

SS 1 FIRST TERM, 2026/2027 ACADEMIC SESSION

SCHEME OF WORK FOR GEOGRAPHY SS 1, FIRST TERM, 2025

WEEK 1. DEFINITION.

- A. MEANING, SCOPE AND IMPORTANCE OF GEOGRAPHY
- B. LOCAL GEOGRAPHY

WEEK 2. THE SOLAR SYSTEM

- A. THE COMPONENT OF SOLAR SYSTEM
- B. THE SHAPE OF THE EARTH

WEEK 3. THE EARTH'S MOVEMENT I

- A. THE ROTATION OF THE EARTH AND ITS EFFECTS
- B. THE REVOLUTION OF THE EARTH AND ITS EFFECTS

WEEK 4. THE EARTH'S MOVEMENT II

- A. LATITUDE AND ITS EFFECTS
- B. LONGITUDE, ITS EFFECTS AND DIFFERENCES

WEEK 5. LOCAL TIME

- A. CALCULATION OF LOCAL TIME

B. CALCULATION OF LONGITUDE

WEEK 6. THE STRUCTURE OF THE EARTH

- A. THE OUTER LAYERS OF THE EARTH
- B. THE INNER LAYERS OF THE EARTH

WEEK 7. ROCKS

- A. MEANING, SEDIMENTARY AND METAMORPHIC ROCKS
- B. IGNEOUS, VOLCANIC AND IMPORTANCE OF ROCKS TO MAN

WEEK 8. MAJOR LAND FORMS I

- A. MOUNTAINS: MEANING AND FOLD MOUNTAINS
- B. BLOCK MOUNTAINS

WEEK 9. MAJOR LAND FORMS II

- A. VOLCANIC MOUNTAINS
- B. RESIDUALS AND IMPORTANCE OF MOUNTAINS

DEFINITION OF GEOGRAPHY.

INTRODUCTION: The word geography was adopted in the year 200BC by a Greek scholar called ‘**ERATHOSTHENES**’. He invented the discipline of geography and some terms used today.

The scholar used two Greek words as thus:

- a. **GEO-** which means the ‘**EARTH**’
- b. **GRAPH-** which means **DESCRIPTION**, the two words metamorphosed and become geography

MEANING: Geography can be simply defined as the science that deals with the description of the earth which involves distribution and arrangement of all elements (including human beings) on the earth's surface. The discipline also concerned with the study of size, shape, earth's movement, climate, vegetation, distribution of natural resources, animals, heavenly bodies etc.

BRANCHES OF GEOGRAPHY

Geography may be grouped into two fundamental branches as mentioned below.

A: SYSTEMATIC GEOGRAPHY: this branch is concerned with individual physical and cultural elements of the earth. The physical aspect deals with the following; geomorphology (land forms), climatology, oceanography, cartography, hydrography, soil formation etc while

the cultural aspects deal with human activities such as economic, natural resources, source of labour, ethnography, demography, military etc.

B: REGIONAL GEOGRAPHY: This aspect of geography deals with the differences and similarities among various regions of the world, it can also be referred to as international relation.

THE SCOPE OF GEOGRAPHY

The discipline has a wide coverage that are drawn extensively from the following subjects, MATHEMATICS, PHYSICS, BIOLOGY, ECONOMICS GEOLOGY, HISTORY, AGRICULTURE, GOVERNMENT ETC.

IMPORTANCE OF GEOGRAPHY

1. Geography is an essential subject that enable man understand his environment better
2. It is an essential field of study to every human being for it consists of knowledge of the world around us.
3. The knowledge of geography and ability to think geographically can help individual in understanding and interpreting the reality of the world.
4. A well-trained geographer can perform many vital roles in the political, social and economic sectors; he can use his skills in such areas as urban economy, regional planning, census administrations, war teaching estate survey etc.
5. Geography has a place in one's intellectual development. It offers training by focusing on **WHAT; WHERE; WHEN; WHO and WHY** through space and time.
6. The knowledge of the subject enables one to become a successful pilot, sailor, astronaut, climatologist, geologist etc.

QUESTIONS

1. Define geography
2. Discuss the scope of geography
3. State the economic importance of geography

LOCAL GEOGRAPHY

Local geography is the geography of the immediate environment, how our local geography is the geography of the Federal Capital Territory (F.C.T)

BRIEF HISTORY

Before now, Lagos was the capital of Nigeria, but during the era of late General Murtala Mohammed the former head of state of Nigeria, he discovered that Lagos was faced with many challenges as thus:

- | | |
|-------------------------------|--------------------------------|
| 1. Lack of adequate land | 4. Lack of accommodation |
| 2. Distance from other states | 5. Proximity to the ocean etc, |
| 3. Traffic congestion | |

However, on 3rd/February/1976, the head of state constituted a committee headed by a Yoruba man called JUSTICE AKINOLA AGUDU (chairman) to choose an appropriate location for the new federal capital.

The report suggested "ABUJA" because of the following reason:

1. Abuja is at the center of Nigeria

2. It was a virgin land that is enough for settlement.

The recommendation of the committee was accepted and on 12th December 1991, the federal capital territory was officially, relocated from Lagos to Abuja during the regime of General Ibrahim. B. Babangida.

LOCATION: Abuja is located in the north central geo-political zone of Nigeria

SIZE: Abuja occupied an area of about 8,000sqkm.

The territory is boarded in the north by Kaduna state, North East by Nasarawa State, South West by Kogi State and West by Niger State.

POLITICAL DIVISION: The federal capital is very large that government spited it into (6) six political zones (local government)

- | | |
|----------------------------|-----------------------|
| 1. ABUJA AREA COUNCIL | 5. KUJE AREA COUNCIL |
| 2. BWARI AREA COUNCIL | 6. KWALI AREA COUNCIL |
| 3. GWAGWALADA AREA COUNCIL | |
| 4. MUNICIPAL AEREA COUNCIL | |

TRANSPORTETION: The federal capital territory has been disseated with different roads; some are dual carriage while other is single track ways.

The first transport system was federal “Urban Mass” others are “private owned terms” Another means of transport in FCT is “AIR” transport system named after Late Dr Nnandi Azikiwe international airport. The last means is the Rail transport system that is running from Abuja to Kaduna.

INFORMATION: There are two major sources of information In Abuja; one is Electronic Medias e.g. Television, Radio etc. while the second one is print Medias e.g. Newspapers, magazines etc. both the media house are owned by both federal and private individual.

AGRICULTURE: Abuja is an agrarian environment therefore the indigene are purely farmers. Crop produced are yam, millet, guinea corn, cassava, ground nut, maize and vegetables.

RELIEF FEATURES: Relief refers to the surface features of the land above the sea level. The relief of Abuja can be grouped into two classes which are low and high lands respectively. Areas of high land include ASO rock and highland that extend from Yakubu Gowan barracks through Abacha barracks to Kugbo while the lowland include plane land around gwagwalada, kuje river gwagwalada, Usman dam etc.

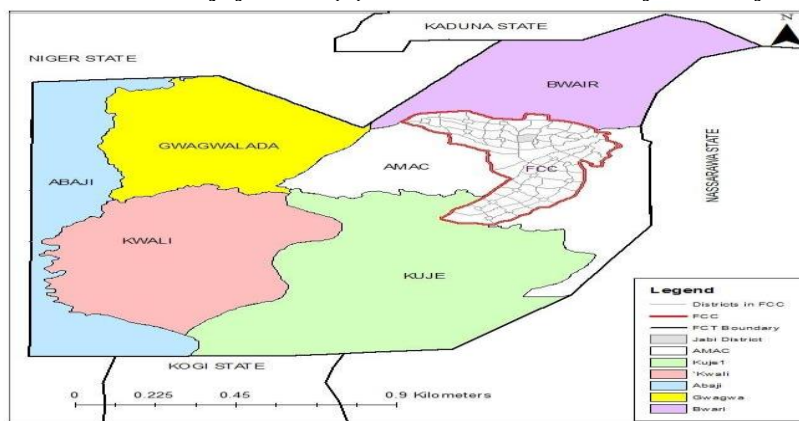
COMMERCIAL ACTIVITIES: The commercial activities in Abuja are carried out largely in plazas, malls, with few open markets within and Abuja environs.

TRIBES/LANGUAGES: There are three (3) major tribes in Abuja

1. GBAGI, GWANDARA and EGEDE; the tribes equally speak HAUSA and PIGIN EINGLISH

HOSPITALITY: Abuja presently is regarded as the home of hospitality.

The residence enjoys five (5) star hostels and eatery in every corner of Abuja.



Map of Abuja

THE SOLAR SYSTEM: The solar system comprises of the sun and its planets. However, there are other discoveries that are not officially documented for studies; but they are known as planets. It can also be described as family of celestial bodies consisting of the Sun and the planets. The sun is at the center of the solar system. The sun has about 6000°C with the internal temperature of about 20000°C and about 300000 times the size of the Earth. All the planets revolve round the sun on their elliptical orbit, the sun is the only source of light that reflects on other planets. Some of the planets have satellites, while others have not, some are closer and others are far away. Stars that reflect light in the night are in group which is best referred to **GALAXIS**.

MERCURY: Mercury is the smallest, hottest and closest planet to the sun. It doesn't contain life because of its close proximity to the sun. Mercury has the shortest orbit to the sun. A year in Mercury is about 88days and about 57,600,00km (36,000,000 miles) away from the sun.

VENUS: Venus is the second planet after Mercury. It takes only 225 days to complete its revolution round the sun. Venus is regarded as earth's twin, because, of its size, mass and density. It has distance of about 107,200,000km away from the sun. it is the hottest planet in our solar system, despite not being the closest to the sun because its thickness traps heat.

EARTH: The earth is the most important among the entire planet. Because, it is the only planet that life can exist perfectly. It has one satellite called the **MOON**.

It takes the earth $365 \frac{1}{4}$ days. i.e a year to revolve round the sun on its orbit. Its distance from the sun is about 148,800,000km and the distance from the moon is about 384,629km.

MARS: The next planet is Mars. It has only two (2) satellites. Mars is the next planet that the possibility of supporting life. Its distance is about 227,200,000km away from the sun. It takes about 687days to complete its revolution round the sun.

JUPITER: Jupiter is the largest planet in the solar system. It has 12 satellites that revolve round it. The surface of Jupiter contains gases such as Hydrogen acid, methane with light and dark bands. The distance of Jupiter from the sun is about 772,800,00km and it takes Jupiter 11.9 years to complete its orbit.

SATURN: Saturn is the second largest planet after Jupiter. It has two surface rings round it; the surface is always because of its distance from the sun. Saturn has nine (9) satellites with the distance of 1,417,600,000km from the sun. Saturn takes about 29.5years to revolve round the sun.

URANUS: The next planet is s; it revolves round the sun clockwise direction. It has five (5) satellites with the distance of about 2,854,400,000km from the sun about 84years to complete its revolution round the sun.

NEPTUNE: Neptune is the second to the last planets of the sun. It has two (2) satellites and 4,468,800,000km to revolve round the sun and it takes Neptune about 164.8years to complete its revolution round the sun.

PLUTO: Pluto is the last and coldest among all the planets. It has the largest orbit round the sun with distance of 5, 850,000,000km from the sun. It takes Pluto 247.7years to complete its revolution.



QUESTIONS

1. Describe the solar system
2. Outline for characteristics each of the following planets
 - a. Earth
 - b. Mercury
 - c. Jupiter
3. Draw the diagram of the solar system
4. Write short note on the following. A. the sun, moon and Saturn

THE SHAPE OF THE EARTH

In the olden days, sailors feared to venture far into the distance ocean because they thought the earth was FLAT like a table. They equally thought that when they reached the edge of the earth, they would slip down and perish in the bottomless ocean.

Later, the modern scientist who are inquisitive to know more embarked on research, based on their years of accumulated knowledge, experience and observations in different parts of the world, they proved that the earth was not FLAT but ROUND in shape. The sphericity/spheroid of the earth was proved to be little flattened at both ends to donate a name called “GEOID”. The evidences provided were accepted by all. It was equally proved that the earth has an equatorial circumference of 40,084km, equatorial diameter of 12,762km approximately.

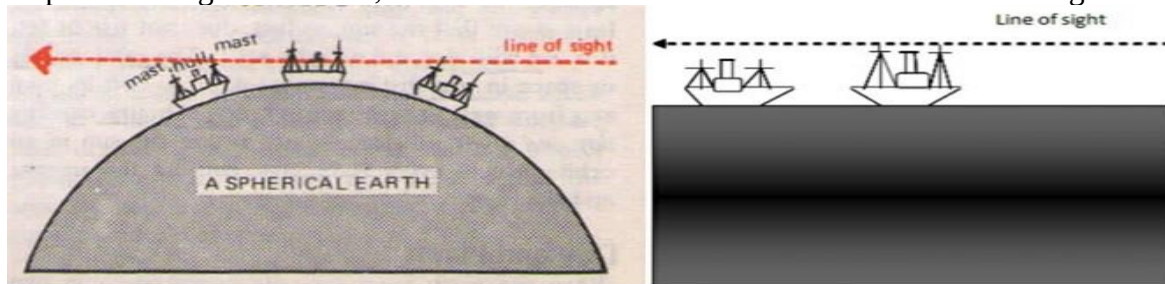
EVIDENCES TO PROOVE THAT THE IS EARTH SPHERICAL SHAPE

There are many ways to prove that the shape of the earth is spherical:

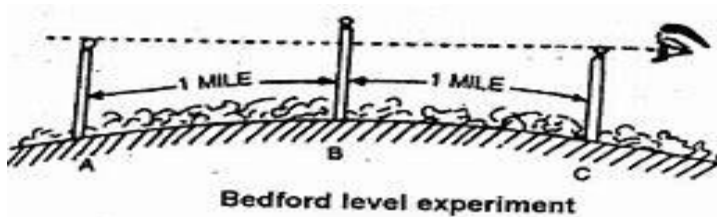
1. **SUN RISE AND SUNSET:** The sun rises and sets at different times in different places of the world. As the earth rotates from west to east, places in the east see the sun earlier than those in the west. If the earth was flat, the whole world would have sunrise and sunset at the same time. The rising and setting of the sun, has proved that the shape of the earth is spherical.

Leave space for diagram

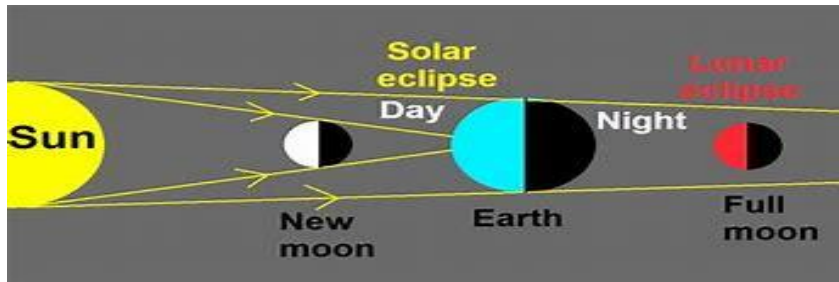
2. **SHIP VISIBILITY:** When a ship appears over the distant horizon, the top of the mast is seen first before the entire body. If the ship leaves harbor, its disappearance over the curved surface is equally gradual. In other words, if 2-3 ships are sailing on an ocean, the observers always view the mast of one first before the other, just like when a vehicle in front first before the one behind. If the earth was flat the entire ship would have been seen or if 2-3 ships are sailing on an ocean, the observer could have seen all at the same time. E.g.



3. **DRIVING POLES ON LEVEL GROUND ON A CURVED EARTH:** There was an experiment by field engineers which shows that when three poles of equal height are driven into the ground on a plain surface, the center pole projects above the two side-poles when viewed from either end, this was because of the curved nature of the earth. If the earth were flat, all the three poles would assume the same horizontal level when viewed from either end.



4. **THE LUNAR ECLIPSE:** As the earth rotates round the sun the moon been the satellite of the earth rotate with it. It comes to a point when the moon will come in between the earth and the sun as eclipse of the moon. During this period (eclipse) of the moon it was observed that the shadow of the earth cast on the moon usually assumes a circular or spherical shape.



5. **CIRCUMNAVIGATION OF THE EARTH:** The earth has been circumnavigated many years ago by Ferdinand Magellan and his crew from 1519 to 1522. The voyage proved that the earth was spherical in shape because no traveler going round the world by land or sea has ever encountered an abrupt edge of the earth. The modern air routes and ocean navigation are based on the assumption that the earth is round and not flat.
6. **AERIAL PHOTOGRAPH:** The scientist who travelled to the space took pictures in different direction especially, North, South, East, and West. However, the print out shows curved images, having re-arranged the images, all proved circular shapes, that i.e., if the earth was flat, the prints or picture could have shown flat or straight lines.
7. **PLANETARY BODIES ARE SPHERICAL:** All the observations from telescopes revealed that all the planetary bodies such as Mercury, Mars, Jupiter etc. and the sun are spherical in shape from which every angle you see them therefore the earth cannot be exception.

QUESTIONS

1. What is the shape of the earth?
2. With the aid of appropriate diagrams, explain four proofs to support your answer in 1 above

THE EARTH'S MOVEMENT 1

Man is always conscious of the movement of the 'SUN' and little realizes that the earth on which he stands is constantly in motion. When the earth rotates away from the sun, he says that the sun sets, and when the earth rotate toward the sun, he says that the sun rises. From the line of solar system, we say all the planets revolves round the sun at different space and time therefore the earth cannot be exception.

The sun does not rise nor set, but the earth that rotates and revolves round the sun.

The earth moves in space in two distinct ways:

1. ROTATION 2. REVOLUTION

ROTATION OF THE EARTH: The earth rotates on its axis from west to east. The axis is an imaginary line joining the north and south poles through the center. The rotation is inclined at an angle of $23\frac{1}{2}^\circ$ along its axis. It takes the earth 24 hours (a day) to complete one rotation and it rotates through 15° in 1 hour or 1° in 4 minutes.

THE EFFECTS OF THE EARTH ROTATION

1. DAY AND NIGHT: The rotation of the earth on its axis brings the occurrence of day and night in alteration, because as the earth rotates only one part of the earth surface comes into the rays of the sun and experiences daylight, while the other half, which is always from the rays of the sun, will be in darkness as shown below



2. SUN RISE AND SET: As the earth rotates from west to east, Places in the east of the circle (earth) will experience sunrise while, at the same time places at the western end will experience sunset.

3. DIFFERENCES IN LOCAL TIME: The rotation of the earth causes difference in local time between places on the earth. Since the earth rotates through 360° in every twenty-four hours or 15° in one hour and 1° in 4 minutes.

Therefore the east is always one hour ahead of time while the west is always one hour behind time, mathematically, to the east is +, but to the west is - .

4. DAILY RISE AND FALL OF TIDES: The rotation of the earth brings about daily rising and falling of the tides. As a result of the movement, the tide produces forces that cause the surface water to oscillate. It is the oscillatory movement that resulted in the rising and falling in the level of water in the seas and oceans.

5. DEFLECTION OF WINDS AND OCEAN CURRENTS: The rotation of the earth makes freely moving objects like wind and ocean currents to be deflected to the right of their normal course in the northern hemisphere and to the left in the southern hemisphere.

6. DAWN AND TWILIGHT: Dawn refers to the brief period between sunrise and full daylight while Twilight refers to the brief period between sunset and full darkness. The two concepts are caused as a result of diffused or reflected light from the sun

REVOLUTION: When the earth revolves round the sun, it travels on an ELLIPTICAL ORBIT at a speed of 30km (185miles) per-second. It takes the earth $365\frac{1}{4}$ days or a year for the earth to complete its revolution round the sun. The $\frac{1}{4}$ day is not possible to show in the calendar. Therefore, a normal year is taken to be 365days, and an extra day is added every four years as a leap year.

EFFECTS OF EARTH REVOLUTION:

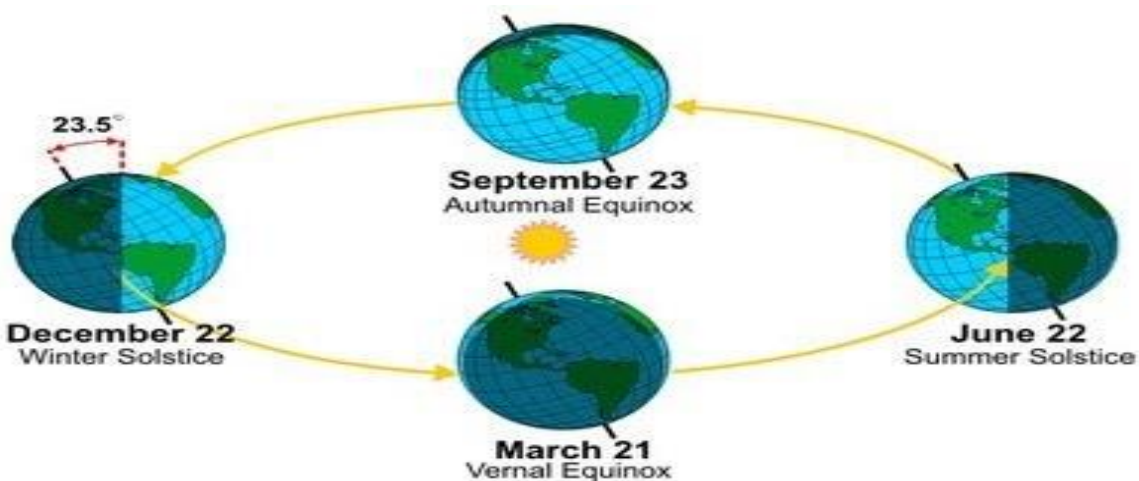
IT CAUSES SEASONS: The revolution of the earth round the sun causes/determines seasons. In the temperate regions of the world, it causes four (4) seasons such as: AUTUMN, SPRING, SUMMER and WINTER, whereas in tropical region, like West Africa, there are two seasons such as RAINY/ WET SEASON and DRY SAESON. These regions are places between $23\frac{1}{2}^{\text{ON}}$ and $23\frac{1}{2}^{\text{OS}}$ of the equator

IT DETERMINES YEAR: The earth revolves round the sun in $365\frac{1}{4}$ days to make a year. Therefore, a year on earth is $365\frac{1}{4}$ days.

VARING LENGHTS OF DAY AND NIGHT: The revolution of the earth results in the varying lengths of day and night at different time of the year. The axis of the earth is in inclined to the plane of the ecliptic (the plane in which the earth) orbits round the sun at an angle of $66\frac{1}{2}^{\text{O}}$, giving rise to different seasons and varying lengths of day and night.

In the northern hemisphere in winter (December, the hours of darkness increase, the sun never rises). In mid-winter on 22 December, there is darkness for the whole day.

In June, summer conditions are exactly reversed. Daylight increases as we go pole wards. In mid-summer 21 June, sun never 'sets' and there is a complete 24 hours' period of continuous day light. In the southern hemisphere, the same process takes place, except that the conditions are reversed.



NOTE: DON'T DRAW THIS DIAGRAM BECAUSE IS NOT CLEAR ,BUT LEAVE SPACE TILL YOU RESUME

SOME TERMS WIT H EARTH'S MOVEMENT

1. EQUINOXES: This refers to period of time when the mid-day sun is directly over-head at the equator. It occurs on March 21st in the Northern hemisphere 23rd September in the southern hemisphere. During these periods there are equal day and equal night.

The march 21st is called spring equinox. The September 23rd is called autumn equinox

2. SOISTICE: This is the period when the sun is vertically overhead at the tropic of cancer and Capricorn, 21st June at the tropic of cancer and 22nd December at the tropic of Capricorn. Their means those day and night are not equal.

3. TWILIGHT: This is the period between the sunset and complete darkness. It is caused by the reflection of the sun as it goes down the horizon.

4. DAWN: This refers to the brief period between sunrise and full day light.

DIFFERENCES BETWEEN ROTATION AND REVOLUTION OF THE EARTH

1. Rotation causes day and night while it takes the earth 365^{1/4} days to complete revolution
2. The earth rotates on its axis while Revolution is on Orbit
3. It takes earth 24hours to complete rotation while it takes the earth 365^{1/4} days to complete revolution

QUESTIONS

1. With the aid of diagram, describe the four positions of the earth during its revolution round the sun
2. Using relevant sketches. Distinguish between:
 - a. Solstice and equinox
 - b. Earth's rotation and revolution
 - c. Parallels of latitude and meridian of longitude

LATITUDE

Latitude are imaginary parallel lines which run from west to east round the Earth and measured distance in degrees north and south of equator.

It is the angular distance of a point on the Earth's surface, measured in degrees from the center of the earth.

The equator represents 0° and the north and the south poles are 90°N and 90°S.

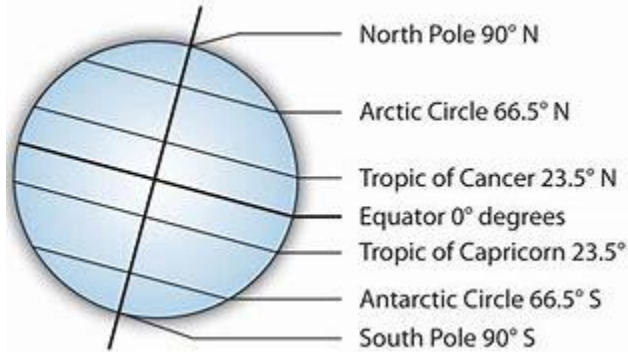
The polar circumference of the earth is 39,955km. The distance between any two (2) successive latitudes is therefore approximately 111km i.e., 1° = 111km.

The lines of latitude have five (5) important lines as mentioned below.

1. The line of the equator 0°.
2. The tropic of cancer: from the equator to 23 ½ °N (Northward).
3. The tropic of Capricorn; from the equator to 23 ½ °S (Southward).
4. The Arctic circle; from the equator to 66 ½ °N
5. The Antarctic circle; from the equator to 66 ½ °S
6. North pole 90°N
7. South pole 90°S

CHARACTERISTICS OF LATITUDE

1. The lines of latitude are parallel to equator.
2. The lines are used to calculate distance.
3. The lines are not equal in length.
4. They are measured in degree (90^{ON} & 90^{OS}) 180° .
5. Equator is the only great circle.



USES OF LINES OF LATITUDE

1. The lines of latitude in conjunction with the lines of longitude are used to determine the exact location of places on the atlas map
2. The lines are used to calculate distances between two places on the earth surface

HOW TO CALCULATE DISTANCE: To calculate distance using lines of latitude, the following procedures should be followed

1. Locate the two (2) points in question and find the difference between the two places involved
 - a. North -North = subtract
 - b. South -South = subtract
 - c. North -South = Add
2. Get the difference between the two (2) points on the globe e.g., 50^{ON} and $20^{\text{ON}} = 50^{\circ} - 20^{\circ} = 30^{\circ}$
3. Add the two (2) points if they are in different hemispheres e.g. 50^{ON} and $20^{\text{OS}} = 50^{\circ} + 20^{\circ} = 70^{\circ}$
4. 1° on map is equal to 111km on land i.e., divide the equatorial circumference of the earth by 360. ($40,085/360^{\circ} = 111\text{km}$)

Question 1. Calculate the distance between latitude 80^{ON} and 14^{ON} of the equator.

$$14^{\circ} - 8^{\circ} = 6^{\circ}$$

$$1^{\circ} = 111\text{km}$$

$$6^{\circ} = 111 \times 6 = 666\text{km}$$

Question 2. What is the distance, between tropic of cancer on 15^{ON} and the tropic of Capricorn on 35^{OS} ?

$$35^{\circ} + 15^{\circ} = 50^{\circ}$$

$$1^{\circ} = 111\text{km}$$

$$50 = 111 \times 50 = 5,550\text{km}$$

Question 3. If the distance between Lagos 4^{ON} and Bamako is 1,665km, what latitude is Bamako, assuming that Lagos and Bamako are in the same hemisphere?

Solution: Lagos = 4^{ON}

Bamako latitude = ?

Distance between = $1,665 / 111 = 15^{\text{O}}$, $15 + 4 = 19^{\text{ON}}$ because the two locations are in the northern hemisphere.

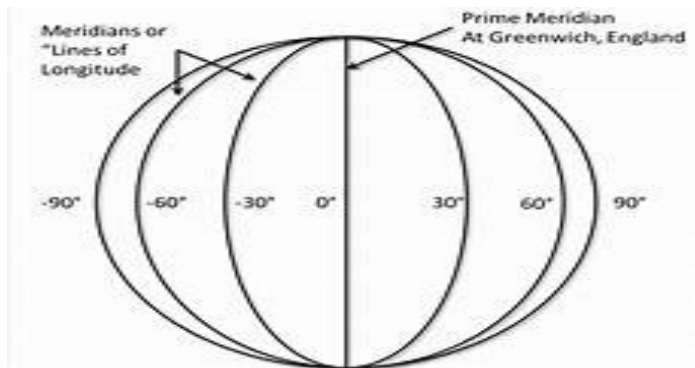
LONGITUDE: Longitudes are imaginary lines running from the North pole to the South pole and calculated from west to east of the green which meridian (0^{O})

It is angular distance EAST or WEST of a Greenwich meridian, measured at the center of the earth. The west is 180^{O} and east is 180^{O} .

The line of longitude (meridian) passes through LONDON (Greenwich) and ACCRA, GHANA on 0^{O}

CHARACTERISTICS OF LINES OF LONGITUDE.

1. The lines are referred to as meridians
2. The lines are measured up to 360^{O} i.e. from the Greenwich line to the West is 180^{O} and to the East 180^{O} .
3. The lines are equal in length
4. All the lines are great circle
5. All the lines meet at the poles
6. The lines are used in locating places on the map
7. The lines are used to calculate local time i.e. $360^{\text{O}} = 24\text{hrs}$; $15^{\text{O}} = 1\text{hr}$ and $1^{\text{O}} = 4\text{minutes}$
8. The lines of longitude converge at the poles.



LONGITUDE AND TIME

The sphere of the Earth was proved to be spherical in shape. It rotates from West to East making a complete rotation of 360^{O} in 24 hours.

i.e. 12hrs of day light and 12hrs of darkness

$$360^{\text{O}} = 24 \text{ hours}$$

$$15^{\text{O}} = 1 \text{ hour i.e. } (360 \div 24)$$

$$1^{\text{O}} = 4 \text{ minutes i.e. } (60 \div 15)$$

Note: As the earth rotates through 360° in 24hrs and 15° in 1hr, therefore in every 15° we go eastward, local time is advanced or ahead by 1 hour. On the other hand, if we go Westward the local time reduces by 1hour or behind by 1hour. The reason is that the Eastern part of the Earth sees the rising sun before the Western side,

HOW TO CALCULATE LOCAL TIME

The following procedures must be followed.

1. Locate the place involved in the question.
2. Workout the longitude difference
3. Convert the difference to a time difference
4. Adjust the time according to the direction of movement.
i.e. East – gain a day or ahead (+)
West – loss a day or behind (-)

FORMULAR:

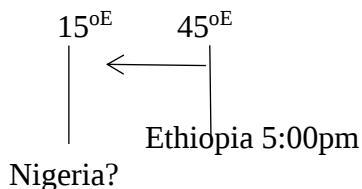
If the Earth rotates through 360° in 24 hours, a complete circle is made, and then the earth will rotate through 60° in?

$$\text{Solution: } \frac{60}{360} \times \frac{24}{1} \text{ or } \frac{60}{15} \times \frac{1}{1} \text{ or } \frac{60}{1} \times \frac{4}{60} = 4\text{hrs}$$

Example I

What will be the local time in Nigeria on longitude 15°E when it is 5:00pm in Ethiopia on longitude 45°E ?

Solution:



Note: both countries are on the same side (East) but Nigeria is in the western part of Ethiopia. Therefore, we are moving westward (-)

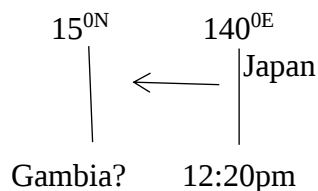
$$45^{\circ}\text{E} - 15^{\circ}\text{E} = 30^{\circ}$$

$$\frac{30}{15} \times \frac{1}{1} = 2\text{hrs}$$

$$5:00 - 2:00 = 3:00\text{pm}$$

Example 2

A football match between Liverpool and Man U was scheduled to start in Japan on longitude 140°E on Saturday, 10th October, 2016 at 12:20pm. At what time and day will Gambia who is on longitude 15°W tune their television to watch the same match?



$$= 140 + 15 = 155 \text{ therefore, } 155 / 15 = 10.5$$

$$10 = 5 \times 4 = 10:20$$

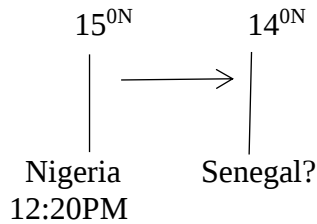
$$12:20 - 10:20 = 2:00\text{am}$$

2:00am

Friday 9/10/2016

Example 3

A football match between Chelsea and Man U was scheduled to start in Nigeria on longitude 15^{OW} on Saturday 10th October, 2016 at 12:20pm. At what time and day will Senegal who is on longitude 140^{OW} tune their television to watch the match.



$$= 140 - 15 = 125; 125/15 = 8.5$$

$$8 = 5 \times 4 = 8:20$$

$$= 12:20 + 8:20 = 20:40$$

$$20:40 - 12:00 = 8:40\text{am}$$

How to calculate longitude from time

To calculate longitude from time, the following procedures should be strictly adhered to:

1. Known the different local time.
2. If the time is ahead of G.M.T. it means the longitude to be calculated will be on the East but if the time is behind the G.M.T, the longitude will be (behind) on the western part.

I. If the local time at town 'B' is 12: 00hours and the G.M.T is 6:00hours. Find the longitude of town B:

Solution:

Local time = 12:00 hours

G.M.T = 6:00 hours

Time difference = 12- 6 = 6:00hours

If 1 hours = 15^{O}

Then 6 hours will be $6 \times 15^{\text{O}} = 90^{\text{O}}$

II. If the G.M.T is 16:00 hours

Local time is 4:00 hours

Time difference = 16:00- 4:00=12:00 hours

1 hour = 15^{O}

12 hours = $12 \times 15^{\text{O}} = 180^{\text{OW}}$

SIMILARITIES BETWEEN LATITUDE AND LONGITUDE

1. Both lines are angular distance measured in degree.
2. Both lines are used in locating places on map.
3. Both lines contain great circle.

4. Both lines are imaginary line. Etc.

DIFFERENCES BETWEEN LATITUDE AND LONGITUDE

1. The lines of latitude run from West – East while the lines of longitude run from North – South
2. The lines of latitude are called parallel while the lines of longitude are called Meridians
3. The lines of latitude are used for calculating distance while the lines of longitude are used for calculating local time
4. The lines of latitude are not equal while the lines of longitude are equal in length
5. The lines of latitude have only one great circle while the lines of longitude are great circles

GREENWICH MEAN TIME: This simply refers to the time at longitude 0° . It is also called World time zone and all the nations of the world adjust their time from G.M.T.

The line Greenwich, 0° passes through LONDON (Britain) and ACCRA (Ghana). To the East of the line is ahead while to the west of the line is behind.

INTERNATIONAL DATE LINE: This is an imaginary line running north to south through the Pacific Ocean. The line is not straight but zigzag to avoid some island.

Where ever the International Date Line is crossed, a whole day is either lost or gained. i.e. to the West a day is lost and to the east a day is gained.

STANDARD TIME: This time is generally adopted by a country which is usually taken from the central meridian. Standard time eliminates differences in local time between one town and the others within the same country.

QUESTIONS

1. A football match is to be played on Sunday in Mexico on longitude $150^{\circ E}$ between the Brazil and Morocco, if the match is to be televised, at what time will Nigerians tune their television sets to watch the match
2. If the time in London is 08.00 hours GMT and the local time in Addis Ababa is 12.00 noon, on what longitude is Addis Asaba?
3. The final world cup 2026, between Argentina and Spain was scheduled to start by 8:00pm in USA on longitude $15^{\circ W}$ at what time should football fans in Nigeria on longitude $150^{\circ E}$ switch on their television sets to watch the match?

THE STRUCTURE OF THE EARTH

INTRODUCTION: Nobody knows exactly how and when the earth was formed. Scientists only assumed that it was formed about 4,500 million years ago.

However, from the evidence of volcanic eruptions, Earth-quakes, deep mining operations, crystal boiling, etc. some vital facts about the crust of the earth were revealed and proved that the earth is made of concentric layers that are grouped into major parts as mentioned below.

1. Outer layers/zones.
2. Inner layers/zones.

OUTER LAYERS/ZONES

ATMOSPHERE: is the layer of gases that enveloped the earth. The gases are; NITROGEN with 78%, OXYGEN with 21%, RARE GASES with 0.7% and CARBONDIOXIDE with 0.3%.

In the atmosphere the higher you go, the cooler it will become because, the elevation is within the layer of the stratosphere and Ozone that act as blanket that absorbs the high intensity of the solar energy (sun). After the layer of the stratosphere (change), the higher the elevation the hotter it will become.

CHARACTERISTICS

1. Atmosphere is the gaseous portion of the earth.
2. It has the density that decreases progressively with elevation.
3. It contains water vapour in the lower layer.
4. It is the region of change or where weather and climate interact.

IMPORTANCE

1. It provides carbon dioxide for photosynthesis by plants.
2. It provides oxygen for respiration for plants and animals.
3. It provides oxygen for combustion or burning.
4. It is the habitat for some living organisms.
5. It contains ozone layer which acts as protective cover for living organisms against the burning effect of ultra-violet rays of the sun. etc.

HYDROSPHERE: Hydrosphere is the liquid portion of the earth. The water occupies over 71% of the total earth's surface. All the body of water (Oceans, Seas, Rivers, springs, Lakes, etc.) is referred to as hydrosphere.

CHARACTERISTICS

1. Hydrosphere is the liquid portion of the earth.
2. It covers about 71% of the earth's surface etc.

IMPORTANCE

1. It provides for industrial and domestic uses.
2. It is a means of transportation.
3. It provides employment opportunities.
4. Water is the source of minerals.
5. It provides food (fish) etc.

BIOSPHERE: Biosphere is the plant cover of the earth's surface. i.e. it covers the lithosphere. It is the biological active part of the earth which consists of plants, animals and microorganism. It is categorized into three parts

The forest bio-chores, the grass land and the desert bio-chores.

CHARACTERISTICS

1. The biosphere is where human activities such as farming, construction etc. take place
2. It is the layer of life.
3. It includes organisms like plants, animals and microorganism etc.

IMPORTANCE

1. It provides plants which provide food for man.
2. Biosphere provides sources of energy for man.
3. It provides raw materials.
4. It creates employment opportunities.
5. Biosphere is a source of herbs

Leave space for diagram

INNER LAYERS/ZONES

LITHOSPHERE/EARTH'S CRUST: it is the portion of the earth above the low velocity zone. It is the solid part of the earth and also forms part of the major earth's sub-systems,

It comprises of two different minerals such as Silica and Alumina (SIAL) with the density of 2.7 the lower part is the home of denser basaltic rock forming the floor of oceans. The region is mainly made of SILICA, Iron and Magnesium called SIMA with the average density of 3.0.

The two minerals form the earth's crust. The thickness is about 5.16cm. The Sial floats on the Sima because it is lighter. The two components form the continent which is the basis of human settlement.

CHARATERISTICS

1. Lithosphere is the solid portion of the earth.
2. It is made of rocks and minerals.
3. It represents 30% of the earth's crust.
4. It provides ground for human activitie

IMPORTANCE

1. Lithosphere is a habitat for human beings.
2. It aids transportation through construction of roads.
3. Lithosphere is the home of mineral resources.
4. All farming activities are carried out on the lithosphere etc.

MANTLE/MESOSPHERE: In a geographical sense, mantle is the part of the earth between the surface and core. It is separated from lithosphere by a line called **moho-discontinuity**. The loose materials from lithosphere are settled in the mantle. The layer is composed of dense rock called OLIVINE.

CHARACTERISTICS

1. Mantle is beneath the earth's crust.
2. Its main mineral is Olivine.
3. It is a middle layer that covers the core.
4. The average density is about 3.3. etc

CORE/BARYSPHERE

Core is the interior layer of the earth. The layer is also called Barysphere. It is generally believed to be in liquid state because of the high pressure and temperature.

Core equally contains liquid, mud, ash and bomb. The mineral constituent of core is known as **NICKEL** with the temperature of about 1927^oc. When the zone is subject to heat and pressure, the

core will change to liquid and therefore erupt towards the earth surface to form features either inside as intrusive features or outside the earth as extrusive features

QUESTIONS

1a. Describe the main characteristics of each of the following

- i. Atmosphere
 - ii. Hydrosphere
 - iii. Biosphere
- b. Highlight three importance atmosphere

2a. Draw a well labelled diagram to show the internal structure of the earth

c. Describe the main features of the parts shown in 2b above

Leave space for diagram

ROCKS: Meaning: In an engineering sense, Rock refers to any hard and solid matter derived from the earth. Geologically, a rock is any naturally formed aggregate or mass of mineral matter that form an essential and appreciable part of the earth's crust.

Rocks contain different mineral elements and equally differ from each other in the following **TEXTURE- STRUCTURE-COLOUR- PERMEABILITY**, the degree of resistance to denudation and mode of occurrence.

However, rocks are generally classified base on their origins, mode of formations and physical appearance.

TYPES

1. IGNEOUS ROCK 2. SEDIMENTARY ROCK 3. METAMORPHIC ROCK

IGNEOUS ROCKS: Igneous rocks are formed by the cooling and solidification of molten magma form ben earth to earth's crust

As a result of heat and pressure, part of the core change to liquid and force itself from its home of origin toward the earth's surface through the possible crack or lines of fault.

When magma contains high proportion of Silica to about 65-80%, they are said to be ACIDIC, but when they contain low proportion of silica about 45- 60%, they are said to be BASIC.

Igneous rocks are grouped into two depending on their mode of formations.

1. PLUTONIC IGNEOUS ROCK:

The rock is form when the molten magma cooled and solidified inside the earth crust as intrusive features. e.g. Granite, gabbro

These rocks can be exposed to the surface by the process of denudation (weathering).

2. VOLCANIC IGNEOUS ROCK:

These are rocks that are formed when molten magma cooled and solidified outside the earth's crust to form features that can be seen physically. They are also called extrusive igneous rocks. Examples: Basalt; Lava cone etc. which formed lava sheets and plateau especially BIU plateau.

CHARACTERISTICS OF IGNEOUS ROCKS

1. They are crystalline in nature.
2. They do not contain fossils.
3. They do not occur in layers.
4. They are very hard and heavy.
5. They are resistant to all agents of denudation.

SEDIMENTARY ROCKS

Sedimentary rocks are formed from the deposition of materials either by water or wind in layers or strata on top of each other for a long period of time; these materials become hardened by natural compressive forces to form an elevated feature higher above sea level.

The plane between two layers or strata is called **BEDDING PLANE**.

Based on the mode of formation, sedimentary rocks are formed through three (3) principal processes.

1. Organically formed sedimentary rocks
2. Mechanically formed sedimentary rocks
3. Chemically formed sedimentary rocks

ORGANICALLY FORMED SEDIMENTARY ROCKS:

These are rocks formed from the remains of living organisms such as **CORALS** or **SHELL FISH** whose fleshy parts have been decomposed leaving behind the hard shells.

When sedimentary rocks are formed from the remains of animals, they are called **CALCAREOUS ROCKS**, such rocks produce mineral oil e.g. crude oil, while others that formed as a result of vegetative matters like plants are called **CARBONACEOUS ROCKS**. Such rocks are coal, limestone, chalk and iron ore. These types of sedimentary rocks are soft in nature.

MECHANICALLY FORMED SEDIMENTARY ROCKS:

These types of rocks are formed as a result of accumulation of other rocks sediments/materials that are usually deposited for a long period of time by agents of denudation like water, wind and possibly ice which are later pressed together to become solid by the weight of other overlying materials like large and fine materials.

When large pebbles (remains) of rocks are firmly cemented to form a rock, such rock is called "CONGLOMERATE" while the finer material from **CLAY** and coarse or sand grains are called **GRIT** (mainly quartz).

CHEMICALLY FORMED SEDIMENTARY ROCKS

These are formed through chemical solutions. e.g. potash, potassium chloride, calcium sulphate. Etc.

CHARACTERISTICS OF SEDIMENTARY ROCKS

Sedimentary rocks occur in layers.

1. The rock contains fossils.
2. They are not resistant to denudation forces.

3. The rocks may be coarse or soft or hard.

4. They are non-crystalline in nature.

METAMORPHIC ROCK: The rocks are formed when igneous rocks or sedimentary rocks metamorphosed as a result of great heat and pressure. Under great heat and pressure, the original character is altered particularly during the movement of the earth.

Under this process the following may occur;

1. Clay will change to slate.
2. Limestone will change to marble.
3. Granite will change to gneiss.
4. Coal will change to graphite.
5. Sand stone will change to quartzite. Etc.

CHARACTERISTICS OF METAMORPHIC ROCKS

1. They often contain fossils.
2. They may occur in layers/strata.
3. The rock may be hard or soft.
4. The structure is always rough.
5. The rock contains different colours and texture.

ECONOMIC IMPORTANCE OF ROCKS TO MAN

1. RAW MATERIALS FOR INDUSTRIES: Rocks provide the essential raw materials for both light and heavy industries. E.g. one derived from sedimentary rock is used for manufacture of cements, iron ore. Marble from metamorphic rock is used for the manufacture of glasses.

2. SOURCES OF MINERALS: Rocks are sources of minerals of different degrees such as limestone, gold, diamond, petroleum.

3. FOR CONSTRUCTION: Rocks especially igneous rocks are used in construction works of building, homes, roads, bridges, etc.

4. TOURIST CENTRES:

Rocks serve as tourist centres/attractions. Example, Zuma rock, Aso rock in Abuja, Olumo rock at Abeokuta and Jos plateau

5. FOR DOMESTIC USES:

Rocks could be used for domestic purposes such as grinding stone and local manicure.

6. FOR SCHOLASTIC PURPOSES:

Rocks are studied for scholastic attainment of geographers and geologists.

7. SOURCES OF POWER/FUEL:

Some rocks such as coal and limestone serve as sources of power or fuel for our domestic and industrial uses. Etc.

QUESTIONS.

1a. Name the three classes of sedimentary rocks

b. Explain with examples; the processes of formation of the three classes of sedimentary

c. State four economic importance of rock to man

- 2a. Mention the types of rock with good examples
- b. Define Igneous rock
- c. mention and explain the types of rocks

MAJOR LAND FORM 1(MOUNTAINS)

DEFINITION:

Mountains are natural elevation of the earth's surface rising more or less suddenly (abruptly) to a summit and attaining altitude greater than that of a rock or hill.

Mountains are built through a general process called 'DEFORMATION' of the crust. The term proposed by Prof. Baden Powell to describe all the processes of mountains formation is called 'DIASTROPHISM', which encompasses OROGENESIS, EPIROGENESIS AND DENUDATION. Mountains can occur either as an isolated peak or prominent ranges.

Base on their mode of formations, four main types of mountains can be distinguished

QUESTIONS

TYPES

- 1. Fold mountains**
- 2. Block mountains**
- 3. Volcanic mountains**
- 4. Residual mountains**

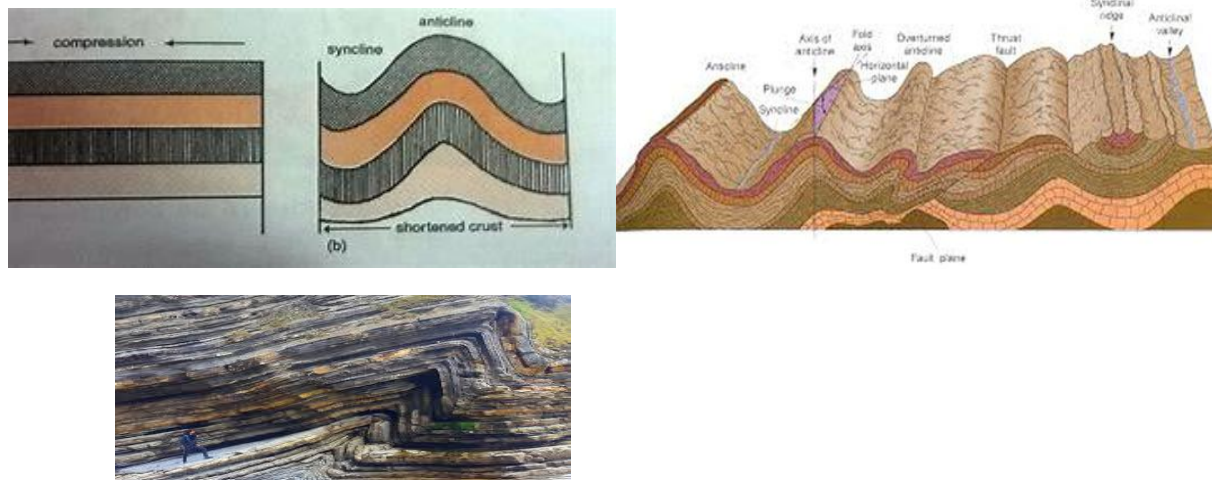
1. FOLD MOUNTAINS

Fold Mountains are formed as a result of large-scale earth movement that caused stress to set up in the earth's crust. The stresses are caused by the increase load of the overlying rocks resulting in the formation of compressional forces called OROGENESIS, the force produced wrinkle or folding along the lines of weakness. The up folds are called ANTICLINE while the down folds are called SYNCLINES

PROCESSES OF FOLD MOUNTAINS: SIMPLE – ASYMMETRICAL – OVER – RECUMBENT and OVERTHRUST folds

Examples of Fold Mountains can be found in the following countries of the world. ATLAS of Africa; HIMALAYAS in Asia; ALPS in Europe; ROCKIES in North America and ANDES in South America

Fold Mountains are by far the widest spread and also the most important of all mountains.



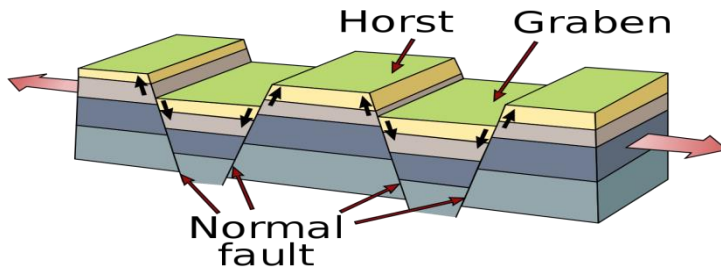
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2, BLOCK MOUNTAINS

Block mountains are formed as a result of earth movement, when the earth rotates it will cause the earth crust to cracks that will produce lines of fault, the cracks or lines of fault will lead to the displacement on either side of the crack. The process is called ‘**EPIROGENESIS**’ that produces **TENSIONAL and COMPRESIONAL FORCES**. The tensional forces act both on the surface and the interior parts of the earth crust thereby pushing the displacement crust either upward or downward to produce an outstanding feature called Block Mountain and the downward feature called rift valley. The earth movement can equally produce compressional forces at both side of the crust to produce outstanding features and depression. Good examples of Block

Mountains are: **HUMSTRUCK OF Germany; VOYAGE of North-East France; LASCADE of North America; RUWANZOEI RANGE between ZAIRE and UGANDA.**

Example of RIFT VALLEY, EAST AFRICAN rift valley

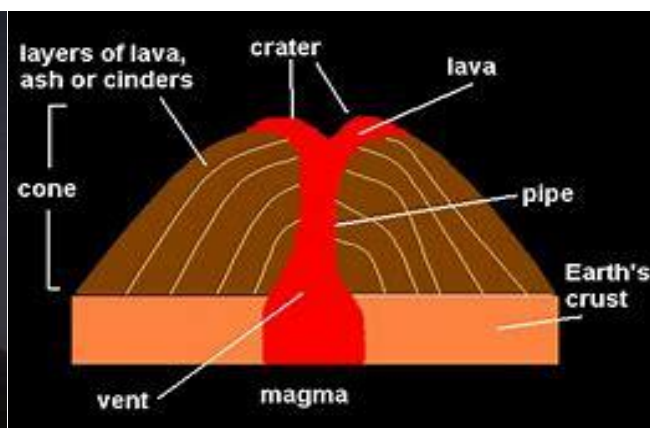


VOLCANIC MOUNTAINS

The formation of Volcanic Mountains can be attributed to the activity of molten magma, ie the eruption of molten magma that is trapped beneath the earth's surface into the atmosphere. The nature of mountain is formed as a result of accumulation of the ejected materials from the core which are gradually build up to form an extensive land form that can be conical or dome like shape. The materials include molten lava, ash, dust, volcanic bonds, mud and liquid, the materials mixed together as a result of heat and pressure to form liquid that erupt through vent in successful layers which later cold and solidified to form mountain, good examples of volcanic mountains globally are: Mountain Fuji in Japan, Cameroon Mountain that served as natural boundary between Nigeria and Cameroon, Mountain Mayor in Philippine, Mountain Kilimanjaro in East Africa, and Mountain Elgon in Kenya etc



X



Draw only this one

RESIDUAL MOUNTAINS

Residual Mountain is also called mountain of denudation. The mountain evolved by the process of denudation majorly wind and water, these agents eroded the original

mountain and changed the structure of the mountain can be defined as the remnant of previously existing mountain that have been subjected to weathering and erosion for an extended period of time, good examples of residual mountains are: Monadnock in USA, Namuli in northern Mozambique etc

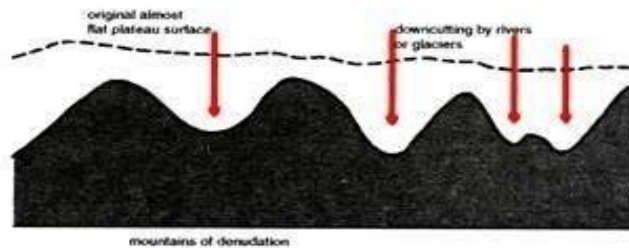


Fig. 23 Residual mountains or mountains of denudation.

IMPORTANCE OF MOUNTAINS TO MAN

1. Mountains serve as source of rivers eg, Fout D’Jallon highland (source of river Niger) and Cameroon mountain (source of river Benue)
2. Mountains attract heavy rainfall on the windward side, especially relief rainfall
3. Mountains modify climate of a place thereby making it friendly for human settlement
4. Some highlands have vast mineral deposits (source of minerals)
5. Mountains act as natural boundaries eg Cameroon mountain
6. Mountains serves as tourist attractions or holiday resort
7. Mountains do encourage terrace farming etc

DISADVANTAGES OF MOUNTAINS

1. Mountains are barriers to road construction
2. Mountains do not encourage huge settlement
3. Mountains encourages erosion etc

QUESTIONS.

1a. Name the types of mountains with examples each

b. Describe the process of formation of any one of the different types of mountains

c. In what four ways are mountains of great importance to man

2a. Name two landforms produced by faulting.

b. Describe the characteristics of one of the land forms named in (a)(1) above

PLATEAUX

MEANING: Plateaux are elevated uplands with extensive level surfaces and are usually descend steeply to the surrounding low land. Plateau is an extensive land area having a relatively level surface rises sharply above adjacent land; it can also be called **TABLE LAND**

According to the mode of formations and physical appearances, plateau may be categorized into three (3) types as mentioned below.

TECTONIC PLATEAU: plateau is formed as a result of earth's movement which causes uplift, are normally of a considerable size and fairly uniform altitude. The uplifted areas formed tectonic plateau and the depression areas formed basins.

When tectonic plateaux are enclosed by Fold Mountain they are known and called **INTERMONT PLATEAU** good example are: **DECCAN PLATEAU** in India, **HARZ** in Germany, **TIBETAN** between **KUNLUM** and **HIMALAYAS**, **PLATEAU BOLIVIA** etc

VOLCANIC PLATEAU: The plateau is formed when molten lava erupts through vent and solidified in a table like structure higher above the surface of the earth, good examples are: **SNAKE PLATEAU** in Columbia, **ANTRIM** plateau in Northern Ireland

DISSECTED PLATEAU: The feature is formed through the continual process of weathering and erosion by running water and wind, the process worn down the surface of original plateau and made it irregular. Wind abrasion equally dissected plateau into steep-sided tabular hills termed **MESA** and **BUTES**, good examples are: **JOS** plateau in Nigeria, **EDGES** of **FOUTA D'JALLON** in Guinea, **KUMASI** plateau in Ghana, **ENUGU-NSUKKA** plateau in Nigeria. Etc

IMPORTANCE OF PLATEAUX

- i. Plateau encourages the development of Tourism
- ii. Plateau provides good grazing ground because of lack of tsetse-flies
- iii. Plateau provides good environment for settlement
- iv. Plateau environment is good for agricultural purposes especially farming due to their cold climate and soil fertility
- v. Some plateaux are rich in mineral resources like Coal, Tin, Gold etc.
- vi. Plateau attracts long period of rainfall

QUESTIONS

1a. Describe the main characteristics and mode of formation of any two of the following

i. Dissected plateau. ii. Tectonic plateau iii. Volcanic plateau

b. Explain three importance of plateau to man

PLAIN

MEANING: plain is a level or gentle undulating land not significantly higher than adjacent areas and with relatively minor differences in elevation commonly less than two hundred (200) meters within the area. In other words, plains are expanse of almost level land either near the sea level or a few hundred (100) meters above sea level

TYPES OF PLAIN

Plain lands in the world are grouped into three (3) major types as thus:

STRUCTURAL PLAINS: These are the structurally depressed areas of the world that make up some of the most extensive natural lowlands on the earth's surface.

They are natural horizontal bedded rocks that are formed as a result of Earth's movement, majorly between Fold Mountains, good examples are: The PRAIRIES of North America; PAMPERS of Argentina; the CENTRAL LOW LANDS of Australia.

Leave space for diagram

EROSIONAL PLAINS: These types of plains are formed by the agents of denudation majorly water and wind. The agents help in smoothened the irregularities of the Earth's surface. When plain is formed as a result of water, ice and glacier's activities it is called PENEPLAIN, while plains that are formed as a result of wind action especially in the arid regions are called PEDIPLAINS, good examples are: CANADIAN SHIFT; REG and HAMADA of Sahara deserts

Leave space for diagram

DEPOSITIONAL PLAINS: They are formed by the deposition of weathered materials due to the activities of denudation such as wind and water, these materials are deposited on the

irregular surface of the earth thereby level it to become plains, good examples are: FLOOD PLAINS, DELTAIC PLAINS, LOESS PLAINS, ALLUVIAL PLAINS.

Leave space for diagram

ECONOMIC IMPORTANCE OF PLAINS TO MAN

- i. Plains provide rich fertile soil which favours intensive cultivation of crops for both local consumption and international trade examples of such crops are cotton, millet, tea, coffee.**
- ii. Plains provide good settlement ground for population concentration**
- iii. Plains provide good communication route ways such as roads, railways.**
- iv. Plain areas are homes of mineral resources such as petroleum**
- v. Plains provide good ground for rearing of animals etc.**

DISADVANTAGES OF PLAINS

- i. Plains are extensively liable to flooding if they are located close to sea or big rivers**
- ii. Plain areas are not good for protection during wars**
- iii. Plains especially in the arid regions (Deserts) are subjected to harsh climate etc.**

QUESTIONS

1a. Describe the formation of the following:

- i. Erosional plains.**
- ii. Dissected plains**

b. Highlight two advantages and two disadvantages of plains.