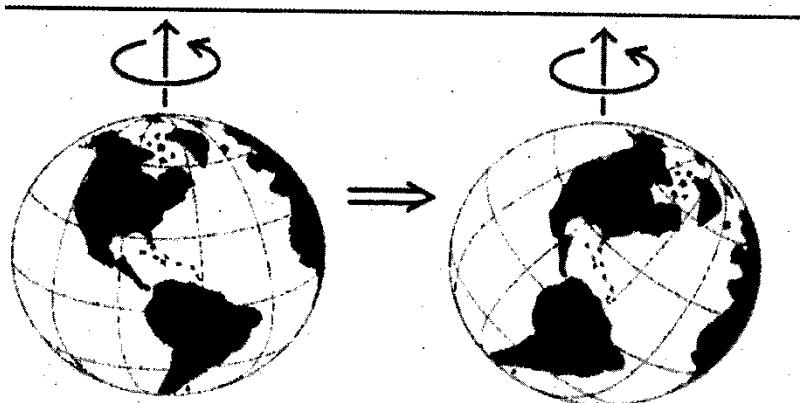
Diagram showing the sun and the planets

NEW DEVELOPMENT IN THE SOLAR SYSTEM

- i. Shifting of the poles
- ii. Inclination of the planets
- iii. Removal of the Pluto as a planet

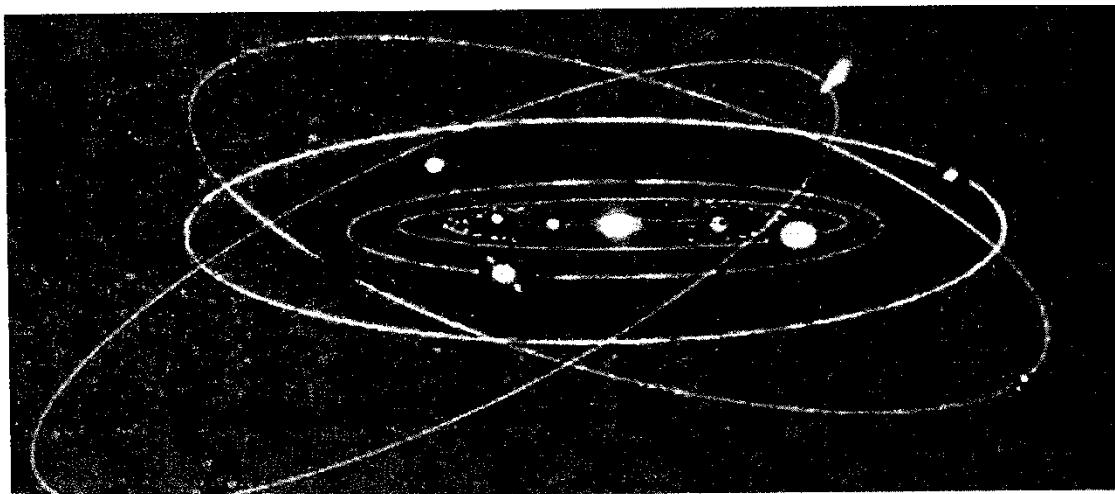
(a) SHIFTING OF THE EARTH'S MAGNETIC POLES

- ✓ The geographic location of the earth North and South Poles have changed due to the molten nature of the Core which has Iron.
- ✓ It is normal for the poles to shift but however the speed matters most.
- ✓ Currently the shifting is faster than before
- ✓ This means that in the near coming future the North Pole would be in the South while the South Pole would be in the North
- ✓ This may happen due to changes in the magnetic field



(b) INCLINATION OF THE PLANETS

- All the planets following elliptical orbits around the Sun
- However all planets do not lie in the same plane but are tilted in respect to each other
- Other planets move in orbits that are more inclined than other
- Orbital inclination is not the same as tilt of a planet's axis to the orbit.



(c) REMOVAL OF THE PLUTO FROM THE LIST OF PLANETS

It was discovered by Astronomers that there were a number of Pluto-like objects floating in the Kuiper belt, hence a doubt of Pluto as a Planet

REASONS FOR CATEGORIZING PLUTO AS A DWARF PLANET

- (1) It cannot clear objects along its' path (orbit)
- (2) There are too many objects of Pluto size to be called planets
- (3) They lack gravitational force to remove objects along its' path

EXAMPLES OF DWARF PLANETS ACCORDING TO SIZE

Eris: the largest and most distanced dwarf planet

Pluto: the second largest Dwarf planet with 3 moons

Makemake: the 3rd largest Dwarf planet

Ceres: revolves between the orbit of Mars and that of Jupiter

Haumea: the smallest of all dwarf planets and revolves rapidly around the Sun

GROUPS OF PLANETS

They are two:-

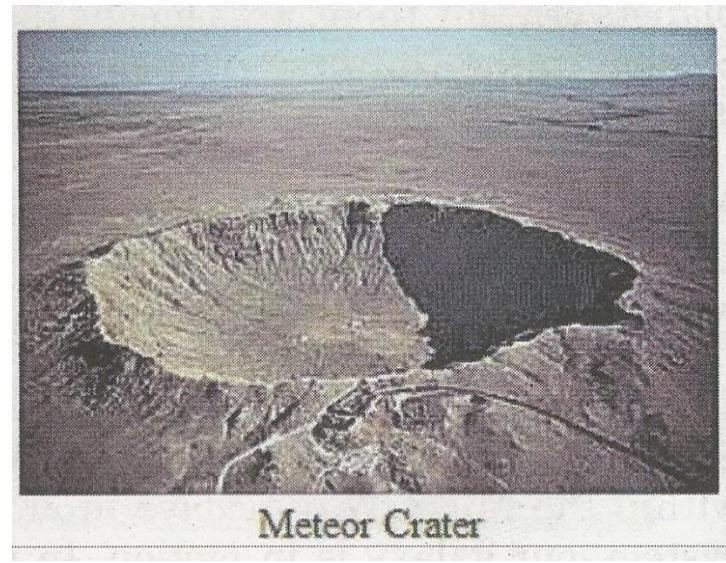
- (1) Inner planets eg Mercury, Venus, Earth and Mars
- (2) Outer planets eg Jupiter, Saturn, Uranus and Neptune

EARTH'S POSITION & LIFE ACTIVITIES

- (a) It receives good amount of heat and light to sustain life
- (b) It has good temperature that support existence of water and water sources (water is life)
- (c) The earth's atmosphere is a source of oxygen which support life
- (d) The earth's atmosphere shields it from ultraviolet radiation from the sun
- (e) The atmosphere acts like an insulator and provides earth with required Nitrogen and carbon

NOTE (FACTS):

- ♣ Saturn is the only planet that has a ring around it
- ♣ Jupiter is the largest planet in the solar system
- ♣ Earth in the only planet that supports life
- ♣ The sun is the largest star near the earth
- ♣ There is a possibility that every star could have its' solar system and a life sustaining planet life earth
- ♣ Shooting stars are Meteors that burns when they enter into the earth's atmosphere
- ♣ Comets are ball of rock floating in the orbits, and often melt and produce a tailed light as they enter into the atmospheric Zone
- ♣ When a big Meteorite fall onto the earth it sometimes create a big depression called a crater



THE SHAPE OF THE EARTH

- The earth is flattened at Poles but bulge at the equator
- The rotation of the earth creates a centrifugal force (pulling force) that pulls objects away from the earth
- However the gravitational force holds objects tightly to it and avoids falling
- Every mass object has gravitation force but however the degree differed on the size of the object, eg our body has a small gravitational force (attraction)

FACTORS AFFECTING GRAVITY

1. Mass of an object: The bigger the mass the more attraction eg the Jupiter has the strongest gravity than the earth due to its' large size
2. Distance of an object / mass : if the distance is closer the gravity becomes much stronger than the object at a distance (far-off)

NOTE:

Our muscle can briefly overcome gravity as we jump the air but we soon come down

EVIDENCE ON SPHERICAL SHAPE OF THE EARTH

(a) Ship visibility:

A moving ship away from the observer appears to be sinking into the water

An approaching ship on the sea appears to be rising from deep (sea) water

However if the earth was flat then the ship wouldn't behave that way (it would just appear and disappear)

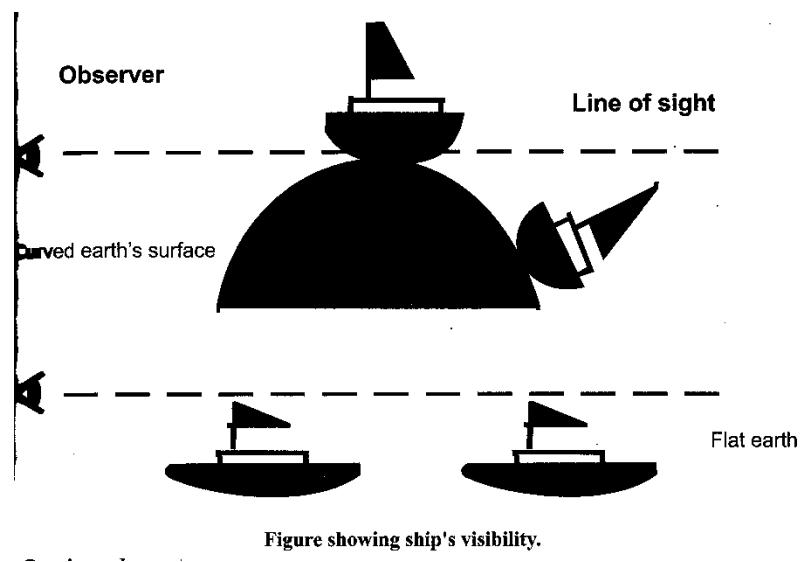


Figure showing ship's visibility.

(b) Aerial Photographs:

Pictures taken from the air space clearly shows that the earth is spherical ie round

(c) Circum-navigation of the earth:

The journey around the earth makes one to come to the same point or position where he or she started

For instance travelling by air towards West would make one to come to the same point but in a different direction ie East

(d) Sunrise and sunset:

Since the earth rotates from the West to the East those on the East see the Sun earlier than those on the Western side

(e) The earth's curved horizons:

Here the earth appears to be touching the sky in the earth's horizons

(f) Eclipse of the moon:

The shadow of the earth that is casted on the moon when the moon is partly blocked appears to be round or curved

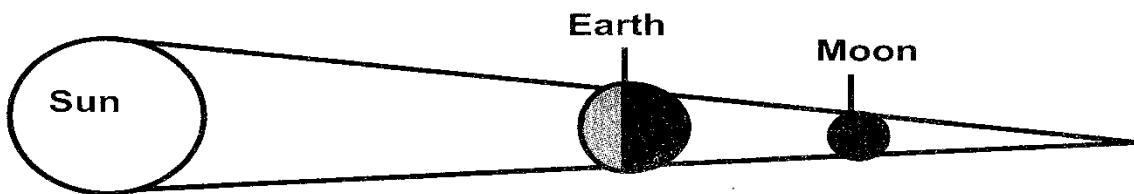


Figure showing the eclipse of the moon

EFFECTS OF THE SHAPE OF THE EARTH

- (a) It result in variation in the heating of the earth surface by the sun hence affects rainfall pattern and its' distribution on the earth which affect human activities
- (b) It is possible to circumnavigate the earth without fear of falling into the dungeon (abyss)

MOVEMENTS OF THE EARTH

They are two:-

- (i) Rotation
- (ii) Revolution

ROTATION OF THE EARTH

Its' the turning of the earth on an imaginary line that passes through the centre of the planet connecting South Pole to North Pole.

It is the spinning of the earth on its' axis once every 24 hours

The axis stands at an angle of $66\frac{1}{2}^{\circ}$ to the orbital plane

RESULTS OF THE ROTATION OF THE EARTH

- (a) It results into sunrise and sunset
- (b) It result into day and night
- (c) It result into deflection of wind and ocean currents
- (d) It result into the different of one hour between meridians that area 15° apart
- (e) It result into the rising and falling of ocean tides everyday due to pull of the moon gravity on oceans

REVOLUTION OF THE EARTH

It's the journey of the earth around the sun on its' orbit, once in every $365\frac{1}{4}$ day

RESULTS OF THE REVOLUTION

- (a) Seasonal changes such as summer, winter, spring and autumn

- (b) Changes in the duration or length of the day and night at different times of the year
- (c) Changes in the position of the overhead sun at different times of the year

THE HYDROSPHERE

Success criteria:

- Explain the term hydrosphere
- Explain the main features and process of the hydrological cycle
- Explain the importance of the hydrological cycle
- Suggest ways of maintaining the hydrological cycle

Hydrosphere:

Its' all water bodies including the atmospheric water vapour

Water bodies caters for over 70% of Land mass on earth's surface

HYDROLOGICAL CYCLE (water cycle)

Water cycle: its' a process under which water renews itself by changing into solid (ice) gas (vapour) and liquid (water)

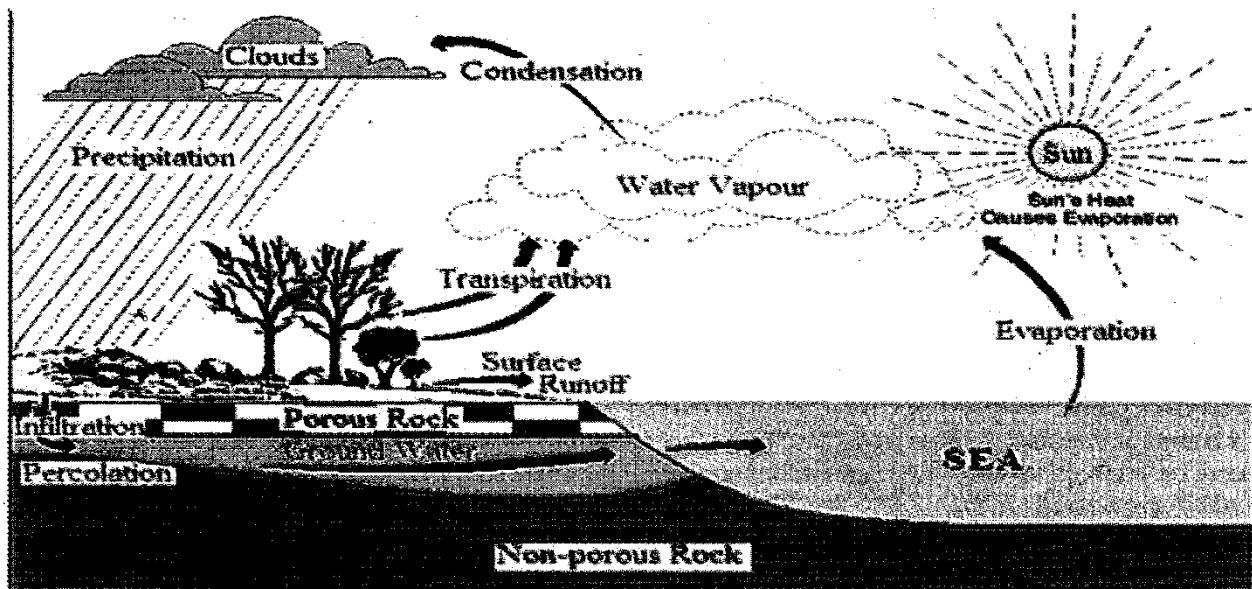
FEATURES & PROCESSES OF THE WATER CYCLE

Features:

- Clouds
- Ground water
- Oceans/ lakes
- Rivers
- Dew/ snow
- Vegetation

Processes :

- ✓ Evaporation
- ✓ Evapotranspiration
- ✓ Transpiration
- ✓ Precipitation
- ✓ Run-off
- ✓ Infiltration
- ✓ Percolation



PROCESSES OF WATER CYCLE

(a) Evaporation:

It's whereby water changes its' state to gaseous form with the energy from the sun

(b) Transpiration:

It's a process whereby water is released into the atmosphere in form of water vapour by vegetation

(c) Condensation:

It's a process where by water changes from gaseous state to liquid in the atmosphere

(d) Precipitation:

Its' a process whereby water droplets fall from the clouds back to the earth surface

(e) Surface run-off:

Its' a process whereby water from different sources flow over the land surface

(f) Infiltration:

Its' a process by which water on the ground surface enters into the soil

(g) Percolation:

Its' the movement of ground water as it reaches saturation level in the earth's surface

WAYS IN WHICH THE HYDROLOGICAL CYCLE IS IMPORTANT

- (1) It provides water in rivers for Hydro-electric power (HEP)
- (2) It provides water for aquatic life like fish which are food to people
- (3) It provides water for the growth of crops
- (4) It provides water for domestic purposes
- (5) It provides water for industrial purposes
- (6) It helps in the purification of water through various processes
- (7) It helps regulate temperature of the land by bringing in a cooling effect after a hot day

FACTORS THAT DISTURB THE WATER CYCLE

- (a) Global warming due to increased accumulation of heavy gases on the earth's surface eg CO₂
- (b) Deforestation that result in reduced evapo-transpiration
- (c) Acid rain that destroy plants, hence reducing evapotranspiration
- (d) Poor farming methods such as overgrazing that result in destruction of vegetation
- (e) Water pollution such as oil spilling on water bodies that reduces evaporation

WAYS OF MAINTAINING THE WATER CYCLE

- (a) Practicing afforestation such as planting trees on bare empty land
- (b) Practicing re-afforestation on places where vegetation has been destroyed
- (c) Reducing oil spilling on water bodies by checking engines
- (d) Reducing air pollution by adopting a modern technology in order to reduce global warming and acid rain
- (e) Avoiding unnecessary drilling that affects the water table and ground water

THE ATMOSPHERE

Success criteria:

- Explain the term atmosphere
- Explain the composition of gases in the atmosphere
- Describe layers of the atmosphere
- Explain the importance of the atmosphere

The atmosphere:

- It's the air that surrounds the earth's surface
- It extends over 560km from the earth's surface

COMPOSITION OF GASES IN THE ATMOSPHERE

- Nitrogen
- Oxygen
- Water vapor
- Carbon-dioxide

NOTE:

However, nitrogen is the largest component with a 78% space, oxygen with 21% and other gases share the remaining fraction

ROLES OF GASES IN THE ATMOSPHERE

Nitrogen:

- Improving soil fertility when fixed into the soil by bacteria
- Nitrogen is also important nutrients for plants used for production of proteins

Oxygen:

- It helps in the release of energy from food molecules by animals
- It is very active in air

Carbon dioxide:

- Used by plants for photosynthesis
- It can absorb sunlight energy which make life possible on the earth

Water vapour:

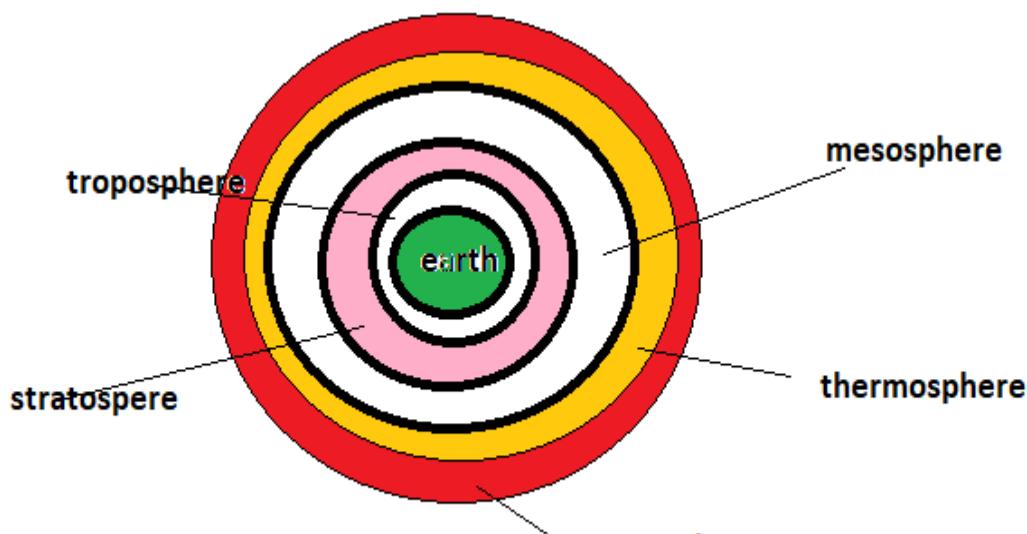
- It is a source of clouds and precipitation
- It can absorb heat from the sun

Ozone-layer (O^3)

It combines three oxygen atoms used to shield earth from ultraviolet rays (radiation) from the sun.

LAYERS OF THE ATMOSPHERE

- Troposphere
- Stratosphere
- Mesosphere
- Thermosphere
- Ionosphere & exosphere



(a) Troposphere
(1st layer)
15km

- It has most gases and has oxygen
- All weather conditions takes place within this layer

(b) Stratosphere: 50 km

- It has a temperature of -2^0C slightly over the troposphere temperature

- The greatest part of the ozone layer is found in it
- It is dry and has clear air (no dust or clouds)

(c) Mesosphere 85km

- It has no vapor, clouds/ dust hence temperature is forced to drop to -92°C
- Meteors normally burn up in this layer

(d) Thermosphere: (500km)

- The temperature is very high over 1200°C due to high energy radiation being absorbed by gases
- It has Ionosphere 80-550km which absorbs X-ray radiation from sun.
- It has also Exosphere which rests above Ionosphere
- Satellites are fixed in this layer to orbit the earth

IMPORTANCE OF THE ATMOSPHERE

- (a) It protects life on earth by absorbing Ultraviolet solar radiation
- (b) It helps warm the earth by returning sun's heat
- (c) It moderates climatic conditions by spreading heat and moisture
- (d) It recycles water and other substances that support life
- (e) It protects the earth from falling meteorites that burn in atmosphere
- (f) It makes flights possible due to presence of air
- (g) It carries sound and picture waves that enhance communication
- (h) It supports plant and animal life by providing oxygen and carbon dioxide

WEATHER & CLIMATE

Success criteria:

- Explain the term weather and climate
- Explain elements of weather and factors that affect them
- Explain factors that affect the elements of weather
- Identify instruments used to measure elements of weather
- Interpret weather data and symbols

Weather:

It's the daily condition of the atmosphere such as windy, cloud cover, sunny and rainy

Climate:

It's the average weather conditions of a place that prevail during different times of the years over a long period of time

ELEMENTS OF WEATHER

- Temperature
- Precipitation
- Wind speed
- Wind direction
- Humidity
- Air pressure
- Cloud cover
- Sunshine

(a) TEMPERATURE

It's how hot or cold something is.

It is measured by an instrument called thermometer

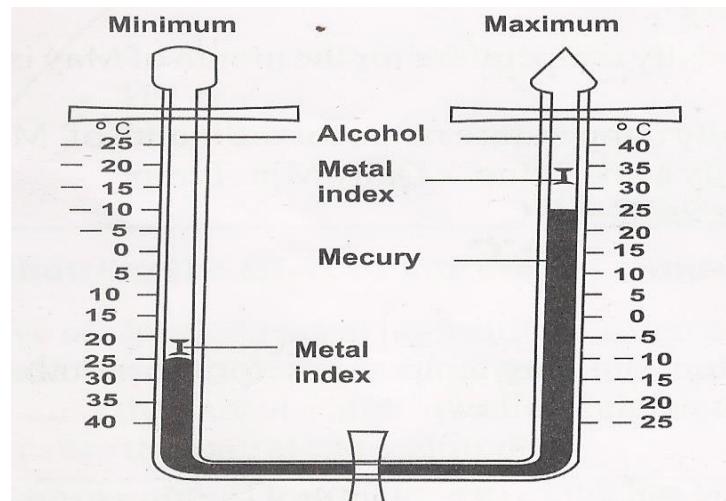
However air temperature is measured by an instrument called Six' Thermometer

It records both the maximum temperature of the day and its minimum

HOW THE SIX'S THERMOMETER WORKS

- ✓ When the temperature of the day rises, alcohol on the left Arm will expand and pushes against the mercury below it.
- ✓ The mercury will then move on the other arm to the right forcing itself up and pushing against the metal index to the right forcing it to rise and record maximum temperature in the case above its 30°C .
- ✓ The alcohol on the right arm will vaporizes into the vacuum space.
- ✓ On the other hand when the temperature drops the alcohol on the left arm will contract giving room (space) for the mercury to move backwards and pushing against the metal index on the left arm forcing it to rise and record the minimum temperature 25°C of the day at the bottom side of the metal index
- ✓ The average temperature of the day is obtained by adding the maximum and minimum temperature then divide the sum by two(2)

$$\frac{30 + 25^{\circ}\text{C}}{2} = 27.5^{\circ}\text{C}$$



However the average monthly temperature is obtained by adding all the daily average and then divide by number of days in a month

Resetting of the Six's Thermometer is done in the following ways:-

- (i) It done by use of a small magnet against the index
- (iii) It can be done by upsetting the Six's Thermometer

FACTORS AFFECTING TEMPERATURE

(a) Sunshine:

More hours of sunshine will increase temperature than less hours

(b) Latitude:

Those places close to the equator experiences higher temperature than places afar

(c) Altitude: (height above sea level)

Higher altitudes have lower temperature than the lower places

(d) Cloud cover:

Cloud cover during the day may bring in cool temperature while during the night it may cause higher temperature

(e) Distance from the sea:

Those places close to the sea may experience lower temperature during a hot day (sea breeze) than those places far away from the sea (however the status of the ocean current may have a different effect)

(f) Aspect:

Those places facing the sun may experience a higher temperature than those places facing away from the sun eg those facing the North or South may have lower temperature than those facing the East or West

WAYS IN WHICH TEMPERATURE IS IMPORTANT

- It determines what to wear over the day
- It controls growth of plants
- It determines precipitation
- It affects wind speed and direction
- It determines rate of evaporation

RAINFALL

It is a form of precipitation

It refers to water falling from the sky

Example of precipitation:

Rainfall, sleet, snow, hail, drizzle

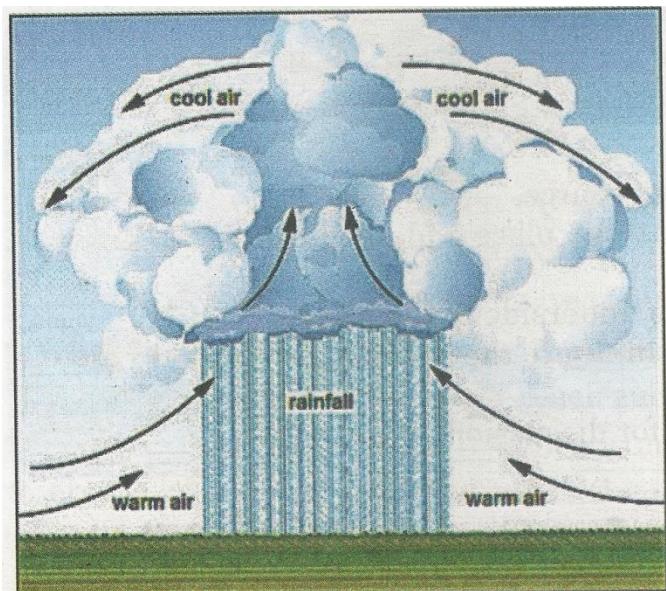
NECESSARY CONDITIONS FOR THE FORMATION OF RAINFALL

- (a) Sufficient evaporation of water from water bodies
- (b) Availability of wind to carry water vapor into the atmosphere
- (c) There should be cooling of water vapor in the atmosphere to condense and result into clouds formation
- (d) There should be a nuclei or dust particle around which rain can form
- (e) Temperature just above the earth's surface should be above melting point

TYPES OF RAINFALL

(a) Convectional Rainfall:

Rainfall that is caused by intense heat of the earth's surface causing warm moist air to rise into the atmosphere where it gets cooled, forming clouds and result into precipitation



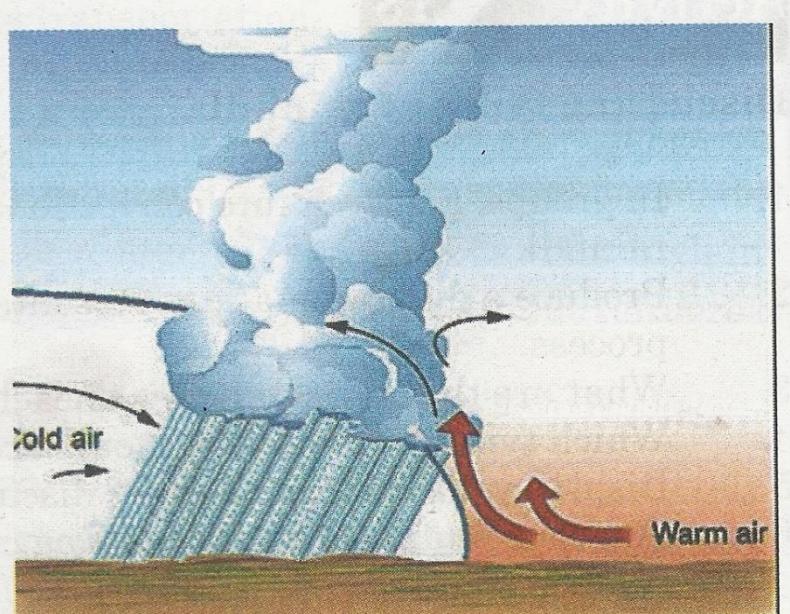
CHARACTERISTICS OF CONVECTIONAL RAINFALL

1. It is associated with heavy thunderstorm and lightning
2. It normally fall for short period of time
3. It is more localized
4. It usually occurs in the afternoon

(b) FRONTAL/CYCLONIC RAINFALL

It is formed when two air masses of different characteristics meets such as cold and warm

The lighter air mass (warm) is usually forced to rise above the cold (heavy) air mass, in this case the warm moist air gets cooled and condenses in the atmosphere to form clouds that fall in form of precipitation (rainfall)



CHARACTERISTIC OF FRONTAL RAINFALL

- It produces cumulonimbus clouds rainfall is usually heavy but for a short period of time
- It is usually associated with storm (cyclones)

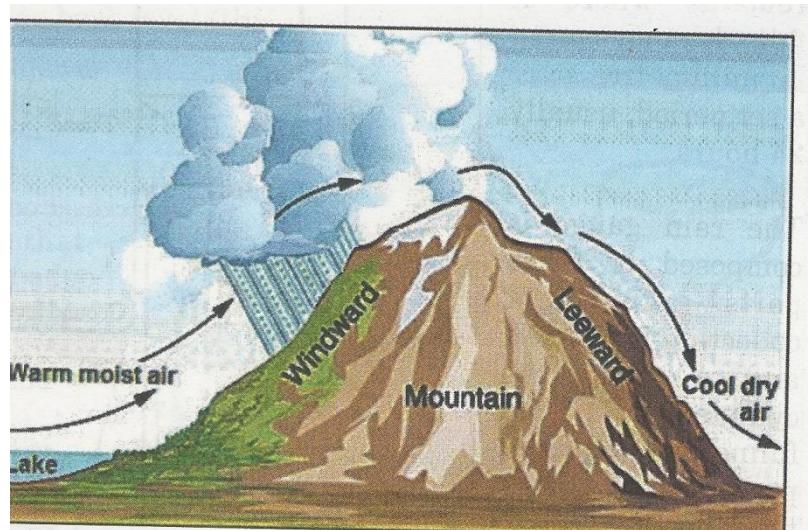
Figure 95 : Frontal Rainfall

- It usually occurs in winter but may still take place anytime

RELIEF / OROGRAPHIC RAINFALL

It is normally formed when warm moist winds blowing across a water body are forced to rise above a relief or mountain

The warm moist wind gets cooled and results in the formation of clouds that later release rainfall on the windward side of the mountain



CHARACTERISTICS OF RELIEF

- It is widespread across different places
- Takes a long duration falling
- It occurs on the windward side

MEASURING OF RAINFALL

It is done using an instrument known as a RAIN-GAUGE

POSITIONING A RAIN-GAUGE

- It should be placed away from tall buildings and trees to avoid water splashing into it which may disturb the readings
- It should be placed 30cm above the ground to prevent splashes of water into the instrument
- The collecting cylinder or bottle should be placed underground to reduce loss of water through evaporation

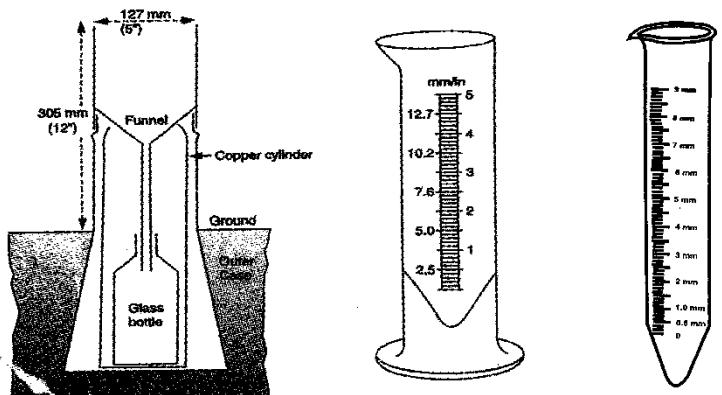


Figure showing the rain gauge.

FACTORS AFFECTING THE DISTRIBUTION OF RAINFALL

(a) Latitude:

Low latitude such as the equator experiences high rainfall due to high rate of evaporation following the over-heat sun

(b) Altitude:

High altitude areas such as mountains experiences high rainfall due to the rising of moist winds that gets cooled and releases rainfall

(c) Nearness to a large water body:

Those places close to the sea on the windward side normally experiences high rainfall than place afar

(d) Prevailing winds:

Those places facing the direction of the prevailing wind experiences high rainfall due to the warm moist air blowing across them

(e) Vegetation:

Place with high vegetation experiences high rainfall unlike deserts

(f) Global warming:

This increases the rate of evaporation on the earth's surface with the rising temperature, which result in increased amount of water vapour in the atmosphere and hence heavy down pouring causing floods

CLOUDS COVER

It's a visible collection of large number of tiny droplets of ice particles being carried by a current of air

CLASSIFICATION OF CLOUDS

It is based on the height of the clouds

(a) Lower level clouds:

- ✓ Stratus clouds
- ✓ Cumulus clouds
- ✓ Stratocumulus clouds
- ✓ Altocumulus clouds
- ✓ Altostratus clouds
- ✓ Nimbostratus clouds

(b) Higher level clouds

- ✓ Cirrus clouds
- ✓ Cirrostratus clouds
- ✓ Cirrocumulus clouds

(c) Clouds of great vertical extent:

- ✓ Cumulonimbus clouds

Symbol	Scale	Cloud cover
○	0 Oktas	Clear sky
○ 	1 Okta	12.5% (sky almost clear)
○ 	2 Oktas	25% cloud cover (scattered clouds)
○ 	3 Oktas	37.5% (sky partly cloudy)
○ 	4 Oktas	50% (sky half cloudy)
○ 	5 Oktas	62.5% cloud cover
○ 	6 Oktas	75% (sky mostly cloudy)
○ 	7 Oktas	87.5% cloud cover
○ 	8 Oktas	100% (sky completely cloudy)

MEASURING OF CLOUDS

It is done on an okta scale

The scale indicates the extend to which the sky is covered

HUMIDITY

- It's the measure of the amount of water vapor in the atmosphere (air) at a given time
- It could be low or high humidity
- If the water holds all the amount of water vapour it is supposed to hold at a given temperature it is said to be SATURATED in other words its' relative humidity is 100%
- For the rainfall to form and clouds to develop, the air is supposed to reach a 100% relative humidity

Warm air has the capacity to hold much more water than cold air since air expand when it is heated hence increases its' capacity to hold more water

MEASURING OF HUMIDITY

It is done using an instrument known as the Wet and Dry Bulb Thermometer (Hygrometer)

The difference in temperature readings between the wet bulb and the dry bulb would indicate the amount of water vapour of the air thus Relative Humidity

Example:

$$\text{Dry Bulb} = 30^{\circ}\text{C}$$

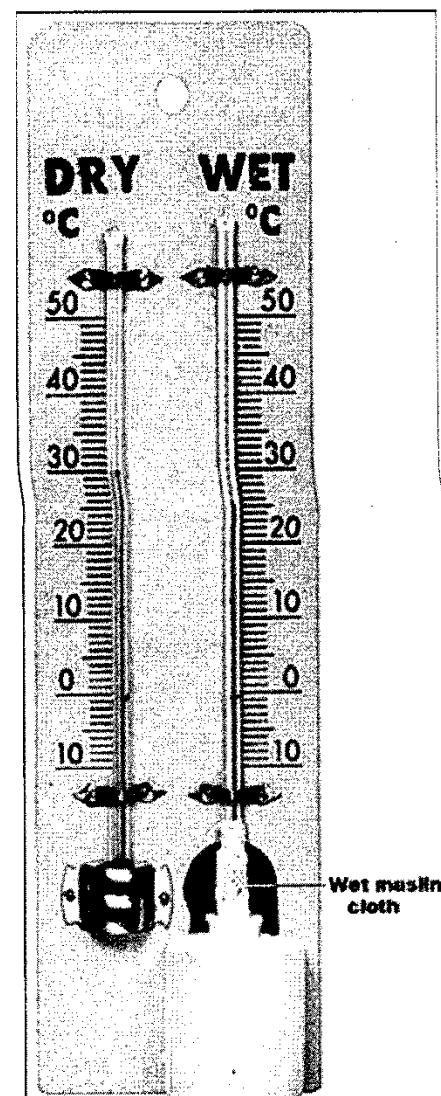
$$\text{Wet Bulb} = 20^{\circ}\text{C}$$

$$\text{RH} = 30^{\circ}\text{C} - 20^{\circ}\text{C} = 10^{\circ}\text{C}$$

$$\text{Relative humidity} = 10$$

If the difference in the two thermometer is small it means the RH is small and the air is too saturated

If the difference is too big it means the RH is high and the air is not saturated (it can accommodate more and more water vapour



The Relative Humidity chart is used to determine the RH of air:

1st step identify readings from a dry as well as wet bulb thermometer

2nd step find the difference of the two readings

3rd step locate the answer found against the readings of dry bulb temperature

In the case above 10 RH would be matched with 39 as the RH

$$30^{\circ}\text{C} - 20^{\circ} = 10 \text{ (39)}$$

Dry Bulb Temperature (°C)	Dry Bulb - Wet Bulb Temperatures (°C)																		
	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20				
2	84	68	52	37	22	8													
4	85	70	56	42	29	26	3												
6	86	73	60	47	34	22	11												
8	87	75	63	51	39	28	18	7											
10	88	76	65	54	44	33	23	14	4										
12	89	78	67	57	47	38	29	20	11	3									
14	89	79	69	60	51	42	33	25	17	9									
15	90	80	71	62	54	45	37	29	22	14									
18	91	81	73	64	56	48	41	33	26	19	6								
20	91	82	74	66	58	51	44	37	30	24	11								
22	91	83	75	68	60	53	46	40	34	27	16	5							
24	92	84	76	69	62	55	49	43	37	31	20	9							
26	92	85	77	70	64	57	51	45	39	34	23	14	4						
28	92	85	78	72	65	59	53	47	42	37	26	17	8						
30	93	86	79	73	67	61	55	49	44	39	29	20	12	4					
32	93	86	80	74	68	62	56	51	46	41	32	23	15	8	1				
34	93	87	81	75	69	63	58	53	48	43	34	26	18	11	5				
36	93	87	81	75	70	64	59	54	50	45	36	28	21	14	8				
38	94	88	82	76	71	65	60	56	51	47	38	31	23	17	11				
40	94	88	82	77	72	66	62	57	52	48	40	33	26	19	13				
42	94	88	83	77	72	67	63	58	54	50	42	34	28	21	16				
44	94	89	82	78	73	68	64	59	55	51	43	36	29	23	18				

FACTORS THAT AFFECT HUMIDITY

(a) Temperature:

Warm air have the capacity to hold more water vapour causing high humidity than cold air

(b) Cloud cover:

It may reduce the capacity of air to hold water vapor due to its' cooling effect

(c) Amount of dust in the air:

If the atmosphere has more dust particles it leads to cooling effect that reduces the capacity of air to hold more water vapor hence less humidity

(d) Wind speed:

High wind speed may increase water vapor as it blows air into the atmosphere

(e) Nature of the underlying surface;

Land surface may have less water vapor than water bodies

AIR PRESSURE

Its' the weight of air pressing down on the earth's surface per unit area

MEASURING OF AIR PRESSURE

It is done by an instrument called Barometer and measured in millibars (mb)

TYPES OF BAROMETER

- (1) Mercury barometer
- (2) Aneroid barometer

MERCURY BAROMETER

When the air pressure is high mercury will rise-up in the glass tube

When the air pressure drops mercury in glass tube will fall down showing a reduction in air pressure

a. Mercury barometer

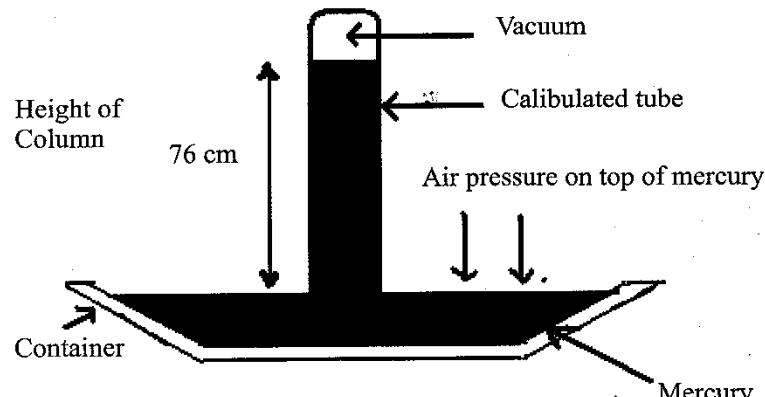


Figure showing the mercury barometer

ANEROID BAROMETER

When the air pressure is high the pointer will be forced to point on the higher side of the scale and when the air pressure drops the pointer will be normal

b. Aneroid barometer

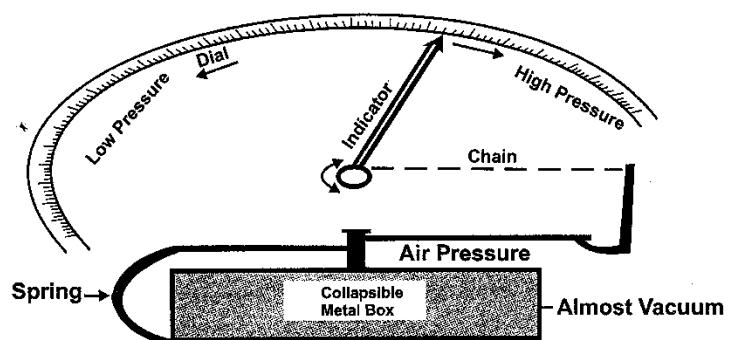


Figure showing the aneroid barometer

Lines drawn on the map joining all places of equal air pressure are referred to as ISOBARS

Air pressure recording helps us to prepare for changing weather conditions

Example;

A drop in atmospheric air pressure would indicate an approaching storm, hence people may need to be indoor

FACTORS AFFECTING AIR PRESSURE

- (a) Changing temperature of the air:

A rise in temperature will reduce air pressure

- (b) Altitude above sea level , the higher the altitude the lower the air pressure

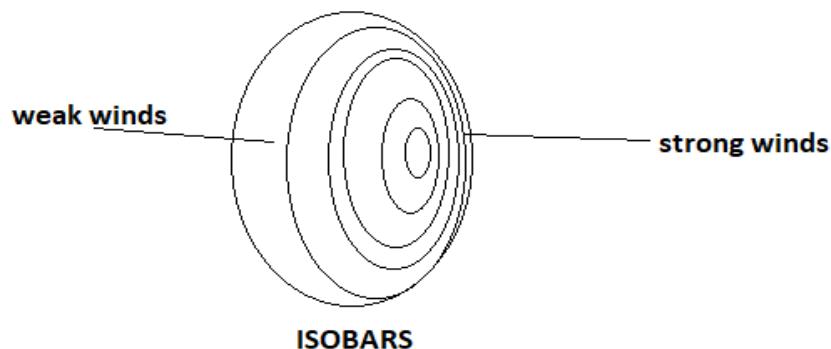
(c) The volume that air takes up

Small volume are associated with high air pressure than large space

WIND:

Wind is air in motion

- ✓ Wind is caused by differences in atmospheric air pressure and blows from a region of high air pressure to a region of low air pressure
- ✓ The change in air pressure with distance is called Pressure Gradient
- ✓ The steeper the gradient the stronger the wind.
- ✓ A steep gradient is associated with closeness of Isobars on a pressure gradient map



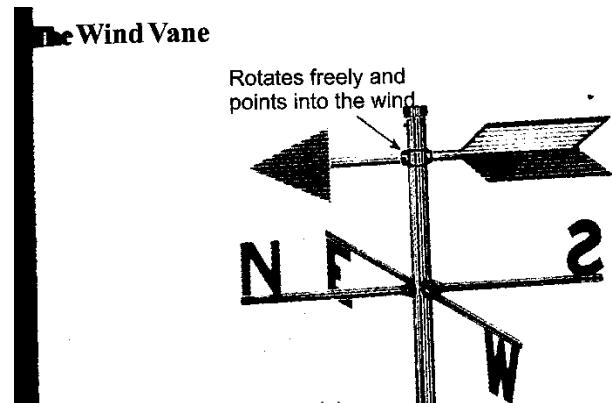
MEASURING OF WIND DIRECTION

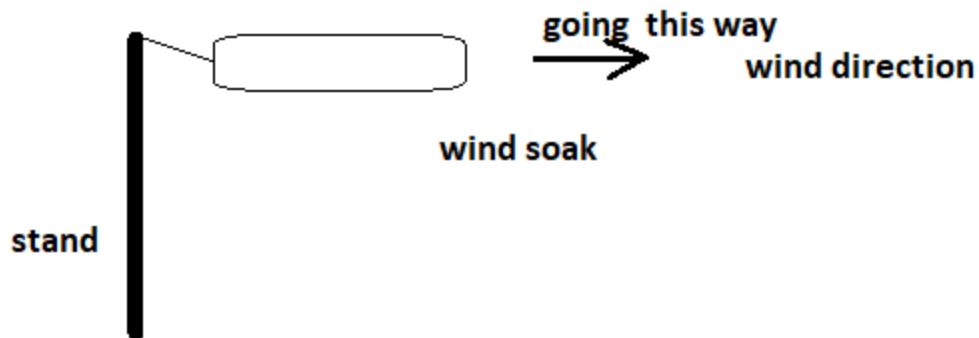
This is done using an instrument known as a WIND-VANE

It can also be measured using a WIND-SOAK

A wind-vane always points the direction of the coming wind while a wind-soak points the direction of the going wind

A wind-soak may also be used to measure the strength of the wind

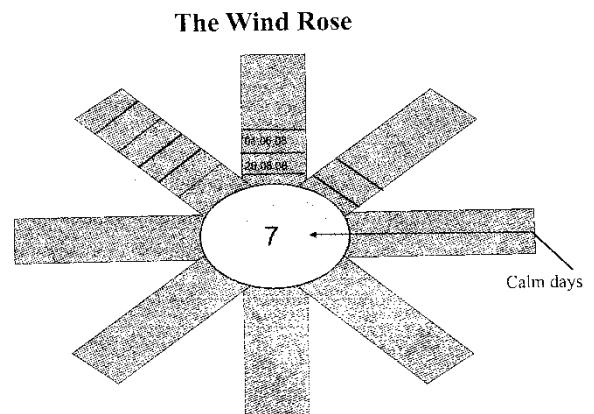




The direction of wind is normally affected by the coriolic force, which forces wind to deflect to the right in the northern hemisphere and to the left in the Southern hemisphere

RECORDING OF WIND DIRECTION

This is done on a chart known as a WIND-ROSE



MEASURING OF WIND SPEED

It done using a "Cup Anemometer"

If the cup rotates faster it means the wind is strong

The speed at which wind blows is indicated on a speedometer

BEAUFORT SCALE

This is an instrument that is used to measure wind by observing its' effects in the environment

See below:

WINDSPEED

The cup anemometer

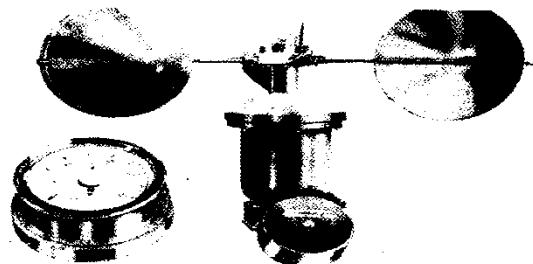


Figure showing the cup anemometer

BEAUFORT NO.	WIND-SPEED	DESCRIPTION	EFFECTS
--------------	------------	-------------	---------

	Km/hr.		
0	<1	calm	Smoke rise
1	1-5km	Light air	Smoke drift
5	29-39km	Breeze air	Small breeze
11	118+ km / hr	hurricane	Falling trees branch

SUNSHINE

It's' the light and heat energy from the sun's rays reaching the earth's surface

All plants need the light energy from the sun

MEASURING SUNSHINE

- ✓ It is done by a **Sunshine Recorder**
- ✓ The amount of sunshine can also be measured in **sunshine hours** which is the number of hours the sky has been cloudless
- ✓ A sunshine recorder is a device that records the duration of sunshine at a given location
- ✓ It has a solid glass sphere which focuses the sun's rays on a card graduated in hours placed behind sphere
- ✓ When the sun is shining and moving across the sky it focuses sunlight burns a line on the card.
- ✓ The length of the burnt line on the card indicates the duration of sunshine
- ✓ The card is changed on daily basis after sunset

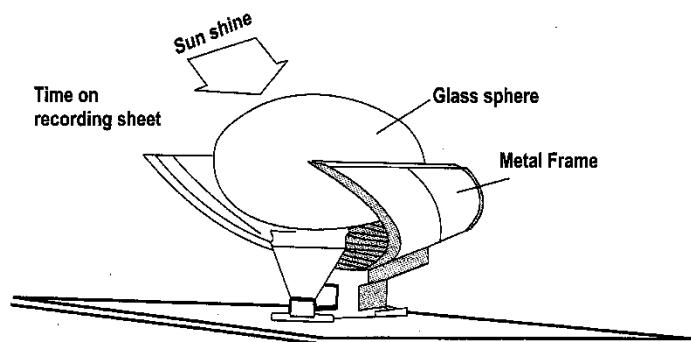


Figure showing the Sunshine Recorder

FACTORS AFFECTING THE AMOUNT OF SUNSHINE

- Amount of dust in the atmosphere
- Cloud cover which may reduce sunshine
- Humidity that tend to absorb sunlight energy
- Latitude where the largest amount of sunshine is recorded along the equator than Poles

WEATHER STATION

Its' a place where weather instruments are kept and used for measuring and recording the elements of weather

INSTRUMENTS FOUND AT A WEATHER STATION

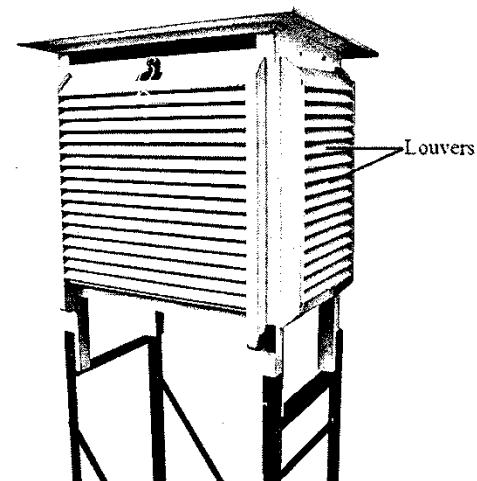
- Rain-gauge
- Cup anemometer
- Wind-soak
- Sunshine recorder
- Wet and Dry bulb thermometer
- Six's thermometer

STEVENSON'S SCREEN

It's a wooden box that is place 1.1m high from the ground where some instruments for recording weather are kept

FEATURES OF A STEVENSON'S SCREEN

- (a) It is made up of wood to prevent absorption and conduction of heat
- (b) It is painted white in order to reflect sunshine
- (c) It stands about 1.1m high to avoid the influence of ground condition
- (d) The sides and floor are louvered to allow free circulation of air and keep off direct sunlight
- (e) The roof is double boarding to prevent the sun's heat from reaching the inside
- (f) The roof is slanting to avoid the accumulation of stagnant rain water
- (g) It is fixed or placed far away from tall buildings or obstructions to avoid any interference



CLIMATE

Its' the prevailing average weather condition of a certain location measured for long period of time

ELEMENTS OF CLIMATE

- (a) Rainfall (precipitation)
- (b) Temperature

FACTORS AFFECTING CLIMATE

- a. Latitude
 - Places close to the equator have high temperature and rainfall
- b. Altitude
 - At high altitude temperature is lower than that of lower altitudes

- c. Closeness to Sea;
Places closer to the sea do not experience extreme temperature than those places afar due to differences in the heating and cooling of the land surface
- d. Nature of the ocean current;
Cold ocean currents may lead to cool temperature than those of warm ocean currents
- e. Distribution of mountain barriers
Places facing the windward side may have high rainfall and cool temperature than those on the lee ward side

CLIMATE OF MALAWI

Malawi has a tropical continental climate (Savanna type)

However the climate varies with temperature distribution ranging from 12⁰C to 32⁰C

The highlands experiences low temperature while the lower Shire and Lake Shore has high temperature

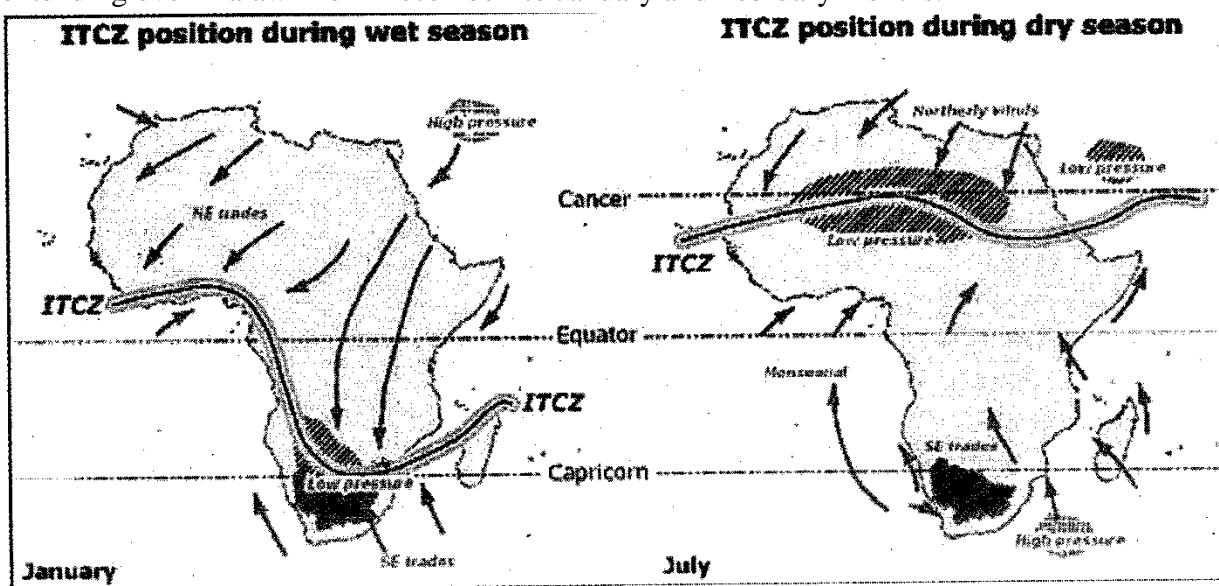
Rainfall too varies with highlands experiencing high rainfall while the low lands have low rainfall

Rainfall ranges from 700- 2,400mm annually with an average of 1,180mm

FACTORS INFLUENCING CLIMATE OF MALAWI

- (a) The Inter-tropical Convergence Zone (ITCZ):

This is a region of low air pressure that pulls along it warm moist trade winds from the North and Southern hemisphere that rises and results into heavy thunderstorm rainfall extending over Malawi from December to January and February months.



(b) Congo air Mass

Its' a body of air mass which is drawn from the South Atlantic Oceans across the Congo Zaire rain forests during warmer months

This air arrives in Malawi via Zambia as moist North Westerly wind bringing in wide spread rainfall

(c) Topography:

The highlands that are facing the windward side such as Nkhata Bay and Viphya Plateau often experiences high precipitation than low laying areas

(d) Proximity to the Lake Malawi:

The lake Malawi has a cooling effect to adjacent highlands but however due to low elevation of the land they tend to have high temperature of an average of 24⁰C

(e) Tropical cyclone:

These are intense low pressure cells that originates from the East to the West bringing rainfall mostly in Southern Malawi

IMPORTANCE OF CLIMATE

(a) It affects the type of dressing that people may desire to wear

(b) It often affects our health for instance high temperature regions are associated with increased bacteria causing diseases

(c) It affects agriculture activities for instance very hot dry conditions may reduce plant growth and affects livestock survival

(d) It may affects tourism industry where some people would wish or prefer visiting places due to their warm summer weather climatic conditions

CAUSES OF CLIMATE CHANGE

(1) Volcanic eruption;

This result in release of dust into the atmosphere causing cooling effect during the day

(2) Movement of some parts of the earth:

These result into mountain building processes that alter climate of a region

(3) Burning of coal and other fossil fuels;

This result into accumulation of heavy gases such as CO₂ which result into the formation of global warming

(4) Deforestation:

This result in to erratic rainfall due reduced amount of water vapor in the atmosphere

(5) Use of chemicals in agriculture activities:

Use of fertilizers, spraying chemicals, among other leads to pollution of the environment and may contribute to green-house effect which leads to climate change

(6) Urbanization;

These are linked to construction of building using concrete cement which affects free evaporation of water from land surface hence contribute to climate change

(7) Rapid population growth:

This often leads to increased consumption of resources such as timber, water resources that may contribute to climate change

EFFECTS OF CLIMATE CHANGE

- (a) Destruction of ecological system as some plants and animals fail to adapt climate change
- (b) Scarcity of food and water resources due to drought conditions
- (c) It leads to increased multiplication of diseases due to high temperature
- (d) It leads to increased weather conditions such as global warming
- (e) It leads to rising sea level due to melting of ice caps
- (f) It leads to reduced water reservoirs due to increased evaporation

EFFECTS OF CLIMATE CHANGE IN MALAWI

- ♣ Prolonged drought conditions
- ♣ Frequent floods especially along the shire river
- ♣ Strong winds that damage crops
- ♣ Landslides in some places such as Phalombe due to heavy deforestation
- ♣ Siltation of rivers due to increased run-off

POSSIBLE SOLUTIONS TO CLIMATE CHANGE

- use of alternative source of energy in order to reduce deforestation
- protecting threatened wetlands and forests
- proper disposal of wastes products
- recycling and re-using some products in order to reduce over extraction of natural resources
- putting in place proper Laws against pollution
- public awareness on effects of pollution

BIOSPHERE

Success criteria:

- Describe the term biosphere
- Identify the components of the biosphere
- Explain the importance of the biosphere
- Suggest ways of maintaining the biosphere

It's a thin zone of land, air and water that is inhabited by living and non-living things on the earth's surface

The zone inhabited by living things extend to a thickness of 20km from the deep oceans to the atmosphere

COMPONENTS OF THE BIOSPHERE

- (a) Lithosphere (land surface)
- (b) Atmosphere (the troposphere ie the lower part of the atmosphere)
- (c) Hydrosphere (all water bodies including the atmospheric water vapor)

WAYS IN WHICH THE BIOSPHERE IS IMPORTANT

- It help maintain water within the hydrological cycle
- It help sustain the components of the atmosphere by providing carbon dioxide for plant growth and oxygen for animals
- Provide shelter for both human beings and animals
- It promotes tourism industry through the natural beauty created by the environment
- Maintains the health of plants as well as animals through by creating a conducive environment for their growth
- They provide medicine to human being from plant materials
- They provide a wide range of raw materials for industrial development

HUMAN ACTIVITIES THAT DISTURB THE BIOSPHERE

- (a) Development or construction of urban places which leads to the destruction of vegetation paving way for construction work
- (b) Use of chemicals in agriculture activities that cause pollution to the environment
- (c) Deforestation that result in increased accumulation of carbon dioxide in the environment
- (d) Recreation and tourism that leads to increased pollution in the natural environment
- (e) Over harvesting through fishing and hunting that leads to extinction of some species
- (f) Production of both domestic and industrial wastes that leads to pollution of the environment
- (g) Mining activities that leads to destruction of plant and animal habitat

WAYS OF MAINTAINING THE BIOSPHERE

- (a) Uses of alternative sources of energy such as solar energy than firewood and charcoal
- (b) Re-using and recycling of trash in order to reduce pollution in the environment
- (c) Avoiding over use of some resources in the environment because it could lead to climate change
- (d) Providing civic education to the people on the dangers of disturbing the environment

- (e) Practicing afforestation and re-afforestation in order to restore the environment
- (f) Providing protection to all threatened wildlife and animals through re-allocation
- (g) Practicing proper wastes disposal to reduce pollution in the environment
- (h) Banning trade in threatened animals and plant matter in order to reduce exploitation

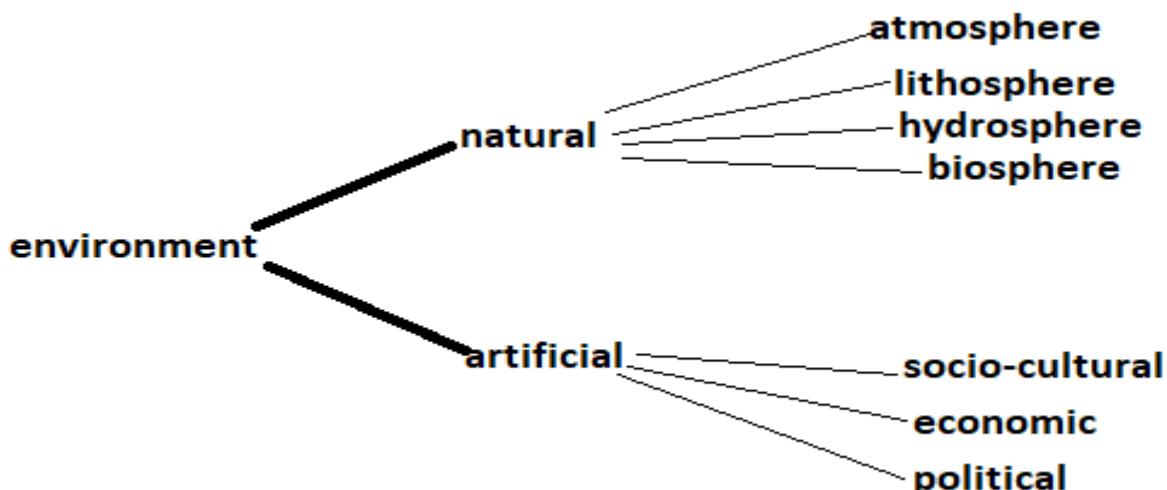
THE ENVIRONMENT

Success criteria:

- Explain the term environment
- Explain how the components of the environment and the earth are related
- Explain the importance of various components of the environment

It's anything living and non-living that surround us

PARTS OF THE ENVIRONMENT



COMPONENTS OF THE ENVIRONMENT

- Land
- Water
- Air
- Plants
- Animals

WAYS IN WHICH VARIOUS COMPONENTS OF THE ENVIRONMENT ARE IMPORTANT

(a) LAND:

- Provides minerals
- Used for agriculture

- Provide building materials
- It is a wildlife habitat
- Used for transportation of goods

(b) WATER:

- Domestic purposes
- Habitat for aquatic life
- Used for irrigation of crops
- Used for industrial purposes
- Used for generation of power HEP

(c) AIR:

- For breathing purpose
- Used for plant growth C₀₂ needed for photosynthesis
- Provides a protective shield against radiation from the sun eg Ozone layer

(d) PLANTS:

- Source of food in form of fruits
- Wildlife habitat
- Provide medicines
- Provide clothing materials
- Helps in providing raw materials for industrial purposes
- Helps in improving the quality of air through gases exchange
- Helps control soil erosion

(e) ANIMALS:

- Provide food eg milk, meat, and eggs
- Provide labour eg ox-curt and oxen
- Provides raw materials in form of manure (dung), hides and wool
- Used for sporting activities and leisure eg horses
- A source of livelihood to Farmers

THE ECOSYSTEM

Success criteria:

- Explain the term ecosystem
- Explain the components of an ecosystem
- Describe factors that can disturb the ecosystem
- Explain ways of maintaining ecosystems
- Explain the importance of the ecosystems

Ecosystem:

Its' a community of plants, animals and smaller organism that live, feed, reproduce and interact in the environment

It is the dependability of living and nonliving things in the environment

COMPONENTS OF THE ECOSYSTEM

They are two:

- (1) Abiotic components
- (2) Biotic components

(a) ABIOTIC COMPONENTS:

(non-living things)

They are in two groups :- (i) Climatic
 (ii) soil

Climatic includes:

- Precipitation
- Temperature
- Light (sunshine)
- Wind
- Humidity

Soil that includes;

- Clay soil
- Sandy soil
- Loam soil
- Gravel/stony soil

(b) BIOTIC COMPONENTS

(living things)

It includes all plants, micro-organisms and animals in the environment

GROUPS OF BIOTIC COMPONENTS

- ✓ Producers
- ✓ Consumers
- ✓ Decomposers

PRODUCERS:

These make their own food from simple materials and in the presence of sunlight eg Plants

CONSUMERS (heterotrophs):

These get their food from others eg human beings and other non-green plants (fungi)

CATEGORIES OF CONSUMERS;

- (a) Primary consumers such as herbivores and human beings (vegetarians)
- (b) Secondary consumers such as carnivores (meat eaters) and omnivores (eat both meat and plants)
- (c) Tertiary consumers such as larger carnivores that eat secondary consumers eg wolves, hyenas, leopards
- (d) Quaternary consumers such as Lions, Tigers, Human beings

DECOMPOSERS (reducers) saprotrophs:

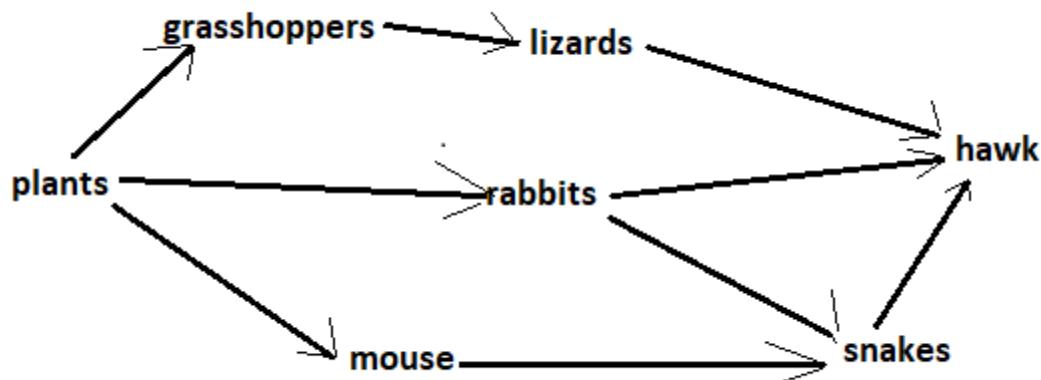
- Get their food from dead animal matter eg Bacteria
- As decomposers feed on dead animals they help in fixing nutrients in the soil needed for plant growth

INTER-DEPENDENCE OF ORGANISMS IN THE ECOSYSTEM

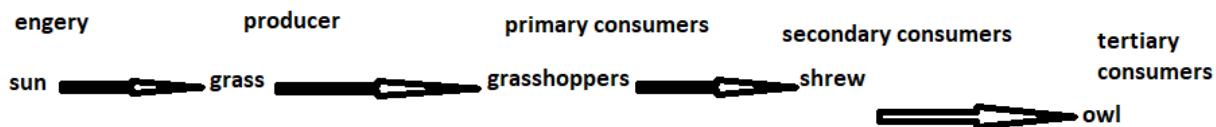
Food web & food chain

Plants relies on rainfall at the same time rainfall needs plant water vapor through transpiration, plants may need CO₂ while human and animals need oxygen generated by plants

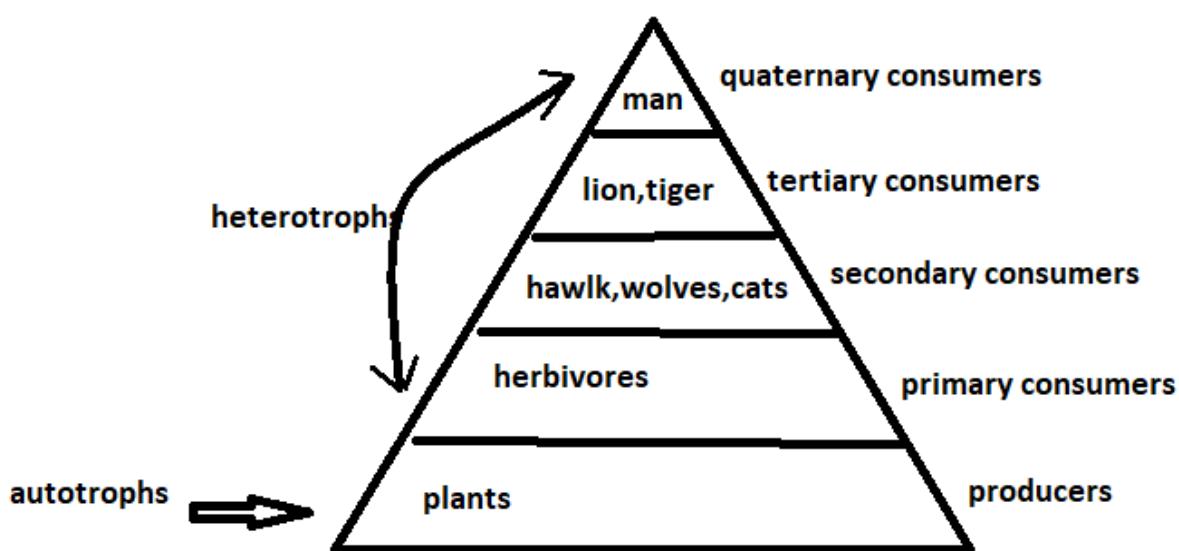
FOOD WEB



FOOD CHAIN



ECOLOGICAL PYRAMID



WAYS IN WHICH THE ECOSYSTEM IS IMPORTANT

- (a) It help provide food such as fruits, maize and fish
- (b) It help regulate climate by proper exchange of gases by green plants which could reduce the effects of global warming
- (c) Reduces flood and run-off for instance vegetation
- (d) Help maintain air quality through proper gaseous exchange by plants and animals
- (e) Helps purify water through the process of water cycle
- (f) Help provide medicine and pharmaceuticals
- (g) Helps reduce erosion of soil by controlling run-off
- (h) Provide recreation opportunities such as camping in forests, mountain viewing etc

FACTORS THAT DISTURBS THE ECOSYSTEM

- (a) Land clearing for both settlement and agriculture activities
- (b) Resource over-exploitation such as over-fishing and cutting down of trees
- (c) Rapid population growth that leads to increased production of wastes
- (d) Increased pollution from industries and motor-cars
- (e) Climate change due to increased accumulation of green-house gases

WAYS OF MAINTAINING THE ECOSYSTEM

- (a) Afforestation and re-afforestation in order to address the situation
- (b) Establishment of wildlife reserve in order to safeguard the environment and its' resources
- (c) Stream, beaches and river clean-up in order to reduce pollution
- (d) Reducing pollution by embarking on recycling program
- (e) Education and awareness program in order to enhance stewardship
- (f) Controlling human population growth through family planning methods

NATURAL RESOURCES

Success criteria;

- Explain the term natural resources
- Explain the different types of natural resources
- Explain how natural resources are being mismanaged in Malawi
- Suggest ways of managing natural resources

Natural resources:

- These are any material that come from the natural environment..
- These are things provided by nature for man's use
- Any material that came from the natural environment and used by man for a purpose

EXAMPLES OF NATURAL RESOURCES

Air, water, sunlight, wind, minerals, soil, wildlife, vegetation, fossil fuels

TYPES OF NATURAL RESOURCES

- Renewable
- Nonrenewable

RENEWABLE RESOURCES

These are resources that can be replaced if they are destroyed used-up in our environment

EXAMPLE:

- Air
- Water
- Plants
- Animals
- Sunlight

NONRENEWABLE RESOURCES

These are resources that cannot be replaced once destroyed or used-up in our environment

EXAMPLES;

- Minerals such as oil, gold, coal, copper, diamond etc
- Fertile soil

WAYS IN WHICH NATURAL RESOURCES ARE IMPORTANT

- (a) They are used for agriculture activities for instance fertile soil
- (b) They provide us with construction materials for instance forests
- (c) They provide us with energy for instance coal and oil
- (d) They provide us with air (oxygen) for gaseous exchange
- (e) They provide us with medicine
- (f) They provide us with food

WAYS IN WHICH NATURAL RESOURCES ARE BEING MIS-MANAGED IN MALAWI

- ✓ Construction of Urban centers on fertile land has led to reduced food production eg Lilongwe city
- ✓ Pollution of air by industrial development has contributed to acid rain that destroy vegetation
- ✓ Deforestation as well as harmful bush-fires has led to loss of important timber and other plant species
- ✓ Extensive mining activities have led to destruction of forests
- ✓ Over consumption of resources by the growing population has led to shortage of resources for the future generations

EFFECTS OF MIS-MANAGING NATURAL RESOURCES

- Declining of quality and quantity of water resources
- Land degradation and food insecurity
- Loss of biodiversity that upsets ecological function
- Increase in disease infection due to changes in various pathogen
- Increased vulnerability to natural disease such as landslide and floods
- Insufficient power generation due to reduced water level in the river

CONSERVATION OF NATURAL RESOURCES

- Practicing recycling of wastes to reduce exploitation of natural resources
- Practicing afforestation in order to restore trees and ecological balance
- Awareness campaign on dangers of causing harm to the environment

- Encourage use of public transport in order to reduce pollution and congestion
- Encouraging fish farming or fish pond

NATURAL DISASTER

Success criteria;

- Explain the term Natural disaster, Disaster, Risk, Hazard, and Vulnerability
- Differentiate natural disaster from natural hazard
- Explain the effects of natural disaster
- Suggest ways of managing disaster

Disaster :

Its' a sudden calamity that disrupt the normal function of a community causing loss to property

Hazards:

Its' anything that has the potential to cause harm to life, health and property

Risk:

Its' the measure of expected losses due to a hazards or to respond when disaster has occurred

Vulnerability:

Its' the inability to withstand a hazard or to respond when a disaster has occurred

CATEGORIES OF DISASTER

- ✓ Man-made disaster
- ✓ Natural disaster

DIFFERENCES BETWEEN NATURAL HAZARDS & NATURAL DISASTER

Natural hazards:

These are natural things that have the potential to cause harm eg earthquake, floods, Tsunami, volcanoes

Natural Disaster:

Its' an event following a natural hazard that may result in damage to the environment

Natural hazard is a **cause** while natural disaster is **an effect** of the hazard in the environment

TYPES OF NATURAL DISASTER

(a) Geological disaster:

- Earthquake
- Landslide
- Volcanic eruption
- Tsunami

(b) Atmospheric disaster:

- Tropical cyclone
- Tornadoes
- Cold weather
- Thunderstorm
- Lightening
- Extreme hot
- Drought

(c) Water related disaster:

- Floods
- Mudslide

(d) Biological disaster:

- HIV/AIDS
- Cholera outbreak
- Ebora and surds

(e) Rapid onset disaster:

- Volcanic eruption
- Earthquake
- Flash floods
- Landslide
- Thunderstorm
- Lightening
- Wildfire

(f) Slow onset disaster:

- Drought
- Insect infestation
- Disease

COMMON NATURAL DISASTER IN MALAWI

(1) Floods especially in lower Shire river

- (2) Drought condition common in Nsanje and Chikwawa
- (3) Earthquake common along the rift valley flow
- (4) Landslide such as the Phalombe disaster of 1991
- (5) Storm cyclone such as the FUNSO that destroyed 450 families and killing others in Nsanje 2015

CAUSES OF NATURAL DISASTER

- Deforestation that leaves land bare exposing it to run-off
- Overcrowding that leads to death of many people if an earthquake or disaster occurs
- Construction of roads and infrastructure on land prone to slide or volcanic eruption
- Air pollution that leads to global warming
- Poor agriculture practices such as shifting cultivation

EFFECTS OF NATURAL DISASTERS

- (a) Contamination of water due to damage of sewers
- (b) Disease out-break due to use of contaminated water
- (c) Disruption of transport system due to wash away of bridges and roads
- (d) Loss of government money due to maintenance work on damaged property
- (e) Death of people caught unaware by the disaster
- (f) Food insecurity due to drought conditions

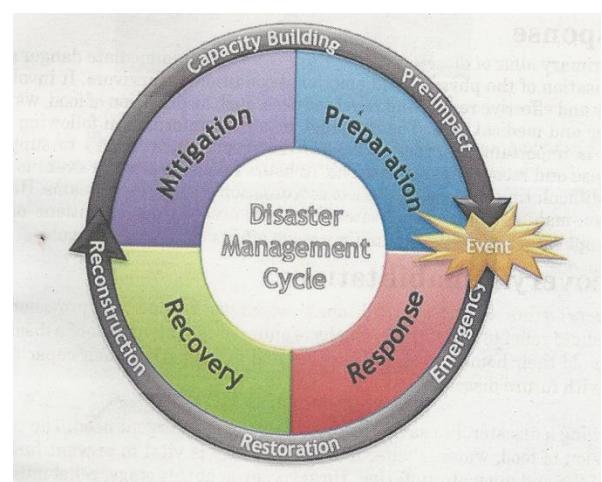
WAYS OF MANAGING DISASTER

- Its' a way of addressing an event that has the potential to seriously disrupt the social structure of a community
- Its' organizing and using resources properly until such a tie when the community situation stabilizes

DISASTER RISK MANAGEMENT CYCLE

Its' in four phases:

- a. Prevention /mitigation
- b. Preparedness
- c. Response
- d. Rehabilitation/ reconstruction



PREVENTION /MITIGATION

- (a) Hazard identification and risk assessment;
This would help in making informed decision to prevent damage

- (b) Education and public awareness of natural hazard risk which would help people know what to do when a disaster strikes
- (c) Technology transfer such as construction of dykes and early warning signs to prevent damage
- (d) Construction of Strong infrastructure that would withstand the natural hazard

PREPAREDNESS / READINESS

It's a process of ensuring that the community is ready to contain the effect of the disaster eg providing rescue, relief, rehabilitation and other services

RESPONSE (most critical)

Rescue from immediate danger and helping survivors to be stable

It involves timely affective rescue and relief services, shelter, medical care and provision of food staff

RECOVERY / REHABILITATION

It involves rebuild of homes and strengthening the capacity of the community to cope with future disaster

PREVENTION & MANAGEMENT OF DISASTER

(a) FLOODS:

It's a temporary overflow of water from river or lake into a dry land

Prevention/ Mitigation:

- Build raised houses in flood prone areas
- Implement afforestation initiative
- Construct embankment or dykes
- Encourage people to stay up-land

Preparedness:

- Identify a safer place for evacuation
- Stockpile food, water, shelter and medical supplies
- Provide civic education
- Identify and train volunteers to respond quickly to the disaster

Response:

- Assist in carrying out search and rescue operation for victims
- Evacuate survivors to safer places
- Take injured people to hospital
- Provide civic education

Recovery:

- Provide psycho-social support to the traumatized
- Mobilize resources for rehabilitation such as building materials
- Create employment and livelihood opportunities
- Encourage agro-forestry and afforestation program

DROUGHTS:

It's a prolonged period of extreme dry weather that may cause crop failure

Mitigation/prevention:

- Growing drought resistant crops such as cassava
- Practicing irrigation farming
- Diversification of livelihood opportunities
- Promoting afforestation
- Promoting use of energy saving technology
- Practicing water harvesting

Preparedness:

- Stockpiling food, water, and farm inputs
- Detecting early warning signs and communicating to members of the community
- Providing civic education on effects of droughts
- Use early maturing crops
- Planting early
- Promoting village savings and loan

Response:

- Distribute maize seeds to plant in dambos
- Monitoring the distribution of relief items
- Start drip irrigation through borehole
- Create employment opportunities

Recovery:

- Provide psycho-social support to traumatized
- Implement afforestation
- Intensify irrigation system
- Mobilize resources for rehabilitation
- Sensitize people to plant early maturing crops and varieties

EARTHQUAKE

Its' the sudden vibration or shaking of the earth's surface

Mitigation/ Preparedness;

- Heavy items should not hang over-head
- Don't build houses in places that are prone to earthquake
- Provide civic education on hazards of an earthquake



Preparedness:

- Find a secure place of hiding from the hazard
- Design buildings with reinforcement tools
- Stockpile food, water, shelter
- Have emergency means of transportation eg a bicycle or ox-cart

Response

- Stay away for potentially falling objects
- Protect yourself with mattress or blanket
- Construct temporary shelter to stay in during emergency

Recovery:

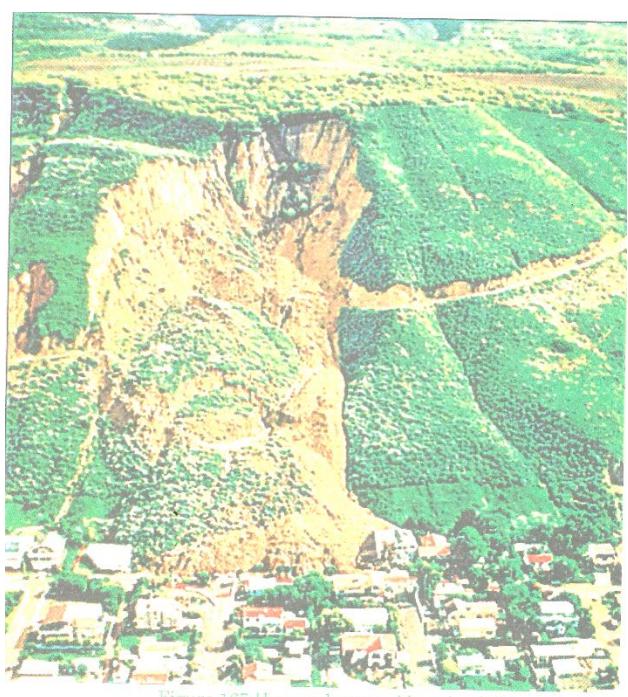
- Provide psycho-social support to the traumatized
- Reconstruct damaged houses
- Mobilize resources for rehabilitation

LANDSLIDE:

Its' the mass movement of rocks, debris or earth down slope

Mitigation (prevention)

- Practice proper agriculture methods



- Avoid building of house in places that are prone to landslide
- Provide civic education
- Plant trees and vertiver grass to stabilize soil
- Refill pits after a mining activity
- Divert streams before they reach a landslide prone area

Preparedness:

- Identify a safe place for construction work
- Construct proper run-off canals
- Stockpile food, water and medical supplies
- Have an emergency means of evacuating people in times of emergency
- Avoid deforestation
- Construct retaining walls

Response:

- Evacuate to safe places
- Provide emergency shelter
- Allocate relief items to victims
- Take injured people to hospital
- Carry-out research and rescue of survivors

Recovery:

- Provide psycho-social support to victims
- Create employment opportunities
- Reconstruct and rehabilitate damaged infrastructures
- Mobilize resources for rehabilitation

STORM/CYCLONE

It's a violent weather condition with winds of 89km/hr accompanied by precipitation, thunder and lightening

Mitigation/ prevention:

- Build houses with great roof slopes $30-45^0$ angle
- Plant trees around houses and fields as wind break
- Encourage proper land husbandry
- Have by-laws against cutting trees unnecessary
- Construct roofed animal kraal

Preparedness:

- Identify a safe place for evacuation

- Stockpile food, water, shelter
- Provide education on water and sanitation
- Disseminate early warning signs to people
- Clear your buildings of loose materials that may cause injury

Response:

- Assist in carrying out search operation for survivors
- Evacuate survivors to safe place
- Disconnect all electrical appliances
- Take injured people to hospital
- Provide civic education on dangers of storm hazards

Recovery:

- Provide psycho-social support to traumatized
- Mobilize resources for rehabilitation of buildings
- Create employment and livelihood opportunities
- Encourage agro-forestry program

POPULATION

Success criteria:

- Explain the term population
- Describe the composition of the population of a given area
- Analyze the population composition of a given area
- Explain population composition at district and regional levels according to where the school is located
- Explain the meaning of the term population distribution
- Describe factors that determine population distribution in a given area
- Explain how population distribution influences allocation of resources
- Explain the meaning of the term population density
- Describe factors that influence population density in a given area
- Explain the effects of population density on resource
- Explain the meaning of the term population growth
- Explain factors that influence population growth
- Explain the impact of population growth on the family and environment

Population is the total number of people living in a particular area at a given time

WAYS OF DESCRIBING POPULATION

It can be done in three ways:-

- Composition
- Density
- growth

POPULATION COMPOSITION

It refers to the characteristics of a group of people in terms of age, sex, ethnic, occupation and religion

The age-sex structure can easily be seen on the population pyramid

A population pyramid helps an individual to have knowledge of distribution of population in the population cohort age

A cohort may lose population through (i) death (ii) migration

SHAPES OF POPULATION PYRAMID

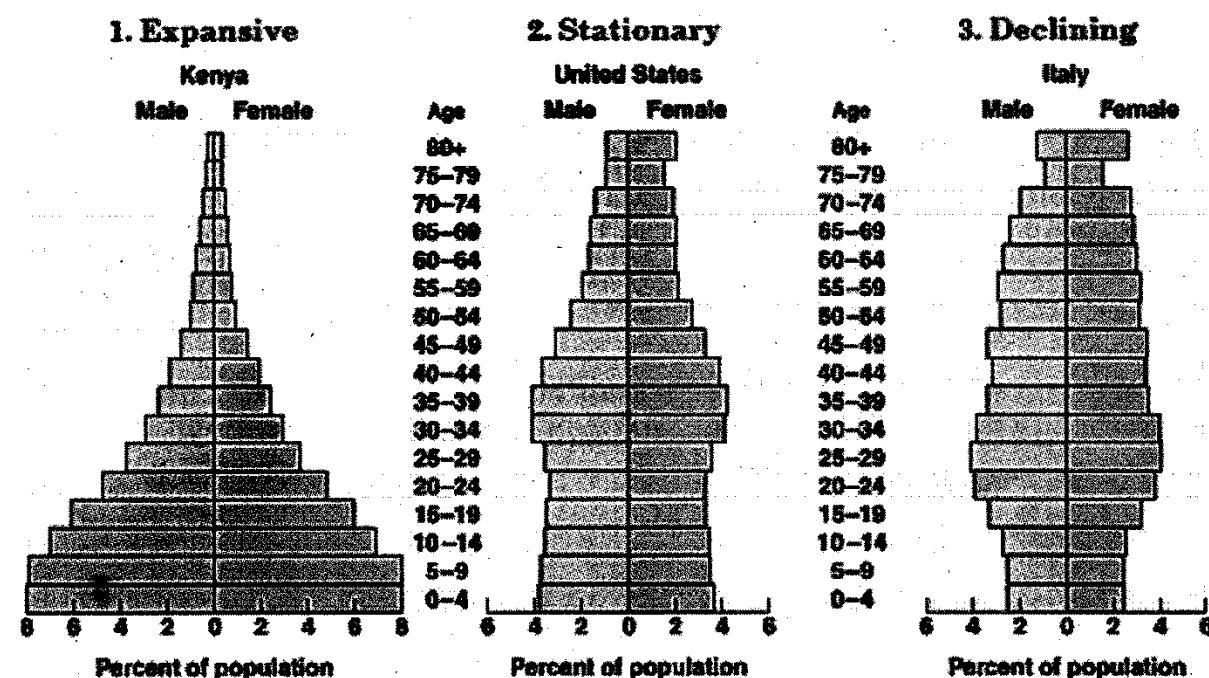


Figure 16.7. Population pyramids.

(a) Expansive population pyramid:

- it has a broad base but a narrow top
- more birth and more death

(b) Stationer population pyramid:

- it has a narrow base but equal distribution in each age group or cohort

(c) Declining population pyramid:

- it has a small base wider in the middle and stay wider until top-off

REASONS FOR EXPANSIVE POPULATION PYRAMID

- (a) Death due to poor health service
- (b) Too many children born due to lack of birth control methods
- (c) Dependence on subsistence agriculture that results in increased number of children to be used as a source of labour
- (d) Poor standard of living that contributes to short life span
- (e) Lack of social security of the aged people

REASONS FOR STATIONARY POPULATION PYRAMID

- (a) Less birth due to high education level leading to more time spend on school and work
- (b) Improved health services due to advancing medicine
- (c) Improved standard of living such as good nutrition, education and employment

EFFECTS OF POPULATION AGE/SEX COMPOSITION

Youthful population:

- (a) More money needed to build school and train teachers
- (b) More money to spend on under-five clinics and immunization
- (c) High tax on a few working people
- (d) Slow development since more resources directed to catering for school children

EFFECTS OF POPULATION AGE/SEX STRUCTURE TO DEVELOPED COUNTRIES

- (a) More money spend on caring for elderly people through pensions and health care services
- (b) There are few workers to fill all the job vacancies
- (c) It may result in reduction of off revenue collection as some stop working due to age
- (d) There is more need for money to support the elderly people in society than the number of workers themselves

SOLUTION TO THE PROBLEMS IN DEVELOPED COUNTRIES

- (a) Use of advanced technology such as automation in industries
- (b) Expenses of young people is greatly reduced as they turn into adult workforce
- (c) High standard of living and advanced health services help people live longer and continue providing their skills to the social services

POPULATION DISTRIBUTION

Its' a pattern of where people live

FACTORS AFFECTING POPULATION DISTRIBUTION

(a) Relief:

Many people prefer staying along fertile rivers rather than mountains

(b) Moderate climate:

This attracts more people than extreme weather conditions such as hot or cold

(c) Government policy:

Resettling people by the government may have a bearing on population distribution

(d) Political stability:

A country or place free from war may attract more people than a warring country

(e) Natural hazards such as region of volcanic eruption may discourage settlement in such regions

HOW POPULATION DISTRIBUTION AFFECTS RESOURCE ALLOCATION

(a) Population size:

Those places with a large population may demand more resources for survival than that with less number of people

(b) Age of the population:

More resources are demanded in a youthful population than a more mature population

(c) Gender of the population:

Population with more women would demand more resources to cater for the growing children and babies

POPULATION DENSITY

It's the number of people living per unit area of land

It's the number of people living per square kilometer

Calculating density:

Population density = total number of people living in an area

Land size area

Calculating density of data below

COUNTRY	POPULATION	LAND AREA Km ²	DENSITY Km
P	129,194,224	1133,910	
Q	275, 562,673	9,154,760	
R	32.207	160	
S	16,388,600	118,484	

FACTORS THAT MAY LEAD TO LOW DENSITY

(a) Extreme climate such as too cold or too hot

- (b) Extreme relief such too high or too steep
- (c) Extreme remoteness such as those places that are not accessible
- (d) Infertile soil which discourages cultivation of crops
- (e) Arid conditions such as deserts

FACTORS THAT MAY PRODUCE HIGH POPULATION DENSITY

- (a) Moderate climate make settles to be attracted hence leads to high density eg Europe
- (b) Fertile farming land, may support a large population with food
- (c) Low-land places may attract easy construction work hence lead to high population density
- (d) Good water supply may attract individual development which brings in high population
- (e) Wealthier countries may attract more people than poor countries
- (f) Poverty too may lead to high population where children are regarded as a sources of labor

POPULATION DENSITY AND RESOURCES

- It leads to deforestation as people demand firewood or timber
- It leads to polluting of land, air and water resources due increased consumption of resources
- It leads to environmental degradation due to cultivation on steep slope
- It leads to scarcity of some important resources due to over exploitation

GROWTH OF POPULATION

It has both negative and positive change of an area overtime

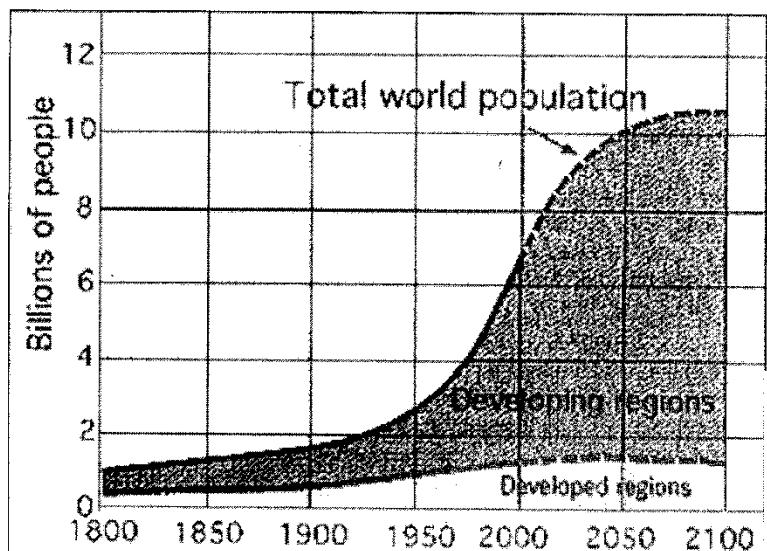
POPULATION EXPLOSION

Its' the rapid growth in population size

FACTORS INFLUENCING POPULATION GROWTH

- (a) High birth rate especially among poor families
- (b) Low death rate especially following improved medical facilities
- (c) Immigration of people into an area

NOTE:



When birth rate and immigration exceed death rate and emigration the population will grow

CALCULATE POPULATION GROWTH

Birth = 4,179,000

Death = 2,162,000

Immigration = 853,000

Emigration = 160,000

Population growth= 2,710,000

CRUDE BIRTH RATE

It's the total number of children being born per 1,000 women within the child bearing age

$$1000 \times \frac{\text{number of birth for a year}}{\text{Total population}}$$

EXAMPLE:

If a country had 10 million residence with 30,000 birth in 2012 the birth rate will be calculated as follows

$$\frac{30,000}{10,000,000} \times 1000$$

Crude birth rate would be = 13

REASONS FOR HIGH BIRTH RATE IN DEVELOPING COUNTRIES

- (a) Give high birth believing that some children may die
- (b) Large family a source of labour
- (c) Children are a form of social security
- (d) Lack of access to family planning
- (e) High illiteracy due to early school drop-out and early marriage
- (f) Reduced malnutrition and increased food production leading to less death
- (g) Improvement in health facilities and medicines that has prolonged life

REASONS FOR LOW BIRTH RATE IN DEVELOPED COUNTRIES

- (a) Children considered expensive to care for
- (b) More women highly educated and working hence no time for child bearing
- (c) Increased sexual equality hence no abuse of each other's sexual rights
- (d) Access to contraceptives

PROBLEMS OF POPULATION GROWTH

Family:

- (a) It leads to food shortage
- (b) It leads to over-crowding in homes
- (c) It leads to shortage of land for crop cultivation
- (d) It leads to shortage of jobs and may cause poverty in family

Environment:

- (a) It may lead to deforestation due to need of firewood
- (b) It may lead to environmental degradation due to need to cultivate crop which may be done on steep slopes
- (c) It may lead to land, water and air pollution
- (d) It may lead to pressure on social service facilities

WAYS OF CONTROLLING RAPID POPULATION GROWTH

- (a) Establishment of laws against high fertility rate eg one child policy
- (b) Encourage the use of contraceptives
- (c) Raise the cost of living to discourage child birth
- (d) Encourage girl child education

REASONS FOR CONTROLLING POPULATION GROWTH

- (a) It improves access to quality health services and education
- (b) Reduced energy and food consumption hence reduced pollution
- (c) It helps government cut down on expenditure to serve a large population

TERMINOLOGIES

Birth rate:

- Its' the average number of children born per 1,000 women within the child bearing age

Death rate;

- Its' the average number of people or children living per 1,000 people who die within an area

Migration:

- Its' the going into and out of people in a country

Immigration:

- People coming into a country to visit or stay

Emigration:

- Its' people leaving the country for other places

END OF FORM 1 WORK

FORM 2 WORK

LONGITUDE AND LATITUDES

Success criteria;

- Distinguish a line of latitude from a line of longitude
- Explain the uses of lines of latitudes and lines of longitudes

Longitudes:

There are angular measurements in degrees on a map north or south of the Equator

IMPORTANT LONGITUDES

- a. Prime meridian
- b. International date line

LATITUDES

These are angular measurements in degrees on a map east or west of the Prime meridian (see below)

IMPORTANT LATITUDES

- a. Equator
- b. Tropic of Cancer
- c. Tropic of Capricorn
- d. Arctic circle
- e. Antarctic circle

Note.

- Latitudes are parallel
- Longitudes are parallel at equator and meet at poles
- Longitudes are also known as meridians
- The Prime Meridian is also called Greenwich meridian and time is expressed as Greenwich Mean Time .

USES OF LINES OF LONGITUDES

- ♣ Help in calculation of time since longitudes 15° apart are said to have a difference of 1hr
- ♣ They help in locating places on a map using degrees, minutes and seconds e.g. $380^{\circ} 53' 23''$ N
- ♣ They help navigators to find shortest distance along the globe
- ♣ They help in calculating distance between places while at equator longitudes are 111Km apart and at 45° N/S they are 79Km

Uses of Latitudes lines

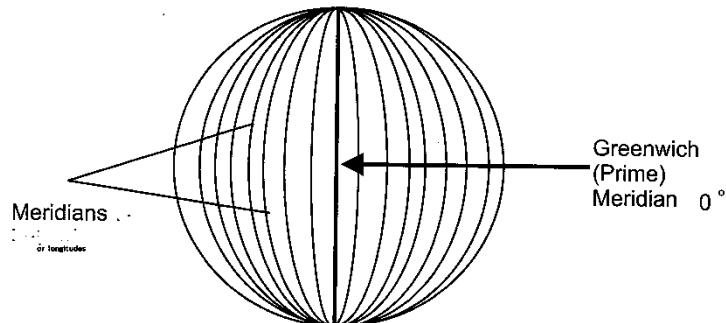
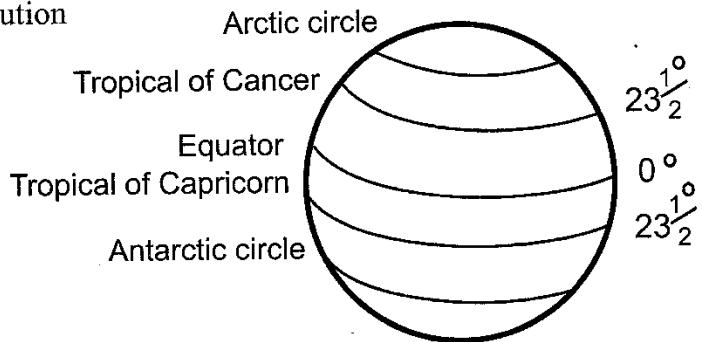


Figure showing Meridians of Longitude



$23\frac{1}{2}^{\circ}$
 0°
 $23\frac{1}{2}^{\circ}$

- a. Defining climates pattern e.g. higher Latitudes are Cold
- b. Locating places on earth together with longitudes to be more precise e.g. 37° (Latitudes) 23° Longitudes (37° N 23° E)
- c. Setting position of border lines on a map 49^{th} latitude of USA and Canada
- d. Estimating distance between places for instance the distance of each Latitude is 111Km away from each other representing 1° there-fore 20° N/S would be $111\text{km} \times 20^{\circ} = 2220\text{Km}$ from equator

Note:

- ♣ All meridian are great circle and the equator is the only great circle on latitude lines
- ♣ All great circle divide the earth into two equal halves
- ♣ The great circle represent the shortest distance around the globe
- ♣ The global positioning system (GPS) device used by surveyors to locate the position of places on earth uses signals from satellites

TIME ZONE

Success criteria:

- Explain a time zone
- Explain why time zones were created
- Calculate time for different countries
- Explain the importance of using standard time
- Explain the importance of using standard time
- Explain the importance of the international date line

It's a region on the earth that has adopted the same time

Each time zone extends over 15° (thus 1 hour time) hence, 24 time zones (representing 24 hours) across the global

All places within the same time zone have the same local time.

REASONS FOR TIME ZONE

They have been created to standardize time and avoid confusion when telling time

Note:

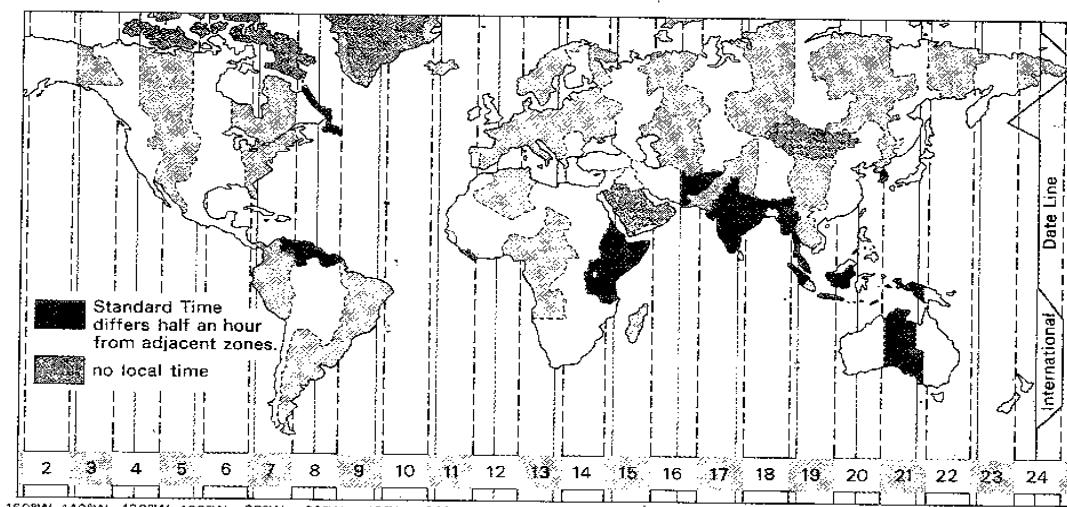


Figure showing the World Map showing Time Zones

Time zones are not straight but winding depending on shape of the country to avoid confusion in telling time of people living within the same boundary.

STANDARD TIME

It is the local time at Greenwich meridian referred to as Greenwich Mean Time (GMT)

Those countries on the west of the Greenwich (prime meridian) are time behind those to east if a place is located 30°W of the Greenwich Meridian and another is located 15° therefore the difference in degrees between the two countries would be

$$30^{\circ} + 15^{\circ} = 45^{\circ}$$

But $15^{\circ} = 1\text{hr}$

Therefore $45^{\circ} = ? \text{ More}$

$$\frac{45}{15} \times 1$$

If the time in USA on the West is 6:00am

Therefore a Country on the East would be 6:00am + 3hrs

9:00hrs GMT

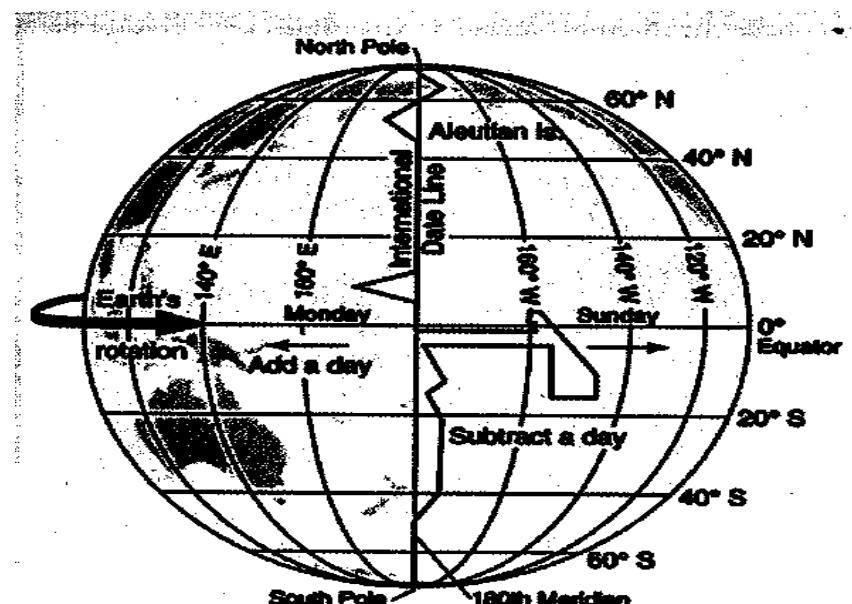
IMPORTANCE OF USING STANDARD TIME

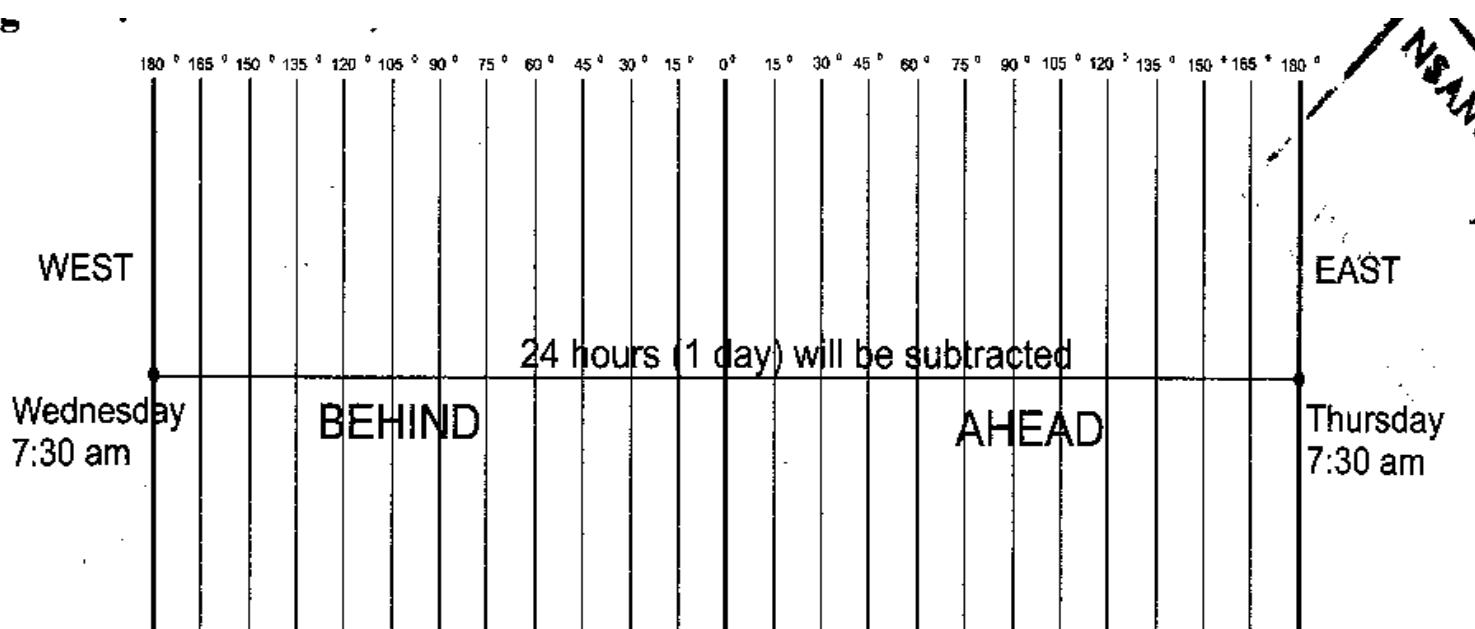
1. Helps in organizing a uniform time schedule for transport e.g. railway, airport
2. Helps in avoiding confusion to a community within the same region in telling different time
3. Help cut down on time costs that could be incurred by adjusting of time

IMPORTANCE OF INTERNATIONAL DEAD LINE

It help to adjust time by one day if crossing the Line to the East of the international date line, if you are moving to east you gain one day, when crossing it moving to west you lose (it is a place where a day is gained or lost when crossing)

It is Located along the meridian 180°





RELIEF

Success criteria:

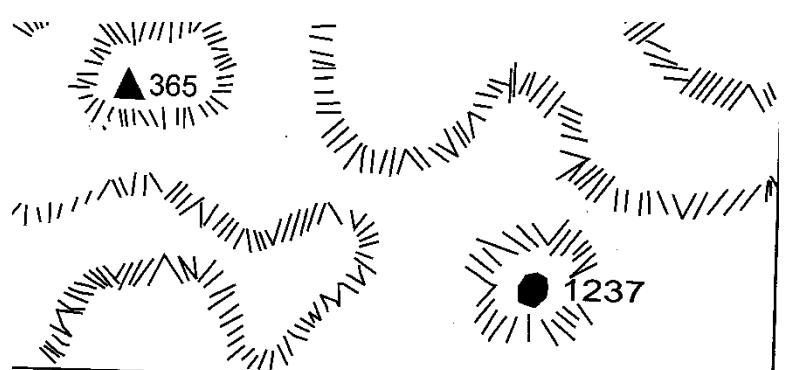
- Identify ways of showing relief on a map
- Explain the advantages of contour lines over other ways of showing relief on topographic map
- Identify landforms using contour patterns
- Calculate the average gradient between two points

It's the shape of the land in relation to its' height or slope

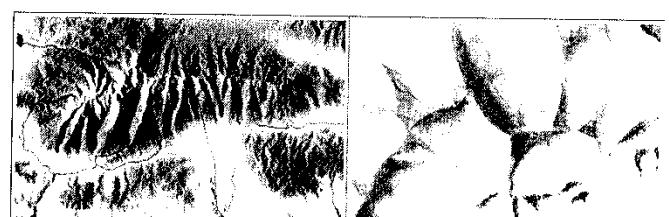
Ways of showing relief on a map

a. Huchures:

Thick dark broken lines shows a steep slope while spaced thin lines indicated gentle slopes.



b. Hill Shading



It represents relief by lines and shadow effects
Valley and hillside appear as if they were cast by a shadow

c. **Spot Height**

Meant to show the exact height of a place or local peaks



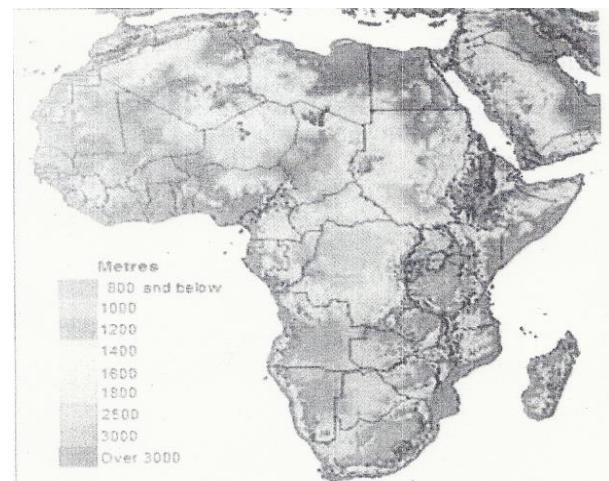
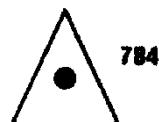
d. **Bench Marks**

It's a point of reference established at a known elevation used as a basis of measuring



e. **Trigonometrical point**

They are similar to spot height and indicate the heights of relief



f. **Layer tinting**

Show relief by color and each band of the color shows specific relief

(see map of Africa or Malawi atlas)

DIAGRAM

g. **FORM LINES**

These are lines sketched from visual observation of the land surface by observer (see below)

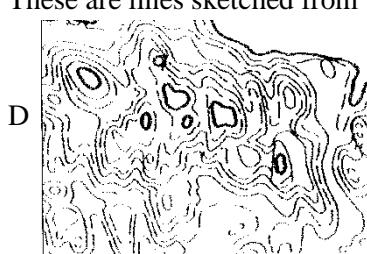
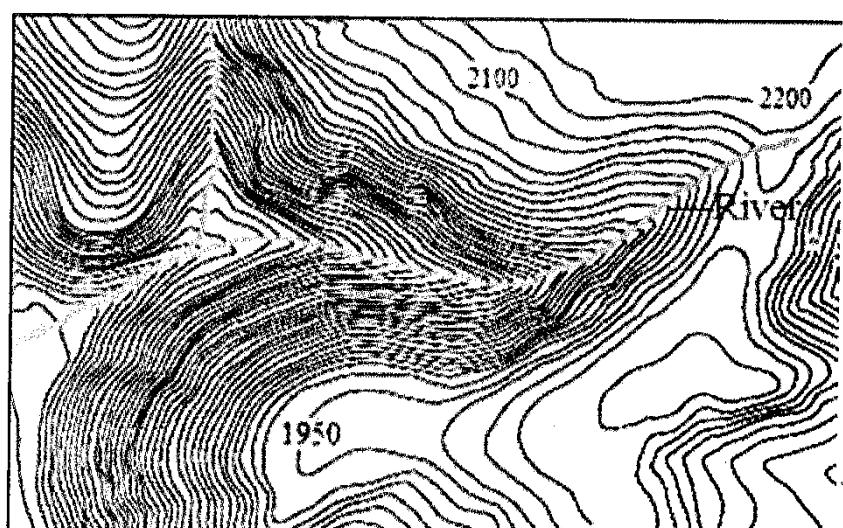


Figure 1c: Form Lines

h. **CONTOUR LINES**

These are imaginary lines drawn on a map joining places of similar heights above sea level



WAYS IN WHICH CONTOUR LINE ARE IMPORTANT

1. Show height of relief by meters/feet attached to each contour line
2. Shows steepness of slope by closeness of contour lines
3. Shows relief of land by considering the space between contour lines
4. Easy to use and describe relief of land
5. They show the direction of a slope of the land

Different land forms (relief features)

Conical hill, Gap, Pass, Saddle, Ridges , Knoll, Plateaus, Cliffs, Escarpment , Spur, Valley

1. CONICAL HILL

Its steep side with circular base and narrow top
Contour lines indicate it with concentric hills

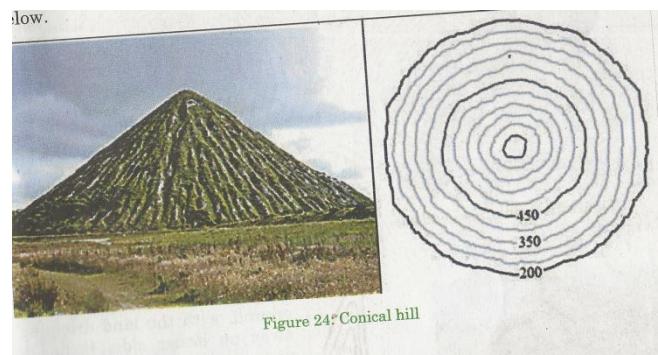


Figure 24: Conical hill

2. GAP

It's a depression between two hills
It's a lower spot between two points

3. PASS

Similar to Gap and found at higher altitudes

4. SADDLE

A low point or slight depression in a ridge hill

5. RIDGE

It's an elongated high ground with the land dropping away on either sides

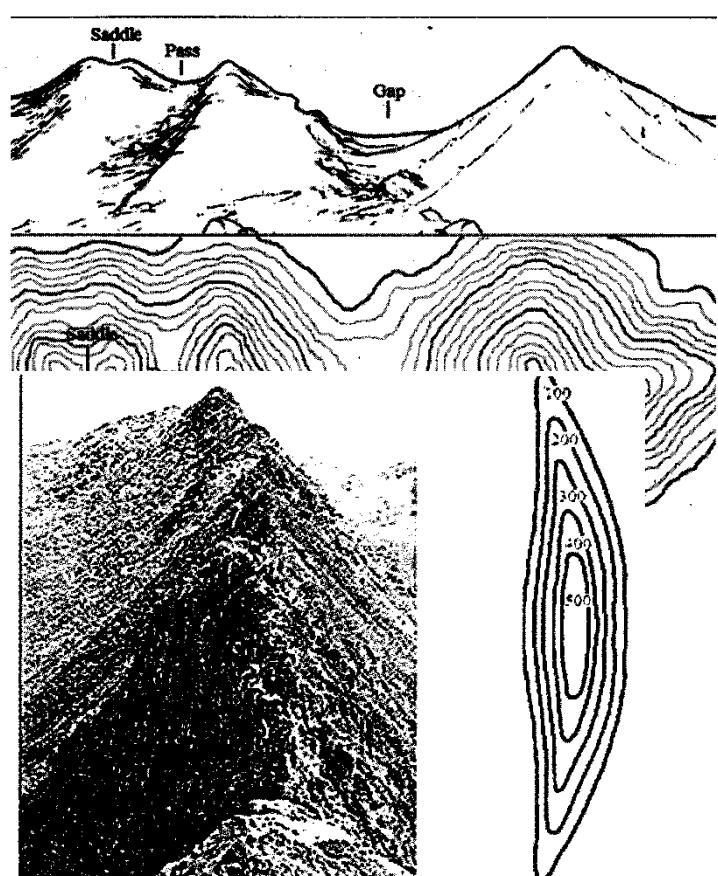
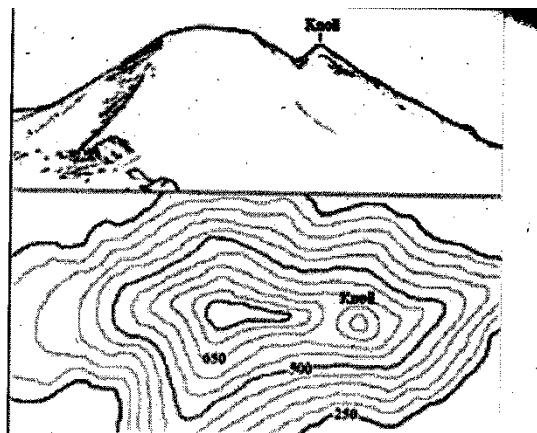


Figure 25: Ridge

6. KNOLL

It's a small rounded hill appearing on a larger mountain

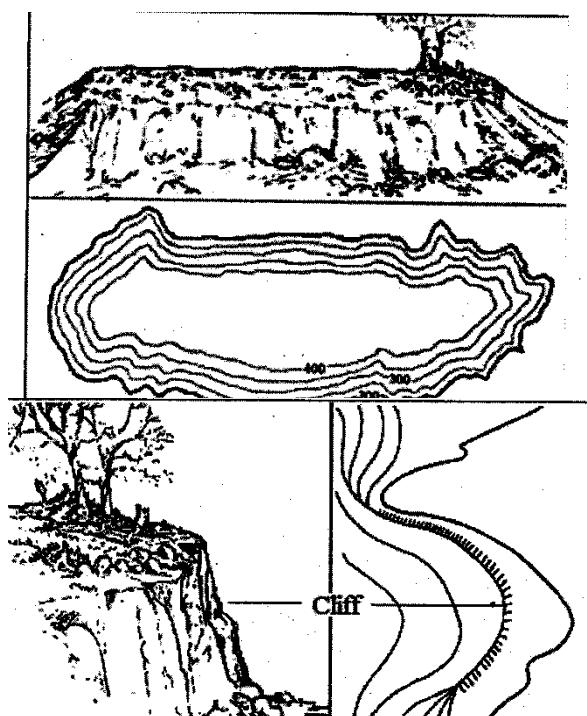
DIAGRAM



7. PLATEAU

It's a flat topped hill land rising sharply from its surrounding

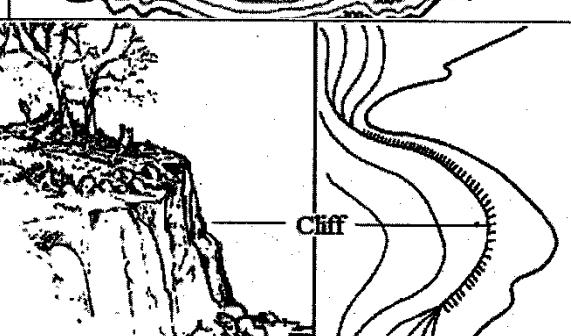
DIAGRAM



8. CLIFF

It's a sudden rise of the Land with contour close to each other on the steep side

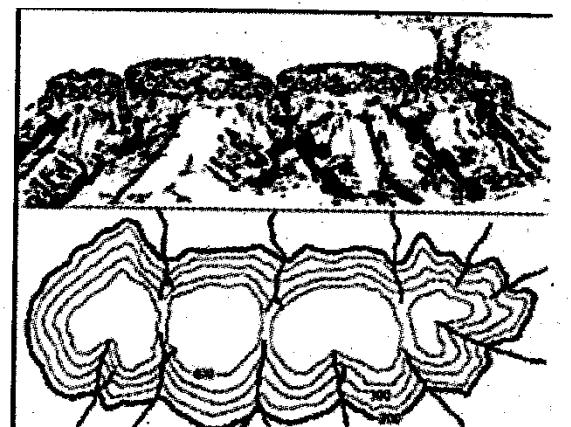
DIAGRAM



9. ESCARPMENT

It is a relatively long break in the land

It appears like a long cliff rising from surrounding areas



10. SPUR

It's a long gentle sloping line of higher ground that run down from hill to lower ground

11. VALLEY

It's an area of elongated low land bordered on the sides with higher ground

Valleys have steep ground on either sides
DIAGRAM

GRADIENT

It's the steepness of a slope

Calculating gradient

The gradient of the slope is easily calculated on the contour of the map between two points

Formula for Gradient

$$G = \frac{VI}{HE}$$

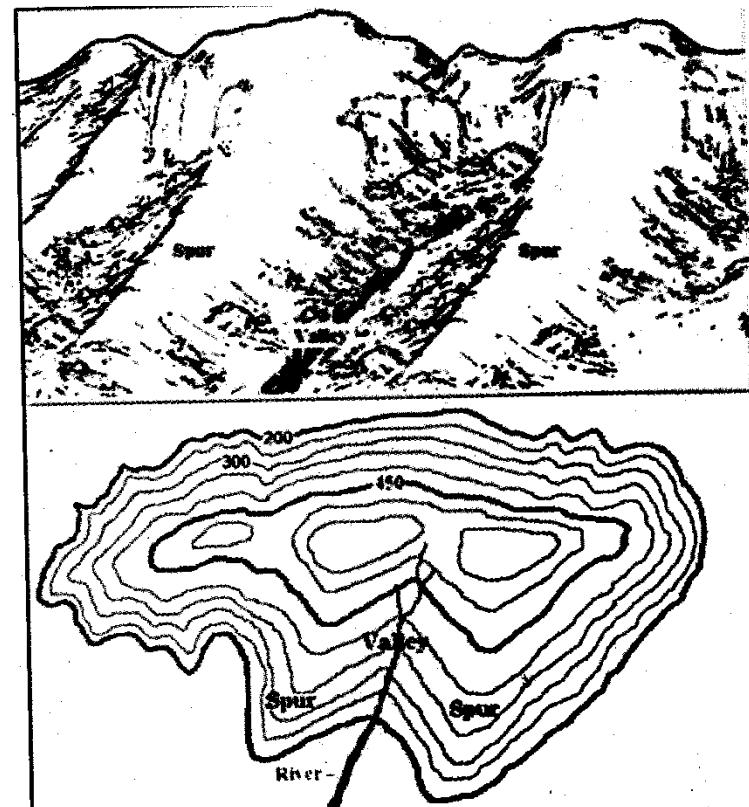
EXAMPLE

If the difference between two contour lines (VI) of interest is 200m (2300m and 2 500m)

In this case the 200m would be the Vertical Interval (VI)

The horizontal equivalent (HE) is a straight distance between two points of measurements in Km but expressed in meters for example the distance of 4Km would be 4,000m.

$$\text{Gradient} = \frac{200\text{m (VI)}}{4000\text{m (HE)}}$$



$$= \frac{1}{20}$$

This means that there is 1m rise for every 20m horizontal distance

The answer could be experienced as percentage by multiplying it by 100

$$\begin{aligned} & \frac{1}{20} \times 100 \\ & = \underline{\underline{5\%}} \end{aligned}$$

DRAINAGE PATTERNS

Success criteria:

- Identify drainage pattern on a topographic map
 - Explain the influence of relief on drainage pattern
 - Explain the formation of river line features
 - Identify coastal features on a topographical map
 - Explain the formation of coastal features
- It's the way in which stream feed into other larger stream and rivers from different direction

TYPES OF DRAINAGE PATTERN

1. Dendritic drainage pattern
2. Trellis drainage pattern
3. Radial drainage pattern
4. Disappearing (intermittent) drainage pattern

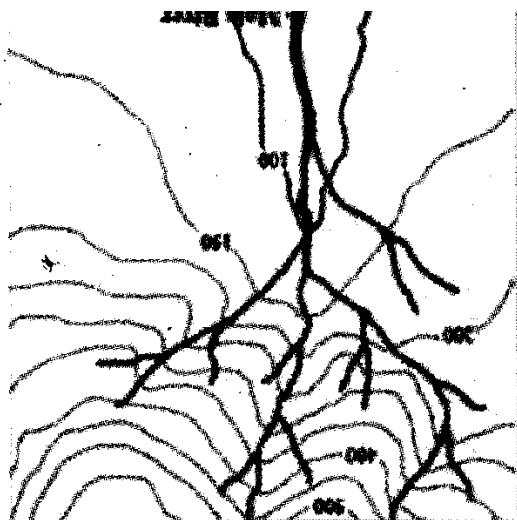
1. DENDRITIC DRAINAGE PATTERN

It's a pattern that appears like a tree (vein leaf)

It develops on soil with uniform resistance to soil erosion

Tributaries meet the main stream at an acute angle

DIAGRAM

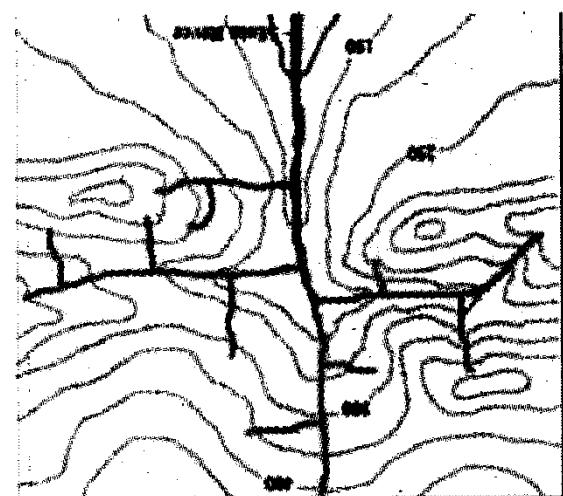


2. TRELLIS DRAINAGE PATTERN

Stream cut-out the valley and joins the main stream at a right angle (90°)

It develop in an area where band of rocks valley in resistance (alternate resistance to erosion)

DIAGRAM



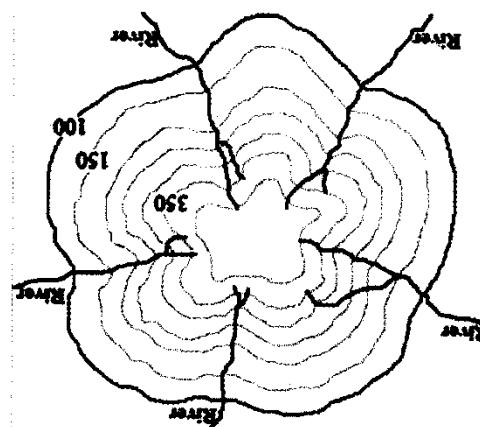
3. RADIAL DRAINAGE PATTERN

It appears like spokes of the bicycle wheel pattern

Water flow around the hill-top

Most develop from conical hill or volcanic mountain

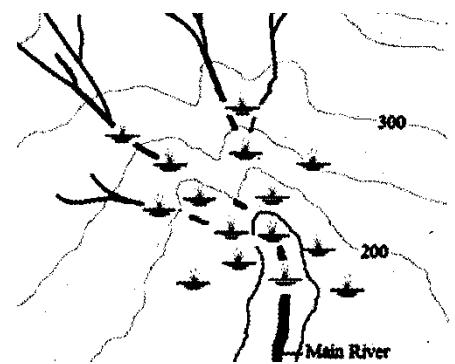
DIAGRAM



4. DISAPPEARING (INTERMITTENT) DRAINAGE PATTERN

Streams disappear at some point and then appear somewhere

Streams disappear in sandy soils or marshy areas and then appears at a later stage



INFLUENCE OF RELIEF ON DRAINAGE PATTERN

- Nature of under laying rocks. If the under laying rocks are porous the streams will move underground if non-porous a stream would develop and water run down stream.
- Slope of terrain if the land is too steep then it would increase run-off than a gentle slope that encourages infiltration
- Vegetative cover, if the land has more vegetative cover the run-off will be controlled and hence change the drainage pattern

DIRECTION OF RIVER FLOW ON THE TOPOGRAPHIC MAP

- Contour lines always point on direction where the stream is coming when crossing it
- The numbering of contour lines also help in telling the position/direction of a flows

WAYS IN WHICH HUMAN ACTIVITIES MAY ALTER DRAINAGE PATTERN

These include

- Creating/construction of dams across a river
- Draining wet land for development
- Building of water canals

RIVERINE FEATURES

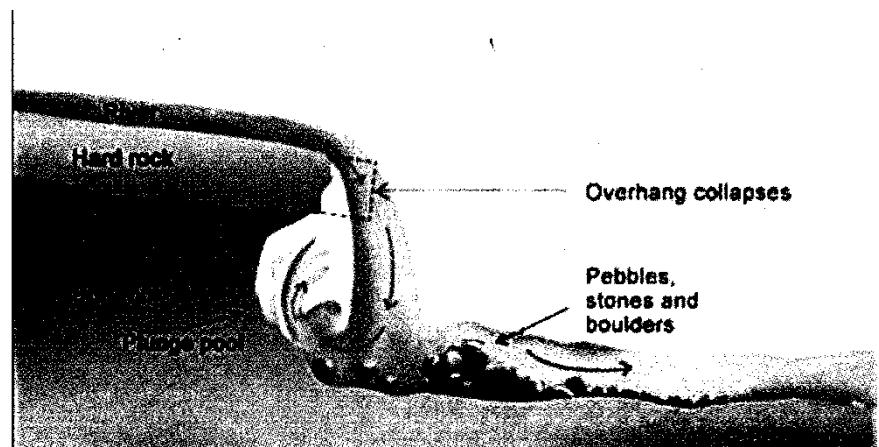
Gorge	Flood plains
Oxbow lakes	Levels
Meanders	Water fall
Rapids	Delta

A. WATER FALL

It's a steep drop in the bed of a river causing the water in the river to fall vertically

Water fall occurs where band of harder rock crosses path of river e.g.

- Angel falls Venezuela 979m (biggest fall in the world)
- Victoria fall
- Mkula fall



B. RAPIDS (CATARACTS)

Its' part of river where water seem to flow vary due to steep gradient

They formed when a river crosses a river bed with hard rocks and soft rocks making a depression on river bed while hard rocks, appears standing-out on the bed in this case the river is forced to flow on a rough course forming rapids

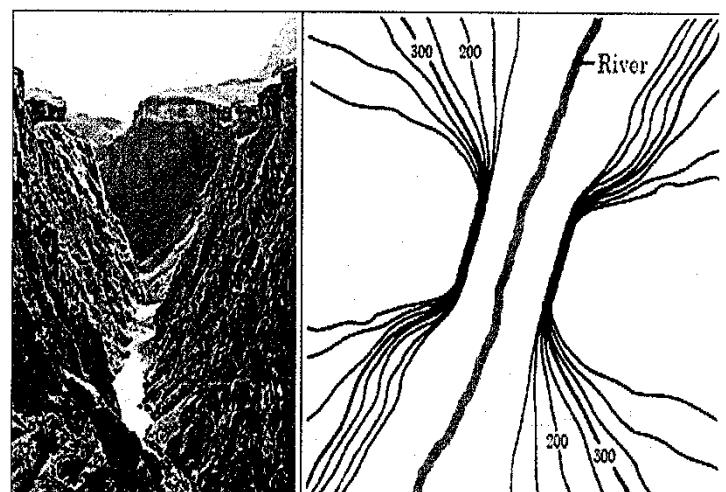
C. GORGE

It is a narrow steep sided valley that may or may not have river at the bottom

It may be formed when a river start cutting deep into its coarse on a narrow strip

E.g. Mpalamanga gorge, Ruo gorge

DIAGRAM



D. FLOOD PLAINS

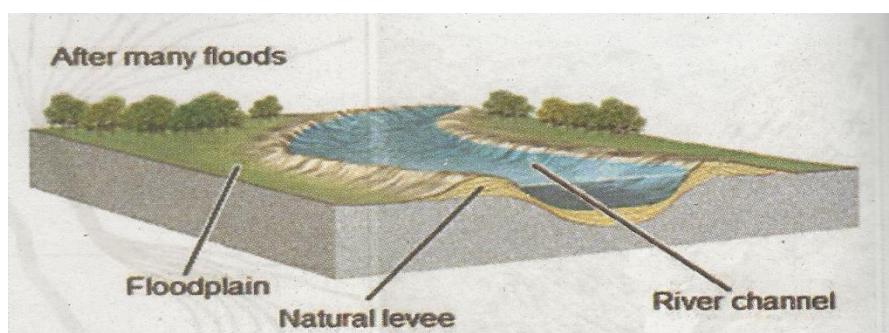
Its an area of land that is flat and found on either sides of the river, the area is usually flooded when river overflow its banks.

When a river overflows its banks it deposits fine alluvial soils to its bank resulting in the formation of flood plain

E.g. lower shire flood plain

WAYS IN WHICH FLOOD PLAIN ARE IMPORTANT

1. Agriculture production



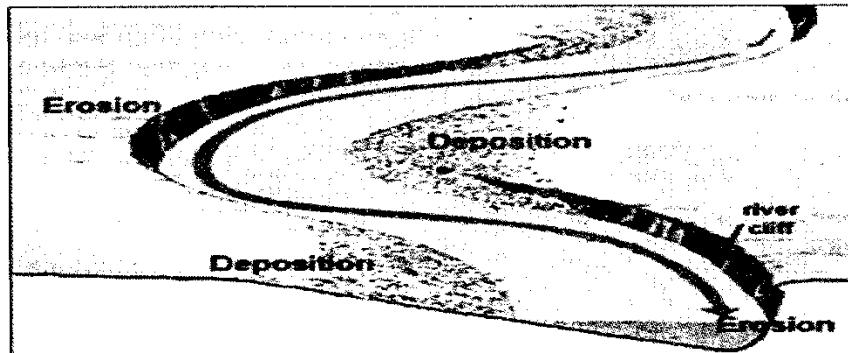
2. Control effects of floods
3. Leads to formation of wet lands

E. LEVEES

It's a mound of sediments on the banks of a river which builds up over time

It is formed when a river floods over the banks and deposit sediments on its bank causing the bank to rise higher than flood plain

DIAGRAM



F. MEANDERS

There are bends of a river due to erosion and deposition process of a river

They are formed when a river struggles to flow on a flat area resulting in the formation of bends (meanders)

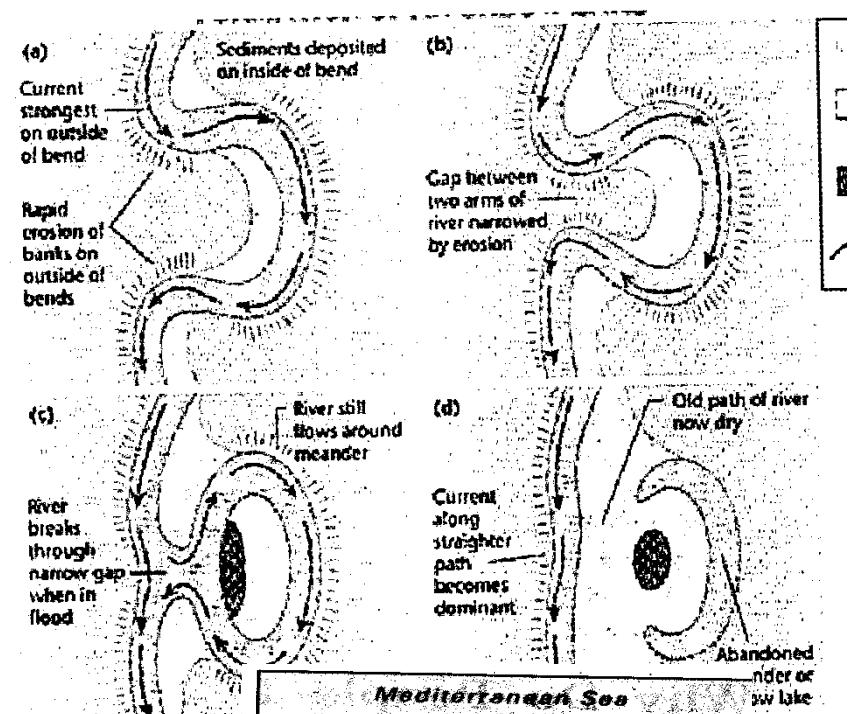
DIAGRAM

G. OX-BOW LAKES

It's a U-shape body of water along a river

It is formed when more pronounced bend is cut-off and river forms new course or channel of flow

DIAGRAM



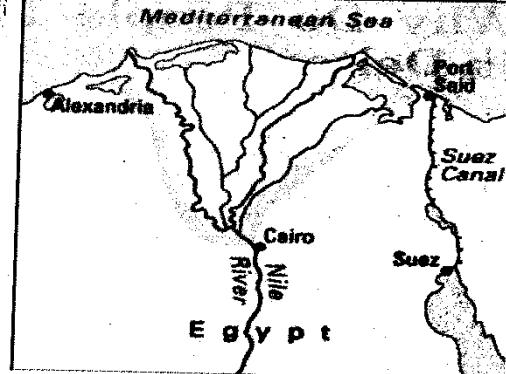
H. DELTAS (COASTAL LANDFORMS)

It is a triangular shape piece of land at the river mouth.

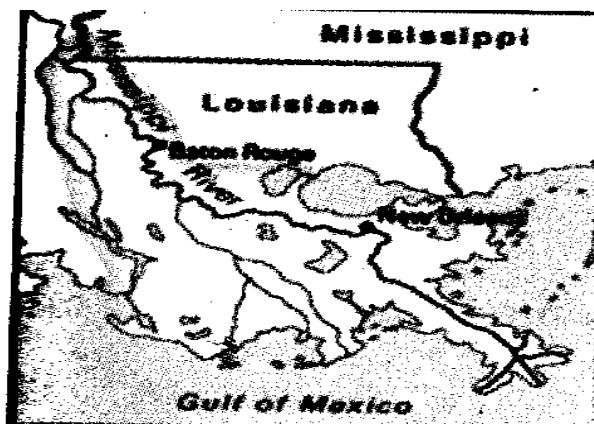
It is formed through deposition of silt and sand into the sea that rises slowly to form U-shape funnel of land called delta

Example

- ♣ Arcuate delta e.g. Nile



Bird's foot delta e.g. Mississippi river



- ♣ Cuspate delta e.g. Tiber



Mediterranean Sea

- ♣ Estuarine delta e.g. Seine river (France)

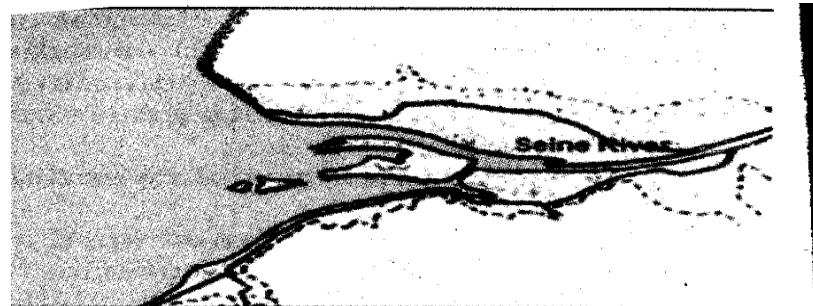


Figure 69. Estuarine delta

COASTAL FEATURES

- | | |
|---------------|------------|
| • Peninsula | Cape |
| • Point coast | Beach |
| • Shoreline | Spit shore |
| • Sandbar | Lagoon |
| • Delta | Estuary |

Terminology

- Coast : it's a broad area of land that borders the sea or lake
- Shore : it's a narrow strip of land adjacent to water bodies
- Coastline : it's the seaward limit of the landmass
- Shoreline : it's the landward limit of the sea

- Off shore: into the deep water of sea
- Foreshore: area within the shallow water of the sea
- Backshore : area between the sea level and the highest reach of a tide during a storm

DIAGRAM

DEPOSITIONAL COASTAL FEATURES

1. BEACH

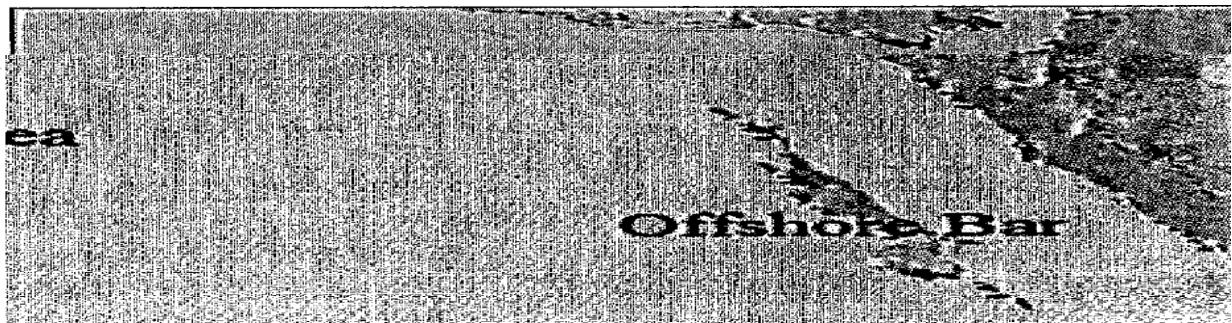
It's a narrow gently sloping strip of land that lies along the Edge Ocean, lake or sea
Formed from erosion and depositional action of water that deposit sand and gravel eroded somewhere on the coastal line



2. SANDBAR (Offshore bar)

It is a long narrow partly submerged ridge of sand as coarse sediments built by waves away from the beach

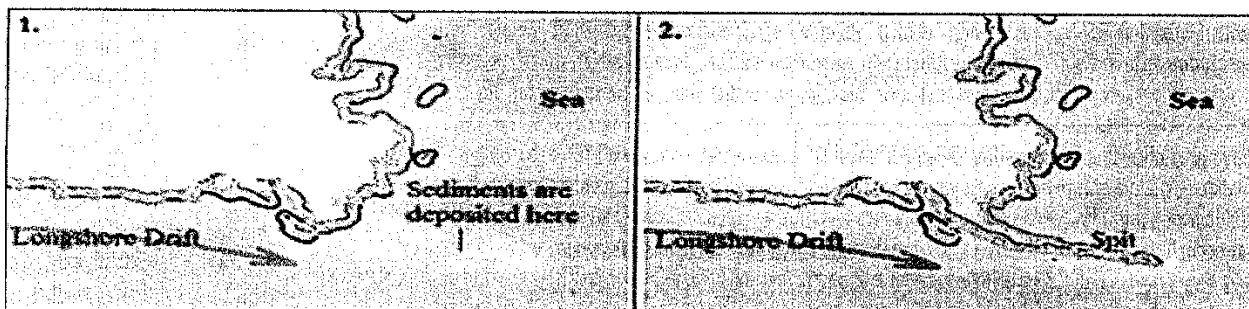
It is formed when a wave approaches a gently sloping beach causing frictional that breaks the at some distance



3. SPIT

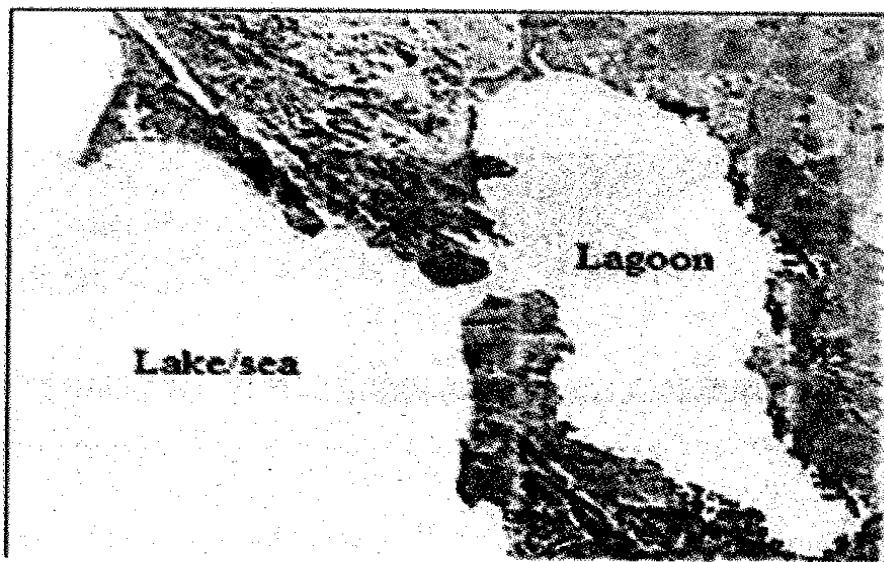
It's a long narrow ridge of deposits that extends from the main land to lake or sea

It is formed from a long shore drift that course movements of sediments along the coast parallel to the shore line to further down the coast.



4. LAGOON

Its shallow body water partly or completely separated from a larger body of water
It is formed when a ridge of sand develops across the entrance of the bay or concave coastline



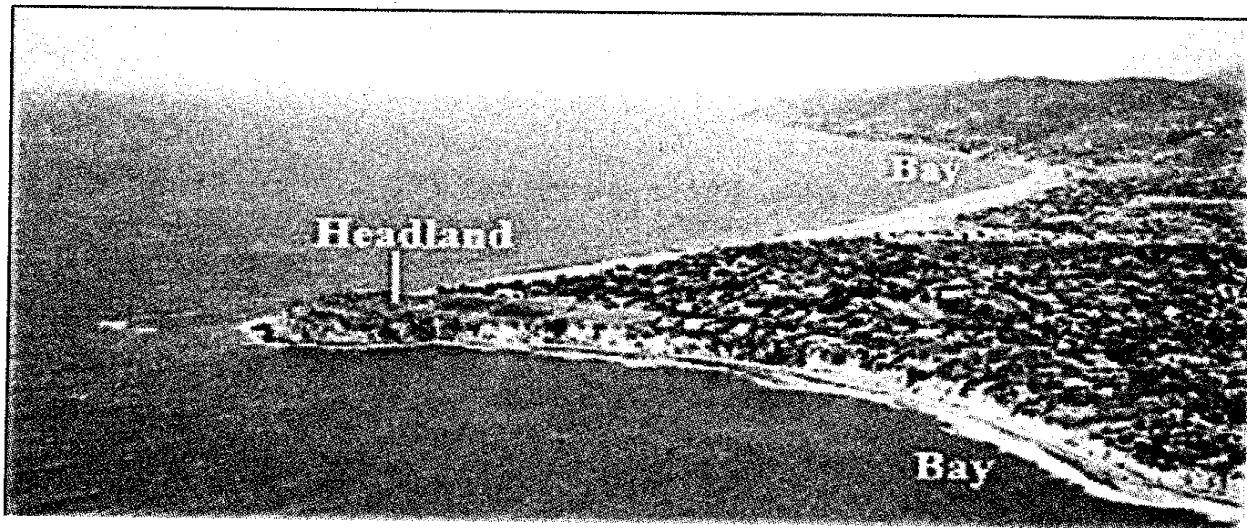
EROSIONAL FEATURES

1. ESTUARY

It's a drowned river mouth
It is a U-shaped opening at the mouth of a river
It is formed when a river reaches the sea or cake at a slightly higher speed reducing deposition of sediments on its mouth

2. HEADLANDS/POINTS

It is a high land (large Mass) that extends into sea or lake
They are formed from hard rocks or material that resists soil erosion



3. BAY

It's a piece of land that is partly enclosed by water

It's a piece of land that is formed of soft rocks that are easily eroded by the action of water forming a curve

They are opposite of the way a headland is formed

4. CAPE

It's a land mass that is bigger and extends into a sea from coastlines

It differs from a Peninsula in the sense that it is connected with a large landmass than a Peninsula

Example

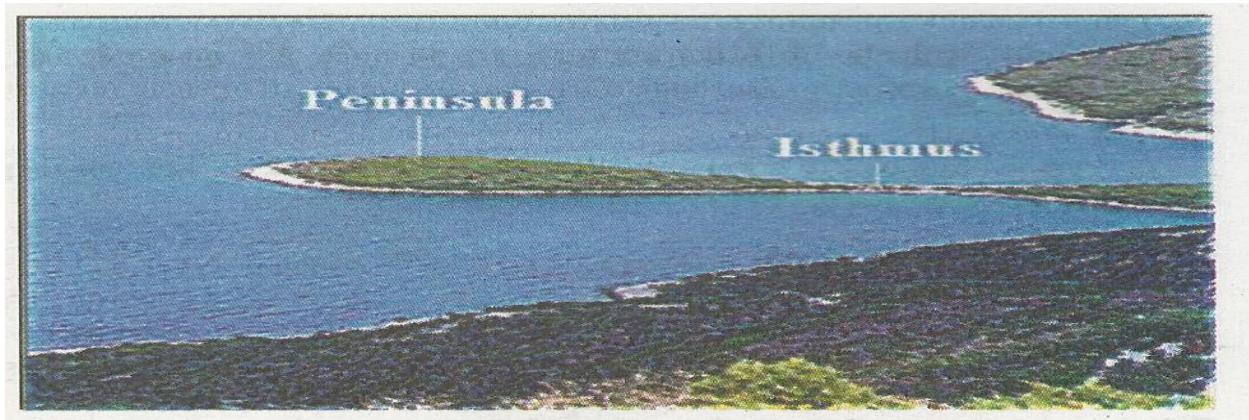
- Cape of Good Hope
- Cape Town
- Cape Maclear
- Natural landforms from geomorphology



5. PENINSULA

It's a piece of land that is almost surrounded by water but connected to mainland by an isthmus (narrow neck)

It develops on a piece of land that is almost surrounded by water but connected to mainland by an isthmus, following the rising water level e.g. Nankhumba peninsula at Cape Maclear



CROSS SECTION AND LONG PROFILE

Success criteria:

- Draw cross-section and long Profiles between different points on a map

A cross section:

It is a side –views of a landscape drawn through a portion of a topographic map

River profile cross section may indicate that a river is deep and narrow up stream and shallow and wide downstream.

In other words a river has more energy upstream and cuts deep into the landform while flowing fast

Downstream a river flows and spread wider and shallow

DIAGRAM

A.

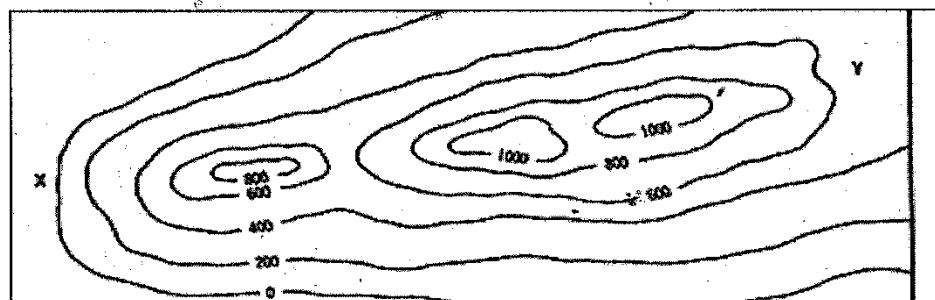
B.

C.

DRAWING A CROSS SECTION

Step 1:

Place a straight edged paper between Y and X

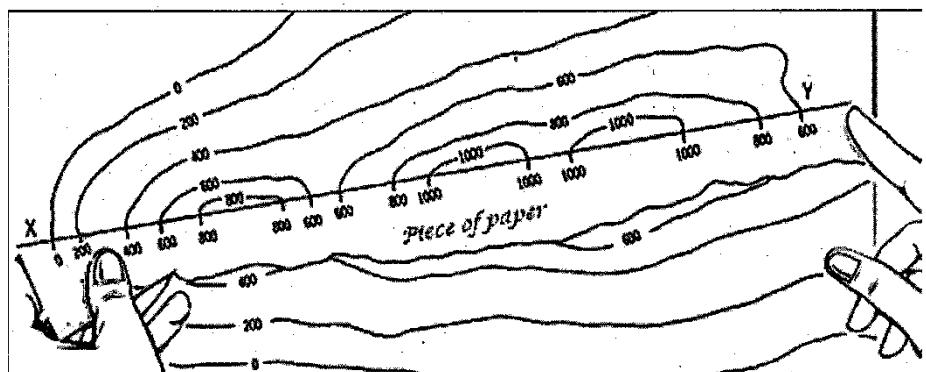


Step 2:

Mark on the paper each contour line that passes under the piece of straight edged paper

Step 3:

Remove the straight edged paper with the data and place it at the graph paper to create a cross section between X and Y



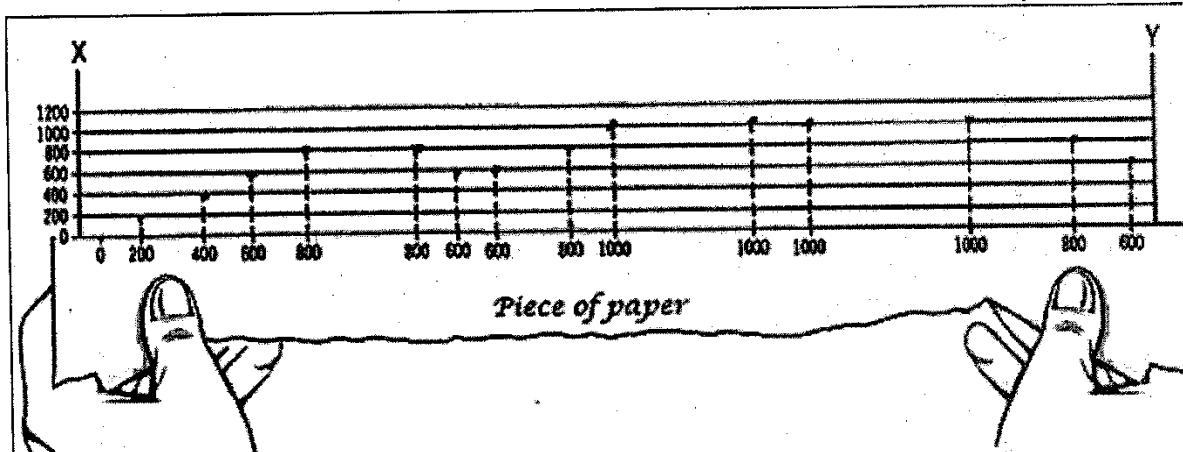
Step 4:

On the X-axis indicate the contour number starting with lowest on the interval and then moving up wards to the highest contour line

Step 5:

Plot against the graph paper from your piece of paper

DIAGRAM



Place a dot or star at the equivalent height on the graph paper and then connect the dots and then shade the plotted area to complete your cross-section as above

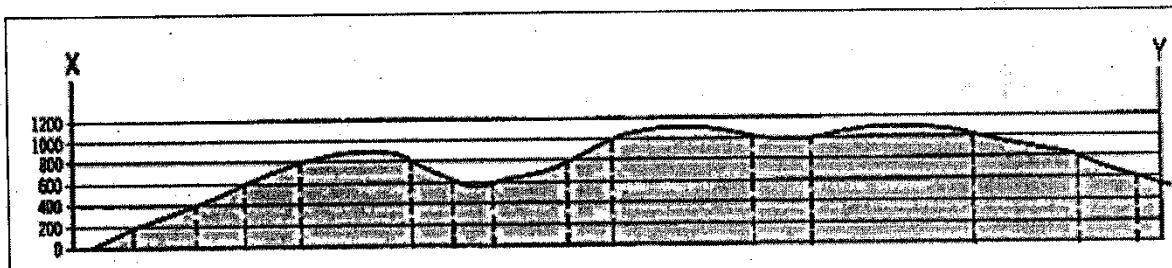
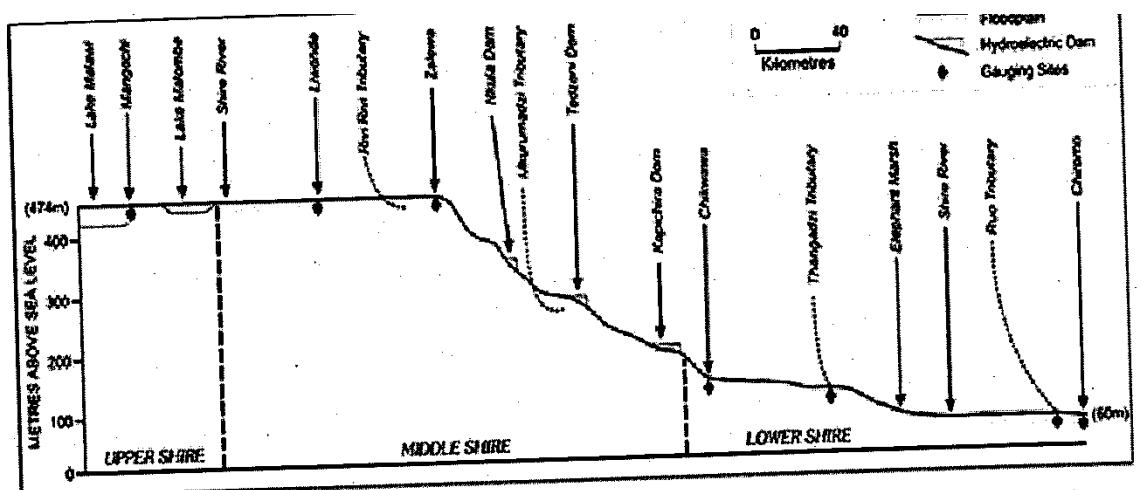


Figure 87: Cross-section between X and Y

LONG PROFILE

It's a side view of a river course from source to mouth which shows how the gradient of river changes as it flows

The cross section and the long profile assist an individual to see the side view landforms or relief on a topographic map



WAYS IN WHICH A CROSS SECTION AND LONG PROFILE ARE IMPORTANT

- They give clear shape of a topographic feature
- They enable people to estimate how the ground can be primarily visible from a point

However visibility of places on a map is vital in the following ways:

- It helps in planning position for the establishment of a communication positions
- Assessment of the area of observation from a fire work-out or for security tower installation

NOTE:

The two instruments/tools help create a link between contour lines and landform by providing a clear side view of relief on a topographic map.

LAND USE

Success criteria:

- Interpret map symbols in relation to land use

Land-use:

It's the arrangement activities and inputs people undertake in a certain land cover type to produce change or maintain it.

EXAMPLES OF LAND USES

- Urban land use, such as permanent building
- Industrial use such as e.g. manufacturing industries
- Agriculture land use of Livestock and crop farming
- Forestry e.g. a forest reserve
- Settlements or residential land use e.g. houses, huts
- Institution land use e.g. school, town hall, police etc.
- Transport and comm. land e.g. roads railways waterway etc.
- Recreation land use e.g. parks
- Commercial land use e.g. markets, banks shops etc.

MAP SYMBOLS IN RELATION TO LAND USE

Feature Name	Symbol
School; Fire station; Police station	
Church; Mosque; Shrine	
Building	
Post Office	
Built Up Area	
Golf course	
Cemetery	
Mine	
Forest Reserve or Wildlife Reserve	
Estate or General Cultivation	

Feature Name	Symbol
Historic site or point of interest	
Main road - All weather	
Dirt road - Seasonal	
Trail or foot path	
Airport	
Airport runways; paved, unpaved	
Railway - Single track	
Railway - Multiple track	
Railway station	
Power lines	

FACTORS INFLUENCING LAND USE AND LOCATION

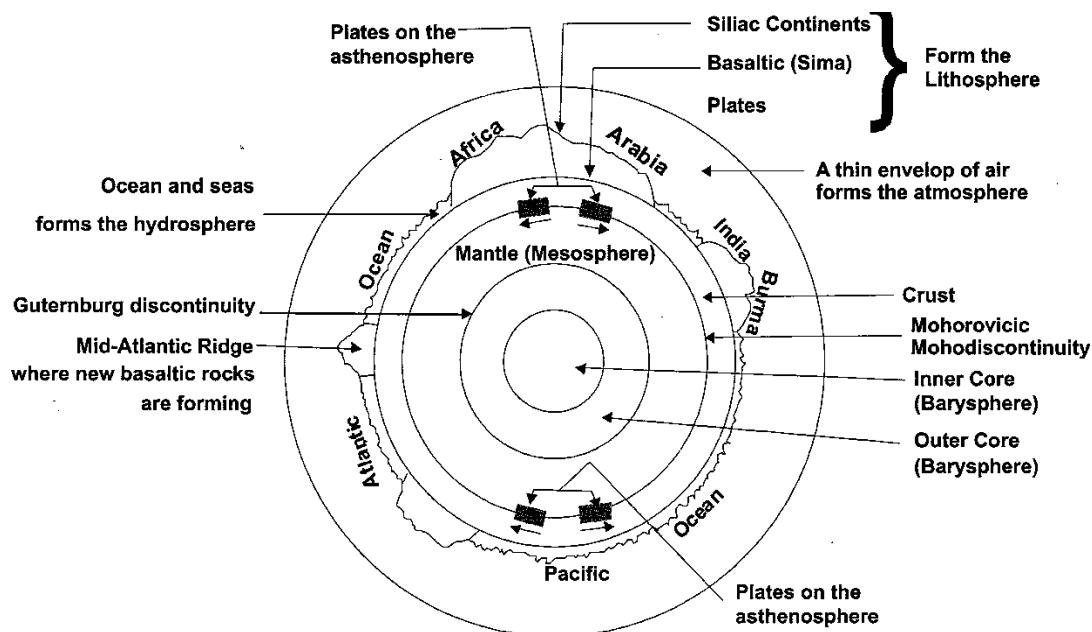
- Topography of Land
 - Lowlands relief offers more land use
- Value of Land

- Those places close to main road/ accessible have high land value
- 3. Government Policy
 - The government may restrict used of some piece of land
- 4. Technology
 - Some have wide roads and airports due to technology used
- 5. Water supply
 - Presence of water may attract people to settle

INTERNAL STRUCTURE OF EARTH

Success criteria:

- Describe the internal structure of the earth
- Identify features that shape the earth's landscape
- Explain the formation of the features that shape the earth's landscape
- Explain the advantages and disadvantages of physical features to life and human activities



THE CRUST

It is made up of two layers

1. Oceanic
2. Continental (thus the lithosphere)

1. THE CONTINENTAL CRUST

It is made up of continents

CHARACTERISTICS OF CONTINENTAL CRUST

- Made up of light colored granite rocks such as Silica and Alumina
- It is lighter than oceanic crust
- It is made up of some oldest rocks
- It is thicker than oceanic crust

2. OCEANIC CRUST

It is made up of oceanic floor

CHARACTERISTIC OF OCEANIC CRUST

- It is made up of dark volcanic lava rock (basalt rocks) formed from molten materials
- It is composed of basalt rock such as Silicon and Magnesium (SIMA)
- It is denser than continental crust rock hence it may sink into the mantle and melt down
- It contain new rock due to recycling
- It is thinner than continental crust

THE MANTLE

It is the thicker layer of the earth 2,900Km (take up 80% of earth size)

CHARACTERISTICS

Made up of hot and dense rocks which are semi-liquid ($30,000^{\circ}\text{C}$)

It is rich in mineral such magnesium, silicon, iron and other precious minerals

It is constant due to convectional current taking place

THE CORE

It has two layer : inner core

Outer core

OUTER CORE

It is in liquid state with temperature above $30,000^{\circ}\text{C}$

Made up of dense molten Iron and Nickel metals (NiFe)

INNER CORE

It is in solid state but very hot due to earth pressure

It is also made up of Nickel and Iron metals

WAYS IN WHICH CORE IS IMPORTANT

- Gives a shape to earth surface i.e. round
- Helps reflect harmful charged particle floating around solar system, hence making life to be possible on earth

WAYS IN WHICH INTERNAL STRUCTURE CAUSE CHANGES ON EARTH SURFACE

- Volcanic eruption; gives rise to Lava plateau and volcanic cone/mountain
- Earthquake; leads to landslide that changes mountain shape
- Movement of plates; causes rift valley, trench, fold mountain, oceanic ridge

FEATURES THAT GIVES SHAPE TO THE EARTH LANDSCAPE

Mountain, Plateau, Coastline, Valleys, delta, coastlines etc

They are formed in two ways

- a. Internal process
- b. External process

INTERNAL PROCESSES

- ♣ **Volcanic eruption;** leading to formation of mountain and plateau
- ♣ **Movement of crustal plates;** leading to fold mountain, block mountain
- ♣ **Earth quake:** leads to landslide that may alter (change) the shape of the earth
- ♣ **The Tsunami (harbour wave);** may result into change of coastal area land mass
- ♣ **Landslide;** may change earth surface by movements of materials from upland to bottom

EXTERNAL PROCESS

- a. **Weathering and erosion;** running water/glacier may erode mountain and change their shape
- b. **Deposition of sediments;** may change shape of earth for instance delta, formed from deposition
- c. **External weather events such as storm, drought;** may damage infrastructure and vegetation hence change the earth's shape
- d. **Impact crater such as collision between earth and asteroid;** may create debris that could change earth

IMPORTANCE OF STUDYING THE EARTH'S INTERIOR

- a. Help us discover valuable minerals
- b. Help us detect natural disaster and cope with them
- c. Help us discover how internal force helps in shaping the earth
- d. Help us identify better places for settlements that are safe or mineral rich

ADVANTAGE OF EARTH'S PHYSICAL FEATURE TO HUMAN ACTIVITIES

- a. **Floodplain;** used for settlements and cultivation of crops
- b. **Mountain;** contain rich timber and cool climates for habitation
- c. **Deserts;** contain good nutrients for crop growth despite arid conditions

- d. **Coastal region;** have good harbor for port facilities
- e. **Lava plateau;** contain rich soil for agriculture production
- f. **Rift valley;** may contain water that could be used for fishing and irrigation
- g. **Mountain;** contain valuable timber
- h. Mountain; are also a source of river that are home to aquatic life e.g. fish, crocodile
- i. Mountain; attracts tourism in a country
- j. **Lakes and ocean;** create cheap transportation route

DISADVANTAGE OF EARTH'S PHYSICAL FEATURE TO HUMAN ACTIVITIES

- Mountain; hinder easy communication between places
- Mountain; contains thin soil for agriculture production
- Volcanic region; are prone to natural disaster that kills human beings
- Rift valley; are places that often influence flooding
- Highland; are prone to landslide making construction work very difficult
- Lake and ocean; may cause accident due to high wave of water e.g. Tsunami
- Deserts; experience high temperature that hinders human habitation

FORMATION OF LAKES

Success criteria:

- Explain how lakes are formed
- Identify the lakes of East and Central Africa
- Explain how lakes of East and Central Africa were formed
- Explain the importance of lake and rivers of central and east Africa

LAKES: They bodies of water that lies in a hollow on the earth's surface and is entirely surrounded by land

WAYS IN WHICH LAKES ARE FORMED

1. Movement of earth
2. Volcanic activity
3. River deposition
4. Human activities
5. Action of erosion

LAKES FORMED BY MOVEMENT OF THE EARTH

They are two ways:

- ♣ Crustal wrapping
- ♣ Faulting

(i) CRUSTAL WRAPPING

Lakes formed by down bending/movement of the plateau which creates a basin-like depression

When the basin is filled with water it becomes a Basin Lake

EXAMPLE

- L. Chirwa
- L. Victoria
- L. Kenya
- L. Chad

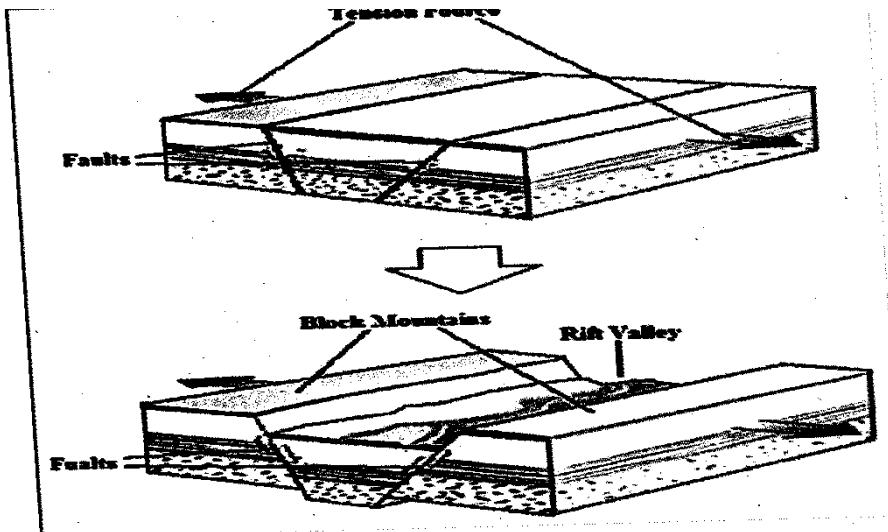
(ii) FAULTING

It's a lake formed due to tensional force acting on the blocks of the rock

When the central blocks sink down following faults it creates a valley that may be filled with water to form a lake such as the Rift valley lakes of Great African Rift valley

Examples

- Lake. Malawi
- Lake. Tanganyika
- Lake. Naivasha



CHARACTERISTICS OF RIFT VALLEY LAKES

1. Long and deep
2. They have steep cliff-like edges
3. Some don't have an outlet
4. Some have salty water

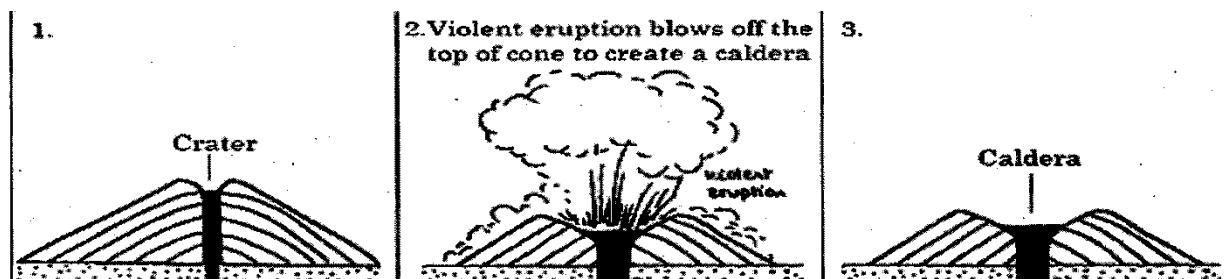
LAKES PRODUCED BY VOLCANIC ACTIVITY

- (i) Crater Lake
- (ii) Caldera Lake
- (iii) Lava dammed

1. CRATER

It's a circular depression in the ground caused by volcanic activities

When a hole/ in the crater is filled with the water it forms a lake e.g. Ngorogoro Crater lake of Tanzania formed on a mountain



2. CALDERA

It's when a volcano erupts in an already existing cone blowing away its crater to its vent and creating a bigger basin

When the basin is filled up with water it becomes a lake

3. LAVA DAMMED LAKES

River valley gets blocked by lava to form a lake

EXAMPLE

- L. Bunyonyi
- L. Mutande (Uganda)
- Sea of Galilee

4. LAKES FORMED BY EROSION

2 ways:

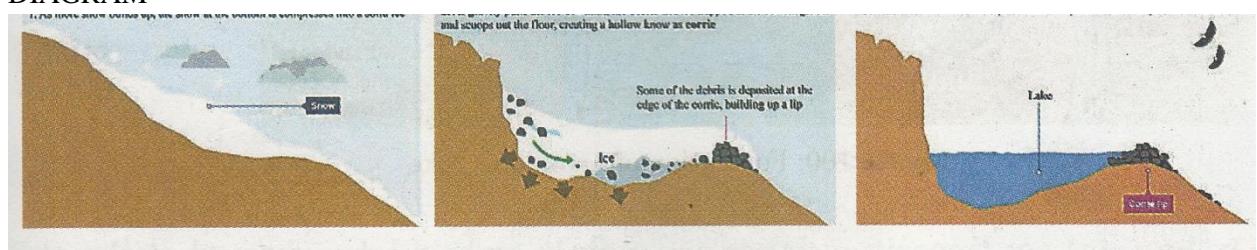
- Glacier erosion
- Wind eroded

(i) GLACIER EROSION LAKES

A glacier is a large mass of ice moving slowly down a mountain slope

When huge blocks of ice glide down the mountain side they cause depressions on earth's surface where melting ice collects to form lakes e.g. Lake Teleki-Tann on Mount Kenya

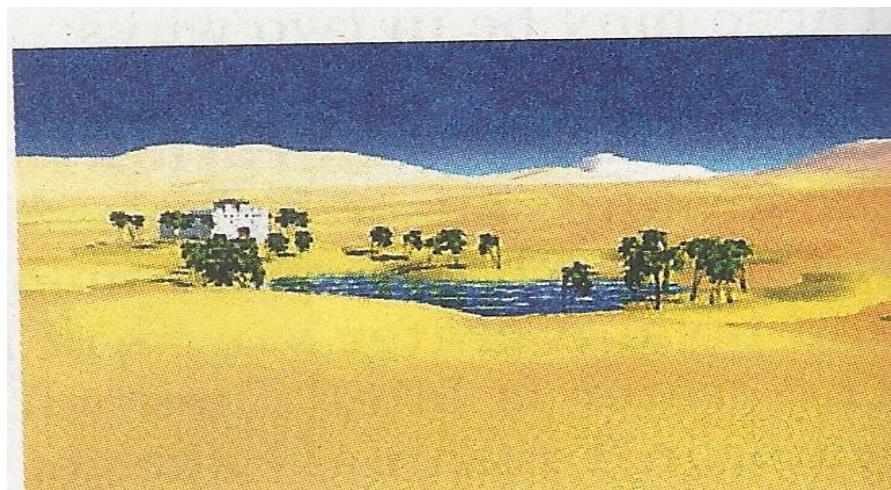
DIAGRAM



(ii) WIND-ERODED

These are found in huge depressions created by wind erosion in desert sand

If the water table is reached by a depression then the depression is filled with water such as Qattara oasis of Egypt



5. LAKES FORMED BY RIVER DEPOSITION

Ox- bow lakes are formed through the action of erosion and deposition taking place in a river at an advanced/mature stage.

A more pronounced loop of a river is cut-off and a river forms a new course of flow leaving the cut-off area as a lake

Example of Ox-bow Lake include: L.Narugi (Kenya)

L. Kirombero (Tanzania)

6. LAKES PRODUCED BY HUMAN ACTIVITIES

Include all man-made lakes

This could be the result of damming water for other purpose e.g. L. Kariba, L. volta, L.Nassen, L. Cabirra Bassa.

WAYS IN WHICH EAST AND CENTRAL AFRICAN LAKE ARE IMPORTANT

- a. They are used for water transport
- b. They control the flow of river by acting as a reservoir
- c. They can be used for recreation that attract tourism
- d. They are used for fishing purpose
- e. They help in reducing the impact of drought as a water storage
- f. Water in lakes and river may be used for agriculture purpose
- g. They help influence water quality down-stream by allowing sediments to settle down
- h. They can also be used for generation of power at ESCOM
- i. They help moderate climate of region by encouraging evaporation

WAYS OF PROTECTING LAKES

- i. Encouraging afforestation In order to control run-off that may cause silting in lakes
- ii. Turning some lakes as protected area in order to take care for it e.g. Lake Malawi, National park
- iii. Practicing proper waste disposal to avoid water pollution
- iv. Making restriction on deposits along the coast which may cause pollution
- v. Proper land management by avoiding excess use of chemical and fertilizer
- vi. Practicing environmental protection in order to avoid pollution
- vii. Restricting water diversion to some surrounding area that may result into pollution'

- viii. Awareness campaign on ways in which lakes are important

RIVERS OF MALAWI

1. Dwangwa river
2. N. Rukuru river
3. S. Rukuru river
4. Lufira river
5. Bua river
6. Lilongwe river
7. Songwe river
8. Shire river

SHIRE RIVER

Success criteria:

- Identify major rivers in Malawi
- Explain the course of the Shire river
- Explain the importance of the Shire river
- Explain challenges faced by the social and economic activities along the Shire river

The course of Shire River can be divided into 3 sections

1. Upper shire
2. Lower shire
3. Middle shire

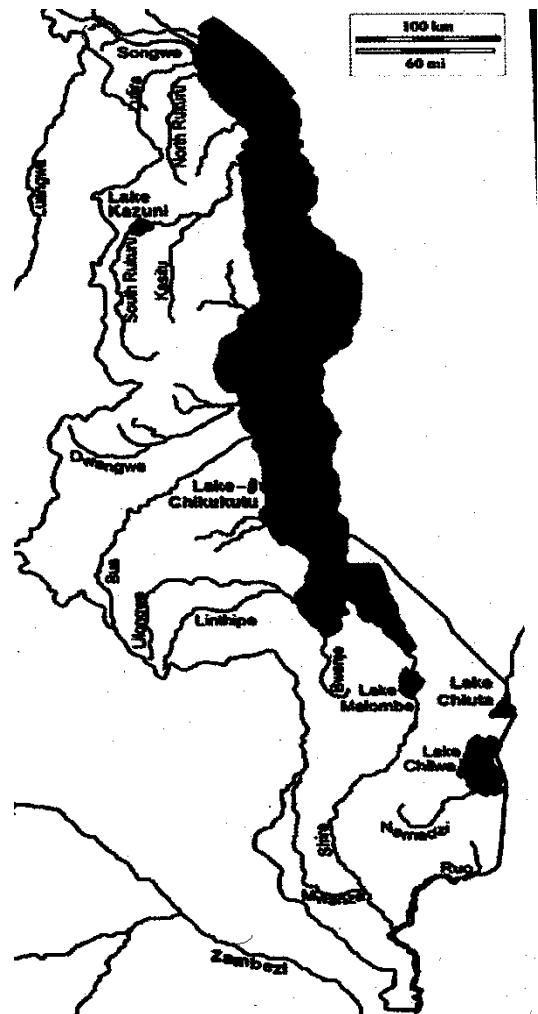
UPPER SHIRE

This section runs from Mangochi to Matope covering a distance by 130Km

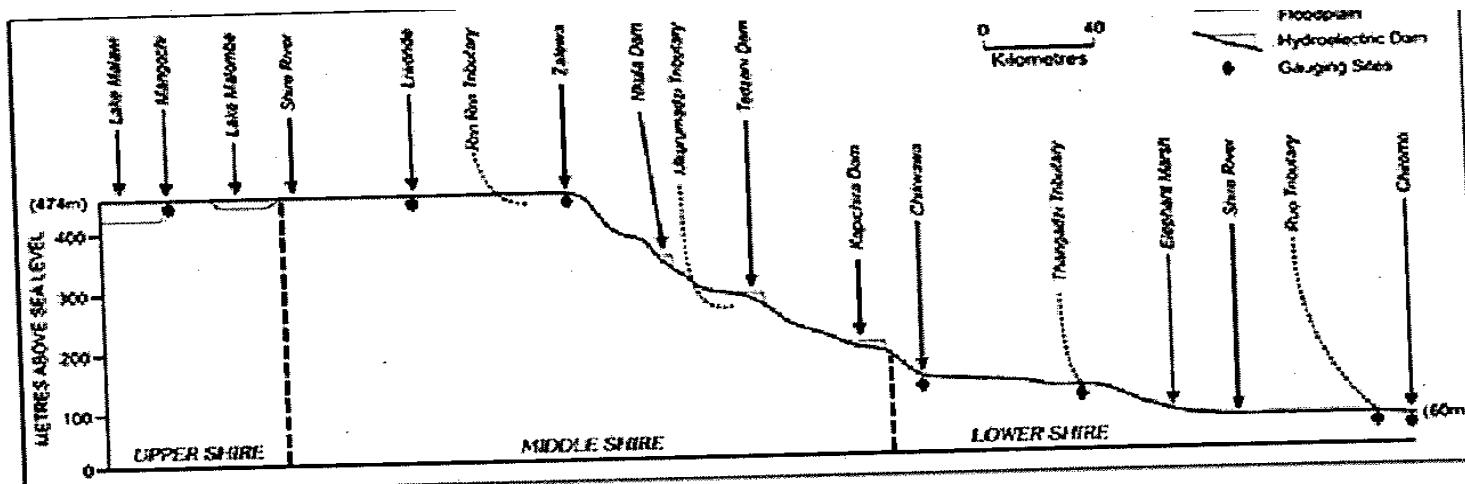
MIDDLE SHIRE

- It run from Matope to Chikwawa 180Km
- It is narrow and drops over a steep gradient
- It has a number of water falls such as Nkula, Tedzani, Mpatamanga, Halmton falls.

LOWER SHIRE



- It extends from Chikwawa to the confluence of Zambezi about 120Km
- Pass through Ndindi marsh, Elephant marsh etc.



The Shire river is different from most rivers in Malawi in the sense that its middle section is steep and narrow unlike most rivers which have the upper Section as Steep and narrow

ECONOMIC IMPORTANCE OF SHIRE RIVER

- a. Used for generation of electricity (HEP)
- b. It is used for fishing
- c. It provide fresh water for irrigation at Nchalo Illovo
- d. The upper and lower shire river basin important for crop production

CHALLENGES FACED BY SHIRE RIVER

1. Extensive siltation due to deforestation on the upper and middle shire that affect HEP
2. Flooding due to increased run-off posing danger to life
3. Salinity due to extensive evaporation hence affecting crop production
4. Pollution from industrial waste endanger aquatic animals
5. Water hyacinth that affect aquatic life as well as HEP

POSSIBLE SOLUTIONS TO CHALLENGES FACED BY SHIRE RIVER

- I. Practicing afforestation and reforestation in upper middle and lower shire
- II. Use alternative form of energy such as Solar Wind and Biomass
- III. Public awareness on need to protect natural resources along Shire river
- IV. Proper land husbandry to produce enough food without degrading the land

SEASONS

Success criteria:

- Explain the term season
- Explain the causes of seasons
- Explain the characteristics of seasons according to regions
- Interpret climate data into seasons
- Relate the seasons of the tropical regions to that of Malawi

SEASON: It is a period of the year marked by changes in the state of atmosphere or weather conditions.

- It is a periodic change in the state of atmosphere due to difference in the position of the sun

TYPES OF SEASONS

1. Summer
2. Autumn
3. Winter
4. Spring

CAUSES OF SEASONS

- a. The tilted position of earth on its axis to the orbital plane during revolutions
- b. The revolution of the earth around the sun

CHARACTERISTICS OF SEASONS

1. Winter period (season)
 - Short day long night
 - Low temperature (cold)
 - Crops experience less sunlight for growth (low light intensity)

NOTE: when the length of the day is shorter than night it is called winter solstice
2. Spring (Winter – Summer)
Transitional period
All place realize equal day and night (spring equinox)
In the south it falls on 23 Sept and the northern hemisphere is on autumn equinox
Temperature gradually rise with increasing sunshine

SUMMER PERIODS

- It is associated with high Temperature and Sunshine
- There is longer days and shorter night
- It is modified with onset of rains

AUTUMN (transition from summer to winter)

Days and night are equal

In south hemisphere autumn equinox occurs on 21 and 22 March

- Plants wilts lose leaves
- Birds move to equator
- Animals gather food

SEASON EXPERIENCED IN EACH REGION OF EARTH

- i. Tropical
- ii. Polar
- iii. Temperate

TROPICAL REGION

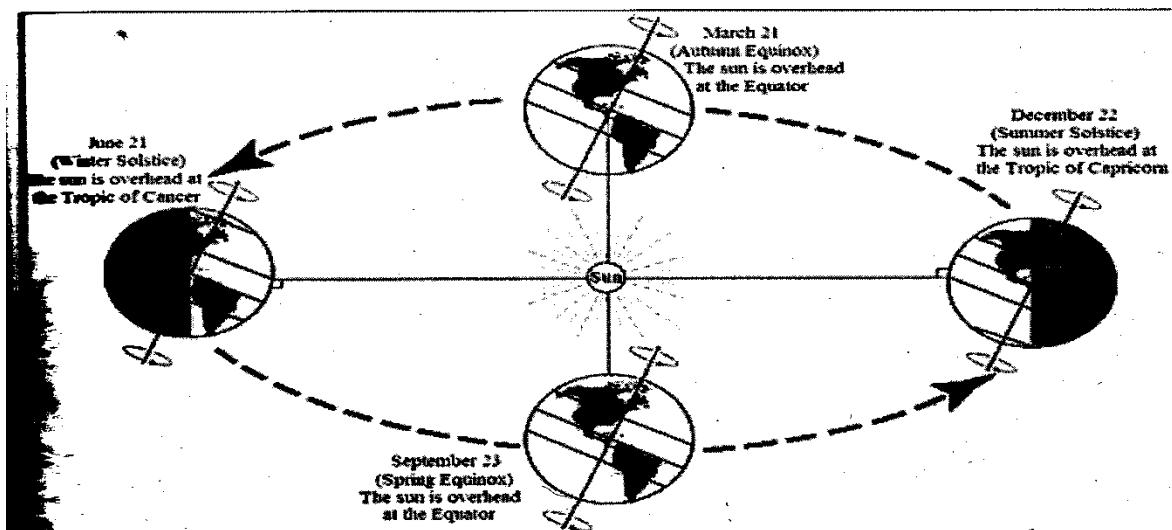
- Hot wet season
- Hot dry season
- Cool dry season

TEMPERATE REGION

- Winter season
- Spring season
- Summer season
- Autumn season

POLAR REGION

- Cold dark season (winter)
- Light cool season (Summer)

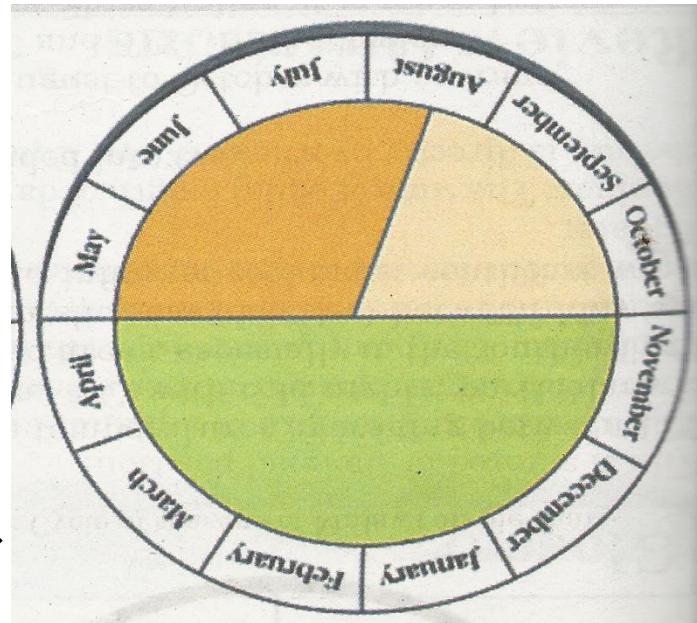


CYCLE OF SEASON IN MALAWI

Malawi has three seasons

1. Hot Wet Season
 - ✓ This run from Nov-April
 - ✓ It is the Longest season
 - ✓ It is associated with high rainfall and high temperature
2. Cool dry Season
 - ✓ It may run from May-August
 - ✓ It is associated with low temperature and drizzles or showers of rain
 - ✓ It is also associated with rain from the cool moist southeast winds (Chiperoni)
3. Hot Dry Season
 - ✓ It run from August-October
 - ✓ It I associated with high temperature and dusty winds

PIE CHART INDICATING CYCLE OF SEASONS



ENVIRONMENT

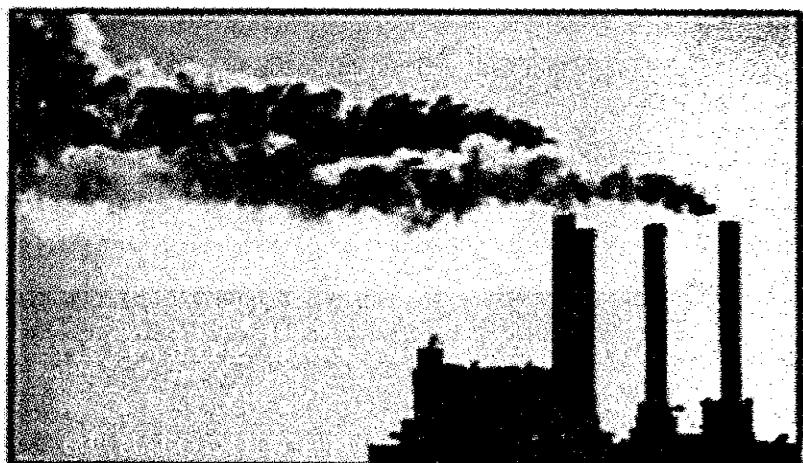
Success criteria:

- Identify activities that endanger the environment
- Explain the effects of activities that endanger the environment
- Explain environmental management practices

An Environment: Its anything that surrounds us both living and Non-living

HUMAN ACTIVITIES THAT ENDANGER ENVIRONMENT

- a. Rapid population growth that lead to **increased pressure** over natural resources
- b. Agriculture development that lead to use of **pesticides fertilizer** and other chemicals which upsets environment
- c. Industrialization that leads increased **waste production** and high use of fossil fuel
- d. Changing life style such as use of vehicles, air conditions and refrigerators that emit Dangerous gas in atmosphere
- e. Deforestation in order to create settlements or industry leaving the land bare
- f. Harmful bushfire that leads to destruction of habitat for wildlife



- g. Mining activities resulting in contamination of rivers such as Kayerekele Uranium mine which endanger life
- h. Increasing pollution due to increased consumption of resources

EFFECTS OF HUMAN ACTIVITIES THAT ENDANGER THE ENVIRONMENT

- Deforestation may lead to rapid soil erosion and hence affect productivity if the land
- Mining activities may lead to landslide
- Harmful bushfire may destroy animal habitat and cause them to die
- Water pollution may lead to scarcity of safe water for domestic purpose
- Releasing of gases from industries and other machinery may lead to global warming
- It may lead to depletion of ozone layer
- It may lead to contribute to arid rain in the atmosphere due to release of gases from industries
- It may lead to cholera due to water pollution

ENVIRONMENTAL MANAGEMENT PRACTICE

Its any activity that is under-taken in order to maintain and improve the state of the environmental resources affected by human activities

ENVIRONMENTAL PRACTICE IN MALAWI IN RELATION TO LEGISLATIVE PROVISION

- a. Environmental Impact Assessment (EIA):
 - a process carried out in an area before the implementation of any developmental project affecting environment
- b. Monitoring environmental quality:
 - This is carried out under the environmental management act by environmental affair department to inspect impact of an activity on environment
- c. Environmental Education and Public awareness:
 - It's carried out by EAD in sensitizing people on benefits of sustainable environment
- d. Private sector and community participation:
 - It operates under the National Council for the environment (NCE) in encourage participation in environmental protection by all people concerned
 - (i) Mobilize initiative and resources
 - (ii) Involves local community in planning
 - (iii) Scrutinizing any development projects to make sure it has no negative impact on environment
- e. Declaring environmental protection areas:
The Ministry of Natural resources and environmental affairs with NCE may declare a place protected in order to prevent any danger to it
- f. Issuing of environmental protection orders and imposing penalties;
The EAD may decide to impose punishment to individual who fail to comply with environmental protection

Other includes:

1. Encouraging family planning in order to reduce population growth
2. Encourage fish farming in order to reduce over fishing
3. Use for alternative source of energy of HEP
4. Re-using and recycling products in order to save the environment
5. Providing sanitation service e.g. rubbish bin, toilets etc.
6. Using improved agriculture technique in order to avoid land expansion
7. International cooperation in order to exchange ideas on environmental protection

FORESTRY

Success criteria;

- Explain the term forestry
- Identify major forests on a map of Malawi
- Explain the importance of forests
- Describe human activities that endanger forests
- Describe human activities that endanger forests
- Explain how forests can be maintained

It's a science and practice of creating managing using and caring for forests and their resource for human benefits

DISTRIBUTION OF NATURAL VEGETATION

- a. Savanna woodland
Common in places with Yellow and red soil
Common trees include Msolo, Muula Mombo and Msuku
Main uses include
 1. Firewood
 2. Timber for construction
 3. Fruits for consumption
- b. Rainforest
Common in the northern region: Nkhata bay and part of Mulanje mountain
Provide timber for construction
- c. Grassland
Develop mainly in the plateau areas
Trees include Mlindimila and Protæ
- d. Savanna grasslands
They contain abundant grass and few trees
Common on the rift valley
Common trees include Baobab (Mlambe), Njale, Nchonwe angola
- e. Thorn shrub
Vegetation protected by thorn
They are of little value such as making sense.

NOTE:

Acacia Savanna are common in places with thin fossil and low rainfall

FACTOR INFLUENCING DISTRIBUTION OF NATURAL VEGETATION

A. Climate

Places that receive high rainfall throughout the year are likely to turn into a rainforest

B. Soil

A nutrient rich soil would support the growth a variety of crops than thin soil

C. Topography

A steep gradient with thin soil may not support growth of a variety of plants

D. Drainage

Most trees would do well in well-drained soil however reeds may adapt in marshy as poor drainage soils

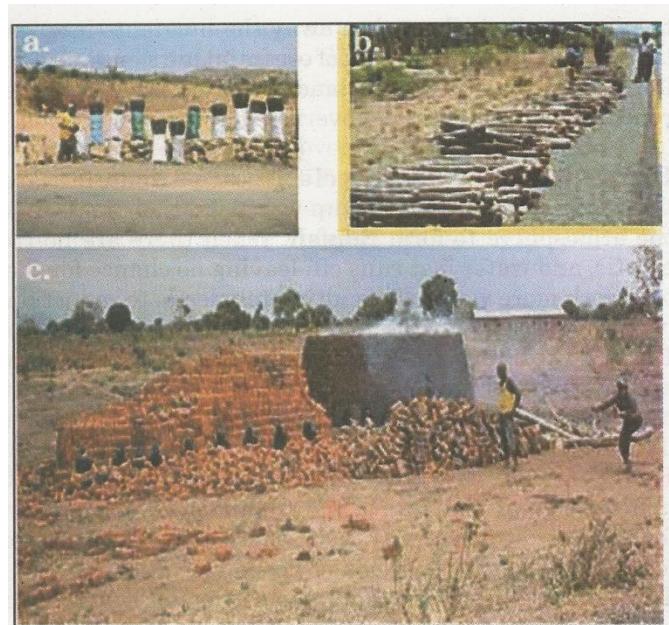
WAYS IN WHICH FORESTS ARE IMPORTANT

1. They provide shelter and home to wildlife e.g. birds
2. They help in exchange of gases in atmosphere
3. Help in soaking out water and reduce run-off
4. They help retain soil fertility through leaves decomposition
5. They provide protection to water shed hence help maintain river water source
6. They are a source of firewood, medicine and timber
7. Help beautify environment that attack eco-tourism
8. They act as wind break to strong winds
9. The help act as water filtrates before water discharge into a lake, hence help maintain clean water



HUMAN ACTIVITIES ENDANGERING FOREST

- a. Rapid population growth that result In increased demand of forest resources
- b. Increased uncontrolled felling of trees due to demand in furniture, firewood industries
- c. Expansion of urban settlements that take up traditional land hence lead to deforestation
- d. Setting up of bushfire that destroy forest
- e. Mining activities that leads to clearing of forests on mine sites



- f. Increased pollution due to release of gases from industries that affects forest with arid rains

EFFECTS OF DEFORESTATION

- It exposes soil to rapid soil erosion and land degradation
- It may contribute to disruption of the water cycle due to reduced evapotranspiration from destroyed forest
- Loss of biodiversity as some wildlife gets extinct due to changing climate following destroyed forestry
- It may lead to flooding and drought due to erratic rainfall
- It may lead to climate change due to increased accumulation of CO₂

CONSERVATION OF FOREST

- a. Controlling population growth that put pressure on forest resources
- b. Engaging in tree planting exercise to replace those destroyed
- c. Reusing and recycling products on order to control usage of forest resource
- d. Creating protected area of forest such as forest reserve
- e. Using alternative source of energy such as solar, HEP instead of firewood
- f. Good logging practice such as harvesting mature trees and leaving others to grow
- g. Making firebreak around a forest area in order to control wildfire
- h. Providing civic education to people living close to forest areas on need to protect forest

WILDLIFE

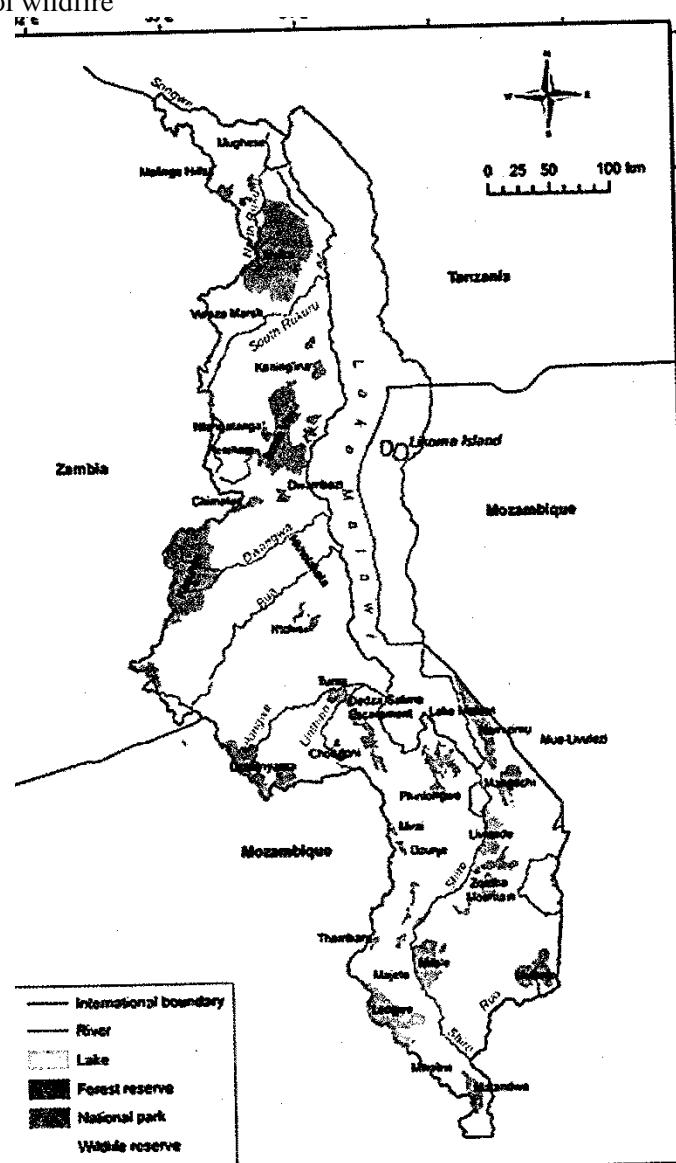
Success criteria:

- Explain the term wildlife
- Locate wildlife reserves in Malawi
- Explain the significance of wildlife
- Suggest ways of conserving wildlife

Wildlife: It's all animals, plants and other living things that live in a natural undomesticated state e.g. elephants, snakes, birds etc.

EXAMPLES OF WILDLIFE RESERVE

- Nyika National park
- Kasungu National Park
- Lake Malawi National Park
- Lengwe National park
- Majete Game reserve
- Nkhotakota Game reserve



- Vwaza marsh
 - 1. Nyika National Park
Largest park in Malawi
It has a number of zebra, leopards and hyena
 - 2. Kasungu National Park
It's a second largest national park
Animals common include elephants, lions, hyena, buffalo, zebra and impala
 - 3. Lake Malawi National Park
It's the first park in the water to give protection to marine animals
The most famous about the park is the colorful mbunaciclid fish (Mbuna) a rock dwelling fish
Other wildlife includes crocodile, hippos, black eagles and Bushback
 - 4. Liwonde National Park
It has a diverse wildlife such as swamps, lagoons and grassland
It is also home to large Elephants, protected black Rhinos and Impala
 - 5. Lengwe National Park
It lies in the savanna grassland
It is home of buffalo, kudu and baboons and other 300 species of animals
However sighting is difficult due to dense forest
 - 6. Nkhotakota Game Reserve
It is located along the great rift escarpment
It is home to lions, hyena, leopards, elephants and antelopes
 - 7. Vwaza Marsh game reserve,
It is located in the northern region border Zambia
It has large herds of buffalo, elephants, Impala and Hippos on L. Kazuni
 - 8. Majete Game reserve
Located in Chikwawa
Managed by African Parks Network
It is home of buffalo, Zebra, Eland, Nyala, Impala and Hippos
 - 9. Mwabvi Game reserve
Located in Nsanje District
It is home of monkey, baboon's and birds

Nature sanctuary

It's a place of refuge for wild animals that may be endangered by human activities e.g. Lilongwe nature Sanctuary

IMPORTANCE OF WILDLIFE

- Provide food in term of fruits
- Maintain ecological balance in the environment
- They are of economic value since they provide timber for sale
- They help in production of medicine
- Provide raw-materials for making shoes, jackets

- They are important for scientific study
- They help provide aesthetic value that attract tourism
- Other wildlife have a spiritual or cultural significance such as lions

HUMAN ACTIVITIES THAT ENDANGER WILDLIFE

- a. Rapid population growth that lead to increased demand for wildlife resources
- b. Agriculture impulsion that leads to destruction of habit and draining of wetland
- c. Rapid urbanization that leads to increased demand of land for settlements
- d. Pollution due to poor waste disposal that interfere with aquatic life
- e. Acts of deforestation where habitat for wildlife are destroyed
- f. Setting of harmful bushfire that kill and destroy habitat for wildlife
- g. Illegal hunting of endangered species of animals that lead to extinction

CONSERVATION OF WILDLIFE

- Creation of protected areas such as National areas and forest reserve
- Using alternative source of energy such as solar and electricity in order to reduce deforestation
- Awareness and mass education on the need to protect the wildlife

SOIL

Success criteria:

- Explain the different characteristics of soil types
- Describe soil profile
- Explain the importance of soil
- Explain ways of conserving soil

Soil is a thin layer on the earth surface on which plant grow

TYPES OF SOIL

1. Sandy soil
2. Silt soil
3. Clay soil

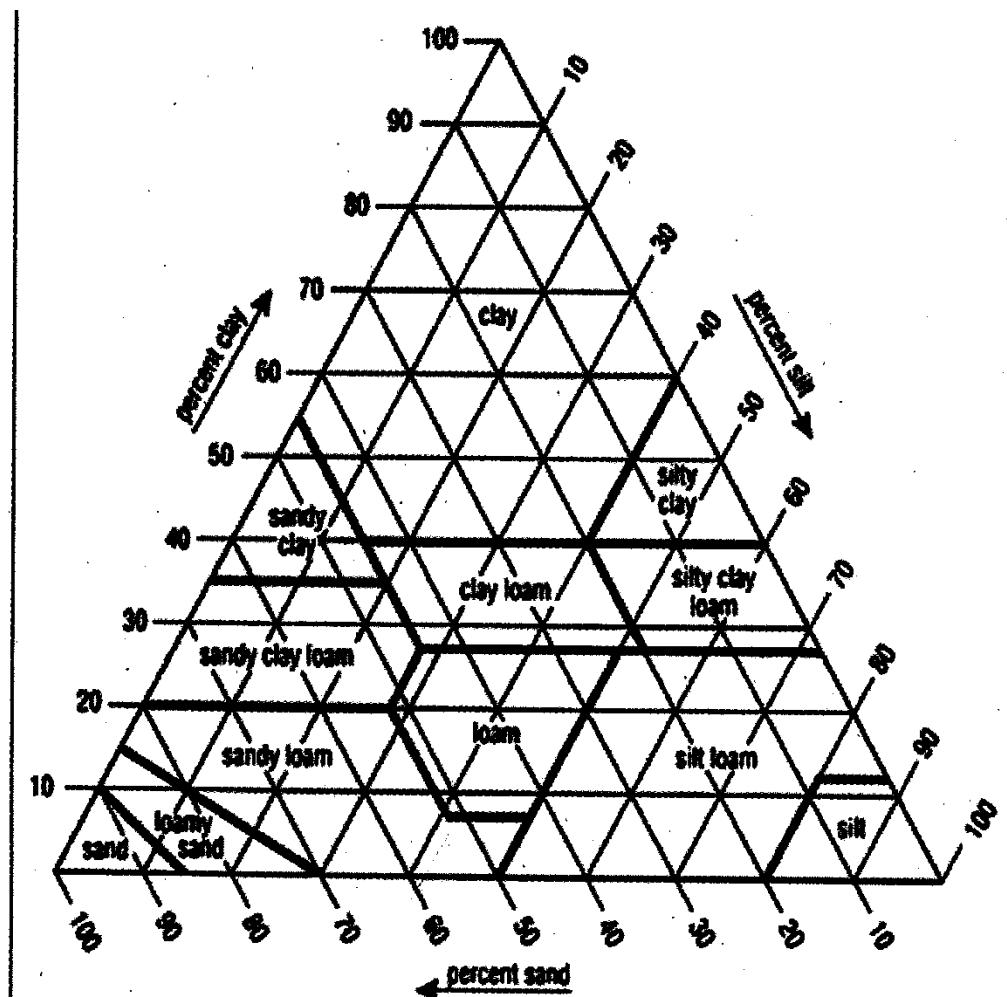


Figure 135: Soil Triangle
triangle chart works as follows:

4. Loam soil

SANDY SOIL

- It has large particles
- It has good aeration
- It doesn't hold water

SILT SOIL

- It has medium sized particles
- It has smooth and sticky particles

CLAY SOIL

- It has very tiny particles
- It has poor aeration
- It holds water for a long time

LOAM SOIL

- It's a mixture of clay, silt and sand soil.
- It is easy to till and retains nutrients
- It is a perfect balance of all types of soil hence ideal soil for agriculture purpose

SOIL PROFILE

It's a cross section of the soil that reveals the textural distinct layers of soil from the ground downwards to where soil meets the underlying rocks

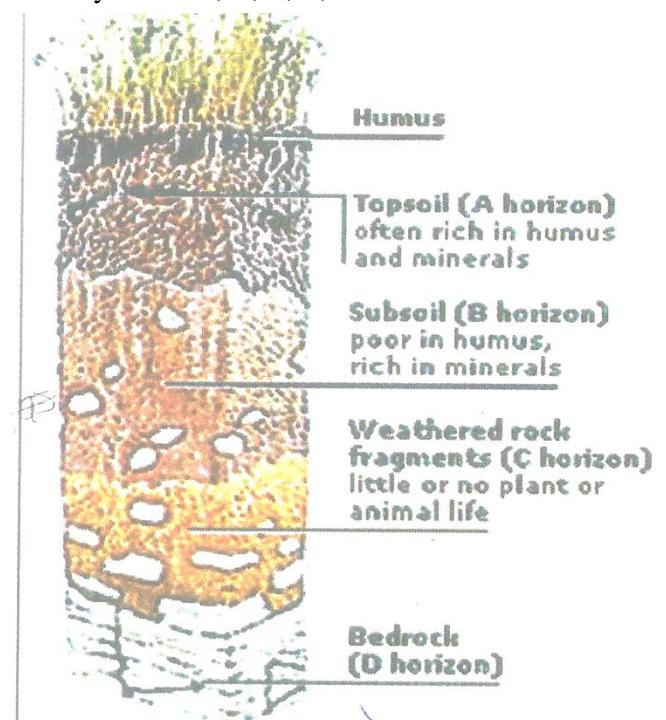
The soil profile is made up of five layers or Horizons represented by letters O, A, B, C, D

"O" HORIZON

- It's made up of organic matter such as leaves that decompose
- It is dark and rich in nutrients
- The organic matters help to hold moisture and prevent erosion
- It supports plant growth of a variety of species

"A" HORIZON

- It is mostly used for agriculture purposes
- It contains some elements of horizon "O" due to leaching



- It make-up surface layer for a variety of soil in Malawi

“B” HORIZON

- It is a sub-surface horizon that has accumulated from above layer
- It's a site of deposition of certain minerals leaching from above

“C” HORIZON

- It is the least weathered material horizon
- It has unconsolidated loose parent material

“D” HORIZON

- Its weathered parent rock
- Mostly made up of rocks

WAYS IN WHICH SOIL IS IMPORTANT

- Help anchor plant
- Help provide nutrient for crop growth
- It is home to beneficial organism
- Help provide raw-material for construction work
- They are also of economic value for making pots and cups for sale
- They contain important minerals such as uranium

HUMAN ACTIVITIES THAT CAUSE SOIL EROSION

- a. Deforestation that leaves soil bare and expose it to erosion by run-off
- b. Harmful bush fire that destroy vegetative cover to soil
- c. Cultivation on steep slope that gave increased run-off
- d. Overgrazing of land that other exposes the soil to run-off
- e. Construction work that result in compaction of soil which reduces aeration
- f. Emission of gases that leads to increased pollution and cause acid rain which eventually destroy vegetation and affect soil

WAYS OF CONSERVING THE SOIL

- a. Increasing vegetative cover of the land surface in order to control run-off
- b. Planting trees that act like windbreak in order to reduce soil erosion by wind
- c. Contour farming on hilly planes in order to reduce run-off
- d. Leaving of crop residue after harvest so that as they decompose they could lead to soil fertility
- e. Aiding plenty of compost or organic manure to the soil in order to improve its nutrients

ENERGY

Success criteria:

- Explain types of energy
- Explain the importance of energy
- Explain ways of conserving energy resources

Energy is the capability to do work (ability to do work)

TYPES OF ENERGY

They are divided into two groups

a. Renewable :

- Biomass
- Hydropower
- Geothermal
- Solar
- Wind

b. Non-Renewable:

- Nuclear fuel
- Fossil fuels
- Oil products
- Natural gas
- Coal

BIOMASS

It's the energy that comes from decomposing vegetation material

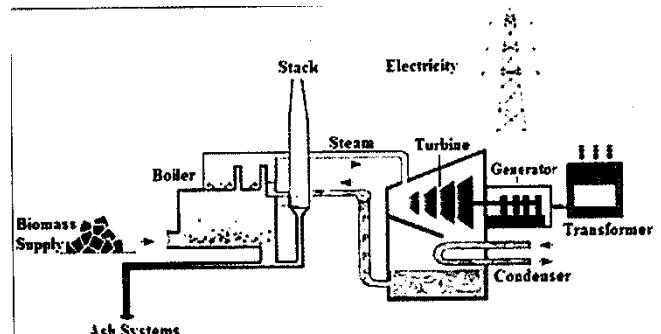


Figure 144: Biomass power

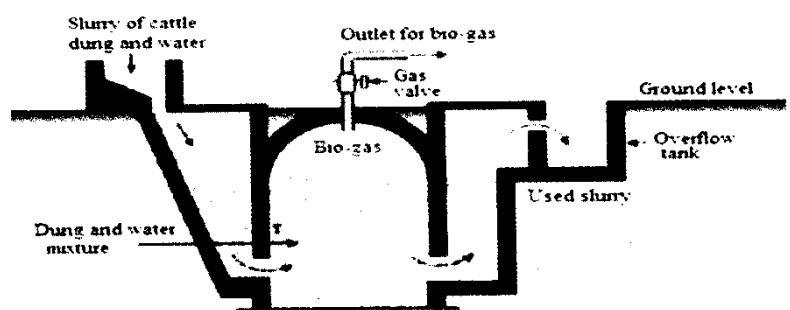


Figure 145: Landfill biomass

HYDRO POWER

It's the energy that comes from a water head that drive turbine

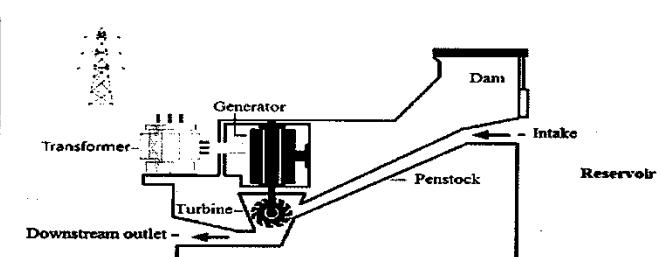


Figure 146: Hydroelectric power plant

GEOTHERMAL

It's the energy that comes from a geyser which is used to generate power

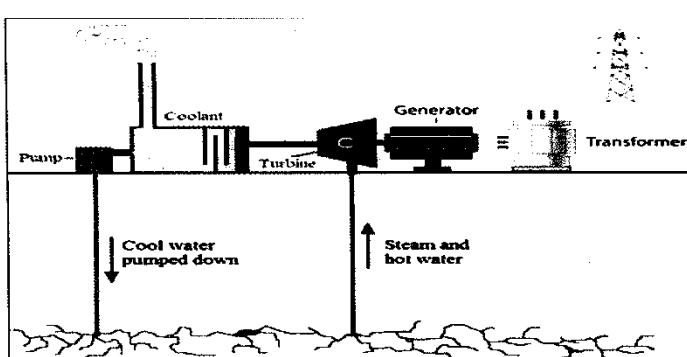
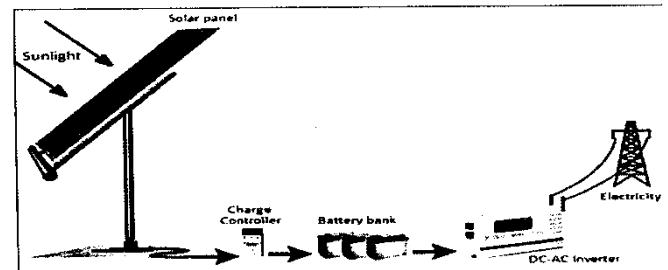


Figure 147: Geothermal power plant

SOLAR

It's the energy that comes from the sun using solar panel



WIND

It's the energy that comes from Uranium rods that react in a chamber to produce abundant energy

FOSSIL FUELS

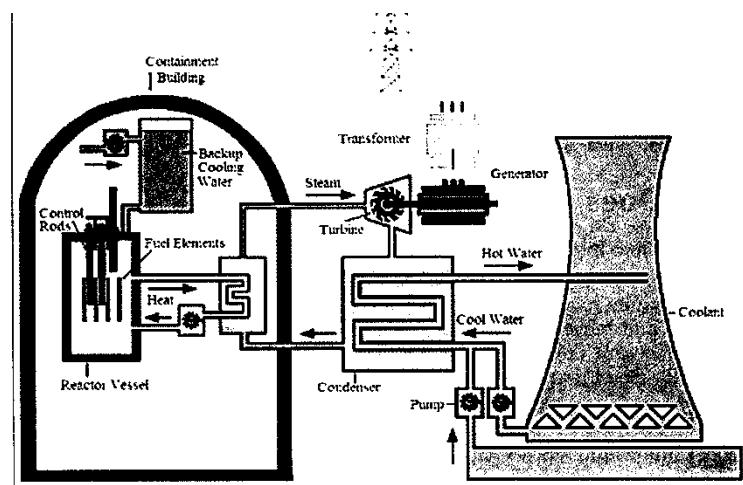
It is the energy that comes from petroleum products such as petrol, diesel and paraffin

COAL

It's the energy that comes from burning of fossils fuel

NUCLEAR FUSION

Produced through bombardment of nuclear atoms by a chain of reaction causing production of abundant energy



WAYS IN WHICH ENERGY IS IMPORTANT

- It helps in homes for domestic purposes such as cooking, heating and lighting
- It helps in industrial developments such as manufacturing industries
- It helps in transportation and aviation fuel
- It helps in communication gadgets such as radio, phone, TV among others
- Help in hospitals such as microscope and operating theaters
- It is also important in agriculture for pumping of water and tractors
- It is also used in cooking system such as Fan, air condition

WAYS OF CONSERVING ENERGY

- Encourage using public transport to reduce pressure
- Planting trees to restore fuel wood source
- Turning power off when not in use
- Recycling and re using products in order to save energy
- Using alternative form of energy to reduce pressure over non-renewable energy sources
- Using energy saving bulbs
- Controlling population growth in order to reduce pressure over energy sources

HYDRO ELECTRIC POWER

Success criteria:

- Locate hydro-electric power sites in Malawi
- Explain the factors ideal for the generation of hydro-electric power
- Explain how power is generated and distributed at either Nkula or Tedzani
- Assess the challenges associated with the generation, transmission and uses of hydro-electric power in Malawi

Most of HEP are located along the shire river especially in the middle section

The power station include:-

1. Nkula A 24 megawatts
2. Tedzani 1 29 megawatts
3. Nkula B (i) 60 megawatts
4. Nkula B (ii) 20 megawatts
5. Nkula B (iii) 20 megawatts
6. Wovwe 4.5 megawatts
7. Tedzani (iii) 50 megawatts
8. Kapichila 64 megawatts

TOTAL 282.5 megawatts

FACTORS IDEAL FOR GENERATION OF HEP

- a. Large volume of water with a regular flow all year
- b. Fast flow of water to provide enough water-head (Powerful force)
- c. Waterfall and steep gradient are good because of natural water-head
- d. Proximity to a large market for consumption
- e. Deep valley for construction of high dams for holding water

REASONS FOR CONSTRUCTION OF POWER PLANT AT NKULA

- a. There is a large volume of water from shire river
- b. It Is located on the middle sector of shire where water flows fast
- c. The presence of Nkula water fall which is ideal for the HEP
- d. Nkula is located close to commercial city
- e. They are located along deep valley for easy construction of dams

GENERATION AND DISTRIBUTION OF H.E.P. FROM PLANT SITES

- Water from a river is directed through an underground tunnel that leads water into **surge chamber** (temporally storage).
- From the surge chamber water is directed through the **valve House** which controls flows of water down penstock
- From the valve house Water goes to the **turbine** at a fast speed down stream
- As the water drives the turbine at high speed power is generated in the **generator** and ready for transmission using **step-up transformers** to increase voltage
- Water is then discharge through the **tailrace** (spillway)

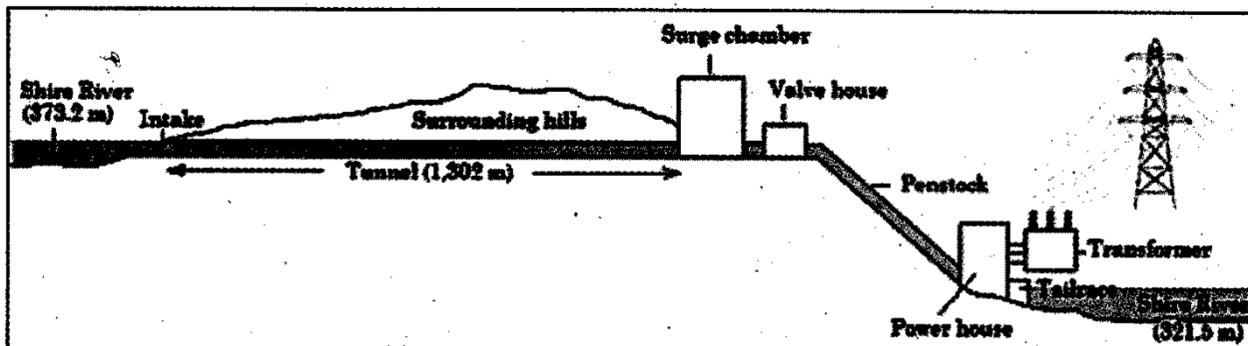


Figure 151: Section of Nkula power station

Substation located in urban areas help in stepping down power for domestic consumption using step-down transformers

Power is transmitted through transmission **cable lines** to consumers over long distance

CHALLENGES ASSOCIATED WITH GENERATION, TRANSMISSION AND USE OF H.E.P.

1. Siltation of river that affect storages capacity of river and reduce required water-head
2. Frequent drought that reduces water-level in Lake Malawi and shire river
3. Increased flooding that affects transmission of power with falling poles and also increased debris in the power plant
4. The aquatic weeds such as water hyacinth that may affect generation of power
5. Vandalism of transformers can be expensive to retain
6. Conflicting government policies and encroachment into river banks that increase siltation

POSSIBLE SOLUTIONS TO CHALLENGES ASSOCIATED WITH THE GENERATION TRANSFORMATION AND USE OF H.E.P

- a. Planting of trees to reduce erosion caused by siltation
- b. Enhancing water resources management for Shire river such as control pollution and removing of water hyacinth
- c. Dredging Out trash to control siltation of rivers
- d. Encourage use of alternative source of power e.g. solar
- e. Civic education on the danger of vandalism of transformers
- f. Reporting and arresting anyone involved in vandalism of power cables and transformers

MINERALS

Success criteria:

- Explain the term minerals
- Explain the importance of minerals

Minerals: are solid organic substances that occur naturally in rocks and in the ground and have their own chemical properties and appearance

ORE

It's a rock that contain enough minerals to make economically viable or feasible for extraction and purification into desired product

CHARACTERISTICS OF MINERALS

1. Occur naturally in nature and not man made
2. They are inorganic matters therefore coal and sugar are not minerals since they come from plants
3. They are solid under normal room temperature
4. They have orderly internal structure i.e. atoms arranged in an orderly form
5. They have a chemical composition, thus made up of one elements e.g. gold, diamonds, copper

TYPES OF MINERALS

1. Metallic minerals grouped into two: i). ferrous (rich in Iron) Nickel, Iron platinum, chromatics
(ii). Non- ferrous (no Iron), copper, tin Aluminum)
2. Nonmetallic minerals (don't have metals) e.g. Phosphate salt etc.

FORMATION OF MINERALS

1. Crystallization process from the melt (magma)
2. Sedimentation of weathered rock materials
3. Metamorphic process
4. Solution process such as leaking of minerals

WAYS IN WHICH MINERALS ARE IMPORTANT

Mineral	uses
1. Aluminum (foil)	cosmetics , beverage, can, deodorants, hand lotion, ant-acid, cooking pots
2. Copper	wire pipes, cooking pots, old gutter and roof bran pennies
3. Fluorite	toothpaste, drinking water
4. Gold	dentistry, jewelry, computer electronics
5. Gypsum	wall board plaster
6. Halite (salt)	food preservatives de-ice
7. Iron	cosmetic, fair dye steel,
8. Lead	car batteries, computer fuel tanks, T/V tube, leaded glam x-ray shields fishing sinker
9. Mica	paints, hair dye, cosmetic, soap, electronic
10. Molybdenum	fertilizer filaments, support in light bulb steel
11. Nickel	nickel coins, stainless steel, alnico magnets, sheetrock
12. Phosphate	fertilizer, dishwashing, detergents, laundry detergent

13. Potassium (Potash)	fertilizer, toothpaste
14. Silica	computer chips, glam, cosmetic, antacids, paints, laundry detergent, drain cleaner, quartz watches
15. Silver	photography developer, jewelry, electronic silverware, dentistry
16. Sulphur	fertilizer, matches, car tires
17. Titanium paint	cosmetic hand lotion, soap, toothpaste, hair dye, bug spray, premier
18. Tungsten	filaments in light bulbs, drill bits (tool steels)
19. Zinc	sun block, fertilizer, cosmetic dandruff, shampoo, pennies, galvanized metal brass, dry-cell batteries

FISHING IN MALAWI

Success criteria:

- Explain the importance of fish
- Identify human activities that endanger fish resources
- Explain ways of preserving fish
- Locate the major fishing grounds of Malawi
- Explain methods of catching fish
- Assess the economic importance of fish in Malawi
- Explain ways of conserving fish

Location of fishing grounds

1. Shallow southern part of Lake Malawi e.g. Salima
2. Mangochi
3. The shallower lake Malombe
4. Shallow lake Chirwa
5. The shire river and other river in Malawi

TYPES OF FISHING IN MALAWI

- a. Recreational fishing done as a sport or pleasure
- b. Subsistence fishing done for consumption as food
- c. Commercial fishing done on large scale e.g. MALDELO

IMPORTANCE OF FISH

1. It creates employment opportunity for the large masses of people
2. It has led to the growth of small scale industry such as boat builder, canoe
3. It has led to availability of cheap proteins found in fish
4. It is a source of income and earn Malawi foreign exchange through exports
5. It is important for recreation that attracts tourist for fishing in lakes
6. They are raw material for processing of food for chicken and pigs

HUMAN ACTIVITIES ENDANGERING FISH

1. Overfishing leading to depletion of fish resources
2. Construction of development works such as ports and hotels along the beach that affect fish bleeding places
3. Siltation of fishing grounds due to continuous deforestation that affect home for aquatic life
4. Water pollution from agriculture water-runoff of chemicals and fertilizer that affect the quality of water
5. Climate change that is forcing fish to migrate to other cool areas hence affecting fishing grounds

WAYS OF PRESERVING FISH IN MALAWI

1. Sun drying
2. Smoking
3. Freezing
4. Salting
5. Packing of fish in ice blocks

METHOD USED TO CATCH FISH



Figure 161: Villagers smoking fish

a. TRAWL NETS

A conical shaped net with a wide opening on one end and enclosed on other side is pulled along the by a boat and fish gets trapped in the net (see Below).

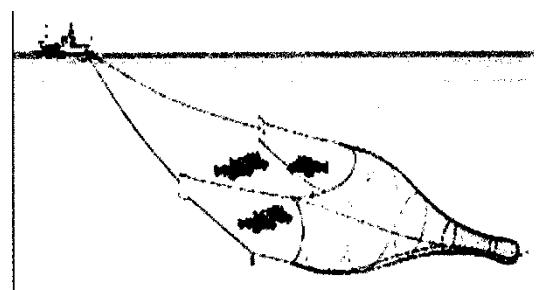


Figure 155: Trawl net

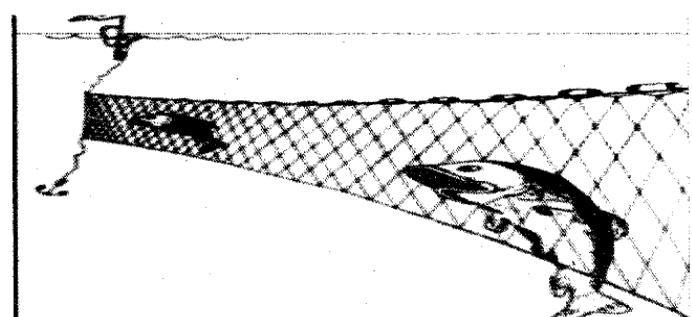


Figure 156: Drift net

b. DRIFTING/GRILL NET

It's a fishing method where by fish are caught by their gills as they try to pass across a stretched and hanging net in a lake/sea

SEINE NET

It's a fishing net that is normally used by two fishing boats which drop the net surrounding a school of fish

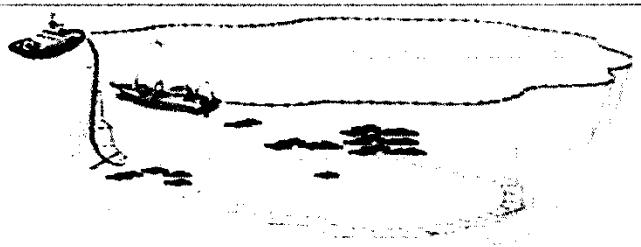
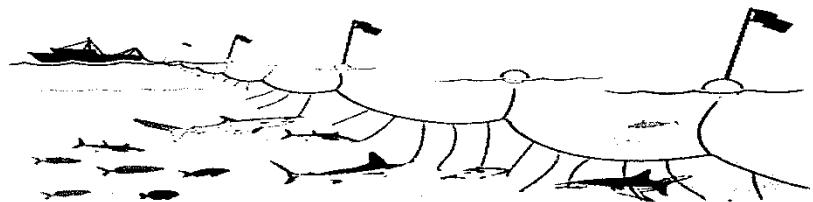


Figure 157: Seine net

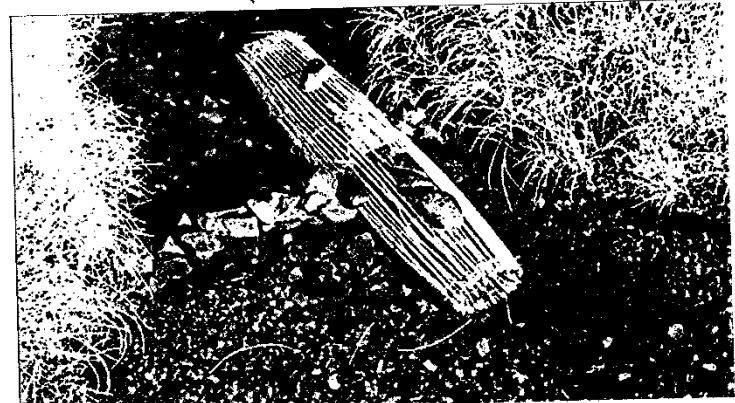
c. LONG LINES

Baited hooks are attached together to a long line by short lines called snoods that hang off the main line. The long line can be 10km long and carry thousands of hooks (see Below)



d. TRAPS

These are weaved buckets like structure that are used to trap fish in shallow water. Once fish has entered into the trap it may not come out. Traps are usually placed at a river mouth.



WAYS OF CONSERVING FISH RESOURCES

- Providing an alternative economic opportunity for lake shoe people
- Public campaign on the dangers of overfishing
- Creating of fish reserve such as Lake Malawi National park at cape Maclear
- Regulating fishing activities by observing closed season
- Encouraging fish farming in order to increase fish production
- Planting trees that prevent/reduce run-off that may cause siltation of fishing grounds

NATURAL DISASTER IN MALAWI

- Identify natural disasters that are common in Malawi
- Explain the effects of natural disasters
- Explain precautionary measures against natural disasters
- Explain the term disaster risk management

COMMON NATURAL DISASTERS IN MALAWI

- Floods**: especially in the lower shire due to overflowing in shire river
- Droughts**: that often affects Chikwawa and Nsanje due to low rainfall

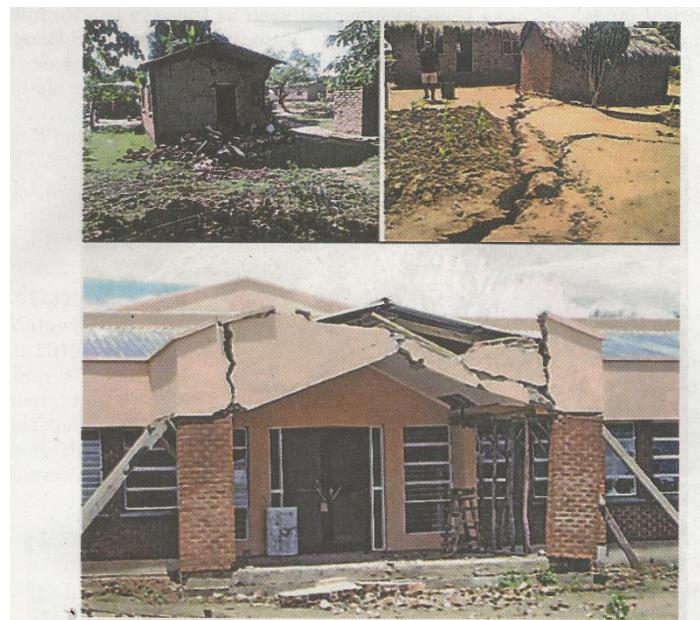


Figure 166: Damaging effects of the 2009 earthquake in Karonga

3. **Earthquake** : that are common along the rifts valleys such as one that hit Karonga in 2009
4. **Landslide**: like one that took place in Phalombe (Napolo)
5. **Storms/cyclone**: Malawi was worse affected by cyclone called Funso that affected several famines in (2012) and killing several people

EFFECTS OF NATURAL DISASTER

- a. Floods and earthquake destroy crops and damaging the sewage system causing water pollution
- b. Floods may put people at risk of water bone diseases such as Cholera
- c. It leads to damage of a number of infrastructure such as roads making communication difficult
- d. The government spend a lot of money trying to rehabilitate damaged property by floods
- e. It kills people and damage property making people helpless in life
- f. Wild fire from volcanic eruption may damage forests and kill people
- g. Drought may affect the water supply at H.E.P
- h. It leads to destruction of markets, food crops, schools, hospitals

PRECAUTIONARY MEASURES AGAINST NATURAL DISASTERS

- i. Sensitizing people of the early warning signs, so that people may move safely
- ii. Providing civic education to people on how to handle disaster such as floating houses in case of floods
- iii. Construction of reservoir for water in order to regulate water flow in rivers (Dam Construction)
- iv. Practicing afforestation to reduce siltation of rivers that may cause floods
- v. Go under a table or bed in case an earthquake starts shaking
- vi. Avoid construction of building in flood prone areas
- vii. Remove any loose material that may easily be blown by wind
- viii. Disconnect power lines when a strong wind starts blowing to avoid damage
- ix. Keep an emergency kit with you in case of natural disaster

DISASTER RISK MANAGEMENT

It's a systematic process that is used to organize resources in order to reduce or avoid the danger of natural disaster.

WAYS OF MANAGING DISASTER RISK

a. Prevention (Mitigation)

This involves the construction of dykes, planting of trees and construction of a meteorological observation system to monitor risk.

b. Preparedness (readiness)

This involves getting organized with resources in order to reduce the impact of a risk e.g. food reserve, emergency kit and public awareness

c. Response

It involves the acting on the disaster in order to rescue the survivors

Provision of food, water, medical care and shelter

d. Recovery (Rehabilitation)

It involves trying to bring back people to normal life by rebuilding their homes and strengthening their capacity through loan or financial help

POPULATION OF MALAWI

Success criteria:

- Describe the population composition of Malawi
- Explain factors that influence population distribution in Malawi
- Describe factors that influence population density in Malawi
- Determine factors that influence rapid population growth in Malawi
- Explain the effects of rapid population growth in Malawi
- Suggest strategies for controlling rapid population growth in Malawi

Population composition

- It is made up of people from different **age/sex group** and young/old
- It is also made up of people from different **religion** such as Christianity, Islamic and Africa Traditional religions
- It has people from different **ethnic group** such as Tumbuka Yao, Sena, Chewa, Ngoni, Nyanja etc
- It has people from different **occupations** farmers, accountants, doctors

FACTORS INFLUENCING POPULATION DENSITY IN MALAWI

a. RELIEF

People prefer occupying places that are not difficult to access by roads and have fertile soils

- b. Natural water resources such as along Lake Malawi and shire river where water may be used for irrigation

- c. Soil condition

Fertile soil may attract more people for settlements than poor soil hence Lilongwe and Kasungu have a dense population

- d. Thick forest vegetation

These discourage settlement due to dangerous animals

- e. Mineral resources: may attract more people to a particular area for example Uranium mine in Karonga'

- f. Presence of TseTsefly may discourage people for settlements especially livestock farmers

- g. Urban centers such as Blantyre, Lilongwe and Mzuzu have attracted more people for settlements
Note:

Population Density

It's the average number of people per square kilometer

Population density is the basis of measuring population distribution

Population Density = Total Population ÷ total land area

Population density describes the number of people per unit area while population distribution is the location of people in different areas with some being concentrated while other less concentrated

population density of Malawi

Area=94276Km²

Population=16.3 Million

$$\text{Population density} = \frac{\text{population}}{\text{area}}$$

$$= \frac{16,300,000}{94276}$$

$$= 172.9 \text{ people/km}^2$$

FACTORS INFLUENCING RAPID POPULATION GROWTH IN MALAWI

1. Natural increase

- Early marriages
- Polygamous marriages
- Sex preference
- Lack of access to use contraceptive
- Cultural practice such as wife inheritance

2. Migration

- Coming in of Indians, Chinese,

GRAPH OF POPULATION GROWTH

EFFECTS
OF RAPID

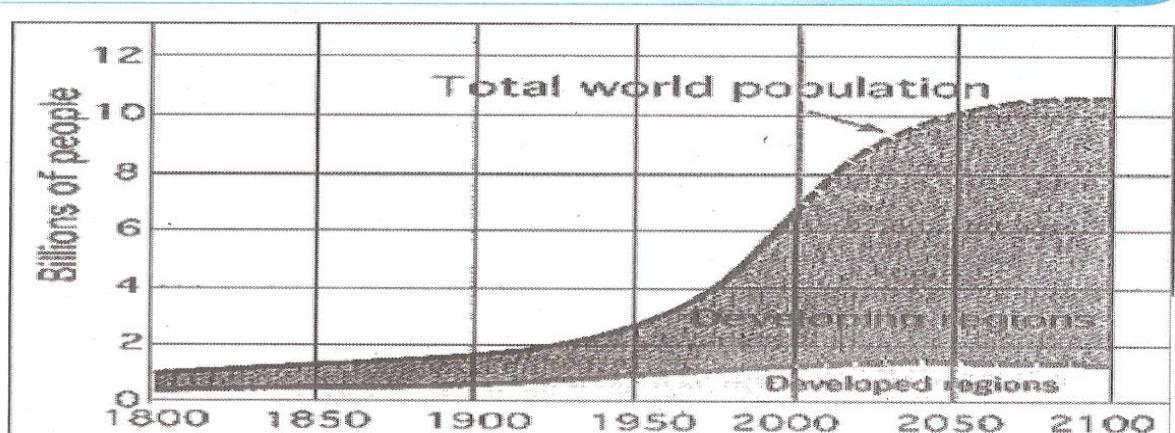


Figure 170: World population growth

POPULATION GROWTH IN MALAWI

- a. Wide spread unemployment in the country
- b. Pressure over basic facilities such as health, education and transport
- c. Environmental degradation as people engage in deforestation for farming and settlements

- d. Climate change due to increased demand for fossil fuels, biomass it leads to pollution of air hence global warming
- e. Increased frequency for disaster such as floods, drought that reduces the economy of a country as the government struggle to provide the needs of its' growing population

WAYS IN WHICH IT IS IMPORTANT TO CONTROL RAPID POPULATION GROWTH

- a. It may improve people access to essential service
- b. It reduce energy consumption hence minimize pollution and control effects of climate change
- c. It help reduce government expenditure on health, education and other service
- d. It encourage investment in permanent infrastructure by government due to improved savings and reduced expenditure

STRATEGIES FOR CONTROLLING RAPID POPULATION GROWTH IN MALAWI

- A. Encouraging girl education in order to delay marriage
- B. Improving living standards of people so that people may find no reason for bearing more children
- C. Encouraging access to family planning service in order to control birth
- D. Establishing of laws and legislation measures against too many children
- E. Set up marriageable age by law and enforcing it if possible

INDUSTRIES IN MALAWI

Success criteria:

- Explain the meaning of the term industry
- Classify industries in Malawi
- Explain factors that influence the location of industries in Malawi
- Explain the importance of industries to Malawi

An industry is an organized activity that utilizes available resources to provide the goods and service we require to meet our daily needs.

EXAMPLE:

Mining industry
Farming industry
Tourism industry
Manufacturing industry
Banking industry

Note:

Every industry is regarded as a system in the sense that it has:

Inputs
Process
Outputs

CLASSIFICATION OF INDUSTRIES

This depends on the level of production

1. Primary Industry (Extractive)

It is concerned with the extraction of material from nature (Land/sea) e.g. mining, fishing, forestry, farming

2. Secondary industry (manufacturing)

It normally turns raw materials into new products

It is sometimes referred to as manufacturing industries

Demand more raw materials into new products e.g. tailoring, car manufacturing, textile, brick making, and construction

3. Tertiary industries

They are mainly concerned in the provision of service to the public

Example: transportation, health (education), banking tourism

4. Quaternary industries

They are knowledge based sectors of economy

They are mainly involved in improving knowledge in order to enhance production

They conduct research and evaluation of information and help in proper decision making

Example: of quaternary

- computer programming
- Biotechnology
- Consultancy
- Malawi Bureau of Standards (MBS)

FACTORS INFLUENCING THE LOCATION OF INDUSTRIES

1. Availability of raw materials for instance the Illovo sugar factory at Nchalo
2. Presence of cheap labor e.g. Mulanje and Thyolo tea factories
3. Presence of market for manufactured goods e.g Brantyre, Lilongwe and Mzuzu
4. Presence of a power supply such as Nkula HEP close to Blantyre
5. Cheap land for easy expansion by the industry
6. Access to transport facilities roads and railway
7. Government policies on taxation and other incentives
8. Capital that is needed for investment by an industry
9. Political stability most industries will be located in places that there is peace

IMPORTANCE OF INDUSTRIES IN MALAWI

1. Create employment opportunity for masses of people
2. They lead to proper utilization of resources e.g. sugar cane into sugar + molasses into ethanol
3. It lead to development of agriculture technology through machinery, chemical fertilizer etc
4. It lead to technological development through research and innovation to enhance production
5. It lead to growth of towns and infrastructure that act as center for consumption

6. They have led to the improved standard of living as people access markets for their goods and services in the society

NEGATIVE EFFECTS OF INDUSTRIES

- a. They contribute to environmental pollution of water as well as air
- b. They contribute to the development of most deforestation their aerial expansion
- c. They lead to stressful and unpleasant environment due to noisy and dust fumes
- d. They have also led to unemployment due to their use of machines
- e. They have contributed to rapid resource depletion as more people demand for better products

TOURISM IN MALAWI

Success criteria;

- Explain the term tourism
- Explain factors that promotes tourism in Malawi
- Assess the impact of tourism in Malawi
- Analyse the challenges facing the tourism industry in Malawi

TOURISM:- It's the temporary movement of people to different destinations for leisure, business or any other purpose.

Tourism Industry: Its' the total income earned in a country through travel and visits

TYPES OF TOURISM

1. Mass tourism:
It's a popular tourist destination such as lakeshore ie beach
This may create employment opportunities in hotels and holiday resorts
However it may lead to increased pollution in the area
2. Ecotourism (Responsible)
It involves visits to see or observe nature eg forests, local people, game reserves
It involves shared benefits with people or environment by the traveller
3. Cultural /Rural Tourism:
It involves visits to places where people have unique culture in order to interact with them.
It include participation in folktale, crafts, nature and livelihood and learning from each other
4. Adventure tourism:
It involves travel to a place in order to participate in an adventure sport such as mountain sports eg hiking (climbing)
5. Health / Wellness tourism:
People may travel to a new environment in order to get released or reduce stress
It may mean travel to a lonely place away from noisy environment

TOURISM CENTERS IN MALAWI

They include:

1. The lake Malawi, its attractive Islands, beaches, in Mangochi and Monkey Bay, the clear water, fine sand, fishing sport and swimming pools as well as angling sports
2. National parks, wildlife and forest reserves eg Nyika, Kasungu, Lengwe and Lake Malawi National Parks
3. Historic sites such as Nguludi Mission, Cape Maclear
4. National features such as Mountaineering, horse riding angling and aquatic sports, skiing and yatching, scuba diving
5. Urban attraction such as Blantyre, Lilongwe and Mzuzu Cities meant for leisure, commerce and entertainment

DIAGRAM

FACTORS PROMOTING TOURISM DEVELOPMENT

- Beautiful scenery such as mountains, lakes rivers and National parks
- Good accommodation in Lodge, hotels and resorts
- Good transport connecting with other places such as Airports, travel Agents
- Advertisement of tourism attractive centers abroad
- Good climatic conditions warm sunny weather which attracts foreigners
- Political stability, where tourists are assured of security of their lives

IMPACT OF TOURISM IN MALAWI

Positive:

- ✓ Source of foreign exchange income
- ✓ Creates employment opportunities for local people in Hotels and travel agents
- ✓ It has lead to the development of road-network
- ✓ It has also promoted cultural awareness of our local traditions to the outside world
- ✓ Income generated from tourism has been used to develop roads and airports as well as improving sanitation in the country
- ✓ It has also helped encourage protection and conservation of wildlife

Negative :

- ✓ It has led to unnecessary use of water resources such as that used in swimming pools and golf-course
- ✓ Construction of hotels along beach has also created pollution to the environment
- ✓ Tourism industry encourages traffic congestion in towns and city's roads
- ✓ Tourism has led to the increased cost of living where demand for local goods has increased
- ✓ Tourism industry is seasonal hence not reliable
- ✓ It has led to increased social problems such as increased drug and substance abuse including prostitution
- ✓ Tourism has led to erosion of local traditional culture through changed life-style

CHALLENGES FACING THE TOURISM INDUSTRY IN MALAWI

- a. Lack of internationally recognized accommodation in towns and cities
- b. Lack of adequate infrastructures such as roads, airports and railways
- c. Lack of incentive for private investment in tourism
- d. Shortage of qualified people to manage hotels and resorts
- e. Deforestation that depletes attractive centers
- f. Opening of new markets in neighbouring countries that have increased competition
- g. Reduction in places of interests due to illegal hunting
- h. Unplanned lakeshore development in form of cottage for individual that have affected tourism development

SOLUTION TO CHALLENGES FACING MALAWI IN TOURISM INDUSTRY

- (a) Conserving wildlife and other natural aesthetic resources
- (b) Providing appropriate infrastructures such as roads ,airports etc
- (c) Allocating adquate financial resources to tourism industry
- (d) Promoting incentives for local people to invest in tourism
- (e) Encouraging safety and security for visitors
- (f) Raising awareness to local community on the benefits of tourism
- (g) Conducting effective marketing and promotion of the country's places of interests

COMMUNICATION IN MALAWI

Success criteria:

- Identify means of communication in Malawi
- Explain the advantages of the different means of communication
- Explain the importance of communication in Malawi

Communication:

Its' a process of exchanging information, ideas, thoughts and feelings through speech or signals

MEANS OF COMMUNICATION

- Cellphones
- Television
- Letters
- Emails or computers
- Facebook
- Radios

ADVANTAGES & DISADVANTAGES OF EACH MODE OF COMMUNICATION

(a) CELLPHONES

Advantages:

- Fast
- Cheap over long distance

- Accessible ie no need of long cables
- It is convenient and private

Disadvantages:

- Expensive in terms of airtime
- Affected by network
- May not work without battery
- Easy breakdown

(b) TELEVISION

Advantages:

- Use both visual and verbal communication
- Easily understood by both literate and illiterate people
- Easy to access world events

Disadvantages:

- Expensive to buy
- May not be used without electricity
- Language used may be difficult to understand
- May lead to immoral behavior through pornographic materials

(c) LETTERS

Advantages:

- It is very cheap to use
- It can be stored for future reference
- Commonly used for official purposes

Disadvantage:

- It is too slow
- It may favor those who are able to read
- It can get torn

(d) EMAILS

Advantages:

- Too fast
- Link people across the globe
- Information may be stored

Disadvantages:

- Too expensive
- May be affected by network
- Only work if both people have email address

(e) FACEBOOK

Advantages:

- Easy to access
- Link people who were lost and missing
- Fast mode of communication

Disadvantages:

- Affected by network
- No privacy
- Expensive to buy the phone

(f) RADIOS

Advantages

- Fast
- Accessible in rural areas
- Understood better if language used is local (vernacular)

Disadvantages:

- Expensive to buy
- May need batteries or electricity to use
- Message may not be stored

WAYS IN WHICH COMMUNICATION IS IMPORTANT

- 1) It links people and save time
- 2) It helps people share information and ideas
- 3) It helps people access higher education through internet
- 4) It helps bring people's awareness in development
- 5) It enhances socio-economic development through advertisement of goods for sale
- 6) It enhances conflict resolution through signing of appropriate documents

PROBLEMS FACED WITH COMMUNICATION IN MALAWI

- 1) High communication costs that prohibits usage
- 2) Vandalism of telecommunication cables
- 3) Inadequate infrastructure for providing effective communication services in rural areas
- 4) Lack of maintenance of existing infrastructure due to lack of technical know-how
- 5) Rapid change in technology rendering most communication gadgets in Malawi out-dated or useless
- 6) High illiteracy rate among Malawians affecting access to information and their usage

POSSIBLE SOLUTION TO CHALLENGES IN COMMUNICATION

- (a) Providing civic education to public on importance of communication facilities in order to encourage usage and avoid vandalism
- (b) Embarking on upgrading of communication facilities in order to keep up with advancing technology
- (c) Enforcing the rule of law by arresting all individuals involved in vandalism

- (d) Promoting education by removing hindrances to higher education such as access to loans for everyone
- (e) Subsidizing on communication gadgets to make them more accessible

TRANSPORT IN MALAWI

Success criteria:

- Identify types of transport in Malawi
- Explain factors that influence the development of transport routes in Malawi
- Analyze the advantages and disadvantages of each means of transport
- Explain the roles of transport in the development of Malawi
- Examine problems of transport in Malawi

Transport:

It's the physical movement of goods as well as people from one place to another

Types of transport in Malawi:

1. Land transport eg road and rail
2. Water transport eg shipping
3. Air transport

FACTORS INFLUENCING THE DEVELOPMENT OF TRANSPORT ROUTES

- a) Physical landscape:
The low lying areas are good for construction of roads
- b) Economic resources:
Regions with high resources are likely to have a good network of roads eg Blantyre to Nchalo due to Sugar factory
- c) Political will :
The willingness of the government to improve road infrastructure eg Nsanje to Bangula road

ROAD TRANSPORT IN MALAWI

It is the commonly used mode of transport

It connects Malawi to neighboring countries

EXAMPLES:

- Blantyre to South Africa via Mwanza border post
- Lilongwe to Zambia via Mchinji border post
- Karonga to De-salaam via Songwe border post
- Blantyre to Beira via Marka border post

Advantages of Road transport

- It is cheaper than air transport
- It is convenient over short distance
- It provides a door to door service
- It makes most places accessible

Disadvantages

- It has limited carrying capacity
- Transportation of bulky goods by road attract high costs
- It may be affected by bad weather conditions such as floods and landslides

WATER TRANSPORT IN MALAWI

The main water transport in Malawi is the Lake Malawi

However Shire river has the potential to provide water transport through direct access to the sea

Advantages of water transport:

- It is a cheap mode of transport for bulky goods
- It is relatively safe as compared to road
- It uses natural routes
- It promotes international trade

Disadvantages of water transport:

It is slow in moving goods

It can be affected by storms and ice-Burges

It requires large investment in ship building

Its' routes are not flexible and hence not economical

Uses winding routes

RAIL TRANSPORT IN MALAWI

Routes include:

1. The Nacala corridor
Blantyre to Nacala via Nayuchi
2. The Beira route:
Blantyre to Beira via Chiromo
3. The Chipata Route

Lilongwe to Chipata (Zambia) via Mchinji

Advantages of Rail Transport

- It is convenient over long distance
- It can carry heavy goods over long distance
- Its' operation is less affected by bad weather

Disadvantages:

- It is expensive over short distance
- It is not available in remote areas
- It provides services according to fixed time schedule hence not flexible
- It is relatively slow as compared to road

AIR TRANSPORT IN MALAWI

Main airport handling international flight are:-

- (a) Kamuzu International Airport
- (b) Chileka International airport

International connections are provided by:-

- British Airways
- South African Airways
- Kenya Airways
- Ethiopian Airways
- Zimbabwe Airways
- Air Malawi

ADVANTAGES OF AIR TRANSPORT

- It is very fast
- It is cheap over long distance
- It is convenient during evacuation and calamity
- It is most comfortable means of transport
- It uses natural routes

DISADVANTAGES OF AIR TRANSPORT

- It is too expensive for short distance
- It cannot carry bulky goods
- In case of accident it is disastrous since nobody can survive
- It can be affected by bad weather

ROLES OF TRANSPORT IN ECONOMIC DEVELOPMENT

1. Helps in distribution of resources needed for development eg cement
2. Increase interaction of people through sharing of knowledge and technical skills needed for development
3. It helps in times of emergencies and natural disasters in saving life and property
4. Transport help in creation of employment of people who also contribute to economic development
5. It helps in mobility of people from place of work and back timely
6. It enhance cooperation among nations through visits hence contribute to development
7. Promotes tourism industry which earns the country foreign exchange

CHALLENGES FACED BY TRANSPORT SECTORS IN MALAWI

- a) Poor conditions of the transport facilities such as roads and railways
- b) Vandalism of transport facilities such as sign posts
- c) Poor safety due to drivers that drive while drunk
- d) Lack of maintenance of existing infrastructures such as motor vehicles and equipment
- e) High costs that force other people to walk on foot
- f) High fuel and transport costs that reduces movement of people
- g) Rapid change in technology rendering some transport equipment out of date eg Electric trains against locomotives

POSSIBLE SOLUTIONS TO CHALLENGES IN TRANSPORT SECTORS

- a) Embarking on upgrading the road network
- b) Enforcing the rule of Law against driving while drunk or overload vehicles
- c) Introducing of new computerized traffic information to enhance safety
- d) Introduction of parking fee in urban areas
- e) Building more road network in rural areas to make them more accessible
- f) Sensitizing people on the dangers of vandalizing transport facilities

TRADE IN MALAWI

- Explain the term trade
- Explain the difference between export and imports
- Identify the main imports and exports of Malawi
- Explain the importance of trade
- Explain the concept balance of trade
- Examine problems of balance of trade in Malawi
- Suggest solutions to the problems of balance of trade between Malawi and its' trading partners

Trade:

It's the exchanging of goods and services for money

Barter :

It's the direct exchange of goods and service that occurred in the past

FACTORS THAT INFLUENCE TRADE

- a) Availability of natural resources such as minerals and raw materials
- b) Level of technology and industrial development that enhance processing of goods into finished products
- c) Geographical location of a country, for instance those countries with access to the sea have more trade opportunities than land locked countries
- d) Absence of trade barriers such as embargo and political instability

TYPES OF TRADE

- a) Internal trade (domestic) eg wholesaler, retailer
- b) External trade eg import, exports, entrepot (re-export)

MALAWI EXPORT PRODUCTS

Tobacco, tea, sugar, cotton, apparel, groundnuts, pulse, wood, rubber, coffee, spices, hides, wooden furniture

MALAWI MAIN IMPORTS GOODS

Machinery, fertilizer, petroleum products, transport equipment, semi-finished goods, food products

MALAWI MAIN TRADE PARTNERS

COUNTRY	IMPORT %	EXPORT %
South Africa	48.5	18.0
United Kingdom	7.9	12.2
Mozambique	16.9	-
Zambia	4.8	-
Tanzania	4.6	-
USA	-	7.0
Egypt	-	6.9

WAYS IN WHICH TRADE IS IMPORTANT

- a) It helps us access raw materials for industrial development
- b) It helps us access foreign exchange
- c) It helps us acquire machinery for industrial development
- d) It helps access products that our country may not produce hence promotes our standard of living
- e) It help enhance cooperation with other countries

BALANCE OF TRADE

Its' the difference in value between a country's total exports and imports of goods and services during a specific period of time

Difference between what has been sold and bought

If exports exceeds imports it is called trade surplus

If imports exceeds export it is called trade deficit (loss)

FACTORS THAT AFFECT BALANCE OF TRADE

- a. Rapid population growth which may demand more goods for consumption hence push up imports
- b. Development programs of the country for instance developing countries may demand more technology which pushes up imports
- c. Preference of foreign goods of high quality by citizens may also increase imports
- d. National disaster such as droughts, floods may reduce exports of goods and instead increase imports especially of food products
- e. Dependence on primary products such as farm produce that are prone to climatic change
- f. Political instability that leads to fewer exports than imports
- g. Trade barriers such as quotas and high tariff
- h. Import of non-essential goods such as toothpaste or tooth picks
- i. Poverty of a country that affects industrial development hence rely on others for its manufactured goods

ADVANTAGES OF TRADE BARRIERS

1. It help protect consumers from consuming dangerous things that could threaten their life
2. It helps in protecting local industries from competition with strong multinational companies
3. It help secure employment opportunities of local people in local trade
4. It acts as a source of revenue collection by government by charging high customs

DISADVANTAGES OF TRADE BARRIERS

1. It reduces trade between countries and hence affect economy
2. It result in production of low quality goods by local industries as they relax due to lack of competition
3. It may result in trade war as heavy duties are imposed on imported goods

PROBLEMS OF BALANCE OF TRADE IN MALAWI

- It result in increased foreign debts
- It result in shortage of foreign exchange reserves
- It result in increased dependency on foreign aids for survival
- It result in decreased employment opportunities as some local industries gets closed due to lack of market

POSSIBLE SOLUTION TO BALANCE OF TRADE

- a. Establishment of regional grouping such as SADC in order to protect the interest local industries
- b. Developing the tourism industry which is free from external competition
- c. Encouraging remittance by Malawians (working abroad and sending money home)
- d. Encouraging Malawians to buy local products

- e. Encouraging privatization of industries so that individuals can invest freely in industries
- f. Encouraging modern technology in industries in order to produce competitive products

END OF FORM 2 WORK

REFERENCES

JCE Geography (2013) Geography Syllabus for forms 1 & 2: Zomba Domasi; MIE

