**GEOGRAPHY SS 2**

**FIRST TERM**

**WEEK ONE**

**Action of Running Water**

**Running Water: An Agent of Denudation**

Running water is a fundamental force of erosion and plays a pivotal role in shaping our landscapes. Rivers, in particular, are active agents in the processes of erosion, transportation, and deposition of materials.

Terminology Associated with Rivers

1. Source of a River: This refers to the point where a river originates, typically in highland areas.

2. Course of a River: The path or channel through which a river flows.

3. Mouth of a River: The endpoint of a river, where it meets the sea, ocean, or lake.

4. River Basin or Catchment Area: All the areas drained by a river and its tributaries.

5. Watershed or Water Divide: The highland area that separates two or more rivers or river basins. It's from the watershed that rivers draw their sources.

6. River Regime: This denotes seasonal changes in a river's water volume over the course of a year. It can be either a single regime, with one period of high water volume and one of low volume, or a double regime, with two distinct periods of high water volume.

7. Confluence: The point where two rivers meet.

8. Tributaries: Smaller rivers or streams that combine to form a larger river.

9. Distributaries: Channels formed as a river divides when it flows into the sea, often found in a river's delta region.

10. River Energy: The river's velocity, which is essential for its efficiency in eroding and transporting materials.

Factors Affecting River Velocity

1. The volume of water released.

2. The slope of the river valley.

3. The shape of the river valley.

4. Amount and size of materials carried by the river.

Stages of a River

A river's course can be broadly divided into three main stages:

1. Upper Course or Mountain Course (Youthful Stage)

2. Middle Course or Valley Course (Mature Stage)

3. Lower Course or Plain Course (Old Stage)

Characteristics of the Upper Course of a River:

1. Marks the beginning or source of a river.

2. Typically found around highland areas.

3. Features steep sides.

4. The river flows swiftly down the steep slope.

5. The dominant work of the river is vertical erosion.

Processes of River Erosion:

While the materials carried by a river are the primary agents of erosion, the erosive work of a river involves four key processes:

1. Hydraulic Action: Fast-flowing water forces itself into cracks and joints within the valley under pressure, enlarging these cracks.

2. Corrosion: This is the wearing away of the sides and floor of the river with the aid of transported sand, pebbles, silts, and boulders, which eventually widen and deepen the river valley.

3. Attrition: The load (material) is worn down as particles collide with one another and with the valley's floor and sides. Large boulders are broken down into smaller pieces like pebbles.

4. Solution: This refers to the chemical action of water on materials it encounters while flowing. Here, rock salt is dissolved and carried away in solution.

Features of the Upper Course of a River:

1. V-Shaped Valley

2. Gorge

3. River Capture

4. Rapids and Cataracts

5. Waterfall

**WEEK TWO**

**Action of Running Water II**

**Middle Course of a River**

The middle course of a river is a crucial segment in its journey, with distinct characteristics that contribute to shaping the landscape:

**Characteristics of the Middle Course of a River:**

1. Lateral Erosion Dominance: In this stage, lateral erosion becomes more prominent than vertical erosion, resulting in the widening of the river valley.

2. Increased Water Volume: There is a notable increase in the river's water volume due to contributions from various tributaries.

3. Enhanced Load: The middle course witnesses a higher load of materials being carried by the river.

4. Transportation Focus: The primary function of the river in this stage is the transportation of materials, with less emphasis on deposition.

Processes of River Transportation

The river's load is transported through four key processes:

1. Solution: Dissolved materials are carried by the river.

2. Suspension: Fine particles are suspended and transported within the water.

3. Saltation: Small pebbles or stones bounce along the riverbed.

4. Traction: Larger rocks and boulders are rolled or dragged by the river.

Features of the Middle Course of a River:

1. Wide V-shaped Valley

2. Meander

3. River Cliff and Slip-off Slopes

4. Interlocking Spur

Lower Course of a River

The lower course of a river showcases distinctive characteristics that contribute to its unique role in the landscape:

Characteristics of the Lower Course of a River:

1. Deposition Dominance: In the lower course, the primary function of the river is the deposition of materials.

2. Lateral Erosion: Lateral erosion continues to be active.

3. Valley Floor Gradient Reduction: The gradient of the valley floor decreases.

4. Reduced Speed: The river's speed decreases significantly.

Features of the Lower Course of a River:

1. Flood Plain

2. Levees

3. Ox-bow Lake

4. Braided River

5. Delta

Drainage Pattern

River systems, which include the main river and its tributaries, can develop specific patterns based on their basin and geological factors. Various types of drainage patterns exist:

1. Dendritic Drainage Pattern: Tributaries (subsequent rivers) join the main river (consequent river) at oblique angles, creating a tree-like structure. This pattern typically forms on homogeneous rock beds.

2. Trellised Drainage Pattern: Formed due to alternating layers of hard and soft rocks, tributaries follow the rock structure, flowing at right angles to the main river in a rectangular pattern.

3. Radial Drainage Pattern: Streams or tributaries flow outward and down a hill, creating a radial pattern resembling a bicycle wheel.

4. Centripetal Drainage Pattern: Multiple rivers or streams flow from different directions into a central point or lake.

5. Annular Drainage Pattern: In this type, the river almost forms a concentric ring around a highland, almost encircling a hill.

**Importance of Rivers**

Rivers hold significant importance in various aspects:

1. Transportation: Serving as a crucial medium for transportation.

2. Hydro-Electric Power (H.E.P): Generating power through rapids and waterfalls.

3. Irrigation: Providing water for agriculture.

4. Domestic and Industrial Water: Supplying water for various purposes.

5. Fertile Soil Formation: Creating flood plains with fertile soil.

6. Food Source: Offering various food resources, including fish and crustaceans.

7. Employment Opportunities: Supporting livelihoods for fishermen and boat builders.

8. Political Boundaries: Acting as boundaries between regions and nations.

9. Tourist Attraction: Serving as tourist destinations, contributing to economic growth.

General Evaluation:

1. What is running water?

2. State the stages of a river.

3. Explain the processes of river erosion.

4. State the processes of river transportation.

5. Mention the features of a river in its lower course.

**WEEK THREE**

**Action of Wind**

**Wind Processes in Deserts**

Wind is a dominant geological force shaping the landscapes of deserts and semi-arid regions across the world. These arid environments, characterized by low rainfall, high temperatures, cold currents, and rapid evaporation rates, exhibit a range of features driven by wind erosion. Prominent deserts include the Sahara in West Africa, the Kalahari and Namib deserts in South Africa, the Arabian, Iranian, and Thar deserts in the Middle East, the Australian desert, the Atacama desert in South America, and the Mohave desert in the United States.

Key Desert Characteristics:

1. Extreme Temperature: Deserts are known for their extreme temperature variations.

2. Low Rainfall: They typically receive minimal precipitation.

3. Absence of Vegetation: Vegetation cover in deserts is limited due to arid conditions.

4. High Evaporation Rate: Rapid evaporation contributes to water scarcity.

5. Wind Dominance: Wind plays a pivotal role in shaping desert landscapes.

6. Presence of Cold Currents: Some deserts are influenced by cold ocean currents.

Types of Deserts:

There are five distinct types of deserts:

1. Erg or Sandy Desert

2. Hamada or Rocky Deserts

3. Reg or Stony Deserts

4. Badlands

5. Mountain Deserts

Wind Erosion Processes:

Wind erosion occurs through the following processes:

1. Deflation: Wind lifts and carries loose sand and pebbles, resulting in the lowering of land surfaces, forming depression hollows.

2. Abrasion: Sand particles carried by the wind act like abrasive agents, wearing away rock surfaces.

3. Attrition: Materials transported by the wind collide, wearing each other down.

Differences Between Deflation and Abrasion:

1. Deflation involves the blowing of loose materials by the wind, while abrasion involves the wind hauling rock against rock surfaces.

2. Deflation entails rolling loose materials along the ground, whereas abrasion polishes, scratches, and wears away rock surfaces.

3. Deflation leads to the lowering of land surfaces, while abrasion is most effective at the base of rocks.

4. Deflation is primarily associated with the wind, while abrasion can also result from water and wave action.

Wind Erosion Features in Deserts:

1. Rock Pedestals: These irregular structures, resembling mushroom shapes, consist of alternate horizontal layers of hard and soft rocks. They are formed by wind abrasion on these rock layers.

2. Zeugen: These tabular masses have a layer of soft rock beneath a hard rock surface, creating a ridge and furrow landscape. Wind abrasion forms Zeugen.

3. Yardangs: These features have vertical bands of hard and soft rocks, resulting in ridge and furrow landscapes. Yardangs form when vertical bands of hard and soft rocks align in the direction of prevailing winds.

4. Mesas and Buttes: Mesas are flat, table-like landforms with a resistant top layer and steep sides, composed of both soft and hard layers. Buttes are isolated flat-topped hills formed from mesas.

5. Inselbergs: These isolated rocky outcrops have steep sides, round tops, and consist mainly of granite. They can rise to considerable heights, such as those found in Northern Nigeria, the Kalahari desert, and Western Australia.

6. Ventifacts and Dreikanters: These are pebbles shaped and polished by sandblasting, while dreikanters are ventifacts with three wind-faceted surfaces.

7. Deflation Hollows or Depressions: These are extensive depressions formed by wind deflation. When below the water table, they can lead to the formation of oases or swamps.

Wind Deposition Features in Deserts:

- Dunes: These are ridges or hills of sand formed through the piling up of sand by the wind. Two main types are Barchan, crescent-shaped dunes, and Seifs, longitudinal dunes.

- Loess: Fine soil particles carried by the wind are deposited outside the desert as loess, which is fertile and porous.

General Evaluation:

1. What is a desert?

2. State three causes of desert formation.

3. List four types of deserts.

4. Explain the action of wind erosion in desert regions.

5. Describe a rock pedestal.

**WEEK FOUR**

**Action of Glacier**

The action of a glacier is an important agent of erosion, transportation and deposition in temperate regions or mountainous regions.

**TERMS ASSOCIATED WITH GLACIER**

1. **Ice:** This is a solid form of water which results from freezing when the temperature is below 00
2. **Snow:** This refers to frozen water vapour that falls in form of crystals from the atmosphere.
3. **Snow-Line:** It is the lower limit of snow cover on a mountain.
4. **Glacier:** This means moving ice i.e. large accumulation of ice in motion.
5. **Glaciation:** It is the wearing away of the earth surface by a glacier.
6. **Snow Field:** This is the region or area that is permanently covered by snow

**ACTION OF GLACIER EROSION**

1. **Sapping:** This is the breaking up of rock by alternate freezing and thawing of water at the bottom of cracks.
2. **Plucking:** It is the tearing away of rocks which have become frozen on the side or bottom of a glacier.
3. **Abrasion:** This is the wearing away of rocks beneath a glacier by the scouring action of the rocks embedded in the glacier.

**FEATURES OF GLACIER DEPOSITION IN LOWLAND AREAS**

1. **Boulder Clay:** This consist of stones of various sizes in a mass of sand and clay.
2. **Erratics:** These are transported rock fragments which are composed of materials entirely different from the bedrock of the region where they are deposited. They are deposited when the ice carrying them melt into water.
3. **Drumlins:** It is composed mainly of boulder clay.
4. **Eskers:** These are long narrow ridges of sand and gravel deposited by melting water. They are usually porous.
5. **Terminal Moraines:** They are made up of boulders which are deposited at the edge of the ice-sheet.
6. **Outwash Plain:** This is a large area consisting of sand and gravel that are washed down the mountainous zone and deposited to form outwash plain which lies beyond the terminal moraines.

**GENERAL EVALUATION**

1. State the processes of glacier erosion.
2. Describe plucking.
3. Explain abrasion.
4. Explain at least three features of glacier deposition in lowland areas.
5. What is Time Zone?

**WEEK FIVE**

**Action of Wave**

The action of wave as an important agent of erosion, transportation and deposition of material is confined to the coast of seas and oceans. The rate of marine erosion depends on the nature of the rocks, the amount of rock exposed to the sea, the effects of tides and currents and human interference in coast protection.

**TERMS ASSOCIATED WITH WAVE**

1. **Wave:**Wave means a turbulent movement of water as a result of wind moving over the water.
2. **Tide:**Tide is the alternate rise and fall of the surface of the sea approximately two times a day.
3. **Current:** Ocean current is the movement of water in the ocean in a particular direction.
4. **Coast:**This refers to the meeting point between the land and the sea.
5. **Shore:**This is the part of the land that lies between high water and low water.
6. **Beach:**This refers to the material deposited on the shore by the action of wave.
7. **Swash:** This refers to water thrown up the beach by breaking waves.
8. **Backwash:**This is the water that sucks back and retreats after wash.
9. **Undertow:**This is water which flows near the bottom away from the shore.

**PROCESSES OF WAVE EROSION**

1. **Corrosion:**This is the wearing down of the base of the cliff by wave action.
2. **Attrition:**This is breaking down of materials like pebbles, boulders, etc. against cliff faces and each other, as the wave continues its activities.
3. **Hydraulic action:**In this process, fast-moving waves force itself into cracks within the base of the cliff under pressure and enlarge the cracks.
4. **Solvent action:**This involves the disintegration of rock materials such as limestone on the coast by the chemical action of the sea.

**FEATURES PRODUCED BY WAVE EROSION**

1. **Capes and Bays:**They are features of marine erosion in coastline which can be made of hard rock (cape) or soft rock (bays). A bay usually contains water and could be used as a harbour.
2. **Cliff:**These are steep rock faces adjoining the coast. They are formed due to the action of waves on the base of the headland which cut backwards as the wave action intensifies.
3. **Coastal Cave:**A cave is a feature of marine erosion. It is an arch-shaped feature found in steep coast or cliff coast. It may contain blow-holes or geo.
4. **Arch:** When two caves approach each other from either side of a headland, they meet to form an arch.
5. **Stack:**Continuous action of waves makes an arch to collapse. The seaward portion of the highland that remains is called a stack.
6. **Stump:** When the stack is seriously eroded to a point that a small portion is just visible above the sea level, a stump is said to be formed.
7. **Geo:** Geo develops when a wave cuts into a cliff, resulting in a narrow hole called geo. It is formed when a cave collapses.
8. **Gloup or Blowhole:** Owing to hydraulic action of wave, a hole might develop at the roof of a cave. Continued erosion will result in the hole piercing through to the surface of the cave and water at times may force itself through these holes to form a gloup or blow-holes.

**FEATURES OF COASTAL DEPOSITION**

1. **Beaches:**Beaches are made up of sand and gravel. They are depositional features on the coast. Beaches are formed when sand and gravel loosened from the land are moved by waves and deposited along the shore. These deposits of sand and gravel on the shore are called beaches.
2. **Spits:**These are ridges of sand and gravel formed by longshore drift across the entrance to the coastal inlet by lying on one side to the land and the other side into the ocean.
3. **Bar:** Bar is a ridge, usually of sand or rock debris formed by deposition across the mouth of a river or the entrance of a bay.
4. **Marine dunes and dune belt:**Dunes are onshore wind with a large force which makes a large amount of coastal sand to move to form marine dunes. Marine dunes will later stretch into dune belts.

**GENERAL EVALUATION**

1. Describe a wave.
2. Describe a beach.
3. What is ocean current?
4. Explain attrition as a process of wave erosion.
5. What is a bay?

**WEEK SIX**

**Climate**

Climate is the average weather condition of the atmosphere over a long period of time usually about 30-35years.

**FACTORS THAT CAN AFFECT OR DETERMINE CLIMATE**

1. Latitude
2. Cloud cover
3. Altitude
4. Vegetation
5. Distance from the sea
6. Planetary wind
7. Ocean currents

**ELEMENTS OF CLIMATE**

1. Temperature
2. Rainfall
3. Wind
4. Relative humidity
5. Pressure
6. Cloud cover
7. Sunshine

**TYPES OF CLIMATE**

* **HOT CLIMATE:**

**(a) Equatorial Climate**

**Location:** This is located within 50 North and South of the equator.

**Areas:** Amazon Basin of South America, Zaire Basin of Central Africa, The Coast of West Africa.

**(b) Tropical Continental (Sudan) Climate**

**Location:** It is located between 50-200 North and South of the equator

**Areas:** Central America, North-Western part of South America, Interior upland of Brazil and Bolivia, West Africa, part of East Africa, parts of India and South East Asia, Northern Australia.

* **COLD CLIMATE:**

**(a) Polar Climate**

**Location:** It is found around 900 North and South of the Equator, especially around the poles.

**Areas:** Greenland, Iceland and Antarctica.

**(b) Tundra Climate**

**Location:** It is located around 600-900North and South of the equator especially around the Arctic and Antarctic circles.

**Areas:** Coastal strip of Greenland, Northern Canada and Alaska, parts of Eurasia and Antarctica.

* **DESERT CLIMATE:**

**(a) Hot Desert Climate**

**Location:** Within latitude 150 and 300North and South of the equator.

**Areas:** Sahara desert, Arabian desert, Iranian desert, Thar desert, Namib desert, Kalahari desert, Great Australian desert and Atacama desert.

**(b) Cold Desert Climate**

**Location:** Within 450-600 North and South of the equator.

**Areas:** Eurasia, North America and South America.

Other types of climate are:

* **WARM TEMPERATE CLIMATE WESTERN MARGIN (MEDITERRANEAN TYPE):**

**Location:** 300-450 North and south of the equator.

**Areas:** North Africa, South West of South Africa, Central Chile, California, Southern Australia, France, Spain and Italy.

* **WARM TEMPERATE CLIMATE EASTERN MARGIN (CHINA TYPE):**

**Location:** 200-400 North and south of the equator.

**Areas:** China, U.S.A, Mexico, Natal in South Africa and Australia.

* **COOL TEMPERATE CLIMATE WESTERN MARGIN (BRITISH TYPE):**

**Location:** 450-600 North and south of the equator.

**Areas:** Britain, France, Belgium, Netherland, Denmark, Norway and British Columbia.

* **COOL TEMPERATE CLIMATE EASTERN MARGIN (LAURENTIAN TYPE):**

**Location:** 400and 500 North of the equator.

**Areas:** North Eastern part of North America, North East Canada and Northern Asia.

**GENERAL EVALUATION**

1. What is weather and climate?
2. Explain the importance of weather and climate.
3. Mention the instrument used for measuring rainfall.
4. Explain the equatorial climate.
5. Mention the areas that experience the Mediterranean climate.

**WEEK SEVEN**

**Classification of Climate**

Climate varies from place to place and the following are the common classification of climate:

1. The Greek system of classification and
2. Koppen system of classification

**GREEK SYSTEM OF CLASSIFICATION OF CLIMATE**

This is one of the earliest climatic classifications which was made by the Greeks. The basis for the Greek classification is temperature. This system of classification divides the world into three climatic zones. These zones are:

1. **Torrid zone:** This zone is found within the tropics. It is very hot and has a high temperature throughout the year.
2. **Temperate zone:** It is found between the torrid and frigid zone and has a moderate temperature.
3. **Frigid zone:** It is found around the polar regions and It is very cold with low temperature all year round. It has a lot of ice-caps in most of the year.

**KOPPEN SYSTEM CLASSIFICATION OF CLIMATE**

The basis for Koppen’s classification of climate is temperature and rainfall. He identified five major climatic groups which correspond with the five principal vegetation groups. These climatic groups are represented with capital letters as follows:

* **Tropical Rainy Climate:**

The environment is defined as the total surrounding or medium of any organism in a given area.  This includes the physical surroundings, climatic factors and other living organisms in that surrounding.

**SPHERES OF THE ENVIRONMENT**

The earth as an environment is grouped into four spheres:

1. **Lithosphere:** The solid portion of the environment which contains rocks, sand, soil, minerals etc.
2. **Hydrosphere:** This is the liquid portion of the environment like rivers, lakes and oceans.
3. **Atmosphere:** This is the gaseous portion of the environment where gases like oxygen, nitrogen, carbon dioxide, ozone are found.
4. **Biosphere:** This is the portion of the environment where plants and animals are found. These four spheres of the environment are interrelated and interdependent on each other.

**Ecosystem:**

An ecosystem is defined as the community of plants and animals living together in harmony and interacting with their physical environment.

In other words, an ecosystem can be defined as the relationship that exists between a living thing and its non-living environment.

**Components of Ecosystem**

The ecosystem is made up of two main components.  These are:

1. **Abiotic (non-living) component:** These are the components like soil, water, gases, sunlight etc. in the environment.
2. **Biotic component:** This is the living component of the ecosystem.  It includes plants and animals.

The biotic component can be grouped into three (3)

1. **Autotrophs:** This is also called the producers.  They include the green plants which manufacture their own food through a process known as photosynthesis.
2. **Heterotrophs:** These are called primary and secondary consumers.  These organisms cannot manufacture their own food but depend directly or indirectly on plants for their own food e.g. man, parasites, saprophytes.
3. **Decomposers:** These are microorganisms that decompose dead organic matter to release nutrients required by producers to prepare their food e.g. Fungi and bacteria holistically, the components of an ecosystem can be grouped into the following:

* Land (soil)
* Water (Lake, Oceans)
* plants
* Animal
* Drainage (river)
* Climate (Atmosphere)

**INTERDEPENDENCE WITHIN THE ECOSYSTEM**

Interdependence is the word used to describe the relationship between the components of the ecosystem.  This is because components in an ecosystem depend on one another and they cannot exist in isolation.  A state of inter-dependence within the ecosystem is best achieved where the components are undisturbed.

Inter-dependence in an ecosystem exists in three ways:

1. Interdependence within Abiotic components e.g. The weathering of rock to form soil or the evaporation of water to form cloud etc.
2. Interdependence within Abiotic components e.g. Animals depends on plants for food or the exchange of oxygen and carbon dioxide by plants and animals.
3. Interdependence between the biotic and abiotic components e.g. plants depend on soil for support and nutrients, Autotrophs convert sunlight, energy.  Water and carbon dioxide during photosynthesis to produce food etc.

**Environmental balance**

Environmental balance refers to the ways of recycling matter and the flow of energy within an ecosystem to ensure continuous supply or availability.

Environmental balance is achieved through the following processes:

1. Hydrological (water) cycle
2. Carbon cycle
3. Nitrogen cycle
4. Mineral nutrient cycle
5. Food chain and food web. (For details, see pages 115 – 118 of Essential Geography)

**TYPES OF CLIMATE**

Types of Climate are:

1. **Cold climate:**This is divided into the polar climate and the Arctic or Tundra climate
2. **Polar climate:**It is located around lat 900N and S of the equator. It covers areas like Greenland and Iceland. Temperature is below 00c. Strong winds and low rainfall (10-15cm). Sparse population
3. **Tundra climate:** It is located around the arctic and antarctic circles (lat 600 and 900N and South of the equator). Covers countries like Canada, Norway, Alaska and part of Eurasia. Characterized by low temperature, inequalities of the length of day and night; prolonged winter, as such, no true tree; shorter summer encourages the growth of low shrub; precipitation is during autumn and winter periods; orens, sheep, bears, foxes and wolves are in place. Cool temperate West margin 40c – 170c temperature range; 600 – 800 min annual rainfall; deciduous trees; coniferous forest; foxes and squirrels are prevalent.
4. **Cool climate:**Regions with mid-latitude cyclones within lat 450 and 600N and S of the equator. There are three types which are:
5. **Cool temperate East margin:**Areas bordering the Atlantic ocean found between lat 400 – 500N and S of the equator covers places like N –E of North America and Argentina; rainfall is 700- 1,600mm: has coniferous forest and land; cultivation of cereals crops like rice, maize oats barleys.
6. **Cool temperate continental:**located 400 and 450 N and S of the equator. Covers place like east-central Europe; South Canada and North America high temperature (160c) and at times fall below 00c rainfall is 508mm; temperate grassland called prairies in Canada, steppers in Eurasia, Pampas in Argentina, Veld in South Africa and Downs in Australia scarcity of trees because of the scarcity of rainfall, long drought and severe winter; nomadic farming prevalent.
7. **Warm climate:**There are two types of warm climate which are:

**Warm Temperate Western Margin (Mediterranean type):**

300 and 450N and S of the equator. Covers South Europe (France, Italy, Portugal, Spain, North Africa (Morocco, Libya, Tunisia), South America (Central Chile), California in the USA and South West of South Africa.

**Characteristics**

It is characterized by a dry and hot summer with a temperature range of between 210c – 270c; high temperature throughout the year; rainfall is 600 – 840mm. Drought- resistant plants grow; the presence of small shrubs patches like acacia, Rosemary and Laurel which are grown; Orchard farming with a wide range of citrus fruits are grown

**Warm Temperate Eastern Margin (china type or gulf climate):**

It is found between lat 200 and 400N and S of the equator in places like South East Australia, Central part of South America, Central China, south Japan, New Zealand and South East US.

**Characteristics**

It is characterized by a warm moist summer and cool dry winter. 40c – 260c of temperature; moderate rainfall between 635mm and 1,524mm, evergreen and deciduous forest because of continuous rainfall all year round; cultivation of maize, cotton, sugar, rice and sugar- are extensively carried out.

**The equatorial climate within Lat 50N and S of the equator**

Places that come under the equatorial region are: Congo Basin of Central Africa, Amazon Basin of South America, South East Asia and the Central Area of West Africa; Temperature range is 200c – 260c(high); conventional rainfall and thunderstorms a lightening; maximum temperature are in March and September when the sun is overhead the equator; tropical rainforest and equatorial trees; the presence of rivers; the presence of economic trees such as iroko, Sapele, Ebony, African walnut etc and plantation agriculture such as rubber, cocoa, oil palms etc. The pygmies live here around Congo Basin and Red Indians of the Amazon Basin.

**Desert Climate**

Desert climate is of two types; they are Cold desert climate and hot desert climate:

**Hot Climate:** They are classified into two; which are: (i) Equatorial climate within Lat 50N and S of the equator. Places that come under the equatorial region are: Congo Basin of Central Africa, Amazon Basin of South America, South-East Asia and the Central Area of West Africa; Temperature range is 200c – 260c(high); conventional rainfall and thunderstorms a lightening; maximum temperature are in March and September when the sun is overhead the equator; tropical rainforest and equatorial trees; the presence of rivers; the presence of economic trees such as iroko, Sapele, Ebony, African walnut etc and plantation agriculture such as rubber, cocoa, oil palms etc. The pigmies live here around Congo Basin and Red Indians of the Amazon Basin

**EVALUATION**

1. What is the Word ‘Interdependence’ mean?
2. What is Environmental balance and how is it achieved?

**WEEK EIGHT**

**Environmental Resources**

**Meaning of Environmental Resources**

Environmental Resources are those organic and inorganic natural materials which are of great value to man, animals and plants

**Major forms of environmental resources**

* **Atmosphere resources:** They are those resources in the atmosphere example solar energy, wind, gases, rainwater etc.

**Importance of atmosphere resources**

Gases: this include oxygen, carbon dioxide, nitrogen, water vapour

1. Oxygen is used by plants and animals for respiration. It also supports burning of materials. Oxygen supports human life and also combines with water (oxidation) for chemical weathering and is also used for industrial purposes
2. Carbon dioxide is required by the plant for photosynthesis. Carbon dioxide combines with water to produce chemical weathering (carbonation). Green plants also take in carbon dioxide. Carbon dioxide absorbs heat to control the atmospheric temperature in the carbon cycle
3. Nitrogen is required by plants for the manufacture of proteins. It combines with water to provide food for plant growth. Nitrogen in the soil can be converted to nitrate in the soil. Nitrogen gas is used in the electrical industry
4. Water vapour is important for rain formation. The resultant of rain is used by plants and animals in the process of chemical weathering. Water vapour moderates atmospheric temperature

* **Mineral resources:** They are mineral content in rock (ores). Examples are gold, silver, gems, metals, petroleum, coal, etc.

**Importance of mineral resources**

1. It serves as a source of fuel
2. It is used for construction purposes
3. It is used for industrial purposes
4. It is used as a source of foreign exchange
5. It serves as a provider of employment
6. It serves as the provision of raw materials for industries

* **Water resources:** These are resources contained in natural water bodies example aquatic life like fish, water, minerals like potash and petroleum

1. **Vegetation resources**: These are resources from the forest example timber, cash crop, tourism etc.
2. **Human resources**: These are resources which have to do with human intelligence. Human coordinate other resources for productivity

**Some importance of Environmental resources to man**

1. Mineral resources provide raw materials for industries
2. Human resources are the basis for labour supply
3. Atmospheric resources help in the supply of solar energy
4. Water resources also provide hydroelectric power
5. Vegetative resources provide food for man

**WEEK NINE**

**Renewable and Non-renewable Resources**

**Natural resources** which are useful to human beings, but when they are abused or mismanaged could harm man and his environment.

Resources are classified into:

**Renewable Resources**

They are resources that have a cycle and as such, readily available for man’s use. This type of resources is much more desire able to use because often a resource is renewed so fast that it will have generated by the time it is used up. Examples are solar energy, wind energy, trees, plants, water etc.

**Advantages of renewable resources**

1. The resources are renewable and easily regenerated
2. Renewable energy such as solar produces clean energy that does not pollute the environment.
3. Renewable sources of energy are available everywhere
4. Maintenance cost needed to install renewable source energy is cheap

**Disadvantages of renewable resources**

1. Most renewable sources of energy are affected by weather
2. They could be wasted because they are readily available
3. No optimum use of it
4. They can cause a natural disaster

**Non-Renewable Resources**

They are resources that don’t have cycles and as such can be depleted. Non-renewable resources cannot sustain its consumption rate. In other words, non-renewable energy is not sustainable. Examples are fossil fuel (petroleum, oil and natural gas) and nuclear energy

**Advantages of non-renewable resources**

1. Availability of fossil fuels and coal
2. Availability of technology

**Disadvantages of non-renewable resources**

1. The resources are not renewable when they run out inevitably
2. Carbon dioxide and other climate gas are released in large quantities when fossil fuels and coal are used
3. Environmental pollution
4. They can be depleted

**INTERVENTIONS WITHIN THE NATURAL ENVIRONMENT**

MEANING: Environmental intervention refers to the forces of nature and the activities of man that change the natural existence of the components of the eco-system.

**TYPES OF ENVIRONMENTAL INTERVENTION**

There are two types of interventions in our environmental.  They are man-made and natural intervention.

1. Natural Intervention includes Desert Encroachment, volcanism, sea-level changes, Earthquakes, climatic changes, Drought, flooding, Hurricane etc.
2. Human Interventions deal with man’s interference with the ecosystem through his activities. Human intervention includes Deforestation, pollution, land reclamation, farming activities, construction urbanization, grazing, industrialization etc.

**EVALUATION**

1. What is Environmental Intervention?
2. Name the two types of Environmental intervention and give two examples of each.

**WEEK TEN**

**Environmental Problems**

**Definition of Environmental Problems**

Environmental problems or hazards are disasters which affect lives and properties as a result of the action of man and other natural phenomena. Environmental hazards have causes and effects. They can be controlled

**Factors affecting Environmental Hazards**

Forms of environmental hazards are:

* **Deforestation:**

This is the destruction of natural forest by the indiscriminate felling of lumberable trees

**Causes**

1. Cutting of trees for timber
2. Cutting down of trees for crop cultivation
3. Excessive bush burning and grazing

**Effects**

1. Deterioration of the environment
2. Soil Erosion
3. Destruction of soil nutrient
4. Disrupts the act of keeping wildlife
5. Decrease transpiration and increases erosion

**Control**

1. Afforestation is the act of planting trees to replace those that have been cut down
2. Decrees are the legislation against tree felling
3. Alternate sources of fuel apart from wood
4. Public enlightenment
5. Licensing

* **Soil Erosion:**

It is the removal of the top layer of the soil by the agents of denudation. These agents are water, wind and ice

**Causes**

1. Bush- burning
2. Overgrazing
3. Excessive rainfall
4. Deforestation
5. Excavation of soil for various purposes example mining and construction

**Effects**

1. Reduction of farmlands
2. Reduction of soil fertility
3. Destruction of roads
4. Loss of lives and properties
5. Land and water pollution through deposition of sediments

**Controls**

1. Afforestation
2. Contour ploughing or making ridge across slopes
3. Bush fallowing
4. Controlled grazing
5. Planting of cover crops like legumes, melons, cowpea etc.
6. Public enlightenment
7. Through terracing
8. An urban master plan to check developments

* **Drought:**

It refers to dryness due to lack of rainfall in an area over a period of time

**Causes**

1. Lack of rainfall
2. Low humidity and cloud cover
3. High temperature over a period of time without compensating rainfall
4. Climatic fluctuation

**Effects**

1. It affects plant growth
2. Loss of crops and livestock
3. Migration of man and animals
4. Drying up of rivers and streams

**Control**

1. Irrigation
2. Avoidance of overgrazing
3. Planting of cover crops

* **Desert Encroachment:**

It is the spread of desert to areas that were not desert.

**Causes**

1. Excessive bush burning
2. Overgrazing
3. Deforestation
4. Climate fluctuation

**Effects**

1. Exposure of soil to wind erosion
2. A hot and dusty and dry environment
3. Shortage of water
4. Migration

**Control**

1. Afforestation
2. Irrigation
3. Conservation of trees, surface and underground water
4. Creation of shelterbelts
5. Rotational grazing

* **Flooding:**

It is the occurrence of an excessive flood of water in areas not usually waterlogged. Flooding is also defined as the accumulation of an abnormally large volume of water in an area which has refused to percolate of flow away. It usually occurs when there is heavy rainfall in an area

**Causes**

1. Excessive rainfall
2. Dumping of refuse
3. Establishments of settlements along the river
4. Inadequate urban planning
5. Presence of steep slopes in the area
6. Poor drainage systems

**Effects**

1. Flooding causes loss of lives and properties
2. Interruption of socio economic activities
3. Washes away roads and railways
4. It lead to diversion of public funds
5. Spread water borne disease
6. Leads to the destruction of farmlands

**Control**

1. Construction of wider gutters
2. Environmental sanitation
3. Regular clearance of drainage channels
4. Avoid dumping in water channels
5. Construction of dams to acts as flood reservoirs