Module for Bachelor of Education Programme (Primary and JHS)

EBS152SW:
PHYSICAL AND SOCIAL RELATIONS IN SOCIAL STUDIES

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UNIT 1: THE ENVIRONMENT AND ENVIRONMENTAL PROBLEMS

This unit will take you through the meaning of the term “environment”, the types of environments and the importance of the natural environment. The unit will also discuss two main views on the interaction between humans and the natural environment, how humans interact with the natural environment, and how they can preserve the natural environment for future use.

Learning outcome(s)
By the end of this unit, the participant will be able to:

- define the concept of “environment”
- identify types of environments
- explain the importance of the natural environment
- discuss the causes of environmental problems
- discuss the activities of humans that pollute the environment
- examine the causes of land degradation

SESSION 1: MEANING OF ENVIRONMENT

In this session, we shall look at the meaning of the term “environment”. The environment can be defined from several perspectives. Think about any of them and write your definition down. We shall also look at some of the constituents of the environment. Before we look at your definition, let’s share the learning outcomes with you.

Learning outcomes

By the end of the session, the participant will be able to:

- define the concept “environment”
- explain three constituents of the environment

Definition of the term environment

The term "Environment" denotes the total set of living and non-living things that surround us. It includes physical, chemical and other natural forces. The term was derived from the French word “Environia,” which in its most literal sense means 'surroundings', hence the environment of an individual, object, element or system are all the other things that surround them. In reality, individuals, objects, elements and systems rarely exist in isolation. They interact with the things that surround them. Therefore, it is not particularly helpful to conceptualize the 'environment' without including in that conceptualization the notion of relationship. Individuals, objects, elements and systems influence and are in turn influenced by their surroundings. Indeed, the networks of relationships that exist between different entities may, in some cases, be extensive and highly complex. Thus, the 'environment' may be regarded as a 'space' or a 'field' in which networks of relationships, interconnections and interactions between entities occur. In fact, the term 'environment' is often used interchangeably with the ecological term 'ecosystem', which may be defined as a community of interacting organisms together with their physical surroundings.

Constituents of the Environment

The environment has a number of important constituents. These include the physical, biological, and social constituents.

The physical constituent of the environment

This includes soil, water, air, climate, temperature, light etc. These are also called abiotic constituents of the environment. This part of the environment mainly determines the type of the habitat or living conditions of the human population. This physical constituent of the environment is again divided into three parts which are the atmosphere (gas), the hydrosphere (liquid), and the lithosphere (solid). These three parts represent the three important states of matter constituting the natural environment. The physical component of the environment consists of only non-living things like air, water and soil. All these non-living things influence all living organisms including man. Water, temperature, air and soil are the most important abiotic components affecting living beings. All living organisms require water for their survival. Besides, water is the main vital fluid to keep optimum temperature of the body. Also, all life activates work in a particular range of temperature. When temperature is in excess of what is required, living beings will die. Air provides oxygen for respiration. All living beings including plants and animals require oxygen for their existence. Oxygen is taken into the body by respiration process and comes out in the form of carbon dioxide. Plants on the other hand take in carbon dioxide for food preparation during photosynthesis and give out oxygen to the surrounding. Soil is the most important physical constituent of the environment all living beings to create their habitat. It is the soil in which plant grows and man constructs houses to live in. It is the ground water present in the soil which provides water for drinking and other farming activities.

The biological constituent of the environment

This is also called biotic component of environment. This component consists of all living things like plants, animals and small or micro-organisms like bacteria. This component interacts with the abiotic component of the environment. The interaction between these two components (biotic and abiotic) forms various ecosystems such as pond ecosystem, marine ecosystem, desert ecosystem, etc. The self-sufficient large ecosystem of the earth is called biosphere. All ecosystems consist of three different types of living organisms. These three types are the producers, consumers, and decomposers. Producers are generally green plants and other photosynthetic bacteria which produce various organic substances such as carbohydrates, proteins etc. with the help of water, soil and light energy. Consumers depend for their nutrition on the organic food produced by the green plants. Decomposers bring about the decomposition of dead plants and animals and return various important minerals for the running of the biogeochemical cycles.

The social constituent of the environment

This mainly consists of various groups of human population. Thus, Man is the centre of the social component of the environment. Man is the most intelligent living organism. He is social animal. He makes various laws and policies for the proper functioning of his society. In brief, the social constituent of the environment consists of man and all social groups and their institutions.

Key ideas y ideas

- The environment consists of the total surrounding of the individual.
- The environment is made up of both physical, social and biological constituent.
- There is however relationship among these constituents of the environment.

Reflection

- What are some of the experiences you have gone through interacting with your surroundings?
- How have your experiences helped you to categorise the environment into various constituents?

Discussion

- How has this session equipped you to better understand the environment?
- How similar or different are the various constituent of the environment?

SESSION 2: TYPES OF ENVIRONMENT

In this session, we shall discuss the major types of the environment. You would agree with me that the things that are found in our environment are of different kinds. Mention two of these different kinds of things found in the environment. Well! Compare your answers to what we have discussed below. Before that, let's look at the learning outcome of the session.

Learning Outcome

By the end of this session, the participant will be able to:

- explain three types of environments.

Types of Environments

When you look around your environment, you will realize that the things that surround you are of different kinds. You will notice that some of the things have life in them whilst others do not have life. Name two of the things that have life in them and two that do not have life in them. Well! Answers to this question include the natural environment, social environment, built environment and spiritual environment.

The natural environment

The natural environment is also known as the biological or ecological environment. It is the environment that possesses all living organisms, plants, animals, human beings and microorganisms. These living organisms are the biota of the ecological environment. The plants are classified as flora or floristic component whilst the animals constitute the faunal or faunal component. Human beings constitute the anthropogenic component whereas microorganisms are the microbial component. The non-living components of the environments are grouped together as the abiotic components of the ecological environment. These abiotic components include the climatic component, the soils or edaphic component, topographic component and all other components such as geographical location, the air or atmosphere and the water of the environment (Gilpin, 1976; Bellamy, 2007).

The Social Environment

The social environment is also known as the socio-economic environment. The social environment occurs when there is an interaction between individuals or species with other individuals or other species. The social aspects cover the shape of the community of which we become members, and the norms and standards that we accept as our folkways, mores and customs.

The Built Environment

This is a well-planned area built by man to provide congenial conditions. The built environment is also seen as the area on the earth's surface, modified by human activities. This results in human-made surroundings, that provide the setting for human activities ranging in scale from buildings and parks or green space, to neighbourhoods and cities that also include their supporting infrastructure. The built environment is the environment that is of great interest to professionals such as town planners, land and quantity surveyors, architects, civil engineers, builders, horticulturists and estate managers, among others.

The Spiritual Environment

In this type of environment, the spiritual component of human beings interacts with the sub-conscious level. It is the extra-terrestrial environment where the human spirit interacts with the super natural spirit. That is, the spirit of a Supreme Being as well as other spiritual beings, such as the devil and his cohorts. It is this environment that has given rise to the diverse religions, through which their believers interact with their gods, in ways that are special to them.

Key ideas y ideas

- The environment is of different types and these types include natural, social, built, spiritual, etc.
- These different types of the environment provide different functions to support life on the earth.

Reflection

- What are some of the ways you have interacted with the natural environment?
- What are some of the ways you have interacted with the social environment?
- What are some of the ways you have interacted with the built environment?
- What are some of the ways you have interacted with the spiritual environment?
- How would you describe your experiences after interacting with the above environments?

Discussion

- How has this session equipped you to better understand the different types of the environment?
- How similar or different are the various types of the environment?

SESSION 3: IMPORTANCE OF THE NATURAL ENVIRONMENT

In this session, we shall discuss the importance of the environment. You would agree with me that the environment is relevant to man in several ways. Some of these are social, health, economic, tourism, etc. Before that, let's look at the learning outcome of the session.

Learning Outcome
By the end of this session, the participant will be able to?

- Outline three importance of the natural environment to man

Importance of the natural environment

The environment is important to man and the numerous living things that live on planet earth. Some of the importance have been discussed below.

Sources of Resources Necessary for Life

The first relevance of the environment is that it provides us with the resources necessary for life: from clean air and water to food and shelter, as well as the natural resources used in industrial economies. In providing what ecologists term the "sustenance base" for human societies, the environment is serving a "supply depot" function. It supplies us with both renewable and non-renewable resources. Trees produce oxygen when they produce their food through photosynthesis. In addition, during this process trees also use carbon dioxide in the air and reduce its concentrations in the atmosphere. This process regulates and maintains the carbon cycle. This is the reason why cutting trees leads to global warming. Trees can also remove pollutants in the air.

It serves as Waste Repository

In the process of consuming resources, humans produce "waste" products; indeed, we produce an enormously greater quantity and variety of wastes than does any other species. The environment serves as a "sink" or "waste repository" for these wastes, either by absorbing or recycling them into useful or at least harmless substances. When the waste products (e.g., city sewage or factory emissions) exceed the environment's ability to absorb them, the result is water and air pollution.

It serves as Habitat for living things

Like all other species, humans must also have a place to live, and the environment provides our "habitat" – where we live, work, play, and travel (e.g., homes, factories, shopping malls, transportation systems, and recreational areas). When we overuse a given living space – from a city to the entire Earth – overcrowding and/or overpopulation result.

Source of Natural Beauty

The environment is so important that it serves as a source of natural beauty. People enjoy nature for recreation, sports such as skiing in snow or rafting, and tourism. Nature is considered necessary for proper physical and mental health too.

Key ideas y ideas

- These different types of the environment provide different functions to support life on the earth.
- Some of these functions are social, economic, as well as health

Reflection

- What are the relevance of the natural environment to you?
- What are the relevance of the social environment to you?
- What are the relevance of the built environment to you?

Discussion

- How has this session equipped you to better understand the useful of the various types of the environment?
- How can you experience the useful of the environment to better your life?

SESSION 4: ENVIRONMENTAL PROBLEMS

This session discusses the major environmental problems. It is important to note that in our attempt to interact with the natural environment, we tend to create a lot of harm to human life. Some of these harms are derived from water, air, land and even the food we eat.

Learning outcomes

By the end of this session, the participant be able to:

- describe environmental problems
- identify three causes of environmental problems
- explain three effects of environmental problems
- discuss three measures to mitigate environmental problems.

Description of Environmental Problems

Environmental problems arise whenever there is a change in the quality or quantity of any environmental factor which directly or indirectly affects the health and well-being of man in an adverse manner. Environmental problems can be studied from two different perspectives. One is simply to look for adverse effects without regard to their origin in order to detect trends that call for further investigation; the other is to try to understand the cause-and-effect relationships, which make better prediction and proper management possible.

Environmental problems can further be examined from the direction of how the air, land and water bodies are polluted. These kinds of pollutions are not only seriously affecting human beings through diseases but also animals and trees/plants. Environment pollution is a worldwide problem and its potential to influence the health of human populations is great. Pollution reaches its most serious proportions in the densely settled urban-industrial centres of every country.

Causes of Environmental Problems

Several environmental factors can cause great harm to the environment. Some of these factors have been discussed below.

Rapid Population Growth and Increasing Industrialization

Many activities and actions of man pollute the environment. Polluted air is common throughout the world especially in develop countries such as Ghana. This has come about as a result of rapid growth in urban population, increasing industrialization, and rising demands for energy and motor vehicles especially in Accra, Tema, and Kumasi where the situation is worse. Other factors such as poor environmental regulation, less efficient technology for production, congested roads, and poor maintenance of vehicles, also add to the problem.

Illegal Mining Activities in River Bodies

Water is needed in every aspect of our life. We need water to wash our clothes, take our bath, drink, cook and for other house hold chores. Do you have a river, stream or lake in your community? Well, children and adults sometimes swim in some of these rivers, streams and lakes. Not only human beings but also some birds wash down in some of these rivers, streams and lakes. In our industries, water is used for a number of purposes. For instance, when the engines heat up, the engineers make use of water to cool down the engines. This reduces the pressure in the engines thereby preventing it from breaking down. Unfortunately, majority of the water bodies which serve as major sources of water have been polluted. Through the activities "galamsey". That is, illegal mining activities along river banks.

Improper Disposal of Untreated Industrial and Municipal Wastes

Due to industrialization and increased population, industrial and municipal polluted water is deposited into canals and rivers. The untreated industrial and municipal wastes have created multiple environmental hazards for mankind: irrigation, drinking and sustenance of aquatic life.

Improper Solid waste Disposal

Improper management of solid waste is one of the main causes of environmental pollution. Land pollution is one of the major forms of environmental catastrophe Ghana is facing today. Heavy metal industries in cities and some rural areas have produced wastes that are deposited into landfills without special precautions.

Effects of Environmental Problems

The following are some of the effects of environmental pollution:

Loss of Human Life

Polluted water consists of industrial discharged effluents, sewage water, rainwater pollution and water polluted by agriculture or households, cause damage to human health or the environment. Estimation indicates that many people especially those in the rural areas drink untreated water and this poor quality water causes health hazard and death of human beings, aquatic life and also disturbs the production of different crops. Moreover, water pollution affects our oceans, lakes, rivers, and drinking water, making it a widespread and global concern. A drinking water contains fluoride content ranging from 5.26 to 26.32 milligrams per litre and this is too high as compared to the World Health Organization's standard of 0.6 to 1.7 milligram per litre (Rizvi, 2000).

Ozone Layer Depletion

Ozone layer is responsible for protecting earth from harmful ultraviolet rays. The presence of chlorofluorocarbons, hydro chlorofluorocarbons in the atmosphere is causing the ozone layer to deplete. As it depletes, it emits harmful radiations back to the earth. This has serious health implications on living organisms.

Loss of Tourism Industry

The deterioration of the environment can be a huge setback for tourism industry that relies on tourists for their daily livelihood. Environmental damage in the form of loss of green cover, loss of biodiversity, huge landfills, increased air and water pollution can be a big turn off for most of the tourists.

Economic Impact

The huge cost that a country may have to bear due to environmental degradation can have big economic impact in terms of restoration of green cover, cleaning up of landfills and protection of endangered species. The economic impact can also be in terms of loss of tourism industry.

Measures to Curb Environmental Problems

Before we discuss the measures to deal with the problems that confront the environment, I will like to ask you for your views. What measures must you take in order to help save your environment from destruction? Well! Check whether your answers are among the measures that have been discussed below.

Public Education

One major way of solving environmental problem is through public education. The general public should be educated on the importance of the environment and the need to protect it. The public should also be educated on the harmful effects of their activities on the physical environment. Public education through television, radio, newspapers, door-to-door, information vans, public lectures, symposia, posters, religious organization, etc. This will create the necessary awareness and sensitize people to take precaution measures when dealing with the environment.

Law Enforcement

It is important for new environmental laws to be enacted. Existing laws should also be strengthened by law makers as well as law enforcement agencies to deal effectively with both domestic and industrial wastes that we generate in the country. Law enforcement agencies both at the traditional level and the national level should actively help in making sure that laws are strictly enforced since making of these laws without strict enforcement cannot help protect the environment.

Proper Waste Disposal Systems

Improper disposal of wastes affects the lives of people, plants and animals in several ways. It is therefore necessary to find better waste management systems in our society. This can take the form of providing public waste dumping sites, provision of waste bins, and ensuring regular removal and dumping of wastes in proper places. It is important to also note that the wastes can be recycled into other use.

Afforestation and Re-Afforestation

One of the effective means of dealing with most environmental problems is to encourage planting of trees. This helps to deal with problems such as high evaporation, soil erosion, and the drying up of water bodies.

Key ideas

- Any human activity that makes the environment unsafe for humans is considered an environmental problem.
- These problems have both human and natural sources

Reflection

- How would you conceptualise environmental problems?
- What are the causes of environmental problems in your community?
- How do these problems threaten the life of the people in your community?
- What measures could be put in place to curb the environmental problems that confront our communities?

Discussion

- How has this session equipped you to better understand environmental problems?
- How can you help prevent problems that we create in our attempt to use the environment?

SESSION 5: ACTIVITIES OF MAN THAT POLLUTE THE ENVIRONMENT

In this session, we shall discuss the various ways in which man interacts with the natural environment. How do you interact with the things that are found in your environment? How does the environment respond to your actions towards it? Now, compare your responses to what we have discussed in this session.

Learning Outcomes

By the end of this session, the participant be able to:

- discuss three influences of man on the natural environment.
- explain three ways in which the environment influences man
- discuss three ways of preserving the environment

Man's Influence on the Natural environment

Man and the environment were created to interact with each other in a symbiotic basis. Human beings live in the kingdom of nature and interact with it constantly. The influence of the environment is in the form of the air he breathes, the water he drinks, the food he eats, and the flow of energy and information. Man interacts with the environment through the various components of the environment such as sunlight, rainfall, temperature and humidity, etc.

Agricultural Activities

Man discovered agriculture as he ate fruits and threw their seeds around that soon afterwards germinated into plants same with the parent plants. Over the years, man has kept animals, cultivated

seeds and crops for food and by this practice, crops that are not originally found in a location have been planted where man is domiciled. Presently, farming has become more and more productive because of the use of chemicals and farm machinery, but many of these the chemicals have fallouts as many of the insecticides, weed-killers; fungicides and fertilizers which are used to improve the quality of our crops are also pollutants. Insecticides kill all insects, not just the crop-eating insects but some insecticides also passed through the food chains as one animal eats another.

Construction of all sorts

The physical environment is a home for man. Man constructs all kinds of houses, transportation channels, bridges, dams and the likes just to adjust to the physical environment. Different house types, depending on one's location and socio-economic status are built, ranging from thatched and mud houses in rural areas to cement-built houses of varying sizes in urban areas for the purpose of shelter from sun and rain.

Man and climate change

Several activities of man produce much more smoke and gases such as carbon dioxide, which pollute the atmosphere. The increase in population, the growth in scientific discoveries, the use of machines, plant and technologies have all led to an increase in the demand for new fuel even as larger amounts of wood, coal, petroleum products and natural gas are consumed. These produce pollutants in the atmosphere and have led to an increase in global warming. Climate change has potential effects on all natural systems and has become a threat to human growth and survival.

How the Natural environment influences man

The environment influences man in several ways. This influence is either through natural processes or human activities has turn to affect the life of man through flooding, rainstorms, earthquakes, volcano, erratic rainfall, heavy winds, and crop failures. Environmentally related diseases such as malaria, cholera, diarrhoea, and many others, are the influence of the environment on man as a result of human activities. The major environmental influence on man is evident in human settlement, human health, occupation, and the way of life of man in the environment.

Influence of the Physical Environment on Man's settlement

Settlements are important in all facets of life. This is because it is through their development that man can explore the environment for his needs. The various human settlement patterns such as dispersed, nucleated and linear settlements have arisen out of the influence of the physical environment. The dispersed settlement pattern occurs when the buildings are spread out whilst nucleated settlement pattern have a lot of buildings grouped together. The linear settlements are found in lines of communication such as along railway lines or roads. The nature of buildings found in these settlement types is also influenced by the physical environment.

Influence of the Physical Environment on Man's Health

Good life and healthy living are products of the physical environment. Clean and unpolluted natural environment promote healthy life whilst polluted environment contributes most of health hazards that confront man. Although it is often difficult to state the exact impact that specific environmental factors have on the health of individuals but the effect of land and water pollution, and air quality are obvious.

Influence of the Physical Environment on Man's Occupation

The economic activity preferred by man is largely hinged on the physical environment that surrounds him. Primary economic activities like agriculture and mining majorly are imposed on man by the physical environment. Fertile plains located in climatically suitable environment will be inviting for crop production, while the mineral deposits in a region will naturally motivate the dwellers into acquiring and utilising same for economic benefits.

The Physical Environment and Man's culture

The way of life of a group of people residing in a particular place is dependent on the environmental factors that prevail. The food that man grows and eats to stay alive is determined by the environment he finds himself. The peculiarity provided in terms of food type, common fruits and seeds form the alternative from which man could make a choice. It is important to note that inhabitants of hot areas would utterly reject thick clothing and embrace light ones, whilst those around very cold areas would obviously have nothing to do with light clothing because of their cold environment.

How to Preserve the Environment for Future Use

Several measures could be put in place to preserve the environment for future use. Some of these measures have been explained below.

Preservation of forests and wild animals

We need to stop destroying forests and cutting trees. Forests are the home to many different animals, birds and insects. Many animals like the leopard, lion, elephants, rhinoceros, etc. have become endangered and are close to extinction because of the destruction of their natural habitat. Trees give us wood that helps in making so many things like furniture, paper, etc. Trees help in purifying the air and also hold the soil with their roots and stop soil erosion. We must protect our forests.

Converting forests to National Parks and Sanctuaries

The government has now started protecting forests by converting them into national parks and wildlife or bird sanctuaries. Cutting of trees or killing of birds and animals is not allowed in these national parks and is punishable by the law. Grazing or cultivating of the land is also prohibited. Some of these national parks in Ghana include the Kakum national park, the Digya National park, the Mole national park, etc.

Preservation of soil

Soil is a very important natural resource. Man, and animals depend on plants for their food and plants get nourishment from the soil. So we can say that all living things depend on soil for their food. The process of wind, rain or rivers carrying away the top fertile layer of soil is called soil erosion. Cutting of trees or deforestation, strong winds in places of less vegetation (deserts), running of water bodies over the soil and overgrazing are all causes of soil erosion. We can prevent it by:

Forestation or planting trees as their roots hold the soil together. Cultivating the soil also provides it cover and prevents wind from blowing it away,

Terrace or step farming done on slopes of hills slows the speed of water flowing down and reduces soil erosion.

Building embankments on river banks prevents soil erosion by the rivers.

Preservation of minerals

We must use minerals sensibly as they are non-renewable natural resources. There is only a limited amount of oil, limestone, iron, coal, etc., found in the Earth. We should use renewable and non-polluting sources of energy like solar energy, wind energy, etc., instead of coal and oil so that they can last longer.

Environmental laws

It determines a theoretical frame including a number of rules regarding environmental protection. Environmental law is a body of law, which is a system of complex and interlocking statutes, common law, treaties, conventions, regulations and policies which seek to protect the natural environment which may be affected, impacted or endangered by human activities. Some environmental laws regulate the quantity and nature of impacts of human activities. Other environmental laws are preventive in nature and see to assess the possible impacts before the human activities can occur.

Key ideas

- Human beings influence the environment in several ways. For instance, the application of fertilizers to the soil, the construction of houses, roads, production of wastes, etc. influence the environment severally.
- The environment in turn also influences human activities on the earth. Human culture, occupation, clothing, feeding, etc. are key examples.

Reflection

- How do you influence your natural environment?
- In what ways does the natural environment influence human life?
- In what ways can you help preserve the natural environment?

Discussion

- How has this session equipped you with knowledge about the activities of man that affect the environmental?
- How can you identify the influence of the natural environment on human life?

SESSION 6: LAND DEGRADATION

This session will take you through the meaning of land degradation. It will also discuss the various types of land degradation as well as factors that contribute to land degradation. As part of this unit, you shall be introduced to the effects of land degradation as well as measures to prevent or mitigate land degradation.

Learning Outcomes

By the end of this unit, the participant be able to:

1. define land degradation.
2. explain three types of land degradation
3. discuss three causes of land degradation
4. examine three effects of land degradation
5. discuss three measure to address land degradation

The Meaning and Indicators of Land Degradation

It is important to note that land degradation is a composite term. It has no single readily-identifiable definition, but instead describes how one or more of the land resources (soil, water, vegetation, rocks, air, climate, relief) has changed for the worse. For instance, landslide is often viewed as an example of land degradation in action – it changes the features of the land, causes destruction of houses, and disrupts activities. In the longer term, however, the area of a landslide may regain its productivity. So, land degradation is far from being a simple process, with clear outcomes. This complexity needs to be appreciated before any attempt is made either to define land degradation or to measure it. Land degradation generally signifies the temporary or permanent decline in the productive capacity of the land. It describes the aggregate diminution of the productive potential of the land, including its major uses (rain-fed, arable, irrigated, rangeland, forest), its farming systems as well as its value as an economic resource. This link between degradation (which is often caused by land use practices) and its effect on land use is central to nearly all definitions of land degradation. The emphasis on land, rather than soil, broadens the focus to include natural resources, such as climate, water, landforms and vegetation. The productivity of grassland and forest resources, in addition to that of cropland, is embodied in this definition. Other definitions differentiate between reversible and irreversible land degradation. For instance, given sufficient time, all degradation can be reversed. For example, old landslide scars are noted for supporting better crops and more intensive agricultural possibilities than on the adjacent land not affected by landslides especially when the new soil is derived from less weathered rock materials, such as calcareous mudstones. So, reversibility depends upon whose perspective is being assessed and what timescale is envisaged. Whilst soil degradation is recognised as a major aspect of land degradation, other processes which affect the productive capacity of cropland, rangeland and forests, such as lowering of the water table and deforestation, are captured by the concept of land degradation. Land degradation is, however, difficult to grasp in its totality.

Types of Land Degradation

Land degradation processes are interactive, sequential and cumulative. For instance, quite small depletions of some nutrients may lead to a decrease in soil organic matter. This in turn may weaken the physical structure of the topsoil, making it easier for rainfall and surface runoff to remove it. In this way a relatively minor change in soil chemistry can lead to erosion. This results in different types of land degradation. These have been discussed below.

Land degradation by water

The removal of soil particles by the action of water is one major type of land degradation. This usually takes the form of sheet erosion in which there is a uniform removal of the thin layer of topsoil. It may also take the form of rill erosion. In this situation, small channels in the field are created. The topsoil could also be removed as a result of gully erosion where large channels, similar to incised rivers are formed. One important feature of land degradation by water is the selective removal of the finer and more fertile fraction of the soil.

Land degradation by wind

This occurs as a result of removal of top soil by the action of wind. This is usually referred to as sheet erosion. In this type of land degradation, the surface of the land is removed in thin layers. It is important to note that the action of wind can create hollows and form other features in the surface of the land. Land degradation by either wind or action of water may lead to reduced soil productivity and change the nutrient in the land.

Land degradation through 'soil burial'

This may occur through flooding, where fertile soil is buried under less fertile sediments. The wind can also blow and sand may inundate grazing lands. Also, catastrophic events such as volcanic eruptions among other may cause soil burial land degradation.

Land degradation through removal of vegetation cover

Vegetation is important in many ways. It protects the soil from erosion by wind and water and it provides organic material to maintain levels of nutrients essential for healthy plant growth. Plant roots help to maintain soil structure and facilitate water infiltration. Many activities of man such as surface mining or "galamsey" (illegal mining), logging and indiscriminate cutting of trees, construction activities, and poor farming practices may result in degrading the land.

Causes of Land Degradation

It is important to note that there are several factors that lead to land degradation in our communities. Majority of these factors are as a result of man's interaction with the physical environment. The causes of land degradation differ depending on the inherent characteristics of the land, specifically soil type, slope, vegetation and climate. Thus, an activity that, in one place, is not degrading may, in another place, cause land degradation because of different soil characteristics, topography, climatic conditions or other circumstances. So, equally erosive rainstorms occurring above different soil types will result in different rates of soil loss. It follows that the identification of the causes of land degradation must recognise the interactions between different elements in the landscape which affect degradation and also the site-specificity of degradation. Now, mention three factors that contribute to environmental degradation. Compare your answers to what we have discussed below.

Pollution

Pollution, in whatever form, whether it is air, water, land or noise is harmful the land and its resources. Air pollution, for instance, pollutes the air that we breathe which causes health issues. Water pollution on the other hand degrades the quality of water that we use for drinking and other purposes. Land pollution results in degradation of earth's surface as a result of human activities.

Overpopulation

Rapid population growth puts strain on natural resources which results in degradation of our land. Mortality rate has gone down due to better medical facilities which have resulted in increased lifespan. More population simple means more demand for food, clothes and shelter. You need more space to grow food and provide homes to millions of people. This puts unbearable pressure on the land thereby causing its degradation.

Deforestation

Deforestation causes land degradation on the account of exposing soil minerals by removing trees and crop cover, which support the availability of humus and litter layers on the surface of the soil. Vegetation cover primarily promotes the binding of the soil together and soil formation, hence when it is removed it considerably affects the capabilities of the soil such as aeration, water holding capacity, and biological activity. When trees are removed by logging, infiltration rates become elevated and the soil remains bare and exposed to erosion and the build-up of toxicities. Some of the contributing activities include logging and slash and burn techniques used by individuals who invade forest areas for farming, rendering the land unproductive and less fertile in the end.

Creation of Landfills Sites

Landfills pollute the environment and destroy the beauty of the land. Landfill sites are created as a result of large amount of waste that is generated by households, industries, factories and hospitals. Landfills pose a great risk to the health of the environment and the people who live there. Landfills produce foul smell when burned and cause huge environmental problems.

Physical Factors

There are several physical factors contributing to soil degradation distinguished by the manners in which they change the natural composition and structure of the soil. Rainfall, surface runoff, floods, wind erosion, tillage, and mass movements result in the loss of fertile top spoil thereby declining soil quality. All these physical factors produce different types of soil erosion (mainly water and wind erosion) and soil detachment actions, and their resultant physical forces eventually change the composition and structure of the soil by wearing away the soil's top layer as well as organic matter. In the long-term, the physical forces and weathering processes lead to the decline in soil fertility and adverse changes in the soil's composition/structure.

Biological Factors

Biological factors refer to the human and plant activities that tend to reduce the quality of the soil. Some bacteria and fungi overgrowth in an area can highly impact the microbial activity of the soil through biochemical reactions, which reduces crop yield and the suitability of soil productivity capacity. Human activities such as poor farming practices may also deplete soil nutrients thus diminishing soil fertility. The biological factors affect mainly lessens the microbial activity of the soil.

Industrial and Mining activities

The land is chiefly polluted by industrial and mining activities. As an example, mining destroys crop cover and releases a myriad of toxic chemicals such as mercury into the soil thereby poisoning it and rendering it unproductive for any other purpose. Industrial activities, on the other hand, release toxic effluents and material wastes into the atmosphere, land, rivers, and groundwater that eventually pollute the soil and as such, it impacts on soil quality. Altogether, industrial and mining activities degrade the soil's physical, chemical, and biological properties.

Urbanization

Urbanization has major implications on the soil degradation process. Foremost of all, it denudates the land's vegetation cover, compacts soil during construction, and alters the drainage pattern. Secondly, it covers the land in an impermeable layer of concrete that amplifies the amount of surface runoff which results in more erosion of the topsoil. Again, most of the runoff and sediments from urban areas are extremely polluted with oil, fuel, and other chemicals. Increased runoff from urban areas also causes a huge disturbance to adjacent watersheds by changing the rate and volume of water that flows through them and impoverishing them with chemically polluted sediment deposits.

Effects of land degradation

Drought and aridity

Drought and aridity are problems highly influenced and amplified by land degradation. The contributing factors to soil quality decline such as overgrazing, poor tillage methods, and deforestation are also the leading causes of desertification characterized by droughts and arid conditions. In the same context, land degradation may also bring about loss of biodiversity.

Loss of arable land

Because soil degradation contributes to land degradation, it also means that it creates a significant loss of arable land. Most of the crop production practices result in the topsoil loss and the damage of soil's natural composition that makes agriculture possible.

Increased flooding

The land is commonly altered from its natural landscape when it rids its physical composition from soil degradation. For this reason, the transformed land is unable to soak up water, making flooding more frequent. In other words, soil degradation takes away the soil's natural capability of holding water thus contributing to more and more cases of flooding.

Pollution and clogging of waterways

Most of the soil eroded from the land together with the chemical fertilizers and pesticides utilized in agricultural fields are discharged into waterways and streams. With time, the sedimentation process can clog waterways, resulting in water scarcity. The agricultural fertilizers and pesticides also damage marine and freshwater ecosystems and limit the domestic uses of the water for the populations that depend on them for survival.

Impact on Human Health

Human health might be at the receiving end as a result of the land degradation. Areas exposed to toxic air pollutants can cause respiratory problems like pneumonia and asthma. Millions of people are known to have died of due to indirect effects of air pollution.

Loss for Tourism Industry

The deterioration of environment can be a huge setback for tourism industry that relies on tourists for their daily livelihood. Environmental damage in the form of loss of green cover, loss of biodiversity, huge landfills, increased air and water pollution can be a big turn off for most of the tourists.

Measures to Mitigate Land Degradation

Measures to prevent land degradation should confront the major causes of land degradation and promote interventions that avoid, reduce and reverse land degradation, while at the same time meeting food production and economic growth demands. These approaches and practices include, among others, agroecology, conservation measures, agroforestry and integrated animal and crop production systems that promote soil organic matter accumulation and nutrient cycling, restoration of degraded forests, rangelands and wetlands, and measures that enhance soil carbon storage in managed landscapes. Other important mitigating measures have been discussed below.

Reducing deforestation

Avoiding deforestation completely is an uphill task. However, deforestation can be cut down and this can create an impressive way of reshaping and restoring forests and vegetation cover. As populations grow, individuals can be sensitized and educated regarding sustainable forest management and reforestation efforts. Also, preserving the integrity of guarded areas can significantly reduce demonstration. Hence, there is a necessity for individuals all over the world to respect forest cover and reduce some of the human-driven actions that encourage logging. With the reduction of deforestation, soil's ability to naturally regenerate can be restored. Governments, international organizations, and other environmental stakeholders need to ensure there are appropriate measures for making zero net deforestation a reality so as to inhibit soil degradation.

Land reclamation

The outcomes of soil erosion and quality decline are widely irreversible. Soil organic matter and plant nutrients can be replenished. To restore the lost soil mineral matter and organic content, it would require what is known as land reclamation. Land reclamation encompasses activities centred towards restoring the previous organic matter and soil's vital minerals. This may include activities such as the addition of plant residues to degraded soils and improving range management. Salinized soils can be restored by salt level correction reclamation projects and salinity control. One of the simplest but most forgotten methods of land reclamation is the planting of vegetation such as trees, crops, and flowers over the affected soils. Plants act as protective covers as they are helpful at making the soil stronger by stabilizing the land surface.

Preventing salinization

Just like the old adage states that "prevention is better than cure," so does the same concept apply in solving the worldwide problem of land degradation through salinization. The costs of preventing salinization are incredibly cheaper than the reclamation projects in salinized areas. Consequently, actions such as reducing irrigation, planting salt-tolerant crops, and improving irrigation efficiency will have high payoffs because the inputs and the labour-demanding aspects associated with reclamation projects are zero. Preventing salinization in the first place is thus an environmentally friendly means of offering a solution to soil degradation.

Conservation tillage

Proper tillage mechanisms hold as one of the most sustainable ways of avoiding soil quality decline. This is otherwise known as conservation tillage, which means tillage mechanisms targeted at making very minimal changes to the soil's natural condition and at the same time improving the soil's productivity. Examples include leaving the previous year's crop residue on the surface to shield the soil from erosion and avoiding poor tillage methods such as deep ploughing.

Key ideas y ideas

- Several activities of man destroy the natural environment. This destruction is sometimes known as land degradation
- Land degradation can occur through burial of top soil, removal of vegetation cover as well as the activities of wind
- Land degradation has several effects which include loss of soil fertility, increased soil erosion, pollution, flooding, desertification, etc

- Land degradation could be reduced or curtailed through the enactment of environmental law, land reclamation, preventing salinization and conservation tillage

Reflection

- How would you define land degradation?
- In what ways does land degradation occur in your community?
- What are some of the effects of land degradation?
- In what ways can you help minimise land degradation?

Discussion

- How has this session equipped you with knowledge about land degradation?
- What factors contribute to land degradation?
- How does land degradation affect human life?
- What measures should be put in place to minimise land degradation in your community?

UNIT 2: THE EARTH AND ITS NATURAL RESOURCES

In this unit, we shall discuss the solar system. Do you know the causes of day and night? What about the number of planets we have? This unit will provide answers to these questions. It will also look at the differences between weather and climate. This unit will highlight some of these issues to you, relax and enjoy your reading.

Learning outcome(s)

By the end of this unit, the participant will be able to:

1. describe the Solar System
2. explain the Two Major Earth Movements
3. list the Continents and Oceans of the Earth
4. state four elements of Climate and Weather
5. describe three Types of Rainfall (convectional, cyclonic, and relief)
6. discuss three major Landforms

SESSION 1: THE SOLAR SYSTEM

In this session, we shall discuss the solar system. We shall talk about the various objects found in the solar system. We shall also discuss the features of the major oceans and continents of the world. Emphasis will also be laid on the elements that constitute weather and climate. As part of our discussion, we shall discuss the types of rainfall we experience in Ghana and the factors that contribute to their formation. Finally, we shall look at some major landforms in Ghana.

Learning Outcomes

By the end of this session, the participant will be able to:

1. define the solar system
2. list three objects found in the solar system

The Solar System

The Solar System is the gravitationally bound system comprising the Sun and the objects that orbit it, either directly or indirectly. Of those objects that orbit the Sun directly, the largest eight are the planets, with the remainder being significantly smaller objects, such as dwarf planets and small Solar System bodies. Of the objects that orbit the Sun indirectly, the moons, two are larger than the smallest planet, Mercury.

The Solar System was formed 4.6 billion years ago from the gravitational collapse of a giant interstellar molecular cloud. The vast majority of the system's mass is in the Sun, with most of the remaining mass contained in Jupiter. The four smaller inner planets, Mercury, Venus, Earth and Mars, are terrestrial planets, being primarily composed of rock and metal. The four outer planets are giant planets, being substantially more massive than the terrestrials. The two largest, Jupiter and Saturn, are gas giants, being composed mainly of hydrogen and helium; the two outermost planets, Uranus and Neptune, are ice giants, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called ices, such as water, ammonia and methane. All planets have almost circular orbits that lie within a nearly flat disc called the ecliptic.

The Solar System also contains smaller objects. The asteroid belt, which lies between the orbits of Mars and Jupiter, mostly contains objects like the terrestrial planets, of rock and metal. Beyond Neptune's orbit lie the Kuiper belt and scattered disc, which are populations of trans-Neptunian objects composed mostly of ices, and beyond them a newly discovered population of sednoids.

Within these populations are several dozen to possibly tens of thousands of objects large enough that they have been rounded by their own gravity. Such objects are categorized as dwarf planets. Identified dwarf planets include the asteroid Ceres and the trans-Neptunian objects and Eris. In addition to these two regions, various other small-body populations, including comets, centaurs and interplanetary dust, freely travel between regions. Six of the planets, at least three of the dwarf planets, and many of the smaller bodies are orbited by natural satellites, usually termed "moons" after the Moon. Each of the outer planets is encircled by planetary rings of dust and other small objects.

The solar wind, a stream of charged particles flowing outwards from the Sun, creates a bubble-like region in the interstellar medium known as the heliosphere. The heliopause is the point at which pressure from the solar wind is equal to the opposing pressure of interstellar wind; it extends out to the edge of the scattered disc. The Oort cloud, which is thought to be the source for long-period comets, may also exist at a distance roughly a thousand times further than the heliosphere. The Solar System is located in the Orion Arm, 26,000 light-years from the centre of the Milky Way.

Objects found in the solar system

The Sun

The Sun is the star at the centre of the Solar System. It is by far the largest object in the solar system as well as the brightest in the sky. It consists of hot lava and a strong magnetic field. The energy it produces can be likened to hydrogen nuclear fusion reactions at its core. The Sun mass is estimated at 99.86% of the Solar System, the rest belongs to Jupiter. The Sun consists of 70% hydrogen, 28% helium, and 2% of the remaining consists of carbon, oxygen, iron, neon, and other elements. By classification, the Sun is a yellow dwarf. It is about the top 10th percentile in mass among all stars. It has a surface temperature of about 5505°C (9941°F). The corona of the Sun is constantly expanding, thus producing a solar wind (charged particle stream that is emitted from the Sun's upper atmosphere). The solar wind is responsible for creating the heliosphere, which is a large bubble that expands into the outer area of the Solar System known as the interstellar medium. Phenomena such as geomagnetic storms can disrupt Earth's power grid, Northern Lights, as well as comet plasma tails which are always aligned away from the Sun.

Be informed that the ancient Egyptians called it as the god Ra, whilst the Greeks called it Helios, and the Romans as Sol. How do you call the Sun in your culture? Do you also regard it as a deity?

The Planets

Mercury

Mercury is the smallest and closest planet to the Sun. Mercury has no moons and has no special features other than impact craters and lobed ridges. Mercury's thin atmosphere consists of particles blasted off by the solar wind from the Sun. It has a large iron core and a thin mantle layer, possibly constant impacts which prevent its layers from developing over time.

Venus

The second planet is slightly smaller than Earth. It has a dense atmosphere and an iron core. It is the hottest planet with blistering surface temperatures (upwards of 400°C/752°F). Venus' atmosphere is toxic due to clouds of sulfuric acid. The planet may have had water at one point, but these have evaporated over time due to the extreme heat. Volcanic activity has been observed on Venus' surfaces, though there have been no signs of lava flow.

Earth

Earth is the largest of the inner planets. It is the only place in the universe where life exists. It has one moon. Earth's core is very active, and it is the only planet with tectonic plates. Earth's biosphere has long since altered its atmosphere, creating more oxygen as well as an ozone layer to block harmful radiation from space.

Mars

This is the second largest planet and the fourth from the Sun. Mars has a carbon dioxide atmosphere. It has two moons: Deimos and Phobos. These are said to be captured asteroids. Its reddish color is due to the large amounts of iron-oxide on its surface. Its atmosphere is very thin and its surface is riddled with impact craters, like that of the Moon's atmosphere.

Jupiter

Jupiter, the size is massive, considered 318 times the Earth size. It is the largest planet in the Solar System with 2.5 times the mass of all the other planets combined. It is composed of mostly hydrogen and helium. Jupiter has 67 known moons or satellites. Jupiter has a rapid rotation which has caused it to bulge slightly around its equator. The atmosphere of Jupiter creates lots of storms on its surface, the prominent result of which is the Great Red Spot, which is actually a continuous storm which has endured since the 17th century (when it was first observed by telescope).

Saturn

This planet is just beyond Jupiter and is known for its ring, which actually consists of 9 bands of rings. Saturn is 60% the volume of Jupiter and has the lowest density of all the planets. It has 62 satellites, including Titan and Enceladus. Saturn's core consists of iron, nickel, silicon, and oxygen compounds, all surrounded by a thick layer of metallic hydrogen. The planetary magnetic field on Saturn has contributed to an electric current through the metallic hydrogen layer.

Uranus

Uranus is unique in that it orbits the sun on its side because of its axial tilt. Uranus has 27 known moons, including Titania, Oberon, Umbriel, Ariel, and Miranda. While Uranus is similar to Jupiter and Saturn in that its atmosphere contains hydrogen and helium, it also contains copious amounts of ice water, ammonia, and methane. Furthermore, it has the coldest atmosphere in the Solar System at -224°C/-435°F. Uranus and Neptune are also known as "ice giants."

Neptune

Neptune is smaller than Uranus but is denser. Neptune has 13 known satellites, including Triton. Neptune's surface gravity is only surpassed by Jupiter, and the two are the only planets with greater surface than Earth's. Neptune contains ice compounds like those of Saturn's as well as greater concentrations of volatile elements similar to those found on Jupiter and Saturn.

Key ideas

- The Solar System is the gravitationally bound system comprising the Sun and the objects that orbit it, either directly or indirectly.
- The objects found in the solar system include the planets, sun, moon, stars, etc.

Reflection

- How would you define the solar system?
- Name any two objects that are found in the solar system?

Discussion

- How has this session equipped you to get better understanding of the solar system?
- What are some of the objects that are found in the solar system?

SESSION 2: THE TWO MAJOR EARTH MOVEMENTS

This session shall take you through another wonderful revelation of the earth. We shall look at the major movements of the earth. Finally, we shall discuss eclipse of the sun as well as eclipse of the moon.

Learning Outcomes

By the end of the lesson, the participant will be able to:

- explain how the earth rotates on its axis,
- explain how the earth revolves around the sun,
- discuss eclipse of the sun,
- discuss eclipse of the moon.

The Two Movements of the Earth

There are two important movements that affect the Earth. The first is the rotation of the Earth around an invisible axis. It takes the Earth about 24 hours to finish one complete rotation. The second important movement that affects the Earth is its revolution around the Sun. One revolution takes 365 ¼ days, or one year. Acting together, these two movements create variations in temperature, weather, and the seasons.

Rotation of the earth

The Earth's rotation is the rotation of the solid earth around its own axis, which is called Earth's axis or rotation axis. This axis in reality is an imaginary line that passes through the centre of the earth. The ends of this axis of rotation are the North and South Poles. A critical look at the globe of your school shows a metal that passes through the centre. This metal represents the axis. Let's do a short demonstration here. Pick an orange and pass a long metal pin through the bottom to the top and hold both ends of the metal pin so that it is vertical in front of you. Start turning the orange about the metal pin from left to right. That is, west to east while you are holding fast to the ends of the pin which

have stuck out of both ends (bottom and top) of the orange. This illustrates the process of the earth's rotation on its axis.

The average rotation period of the Earth is called a "sidereal day". Its value is 23h 56m 4.091sec and describes the rotation with respect to the cosmic background of the stars. In contrast to this, the rotation with respect to the Sun is 24 hours, differing because the Earth revolves around the sun once per year. Per day the difference is 86 400 s / 365.25 = 236 seconds = 3 m 56 s.

Consequences of the Earth's Rotation

The earth rotates on its axis taking approximately 24 hours to complete one rotation. This has important environmental consequences.

a. Rotation creates a diurnal cycle of light and darkness, temperature, and humidity changes. This means that half the earth is illuminated while half is dark. This also creates a corresponding cycle of temperature and humidity.

b. Rotation requires the creation of standardized time zones. Each Time Zone covers 15°of Longitude or one hour of Earth's rotation. Time zone follows line of longitude. In all, it takes 24 hours for the earth to complete one rotation.

c. Rotation causes tides. Sea level rises and falls twice a day as the earth rotates. The tidal range is determined by the combined gravitational pull of the sun and moon. Sometimes the sun and the moon are lined up with the earth, but most of the time they are not. Tides are highest when the earth, sun and moon are in a straight line.

d. The Coriolis force. Rotation causes a deflection of ocean and air currents. The earth rotates much faster than the winds or currents move. This causes a large deflection in the direction that winds move and ultimately results in rotation around low pressure cells and high pressure cells.

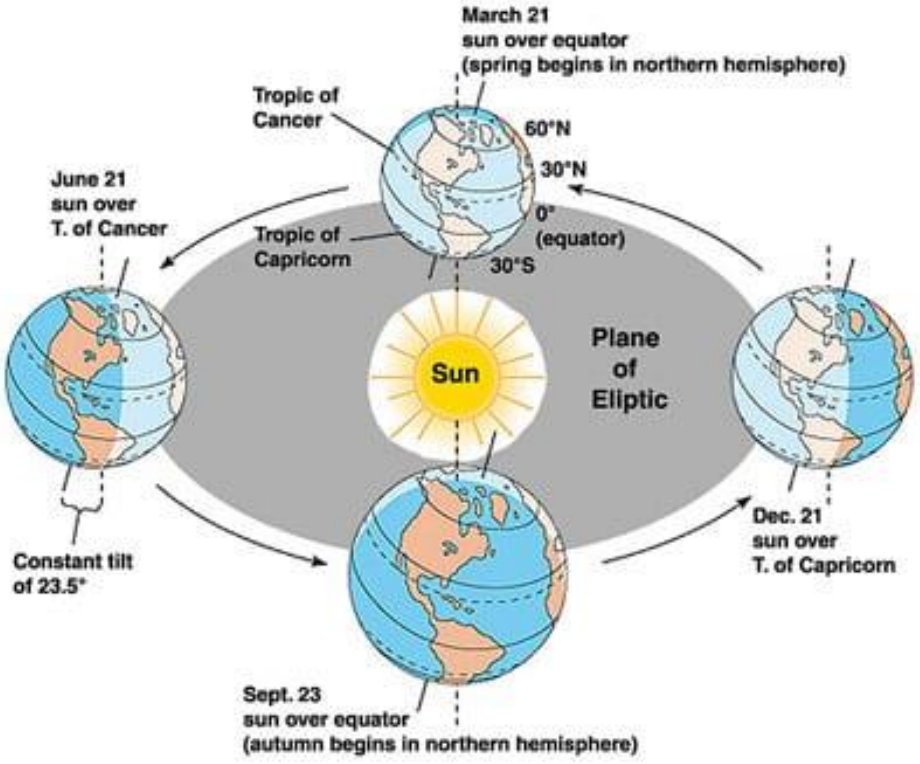
e. It also causes large rotating pools of water in the oceans called gyres. The Coriolis force only operates on large features.

Revolution of the Earth

The motion of the Earth around the Sun is called Revolution. It is the cause for different seasons that we experience like summer, winter, autumn and spring.

Since the revolution of Earth around the Sun is a gradual process, the changes in the area receiving the Sun's rays and the changes in seasons are gradual. The earth orbits the sun in a plane called the ecliptic (Figure 2.2). From our vantage point, however, it appears that the sun circle us once a year in that same plane. Hence, the ecliptic may be alternately defined as "the apparent path of the sun on the celestial sphere".

The ecliptic is tilted 23.5 degrees with respect to the celestial equator because the earth's rotation axis is tilted by 23.5 degrees with respect to its orbital plane. Be sure to keep distinct in your mind the difference between the slow drift of the sun along the ecliptic during the year and the fast motion of the rising and setting sun during a day.



Rotation and Revolution of the Earth

The ecliptic and celestial equator intersect at two points: the vernal (spring) equinox and autumnal (fall) equinox. The sun crosses the celestial equator moving northward at the vernal equinox around March 21 and crosses the celestial equator moving southward at the autumnal equinox around September 23. When the sun is on the celestial equator at the equinoxes, everybody on the earth experiences 12 hours of daylight and 12 hours of night. The day of the vernal equinox marks the beginning of the three-month season of spring on our calendar and the day of the autumn equinox marks the beginning of the season of autumn (fall) on our calendar.

However, it is customary and convenient to mark these changes by specific dates and to identify them by specific names. These dates are as follows:

1. March 21. The vernal equinox, when Earth's axis is perpendicular to the Sun's rays. Spring begins in the Northern Hemisphere and fall begins in the Southern Hemisphere.

2. June 21. The summer solstice, when Earth's axis is inclined 23 1/2° toward the Sun and the Sun has reached its northernmost zenith at the Tropic of Cancer. Summer officially commences in the Northern Hemisphere; winter begins in the Southern Hemisphere.

3. September 23. The autumnal equinox, when Earth's axis is again perpendicular to the Sun's rays. This date marks the beginning of fall in the Northern Hemisphere and spring in the Southern Hemisphere. It is also the date, along with March 21, when the Sun reaches its highest position (zenith) directly over the equator.

4. December 22. The winter solstice, when the Sun has reached its southernmost zenith position at the Tropic of Capricorn. It marks the beginning of winter in the Northern Hemisphere and the beginning of summer in the Southern Hemisphere.

The eclipse of the sun (Solar Eclipse)

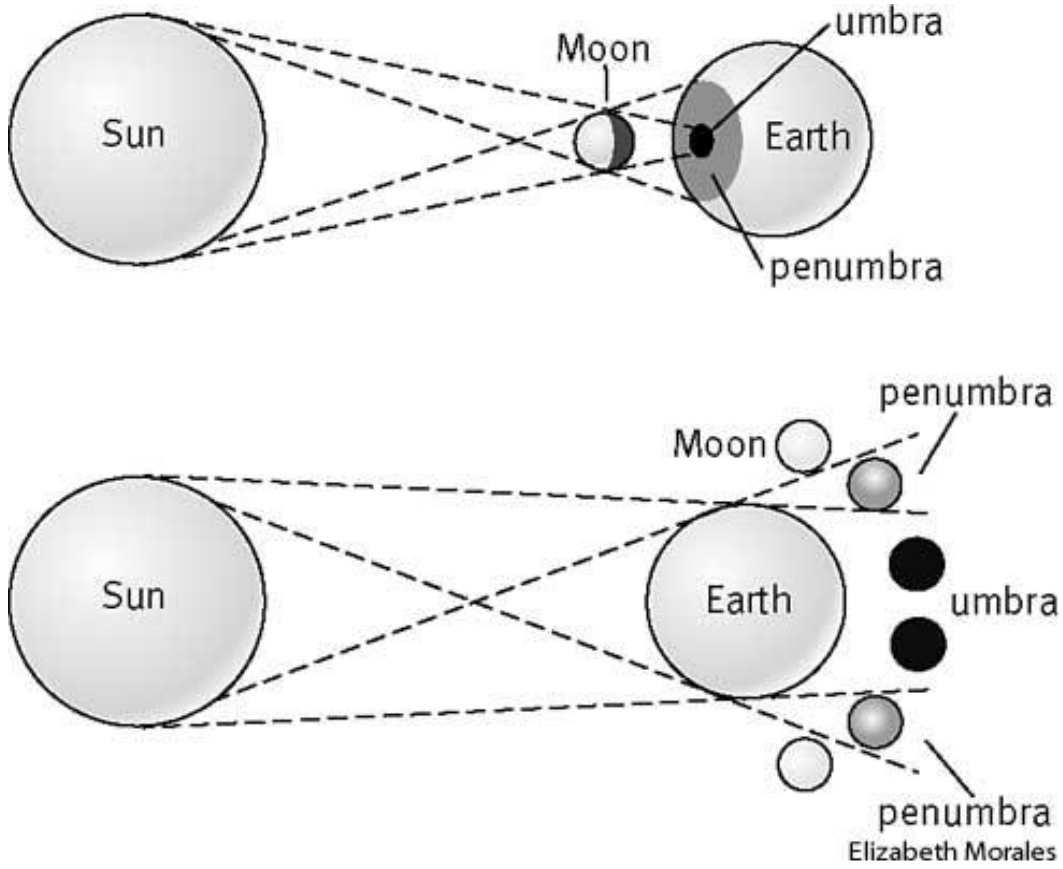
Eclipse of the sun refers to the period when the light from the sun is obscured from observers on the earth's surface for only a few hours. It is also known as solar eclipse. It is caused by the earth's revolution round the sun and the moon's movement round the earth. Both movements are in the same anti-clockwise direction, from west to east. As a result of these movements, there comes a time when the moon comes between the sun and the earth. Both the moon and the sun will be in a straight line on the same side of the earth, a situation referred to as conjunction.

The moon's shadow will be cast upon the earth, blocking the light from the sun. Solar eclipse normally occurs at the new moon, at the time when most of the dark side of the moon turns towards the earth. It does not however, take place at every new moon. It is important to note that if the sun is completely obscured, the eclipse is said to be total eclipse. If it is a partial one, it is called a partial eclipse. If the moon's shadow does not reach the earth's surface, a ring of light is formed around the moon. This is referred to as annular eclipse. Partial eclipse occurs more frequently than the total eclipse. Eclipse of the sun occurs during the day.

Eclipse of the Moon (Lunar Eclipse)

Another eclipse that occurs at night is the eclipse of the moon or lunar eclipse. It refers to the period when the light from the sun is obscured from observers view on the moon. As the earth revolves round the sun, so does the moon revolve round the earth? Thus, there comes a time when the earth comes between the sun and the moon. Eclipse of the moon does occur only at time of full moon when the whole of the sunlight side of the moon is seen from the earth. This time is called opposition, when the sun, the earth and the moon will be in a straight line but the directions of the moon and the sun will be in opposite way to each other and to the earth.

It is, however, not at every full moon when an eclipse of the moon occurs. This is due to the fact that the moon's orbit is not in that plane of the ecliptic (the earth's orbit path around the sun), but it is inclined to the ecliptic at about 5o. It must be noted that when the moon is completely obscured, the eclipse is called a total eclipse. If on the other hand, the eclipse is a partial one, it is known as partial eclipse. Let me point out one difference between solar eclipse and lunar eclipse. A total lunar eclipse may last for as much as two hours but that of a solar eclipse may last for only a few minutes. Eclipse of the moon occurs less frequently, but when they do occur, they are usually seen over a wider area.



Solar and Lunar Eclipse

Key ideas y ideas

- The earth is always involved in two major movements yearly. The movement on its axis is called rotation whilst the movement of the earth around the sun is known as revolution.
- Another natural phenomena which occur in the solar system is solar and lunar eclipses

Reflection

- How you distinguish between rotation and revolution of the earth?
- What two differences exist between solar and lunar eclipse?

Discussion

- How has this session improved your understanding of the rotation and revolution of the earth
- In what ways do solar and lunar eclipses occur?

SESSION 3: CONTINENTS AND OCEANS OF THE EARTH

In this session, we shall find out some major features of the oceans and continents. We shall discuss their location on the earth.

Learning Outcomes

By the end of the session, the participant be able to:

- name the seven continents of the world
- list the five oceans of the world

Continents of the World

Our planet Earth, where all of us live is one of the most diverse planets known to human being. Though there have been so much advances in the astronomy over the years, we have never been able to find a planet as diverse as earth which is home to millions of living organisms like our mother earth is. In the millions and zillions of stars and planets which comprise our universe, our earth is of the size less than the size of the point of a needle. But for us, the small living beings on this planet, this is a very huge home. Our earth is made up of large land masses known as continents and water bodies known as oceans. The earth has not been like this always as how we see it now. Millions of years before there were only one large land mass and a large ocean surrounding it. Later on, the land mass started to split and drift apart surrounded by ocean on all sides. This process is still going on. Now we have 7 continents and 5 oceans which are home to all of us and millions of other living organisms. Let us learn about each of these seven continents and five oceans that make up our planet earth.

Continents are the large land masses that we see on our earth. These hard land masses where people and other living organisms walk or crawl and make home are large in size, and are made up of many countries. There are also many small landmasses which are called islands, but continents are very large in size compared to these islands. Many people combine the two continents Asia and Europe into a single continent and call it Eurasia. Many others combine the two continents North America and South America into one and call it the American continent. But in general there are seven large land masses on earth, namely Africa, Antarctica, Asia, Australia, Europe, North America and South America. You must be wondering to know what the seven Continents of the World are.

Africa

Africa is the second largest continent in the world. It is also the second largest continent in the world in terms of population. Africa is commonly referred to as the black continent by many. This large land mass comprises of 54 countries and is home to one billion people. About 15 percent of the world population lives in this continent, this constitutes about 20 percent of the total land area. Africa lies in the centre of the earth with the equator passing through its centre. It is the only continent that stretches from the northern temperate to the southern temperate zones. The climate of Africa is largely tropical in nature. The northern and southern parts of Africa have temperate climatic conditions. Africa is also considered to be the birth place of mankind. The oldest fossils of Homo sapiens found till now have been from the eastern parts of this continent. This large and diverse continent is home to lot of endangered species.

Africa is surrounded by the Mediterranean Sea in the north, the Indian Ocean to the south east, the Suez Canal and the Red Sea to the northeast all along the Sinai Peninsula, and the Atlantic Ocean on the west. Madagascar and a large number of archipelagos are part of the continent. The population of

Africa is the youngest in the whole world. About 50% of the residents in the continent are younger than 19 years of age.

Antarctica

Antarctica is the southernmost continent of all. The geographic south pole of the earth is contained in this continent. It is made of large permanent glaciers that surround the South Pole. This is one of the most uninhabitable places on earth. With a very small population of less than 5000 residents, Antarctica is the least populated continent on earth. It is also home to very few plant and animal species. Antarctica is also the coldest landmass on earth and much of this continent is made of permanent glaciers. Around 98% of the continent is covered by ice of about 1.9 kilometres thick.

Antarctica is the fifth largest among the seven continents. It is actually double the size of the whole of Australia. It is known to be the driest, coldest, and also the windiest continent. It has the highest elevation among all the continents, and is considered to be a complete desert. The temperature here is known to have reached -89 degrees as well. Only cold adapted organisms have the capacity to survive in this continent. Due to the hostile environment and the lack of resources, this continent was largely neglected and isolated.

Asia

Asia is the largest continent on earth covering about 9 percent of the earth's surface. It is also the most populated continent on earth, home to an estimated population of around 4.3 billion people. This large population makes it an important part of the world economy. Asia is located mostly in the northern and eastern hemispheres of the earth. It covers around 30% of the total land area, and is known to be home to the earliest human populations. Around 60% of the planet's human populations were in this continent. This continent is known for the large size, dense settlements, and also the vast area of barely populated regions.

The boundaries of Asia are not very clearly defined. There is actually no geographical separation as such between Asia and Europe. The two continents form a large landmass which is popularly called Eurasia. On the east of Asia you have the Pacific Ocean, Indian Ocean to the south and Arctic Ocean to the north. The continent is known for its vast diversity in terms of culture, environments, ethnic groups, economics, historical background, and also the government systems.

Australia

The continent of Australia is a single country continent. It is the sixth largest country by total area, and is also the smallest of all the seven continents. Because of its size, and isolated location, it is also called island continent. Covering an area of 7617930 square kilometres, Australia lies in the Indo-Australian Plate. This continent is surrounded by Indian Ocean and Pacific Ocean. Australia is one of the least populated continents and is rich in biodiversity. The Great Barrier Reef, which is the largest coral reef in the world, is in Australia. It extends over 2000 kilometres in the northeast coast of Australia. Australia is also home to world's largest monolith, Mount Augustus.

Officially known as the Commonwealth of Australia, the country is an Oceanian country. It comprises the whole of Australia, the island of Tasmania, and also a large number of other smaller islands. The countries neighbouring Australia are East Timor, Indonesia, and Papua New Guinea to the north, Vanuatu and the Solomon Islands on the north-east, and New Zealand on the south-east. Australia was mainly inhabited by the indigenous Australians for around 40,000 years before the British first came to settle here. They had over 250 language groups then. Today, Australia is one of the wealthiest countries in the world, and a well-developed one too. It is the 12th largest economy in the world, and

has the fifth-highest per capita income in the world. It is ranked among the highest in terms of provisions like quality of life, education, health, economic freedom, and also the protection of political rights and liberties.

Europe

Europe is the second smallest continent in the world. It comprises the westernmost peninsula of the giant Eurasian landmass. Covering almost 2 percent of the earth's surface Europe takes 6.8 percent of the world's total land area. Europe is home to almost 50 countries and is the third most populated continent in the world after Asia and Africa. About 11 percent of the world's population lives in Australia. Russia is the largest country in Europe and Vatican City is the smallest. Russia has got territory in both the continents of Europe and Asia, and it takes up around 40% of the land area of Europe.

Europe is divided from Asia by the watershed divides of the Ural and Caucasus Mountains, the Ural River, the Caspian Sea, black sea and the waterways connecting black sea and Aegean Sea. Europe is bordered by Arctic Ocean in the north side, Atlantic Ocean on the west side, Mediterranean Sea to the south and black sea and connected water ways on the southeast.

Europe, especially ancient Greece is known to be the birthplace of the western culture. From the early 15th century, Europe has been playing a predominant role in the global affairs. It is also where the industrial revolution started. The countries of Europe had been controlled by the Americas, some parts of Africa, Oceania, and a large majority of the countries in Asia all through the times between the 16th and the 20th centuries. Western Europe had been subject to a lot of radical cultural, economic, and social changes due to the Industrial Revolution that began in Great Britain. By the year 1900, Europe contributed to about 25% of the total world population.

The World Wars were both concentrated around Europe, and that led to a decline in the dominance of the continent in world affairs by the time the world came on to the 20th century. Politics and economics had been affecting the countries largely leading to several changes all throughout history. Nowadays, the European Union has started having an influence over the member countries.

North America

North America is a continent which lies wholly in the northern hemisphere. It is bordered by Arctic Ocean in the north, Atlantic Ocean in the east, Pacific Ocean in the south and west, and South America and Caribbean Sea in the southeast. North America lies almost wholly in the western hemisphere. North America covers almost 4.8 percent of the earth's surface and comprises around 16.5 percent of the whole land area on earth. North America is home to nearly 565 million people. About 7.5 percent of the world's population lives here. It is the third largest continent in the world by area and fourth largest continent by population. Most of the land and area of the continent is dominated by Canada, United States of America, Greenland and Mexico. There are also many smaller states in the Central America and Caribbean regions.

South America

South America is a continent located in the western hemisphere with most of its land area lying in the southern hemisphere and a relatively small portion in the northern hemisphere. It has Pacific Ocean to its western side, Atlantic Ocean in the north and eastern side, and North America and Caribbean Sea in the Northwest side. With an area covering 17,840,000 square kilometres and a population of more than 3 billion, South America is the fourth largest continent in terms of size and fifth in terms of population. South America is home to twelve sovereign states and two non-sovereign states. It is generally considered to be a subcontinent of the Americas.

South America is a continent which is diverse in terms of geography and biodiversity. The world's highest uninterrupted waterfall, angel falls is situated in Venezuela in South America. The Amazon River, which is the largest river in the world in terms of volume, is also in this continent. The Atacama Desert, which is the driest non-polar place on earth, and the Amazon forest which is the largest rainforest on earth, is situated in this continent. It is also home to many interesting and unique species of animals such as anaconda, piranha, jaguar etc. The Amazon rainforests contains a major proportion of the earth's species. Brazil is the largest country in South America occupying more than half of the continents land area and population.

Most of the population in this country is concentrated near the eastern or western coasts. The far south regions and the interior regions are just sparsely populated. The western part is dominated by the mighty Andes Mountains. The eastern part has got both highland regions and also lowlands. The major rivers flowing through the continent like Parana, Amazon, and Orinoco flow in this part.

Through regular interactions of the indigenous people with the immigrants and conquerors from Europe, and the slaves from Africa, the continent's cultural and ethnic outlook came to be formed. After being colonised for long periods in history, Spanish and Portuguese came on to become the most spoken languages here. Western traditions are followed in several parts.

Continents and Oceans of the world

The Five Oceans

Up to now we were discussing the land masses on earth which covers only 30 percent of the earth's surface. The larger portion of the earth's surface is covered by water. 70 percent of the earth's surface is covered by water, out of which over 96 percent is salt water in our oceans. These large water bodies which surround the continents are called oceans. Though they are all interconnected, they are generally divided into five Oceans, namely, Pacific Ocean, Atlantic Ocean, Indian Ocean, Arctic Ocean and Antarctic Ocean. Just like the available Continents, we should know more about all the big Oceans available on the Planet earth. Get all the 5 major Oceans along with all the details to describe what the five Oceans of the World are and much more.

The Pacific Ocean

The largest of all the oceans is the Pacific Ocean. It is located between the western coastlines of the American continents and eastern coast lines of Asia and Africa. Arctic Ocean lies to the north of Pacific Ocean and Antarctic Ocean in the south. Covering about 165,200,000 square kilometres the

Pacific Ocean has the longest total shoreline of about 135,663 kilometres. The Pacific Ocean covers 46% of the total water surface of the Earth, and covers more than a third of the total surface area. It is actually larger than all the land area combined. The water in the ocean represents about 50.1% of the total oceanic water on earth. The ocean can be demarcated as the North Pacific Ocean and the South Pacific Ocean with the equator passing through the middle. The deepest point on the earth, the Mariana Trench, is in the North Pacific Ocean. The Pacific Ocean is known to be the most peaceful one.

Atlantic Ocean

Atlantic Ocean is the second largest ocean in the world with an area of 106,400,000 square kilometres. It is bordered by Americas in the west and Africa and Europe in the east. Atlantic Ocean consists of the Mediterranean Sea, Caribbean Sea, Baltic Sea and the Gulf of Mexico. Like Pacific Ocean, Atlantic Ocean also reaches out to Arctic Ocean in the north and Antarctic Ocean in the south. Up to 15th century the Indian Ocean and eastern Atlantic Ocean were the only known voyaged seas in the world. It was the route for spice trade and colonisation. The ocean is home to a lot of marine species, including the sperm whale which is the largest living toothed animal.

The equator divides the ocean into the North Atlantic Ocean and the South Atlantic Ocean. The area north of the equator, between Africa and South America, is referred to as Central Atlantic. The water in this part is very different from the waters in the northern part, which is between Europe and North America. The Atlantic Ocean is known to be the saltiest. The processes of evaporation, precipitation, river inflow, and sea ice melting are the major contributors to the salinity. The water in North Atlantic circulates in a clockwise direction, whereas the water in the South Atlantic circulates in an anti-clockwise direction. This is due to the Coriolis Effect. This ocean is also the second youngest among all oceans. Before 30 million years ago, it did not even exist.

Indian Ocean

Indian Ocean is the third largest ocean in the world. Covering an area of around 73,556,000 square kilometres, Indian Ocean has been home to a rich variety of humankind throughout the world history. Indian Ocean is bordered by eastern coast of Africa, the shores of Middle East and India in the north. It is separated from the Pacific Ocean by southeast Asia and Australia. Indian Ocean is also rich in exotic plan and animal species.

Around 20% of all the water on the Earth's surface is in the Indian Ocean. It is the youngest of all the major oceans on the earth. It is a major sea route that connects Africa, the Middle East, and East Asia with the Americas and Europe. Around 40% of the world's offshore oil production is known to come from the Indian Ocean. The different bordering countries largely exploit the beach sands that contain a rich amount of heavy minerals. The India Ocean is known to be quite warm, which keeps the production of phytoplanktons low. As such, there is limited life in this ocean. The Mumbai port is the chief trading port in India on the coast of the Indian Ocean, and is known to be the Gateway of India. The Port of Singapore is the busiest. There are a lot of other ports as well. The Indian Ocean encompasses a large number of bays, gulfs, and straits as well.

Arctic Ocean

Arctic Ocean is the smallest and shallowest of all the oceans in the world. It covers an area of around 13,986,000 square kilometres. This is almost the size of the whole of the country of Russia. Arctic Ocean lies mostly in the Arctic Circle. Arctic Ocean is surrounded by the Eurasian and north American continents. It includes the Hudson Bay, the North Sea and Barents Sea. For most of the time of the year, this sea is covered with ice often thick as up to hundreds of feet. Even during the summer season most of the ocean remains impassable.

Located in the Northern Hemisphere, the ocean is generally considered to be the northernmost part of the total World Ocean. The salinity and the surface temperature vary according to the seasons because the ice cover freezes and melts periodically. On an average, it has the lowest salinity among all the oceans because of the lower amount of evaporation, flow of heavy freshwater from rivers and streams, and also a limited connection to the other oceans around it. The main countries bordering the Arctic Ocean are Russia, Iceland, Norway, Canada, Greenland, and the United States. It includes a large number of bays, straits, and other tributary water bodies. The deep sea North Polar Basin is divided in to the two oceanic basins, the Amerasian Basin and the Eurasian Basin, by the Lomonosov Ridge, and underwater ridge in the Arctic Ocean. The deepest point in the ocean is in the Eurasian Basin. Relatively little plant life is found in this ocean. Mainly Phytoplanktons are available. It houses a number of endangered marine species as well.

Antarctic Ocean

Antarctic Ocean covering an area of around 20,327,000 square kilometres is the fourth largest ocean in the world. It is also referred by many as the Southern Ocean as it is located near to the South Pole. Antarctic Ocean has a great influence on the earth's weather patterns. It joins the waters of Pacific Ocean, Atlantic Ocean and Indian Ocean with a persistent easterly current. The cold, northward flowing waters in the Antarctic mix with the warmer waters of the subantarctic in the ocean zone. This ocean is considered to be the youngest of all oceans, geologically. There are a wide variety of marine animals that exist and rely on the phytoplankton in the Antarctic Ocean. This area is rich for a number of marine species. The Antarctic Ocean is a storehouse of natural resources. It contains giant oil and gas fields and valuable minerals as well.

Key ideas y ideas

- There are seven major continents of the world. These include Europe, Asia, Africa, North America, South America, Australia, and Antarctica.
- There are also five oceans of the world. These are Pacific, Indian, Atlantic, Arctic, and Antarctic Oceans.

Reflection

- Identify three key features of each of the seven continents of the world?
- Name the five oceans of the world?

Discussion

- How has this session improved your knowledge of the seven continents of the world?
- How has this session enhanced your understanding of the various oceans of the world

SESSION 4: ELEMENTS OF CLIMATE AND WEATHER

In this session, we shall distinguish between weather and climate. We shall also look at the element of climate and weather. We shall also discuss various ways of measuring weather and climate. Finally, we shall examine some factors that control weather and climate.

Learning Outcomes

By the end of the session, the participant will be able to:

1. distinguish between weather and climate,
2. list four elements of weather and climate
3. identify three ways of measuring weather
4. examine three factors that control weather and climate.

Distinction between Weather and Climate

In this session, we shall look at the differences between weather and climate. Before that, let me ask you this question. What is the current state of the atmosphere? I mean, is the atmosphere hot, dry and sunny, or rainy? Is the current state of the atmosphere the same yesterday? Well! This state of the earth's atmosphere with respect to temperature, humidity, precipitation, visibility, cloudiness, and other factors is termed weather. It is the short-term variations of the atmosphere. Weather is highly variable. It is constantly changing, sometimes from hour to hour and at times from day to day. It may be hot, dry and sunny today where you live, but in other parts of the world it is cloudy, raining or even snowing. Weather is the behaviour of the lower atmosphere which affects the land and oceans and has an influence on the organisms which live within them. Every day, weather events are recorded and predicted by meteorologists worldwide. Weather involves large-scale horizontal motion of air.

How is air different from wind? Well! Air in motion is called wind. This motion is produced by differences of atmospheric pressure, which are attributable both to differences of temperature and the nature of the motion itself. Weather is of vital importance to the mariner. The wind and state of the sea affect dead reckoning. Reduced visibility limits piloting. The state of the atmosphere affects electronic navigation and radio communication. If the skies are overcast, celestial observations are not available; and under certain conditions refraction and dip are disturbed.

Climate (from Ancient Greek klima, meaning inclination) on the other hand is commonly defined as the weather averaged over a long period of time. The standard averaging period is 30 years, but other periods may be used depending on the purpose. Climate also includes statistics other than the average, such as the magnitudes of day-to-day or year-to-year variations. It must be noted that, all weather may be traced to the effect of the sun on the Earth. Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Who is a meteorologist and how is he different from climatologist? Compare your answer to this. Meteorologist studies weather, while climatologist studies climate; both are atmospheric sciences. There are several elements that make up the weather and climate of a place. The major of these elements has been discussed below.

Elements of Weather and Climate

The conditions of the atmosphere at any time or place are expressed by a combination of several elements primarily:

Temperature

Temperature shows how hot or cold a body is. It is the intensity, that is, as to how hot or cold the atmosphere is, how many degrees Celsius (centigrade) it is above or below freezing (0°C). Temperature is a very important factor in determining the weather, because it influences or controls other elements of the weather, such as precipitation, humidity, clouds and atmospheric pressure.

Solar radiation

Solar radiation is probably the most important element of climate. Solar radiation first and foremost heats the earth's surface which in turn determines the temperature of the air above. The receipt of solar radiation drives evaporation, so long as there is water available. Heating of the air determines its stability, which affects cloud development and precipitation. Unequal heating of the earth's surface creates pressure gradients that result in wind. All the characteristics of climate can be traced back to the receipt of solar radiation.

Air pressure

Air pressure is the weight of air resting on the earth's surface. Air has specific weight. This weight exerted by the air is atmospheric pressure. Atmospheric pressure is defined as the force per unit area exerted against a surface by the weight of air above that surface in the earth's atmosphere. It is used primarily by meteorologists to monitor developing storms. While typically considered an aspect of weather, certain regions of the world exist in zones where changing atmospheric pressures form a part of the predictable climate. Because of their proximity to large bodies of water (a major factor in atmospheric pressure changes) places like coastal regions and islands experience severe storms on a regular basis.

Humidity

Atmospheric moisture is the most important element of the atmosphere which modifies the air temperature. Humidity is the measurable amount of moisture in the air of the lower atmosphere. There are three types of humidity:-

a. Absolute humidity: The total amount of water vapor present in per volume of air at a definite temperature. The absolute measures include those that depend only on the amount of water vapor in the air.

b. Relative humidity: It is the ratio of the water vapours present in air having a definite volume at a specific temperature compared to the maximum water vapours that the air is able to hold without condensing at that given temperature. The relative measures include those types that depend on the amount of water vapor and temperature of the atmosphere.

c. Specific humidity: It is defined as the mass of water vapor in grams contained in a kilogram of air and it represents the actual quantity of moisture present in a definite air. The humidity element of weather makes the day feels hotter and can be used to predict coming storms. The humidity element of climate is the prolonged moisture level of an area that can affect entire ecosystems. For instance, tropical jungles can sustain different forms of life than dry, arid climates because of the overall humidity from rainfall and other factors. This is an aspect of climate rather than weather, in that the typically high humidity levels of these regions is predictable over periods of decades.

Precipitation

Precipitation is the term given to any aqueous deposit in the liquid or solid form this is derived from condensation in the earth's atmosphere. Precipitation includes snow, hail, sleet, drizzle, fog, mist and rain. It will interest you to note that when some of the liquid or ice particles in clouds attain sizes and weight, they fall out of the cloud's base and the updrafts that sustain them in the clouds. This is how precipitation occurs. As an element of climate, precipitation is a long-term, predictable factor of a region's makeup. For instance, a desert may experience a storm (weather) though it remains a typically dry area (climate).

Winds

The horizontal movement of the atmosphere is called wind. Wind can be felt only when it is in motion. Wind is the result of the horizontal differences in the air pressure. It is simply the movement of air from high pressure to low pressure. The speed of the wind is determined by the difference between the high and low pressure. The greater the difference, the faster the wind speed, and the closer the isobars, the stronger the winds. The wind brings with it the temperature of the area it is coming from. Therefore, a high pressure in a warm region will make the temperature in the low-pressure area higher. Wind-chill is the effect of the wind making it feel colder than it actually is. As the wind speed increases air is moving more quickly and therefore removes warm air thereby making it seem colder than the actual temperature.

Cloudiness

Clouds are suspended water in the atmosphere. They consist of myriads of tiny water droplets and sometimes with ice crystals. They are formed when air containing water vapor cools until some of the vapor condenses. When saturation occurs in the atmosphere at a temperature below 0oc, the water vapor in the air condenses into small droplets of water with diameter of few microns. Clouds are usually the most obvious feature of the sky. Clouds give us a clue about what is going on in our atmosphere and how the weather might change in the hours or even days to come. Each type of cloud forms in a different way, and each brings its own kind of weather. Clouds are classified based on four basic criteria. These include: the composition of the cloud (e.g. Water clouds, ice clouds, mixed clouds); shape, structure, and form or appearance of the cloud in the sky (e.g. Cumuliform clouds, stratiform clouds, cirroform clouds); the height at which the clouds occur in the atmosphere (low clouds, middle clouds, high clouds); and the mode of formation of the clouds (e.g. Clouds produced by: gradual uplift of air along fronts, thermal convection, mechanical turbulence, and ascent of air mass over a mountain barrier).

Clouds play multiple critical roles in the climate system. In particular, being bright objects in the visible part of the solar spectrum, they efficiently reflect light to space and thus contribute to the cooling of the planet. A small increase in cloud cover could, in principle, balance the heating resulting from greenhouse gases. Clouds are the base for precipitation especially cumulonimbus clouds. In summer, cloudy days provide protection from the rays of the sun. In winter cloudy skies at night diminish nocturnal radiation and check the fall of temperature. Clear calm winter nights are usually the coldest and help in condensation. The amount of cloud controls the duration of sunshine, the brightness of the sky and the amount of diffused day light.

Brightness of the Sun

The amount of sunshine at a certain place can influence its temperature. The amount of sunshine can be measured in sunshine hours. That is worked out by the number of hours of daylight and how many of these are cloud free. Sunshine is variable due to daylight hours as during the night there is no

sunshine as the earth is pointing away from the sun at the given spot. Also due to the earth's tilt sometimes of the year have more sunshine (summer) and some less (winter).

Ways of Measuring the Weather

Weather stations are places where a variety of instruments are used to record regular data on the weather. The most important instruments used in a weather station are shown below.

Hygrometers are special thermometers that measure relative humidity by calculating the amount of water vapor in the air. It consists of two ordinary mercury thermometers, wet and dry bulb thermometers. To measure relative humidity, we first have to go to the Stevenson Screen. It is a screen where the thermometer is kept. Secondly, the readings of both the wet and dry bulb thermometers are taken. To continue, the difference between the two readings is calculated. The final step involves referring the differences in the two readings to a set of already-prepared table from which the relative humidity, expressed as a percentage is obtained.

Rain gauges are containers that collect and measure rainfall or any other form of precipitation. Levels of rainfall are measured in millimetres (mm). The rain gauge is a copper cylinder which is graduated with a funnel at the top and a copper collecting jar inside. It is used to measure the amount of rainfall for every 24 hours. To measure the amount of rainfall, the funnel is first removed. Secondly, the rainwater in the collecting jar is emptied or poured out into the graduated cylinder. The next step involves the reading of the amount of rainfall taken at the eye level. The final step, the reading is recorded and kept properly. It is important to know that the reading is done once every day at a fixed time, usually at 9 G.M.T.

Barometers

A barometer is a widely used weather instrument that measures atmospheric pressure (also known as air pressure or barometric pressure). While an array of barometer types exists, two main types are used in meteorology: the mercury barometer and the aneroid barometer. The classic mercury barometer is designed as a glass tube about 3 feet high with one end open and the other end sealed. The tube is filled with mercury. This glass tube sits upside down in a container, called the reservoir, which also contains mercury. The mercury level in the glass tube falls, creating a vacuum at the top. (The first barometer of this type was devised by Italian physicist and mathematician Evangelista Torricelli in 1643).

The barometer works by balancing the weight of mercury in the glass tube against the atmospheric pressure, much like a set of scales. Atmospheric pressure is basically the weight of air in the atmosphere above the reservoir, so the level of mercury continues to change until the weight of mercury in the glass tube is exactly equal to the weight of air above the reservoir. Once the two have stopped moving and are balanced, the pressure is recorded by "reading" the value at the mercury's height in the vertical column. If the weight of mercury is less than the atmospheric pressure, the mercury level in the glass tube rises (high pressure). In areas of high pressure, air is sinking toward the surface of the earth more quickly than it can flow out to surrounding areas. Since the number of air molecules above the surface increases, there are more molecules to exert a force on that surface.

With an increased weight of air above the reservoir, the mercury level rises to a higher level. If the weight of mercury is more than the atmospheric pressure, the mercury level falls (low pressure). In areas of low pressure, air is rising away from the surface of the earth more quickly than it can be replaced by air flowing in from surrounding areas. Since the number of air molecules above the area

decreases, there are fewer molecules to exert a force on that surface. With a reduced weight of air above the reservoir, the mercury level drops to a lower level.

Aneroid barometers are more widely used as an alternative to "liquid" barometers. Invented in 1884 by French scientist Lucien Vidi, the aneroid barometer resembles a compass or clock. This is how it works: Inside of an aneroid barometer is a small flexible metal box. Since this box has had the air pumped out of it, small changes in external air pressure cause its metal to expand and contract. The expansion and contraction movements drive mechanical levers inside which move a needle. As these movements drive the needle up or down around the barometer face dial, the pressure change is easily displayed. Aneroid barometers are the kinds most commonly used in homes and small aircraft.

Anemometers

Are used to record the wind speed in km/h. An anemometer catches the wind in cups and calculates the wind speed based on how fast it rotates. From the gentle winds to the strongest winds you can distinguish. It consists of two or three or four semi-circular metal cups fixed to metal arms that rotate freely on a vertical shaft. In order to measure the velocity of the wind, we first check the recorded number of the rotation of the cups on the meter attached to the instrument and read off the speed of the wind in kilometres per hour. An anemometer catches the wind in the cups and calculates the wind speed based on how fast it rotates.

Sunshine recorders

They are used to measure the duration of sunshine each day. It consists of a glass sphere which is partially surrounded by a metal frame, with a sensitized chart inside it. The chart is graduated in hours and minutes. The sun's rays are focused through a magnifying glass onto a chart. The chart has been treated so it won't catch fire, but will leave a burn mark to show for how many hours the sun shone. To measure the duration of sunshine for that day, first take out the sensitized chart from the frame. Secondly, note the length of the burned track on the chart. Finally, record from the graduated chart the total number of hours of sunshine for the day.

Thermometer

The thermometer is a narrow-graduated glass tube filled with either mercury or alcohol. It is use for measuring both the highest (maximum) and the lowest (minimum) temperatures for the day (24 hours). To measure temperature, we must first of all take the readings from the Stevenson Screen. I believe you remember the meaning of this screen? Well! It is the specifically-made meteorological shelter for the weather instruments which keeps off the direct rays of the sun and thus, makes it possible to measure the actual temperature of the air, known as the shade temperature. Secondly, we take the reading of the highest temperature of the day by examining carefully the maximum thermometer. This is done by looking at the end of the metal indicator nearest the mercury. Reset the maximum thermometer for the next day's reading by drawing the maximum thermometer hand, or by drawing the metal indicator back by a magnet. The next step is that we must take the reading of the lowest temperature by examining the minimum thermometer. This is done by looking at the end of the metal indicator farthest from the bulb. Then, reset the minimum thermometer for the next day's reading by using a magnet. Finally, calculate the mean daily temperature. This is done by adding up both the maximum and minimum readings and dividing the result by two.

Wind vanes (as seen on the top of church spires) are used to show the direction of the wind. It is made up of a horizontal rotation arm placed on a vertical shaft. The rotating arm has a tail at one end and a pointer or head at the other. To measure wind direction, first look at the head of the arrow. Note

the direction where the arrowhead points. That particular direction is where the wind comes from. For example, if the arrowhead points to the east, then the wind is from the east.

Factors that Control Weather and Climate

Latitude

Latitude is the distance of a location from the equator. The hottest temperatures on earth are found near the equator. This is because the sun shines directly on it for more hours during the year than anywhere else. As you move further away from the equator towards the poles, less sun is received during the year and the temperature become colder. Latitude is the angular measurement in degrees of the distance from the equator to any location on the earth. Depending on the latitude of a location determines the amount of sunlight that a location receives. The higher your latitude the less sunlight you will receive throughout the year and the cooler will be your climate. Locations near the equator receive vast amounts of sunlight throughout the year, and as a result are warm year-round. Locations near the poles get very little sunlight and as a result are cool year-round. There is great imbalance between latitude and heat balance.

Altitude

Altitude is the difference in the vertical height of the atmosphere. It is the height above sea level. Altitude controls temperature and pressure density. The higher you are the lower the temperature will be within the troposphere. The temperature decreases with altitude and this temperature phenomena is known as the Lapse Rate. This is because air that is at a higher altitude is less dense than it is at lower altitudes and air temperature depends on its density.

a. The normal lapse rate is 6.5°C per km.
b. The rate of decrease of pressure with altitude is not constant.
c. The rate of decrease is about .34 millibars for 300 meters of altitude.
d. Different types of clouds are found at different altitudes which controls different types of precipitation.
e. Jet streams are located at high altitudes and these fast-moving rivers of air controls extreme and severe weather conditions.

Land and water

The distribution of water and land across the surface of the Earth is another important control that regulates climate. Water responds to temperature change much more slowly than does land. It takes longer to heat water, and longer for it to cool down. As a result, locations near the oceans experience milder changes in climate than location near the land. Variations in air temperature are much greater over land than over water. It is the differential heating of land and water that effects for the distinct types of marine and continental types of climate.

Distance from land and water

Sea temperature changes slower than land temperature. If the temperature on land drops, then the area next to the sea will be kept warmer for longer than areas inland. Islands have a less dramatic climate than continents. Continents have extreme weather conditions. Areas located near the water bodies will have mild climates and the areas located in the interior of the continent will have severe climatic conditions. Different seas have different temperatures therefore allowing one side of an island to be having different temperatures than the other side.

Low and high pressure cells

Pressure systems have a direct impact on the precipitation characteristics of different climate regions. In general, places dominated by low pressure tend to be moist, while those dominated by high pressure are dry. The seasonal changes of precipitation are affected by the seasonal movement of global and regional pressure systems. Climates located at 10o to 15o of latitude experience a significant wet period when dominated by the Inter-tropical Convergence Zone and a dry period when the Subtropical High moves into this region. Pressure dominance also affects the receipt of solar radiation. Places dominated by high pressure tend to lack cloud cover and hence receive significant amounts of sunshine, especially in the low latitudes

Winds and air masses

Air masses as a control of climate subsume the characteristics of temperature, humidity, and stability. Location relative to source regions of air masses in part determines the variation of the day-to-day weather and long-term climate of a place. For instance, the stormy climate of the mid-latitudes is a product of lying in the boundary zone of greatly contrasting air masses called the polar front. Movements of air masses often result in moderate to drastic temperature changes, precipitation, thunderstorms, and sometimes tornado activity. If the air masses contrast greatly, it can result in thunderstorms, and possible formation of tornadoes. Hello, have you ever heard of the word tornadoes? Well! It is a major component of this module, keep on reading and you will come across it. All these activities are common where the tropics and arctic air masses meet. In the subtropical high-pressure belt there is a convergence of both polar and tropical winds. When polar and tropical winds meet, storms occur.

Mountains barriers/Relief

Topography affects climate in a variety of ways. The orientation of mountains to the prevailing wind affects precipitation. Windward slopes, those facing into the wind, experience more precipitation due to orographic uplift of the air. Leeward sides of mountains are in the rain shadow and thus receive less precipitation. Air temperatures are affected by slope and orientation as slopes facing into the Sun will be warmer than those facing away. Temperature also decreases as one moves toward higher elevations. Mountains have nearly the same effect as latitude does on climate. Mountains can often act as barriers, diverting wind and moisture, affecting the climate in the areas around it. The side of a mountain facing the wind will have a climate very different from that of the other side of the mountain. Often mountains create a vast shadow, where rain can seldom fall. With rainfall being blocked by vast mountain ranges, these areas become deserts. Sahara Desert – North Africa, Atacama Desert – South America, Namib Desert – southern Africa, etc. are some examples.

Ocean currents

It is the movement of the surface water of the ocean. It is a large volume of water flowing in a certain direction. Surface currents carry warm or cold water horizontally across the ocean's surface. Surface currents extend to about 400 m below the surface, and they move as fast as 100 km/day. Earth's major wind belts, called prevailing winds, influence the formation of ocean currents and the direction they move. That is, Currents are driven by the prevailing winds passing over the surface of the ocean. Therefore, winds blowing from tropical areas bring warm currents and vice versa. Examples include Canary Current, Benguela Current, Mozambique Current, South Equatorial Current, North Pacific, the Gulf Stream, etc.

Ocean currents greatly affect the temperature and precipitation of a climate. Those climates bordering cold currents tend to be drier as the cold ocean water helps stabilize the air and do not favor cloud formation and precipitation. Air traveling over Cold Ocean currents lose energy to the water and thus

moderate the temperature of nearby coastal locations. On the other hand, air masses traveling over warm ocean currents promote instability and precipitation. The warm ocean currents raise the temperature of the nearby coastal regions slightly above the mean values during the winter season. Example, the effect of the North Atlantic Drift on the north-western coastal areas of Europe. The cold ocean currents lower down the temperatures of the adjacent coastal areas. The effects of cold currents are more pronounced in the temperate regions during the summer season.

Key ideas y ideas

- There are seven major continents of the world. These include Europe, Asia, Africa, North America, South America, Australia, and Antarctica.
- There are also five oceans of the world. These are Pacific, Indian, Atlantic, Arctic, and Antarctic Oceans.

Reflection

- Identify three key features of each of the seven continents of the world?
- Name the five oceans of the world?

Discussion

- How has this session improved your knowledge of the seven continents of the world?
- How has this session enhanced your understanding of the various oceans of the world

SESSION 5: TYPES OF RAINFALL (CONVECTIONAL, CYCLONIC, AND RELIEF)

In this session, we shall discuss the various types of rainfall. We shall also discuss the factors that contribute to the formation of the various types of rainfall.

Learning Outcomes

By the end of the session, the participant will be able to:

- define precipitation
- explain the formation of the three types of rainfall

The Meaning of Precipitation

Moisture entering the atmosphere as a result of evaporation from water and land surfaces is transported with air fluxes; it condenses and again falls as precipitation on the surface of the Earth. Precipitation is the water in a liquid or solid state falling from clouds or formed on the earth's surface and ground objects due to condensation of airborne water vapor. Depending on the mechanism of cloud development and structure, precipitation may be continuous (temperate-intense) and produced predominantly from stratocumulus clouds, *heavy*, from cumulonimbus, or drizzle, often from stratus clouds. Precipitation formed on the earth's surface is called ground hydrometeors and includes dew, different type of rain, hoarfrost, black and hard frost and glaze. At meteorological stations, precipitation is measured with rain gauges of different types, recording rain gauges (pluviographs) or

by radar, which allows estimation of both precipitations fall area and its intensity. Do you remember these instruments? Well done. We have already discussed them. (See unit 2, session 4.3)

Solid precipitation can be of forms that are more diverse. It falls as snow, hail, snow and ice pellets, ice needles, and ice crystals. At lower surface temperatures ice forming on solid objects are solid surface hydrometeors—frost, solid film, and ice. In free atmosphere, an analogue of such phenomena is airplane icing, when super-cooled cloud drops or precipitation freeze on the surface of an airplane. The differentiation between rain and drizzle is to a certain extent arbitrary. These two forms of liquid precipitation differ from each other only in the size of drops. The diameter of raindrops is usually 5 to 6 mm, whereas drizzle drops are smaller (between 0.2 and 0.5 mm) and their terminal velocities are between 70 and 200 cm per second. Drizzle falls mostly from low stratus clouds and is frequently accompanied with fog and poor visibility. The diameter of raindrops is usually larger than 0.5 mm, but they only rarely reach 6 mm or more because larger raindrops are destroyed during falling. Small raindrops are of almost spherical shape, but bigger ones are flattened when falling, especially in the lower part of the cloud. The terminal velocities of rain drop range from two meters per second for the smallest to about 10 meters per second for the largest.

During heavy rains, raindrops are considerably bigger than in light rain. The largest drops of more than six millimeters in diameter appear only in heavy rains, especially at the start of a rain storm. When raindrops pass through cold air layers (below 0 °C), they become super-cooled, and freezing rain or super-cooled drizzle occurs. Freezing rain falls in liquid form but freezes upon impact to form a coating of glaze on the ground and exposed objects. Often these frozen raindrops form a very slippery and almost transparent “glazed” film which is dangerous for both pedestrians and transport. Dew is the smallest water drop formed during condensation on the Earth’s surface, most frequently on grass during the warm period of a year. Dew arises mostly with clear and calm weather in the evening hours and at night when there is no fog. Dew develops when soil and vegetation (grass and leaves) cool to the temperature typical of the dew point. Snow is solid atmospheric precipitation of different forms of ice crystals. Groups of ice crystals form snowflakes in the shape of six-cone stars, needles or multiple combinations. The size of snowflakes varies from one millimeter to a few centimeters depending on air temperature: the higher the temperature and weaker the wind, the larger the flakes. The largest flakes fall with heavy precipitation. The diversity of snowflakes is endless. Mostly they are stars, columns, or their combinations. The velocity of snowflake fall is a function of their shape and air temperature, being in the range of 0.1 to 2 meter per second in motionless air. Snow falls from clouds of different shapes, mostly strato-cumulus, high-stratus and cumulo-nimbus, during the cold period of the year.

By their size snowflakes are classified as tiny (particles < 5 millimeter), small flakes (5 to 15 mm), or large flakes (> 15 mm). Snowflake fall velocity ranges from < 0.1 meter per second (slow flying) to > 0.8 meter per second. Plates and stars fall with velocity of 0.5 to 1 meter per second, needles and columns – a few decimeters per second, and snow and ice pellets at 1 to 2.7 meters per second. The rate of snowfall is measured by precipitation amount in 1 mm water layers per unit of time, mostly per hour or 24 hours. Weak snow has a rate of less than 0.1 mm/hour, average snow – from 0.1 to 1 mm per hour, and heavy snow – more than 1mm per hour. Vision in dense snow can be reduced to 1 km or less. The length of snowfall period is usually inversely proportional to the rate of its fall. Dense snowfall rarely lasts more than 1 to 2 hours, and weak snow can last 24 hours or even longer. At meteorological stations several types of snow are distinguished: snow with rain, rain with snow, drizzle, and heavy snow. The latter is sometimes called a snow shower. There is also such an event as a snow storm (or snow charge), as well as snow under clear sky. Rain with snow usually falls at positive surface temperature and represents rain with a small number of separate snowflakes. Snow with rain is a mixture of snowflakes and raindrops occurring at the temperatures close to 0°C.

Overcasting snow falls mostly from stratocumulus or from high stratus clouds and can last for several hours continuously. Pouring snow falls usually from cumulus-nimbus clouds at temperatures close to 0°C. This kind of snow falls due to a cold front and unstable air mass. A snow storm is formed in an unstable stratified cold air mass passing over relatively warm underlying surface. Sometimes colored snow occurs. The color is derived from mineral or organic admixtures. Colored snow is mostly of a brown or red shade due to dust settling on snow, or algae or bacteria reproducing on snow. Color snow mostly occurs in the high latitudes in spring when soil is partly bared and partly covered with snow.

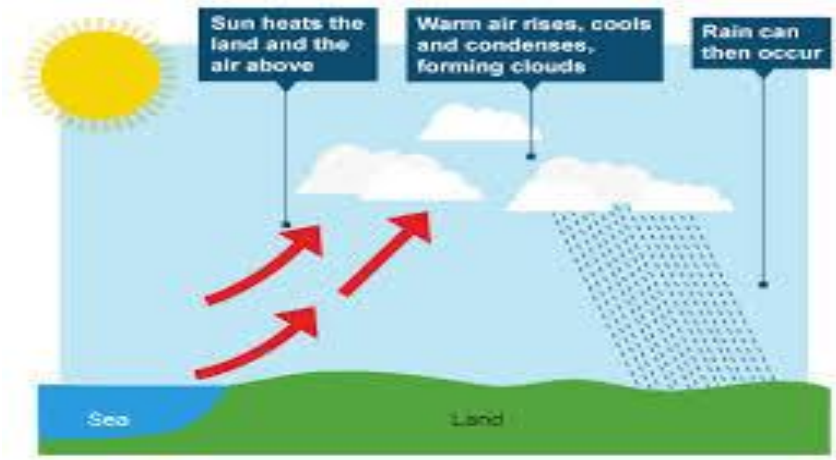
Types of Rainfall

There are three common types of rainfall. All have the common theme of air being forced to rise.

As air rises, it cools, it cannot hold as much moisture as it could when it was warmer. Eventually the rising air reaches a point where it is 100% saturated, in other words it cannot hold any more water. This is called **dew point**, and it is above this point that **condensation** occurs. **Condensation** is the process by which the water vapor (a gas) held in the air is turned back into water droplets (a liquid), which fall as rain.

Convectional rainfall

Convectional rainfall is a type of rainfall caused by convection where the surface layer of the atmosphere is heated causing the moisture laden air to rise. As it rises it cools to form clouds. The unequal heating of the earth's surface causes convection. The resulting condition is that more widespread areas of colder air separate rising currents of warm air. The colder air slowly sinks to take the place of rising warm air. The condition of rising currents of warm air separated by more wide-spread areas of slowly sinking air is referred to as **convection**. This is typical of thunder storms during a hot summer. Convectional rain can also be found year round in regions near the equator.



Formation of convectional rainfall

In other words, it is typical of warm moist air by heating from the ground surface. As a result of heating of the surface air, the air expands and forced to rise to great height. As the air rises, it cools and becomes saturated and dew point temperature (the temperature at which water vapour in the air condense (gas-liquid) is attained and then clouds will form. By further cooling, precipitation takes place

Convectional rainfall occurs when:

- The surface of the earth is heated by the sun.
- The warm surface heats the air above it. Hot air always rises so this newly heated air does so.

- As it rises the air cools and begins to condensate.
- Further rising and cooling causes a large amount of condensation to occur and rain is formed.
- Convection tends to produce towering cumuli-nimbus clouds, which produce heavy rain and possible thunder and lightning.

Necessary conditions for Convective rainfall

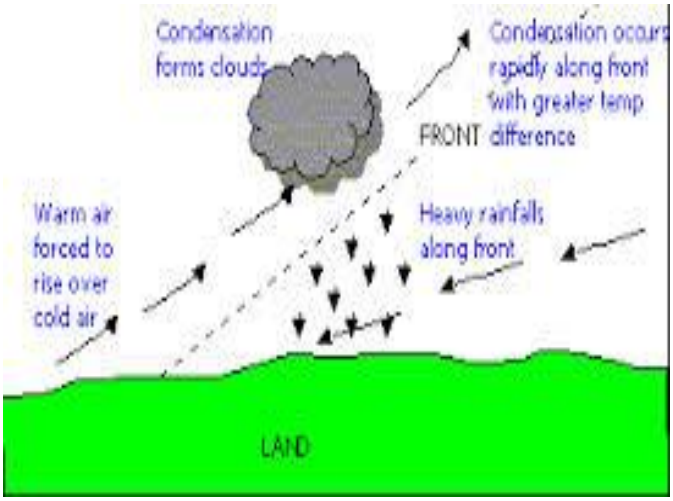
1. Intense heating of the surface which causes the air to expand and rise.
2. Abundant supply of moisture in the air to produce a very high relative humidity.

Turbulence in the atmosphere and surface obstructions such as hills and mountains provide the initial upward push for the air. This rainfall occurs throughout the year near the equator daily in the afternoon. In middle latitudes, convectional rainfall occurs in early summer, in continental interiors.

Frontal Rainfall/Cyclonic Rainfall

Frontal or Cyclonic precipitation results when the leading edge of a warm, moist air mass (warm front) meets a cool and dry air mass (cold front). The molecules in the cold air are more tightly packed together (i.e., denser), and thus, the cold air is heavier than the warm air. The warmer air mass is forced up over the cool air. As it rises, the warm air cools, the water vapor in the air condenses, and clouds and precipitation result. This precipitation is common in Atlantic Canada. This type of system is called Frontal Precipitation because the moisture tends to occur along the front of the air mass. A cyclonic storm is a large, low pressure system that forms when a warm air mass and a cold air mass collide. This collision often occurs under the polar-front jet stream which spreads cold, dry arctic air near warm, moist tropical air. The rotation of the earth causes the air to circulate in a counterclockwise direction around an area of low pressure. This rain is caused by depressions or Lows.

Cyclonic rain originates where warm tropical air meets cold polar air. The warm air overrides the cold air. When contrasting air masses make contact, an abrupt zone or boundary is formed. This boundary is called a **front** and is accompanied by rather abrupt changes in temperature, pressure and humidity. When a mass of warm air moves into a region of cold air, the warm air overrides the cold air mass, forcing the cold air to retreat. This situation is called a **warm front**, which is characterized by several days of rain. A cold air mass moving into a warm air mass produces a frontal surface, which is more vertical than that of a warm front. This situation produces a **cold front**. Cold air masses advance rapidly and force the warm air mass upward where it becomes cooled. The movement of the air mass is rapid enough to produce cumulonimbus clouds. Rainfall is heavy but brief in duration.



Formation of cyclonic rainfall

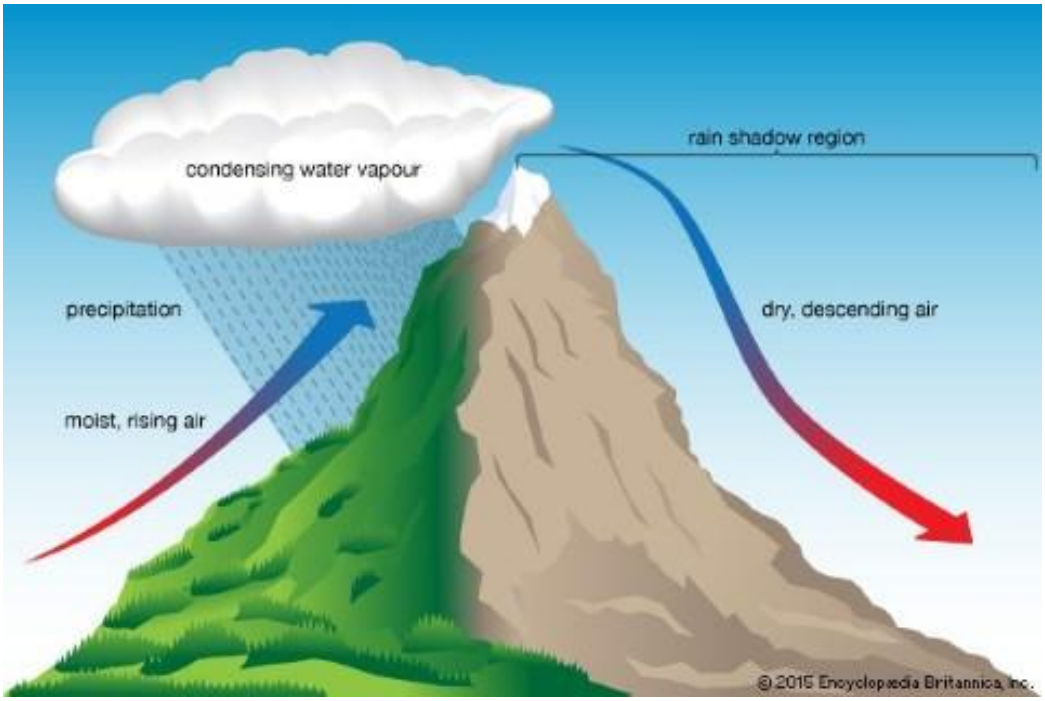
This type of precipitation associated with a cyclonic activity and occurs along the frontal zone (front is a narrow zone of transition, dividing two air masses of differing temperature and humidity characteristics, intersecting the earth's surface. Fronts are most clearly developed in areas where air masses converge) of convergence particularly at the ITCZ (inter tropical convergent zone) and at the polar fronts. In a zone of horizontal wind divergence, the warm air forced up over the colder air. In this slow ascend pressure decreases, air expands and cools, condensation and cooling produce a precipitation. These fronts and associated weather phenomenon are best developed in the middle latitudes; most of the winter precipitation of low lands in the middle latitudes is cyclonic or frontal in origin.

Frontal rainfall occurs when:

- Two air masses meet, one a warm air mass and one a cold air mass.
- The lighter, less dense, warm air is forced to rise over the denser, cold air.
- This causes the warm air to cool and begin to condense.
- As the warm air is forced to rise further condensation occurs and rain is formed.
- Frontal rain produces a variety of clouds, which bring moderate to heavy rainfall.

Relief Rainfall/Orographic/Relief Rainfall

Orographic Precipitation results when warm moist air moving across the ocean is forced to rise by large mountains. As the air rises, it cools. Why? A higher elevation results in cooler temperatures. Cold air cannot hold as much moisture as warm air. As air cools, the water vapour in the air condenses and water droplets form. Clouds forms and precipitation (rain or snow) occurs on the windward side of the mountain (see figure 2). The air is now dry and rises over top the mountain. As the air moves back down the mountain, it collects moisture from the ground via evaporation. This side of the mountain is called the leeward side. It receives very little precipitation. It occurs when large mass of air is forced to rise across landform barriers, such as high mountain ranges, plateau, escarpment, or over high hills. The **leeward side** of such mountain barrier where the air is ascending and warming are characteristically drier and are called **rain shadow region.** It is most common on the windward slopes of the mountain where the on-shore moisture laden-winds come from the sea. Ideal condition for heavy orographic rainfall is a high relatively continuous mountain frontier (boundary) close to the coast and the winds from off a warm ocean meet the barrier at right angles. This is exactly the case with Western Ghats in India, which lies athwart (perpendicular) the south-west monsoon.



Formation of relief or orographic rainfall

Key ideas y ideas

- Precipitation is the water in a liquid or solid state falling from clouds or formed on the earth's surface and ground objects due to condensation of airborne water vapor.
- There are three major types of rainfall. These are convectional, relief, and orographic rainfall.

Reflection

- How would you explain the concept of precipitation?
- Which of the three types of precipitation do you usually experience in your community?

Discussion

- How has this session improved your understanding of the concept of precipitation?
- How has this session enhanced your understanding of the various types of rain that falls in your community?

SESSION 6: MAJOR LANDFORMS

In this session, we shall look at some landforms on the surface of the earth. We shall begin by identifying the classifications of plateaus and continue with the importance of plateaus. We shall also discuss the concept of hills and their importance. Finally, we shall look at plains and their importance.

Learning Outcomes

By the end of the session, the participant should be able to:

- identify two classifications of plateaus
- state two importance of plateaus
- describe the concept of hills
- explain four importance of hills
- explain the concept of plains

Classification of Plateaus

A plateau is an extensive and broad highland area with a comparatively level surface. In other words, it is a stretch of high, flat land usually 2,000 feet (609.6 metres) or more. It is generally characterized by steeply sloping edges to the lower land or the sea on either side. Plateaus have several classifications.

Locational Plateaus

Plateaus are classified according to their direct relationship to other surface features and such plateaus are called locational type plateaus. Others may be classified by their mode of formation. Locational type plateaus are divided into three categories. One of them is called internontane plateau. The principal characteristic of intermontane plateau is that they are hemmed in by mountains. The best example of this kind of plateau is the Colorado Plateau in the Western Highlands of the USA. The Colorado Plateau lies between the Rockies and Wasatch Mountains. Another feature of intermontane plateau is that they are usually lower than the surrounding mountains. The second locational type of plateau is called piedmont plateau. The term piedmont refers to a position at the foot of a mountain. A good example of a piedmont plateau is the Yunna Plateau in China. The third and last locational type of plateau is termed continental plateau.

Continental plateaus

Continental plateaus are the largest plateaus. They usually cover a vast area. Good examples are the South Africa Plateau and the plateau section of the Brazilian Uplands. Structural types of plateaus or those classified by their formation may be grouped into three namely the horizontal kind, the deformed rock plateau and lava plateau. The horizontal kind as the name implies is not tilted. It is much like the Colorado Plateau. The deformed rock plateau is formed as a result of erosion and later uplifting. The plateau of the Ardennes region of South-eastern Belgium is a common example. Lava plateau are formed differently. When molten rock (magma) reaches the surface of the earth through fissures and cracks, the molten rock is termed lava. Thus, lave plateaus are formed as a result of lava flowing over existing landforms. Colombia Plateau and the Deccan Plateau of India are examples.

Importance of Plateaus

Now, let us look at some importance of plateaus. Plateaus influence human activities in several ways. Some of the uses of plateaus are similar to or the same as those of mountains. In the first place, some plateaus are a source of valuable mineral resources. The African Plateaus are rich in copper and gold and the plateau in Western Australia is rich in gold. These minerals found in plateaus are put to very good uses by the people. Also, some high plateaus provide excellent fertile soil suitable for the cultivation of certain crops. For example, the Kenyan Plateau in Africa provides rich soil for the cult of coffee, sisal and maize. Also, coffee is grown on the Brazilian Plateau. Again, high plateaus serve as tourist sites. They attract tourists for recreational activities and for that matter, the states in which such high plateaus are found such as Brazil, Kenya, China and Colorado receive large amount of foreign exchange from tourism. Moreover, some plateaus savanna and forest resources which are gainfully used by people. For example, the Jos Plateau in West Africa has a grassland vegetation at its base, forest vegetation on the windward slope and grass vegetation on the plateau surface.

The Concept of Hills

A hill is a small highland whose height ranges from 200 to 2,000 feet (about 61 metres to about 610 metres). Hills are made of many different kinds of rock. Basically, there are two (2) types of hills. These are structural hills and erosional hills. Structural hills are closely related to their bedrock. Folding or the movement of the earth's surface causes differences in thickness of the bedrock layers. The less dense, or soft, areas are eroded more quickly than he thicker layer of rock. The result is a series of roughly parallel valleys and ridges. Erosional hills are formed as countless streams cut through horizontal layers rock. The formation of erosional hills depends more on where the streams cut through the rock and on the climate than on variations in thickness of the bedrock.

Importance of Hills

Though hills present obstacles to transportation, they serve very good purposes in the area of settlement, agriculture, mineral resource and tourism.

Firstly, remote hilly districts are often sparsely populated and therefore provide a place of refuge for oppressed people. Additionally, hilly areas are not liable to flood, that is they are not flooded when it rains heavily. They therefore provide excellent site for human settlement. For example, the Ningo, Osudoko and Krobo Hills have provided good sites for settlement by the people of the areas for the purposes of defence and protection against floods in the past.

Secondly, the slopes of some hills have provided fertile soil for the cultivation of crops. For instance, in the places like Shai, Tongo and Bongo the people farm on the slopes of the hills there. Thirdly, some hills are important sources of minerals, for example, Kanaiyerebo Hill near Awaso in the Western Region of Ghana has large deposit of bauxite which is being mined. We get aluminum from bauxite. Aluminium is used in making roofing sheets, parts of airplanes and cooking utensils. Fourthly, the features of some kinds of hills, especially, inselbergs or erosional survivals appear here and there all over the West African plains and characterized by very steep sides and usually dome-shaped attract many tourists.

The Concept of Plains

The concept plain is a large land area whose distance in height from the low point to the high point in the area being studied is usually less than 200 feet (about 61 metres). Not all plains are flat. Some plains have hilly regions above sea level and valleys below sea level. The land is not always smooth. It may be rolling or rough. Generally, we think of plains as lands that are fairly low with respect to sea level.

Types of Plains and their Formation

There are two (2) basic types of plains. These are (a) erosional plains and (b) depositional plains.

Erosional plains are found on all continents except Antarctica. They are formed by the weathering and eroding of an area, that is not far enough above sea level for streams to cut deeply into its surface. The elevation is made smooth or levelled by water, wind and ice. The broad plain of Western Amazon Basin was created by weathering and running water.

Depositional plains are formed by deposit of weathered (broken down) and eroded materials that have been carried by glaciers (moving ice) or moved by running water. Rivers and streams, flowing from higher areas to the sea, carry eroded material and soil material. As the speed of the moving water decreases these materials are deposited. These deposits form fairly flat plains. Deltas are deposits of rocks and soil at the mouth of the river or stream where its speed decreases as it flows into a lake or sea. The Nile delta is a large area of plain that has been built in this way.

Importance of Lowlands (Plains)

Lowland and for that matter plains, whether small or large, have been the world's most easily used landforms with respect to settlement, communication, agriculture and industry. Plains provide excellent places for residential settlements. The fairly level surface of plains or the relative flatness of plains makes the construction of houses very easy and less expensive. As a result of this most built-up residential areas are sited on plains. Also, plains provide the most suitable landform or relief feature for the construction of roads, railways and airports as well as laying of underground telephone cable. Again, plains facilitate large scale or plantation farming. The flat terrain of plains makes easy the use of agricultural machinery such as combined harvesters, ploughs and tractors. With the use of these machines large areas of land are cultivated and harvested. For example, Twifo Oil Palm Plantations are found in fairly level lowland. Furthermore, the relative flatness of plains makes it possible for easy construction of factories; easy transportation of raw materials to the factories and easy transportation of finished or manufactured to the market for sale. In view of this, most industries all over the world are sited on plains.

Key ideas y ideas

- Plateaus are basically classified into two. These are locational plateaus and continental plateaus.
- Plateaus are importance in several ways. For instance, some plateaus contain mineral deposits, others attract tourists, some are also rich for agricultural purpose.
- A hill is a small highland whose height ranges from 200 to 2,000ft.
- Hills are important because they also promote tourism, serve agricultural purposes, provide excellent site for human settlement.
- Plains are large land area whose distance in height from the low point to the high point in the area being studied is usually less than 200ft
- There are two main types of plains which are erosional and depositional plains.
- Plans are also important in the sense that the provide fertile grounds for agricultural purposes, good for construction of houses, factories, etc.

Reflection

- In what two major ways are plateaus classified?
- In what two major ways are hills classified?
- What are the importance of plateaus and hills?
- Wat are the types of plains?
- In what ways are plains useful to man?

Discussion

- How has this session improved your understanding of the concepts of plateaus, hills and plains?
- How has this session enhanced your understanding of the usefulness of plateaus, hills and plains?

UNIT 3: DIRECTIONS, POSITIONS AND FEATURES OF MAPS

In this unit, you will be introduced to the cardinal points and the compass. This unit shall also take you through latitudes and longitudes. Besides, the various ways of showing relief on map shall be discussed. It will also cover the various drainage patterns in this world. Let us ask this question: have you heard of any natural disaster that has occurred in any part of this world? Where did it occur? Well! This unit shall provide answers to these questions.

Learning Outcomes

By the end of this unit, the participant will be able to:

- define the concept of Compass/Cardinal Points (True, Magnetic and Grid North)
- describe Longitudes and Latitudes
- identify three conventional signs use on maps
- describe Methods of Showing Relief
- explain the Drainage Patterns
- explain the Meaning of Natural Disasters

SESSION 1: COMPASS/CARDINAL POINTS (TRUE, MAGNETIC AND GRID NORTH)

In this session, we shall talk about the cardinal points. We shall also discuss the instruments used for measuring and showing direction. We shall as well distinguish among the true north, magnetic north and the grid north.

Learning Outcomes

By the end of the session, the participant be able to:

- describe the compass
- state the cardinal points
- distinguish among the true north, magnetic north and the grid north

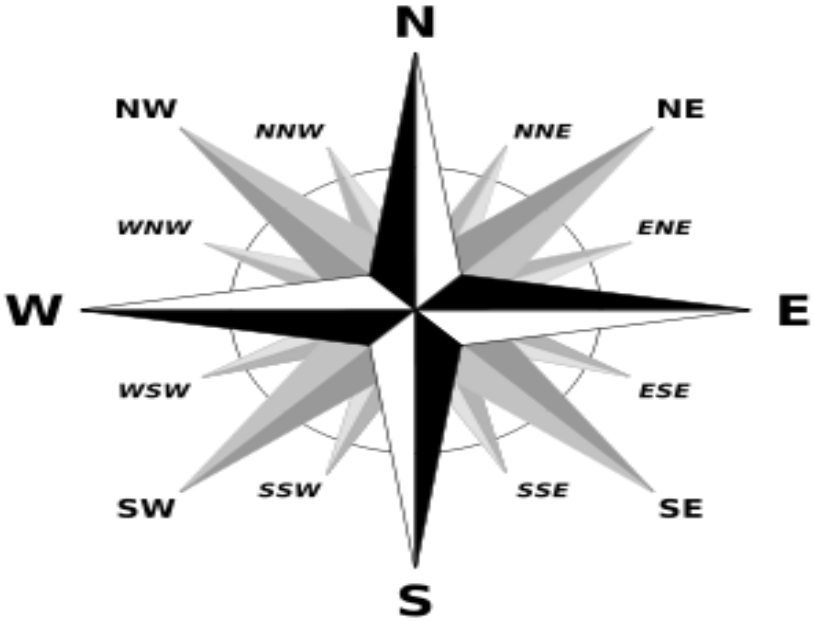
The compass

A compass is an instrument that people use to find direction. It is an instrument that points to the Earth's North Pole. On earth we can use a compass to guide us because the needle points to the approximate position of the North Pole. The compass has several faces which show the South Pole, which is in the opposite direction to North, as well as the position of the Sun at sunrise and sunset. Where does the Sun rise from? Well, it rises from the East and sets in the West. The magnetic needle in the compass, which is the freely moving needle in the compass that has a red end, points north. More specifically, this needle points to the north magnetic pole, the northern end of the earth's magnetic field, which can be imagined as lines of magnetism that leave the south magnetic pole, flow north around the earth, and then enter the north magnetic pole.

The Cardinal Points

The prismatic compass, which is used for measuring angles and showing direction, has a north point. It also shows south, west and east. These are the four cardinal points (see Figure 3.1). There are intermediate points of the compass. These are based upon cardinal points and they are named from the four cardinal points. When the cardinal points are subdivided or bisected, four additional points are obtained to make an eight-point compass. These additional points are north-east, south-east, south-west, and north-west. The eight-point compass can be further subdivided to get a sixteen-point

compass (Figure 3.1). The additional points are north-north-east, east-north-east, east-south-east, south-south-east, south-south-west, west-south-west, west-north-west, and north-north-west



The four cardinal points

Differences among Magnetic North, True North/ North Pole/Grid North

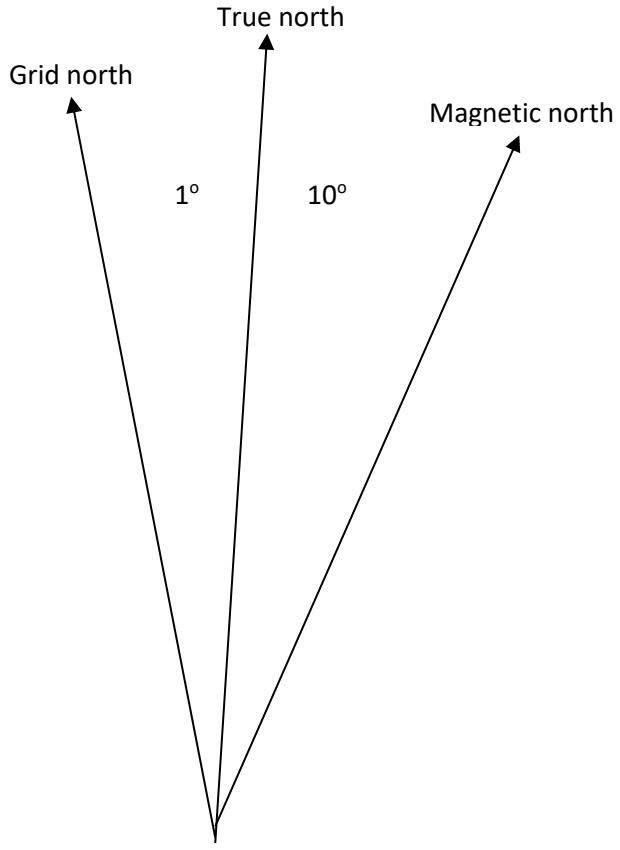
A magnet is a piece of iron or steel that makes other metal objects move towards it. There is an instrument called the prismatic compass. Do you know of any instrument that contains magnet? One of such instruments is called prismatic compass. This instrument is used for measuring angles and showing direction. It has a magnetic needle. The north point it shows when it is at rest is known as Magnetic North. This is different from the True North. Since Magnetic North does not coincide with the True North, there is an angle of difference between them. This angle is known as **magnetic variation or magnetic declination.**

The north magnetic pole is not the same as the geographic North Pole, also known as true north. The true north is the northern end of the axis around which the earth spins. In fact, the north magnetic pole currently lies approximately 800 mi (1300 km) south of the geographic North Pole, in northern Canada. The meridians of longitude on maps and globes are based upon the geographic North Pole rather than the magnetic pole. This means that magnetic north, the direction that a compass indicates as north, is not the same direction as maps indicate for north. Magnetic declination, the difference in the angle between magnetic north and true north must therefore be taken into consideration when navigating with a map and a compass.

The amount of declination between the magnetic north and true north varies across the world, so high-quality maps always give the amount of variation. The error caused by magnetic declination can be very significant. For every degree of declination, the error is approximately one-sixtieth of the distance travelled. This means that in an area of 10 degrees of declination, the error is ten times greater, or one-sixth of the distance travelled. By implication, a person using a compass to navigate in an area of 10 degrees declination will travel one-sixth of a mile (kilometer) off target for every mile (kilometer) travelled if declination is not taken into account. If the destination is 6 miles (10km) to the north, the person would end up 1 mile (1.6km) east or west of the destination.

There is a third type of north called the **grid north**, which is the northward direction of grid lines as given on a map. Grid north exists because flat paper maps cannot represent the spherical earth accurately. Meridians of longitudes on a globe converge toward each other steadily as they approach each pole but on a flat map, meridians are shown as parallel. This means that meridians of longitudes do not point toward true north. The difference in direction between grid north and true north gives rise to grid declination which is also the difference in the angle between the grid north and true north.

Generally, the difference between grid north and true north is fairly small except close to the poles. However, grid declination is usually shown beside magnetic declination on high-quality maps so it is necessary to be able to recognize what it means. The true north, magnetic north, and grid north are traditionally shown on a map in a single diagram. Figure 3.2 shows the true north, magnetic north and grid north with a magnetic declination of 10 degrees east of north because the magnetic north arrow is to the east, or the right, of the true north arrow. In the area shown on figure 3.2, a compass arrow will always point 10 degrees further to the right, or east, than the map shows as north because the north magnetic pole is 10 degrees to the east of true north from that position. Therefore, to compensate for the 10 degree declination, it is necessary to subtract 10 degrees from the compass reading in order to find the true north direction shown in figure 3.2.



Grid north, True north, Magnetic north

Key ideas y ideas

- A compass is an instrument that is used to find direction. Sailors, pilots, drivers, etc. mostly find their ways by relying on compass.
- The compass is used for measuring angles. It shows north, south, east and west. These constitute the cardinal points
- The north point that the compass shows when it is at rest is the magnetic north.

Reflection

- What is the meaning of a compass?
- What are the uses of a compass

Discussion

- How has this session improved your understanding of the instrument used to show direction?
- How has the session helped you better understand the uses of a compass?

SESSION 2: LONGITUDES AND LATITUDES

The main focus of this session is to distinguish between longitudes and latitudes as well as discuss their importance.

Learning Outcomes

By the end of the session, the participant will be able to:

- distinguish between longitudes and latitudes
- explain four importance of longitudes and latitudes

Difference between Longitudes and Latitudes

Lines of latitude are imaginary lines which run in an east-west direction around the world. They are also called parallels of latitude because they run parallel to each other. Latitude is measured in degrees (°). The most important line of latitude is the **Equator** (0°). This is because the equator is the only latitude that is a Great Circle. The North Pole is 90° North (90°N) and the South Pole is 90° South (90°S). All other lines of latitude are given a number between 0° and 90°, either North (N) or South (S) of the Equator. Some other important lines of latitude are the Tropic of Cancer (23.5°N), Tropic of Capricorn (23.5°S), Arctic Circle (66.5°N) and Antarctic Circle (66.5°S).

Latitudes have effects on both temperature and the length of day and night. Within the tropics, especially along the equator, the sun is almost always overhead. Therefore, temperatures are always high. In higher latitude on the other hand, that is areas outside the tropics, the altitude of the midday sun is lower, so temperatures are low. Generally, temperature decreases from the equator towards the poles. At the equator, bands of the sun's energy pass through a shorter space and heat a smaller area in the ground vertically. In the higher latitude, however, the bands of the sun's energy pass through a longer space and heat a larger area obliquely. That is, in a slanting form.

The length of the day and night also vary according to the latitude of the observer and the time of the year. The major cause of varying lengths of day and night is the revolution of the earth, together with the earth's inclination on its axis at 66.5^{o}. In general, longer days are experienced when the earth is inclined towards the sun while shorter days occur when the earth is turned away from the sun. On March 21 and September 23, the sun is overhead at the equator, and the equinoxes occur. There are12 hours of daylight and 12 hours of darkness throughout the world. On June 21, the North Pole is tilted towards the sun and the whole of the northern hemisphere has longer days and shorter nights, but the hours of light increase from the equator towards the poles. Thus, at the Arctic Circle (latitude 66.5^{o}N) there would be 24 hours of continuous daylight while at the poles there would be 6 months of continuous daylight. In the southern hemisphere the longest nights are experienced, especially areas south of the Tropic of Capricorn. At the Antarctic Circle, there is continuous darkness for 24 hours. At the South Pole, the darkness goes on for six months.

On December 22, the sun is overhead at the Tropic of Capricorn and the South Pole is tilted towards the sun. The southern hemisphere generally has longer days and shorter nights. The longest days are experienced south of the Tropic of Capricorn. At the Antarctic Circle, there will be 24 hours of continuous daylight, while at the South Pole, there will be six months of continuous daylight.

Longitudes: Lines of longitude on the other hand, are imaginary lines which run in a north-south direction, from the North Pole to the South Pole of the earth. They are measured in degrees (°). Any circle on the surface of a sphere whose plane passes through the centre of the sphere is called a **great circle**. Thus, a great circle is a circle with the greatest possible diameter on the surface of a sphere. Any circle on the surface of a sphere whose plane does not pass through the centre of the sphere is called a **small circle**. A **meridian** is a great circle going through the geographic poles, the poles where the axis of rotation (polar axis) intersects the earth's surface. The **upper branch** of a meridian is the half of the great circle from pole to pole passing through a given position; the **lower branch** is the opposite half. The equator is the only great circle whose plane is perpendicular to the polar axis. Further, the equator is the only parallel of latitude being a great circle. Any other parallel of latitude is a small circle whose plane is parallel to the plane of the equator.

The **Greenwich meridian**, the meridian passing through the Royal Greenwich Observatory in London (closed in 1998), was adopted as the prime meridian at the International Meridian Conference in October 1884. Its upper branch (0°) is the reference for measuring longitudes, its lower branch (180°) is known as the **International Dateline**. All the lines of longitude are given a number between 0° and 180°, either East (E) or West (W) of the Greenwich Meridian. Longitudes meet at the Poles as you can see from the globe (Figure 3.3). Longitude is angular distance measured from the centre of the earth. They are measured in degrees, minutes, and seconds of an arc. Lines of longitudes are numbered in degrees west of the Greenwich Meridian/Prime Meridian (0^{o}) up to 180^{o} and east of the Greenwich Meridian, up to 180^{o}. Two opposite longitudes form a great circle, that is, they form half circles and are equal in length.

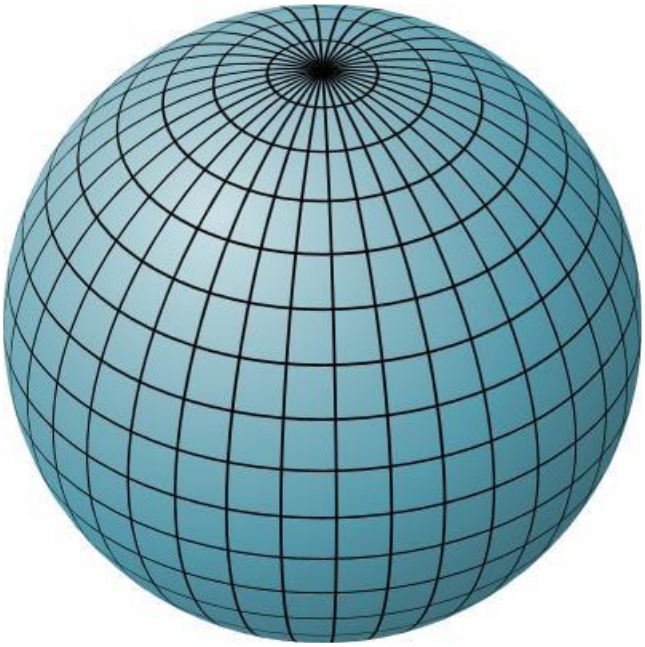
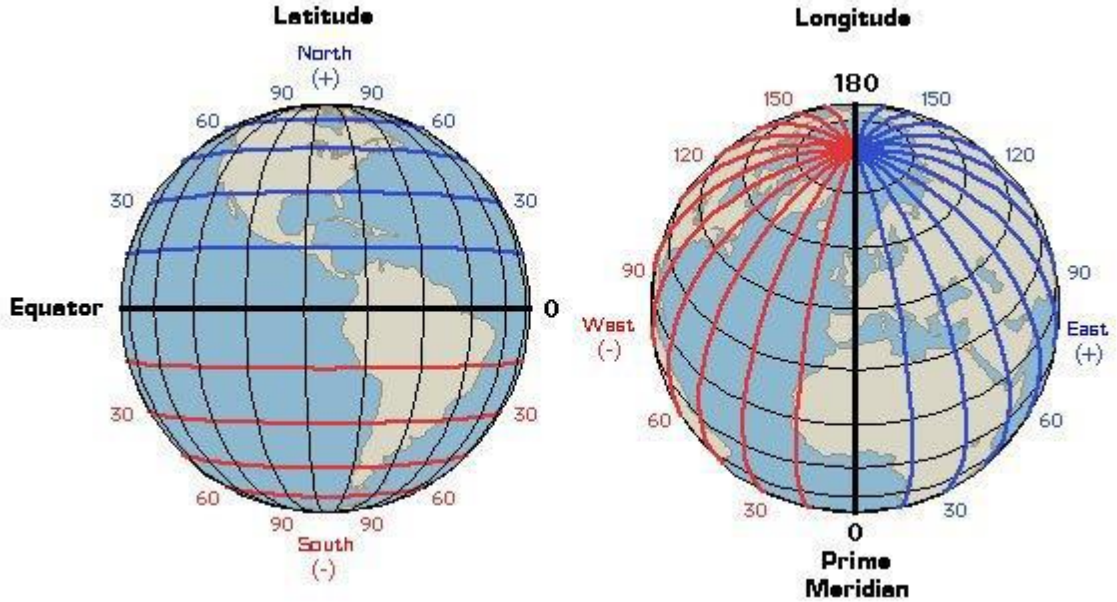


Figure 3.3: Longitudes and Latitudes



Longitudes and Latitudes

Importance of Longitudes and Latitudes

The earth has 360 degrees of meridians. All places on the same meridian have the same local time. There is a difference of 4 minutes between any two meridians 1 degree apart or 1 hour between two meridians 15 degrees apart in longitude. As a result of the earth's rotation from the west to east, areas to the east of the Greenwich meridian have time ahead, while areas to the west have their time behind.

Key ideas

- A Lines of latitude are imaginary lines which run in an east-west direction around the world. They are also called parallels of latitude because they run parallel to each other. Latitude is measured in degrees (°).
- Longitudes: Lines of longitude on the other hand, are imaginary lines which run in a north-south direction, from the North Pole to the South Pole of the earth. They are measured in degrees (°).

Reflection

- What is the meaning of longitudes?
- What is the meaning of latitudes?
- What are the uses of longitudes and latitudes?

Discussion

- How has this session improved your understanding of the concept of longitudes?
- How has the session helped you better understand latitudes?

SESSION 3: CONVENTIONAL SIGNS

The main focus of this session is to define conventional signs. The session will also introduce you to some examples of conventional signs used on maps.

Learning Outcomes

By the end of the session, the participant be able to:

- define conventional signs
- identify four examples of conventional signs used on maps.

The Meaning of Conventional Signs

Have you ever read any topographical map? When you look at topographical and other maps, you will realize that there are certain signs that are used to represent other elements on the actual land. You will also realize that the map contains different colours that are used to indicate different features such as vegetation, water bodies and landforms. These signs are called conventional signs. Almost everything that appears on a map, except a printed name, is a conventional sign. Conventional signs and symbols represent various features shown on a map and are not drawn to scale. Most conventional signs and symbols are very easy to learn and they make using a map much easier and clearer.

Conventional signs are symbols used on maps to represent different features. A symbol is a mark or sign that indicates, signifies, or is understood as representing an idea, object, or relationship. Symbols allow people to go beyond what is known or seen by creating linkages between otherwise very different concepts and experiences. All communication (and data processing) on maps is achieved through the use of symbols. Therefore, on maps, the symbols are explained in the key of the map. Since a map is a reduced representation of the real world, map symbols are used to represent real

objects. Both shapes and colours can be used for symbols on maps. A small circle may mean a point of interest, with a brown circle meaning recreation, red circle meaning services, and green circle meaning rest stop. Man-made features like cities, roads and railways are very important on a map; therefore, they are shown far larger on a map.

It must be emphasized that conventional signs on topographical maps should be standardized by international agreement so that map users could visualize at a glance the country that is represented on any sheet, without reference to the legend. The information given on the bottom margin of a map is unfortunately, used by the few. Actually, every country has different system of mapping suited that country. Certain conventional signs are easy to draw or reproduce, are clear to read, and may be conveniently used to represent quite different features in different parts of the world. However, one major problem with topographical map makers is to effectively combine the colour, form, and texture of the signs so as to show the maximum amount of useful information required by different classes of map used without encumbering the sheet and reducing clearness and legibility beyond a certain point.

The following colour codes are used to indicate conventional signs on maps:

1. **Brown**: land or earth features = contour lines, eroded areas, prominent rock outcrops, sand areas and dunes, secondary or gravel roads.

2. **Light Blue**: water features = aqueducts, canals, furrows and siphons, coastlines, dams, lakes, marshes, swamps, pans, rivers, water towers.

3. **Dark Blue**= national freeways.

4. **Green**: vegetation features = cultivated fields, golf courses, nature and game reserve boundaries, orchards and vineyards, recreation grounds, woodland.

5. **Black**: construction features = roads, tracks, railways, buildings, bridges, cemeteries, communication towers, dam walls, excavations and mine dumps, telephone lines, power lines, wind pumps, wrecks, ruins, trigonometrical beacons, boundaries.

6. **Grey**: construction features = built-up areas, cadastral information.

7. Red: construction features = national, arterial and main roads, lighthouses and marine lights.

8. **Pink**= international boundaries.

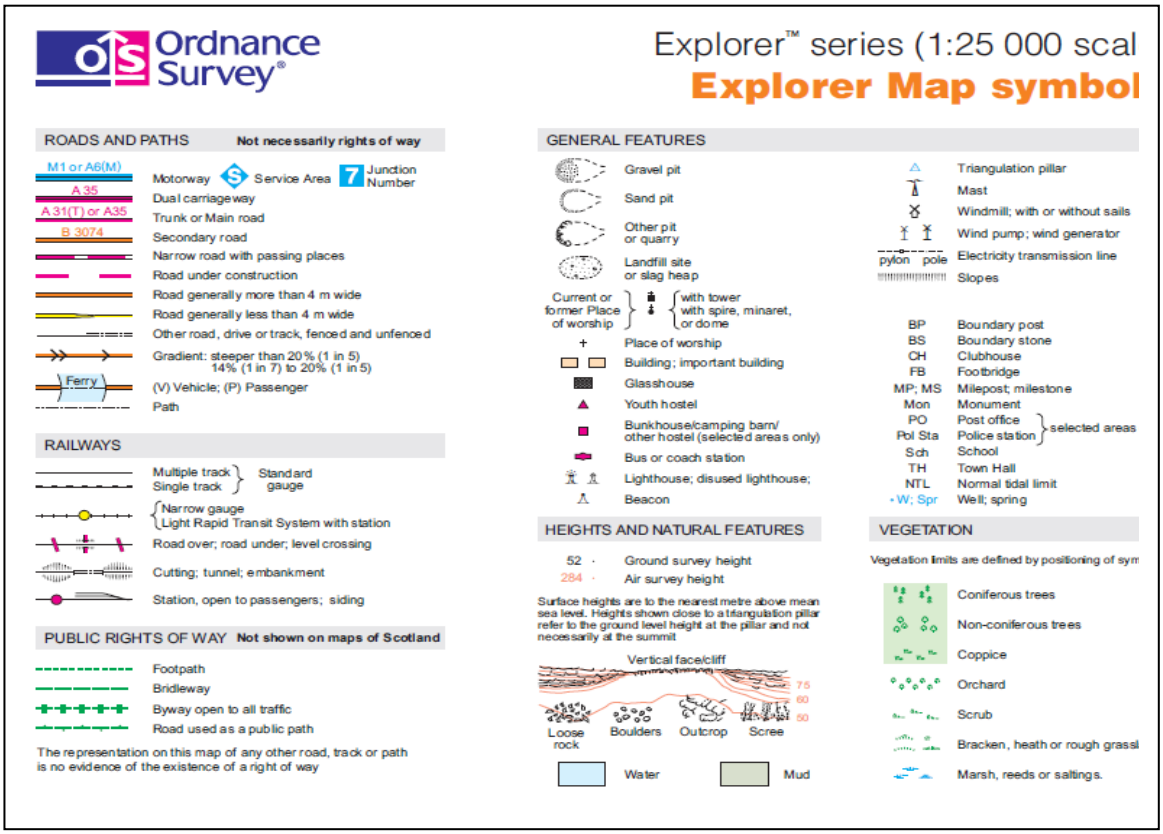
Always remember that grouping map symbols into colours will allow you to remember them easier and it will allow for you to understand the symbols much better!!

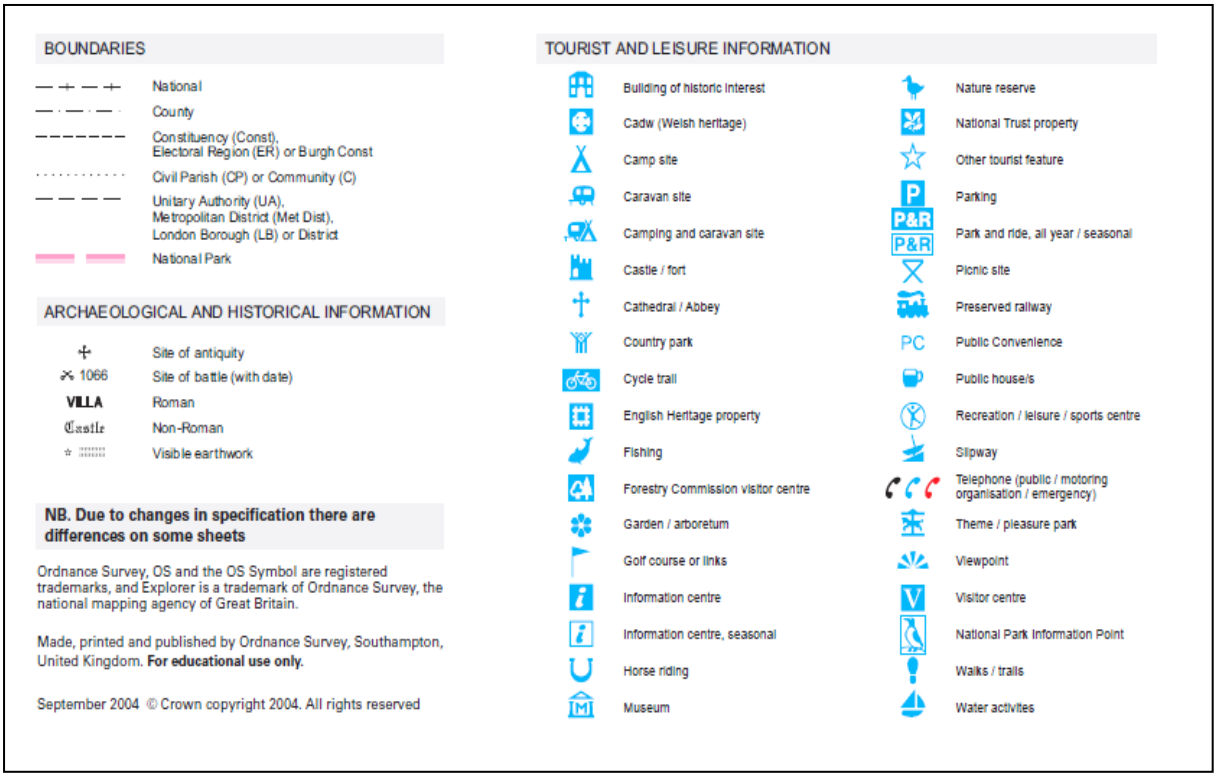
We can also group map symbols into 5 elements:

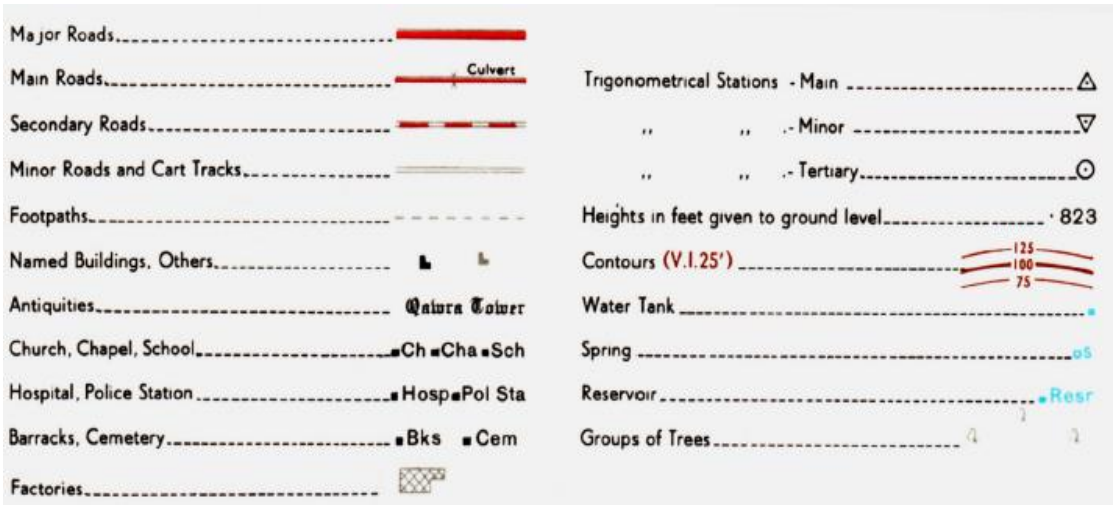
1. **Relief**= contours, spot heights, trigonometrical beacons.
2. **Wate**r= lakes, rivers, waterholes, reservoirs.
3. **Vegetation**= cultivation, orchards and vineyards, forests, plantations, woodland.
4. **Man-made**= communication lines, settlements.
5. **Political**= boundaries.

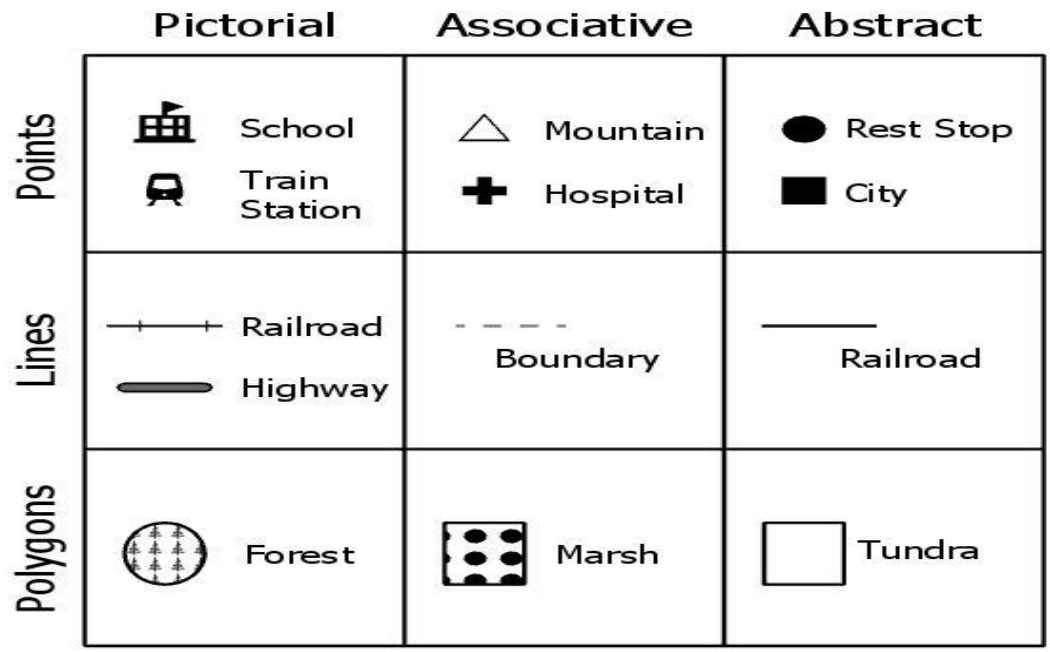
Examples of Symbols used on Maps as Conventional Signs

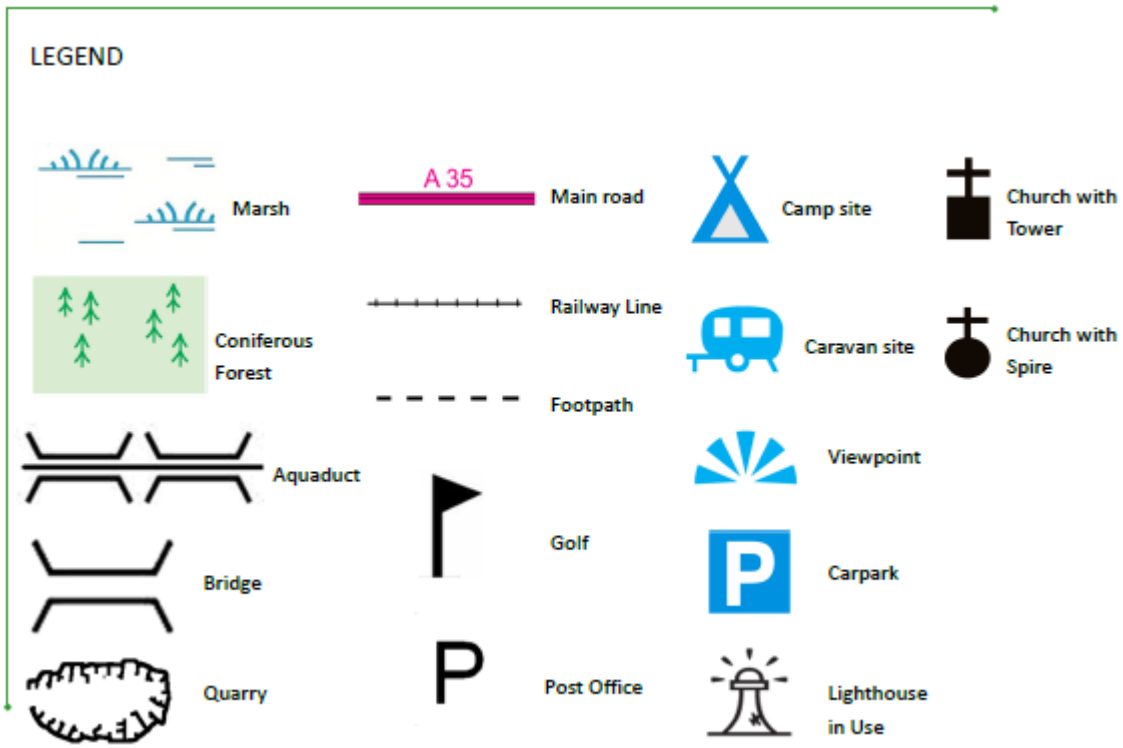
The following are examples of signs that are used on maps as conventional signs.






Major Roads
Main Roads
Culvert
Secondary Roads
Minor Roads and Cart Tracks
Footpaths
Named Buildings, Others
Antiquities
Qaiwa Tower
Church, Chapel, School
Ch Cha Sch
Hospital, Police Station
Hosp Pol Sta
Barracks, Cemetery
Bks Cem
Factories
Trigonometrical Stations - Main
,, ,, - Minor
,, ,, - Tertiary
Heights in feet given to ground level
823
Contours (V.I.25')
125
100
75
Water Tank
Spring
Reservoir
Resr
Groups of Trees


Pictorial
Associative
Abstract
Points
School
Train Station
Mountain
Hospital
Rest Stop
City
Lines
Railroad
Highway
Boundary
Railroad
Polygons
Forest
Marsh
Tundra



Key ideas

- Conventional signs are symbols used on maps to represent different features
- Examples of conventional signs include roads, forest, school

Reflection

- What is the meaning of conventional signs?
- What are some examples of conventional signs?

Discussion

- How has this session improved your understanding of the concepts of conventional signs?
- How has this session enhanced your understanding some examples of conventional signs?

SESSION 4: METHODS OF SHOWING RELIEF FEATURES

In this session, we shall discuss the methods that are used to show relief features on maps. We shall begin by finding out the meaning of relief.

Learning Outcomes

By the end of the session, the participant will be able to:

- define the concept of relief
- state three methods of showing relief on maps

The Concept of Relief

If you look around your environment, you will observe that some parts of the land rise higher than others. This is referred to as relief. Relief refers to the rise and fall of the land or the topography (highlands and lowlands). Let's define two commonly used topographic terms from the outset. *Altitude* or *elevation* refers to the height of the land surface above some arbitrary datum. In many maps, altitude is expressed as the height (once in feet, now in metres) of the land above mean sea-level. *Relief* refers to the *difference* in height between the highest and lowest land surface in a locality. Thus, a high plateau may have a high altitude but a low relief. Similarly, coastal mountains may achieve only a modest altitude but may have great relief.

Methods of Showing Relief on Maps

Attempts to solve the problem of representing relief include the following techniques:

(a) Pictorial representation

(b) Hachures

(c) Benchmarks and spot heights

(d) Contours

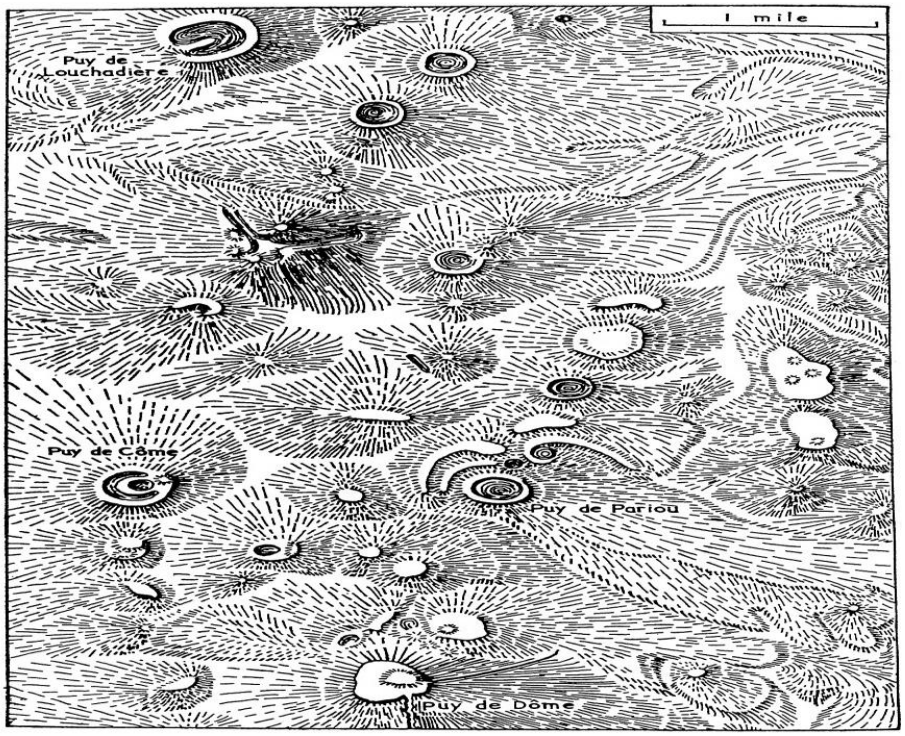
(e) Layer shading and tinting, and

(f) Hill shading

Pictorial representation of the land, as a landscape artist might depict it, was a feature of many early maps. Mountains were painted onto the map and valleys drawn to accommodate rivers. In areas of simple topography, the technique can provide an effective general picture of 'the lay of the land'. In regions of complex topography such as alpine areas, however, the task is overwhelming and the results invariably confusing and certainly obscuring. In any case, the information imparted by this device is purely qualitative; actual altitudes, relief, and slopes have to be derived by eye and imagination, instruments not known for their precision and reliability! The only type of serious mapping in which this technique is used today is marine navigational charts. It is not uncommon, for example, for the approaches to a harbour or a hazard to be shown pictorially or as a silhouette in the margin of the map to assist navigators to identify particular stretches of coastline from offshore. Pictures and silhouettes are not used by themselves, of course, but as information supplementary to other more quantitative descriptions.

Hachures represent an early attempt to portray not only the general lay of the land, but more detailed information on relative slopes as well. They are short parallel lines indicating approximately the direction of surface-water flow from higher to lower ground. On steep slopes the hachures are closely spaced (and sometimes thicker) and are placed further apart as the slope lessens to more gentle inclines. Although hachuring can very effectively depict the major relief features of a region, the technique has several important deficiencies, not the least of which is that they obscure most other information on the map. Furthermore, they tell us nothing quantitative about altitude or relief although attempts were made early in this century to standardize the hachure spacing to reflect slope classes. They are common on 19th century and early 20th century European maps but little use is

made of them on modern maps. Perhaps the one exception is their use in portraying near-vertical slopes such as those encountered at a waterfall or at the walls of a quarry.



Hachures

Benchmarks and spot heights, by themselves do not convey an impression of the lay of the land but they may be used very effectively in combination with other methods such as hachuring and contouring. Benchmarks are accurately surveyed permanent markers (usually a brass disk set in concrete) from which local surveys may originate. Spot heights are points on a map for which elevation has been accurately determined. They are indicated as a dot on the map but they are not monumental or marked on the ground in any way. Their basic function is to augment the information given by contours.

Contour lines represent imaginary lines on the ground along which all points have the same elevation. In other words, if you walked along a contour line your path would be perfectly horizontal. Contours appear on topographic maps as fine brown lines (unless on the surface of a glacier where they are blue), with every fifth contour (called *index contours*) thickened to facilitate reading them. At various places the contour is broken and its height printed in feet or metres above mean sea level. A very useful convention to remember is that, on maps the contour numbers are printed so that they read 'uphill' (the top of the number is on higher ground than the bottom). This printing convention can be very helpful in determining the lay of the land in very low-relief terrain where contours are few and far between.

On some maps of flat areas where the index and intermediate contours do not show sufficient detail, auxiliary contours may be added to the map. These are represented as dashed lines at one-half the contour interval of the map; their accuracy is the same as that for the intermediate and index contours. Contour accuracy depends on the survey methods used (very accurate ground survey or somewhat less accurate photogrammetry) and on the slope of the land. On a topographic map with a 50 ft (~15 m) contour interval, the actual contour height is Representation of relief accurate to ± 25 ft (~8 m).

This height error translates into a contour position displacement that is a function of the slope of the land and the scale of the map. For example, at a scale of 1: 50 000, an 8 m contour height error on a land surface sloping at 20 would correspond to a horizontal contour displacement of 21m on the ground or only about 0.4 mm on the map. At a slope of 50, however, the corresponding contour displacement is 91 m on the ground or about 1.8 mm on the map.

The distinct advantage of contours over other methods of representing relief is that they provide comprehensive quantitative information about the surface of the land without cluttering up the map and obscuring other detail. Their weakness is that they do not convey a picture of regional landform as readily as do hachures or pictorial representations. On balance, however, contours are far superior to any alternative relief- display methods, displacing them on all modern maps.

Although contour maps do not readily yield a picture of the lay of the land to the untrained and unpractised eye, they do come alive for those who have made the effort to learn to 'read' a topographic map. An experienced map reader can pick up any topographic map and quickly translate the contour pattern into a three-dimensional image of the ground with its hills and valleys and ridges and rivers.

We may not quite understand how the brain takes such two-dimensional data and turns them into a real landscape in our 'mind's eye', but we do know that most people have the ability to visualize in this way. But like learning any language, it takes practice. In each case a cross-section A-B has been formed as though a knife had taken a vertical slice through the feature to yield an outline much as the silhouette of the feature would appear against the fading light of dusk. By this means the relation between the slope of the land and the contour spacing on the map may be seen directly. A careful examination of each of the examples will suggest some general rules for contour properties:

(a) Because contours join only points which are the same height above sea level, they can never cross. It is possible, however, that they may touch where the slope is precipitous, as at a near-vertical

(b) Each contour must close so that it is continuous, with neither beginning nor end. This condition may be met on one map or on adjoining sheets, depending on the map scale, contour interval, and the scale of roughness of the land.

(c) Contours tend to parallel adjacent contours. This is another way of stating that, if the contour interval is small enough for a meaningful depiction of the major landform elements, then the slope changes between adjacent contours will be relatively small.

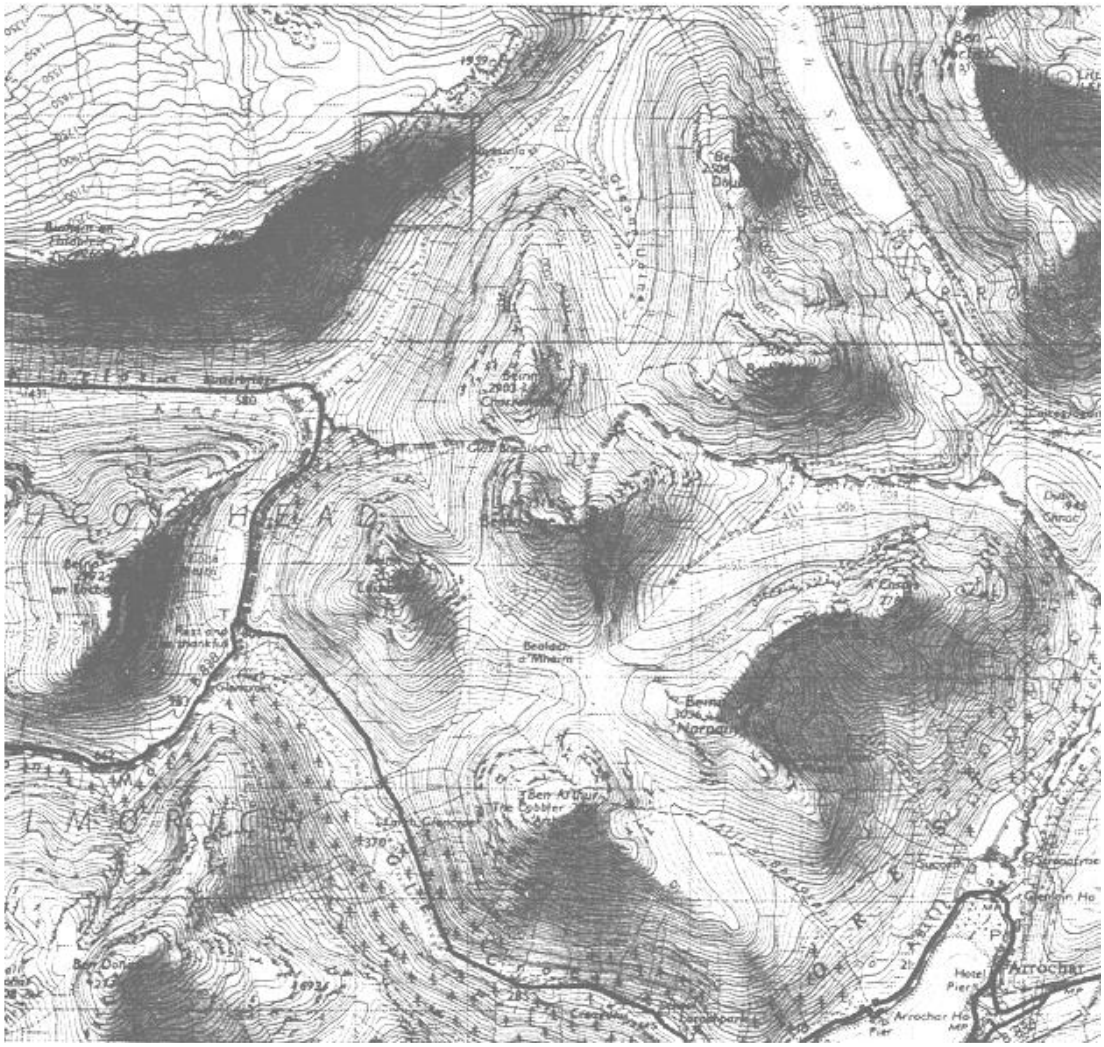
(d) Contours tend to be parallel to major river courses.

(e) Valleys generally are shown by 'V'-shaped contours with the 'V' always pointing upstream and upslope.

(f) Ridges are shown by 'V'- or 'U'-shaped contours with the 'V' or 'U' always pointing downslope. Ridges described by 'V'-shaped contours are characteristic of glacially eroded alpine areas whereas 'U'- shaped contours describe the more rounded ridges of non-glacial erosion.

(g) Contours generally are depicted as smooth curves.

Layer shading and tinting are used in combination with generalized contours to represent relief on small-scale maps where it is impossible to show individual relief features. Layer shading is designed for use on monochromatic (shades between black and white) maps while tinting can be used on coloured maps. In both cases the elevation range on the map is divided into a limited number of classes, assigned a shade or tint, and mapped as such. Most world atlases are replete with examples of this technique of displaying relief.



Layer shading and tinting

Hill shading, a technique borrowed from artists, is used to enhance the three-dimensional appearance of a map by creating the illusion of depth. It records the shadows that might fall over an area if it were illuminated by a light in the northwest. Thus, the southeast sides of hills, which are away from the light, are darkened, the tops of hills and lower slopes are only lightly shaded, and plains are fully illuminated (unshaded).

Key ideas

- Relief refers to the rise and fall of the land or the topography (highlands and lowlands)
- Methods of showing relief on maps include: pictorial representation, hachures, contours, etc.

Reflection

- What is the concept of Relief?
- State three methods of showing relief on maps

Discussion

- How has this session improved your understanding of the concepts of relief?
- How has this session enhanced your understanding of the methods of showing relief on maps?

SESSION 5: DRAINAGE PATTERNS

In this session, we shall introduce you to the various patterns that drainage takes. We shall begin by first defining drainage and a drainage basin before we conclude with the various drainage patterns. We shall also show you diagrams of the various drainage patterns.

Learning Outcomes

By the end of this session, the participant be able to:

- define drainage and drainage basin
- identify four types of streams
- distinguish between a drainage and a drainage basin
- state four drainage patterns

Definition of Drainage and Drainage Basin

In geomorphology, drainage systems are the patterns formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land. Geomorphologists and hydrologists often view streams as being part of drainage basins. A drainage basin is the topographic region from which a stream receives runoff through flow and groundwater flow. It is the catchments area into which drains a river and all those tributaries that flow in their own channels and the millions of the small rills that have their source from rainfall and which flow in countless numbers down each hillside. In other words, it is the entire area or slopes and the low-lying area drained by a river and its tributaries. A drainage system is separated from another by an imaginary line known as watershed or water divide or water parting. The number, size, and shape of the drainage basins found in an area vary and the larger the topographic map, the more information on the drainage basin is available.

Types of Streams

A stream is water that is moving under the gravity downslope in a linear channel of its own making. There are numerous differences in the character of streams that develop in response to the staggering array of structural forms, earth materials, and climatological regions over the earth's surface. However, streams have relationship with certain structural forms that are repeated often enough to produce recognizable patterns that are a part of the natural order in the landscape. The types of streams have been identified as: consequent, subsequent, obsequent, resequent, and insequent streams. Now, let us discuss them together.

Consequent streams: These are streams that follow the original slope of the land, often down-dip are called consequent streams because they flow as a consequence or result of the slope. **Subsequent streams:** These are streams that join the consequent streams at right angles, usually following zone

or area of crustal weakness, frequently along the strike of the bedrock outcrop. **Obsequent** streams generally flow in the opposite direction to consequent streams. They actually form the tributaries of subsequent streams.

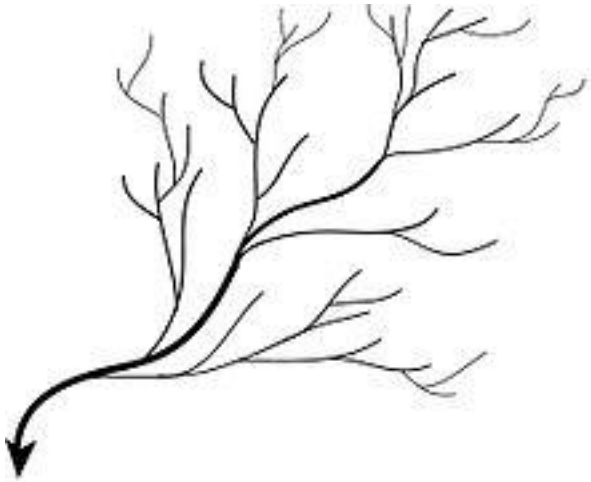
Resequent streams are secondary consequent streams though flow in the same direction as the consequent streams, they develop on slopes at different levels from those originally responsible for the consequent streams whilst **insequent** streams are tributaries characterized by irregular branching in several directions and at any angle though usually less than a right angle. They have little or no relationship with the structure and bedrock control in areas such as those covered by glacial drift, or in areas underlain by permafrost, or they may be simply the initial stages of consequent streams that are developing in areas of limited slope.

Accordant drainage patterns

A drainage system is described as accordant if its pattern correlates to the structure and relief of the landscape over which it flows.

Dendritic drainage pattern

Dendritic drainage systems (from Greek δενδρίτης, *dendrites*, "of or pertaining to a tree") are the most common form of drainage system. In a dendritic system, there are many contributing streams (analogous to the twigs of a tree), which are then joined together into the tributaries of the main river (the branches and the trunk of the tree, respectively). They develop where the river channel follows the slope of the terrain. Dendritic systems form in V-shaped valleys; as a result, the rock types must be impervious and non-porous.



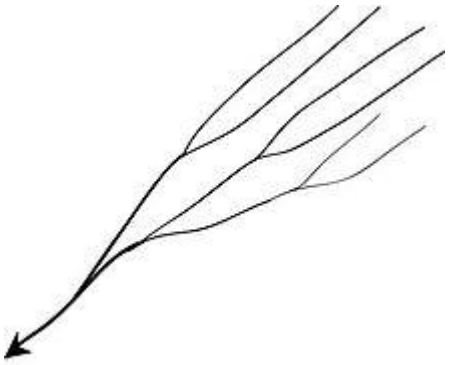
Dendritic drainage pattern

Parallel drainage pattern

A parallel drainage system is a pattern of rivers caused by steep slopes with some relief. Because of the steep slopes, the streams are swift and straight, with very few tributaries, and all flow in the same direction. This system forms on uniformly sloping surfaces, for example, rivers flowing southeast from the Aberdare Mountains in Kenya.

Parallel drainage patterns form where there is a pronounced slope to the surface. A parallel pattern also develops in regions of parallel, elongate landforms like outcropping resistant rock bands. Tributary streams tend to stretch out in a parallel-like fashion following the slope of the surface. A

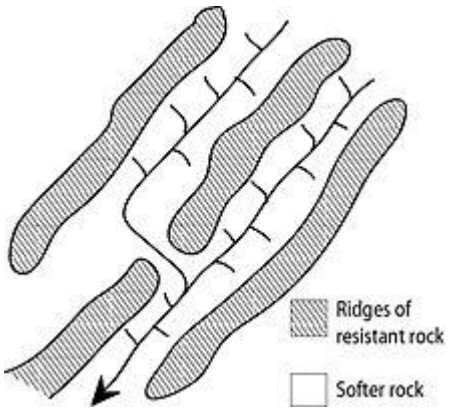
parallel pattern sometimes indicates the presence of a major fault that cuts across an area of steeply folded bedrock. All forms of transitions can occur between parallel, dendritic, and trellis patterns.



Dendritic drainage pattern

Trellis drainage pattern

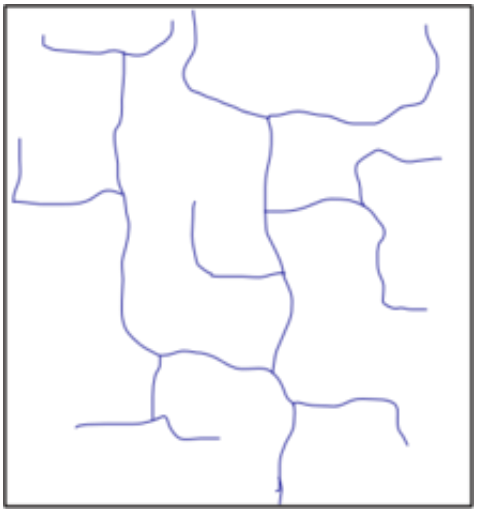
The geometry of a trellis drainage system is similar to that of a common garden trellis used to grow vines. As the river flows along a strike valley, smaller tributaries feed into it from the steep slopes on the sides of mountains. These tributaries enter the main river at approximately 90 degree angle, causing a trellis-like appearance of the drainage system. Trellis drainage is characteristic of folded mountains, such as the Appalachian Mountains in North America and in the north part of Trinidad.



Trelis drainage pattern

Rectangular drainage pattern

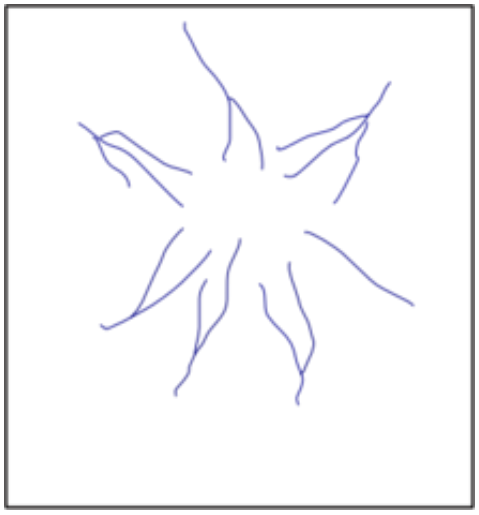
Rectangular drainage develops on rocks that are of approximately uniform resistance to erosion, but which have two directions of joining at approximately right angles. The joints are usually less resistant to erosion than the bulk rock so erosion tends to preferentially open the joints and streams eventually develop along the joints. The result is a stream system in which streams consist mainly of straight line segments with right angle bends and tributaries join larger streams at right angles.



Rectangular drainage pattern

Radial drainage pattern

In a radial drainage system, the streams radiate outwards from a central high point. Volcanoes usually display excellent radial drainage. Other geological features on which radial drainage commonly develops are domes and laccoliths. On these features the drainage may exhibit a combination of radial patterns.



Radial drainage pattern

Deranged drainage pattern

A deranged drainage system is a drainage system in drainage basins where there is no coherent pattern to the rivers and lakes. It happens in areas where there has been much geological disruption. The classic example is the Canadian Shield. During the last ice age, the topsoil was scraped off, leaving mostly bare rock. The melting of the glaciers left land with many irregularities of elevation, and a

great deal of water to collect in the low points, explaining the large number of lakes which are found in Canada. The drainage basins are young and are still sorting themselves out. Eventually the system will stabilize.

Annular drainage pattern

In an annular drainage pattern streams follow a roughly circular or concentric path along a belt of weak rock, resembling in plan a ring-like pattern. It is best displayed by streams draining a maturely dissected structural dome or basin where erosion has exposed rimming sedimentary strata of greatly varying degrees of hardness, as in the Red Valley, which nearly encircles the domal structure of the Black Hills of South Dakota.

Figure 3.11: Annular drainage pattern

Angular drainage pattern

Angular drainage patterns form where bedrock joints and faults intersect at more acute angles than rectangular drainage patterns. Angles are both more and less than 90 degrees.

Discordant drainage patterns

A drainage pattern is described as discordant if it does not correlate to the topology and geology of the area. Discordant drainage patterns are classified into two main types: *antecedent* and *superimposed*, while *anteposition* drainage patterns combine the two.

In ***antecedent*** drainage, a river's vertical incision ability matches that of land uplift due to tectonic forces. During the uplift of a great mountain range, it may happen that a river which was already flowing the side of a mountain continuous to deepen its valley while the uplift is in progress so that the river becomes permanently entrenched in the rising landscape. Such a river is called an antecedent to express the fact that the river was in an existence before the mountain which has river across its course. Examples are found in the Himalayas

***Superimposed* or epigenetic** drainage develops differently: initially, a drainage system develops on a surface composed of 'younger' rocks, but due to denudative activities this surface of younger rocks

is removed and the river continues to flow over a seemingly new surface, but one in fact made up of rocks of old geological formation. The Lake District of Britain is an example.

Key ideas y ideas

- Drainage systems are patters formed by the streams, rivers, and lakes in a particular drainage basin.
- Drainage basin is the topographic region from which a stream receives runoff through flow and groundwater flow.
- The types of streams include: consequent, subsequent, obsequent, and resequent
- The types of drainage patterns include: dendritic, accordant, trellis, rectangular, etc.

Reflection

- What is the meaning of a drainage and a drainage basin?
- State the difference between drainage basin and a drainage.
- State four types of streams
- State four drainage patterns

Discussion

- How has this session improved your understanding of drainage basin and a drainage?
- How has the session helped you better understand the difference between a drainage and a drainage basin?
- How has this session enhanced your understanding of the types of streams?
- how has this session helped you better understand the types of drainage patterns?

SESSION 6: THE MEANING OF NATURAL DISASTER

In this session, we shall look at the meaning of natural disaster. We shall also look the impact of natural disasters on socio-economic development. Can you mention few? Keep on reading.

Learning Outcomes

By the end of this session, the participant will be able to:

- define natural disaster
- state three examples of natural disasters
- state three impacts of natural disaster

The Meaning of Natural Disaster

Natural disasters such as earthquakes, hurricanes, floods, and droughts spring to mind when the word "disaster" is mentioned. But a disaster should be defined on the basis of its human consequences, not on the phenomenon that caused it. An earthquake, for example, is simply an event in nature. Even a very strong one is not a disaster unless it causes injury or destroys property. Thus, an earthquake occurring in an uninhabited area is only of scientific interest and is not considered a disaster. When a natural event does affect a human settlement, the result may still not be a major disaster. Consider the earthquake that struck San Fernando, California, in 1971. The earthquake

registered 6.4 on the Richter scale, yet the region around San Fernando Valley (with a population of over seven million people) suffered only minor damage and 58 deaths. Two years later, though, an earthquake of a magnitude of 6.2 struck Managua, Nicaragua, and reduced the centre of the city to rubble, killing an estimated 6,000 people.

A disaster can be more precisely defined as an occurrence of widespread severe damage, injury, or loss of life or property with which a community cannot cope and during which the society undergoes severe disruption. While some developed nations may be as prone to disasters as poor nations, the people of wealthier nations are not as vulnerable to disasters; they do not die in as large numbers nor does their environment collapse as easily. Rapid population growth, urban migration, inequitable patterns of land ownership, lack of education, subsistence agriculture on marginal lands, etc. lead to vulnerable conditions such as unsafe siting of buildings and settlements, unsafe homes, malnutrition, unemployment and underemployment, illiteracy, etc. The poor within the poor countries are the most vulnerable.

A natural disaster is a major adverse event resulting from natural processes of the earth; examples include floods, volcanic eruptions, earthquakes, tsunamis, and other geologic processes. A natural hazard becomes disastrous when human systems fail to cope with its social, economic and physical impacts. While some natural hazards will become more severe as a result of global climate change, the root causes of a disaster remain underlying vulnerability and lack of resilience in human systems. The impacts of natural disasters on men, women and their communities depend in large part on earlier development choices and the extent to which capacities to reduce and mitigate known risks have been created and sustained. Human causes of disaster vulnerability can be classified according to a geographic scale.

Global: Anthropogenic climate change, population movements, and demographic change.

National and regional: poor governance, civil war, landlessness and tenure insecurity, economic policies, epidemic disease and urbanisation.

Community and local: Unsustainable land use, chronic hunger, poorly constructed buildings and poor urban planning. These causes of disaster vulnerability relate to land use, planning and tenure in a number of respects. The impact of natural disasters on land and human land use is shaped by the nature of vulnerability within a particular land governance context. Addressing land issues after a natural disaster can promote disaster resilience by providing (1) secure access and rights to land, especially land for shelter and livelihoods; and (2) effective land use and settlement planning, particularly so as to build back better and safer after a disaster.

Examples of Natural Disaster

Natural disasters come in diverse form depending on the impact they have on human activities. Below are examples of natural disasters and the impact they have on human activities. Let us begin with earthquake, continue with tsunamis, volcanoes, tropical cyclones, floods, and end with drought.

Earthquakes

An earthquake is the result of a sudden release of built up stress in the lithosphere. It occurs along faults. Sometimes the stress produces new faults or it causes breaks in the lithosphere. It sometimes

causes slipping along old and existing faults. When movement along faults occurs gradually and relatively smoothly it is called creep. Creep is sometimes called a seismic slip. This can be inconvenient but it does not cause serious damage. When the stress at last exceeds the rupture strength of the rock, a sudden movement occurs to release the stress. This is an earthquake or seismic slip.

With a sudden displacement to an associated stress release, the rocks snap back elastically to their previous dimensions. This behaviour is called elastic rebound. Earthquakes come in all sizes, from tremors, so small that even sensitive instruments cannot detect them, to massive shocks that can level cities. The amount of damage associated with an earthquake is partly a function of the amount of the accumulated energy released as the earthquake occurs. It must be noted that the point on the fault at which the first movement or break occurs during an earthquake is called the focus or the hypocentre. The point on the earth surface directly above the focus is called the epicentre.

There are three identifiable types of earthquake movements or shock waves. The P wave is the fastest moving wave, traveling at about five kilometres a second, (three miles a second). Having the characteristic of sound waves, it moves longitudinally, creating a "push-pull" effect on the rock as it passes. The S, or shear wave, travels about three kilometres a second (two miles a second) near the surface, causing the earth to move in right angles to the direction of the wave. An example of this kind of motion is a rope snapped like a whip. The waves move the length of the rope, but the actual motion is at right angles. The L, or long wave, is a slow surface wave. These long-period waves cause swaying of tall buildings and slight wave motion in bodies of water at great distances from the earthquake centre. The different rates of travel between the P and S waves produce two separate shocks. The farther from the centre, the longer is the time lag between the different shocks.

A major earthquake is never an isolated phenomenon. The violent and destructive main shocks may be preceded by preliminary tremors or foreshocks, which are less severe and few in number, but important to study in order to predict the destructive shocks and take protective measures. Sometimes seismic activity in a region increases gradually in intensity up to a climax. Then there are aftershocks, which are belated shocks of decreasing intensity occurring at increasing intervals. The disturbance may last for months or years, keeping the threatened population in a state of anxiety. This may cause them to evacuate the area.

The main shock rarely lasts even a minute in any local area. Generally, the duration is only several seconds, although to people experiencing it the time seems much longer. Strong shaking from a major shock frequently lasts only 30-60 seconds. The major shock of the 1906 San Francisco earthquake lasted only 40 seconds. However, the major shock of the Alaska earthquake lasted 3-4 minutes.

The severity of an earthquake can be expressed in several ways. The magnitude of an earthquake, as expressed by the Richter scale, is a measure of the amplitude (total range of fluctuation) of the seismic waves. Do you know why it is called so? Well, it was named after a geophysicist, Charles Richter who developed it. Magnitude is related to the amount of energy released – an amount that can be estimated from seismograph recordings. The intensity, as expressed by the modified Mercalli scale, is a subjective measure that describes how severe a shock was felt at a particular location. Damage or loss of life and property is another, and ultimately the most important, measure of an earthquake's

severity. The Richter scale is the best-known scale for measuring the magnitude of earthquakes. The scale is logarithmic so that a recording of 7, for example, indicates a disturbance with ground motion 10 times as large as a recording of 6. A quake of magnitude 2 is the smallest quake normally felt by humans. Earthquakes with a Richter value of 6 or more are commonly considered major in magnitude.

The modified Mercalli scale expresses, in values ranging from I to XII, the intensity of an earthquake's effects in a given locality. The most commonly used adaptation covers the range of intensity from the condition of "I. – Not felt except by a very few under especially favourable conditions," to "XII. – Damage total. Evaluation of earthquake intensity can be made only after eyewitness reports and results of field investigations are studied and interpreted.

Tsunamis

A tsunami is a sea wave that may become one or more massive waves of water as it makes landfall. These sea waves are often called popularly "tidal waves," but this is a misnomer. They are not caused by tidal action of the moon and sun like the regular ocean tides. Rather, they are long water waves generated by sudden displacement of the land under water, the most common cause of significant tsunamis being the sudden displacement along a submarine fault, caused by an earthquake. Submarine volcanic eruption and large submarine landslides may also cause a tsunami. In short, a tsunami is a natural hazard generated or created by other natural hazards, that is, a secondary effect of other natural hazards that can potentially have far greater impact on a population than the original hazard event.

Tsunamis are believed to originate as vertically displaced columns of ocean water. Seismic or volcanic action on the ocean floor may cause tsunamis by creating a pulse or force on a wall of water equal to the depth of the ocean at the point of the movement. Tsunamis spread outwards in all directions from the point of origin, traveling at a speed proportional to the square root of the depth of water and reaching 1,000 kilometres per hour (600 miles per hour) in the deep ocean. The distance between successive wave crests may be as much as 500 kilometres (310 miles). As the waves reach coastal areas, this speed decreases, though the interval of time between the passage of successive waves remains unchanged (usually between 20 and 40 minutes). A single tsunami may comprise up to 12 large wave crests.

Volcanoes

Over a time span longer than human record, volcanoes have played a key role in forming and modifying the planet upon which we live. More than 80 percent of the earth's surface—above and below sea level—is of volcanic origin. Gaseous emissions from volcanic vents over hundreds of millions of years formed the earth's earliest oceans and atmosphere, which supplied the ingredients vital to evolve and sustain life. Over geologic eons, countless volcanic eruptions have produced mountains, plateaus, and plains, which subsequent erosion and weathering have sculpted into majestic landscapes or reduced to fertile soils. Ironically, these volcanic soils and inviting terrains have attracted, and continue to attract, people to live on the flanks of volcanoes. Thus, as population density increases in regions of active or potentially active volcanoes, an awareness of the hazards must increase so people will learn not to "crowd" the volcanoes. People living in the shadow of volcanoes must live in harmony with them, expecting and planning for periodic violent unleashing of their pent-up energy.1

A volcano is a vent or chimney to the earth's surface from a reservoir of molten matter, known as magma, in the depths of the crust of the earth. The material ejected through the vent frequently accumulates around the opening, building up a cone, called the volcanic edifice. The tallest mountains on earth are volcanic edifices. The term volcano includes both the vent and the accumulation (cone) around it.

Volcanic eruptions vary between two extremes. In one, the lava rises more or less quietly to the surface and overflows the lip of the crater. The gases bubble through the lava and escape undramatically, or, in some instances, rush out with sufficient force to form lava fountains hundreds of meters in height. Nevertheless, the lava is not disrupted but flows away as a river of lava, with little resulting damage except to objects in the path of its flow. On the other extreme, tremendous explosions occur in the chimney, and as the lava rises into zones of less pressure it "froths" and is ejected in the form of ash and pumice. Thus, in these volcanoes the molten rock never reaches the surface as a liquid (lava) but is disrupted and ejected as ash. The explosions are sometimes so severe that they disrupt the cone, frequently blowing away large sections of it and spreading the debris over the countryside. The essential difference in the two types is in the gas content and the manner in which the gas is released when the molten rock reaches the surface. Another factor is the chemical composition of the magma. The great majority of the volcanoes of the world are intermediate between the two extremes described, yielding both lavas and fragmental products.

Tropical Cyclones

Cyclones are among the most awesome events that nature can produce. They pose a major threat to lives and property in many parts of the world. Every year these sudden, unpredictable, violent storms bring widespread devastation to coastlines and islands lying in their erratic paths. A windstorm's destructive work is done by the high wind, flood-producing rains and associated storm surges.

As the sun warms the oceans, evaporation and conduction transfer heat to the atmosphere so rapidly that air and water temperatures seldom differ by more than 1 degree F. The water vapor generated by such evaporation is the fuel that drives a tropical storm, because as the vapor condenses into clouds and precipitation it pumps enormous amounts of heat into the cyclone. The fuel supply is controlled by the evaporation rate—which explains why cyclones cannot develop when the ocean temperature is below about 24 degrees Centigrade (76 degrees F).

The frequent products of this mix of heat and moisture are several thunderstorms that can become the seedling for a tropical cyclone—but it must be nurtured further. The trigger for most Atlantic hurricanes is an easterly wave, a westward-migrating low-pressure centre that may have begun as an African thunderstorm. Typhoons in the Pacific and Indian oceans, and a few hurricanes in the Atlantic, emerge from waves in the equatorial trough, the calm, cloudy doldrums that separate the trade winds of the two hemispheres. To develop and mature into a tropical storm, storm seedlings must overcome many obstacles. In fact only about nine of the more than 1000 seedlings tracked each year in the Atlantic will evolve into gale-force tropical storms or full-fledged cyclones.

The sole difference between harmless thunderstorms and a dangerous cyclone is the rotation that organizes weather systems. This spin, which meteorologists call vorticity, is ever-present in temperate latitudes, where the Coriolis effect of the earth's rotation is pronounced. But in the tropics,

the weak Coriolis effect must be augmented by the wind itself. (The Coriolis effect is the force caused by the earth's rotation that deflects a moving body to the right in the Northern Hemisphere and to the left in the Southern Hemisphere). When two wind currents move side by side, the faster current tends to curl around the slower one.

If the faster current is on the right (viewed from upwind), the curl is to the left, yielding positive vorticity in the Northern Hemisphere because it adds to the counter clockwise Coriolis effect; a right-hand curl creates negative vorticity. A curving wind also possesses vorticity— positive for a left-hand turn, negative for a right turn. When positive vorticity becomes strong enough to spin a storm seedling, it starts a chain reaction. The thunderstorms, not revitalized by a steady influx of warm, moist air, organize around a deepening low-pressure centre, called a tropical depression. This dramatically increases the likelihood of cyclone formation; fully 70 percent of these depressions develop into cyclones.

The depression becomes a tropical storm when its winds reach gale force, 62 kilometres per hour (40 miles per hour). The storm often already has as much total energy as a cyclone, but its winds are widely distributed and hence much slower; the ring of maximum wind may be as much as 320 kilometres (200 miles) across. The final step to cyclone status merely concentrates this energy. As pressure falls at the storm centre, the ring of maximum wind contracts dramatically, until it is perhaps 50 kilometres (30 miles) in diameter. Outside this circle the velocity drops rapidly.

Floods Introduction

People have long been attracted to floodplains. Here rivers deposit the topsoil picked up elsewhere, so the land is fertile. Floodplains are both flat and near water, so irrigation, ploughing and transport (usually aided by the river) are all made easier. The heavy settlement along the lower reaches of Egypt's Nile, India's Ganges, Bangladesh's Brahmaputra-Padma, the Yellow River and Yangtze of China, and the Tigris and Euphrates of Iraq are all examples of floodplain civilizations. Floodplains are desirable places to live, not only in agricultural societies, but also in industrial countries where the floodplains often host large capitals that use the river water for industry and its mouth as a harbour for shipping.

The floodplain of a river is a clearly definable physical feature of its valley. It is the almost flat area that borders the river. A floodplain is built up of layers of sediment deposited by the river when it periodically overflows its normal banks. Steep narrow valleys in mountain regions have no floodplains at all, but a large complex system of converging rivers in a lowland region may have a floodplain over a hundred kilometres wide. There is a natural tendency for a river to deposit sediment in its channel during times of low flow, so that equilibrium is arrived at where the river comfortably fills its main channel under normal conditions. Therefore the river will spread out automatically onto its floodplain during periods of high flow—after all, floodplains are for floods.

A flood is too much water in the wrong place, whether it is an inundated city or a single street or a field flooded due to a blocked drain. Among the trigger mechanisms are dam or levee failures; more rain than the landscape can dispose off the torrential rains of hurricanes; tsunamis; ocean storm surges; rapid snow melts; ice floes blocking a river; and burst water mains. Flooding is generally defined as any abnormally high stream flow that overtops the natural or artificial banks of a stream.

Flooding is a natural characteristic of rivers. The floodplains are normally dry land areas. They are an integral part of a river system that act as a natural reservoir and temporary channel for flood waters. If more runoff is generated than the banks of a stream channel can accommodate, the water will overtop the stream banks and spread over the floodplain. The ultimate factor of damage, however, is not the quantity of water being discharged but how high the water goes above normal restraints or embankments. Furthermore, floods can form where there is no stream, as for example when abnormally heavy precipitation falls on flat terrain at such a rate that the soil cannot absorb the water or the water cannot run off as fast as it falls.

Of all the disasters except droughts, flood disasters affect the most people. But there are many more flood disasters than droughts, and the number affected by floods is increasing much more rapidly than those suffering droughts. In fact, flooding is one natural hazard that is becoming a greater threat rather than a constant or declining one. Floods are caused not only by rain but also by human changes to the surface of the earth. Farming, deforestation, and urbanization increase the runoff from rains; thus storms that previously would have caused no flooding today inundate vast areas.

Not only do we contribute to the causes of floods, but reckless building in vulnerable areas, poor watershed management, and failure to control the flooding also help create the disaster condition. All of the earth's water (including the atmosphere) is part of a system referred to as the hydrological cycle. Beginning with the moisture in the air, water vapor enters the atmosphere by evaporation from bodies of water and by transpiration (the giving off of water vapor) from plants and trees. Once aloft, the moisture cools and collects into clouds as it rises higher into the atmosphere. When temperature and moisture content reach the proper stage, the vapor in the clouds condenses, and the water in the clouds falls to the earth as rain or snow.

Once returned to the surface, the water may evaporate again rapidly, or it may soak down into the earth and remain as groundwater for thousands of years until at last it again finds its way to an outlet. But regardless of where the precipitation falls, or how long it remains, eventually it is recycled. At any given moment, only about .005 percent of the earth's estimated 1,360 million cubic kilometres of water is actively involved in the hydrological cycle. But because of fluctuations in the cycle, the actual amount of water available to various regions of the world can vary dramatically, often bringing searing drought or devastating flood.

Flood can be classified into different types. For example, flash floods are local floods of great volume and short duration. A flash flood generally results from a torrential rain or "cloudburst" on relatively small and widely-dispersed streams. Runoff from the intense rainfall results in high flood waves. Discharges quickly reach a maximum and diminish almost as rapidly. Flood flows frequently contain large concentrations of sediment and debris. Flash floods also result from the failure of a dam or from the sudden breakup of an ice jam. Flash floods are particularly common in mountainous areas and desert regions but are a potential threat in any area where the terrain is steep, surface runoff rates are high, streams flow in narrow canyons, and severe thunderstorms prevail. Riverine floods are caused by precipitation over large areas or by melting of the winter's accumulation of snow, or by both. These floods differ from flash floods in their extent and duration. Whereas flash floods are of short duration in small streams, riverine floods take place in river systems whose tributaries may drain large geographic areas and encompass many independent river basins.

Floods on large river systems may continue for periods ranging from a few hours to many days. Flood flows in large river systems are the distribution of precipitation. The condition of the ground (amount of soil moisture, seasonal variations in vegetation, depth of snow cover, imperviousness due to urbanization, etc.) directly affects runoff. In most cases the most devastating flooding from rainfall is that associated with tropical cyclones. Catastrophic flooding from rainfall is often aggravated by wind-induced surcharge along the coastline. Rainfall intensities are high and the area of the storm is broad-based; these two factors together are capable of producing extreme flood discharges in both small and large river basins.

The size of catchment area usually governs the character of flooding. On very large rivers, such as the Nile and the Mekong, river flow is relatively slow to change in the downstream reaches. Flood waters are, therefore, mostly a combination of numerous and widespread rainfall events possibly with considerable snow-melt contribution. In large river basins, flooding is usually seasonal and of major significance. Peak discharges are maintained over a relatively long period of days or even weeks.

Drought

Drought has long been recognized as one of the most insidious causes of human misery. It has today the unfortunate distinction of being the natural disaster that annually claims the most victims. Its ability to cause widespread misery is actually increasing. While generally associated with semi-arid climates, drought can occur in areas that normally enjoy adequate rainfall and moisture levels. In the broadest sense, any lack of water for the normal needs of agriculture, livestock, industry, or human population may be termed a drought. The cause may be lack of supply, contamination of supply, inadequate storage or conveyance facilities, or abnormal demand. Drought, as commonly understood, is a condition of climatic dryness that is severe enough to reduce soil moisture and water below the minimums necessary for sustaining plant, animal, and human life. Drought is usually accompanied by hot, dry winds and may be followed by damaging floods.

Drought differs from other natural disasters in its slowness of onset and its commonly lengthy duration. Before the rise of modern water-consuming cities, drought was an agricultural disaster. Now, with cities having expanded faster than water supplies can be made available, the spectre of drought faces both the farmer and the urban dweller. Shifts in atmospheric circulation, which cause drought, may extend for time scales of a month, a season, several years or even a century. The latter might be termed a climatic shift, but the effect on humans and their environment is equally great. Because of the economic and environmental importance of drought, determined efforts are being made to solve the problem of prediction of the atmospheric circulation patterns that produce droughts.

Causes of drought

Widespread and persistent atmospheric calm areas called subsidence, which do not cause precipitation. These areas result from the present-day atmospheric circulation, which tends to create subsidence in the subtropical latitudes of both hemispheres. Also, localized subsidence induced by mountain barriers or other physiographic features. Most of such areas lie in the lee of mountains across the westerly belts. They are hence in mid-latitudes. The dryness is caused by the warming of westerly currents as they descend east of the summits. This allows them to hold moisture and carry it away. Furthermore, absence of rainmaking disturbances causes dry weather even in areas of moist

air. In general, rain is caused by the travel of organized disturbances across a region—i.e., systems that involve actual uplift of humid air.

Thus, the aridity of the Mediterranean summer, though in part due to subsidence, arises mainly from the absence of cyclonic disturbances that bring the rains of winter. There is plenty of water in the air, but nothing to bring it down as rain. Finally, absence of humid airstreams can result in drought. The relationship between the water available for precipitation (precipitable water) and the precipitation that actually falls is by no means simple. As we have just seen, dry weather may be prolonged in areas of high humidity. In addition to having rainmaking atmospheric disturbances, regions of abundant rainfall must have access to humid airstreams. Some inner-continental regions are quite remote from such sources. These four causes are interdependent, but their relative effect depends on season and locality.

One can broadly distinguish between: 1. Almost continuously dry climates, leading to desert surface conditions, in which there is no season of appreciable rainfall; 2. Semi-arid or sub-humid climates with a short wet season in which humid airstreams or rainmaking disturbances penetrate; 3. The rare sub-humid areas in which rainfall is infrequent but not confined to a special season. Human activities also contribute to the development of drought conditions. Overgrazing, poor cropping methods and improper soil conservation techniques often contribute to creating the drought.

Impacts of Natural Disaster

Different types of disasters have different effects on land and land tenure. Hydro-meteorological hazards such as floods and tsunamis may leave large amounts of land uninhabitable through long-term inundation. Seismic events may destroy land through land slips, leaving other areas too unstable for safe habitation. High wind events have relatively little physical impact on land, but displace large numbers of people and destroy much of their housing. In addition to the physical impacts, the social and economic impacts of disasters are also often catastrophic. Natural disasters can fragment family structures and force new roles and responsibilities on remaining individuals. Perceived scarcity of usable land can create insecurity and conflict within and between communities.

Disasters may economically isolate communities, restricting their access to markets and requiring them to diversify their income-generating activities. Natural disasters disproportionately affect vulnerable groups such as women, children, youth, the elderly and disabled people by undermining traditional assistance and support systems and coping strategies. The impacts of natural disasters on affected communities depend in large part on prior development choices and the extent to which capacities to reduce and mitigate known risks have been created and sustained. Displacement occurs when victims of disaster leave their homes in order to avoid the effects of disaster. Displacement-related land issues tend to increase in severity in accordance with the distance people are displaced from their homes, the duration of their absence and the degree of tenure security they have prior to – or after – displacement.

The effects of droughts can be divided according to the primary or immediate effects, and the secondary or resulting effects. Primary effects of drought result from a lack of water. As a dry period progresses and water supplies dwindle, existing water supplies are overtaxed and finally dry up. The primary losses are loss of crops, loss of livestock and other animals, and loss of water for hygienic use and drinking. The secondary effects of drought follow and result from the primary effects. As

water supplies dwindle and crops and fodder are depleted, families begin to migrate in search of better grazing lands for their herds or move to the cities to seek jobs and alternative sources of income.

If the dwindling supplies of food are not replaced, famine can occur, further accelerating the migration out of the stricken areas to less affected zones. The migration may, in itself, contribute to spreading the scope of the disaster, especially if grazing animals are moved with the people. If drought is long term, it may result in permanent changes of settlement, social, and living patterns. Secondary effects of droughts also include major ecological changes, such as increased scrub growth, increased flash flooding and increased wind erosion of soils. Of these, desertification is the most concern.

Earthquakes cause the ground to shake and there is considerable structural damage. The amount of ground shaking is related to the magnitude of the earthquake.

The destructive power of tsunamis derives from the fact that the amplitude of the waves, which is usually less than one meter (three feet) in the deep ocean, increases sharply as the waves reach shallow water near the coast, and may be further enhanced by funnelling or resonance effects on bays and estuaries. In extreme cases, wave heights may reach as much as 20 or 30 meters (65 or 100 feet). In such cases, waves may sweep a considerable distance inland.

The severity of disaster impacts such as destruction, displacement and death is shaped by underlying vulnerability related to weak land governance. Emergency shelter in the context of displacement or relocation may give rise to further risks in situations where sites are poorly planned or located, when local communities are not sufficiently consulted, or when emergency shelter becomes long-term in nature without the inhabitants being granted secure rights to land and associated natural resources.

Key ideas

- A natural disaster is a major adverse event resulting from natural processes of the earth.
- Some examples of natural resources include flood, volcanic eruptions, earthquakes, etc.
- The severity of natural disaster such as drought can result from a lack of water

Reflection

- What is the meaning of natural disaster?
- What are some examples of natural disasters?
- What are some of the impacts of natural disasters?

Discussion

- How has this session improved your understanding of natural disaster?
- How has the session helped you better understand the examples of natural disaster?
- How has this session enhanced your understanding of the impacts of natural disaster?

UNIT 4: LAW AND ORDER IN OUR COMMUNITY

You are welcome to unit 4. How did you see unit 3? Well! I believe it was a memorable encounter? In this unit, we shall look at the meaning of law and order. We shall also discuss the sources of laws as well as features of a good law. We shall continue with ways of maintaining law and order. But before that let us ask you this question: do you obey laws that govern you in your community? If your answer is yes, then what make you obey them? This unit shall also end by taking you through the benefits of law and order in our society. Enjoy your reading.

Learning Outcomes
By the end of the unit, the participant be able to

- distinguish between law and order
- explain the sources of laws
- state the features of a good law
- state the ways of maintaining law and order
- explain ways of disturbing law and order
- examine the benefits of law and order

SESSION 1: MEANING OF LAW, ORDER AND RULES

Law and order are used as a singular noun because they are seen as the two sides of a coin or they join together as one. In this session, we shall look at the meaning of law and order. We shall also look at how law and order is maintained.

Learning Outcomes
By the end of this session, the participants be able to:

- define law, order and rules
- state two differences between law and rules

Definition of Law, Order, and Rules
The law and the legal system are very important in any civilization. In modern times, no one can imagine a society without law and a legal system. Law is not only important for an orderly social life but also essential for the very existence of mankind. Therefore, it is important for everyone to understand the meaning of law. We believe there are laws that govern your community and school? Good! How will you define the laws? Well, Jurists and legal scholars have not arrived at a unanimous definition of law. The problem of defining law is not new as it goes back centuries. However, some jurists consider law as a 'divinely ordered rule' or as 'a reflection of divine reasons'. In a layman's language, law can be described as a system of rules and regulations which a country or society recognizes as binding on its citizens, which the authorities may enforce, and violation of which attracts punitive action.

These laws are generally contained in the constitutions, legislations, judicial decisions etc. of a nation. Law has also been defined from philosophical, theological, historical, social and realistic angles. It is because of these different approaches, that different concepts of law and consequently various schools of law have emerged. There are many definitions of law given by various jurists. Some of the important definitions of law are as follows: The ancient Greek Philosopher Aristotle (247 BC – 314BC) defined law 'as an embodiment of reasons whether in individual or the community' whilst British philosopher Jereny Benthan defined law as 'A collection of signs declarative of volition conceived or adopted by the sovereign'. Others defined it as a body of rules determined and enforced by a sovereign political authority, and a system of rules, a union of primary and secondary rules.

On the basis of the definitions of law as provided by jurists and legal philosophers over time, one can understand that there cannot be a universally accepted definition of law as different schools of thought are characteristically different in their approach. For example, the positive school does not consider moral values as part of the law, while the natural law school considers law and morality as inseparable. Law as used in the phrase "law and order" refers to condition of society brought about by following or observing laws or rules. Order in the phrase means absence of revote, disturbance and confusion. It can also be explained as situation that exists when people live together peacefully rather than fighting or causing trouble. We see clearly from the separate meanings of law and order that they are, so to speak, two in one or the head and tail of the same coin. Why this? The answer is simple and straight forward. This is because the condition that is brought to any community when people observe or follow the rule is the absence of disturbance or the situation where people live together peacefully.

Differences between Rules and Laws

The main difference between rules and laws is the consequences associated with breaking them. While each is developed to invoke a sense of order, fair play, and safety, the weight of a law is much heavier than the weight of a rule. Laws are like the legal version of rules. We believe that when you were a child, your parents set rules for you to follow. When those rules are broken, the consequences tend to be uncomfortable but mild in comparison to the breaking of a law. Laws are enforced by a higher governmental office, usually the police and the prosecutor's office. Laws are written in specific code so that they can be interpreted as needed. When you break a law there is legal action that follows, provided that you are caught. Laws must be passed through due process in order to take effect. One of such fundamental process is that a law must start off as a bill, and must go through a series of checks, balances, and votes in order to become a law. Rules are merely set and adjusted as the need arises, and should be followed out of respect for those setting the rules.

Key ideas

- A law is a system of rules and regulations which a country or society recognizes as binding on its citizens, which the authorities may enforce, and violation of which attract punitive action.
- Order is the situation that exists when people live together peacefully rather than causing trouble
- Rules are merely set and adjusted as the need arises, and should be followed out of respect for those setting the rules
- The difference between laws and rules is the consequences associated with breaking them.
-

Reflection

- What is the meaning of law, order, and rules?
- What are the differences between law and rules?

Discussion

- How has this session improved your understanding of law, order, and rules?
- How has the session helped you better understand the differences between law and rules?

SESSION 2: SOURCES OF LAW

In this session, we shall be discussing an important aspect of law. This is sources of laws.

Learning Outcomes
By the end of this session, the participant be able to

- state two sources of law
- explain two kinds of legislation

Sources of Laws
Some of these avenues have been discussed below.

Formal Sources of Law: These are the sources from which law derives its force and validity. A law enacted by the State or Sovereign falls into this category.

Material Sources of Law: It refers to the material of law. In simple words, it is all about the matter from where the laws are derived. Customs fall in this category of law. However, if we look around and examine the contemporary legal systems, it may be seen that most legal systems are based on legislations. At the same time, it is equally true that sometimes customs play a significant role in the legal system of a country. In some of the legal systems, court decisions are binding as law. On the basis of the above discussion, three major sources of law that can be identified in any modern society are as follows:
i. Custom
ii. Judicial precedent
iii. Legislation

For a custom to be valid, it must be observed continuously for a very long time without any interruption. Further, a practice must be supported not only for a very long time, but it must also be supported by the opinion of the general public and morality. However, every custom needs not become law. Customs can simply be explained as those long established practices or unwritten rules which have acquired binding or obligatory character. In ancient societies, custom was considered as one of the most important sources of law. In fact, it was considered as the real source of law. With the passage of time and the advent of modern civilization, the importance of custom as a source of law diminished and other sources such as judicial precedents and legislation gained importance.

Judicial Precedent as a Source of Law
In simple words, judicial precedent refers to previously decided judgments of the superior courts, such as the High Courts and the Supreme Court, which judges are bound to follow. This binding character of the previously decided cases is important, considering the hierarchy of the courts established by the legal systems of a particular country. In most of the developed legal systems, judiciary is considered to be an important organ of the State. In modern societies, rights are generally conferred on the citizens by legislation and the main function of the judiciary is to adjudicate upon these rights. The judges decide those matters on the basis of the legislations and prevailing custom but while doing so, they also play a creative role by interpreting the law. By this exercise, they lay down new principles and rules which are generally binding on lower courts within a legal system. Given this background, it is important to understand the extent to which the courts are guided by precedents. It is equally important to understand what really constitutes the judicial decision in a case and which part of the decision is actually binding on the lower courts.

Legislation as a Source of Law

In modern times, legislation is considered as the most important source of law. The term 'legislation' is derived from the Latin word *legis* which means 'law' and latum which means "to make" or "set". Therefore, the word 'legislation' means the 'making of law'. The importance of legislation as a source of law can be measured from the fact that it is backed by the authority of the sovereign, and it is directly enacted and recognized by the State. The expression 'legislation' has been used in various senses. It includes every method of law-making. In the strict sense, it means laws enacted by the sovereign or any other person or institution authorized by the sovereign.

Kinds of Legislation

Supreme Legislation: When the laws are directly enacted by the sovereign, it is considered as supreme legislation. One of the features of Supreme legislation is that, no other authority except the sovereign itself can control or check it. The laws enacted by the British Parliament fall in this category, as the British Parliament is considered as sovereign. The law enacted by the Indian Parliament also falls in the same category. However, in India, powers of the Parliament are regulated and controlled by the Constitution, though the laws enacted by it are not under the control of any other legislative body.

Subordinate Legislation: Subordinate legislation is a legislation which is made by any authority which is subordinate to the supreme or sovereign authority. It is enacted under the delegated authority of the sovereign. The origin, validity, existence and continuance of such legislation totally depend on the will of the sovereign authority. Subordinate legislation further can be classified into the following types.

(a) Autonomous Law: When a group of individuals recognized or incorporated under the law as an autonomous body, is conferred with the power to make rules and regulation, the laws made by such body fall under autonomous law. For instance, laws made by the bodies like Universities, incorporated companies etc. fall in this category of legislation.

(b) Judicial Rules: In some countries, judiciary is conferred with the power to make rules for their administrative procedures. For instance, under the Constitution of India, the Supreme Court and High Courts have been conferred with such kinds of power to regulate procedure and administration.

(c) Local laws: In some countries, local bodies are recognized and conferred with the law-making powers. They are entitled to make bye-laws in their respective jurisdictions. The rules and bye-laws enacted by them are examples of local laws. This situation also occurs in Ghana.

(d) Colonial Law: Laws made by colonial countries for their colonies or the countries controlled by them are known as colonial laws. For some time, Ghana was governed by the laws passed by the British Parliament. However, as most countries of the world have gained independence from the colonial powers, this legislation is losing its importance and may not be recognized as a kind of legislation.

(e) Laws made by the Executive: Laws are supposed to be enacted by the sovereign and the sovereignty may be vested in one authority or it may be distributed among the various organs of the State. In most of the modern States, sovereignty is generally divided among the three organs of the State. The three organs of the State namely legislature, executive and judiciary are vested with three different functions. The prime responsibility of law-making vests with the legislature, while the executive is vested with the responsibility to implement the laws enacted by the legislature. However, the legislature delegates some of its law-making powers to executive organs which are also termed delegated legislation. Delegated legislation is also a class of subordinate legislation. In welfare and modern states, the amount of legislation has increased manifold and it is not possible for legislative bodies to go through all the details of law. Therefore, it deals with only a fundamental part of the

legislation and wide discretion has been given to the executive to fill the gaps. This increasing tendency of delegated legislation has been criticized. However, delegated legislation is resorted to, on account of reasons like paucity of time, technicalities of law and emergency. Therefore, delegated legislation is sometimes considered as a necessary evil.

Key ideas

- The two sources of law are the formal and material sources
- The two kinds of legislation include: supreme legislation, and subordinate legislation

Reflection

- State two sources of law
- Explain two kinds of legislation

Discussion

- How has this session improved your understanding of the sources of law?
- How has the session helped you better understand the kinds of legislation?

SESSION 3: FEATURES OF GOOD LAW

This session will look at the qualities that a good law should possess.

Learning Outcome

By the end of this session, the participant will be able to

- Outline four features of a good law

It must be known to the public

Ignorance of the law is not an excuse. We believe you are aware that this point has already been discussed. Well, we want to put much emphasis on the fact that, laws must be made known to the public in order to be effective. If the public does not know about a new law, they would not be able to follow it. Individuals bear the responsibility of knowing the law; however, law-makers need to inform the public of any new laws that have been passed in parliament. For example, public signs such as road signs and no smoking signs, tell the community what the laws are. The media plays a large role in keeping the public informed of any major changes to the law.

It must be acceptable in the community

In a democracy, laws should reflect community values. Thus, for a law to be effective, it must be acceptable to the community, otherwise members of the community may be inclined to disobey the law rather than going against their own values. For example, laws in anti-social behaviour such as the Road Traffic Amendment (Impounding and Confiscation of Vehicles) ACT, have been introduced across many countries. Because of community outcry against drivers and the concern for community safety, laws have been created to deter careless driving.

It must be capable of being enforced

Although some laws may be seen to be a good idea, if they cannot be enforced, then they would be inoperable. An effective law must be able to be enforced. Law enforcers must be able to arrest those who break the law and bring them to justice. Laws that are not being enforced do not portray a good characteristic of law.

It must be Stable

Constantly changing laws would create confusion in the community. Laws must be stable to be effective. In order to know the laws, members of the community need the stability of the law, they need the certainty that the law can be relied upon. This includes not only avoiding unnecessary changes but also to clarify and create laws to provide stability.

Capable of being amended

For laws to reflect community values, they must be capable of being amended as community values change. For a law to be effective there has to be the possibility of amending the law especially as new advances in industry and technology occur. It is interesting to note that rapid development of information technology and the availability of the internet has become a significant concern for many communities and legislators are struggling to keep up with the changes. Besides, culture is not static. It keeps on changing, so are our values and traditions. So when these are changing, then the laws must also be amended to reflect the changing values.

It must be applied consistently

Consistency is a key factor in whether a law is effective or ineffective. If laws are applied differently to different individuals, it would not be just and the law would be unfair. This would make the law ineffective as the community would not be able to rely upon the law being applied appropriately and function as intended. It must be noted that no one is above the laws of the country. Authorities must not only be seen as preachers of the law but also as doers of what they preach. For example, if teachers or those in authorities make laws against late comers or absentees in schools, then it must also apply to them as well. Inconsistency in enforcement of the laws can lead to negative behaviour and rejection of the law as there will be no trust in the law.

It must be able to resolve disputes

Laws must include the opportunity for disputes to be resolved when required. Without such provisions, laws would be ineffective and unresolved disputes could destabilize the smooth functioning of the community. This also includes the opportunity to resolve the disputes in a timely and appropriate manner. In civil disputes, the parties involved require the confidence in the law that a resolution can be found. If not, the dispute would be ongoing and become destabilizing. Equally, in criminal matters, legal disputes must be resolved in order for the process to continue fairly. For example, rules of evidence allow judges to make decisions in law where there is a dispute between two communities regarding the admissibility of evidence in a trial. Without these rules of evidence, trials would become overly cumbersome and very time consuming thereby hindering the effective enforcement of the law.

Key ideas

- A good law possesses some of the following features:
    - It must be known to the public
    - It must be able to resolve disputes
    - It must be stable

Reflection

• What are some of the features of a good law?
Discussion • How has this session improved your understanding of the features of a good law?

SESSION 4: MAINTENANCE OF LAW AND ORDER

In this session, we shall discuss the ways of maintaining law and order in our communities. Can you mention some of these ways? Now, compare your answers to what we have stated below.

Learning Outcome
By the end of the session, the participant will be able to:

- State three ways of maintaining law and order in our community

How Law and Order is Maintained in the Community
Law and order is needed in the community for the community to enjoy peace, stability, development, economic growth and good governance. Therefore, it is very important to maintain law and order in your community. Due to the relevance of maintaining law and order, the Ghanaian community has appointed some institutions or bodies which are responsible for maintenance of law and order. They include the Traditional council, the Police, the Courts and other Security Agencies.

Activities of the Traditional Council, the Police and other Security Agencies, and the Courts
The Traditional Council, the Police and other Security Agencies, and the Courts maintain law and order in the community by enforcing the law, that is, the set of rules and regulations made by the authorities to order and control the behaviour of the people in the community. Thus, the institutions responsible for maintenance of law and order are also known as law enforcement agencies whilst the people working in those agencies are referred to as law enforcement agents. By enforcing the law simply means seeing to it that people obey the law or rules and regulations.

Enforcing the law through a three-level process
The law is enforced to maintain law and order through a three-level process. This entails education, caution and punishment. In other words, the Traditional Council, Courts, Police and other Security Agencies enforce the law by a process of education, caution and punishment. Through education which is the first level of the process, people are made aware of the law or rules and regulations for governing the community or the law is made known to the people. Education here takes the form of advice and discussions. The general public is educated through the social and electronic media. When people are aware of the rules and regulations and the punishment for disobeying them, they tend to obey them. This, in the long run, brings about law and order. However, if people lack knowledge about the existence of law and order, they easily break them unknowingly which can result in disorder.

By cautioning or warning people who try to disobey or go against the rules and regulations and those who commit minor offences, the intuitions responsible for maintaining law and order make such people very mindful of the offences and therefore refrain from committing them. Punishment which is the last level of the process helps a great deal in the maintenance of law and order. Punishment takes several forms. The forms include bonding the offender to be of good behaviour for a period of

time, especially, when the offence is mild, fining the offender a sum of money and imprisoning the offender, when the offense is severe. Punishment reforms the offender and deters others from committing offences.

Bringing the behaviour of law breakers into compliance with the law

Order maintenance is the central function of the law enforcement agencies. To be able to effectively maintain order, the law enforcement agencies must be able to bring the behaviour of people of the society into compliance with the law and the directives of legal authorities such as police officers and judges. Unless the authorities can secure compliance from most members of society, most of the time, it is difficult to effectively maintain social order. Controlling crime and community disorder becomes difficult for the police without the active cooperation of members of the community. In other words, it is not enough for people to comply with the law; they also need to actively aid the efforts of the police to fight crime. Hence, effective order maintenance depends upon compliance and cooperation on the part of the general public. Such compliance by members of the public can never be taken for granted.

Application of force

How might legal authorities secure cooperation from member of the public? One approach is via the threat or application of force – that is, by trying to deter illegal and undesirable behaviour. The police carry guns and clubs, while judges are empowered to fine and imprison so that they can communicate a credible threat of punishment to those who might be inclined to defy, resist, and otherwise rebel against law and social order. The uniform, badge, truncheon, and arms all may play a role in asserting authority in the effort to gain control of the situation. The police seek to control the individual's behaviour by manipulating an individual's calculus regarding whether "crime pays" in the particular instance. Judges similarly shape people's acceptance of their decisions by threatening fines or even jail time for failure to comply. The ability to threaten and/or deliver sanctions is usually effective in shaping people's law-related behaviour.

One difficulty is that deterrence effects are typically costly to maintain, since they require sufficient investment of societal resources to create and maintain credible risks of punishment. The question is how many resources society is willing to deploy to control crime, and how much power to intrude into people's lives legal authorities are allowed to have. Societal investment of resources produces at best modest behavioural changes. Finally, deterrence approaches have the unfortunate long-term consequence of undermining the intrinsic motivations that also encourage law abiding behaviour, with the result that people's behaviour must be increasingly motivated by costly deterrence mechanisms if constant levels of compliance are to be maintained.

Voluntary compliance

Further, voluntary compliance is more reliable because the people involved take the responsibility for rule following upon themselves and minimizing the role of surveillance in motivating compliance. Because of the benefits of self-regulation, it is widely suggested that law abiding societies are more efficient and effective. If many or most of the people within a society are voluntarily following the rules, authorities are freed to direct their coercive force against a smaller subset of community residents who do not hold supportive internal values.

Key ideas

- Some of following ways of maintaining law and order in our community are:
- Enforcement of the law through a three-level process
- Application of force
- Voluntary compliance

Reflection

- What are some of the ways of maintaining law and order in our community?

Discussion

- How has this session improved your understanding of the ways of maintaining law and order in our community?

SESSION 5: HOW LAW AND ORDER CAN BE DISTURBED

In this session, we shall look at the various ways through which people in our various communities are disrupting law and order.

Learning Outcome

By the end of this session, the participant will be able to:

- Outline four ways in which law and order can be disturbed in school and the community

By disobeying rules and regulations of the school or the community

You must note that when people in the school or in the community begin to disrespect the laws of the school or the laws of the community, they end up disturbing the laws that govern our society. I believe that you are aware of some benefits associated with law and order in our communities? Then! Let me ask you this question: Name two ways in which people disrespect law and order in your school or community. Now, let's compare answers. Some of the ways are that when we engage ourselves in petty stealing, robbery, murdering, or when we dispose wastes indiscriminately, etc. In most communities in Ghana, people, especially the unemployed and even some people who are employed engage themselves in these crimes. This does not help in the development of society.

By disrespecting the authorities that govern us

Another way in which law and order is disturbed is when pupils or members of the community disrespect the authorities in the school and in the community. Hello, which people are in authorities of your school or community? Well! Is your answer similar or same as the headmaster, house master, the teachers, PTA executives, school prefects, class prefects, etc? We can also mention the chiefs, the sub chiefs, the assemblyman, the unit committee chairperson, the local council chairperson, the district chief executive among others. These people have been mandated by the people of our school and community to help manage and maintain law and order in the community. Therefore, they represent our views in the community. If their views and regulations are disrespected, then we tend to disturb the laws that gave them power to rule and govern our school and communities.

When members of the community fail to perform the roles assigned them

We should also know that when pupils or members of the community do not perform the roles assigned to them properly, it disturbs the laws. In our various communities, there are duties and responsibilities assigned to the various citizens. what roles or responsibilities do you perform as a citizen of your community? Well. Some people perform the role of enacting laws, others are law enforcers, yet others interpret the laws of the nations. Other group of people is regarded as policy makers whiles others are considered policy implementers. Now, name one example of people who perform any of the above roles. Let me first mention one to serve as a guide to you. One example of

people who are law enforcers is the police. The chief is another example. Now, compare your answers with those of your colleagues. It is important to note that when each of these people perform their duties as expected of them, the laws of the country will be maintained effectively. On the other hand, when they do not discharge their duties as expected of them, it disturbs effective implementation of the laws. For example, if law makers do not put proper measures to enact good laws, people may not respect and abide by the laws. In the same way, if people who are supposed to enforce the law are themselves breaking it, then they are disturbing the law. What do you think will happen if authorities or the law court refuse to give punishment when the need arises? I believe your answer is that there will be chaos in society since law breakers will abound.

When authorities prevent free flow of information

The next way in which law and order can be disturbed is when authorities prevent free flow of information. That is, when information regarding the laws or rules is not properly communicated to members of the community. There could be an instance when authorities formulate rules without properly communicating those rules to members of the community. Also, when information concerning sanctions and punishment associated with the laws is not properly communicated, people tend to violate the law since they are not adequately informed or educated. Even though, ignorance of the law is not an excuse, however, information regarding the laws must flow freely to the public for effective implementation of the laws. If the public does not know about the new law, they will not be able to follow it. Individuals bear the responsibility of knowing the law; however, law-makers need to inform the public of any new laws that have been passed in parliament.

Key ideas

- Some of following ways in which law and order can be disturbed include:
  When authorities prevent free flow of information
  By disobeying rules and regulations of the school or the community

Reflection

- What are some of the ways in which law and order can be disturbed?

Discussion

- How has this session improved your understanding of the ways in which law and order can be disturbed?

SESSION 6: BENEFITS OF LAW AND ORDER

In this session, we shall look at the benefits of law and order. Before that, let me ask you: Why are laws made to govern your community? Why do we need laws? Can a society be governed smoothly without any kind of law? What is the function and purpose of law? Etc. Functions and purpose of law have been changing with time and place. They depend on the nature of the state.

Learning Outcome
By the end of the session, the participant will be able to:

- List three benefits of a good law

Benefits of Law and Order
The Biblical account of creation shows that the earth was created in an orderly fashion together with all that it contains. It is therefore wise to recognize that law and order is necessary in every society to maintain a healthy balance between man and man, man and nature, and nature and nature. Law and order are necessary for any state to prosper. In most countries, the law is maintained by the judiciary which is normally an independent arm of the government. Law and order are enforced by disciplined forces like the Police and Bureau of National Investigation just to name a few. For countries that do not have proper law and order, they tend to have dwindling economies due to lack of patriotism; which always results in devastating effects. In an environment where law and order govern every person, thriving becomes natural hence our advocacy for the aforementioned. This post highlights some of the benefits that are as a result of law and order.

The existence of law and order in our society protect us from violence
A community made up of people who bear no ill-will to anyone else and are simply concerned to pursue their own self-interest needs law because there are situations where if everyone pursues their own self-interest, everyone will be worse off than they would have been if they acted differently (This is the reverse of the 'invisible hand' phenomenon where if everyone pursues their own self-interest, everyone in the community is made better off, as if everyone's actions were guided by an 'invisible hand' to achieve that end). So a community of self-interested actors needs law: (i) to solve 'Prisoner's dilemma' situations; (ii) to distribute into private hands property that would otherwise be exploited by everyone, thereby avoiding a 'tragedy of the commons' situation arising; (iii) to prevent people acting on their natural desire to extract 'an eye for an eye' in revenge for actual or perceived wrongs that they have suffered at other people's hands. The existence of law and order in our society makes us overlook the importance of protection from violence. We have reliable legal systems that protect us from those with an intention to cause us harm. Physical abuse is what leads to murder, torture, rape and other life-threatening situations. Laws are there to protect us from those who want to hurt us. However, they won't stop those who lack a moral compass. They will only stop those with an intention to start violence because of the consequences that they are likely to face.

The law is an important ingredient when it comes to resolving conflicts
Disputes are common, and when there is no neutral party to settle them, things get out of hand. The law is an important ingredient when it comes to resolving conflicts and coming up with fair resolutions that are accepted by everyone. Without proper law enforcement, when people have a conflict they will often use violence as a means to try and resolve the conflict. The outcome of this in all cases is not fair at all. Having laws in place ensures that such disputes arising among people are resolved easily and amicably. This will also play a major role in ensuring that the people governed by the law live peacefully with each other.

It promotes peace in the community
Other benefits are that law and order is needed in the community because it promotes peace in the community. People go about their work peacefully in the community where there is law and order. People get the peace of mind to carry out their businesses without fear of being attacked by others. As law and order promotes peace in the community, it fosters development as well. This is because development cannot take place in the community if there is no peace.

It promotes development
For there to be development, security has to be in place. It is easier for Ghanaians and foreigners to make investments in Ghana when they have an assurance that their property and other forms of

investment are safe and protected by the law. When the judiciary and the security forces work hand-in-hand to enforce the law and provide security, citizens will be comfortable and concentrate on working and building their nation. Security, especially in less developed places in the world attracts foreign investments, a key ingredient in improving the status of a country. In addition, law and order is needed in the community for economic growth. This is because in a community where there is political stability as well as good governance as a result of law and order, business thrives and this leads to economic growth. Law and order contribute to the rapid improvement of a community because it is only in places with law and order that children can get the education that they need, technology grows to just to mention a few. Without laws set in place to protect these vital services and advancements then the society won't be able to progress. Lawless states lack legislation and order and thus put the nation at risk because experts like doctors, teachers, among others won't be working in an environment that allows the progression of the society.

It promotes stability and good governance

Another reason for the need for law and order in the community is that law and order promote stability and good governance. This is because in communities where law and order prevail, ordinary people and people in government follow the laid down rules and regulations to such an extent that there is no room for frequent violent change of governments. There is always smooth change of government through election so there is stability as well as good governance.

Law and order enable people to live as equals

The existence of law and order enables people to live as equals. This provides an avenue for everyone to pursue what they are interested in, given that resources are fairly available to everyone. With equal opportunities, everyone will be working hard, and in return, their country grows economically. Equal opportunities also make people work better given that it's their choice to do whatever they want.

Law and order promote fairness

Fairness is important to all people in a country. With law and order being reinforced, people naturally become fair in their dealings, hence reducing cases where people are taken advantage of. If this is the case, the society will end up prosperous since people will be at peace with each other and ready to work on projects that will improve their living standards and that of their fellow citizens.

Key ideas

- The following are some of the benefits of law and order:
- It promotes peace in the community
- It promotes stability and good governance

Reflection

- What are some of the benefits of law and order?

Discussion

- How has this session improved your understanding of the benefits of law and order?

UNIT 5: USEFUL INSTITUTIONS IN OUR COMMUNITIES

Welcome to unit 5. In this unit, we shall take you through the various useful institutions we have in our communities. We shall also learn about how these useful institutions can be grouped. We shall discuss the functions of some of these useful institutions. We shall look at some of those factors and how to make the institutions active. Finally, we shall discuss the benefits of keeping institutions.

Learning Outcomes
By the end of this session, the participant be able:

- examine the family as useful institutions
- examine marriage as useful institutions
- examine the school as a useful institution
- examine the Parliament, the Judiciary, and the Executive as useful institutions
- explain why some institutions tend to be inactive
- discuss ways of making useful institutions active

SESSION 1: THE FAMILY AS A USEFUL INSTITUTION

In this session, we shall look at the family as useful institution in Ghana. We shall begin by defining institutions and then finally examine that family as a useful institution.

Learning Outcomes
By the end of the session, the participant will be able to:

- define the concept of useful institutions
- discuss the family as a useful institution in Ghana

The Meaning of useful Institutions

Institutions are "stable, valued, recurring patterns of behaviour". As structures or mechanisms of social order, they govern the behaviour of a set of individuals within a given community. Institutions are identified with a social purpose, transcending individuals and intentions by mediating the rules that govern living behaviour. The term "institution" commonly applies to both informal institutions such as customs, or behaviour patterns important to a society, and to particular formal institutions created by entities such as the government and public services. Formal institutions are explicitly set forth by a relevant authority and informal institutions are generally unwritten societal rules, norms, and traditions.

People may deliberately create individual, formal organizations commonly identified as "institutions". Institutions arise, develop and function in a pattern of social self-organization beyond conscious intentions of the individuals involved. In other words, institution refers to an established order comprising rule-bound and standardized behaviour patterns. The term “institution” is also widely acknowledged to be used in a variety of ways, and hence often ambiguously defined. It is widely used to describe; social practices that are regularly and continuously repeated as sanctioned and maintained by social norms, and have a major significance in the social structure.

Useful institutions are institutions that enable people to work together effectively and peacefully. They ensure that all people have equal rights and a chance to improve their lives, and access to justice when they are wronged. They also ensure that their profit margins are always increased by minimizing losses and wastes. They perform their primary functions of serving the current needs of

society for which they were established. Alternatively, useful institutions are the institutions which perform functions that are very important to the development of the society. Now, let us examine the family as a useful institution.

The family as a useful Institution

The family is the centre of the child's life, as infants are totally dependent on others. The family teaches children cultural values and attitudes about themselves and others. Children learn continuously from the environment that adults create. Children also become aware of class at a very early age and assign different values to each class accordingly. The term family refers to a group of people who are related to each other though birth or blood, marriage, or adoption. The family as a social institution forms the basis of every society. In the Ghanaian context, two main types of family can be identified. These are the nuclear and the extended family.

The nuclear family as a basic unit consists of parents, that is, husband and wife and their immediate offspring. This type of family system is also practiced in Europe. In Ghana, it is common among the educated elite. The nuclear family is the individual's family of procreating because it is the family that he also creates. The nuclear family bears other characteristics such as children leaving the family household when they are matured and get married to establish their own family of procreation. The father is regarded as the head of the family whose major responsibility is to provide the family with the basic necessities of life including food, clothing and shelter. The nuclear family enjoys a great measure of privacy as family members do not encourage the members of the extended family to interfere in their personal affairs. This is made possible because the nuclear family is based on the principle of "each one for himself, and God for all".

The nuclear family lives in a different compound from other members of the extended family. This ensures peaceful living among members of the nuclear family. This absence of interference from members of the extended family also ensures peaceful marriage among members of the nuclear family which in turn results in long lasting marriages. Decision taking and conflict resolution are therefore limited within the nuclear family. The nuclear family however, breeds disunity among members of society. This is because individuals in the nuclear family become individualistic in nature. They become inward looking and selfish since they were not trained to live with others. Opportunities for support may also be denied especially in times of difficulties. Unlike the extended family where opportunities for communal living abounds, when a member of the nuclear family wants to engage in economic activity or wants to pursue further education but does not have the means, he or she may not get the support from the members of the extended family.

The extended family on the other hand is an extension of the nuclear family which involves a wide range of people who trace their ancestry to a common person. It consists of parents, children, grandparents, uncles, aunts, cousins, nephews and nieces. This type of family is typical of traditional societies in Ghana. This type of family provides mutual assistance in times of need. The extended family system provides an avenue for family members to help themselves. Family members become each other's keeper and they are prepared to support members who are in need of help. They cater for the older members of the family, widows, as well as children whose parents are dead.

They also provide a fertile training ground for children both nuclear and extended families. The beliefs, values, and norms of the society are transmitted from one generation to another and this becomes possible mainly due to the role of the extended family. It serves as a control mechanism to check wayward behaviours. This ensures that members exhibit good moral behaviours that do not bring the name of the family into disrepute. The extended family also provides good ground for members to pool their resources together in order to engage in economic activities or to solve family problems especially during naming ceremonies, marriage rites and funerals.

It is important to note that every family has a leader, who is usually referred to as the family head. In the case of the Akans, the family head is known as the "Abusuapanin" and he is the head of the extended family. The "Abusuampanin" performs some obligations in the family. He settles disputes that may arise out of misunderstanding among his family members. Misunderstanding may occur as a result of land disputes, marital issues, among others. In some of these matters, he acts as an arbitrator and reconciles the disputing family members. This is to ensure peace and unity in the family. The head of the family is also the custodian of all the family properties. These properties include jewels, lands, farms, vehicles, family house, and others. He holds all these properties in trust on behalf of the living and the dead members of the family. In performing this function, he ensures that all family members get their fair share of the properties. He is also the religious leader of the family. He serves as a link between the living and the dead members of the family and their ancestors.

An ancestor refers to someone who once lived in the physical world but is now dead and lives in the spiritual world. The spirit of such a person is believed to continue to exist among the living, providing guidance and protection for the living. However, for one to be considered as an ancestor, that person should have died a natural death but not an accidental death. The person should also be of old age who bore children when alive. The person should be someone who led a life worthy of emulation. The "Abusuapanin" performs religious functions such as communicating with God, the ancestors and the family gods on behalf of his family members by pouring libation on occasions such as naming ceremony, marriage rites, puberty rites, funerals, and festivals. The "Abusuapanin" is also responsible for convening family meetings to discuss issues that concern the family and he makes sure that he presides over all these meetings and steers the affairs to a successful end. Finally, when the chief's council of elders meet, the head of the family represents that family. He is therefore the link between the family and the council of elders of the chief of the town. He performs this function by conveying information from his family members to the council of elders for consideration, and vice versa.

With respect to the nuclear family, the father happens to be the family head. Apart from the above-mentioned functions which may be applicable to the head of the nuclear family, the father provides the physical needs of his family. These family needs may include food, clothing, shelter, school fees, health care, and other social needs. He caters for the wife as well as the children in the nuclear family in order to ensure proper growth of members of the family. He is responsible for the financial commitment of the family. The father also protects the family physically and spiritually. Physically, the father defends the family from external threats, violence and physical abuse or harm. He provides secured environment for the family. He also performs spiritual duties. He organizes family devotion to offer thanks to God and seek protection from God for the family to guard the family against spiritual forces. Finally, the father as a husband is responsible for satisfying the sexual needs of the wife. This is because marriage is the only legitimate means for a man and a woman to derive sexual satisfaction from each other. He also provides love and affection to the wife.

Key ideas

- Useful institutions are institutions that enable people to work together effectively and peacefully
- The family as a useful institution is the centre of the child's life, as infants are totally dependent on others. The family also serve as the basis of every society

Reflection

- What are useful institutions?
- Discuss the family as a useful institution

Discussion

- How has this session improved your understanding of the concept of useful institutions
- How has this session enhanced your understanding of the family as a useful institution in Ghana

SESSION 2: MARRIAGE AS A USEFUL INSTITUTION

In this session, we shall look at marriage as a useful institution in Ghana. We shall begin by defining marriage and then examine different types of marriage.

Learning Outcomes
By the end of the session, the participant will be able to

- define the concept of marriage
- discuss three different processes through which marriage is accepted in Ghana

Marriage as a useful Institution

Marriage as an institution sets out how societies protect themselves by controlling the way people live together, have children and care for them. It is an acceptable institution for the establishment and maintenance of family life all over the world. Marriage is a union between a man and a woman who have agreed to become husband and wife after going through all the procedures recognized in the society. The union also includes the two families.

Processes through which Marriage is accepted in Ghana

There are various processes through which marriage is accepted. These may include customary marriage and religious marriage (Christian and Islamic).

Marriage

This forms the basis of all marriages in Ghana. This is because couples must perform customary marriage before they take on the religious, and the marriage under the ordinance. In the customary marriage, the consent of parents of both the prospective husband and wife is considered very important. However, before one's marriage is accepted under the customary marriage, one must have undergone the following preparations. The prospective husband must make a formal request for the hand of the woman in marriage. The father of the man will have to go to the family of the woman on the man's behalf to ask for the hand of the woman. This is followed by an investigation by both families to find out the background of the would-be couple. This provides avenues for addressing certain questions concerning the existence of serious issues such as genetic diseases, criminality, among others. A period of courtship begins after both families are satisfied with issues emanating from the investigation. The would-be couple use this period of courtship to study each other and to get to know each other better. They move together, pray together, and chat together.

However, they are not expected to have sexual intercourse. After this, the knocking rite is performed. This happens after each is well satisfied that they can live together as husband and wife. The woman's family accepts the proposal and asks the man's family to present some prescribed items. Customarily,

this knocking ceremony involves the presentation of drinks, the payment of an amount of money, and other relevant items depending on the ethnic group. It must be emphasized that this stage is called knocking because it is the time the man and his family knock at the door of the family of the woman in order to enter in the marriage ceremony if they are opened. The acceptance of these items signifies the acceptance and approval of the marriage and vice versa. After the items have been accepted, then the payment of the bride wealth follows. The items required for the bride wealth differ from ethnic group to ethnic group and may also depend on the status of the woman as well as her religious affiliation. Traditionally, money and drinks cannot be left out of the items. There should also be a public ceremony to climax the customary marriage.

Christian marriage

Christian marriage involves the consecration of the customary marriage by a recognized Reverend Minister or Pastor. This marriage usually takes place in a registered church or place. It takes place after the would-be couple has successfully gone through the customary processes. This marriage goes through the following stages: notice of wedding/publication of the banns, counselling of the would-be couple, engagement ceremony, and the wedding ceremony and registration of the marriage. It is important to note that the marriage banns are announced on three consecutive Sundays or Saturdays depending on the day of worship of the would-be couple. The main reason is to draw people's attention to the impending wedding so that if anyone has an objection to the wedding could raise it. The counselling session is another critical component of the Christian marriage. It is a period in which an experienced marriage counsellor or expert prepares the would-be couple adequately for life before and after the marriage ceremony.

The counselling usually covers topics such as financial management, sources of conflict and conflict management, childbearing and child care, communication in marriage, sex in marriage, home management, resource management, love in marriage, blood groupings or type and its effects, family planning, among others. After the counsellor is fully satisfied that the would-be couple is well prepared, then he or she ushers them into the engagement ceremony. This is what we normally refer to as the traditional or customary marriage. The bride wealth is paid during this time. The engagement ring and bible as well as soft drinks are presented at this stage. The final stage of the Christian marriage is the wedding ceremony. This is where a qualified and recognized Reverend Minister, Pastor or Priest consecrates the marriage. The consecration is carried out by inviting the couple to exchange vows and marriage rings. The couple and their representatives are therefore made to sign the marriage register.

Finally, prayers are offered for the couple. One important reason for signing the marriage register is the marriage certificate is given to the couple which serves as evidence of marriage and in case of dissolution of the marriage; it is the court that will determine which of the parents should take charge or custody of the children. It also minimizes conflict that arise over the sharing of property in the even the marriage is dissolved. It is important to note that Christian marriage is a type of monogamous marriage. Monogamous marriage means that the man takes only one woman as his wife whilst the woman also takes one man as her husband. That means, it is one man, one wife, or one woman, one husband.

Islamic marriage

This type of marriage has some aspects that are similar to the Christian marriage. This is because, during the Islamic marriage, the consecration of the couple is performed by a recognized Islamic clergyman or Imam. The Islamic marriage like the other marriages is entered into by a contract based on mutual consent of the would-be bridegroom or his representative and the guardian or representative of the would-be bride. Another prominent feature of the Islamic marriage is the payment of the bride wealth known as "Sadaki" which takes place in the presence of family members, friends and well-wishers who gather to witness and grace the occasion. It should be noted that the "Sadaki" belongs to the wife and must be collected before the marriage is consummated. One other

major feature of Islamic marriage is the issue of polygyny unlike the Christian marriage. Polygyny means that the man can have four wives at the same time, provided he is financially sound and resourceful to give equal attention to each of his wives. It is a tradition of the Holy Prophet that permits the Muslim man to marry up to four wives.

It will also interest you to know that there are other forms of marriages that are practiced in some parts of Africa and the world. For example, polygamy in which a person marries two or more spouses at the same time; polyandry in which a woman legally marries two or more men as her husbands; sororal polyandry where a man marries two or more sisters who could be twins; fraternal polyandry in which a woman marries two or more brothers; levirate where a man is permitted to marry his deceased brother's wife; and sororate marriage in which a man marries his deceased wife's sister.

Key ideas

- Marriage is a union between a man and a woman who have agreed to become husband and wife after going through all the procedures recognized in the society
- The processes through which marriage is accepted in Ghana are; Customary marriage, Christian marriage, and Islamic marriage

Reflection

- What is marriage?
- Discuss three different processes through which marriage is accepted in Ghana

Discussion

- How has this session improved your understanding of the concept marriage?
  How has this session enhanced your better understanding of the processes through which marriage is accepted in Ghana?

SESSION 3: THE SCHOOL AS A USEFUL INSTITUTION IN GHANA

In this session, we shall discuss how useful institution the school is an institution. It is our hope that we all support the school to perform it roles so that it can render the services it is mandated to perform.

Learning Outcomes
By the end of the session, the participant will be able to:

- identify three roles of the school as a useful institution in Ghana
- state three benefits of the school as a useful institution.

The School as a useful Institution

An educational institution is a place where people of different ages gain education. It must be noted that education prepares the young ones to be useful members of society. The school as a social institution embraces pupil roles, teacher roles (which usually include different roles for juniors, seniors and head teachers) and, depending on the degree of autonomy a school has from outside agencies, parent roles and the managerial/inspectorial roles associated with the relevant educational authority. The school as an institution embraces these roles across all the schools that jointly constitute the school system in a given society.

The school is also considered as a formal social institution. As a formal social institution, its activities take place in classrooms, lecture halls and workshops. The school is also structured by means of syllabuses, course outlines, and timetables. Various subjects with different topics are taught and time is allotted for the teaching of these subjects. It has clearly defined roles for teachers, head teachers, administrators, supervisors and learners. Each knows what he or she is expected to do since their roles are clearly prescribed by the education authorities. Furthermore, the school's activities are supervised. Two major forms of supervisions are carried out in the school. These are the internal and external supervision. Internal supervision is mostly carried out by teachers and head teachers while external supervision is carried out by circuit supervisors and other educational officers. Finally, the school makes provision for evaluation in which learning is measured by means of tests, quizzes, project works, assignments, homework, and examinations to know how well the learner has understood the lessons. Certificates such as degrees and Diplomas are awarded to deserving students.

Benefits of the school as a useful institution

Transmission of culture

The school has been established by society to transmit its culture to the younger generation to enable them acquire skills, values, attitudes and knowledge that will prepare them to become productive participants in the socio-economic development of their society. This enables the pupils to imbibe the values and norms that will enable them become responsible and acceptable members of society. It is the teacher who ensures that the child acquires the right lessons that are relevant to their social, economic, political, cultural, and personal development. In the formal school system, subjects such as social studies, cultural studies, religious and moral education, economic, geography, among others have been introduced to prepare the child adequately for societal participation. Apart from the transmission of cultural heritage, the school provides the child with academic knowledge to broaden his or her mind.

It broadens the mind of the child

The introduction of varied subjects on semester or trimester basis is meant to adequately provide the child with holistic and integrated knowledge about one's world. Subject like geography give more insight about the physical environment as well as knowledge about the world at large. Other subjects such as economics, sociology, psychology, history, chemistry, physics, biology, integrated science, social studies, etc. develop intellect, values, and skills of the child thereby making him or her a valuable asset to the development of every nation. In addition to the academic knowledge provided by the school, it also provides the child with character and moral training. The aim is to mould and shape the personality of the child. In this sense, the school develops code of conduct that regulates the behaviour of the child as a way of disciplining him or her. The child will face sanctions for non-compliance.

Provision of skills for employment

Whatever occupation you would like to secure in future, the preparation is adequately made through the activities of the school. The school provides the child with occupation training that equips him or her with vocational or technical skills that will enable the child get a job after school in order to earn a living. Occupation training therefore helps the child to better his or her conditions, thereby, preventing the child from becoming social misfit. Workers such as teachers, doctors, nurses, engineers, etc. have been given occupation training that facilitates the performance of their duties as expected from them. So, for you to be able to discharge your duties and execute your tasks as a good worker, you need to take your formal training seriously.

Provision of knowledge and skills for sporting and gaming activities

The school also provides children with knowledge, skills and attitudes to be able to undertake varied sporting and gaming activities. Through subjects such as physical education and other physical

education programmes, the child is adequately trained and prepared to be engaged in sporting activities like, football, racing or running, netball, table tennis, basketball volleyball, etc. Which of these sporting activities do you like most? Do you know that these sporting activities also ensure the good health of the child? Well, the child exercises his or her body a lot and this promote good health.

Proper socialization of the individual

Finally, the school as a useful institution inculcates such values as punctuality, respectfulness, obedience to authority, hardworking, integrity, etc. to ensure the proper socialization of the child. It is both conscious and unconscious efforts by the older generation to transmit the culture of the society to the younger generation to enable the younger generation function effectively as responsible and acceptable members of the society. The school has instituted a number of measures to inculcate in them the culture of the society. Some of these measures include measures to ensure that children report to school on time, they should attend morning assembly and other important school gatherings. They are also trained to respect authorities that govern them. The school timetable has also been structured in a way that there is time for the beginning of lessons, time for break, and time for closing from school. All these are instituted to instil the spirit of punctuality in the child. All these efforts are geared towards the development of good citizens. The development of good citizens among the child is therefore achieved through these major approaches to training the citizen:

1. **Exemplary Approach**: Which is based on the idea that; example is better than precept''. Here, the social studies teacher must set examples of an ideal behaviour in relations with others to allow students to follow him / her. The classroom teacher must practice what he / she teaches. He must not tell students to obey the laws of the land without himself following them.

2. **The Experience-Service Approach**: This is based on the axiom that, experience is the best teacher''. The learners must be given a good chance for active and responsible involvement in the activities in the school and the community. Such experience could be oriented through group methods of teaching (discussion) class project and group competitions (debates) visit to parliament house, Metropolitan district & Municipal meetings celebration of national days, social services and students' councils

3. **Academic Discipline Approach:** This approach teaches the concepts, facts and generalization about social phenomenon. In the course of study, in particular social; studies concepts like voting, citizenship and human right can be treated while students are in school so that they will grow with them. When the learners master such skills, concepts and facts they will assist them to meet challenges of civic matters whether anticipated or unanticipated.

4. **Law-Related Education:** This approach provides legal framework for learners to study law related issues when in school. For instance, information on legal concepts such as the system of juvenile justice, rule of law, problems of law enforcement agency and the constitution can be treated in class.

5. **The Community Involvement Approach:** This attempt to involve students to experience real life situation. This is made possible when the teacher takes students to fieldtrips, excursions to the community to let students have a feel of what is happening over there. The students must be encouraged to pay house dues, participate in clean – up campaign as well as taking part in politics in the community.

6. **Institutional School Reform Approach:** In this approach students are taught to obey and respect the authorities that govern them. The school must offer good example of respect to authority in an attempt to inculcate democratic principles in the learners. The school must be

governed democratically such that students as well will have the voice in enacting such rules. The teacher should not in any way intimidate his / her students with personal and selfish interest if student is to be trained in a democratic way of life.

Key ideas

- Some of the benefits of the school as a useful institution in Ghana are:
  - broadens the minds of the child
  - transmission of culture
  - provision of skills for employment

Reflection

- What are some of the roles of the school as a useful institution?
- What are some of the benefits of the school as a useful institution in Ghana?

Discussion

How has this session improved your understanding of the benefits of the school as a useful institution in Ghana?

SESSION 4: THE PARLIAMENT, JUDICIARY AND EXECUTIVE AS USEFUL INSTITUTIONS

In this session, we will look at the parliament of Ghana as a useful institution in Ghana. Have you ever visited the parliament of Ghana? Did you notice the leadership of parliament and the role they play in the country? Okay, this session will give you a lot of insight into that.

Learning Outcomes
By the end of the session, the participant be able to:

- identify Parliament as a useful institution
- identify the leadership of Parliament
- discuss the Judiciary as a useful institution
- state two functions of the Judiciary as a useful institution
- discuss the Executive as a useful institution

The Parliament as a useful Institution

The Parliament of Ghana is organized into a Unicameral Legislature. There is only one parliament, which exercises all primary legislative functions. Article 11 of the 1992 Constitution of Ghana states: "The laws of Ghana shall comprise (a) this Constitution; (b) enactments made by or under the authority of the Parliament established by this Constitution; (c) any Orders, Rules, and Regulations made by any person or authority under a power conferred by this Constitution; (d) existing law; and (e) common law. Therefore, chief legislative power has been vested in the Parliament of Ghana".

Although the current constitution vests principal legislative power in parliament, this appropriation of authority was not always the case. In 1850, the first Legislative Council was established to advise the Colonial Governor in enacting legislation. Although this Council prevented direct involvement of the people, it served with its enlargement in 1916 under Sir Hugh Clifford as a representation

chamber as a precursor to today's representative democracy. In 1925, the Guggisburg Constitution created a Provincial Council for paramount chiefs, representing selected colonial provinces. Although the system appeared to recognize the concerns of Africans, it continued to be dominated by British interests, which limited the amount of African representation in the government.

However, the introduction of the elective principle induced radical change in the political history of Ghana. Both the Burns Constitution of 1946 and the Coussey Committee's recommendations which formed the basis for the constitution of 1951 altered the structure of government by increasing the number of African representatives. But complete representation was not achieved until 1954. In 1951 it was a representative government. In 1954 it was responsible government which paved the way for self-government of Dominion Status in 1957. The constitution of 1954 called for the election of a 104-member assembly, all elected through political representation along party lines. This laid the foundation for the political structure surrounding Ghana's independence in 1957. Since gaining its independence from British colonial rule, the Parliament of Ghana has continued to improve the lives of Ghana's citizens by representing their concerns and voicing their opinions at the legislative level.

The Legislative branch of the Ghanaian government passes bills which assented to by the President, become the laws which protect the constitutional rights of the citizens of Ghana. The elected body consists of "no less than 140 members." A Member of Parliament must be a citizen of Ghana and must have "attained the age of 21 years and be a registered voter." Article 94 further states: "a Member of Parliament must hold current residence in the area he or she represents or has lived in the area for at least 5 of the 10 years preceding his or her election." All taxes must be paid. Criminal cases, bankruptcy, or other judicial issues can prevent a citizen from becoming a Member of Parliament. Article 94 of the 1992 Constitution outlines possible reasons for someone not being qualified to become a Member of Parliament:

(1) A person shall not be qualified to be a Member of Parliament if he:
(a) owes allegiance to a country other than Ghana; or
(b) has been adjudged or otherwise declared bankrupt under any law in force in Ghana.

Other provisions of the constitution outline possible reasons for the ineligibility of candidates for Parliament. If, for instance, a person is a member of "the Police Service, the Prisons Service, the Armed Forces, the Judicial Service, the Legal Service, the Civil Service, the Audit Service," or any other service listed in Article 94 of the 1992 Constitution, he is ineligible to become a Member of Parliament.

It is very important to note that even after being elected, a Member of Parliament can lose his or her seat for a number of reasons. Such reasons include, but are not limited to: "if he is elected as Speaker of Parliament, if he is absent without the permission in writing to the Speaker, if he is expelled [after being] found guilty of contempt of Parliament, [or] if he leaves the party of which he was a member at the time of his election to join another party or seeks to remain as an independent.

One of the most important clauses in Article 97 pertains to the act of changing political parties following an election. Although this has not been much of an issue now within Ghana as in the past, other countries have suffered from such acts. Currently, many parties exist within parliament, including the New Patriotic Party (NPP), which is the majority party, and the National Democratic Congress (NDC), which is the minority party. The current Parliament of Ghana has 275 members (106 for NDC and 169 for NPP).

Leadership in Parliament

The Speaker of Parliament

The Speaker of Parliament presides over Parliament and enforces the observance of the Standing Orders. The Speaker of Parliament "shall be elected by the Members of Parliament from among persons who are members or who are qualified to be elected as Members of Parliament." The Speaker's decision is never appealed on at any point of order and shall not be reviewed by the House, except upon a substantive motion made after notice. The Speaker must be non-partisan and patient. The Speaker can exercise indirect influence on both the majority and minority to reach consensus when necessary. However, the Speaker has neither an "original nor casting vote." According to the constitution, "no business shall be transacted in Parliament other than an election to the office of the Speaker, at any time when the office of Speaker is vacant."

First Deputy Speaker

In the absence of the Speaker, two Deputy Speakers are elected. The Deputy Speakers are elected from either side of the political divide. The first is the First Deputy speaker while the second becomes the Second Deputy Speaker. It must interest you to know that According to the Standing Orders of Parliament, the First Deputy Speaker exercises all the powers of the Speaker for the "effective and efficient conduct of business in the House." He or she also presides over the Appointments and the Privileges Committees. The Second Deputy Speaker, who happens to come from a different political party, takes over the affairs of Parliament when both the Speaker and the First Deputy Speaker are absent. It is his or her duty to preside over sittings of parliament. The standing orders of Parliament give him or her right to exercise all the powers of the Speaker "for the effective and efficient conduct of business in the House." Additionally, the Second Deputy Speaker presides over the Committee on Members Holding Offices of Profit.

Majority Leader

The Majority Leader is the next in command. He or she is elected from the political party that holds the majority of seats in Parliament. He or she is assisted by A Deputy Majority Leader and a Majority Chief Whip. Both the majority and minority leaders are consulted by The Speaker on the business of the House and other important issues. The Majority Leader is usually the first to gain the Speaker's attention during debates. The position of the Majority Leader allows smooth and orderly progression during important debates. He maintains order by scheduling legislation for floor consideration by planning the daily, weekly, and annual legislative agendas. The Majority Leader urges colleagues to support or defeat motions on the Floor and works to "advance the goals of House in general, and the majority party in particular." In addition, the Majority Leader guards and champions rights of parliament and privileges. As a parliamentary leader, he can speak on behalf of the entire House in Public.

Minority Leader

If the majority leader is elected from the party that holds majority seats in Parliament, then from which party (majority or minority) will the minority leader be elected? I hope you got the answer? Well! Did my question give you a clue to the answer? Okay, he or she is elected from the second largest political party in Parliament. The Minority Leader is elected from the second largest political party in Parliament. Like the Majority Leadership, a Deputy Minority Leader and a Chief Whip assist the Minority Leader with his various tasks. The two Leaders and the Chief Whip constitute the Minority Leadership of Parliament. The Speaker must consult with the Minority and Majority Leadership on the business of the House and other important issues. The Minority Leader typically gets the Speaker's attention during important debates.

The Judiciary as a useful Institution

According to the constitution of Ghana, justice emanates from the people and shall be administered in the name of the Republic by the Judiciary, which shall be independent and subject only to the

Constitution of Ghana. The judicial power of Ghana is vested in the Judiciary; accordingly, neither the President nor Parliament nor any organ or agency of the President or Parliament shall have or be given final judicial power. The Chief Justice, according to the 1992 Constitution of Republic Ghana, is the Head of the Judiciary and is responsible for the administration and supervision of the Judiciary. It has the jurisdiction in all matters, civil and criminal, including matters relating to the 1992 Constitution, and such other jurisdiction as Parliament may, by law, confer on it. The Judiciary is made up of Superior Courts and Inferior Courts. The Superior Courts consist of the Supreme Court, Court of Appeal, High Courts, and the Regional Tribunals. The Inferior Courts on the other hand, include the Circuit Courts, District Courts, Magistrate Courts, and Juvenile Courts.

The main body of the judicial branch is the Supreme Court. It is the highest court in Ghana, and no other court can challenge it. The main role of the Supreme Court is to interpret the Constitution. Like being a referee when two players cry foul, it is the Supreme Court's duty to decide who is correct. There are nine justices who sit on the Supreme Court. The odd number of justices is meant to reduce the chances of ties during cases, and thus for the Supreme Court to decide a case, they simply need a majority of justices to agree. Being a justice on the Supreme Court is a prestigious and powerful position. Not only is their job important, but once they are officially appointed and confirmed, they serve till their retirement. Supreme Court justices never have to run for re-election or seek re-appointment. This gives them a lot of freedom to do the job as they see fit without consequences.

In addition to the Supreme Court, the judicial branch is made up of lower courts. These courts serve under the Supreme Court and help manage the workload. There are simply too many cases in the court system for the Supreme Court to hear them all, so these other courts help. The Supreme Court then handles the most important cases.

Functions of the Judiciary
The judiciary performs a lot of functions. Some of the major functions of judiciary are as follows:

It interprets the laws
A number of cases are brought before the judges in which the question of the interpretation of the laws arises, because in such cases the law is not clear. Even such matters are brought before them in which the laws are silent. In these cases or matters the judges give their decisions. Later, these decisions are quoted in similar cases. In this way the courts expand the laws in an indirect manner. Anytime there is disagreement over any law of the state, the Judiciary is the right body to say exactly what the law is. For example, the Supreme Court of Ghana determined the constitutionality of the Fast Truck High Court in June 2002.

Custodian of fundamental rights
In modern times, many countries grant fundamental rights to the people in the Constitution. The Supreme Courts therefore act as the custodian of these rights. In the Constitution of our country, citizens violate these fundamental rights or if, because of this violation, a person loses his rights, an appeal can be filed in a High Court or the Supreme Court for the protection of these rights. It is the duty of the courts to protect the rights of the citizens. Our High Courts and Supreme Court have decided many cases in which the question of the violation of the fundamental rights was involved. The courts have the power to issue writs that can prevent anybody from taking an action that threatens the rights of others.

Miscellaneous functions
The Court appoints Trustees or guardians of the property of minors. It gives approval of Civil Marriages. It also performs the act of the registration of Wills. It issues certificates for the grant of naturalized citizenship. In some countries it issues licenses. In our country, appeals relating the elections are also sent to the Supreme Court. It settles disputes or disagreement between individuals,

government, etc. Do you remember the famous Election Petition in Ghana in 2013? If yes, what was it about? It also protects the constitution from being treated with disrespect by those in power.

The Executive as a useful Institution

The Executive Branch of Government has responsibility for the functioning of the public services. It is responsible for implementing the laws passed by parliament. In the performance of its functions, however, the executive both implements and determines law. Members of the executive are drawn from the largest political party in parliament, which by virtue of its majority has won an electoral mandate to govern. Thus, the government produces policies, and because of its numerical advantage in parliamentary votes, it is able to dominate proceedings. Therefore, in reality, the Executive is responsible for both determining and implementing government policy.

The President is the Head of the Executive. He or she is 'Head of State and Head of Government and Commander in-Chief of the Armed Forces'. A further key duty of the President is to make appointments to various public offices, including the Chief Justice, Inspector-General of Police and the Auditor-General. The appointments are made in consultation with the Council of State and approved by parliament. Beneath the President in the hierarchy is the Vice-President who is responsible for presidential duties if the President is unable to perform them. If the President dies, resigns, is removed from office, or is out of the country, the Vice-President takes over. If, for any reason, the Vice-President is unable to fulfil these duties, the Speaker of Parliament shall assume the duties.

One major body that is responsible for assisting the President in the determination of general policy of the government is the Cabinet. The Cabinet consists of the President, the Vice-President and not more than nineteen ministers of state. Ministers are appointed by the President with the approval of parliament to run the various ministries. The majority of the ministers must be Members of Parliament.

The President is also responsible for appointing Regional Ministers for each of the regions of Ghana, with approval from Parliament. Now, let us ask this question. How many regions are there in Ghana? Can you name their respective Regional Ministers and their Deputies? It is the duty of the Regional Ministers to represent the President in the region. They are responsible for the coordination and direction of the administration in the region. Each Regional Minister is the chairman of the Regional Coordinating Council and the Regional Security Council. The Regional Coordinating Council consists of the Regional Minister and his deputies, the Presiding Member and the Metropolitan, Municipal, District Chief Executive from each metropolis, municipal, and district in the region, two chiefs from the Regional House of chiefs, and the Regional Heads of the ministries.

The Executive also benefits from three key advisory panels: 1) the National Security Council, 2) the National Development Planning Commission, and 3) the Council of State. Although their functions are distinct, they all serve to counsel the government, hold it to account and ensure it is functioning effectively. The National Security Council is responsible for safeguarding the internal and external security of Ghana. It aims to ensure the integration of domestic, foreign and security policy to allow the security services and other government departments to cooperate on matters of national security. The National Development Planning Commission analyses macroeconomic reform options and creates plans and policies for development. The Council of State is an advisory panel of prominent citizens of proven character. Its main function is to 'counsel the President in the performance of his functions.' The Council also advises public officials, including Ministers and Members of Parliament. The Council of State has a key role in holding the Executive to account. The composition of the Council of State is also important. It must include a former Chief Justice, a former Chief of Defence Staff of the Armed Forces, a former Inspector-General of Police, the President of the National House of Chiefs and an elected representative from each region of Ghana.

Key ideas

- The parliament as a useful institution exercises all primary legislative functions
- Some of the leadership in parliament include: the Speaker of Parliament, majority leader, minority leader, etc.
- The judiciary interprets the laws of a given country
- Some of the functions of the judiciary include the following:
    - Interprets the laws
    - Custodian of fundamental rights
- The executive as a useful institution is responsible for implementing the laws passed by parliament

Reflection

- What is the usefulness of Parliament institution?
- What is the leadership of Parliament?
- What is the usefulness of the Judiciary institution?
- What are some of the functions of the Judiciary?
- What is the usefulness of the executive?

Discussion

- How has this session improved your understanding of the Parliament as a useful institution in Ghana?
- How has this session enhanced your understanding of the leadership of Parliament as a useful institution in Ghana?
- How has this session improved your understanding of the Judiciary as a useful institution in Ghana?
- How has this session improved your understanding of the functions of the Judiciary in Ghana?
- How has this session improved your understanding of the Executive as a useful institution in Ghana?

SESSION 5: WHY INSTITUTIONS TEND TO BE INACTIVE

You know what institutions are and why they have been established. Institutions are supposed to play their roles effectively but other factors limit them. Can you guess why institutions tend to be inactive? In this session attempt will be made to look at some of these factors.

Learning Outcomes

By the end of this session, the participant be able to:

- state two factors that make institutions inactive

Factors that make Institutions Inactive

Indifferent attitude of some members

To start with, one says that the lukewarm or indifferent attitude of the members in the institution is a major concern. The institutions may provide the framework within which individuals are to work.

But in a situation where individuals do not show keen interest, such institutions will not be effective. The lackadaisical behaviour, laziness, loitering and pilfering that go on in some public institutions are major reasons that render some government institutions inactive.

Lack of effective supervision

Level of supervision of workers is another major factor. Supervision of workers is efficient and better in private businesses than one can find in the public service. Supervisors and managers take personal interest in their supervisory roles and ensure that workers do get to work early and punctually. They also make sure workers avoid unnecessary loitering and conversation. The result of a strict supervision is that it makes the most efficient use of man-hours and hence, an increase in productivity. One cannot justifiably conclude that the same level of supervision exists in public institutions.

Inadequate facilities

Facilities needed by workers to work with are readily available to private institutions than most government institutions. Government is over-burdened with lot of responsibilities; it finds it difficult to provide most of the equipment and other facilities needed by workers. On the other hand, the survival of private businesses depends on output, they therefore take it as a matter of necessity to provide all that is needed to make their organizations succeed. For educational institution to have real impact, the system must be made to operate efficiently. Constant and reliable provision for educational facilities such as teaching and learning materials, textbook, school buildings are pre-requisite for active institutions. In a situation where they are lacking, the institution will be inactive.

Lack of political will

In some cases, the lack of political will to support the institutions will make them ineffective. For instance, if it is established in the legal institution that there should be equality before the law but the government and her functionaries "stand" above, the legal institution will be inactive in executing its constitutional mandate.

Introduction of western education

It appears that these days the practices of the extended family have been undermined. Can you mention few factors that account for this? Good! Now, let us compare answers. The introduction of formal education has brought about the shortcomings of the extended family system. Formal education has imbibed in people a sense of individualism, especially among the educated elite. People tend to get closer to their immediate families (nuclear families) and spend their resources with them rather than the members of the extended family. With the introduction of western education and western lifestyle, individuals have come into contact with the mass media (video, radio, internet, etc) and through these, they have come to realize the need to prepare and train their children and take responsibilities of catering for their children than rather spending their resources on their nephews and nieces.

The rise of urbanization

In a typical Ghanaian village, members of the extended family sometimes live together in the same compound or around the same vicinity. This enhances effective interactions among members of the family. Well, the rate at which cities are developing have also undermined the practice of extended family system. In cities like Accra, Kumasi, Tamale, Sunyani, and Takoradi, family members may live widely apart and this makes it difficult for them to interact with one another.

More emphasis on academic knowledge to the detriment of skills

Despite all efforts and the role of the school as a useful institution, there are other factors that have undermined the efforts of the school in becoming a useful institution. Let us read on to identify some of these factors. One major factor is that the school lays more emphasis on academic knowledge to

the detriment of skills. Though the school is intended to give both academic and character or moral training, its activities are mostly tailored towards imparting academic knowledge with little or no emphasis on moral training and skill development. As a result, the child is better developed when it comes to knowledge about society and its problems but can do little to help address societal problems. The child's ability to also develop positive attitudes and value is also undermined making the child social misfit. Besides, the syllabus of the school is overloaded and in addition, the child is required to offer all these overloaded curricula within a short period. The school has also not been able to play it role as a useful institution as a result of the refusal of some teachers to accept postings to the rural areas.

Unfaithfulness of members or individuals in the institutions

Again, unfaithfulness of members or individuals in the institutions can cause the institutions to be inactive. For instance, in the marriage institution, couples are supposed to be faithful to each other. Where the faithfulness is not realized, the beauty in the marriage institution will not be felt. We think that you are following the discussion so far advanced.

Lack of dedicated individuals within the institutions

We can also discuss the lack of dedicated individuals within the institutions. For instance, there are many professional teachers in the educational institution who should have taught students to pass well but because of lack of commitment they do not give adequate support to the profession.

Also, some institutions tend to be inactive because people in authority interfere with their activities. For instance, there appear to be many challenges in the chieftaincy institution because politicians impose their candidates and therefore change the dynamics of the traditional rule.

Key ideas

- Some of the factors that make institutions inactive are:
- Lack of effective supervision
- Inadequate facilities
- Lack of political will

Reflection

- What are some of the factors that make institution inactive?

Discussion

How has this session improved your understanding of the factors that make institution inactive?

SESSION 6: WAYS OF MAKING USEFUL INSTITUTIONS ACTIVE

You are welcome to this session. In this session, we shall look at the ways of making our various institutions active as well as the benefits of keeping useful institutions.

Learning Outcomes

By the end of this session, the participant be able to

- list four ways to ensure activeness of the various institutions in our community
- explain three benefits of keeping useful institutions

Ways of making various Institutions in our Community Active

Institutions need to be re-shaped according to the changing need of the times. Institutions therefore must be assessed from time to time, their duties against the needs of the society. Those institutions which have outlived their usefulness should be abolished, and new ones set up to meet the new needs of society. The useful institutions can be made to be active by any of the following ways:

The provision of adequate education and training

One major way of making institutions useful is the provision of adequate education and training to members of the various institutions to better equip them to function effectively. Education and training should cover both technical and vocational skills that will enable them perform their duties efficiently. Through education, the individual becomes abreast with contemporary issues.

Development in members positive attitudes towards the institution

Another way of making institutions useful is the development in members positive attitudes towards the institution. We can talk about punctuality, regularity, commitment to work, a high sense of duty, disciplined, hardworking, among others. These positive attributes will enable members perform their duties as expected of them. This will in the long run result in the attainment of the goals of the institution. They will eschew tendencies such as ethnocentrism, nepotism, favouritism, and the like.

Intensive counselling session

Would-be couples should also be taken through intensive counselling session to adequately prepare them for the marriage. This is because the counselling exposes them to the challenges they are likely to face in course of their marriage and how to overcome those challenges. During the counselling session topics such as conflict and conflict management or resolution, financial management, childbearing, family planning, resource management, home management, sex in marriage, among other important topics are treated. This equips them better to cope with the realities of life.

Society must honour members of the various useful institutions

Society must honour members of the various useful institutions who have distinguished themselves and have contributed immensely to the development of the institution and the society at large. This honour will motivate such people to always make themselves available for national course and it will also whip their interest and enthusiasm in others to contribute to the development of the useful institutions for the benefit of all. Besides, most of the personnel of public institutions are poorly housed and their morale is always low. There is the need for the government to collaborate with other non-governmental organizations to provide adequate accommodation. This will help boost the morale of the workers.

Adequate supply of modern technology

There should also be adequate supply of modern technology especially to public institutions such as the Ghana Revenue Authority, Customs Excise and Preventive Service, among others. This will ensure effective and efficient discharge of duties by the workers. For example, the Ghana Police Service should be given modern equipment such as detectors, cameras, mobile phones, as well as internet services for effective patrol and crime control.

Benefits of keeping institutions

Prevention of confusion in the community

Be told that the kingship system presents and directs status and roles to people who are in particular relations. It therefore outlines the duties, rules, and obligations of individuals and groups in all manner

of life. For example, one gets to know through institutions such as kingship, the descent groups like the clan and lineage, succession and inheritance, the matrilineal system, the double unilateral system and bilateral systems of kingship. The knowledge of this organized system as much as possible prevents confusion in communities.

Provision of basic needs in society

Another institution which is marriage provides the basic institution in every human society. Marriage as an institution has become so useful in the Ghanaian context that every woman and man who gets to adulthood is expected to marry and have children. Marriage aiming at procreation, providing parental care, sustaining the ties of kingship, providing sexual satisfaction, among others is an important institution which cannot be left to chance.

Provision of social and moral values

Family as another institution may be considered as a group of individuals related to one another by ties of consanguinity (blood), marriage or adoption, the adult of which are expected to bring them up in a proper way. As much as possible, the family as an institution ensures social and moral values, cohesion, caring, interdependence and concern for the well-being of members is beneficial in communities.

Encouragement of sanity in society

Let us also consider religion as an important institution. Religion as may be considered as the beliefs and practices associated with the supernatural. The beliefs and practices in religion set people apart to behave in a manner that brings sanity in society. Individuals know the levels and forms of beliefs and practices and what to do to incur and not to incur the displeasure of the deity.

Opportunity for taking part in decision making

We can also talk about the political institutions which orders how individuals or group of people take decision on how they are governed. This institution determines those leaders and followers regarding how they are to be led and followed. For instance, the sovereignty and supremacy of parliament provisions of the constitution are all directed under the political institution.

Development of human capital

Another benefit of institutions, can be understood as helping to develop human capital in terms of knowledge, skills and attitude. Taking the education institution for instance, structures have been put in place so that right from childhood to the university, people are taught in various dimensions to fit well into society.

Regulation of limited resources for a maximum use

Economic institution is also beneficial in the sense that they regulate the limited resources for a maximum use. Economics understood as a wide spectrum of human activity concerned with resources, their limitations and uses, and the organization whereby they are brought in a rational way into relation with human wants. This, according to Nukunya (2011), involves many activities, centred on the management of resources for the satisfaction of human wants, needs and desires. An institution like this helps individuals to prioritize their needs in the midst of scarcity.

Key ideas

- Some of the ways to ensure activeness of the various institutions in our community include:
    - Provision of adequate education and training
    - Intensive counselling
- Keeping useful institutions helps to prevent the confusion in the community, development of human capital, etc.

Reflection

- What are some of the ways to ensure activeness of the various institutions in our community?
- What are some of the benefits of keeping institutions?

Discussion

How has this session improved your understanding of the ways to ensure activeness of the various institutions in our community?

How has this session improved your understanding of the benefits of keeping institutions?

UNIT 6: TOURISM

This unit marks the end of all the units. In this unit, we shall talk about tourism, leisure and scenery. We shall state some of the places in Ghana that attract people from all over the world. Where do you come from? Is your hometown a tourist attraction centre? Can you mention other places in Ghana that attract tourists? Good! This unit shall provide answers to those questions. We shall also look at the reasons why people embark on tourism. This unit shall also discuss the various ways of promoting tourism in Ghana and finally outline the challenges confronting the tourism industry not forgetting the importance of tourism to the economic development of Ghana.

Learning Outcomes
By the end of the unit, the participant will be able to:

- distinguish among tourism, leisure and scenery
- list the attractive Places of Sceneries in Ghana
- explain Why People go on Tour
- state the reasons why people do not show interest in tourism
- discuss ways of promoting tourism
- state the importance of tourism

SESSION 1: MEANING OF TOURISM

In this session, we shall look at the meaning of tourism. We shall also look at the meaning of leisure and scenery. Finally, we shall

Learning Outcomes
By the end of this session, the participant be able to:

- define tourism
- state three classifications of tourism

Definition of Tourism
There is no full agreement on the meaning of the term tourism, nor is there complete agreement on who a tourist is. Tourism may however comprise: The temporary movement of people to destinations outside their normal places of work and residence, the activities undertaken during the stay in those destinations, and the facilities created to cater for their needs. It may also be seen as the activities of a person travelling outside his or her usual environment for less than a specified period of time whose main purpose of travel is other than for exercise of an activity remunerated from the place visited (WTO, 1991). Neither of these two definitions make reference to the impacts of tourism. Impacts are key factors to any discussion of the planning and management of tourism. Most definitions of the term tourist are based on the concept of tourism. Usually, such definitions make reference to the need for the tourist to spend at least one night in a destination to which he or she has travelled. Tourists can be distinguished from excursionists in such definitions, an excursionist is someone who visits and leaves without staying a night in a destination (Prosser, 1998). However, it is relatively common today for the two terms to be used interchangeably. The term visitor is often used in preference to either tourist or excursionist. The distance travelled is often seen as important in definitions of both tourism and tourists. However, there is no commonly accepted international distance used in connection with definitions of tourism. As with the need of at least some definitions to include reference to an overnight stay, there is a good deal of debate and unresolved confusion about distance travelled and tourism definitions.

One of the continuing problems caused by a lack of clear definition of tourism is that tourism studies are often poles apart in philosophical approach, methodological orientation or intent of the investigation. Nevertheless, if there is no complete agreement on the definition of tourism, it is still important to understand the key aspects of the processes of tourism and the reality of being a tourist. The central components of any definition of tourists or tourism are: movement, non-permanent stay, activities and experiences during the travel and stay, resources and facilities required and impacts resulting from the travel and stay.

It will also interest you to know that tourism is multi-dimensional and can be compartmentalized in a number of ways. There are two major variables that are clear in tourism. These are the origin–destination relationship and the motivation for travel. Moreover, the community a tourist visits is often termed the host community. It is usually the destination of the tourist. The host community is therefore the town or city that welcomes visitors and provides them with the desired services. It is the people who live in the vicinity of the tourist attraction and are either directly or indirectly involved with, and/or affected by the tourism activities. Tourism involves some elements of interaction between the tourist and the destination environment.

Classification of Tourism
United Nations classified 3 forms of tourism in 1994 in its recommendations on tourism Statistics as follows:

Domestic tourism. This involves residents of the given country traveling only within that particular country. If you and your family decide to tour this country, that is, visit places of interest such as the Kakum National Park, the Mole National Park, the Accra and Kumasi Zoos, etc, you will be considered as domestic tourists. This is due to the fact that your tour did not cross the boundaries of Ghana. Therefore, all tourism activities that are limited within the geographical borders of a country are termed as domestic tourism.

Inbound tourism. This involves non-residents traveling in the given country. Do you have friends who are nationals of other countries? Well! If they decide to come to Ghana and tour or visit the beautiful scenery of the country, they would be considered as inbound tourists. Have you ever noticed that during the cerebration of national and other festivals in Ghana, foreigners from all walks of life travel to the country to witness these festivals? Some of them even take advantage to visit other places they might have heard but have not seen or visited before. Hello, mention any festival in Ghana that attracts foreigners into the country. Does the festival of the people of your traditional area draw foreigners into your town? Well! Observe that next time and cite it as a case during class interaction with your course tutor.

Outbound tourism. Outbound tourism involves residents traveling to another country. Mention some tourist attraction centers in the world apart from Ghana that you know. Compare your answers to this. We can mention places such as the Great Pyramid of Egypt, the biblical red sea and river Nile, the river Jordan, the east African Rift Valley, Mt. Everest, etc. All these places attract large number of tourists especially during national holidays.

Key ideas

- Tourism may however comprise: The temporary movement of people to destinations outside their normal places of work and residence, the activities undertaken during the stay in those destinations, and the facilities created to cater for their needs.
- Tourism may be classified as either domestic, inbound or outbound

- Domestic tourism involves residents of the given country traveling only within that particular country whereas inbound tourism involves non-residents traveling in the given country. In outbound tourism, residents travel to another country.

Reflection

- State four factors that motivate people to show interest in tourism in Ghana

Discussion

- How has this session improved your understanding of the reasons why people show interest in tourism?

SESSION 2: ATTRACTIVE PLACES OF SCENERIES IN GHANA

In this session, we shall look at beautiful places in Ghana that serve as tourist centers. It will interest you to know that some of these places are mountains, others are rivers, lakes, lagoons while others are forests and national parks. Others also contain wild animals and different plant species. Have you ever visited any of such places? Enjoy your studies in this session.

Learning Outcomes

By the end of this session, the participant will be able to

- List five places in Ghana that attract tourist
- Name three plant and animal species that could be found in those places

Places in Ghana that attract Tourist

Are you aware that Ghana has considerable and diverse tourism assets? Well! These assets have been comprehensively identified in past and current tourism development plans. Ghana's tourism assets are usually organized into four sectors: (1) natural attractions; (2) historical heritage; (3) cultural heritage; and (4) other attractions. These assets can be leveraged with tourism support services, infrastructure, marketing, and the friendly, hospitable disposition of Ghanaians to accelerate tourism growth and employment. Ghana's tourism assets offer opportunities for the development of ecotourism, cultural and heritage tourism, conference and business tourism, leisure tourism, and beach resort tourism.

Natural attractions in Ghana include national parks, resource reserves, wildlife sanctuaries, and wetland reserves. In addition, there are good beaches, lakes and rivers, waterfalls and general scenic beauty. Kakum and Mole national parks are the most developed but Kakum has become the best-known tourism attraction in Ghana because of its canopy walkway. It is located close to Cape Coast in the Central Region of Ghana. Other well-known natural attractions include Boabeng-Fiema monkey sanctuary, Nzulezo stilt settlement, Shai Hills resource reserve, Wli waterfalls and the Volta Lake. These natural attractions provide opportunities for ecotourism, beach tourism, and adventure tourism.

Ghana has a large number of historical and archaeological sites, including forts and castles along the coast, traditional buildings, mosques, churches, and major shrines. These also include forts and castles, along the coast, and Asante traditional buildings. The forts and castles are over 500 years old

and played significant part in the transatlantic slave trade. The traditional buildings include shrines, courtyards, and traditional symbols that illustrate ideas and beliefs of ancient Asante. These historical assets provide opportunities for cultural heritage tourism. In particular, the large African diaspora in the Americas and the Caribbean have a natural affinity for understanding and experiencing Ghanaian history. The vibrant customary life in Ghana includes many festivals.

Adae Kese, Homowo, Odwira, Aboakyir, Hogbestosto, and Damba. Music, dances, traditional attire, decorations, and cultural artifacts also promote traditional authorities and customary life. These provide opportunities for cultural tourism all over the country. Other tourism assets centre around urban areas, especially Accra, Kumasi, and the regional capitals. As the capital city, seat of government and main business centre, Accra provides opportunities for conference and business tourism. Accra is the gateway to Ghana, adequately serviced by flights to international and regional destinations. It has many star rated hotels, including four- and five-star hotels that cater for the business market. It has many conference facilities, the World Trade Centre, the International Conference Centre, trade fair pavilions, universities, a stadium, and shopping malls. There are museums, national monuments, arts and craft markets, restaurants, and entertainment for leisure tourism. Accra also has zoological garden.

Kakum National Park: This Park and reserve occupy about 350km^2 and moist evergreen forest, with some particularly tall trees, in south-central Ghana. Some 40 species of larger mammals live here including forest elephant, bongo, red river hog and seven primate species. About 300 species of birds are known including five hornbill species, the Frazer eagle, African grey and Senegal parrots. Butterflies are particularly rich with over 400 species recorded including some local species. This Park is developed with visitor centre facilities, park headquarters and nature trails. A canopy walkway (see the picture below), made up of series of suspended walkways at the forest canopy level of the rainforest that offers both upper level and ground views, was opened in 1994. This is the first forest canopy walkways in Africa and one of few in the world. Kakum, which is near Cape Coast, attracts an increasing number of visitors.

Kakum National Park Canopy Walk

Crocodile Pond

The popular crocodile pond in Ghana is the Paga Crocodile Pond. It is a sacred pond in Paga in the Upper East Region of Ghana, which is inhabited by West African crocodiles. Due to the friendliness of the reptiles, it has become popular among tourists and the pond is now reliant on tourism to ensure the population of crocodiles remains fed and healthy. The pond is located in Paga in the Upper East Region of Ghana, and is 44 kilometres (27 miles) outside Bolgatanga, the regional capital. It is inhabited by wild West African crocodiles, with some up to 90 years old. The crocodiles are so tame that local children can swim in the pond alongside them without being harmed. Some myth have it that one of the ancient crocodiles of this pond saved the life of the first man who settled in the area, by leading him to the pond to quench his thirst from a long journey. After that incident, the man declared the pond be sacred and the crocodile should be treated as royals. Up till now it's a taboo to harm or kill these reptiles. It is believed that the oldest crocodile is about 85years old.

Crocodiles are naturally wild creatures but not the ones in Paga. Another myth states that a man was trapped against the water's edge by a lion, when he bargained with a crocodile that none of his children would harm his kind if he would kill the lion. It is believed that the souls of the people of Paga reside in these crocodiles. It is an offence to kill crocodiles in Paga, or eat crocodile meat. What's even more stunning is that, no one has ever been harmed by one of the crocodiles. Young children swim in the pond and Ghanaians along with tourists are invited to touch and practically play with the reptiles. The people of the town wash clothes next to the bumpy ridges of the crocodiles' jaws without a hint of fear. Even more remarkable than the docile nature of this crocodile population, is how these massive crocodiles made the pond their home. The pond is completely landlocked and apparently the oldest beasts in the water are over 80 years old. Yet here they are, ready and waiting for tourists to feed them live chickens, sit on them, or lift their spiny tails.

The crocodiles at Paga are very friendly. Visitors can sit, touch and take photographs with the crocodiles. The crocodiles roam freely throughout the ponds, and are brought to the shore when the guides whistle loudly. Tourists can then take photographs while holding the crocodile's tails, after the guide has fed them a chicken. There are concerns that the pond is now too reliant on tourism, with the elderly crocodiles requiring specialist care, and the only time additional food is provided to the reptiles is when tourists pay for the chickens when they pose for photographs. One of the pleasant tourist attraction spots you should not miss when you are in Ghana is the Paga Crocodile Pond in the Upper East region which is very close to the Burkina Faso border. This famous pond is filled with some of the biggest crocodiles in the world.

These crocodiles coexist with humans and their friendly interactions with humans baffle the minds of many tourists. It is also believed that the soul of every native of this village has a corresponding crocodile in the pond. It will interest you to know that the death of most of the important personalities in the town coincided with the deaths of some of the biggest crocodile in the sacred pond.

Crocodile Pond

Botanical Gardens: Botanical gardens relate to natural attraction scenes. The main botanical garden in Ghana is at Aburi located in the Eastern Region and first developed some 100 years ago. Aburi Botanical Garden has an attractive park. It has a variety of trees and other plants, accommodation, restaurants and craft shop. The garden occupies an area of 64.8 hectares. It was opened in March, 1890. Before the garden was established, it was the site of a sanatorium built in 1875 for Gold Coast government officials. During the governorship of William Brandford-Griffith, a Basel missionary supervised clearing of land around the sanatorium to start the Botanic Department. In 1890 William Crowther, a student from the Royal Botanic Gardens, Kew, was appointed the garden's first curator. The gardens played an important role in encouraging cocoa production in South Ghana, by supplying cheap cocoa seedlings and information about scientific farming methods. After Hevea Brasiliensis was sent to Aburi from Kew in 1893, the gardens also encouraged rubber production in Ghana.

The beauty and uniqueness of this garden stem from its relatively bracing, relieving climate and the lushly scenic setting. Its serenity makes it an ideal place for the stressed who wants relief, the writer who wants solitary to write, the thinker for reflections, newlyweds for honeymoon, campers, nature lovers, recreationists and sanatorium for the recuperating. It is also an excellent place for picnic activities. Butterfly and bird lovers would love Aburi Gardens for the presence of many species of butterflies and birds that would come so near as if wanting to perch on one’s head. Another delight of Aburi Botanic Garden is the blossoming mixture of indigenous and exotic trees of global importance, aesthetics and medicinal properties. Among the many exciting attractions within the garden are The Bush House, The Rock Garden, The Pergola or Lovers lane, The Ficus tree, the retired helicopter, and the school of horticulture. The bush house, which is a relic of history, is an open shed with thatched roof supported on stone pillars. The floor is made of mud and decorated weekly with red clay as is practiced in rural Ghana.

There are two bamboo groves one on either side of the house. These have formal bamboo hedges and in front of the house are collections of species of exotic flower plants so beautiful that you will forever keep remembering them even long after you have left the garden.

On the lawn surrounding the Bush House is the very sensitive plant called mimosa pudica. When you visit the Bush House, remember to touch any of the mimosa and look at what happens. The famous

Ficus tree that was first discovered in 1906 has successfully strangled its host and has now taken its place. For the evidence, ask for the Ficus tree when you find yourself within the garden. There are also many species of medicinal and economic plants reserved to be managed for conservation of plant genetics.

Aburi Botanical Garden

Botanical Garden

Zoos

Kumasi Zoo

The two zoos in the country are in Accra and Kumasi. The **Kumasi Zoo** (Kumasi Zoological Garden) is a zoo located in the heart of Kumasi in the Ashanti Region of Ghana. The zoo occupies a 1.5-square-kilometre (370-acre) area between the Kejetia Bus Terminal, the old race course and the Kumasi Centre for National Culture. The zoo was established in 1951 and officially opened in 1957 by the Asanteman Council to conserve nature and display indigenous wild animals of Ghana. It has about 40 different species of animals, with individual animals numbering over 135. A notable feature is the thousands of bats that rest on trees in the zoo. Managed by the Wildlife Division of the Ghana Forestry Commission, the City centred walled Kumasi Zoo can boast of a green urban area and several animal species like primates, rodents, reptiles, ungulates, carnivore and birds which provides a splendid tourism spectacle worth paying for. The Kumasi Zoo happens to be the only active Zoo in the hospitable and peaceful West African nation of Ghana following the closure of the Accra Zoo to make way for the construction of a presidential palace.

The Zoo was established with the aim of conserving wildlife in the Ashanti Kingdom and also to display local fauna in captivity to satisfy the curiosity of the viewing public. By extension, apart from generating revenue, the highly patronized zoo is to also promote the Ashanti culture to people of all walks of life as well as to offer a serene place for relaxation and recreation for visiting local and international tourists. Statistics have it that amidst strong competition from other significant tourist sites in Ghana and the sub region as a whole, the Kumasi Zoo at the end of the year 2011 hosted over 97,000 visitors therefore endorsing the claim that it is one of the main points of call for anyone who visits the Ashanti Regional capital of Ghana. The popularity of the Zoo can obviously be attributed to the hospitable nature of the people of the Ashanti Region just like any Ghanaian national as well as the strategic location the Zoo is situated. The closeness of the zoo to one of the most visited sites in Ghana, the Kumasi Cultural Centre also plays key factor in the popularity of the Zoo. Means for accommodation for visitors to the Kumasi is no problem since the Garden City of Kumasi has several international hotels to select from.

Accra Zoo

The Accra Zoo is located when travelling north on the Independence Avenue, past Sankara Interchange and look for Afrikiko Restaurant; turn left and follow the signs leading to the zoo. This is a small, but fascinating, collective of many birds and animals indigenous to Africa. Some of these animals that are worth a visit include the monkeys, snakes, lions, leopards, crocodiles, duikers among others. Interestingly, the zoo was once part of Kwame Nkrumah’s estate. His original house (in its original condition) is still located adjacent to the zoo.

Zoological Garden

Waterfalls of Ghana

Kintampo waterfall is one of the highest waterfalls in Ghana. Also known as **Sanders Falls** during the colonial days, it is located on the Pumpum river, a tributary of the Black Volta, about 4 kilometres (2.5 mi) north of Kintampo Municipality, on the Kumasi–Tamale road. This waterfall, one of the main natural attractions in the area, is hidden in the forest and it is formed by 3 main drops where the longest drop measures 25 metres (82 ft) in height, and, after a number of steps and cascades, the river falls about 70 metres (230 ft).

Boti falls is a twin waterfall located at Boti in Manya Krobo in the Eastern Region of Ghana. These twin falls are referred to as female and male. It is located 17km North-east of Koforidua, which is the Eastern Regional capital. It is just over 30 minutes' drive from Koforidua and over 90 minutes from Accra depending on the means of transportation. This waterfall features two falls, side-by-side and are accessed via a scenic descent via 250 concrete steps to the bottom of the falls. A somewhat strenuous hike to Umbrella Rock can also be found from the visiting centre. The view from Umbrella Rock is unforgettable, but we recommend doing this in the cool of the morning.

Akaa falls: These falls are a mere 7km from Boti Falls and are also seasonal in nature. Like Boti Falls, these falls are also accessed via scenic 250 concrete steps to the bottom, where a canyon of water can fall around you from three sides if the flow is good. Lookout rock is a nearby attraction that you may visit when at the falls. After climbing a somewhat frightening bamboo ladder, you arrive at the top of a large flat rock that looks out over an amazing forest vista. It is quite an incredible experience.

Wli Falls: Wli Falls are located about 20km from Hohoe, in the Wli Natural Reserve. An hour walk through cool shades of the forest will lead you to Ghana's highest waterfalls which flow throughout the year. It is located at the edge of the Agumatsa Wildlife Sanctuary, which has hundreds of fruit bats. There are a couple of guesthouses at the falls for an overnight experience. Note that Wli Falls also has an upper falls. It is a very strenuous hike and generally cannot be done during the rainy season. But if you are adventurous, healthy and strong, it is a worthy goal to reach the rarely visited upper falls.

Water Fall

Kyabobo National Park: This Park covers about 360km^2 of hilly land in the dry semi-deciduous forest zone in the central-eastern part of Ghana, next to the Togo border. The range of hills rises to 150 metres and the many waterfalls add to the scenic interest of the area. Mammals in the park include elephant, lion, leopard, buffalo, four primates and several antelope species.

Digya National Park: This Park occupies 3,478km^2 of undulating land with sandstone inselbergs situated on the western shore of Volta Lake. Guinea savanna woodland predominates with gallery forest along the major river courses. Animals include at least six primate species monkeys, elephants, and a variety of antelopes. Manatee and clawless otter are reported to live here.

Boaben-Fiema Wildlife Sanctuary: This small sanctuary of 4.4km^2 was established to help the local community protect the resident black and white Colobus and Mona monkeys that are important in their cultural beliefs. The monkeys live with the people and can easily be seen in the village near the forest sanctuary, the forest also contains interesting vegetation and a rich butterfly population.

Kogyae Strict Nature Reserve: This 386km^2 reserve in central Ghana is situated in the transitional semi-deciduous forest zone and has areas of open woodland and grassland. The 26 species of mammals listed buffalo, five primates and a variety of antelopes. About 85 species of birds have been recorded.

Bomfobiri Wildlife Sanctuary: This 53km^2 reserve contains remnants of semi-deciduous forest with savanna meadows. Three species of crocodile live here along with 25 species of mammals including four primate species, duikers and red river hog. Among the bird species is the threatened bareheaded rock fowl. Bomfobiri waterfalls are a scenic attraction.

Owabi Wildlife Sanctuary: This sanctuary is 13km^2 focuses on a reserve and is designated as a "Ramsar" (International programme for conservation of important wet lands) site. The secondary forest contains several primate and antelope species including black duiker.

Bia national park and Bia Resource Reserve: This 306km^2 park and related reserve have been designated as an International Biosphere Reserve Park. It is situated in the transition between the moist evergreen and semi-deciduous tropical forest of southwestern Ghana. The 62 species of mammals recorded here include ten primate species including three species of Colobus monkey, the chimpanzee, forest elephant and threatened bongo. Over 160 species of birds are listed including the threatened white-breasted guinea fowl.

Nini-Suhien National Park and Ankasa Resource Reserve: This Park and reserve cover 490km^2 of pristine wet evergreen forest with great biodiversity of up to 300 plant species per hectare. Still largely unexplored and researched, 43 mammal species have been recorded including bongo, forest elephant, ten primate species including endemic Diana monkey and endangered West Africa chimpanzee. This rich birdlife includes parrots and hornbills and the rare white fronted guinea fowl.

Shai Hill Resource Reserve: It occupies 48km^2 of the Accra Plains. Shai Hills Reserve, which includes Krobo Hills, is made up of 200 metre granite hills covered in a dry evergreen forest. This was the ancestral home of the Shai people. Kro, bushbuck and oribi and three primate species can be seen. The birdlife is rich with over 160 species recorded including ground hornbills, bustards and parrots.

Kalakpa Resource Reserve: It is located in south-eastern Ghana. This reserve covers 320km^2 of savanna grassland with riverine woodland, isolated hills with dry forest and extensive grooves of Borassus palms. Nineteen species of mammals are recorded including buffalo, several duikers, keba and serials. When the wildlife population has increased, this reserve will be opened for game viewing.

Key ideas

- There are several attractive places in Ghana which draw people from all over the world. These include the Kakum national park, Digya park, Mole national park, Cape Coast castle, Elmina castle, Paga crocodile pond, etc.
- These attractive places have plants and animal species

Reflection

• Identify any five important places of attraction in tourism in Ghana
Discussion • How has this session improved your understanding of some of the attractive places that draw people into our communities? • How has this session improved your understanding of some of the plants and animals that are found in those attractive places?

SESSION 3: FACTORS THAT MOTIVATE PEOPLE TO GO ON TOUR

In this session, we shall look at the reasons why some people embark on tourism. Can you mention any two? Compare your answer to what we have discussed below.

Learning Outcome

By the end of the session, the participant be able to:

- state four reasons that motivate people to go on tour

Reasons that motivate People to go on Tour

Motivations for travel

In any tourism trip, there are likely to be a number of reasons which, when combined, can be considered as the motivational factors for the journey. These can be characterized as 'push' and 'pull' factors. The 'push' factors are a number of perceived negative factors about the context in which the potential tourist currently finds himself or herself. The 'pull' factors are perceived positive factors of a potential or real destination. The nature, extent and significance of particular 'push' and 'pull' factors will vary according to the particular tourism context.

Relaxation and refreshment of body and mind: Some people go on tour to relax and refresh the body and mind which is becoming ever more necessary in modern life due to strain and stress. There is the saying that all work and no play makes jack a dull boy. In order to have a stronger body system, the body must rest and relax for a while. Let me ask you this question: have you ever thought of the reasons why there are holidays all over the world? I believe that one of the reasons is to ensure that workers get enough time to rest so that they can become productive in discharging their duties.

Health purposes: Some people go on tour to have fresh air and sunshine, and often winter warmth, and sometimes to take a bathe in medicated waters or undergo special medical treatment. It will interest you to know that some people embark on tourism for the purpose of changing their environment. For medical reasons, people leave their homes to serene environment where they can enjoy noise free atmosphere. Others also leave their homes to places that are free from pollution – air, water, and land.

Sporting activities: Some people move away from their homes to take active part in a wide variety of sporting activities such as walking, jogging, mountaineering, etc. This is what most people term as sport tourism. They move from one place to another with the intention to enjoy varied sporting activities. Such people take delight in sport and are able to release stress from such sporting activities. Have you ever embarked on any sporting tourism outside your community? If yes, what was your experience? If no, I will recommend one for you.

Pleasurable and excitement: Some people go on tour for sheer pleasure, fun and excitement. Where individual desire for pleasure is very strong, he or she travels alone or joins a holiday making group as a means of satisfying his or her desire. Such individuals sometimes visit places such as the beach, national parks, and zoological gardens, among others. During holidays in Ghana just as in other parts of the world, a lot of people are seen swimming in the sea. Have you ever observed this? If no, then visit any of the tourists' centres in your community during national holidays and you will find answers to this question.

Some places in the world have unique historical importance. Such places were used for one purpose or the other by our forefathers. With the emergence of modernity, some of these places have outlived their purposes. Examples include the castles, forts, houses of great persons, etc. Have you heard of the great Pyramids of Egypt? Good! Some people go on tour to see some of these special places which have important historical monument or cultural association or places holding special association. It must also be pointed out that some of these places hold special festivals in art, drama, enstoolment of a king, etc. For instance, the celebration of Fetu Afahye, Aboakyir, Kundum, etc. Let me ask you this question. What kind of festival is celebrated by the people of your traditional area? Do people come around to observe it?

Key ideas

- There are several reasons that motivate people to show interest in tourism especially in Ghana. These reasons include motivations for travel, relaxation and refreshment of body and mind, for improvement of health, sporting activities, pleasurable and excitement, etc.

Reflection

- State four factors that motivate people to show interest in tourism in Ghana

Discussion

- How has this session improved your understanding of the reasons why people show interest in tourism?

SESSION 4: WHY PEOPLE DO NOT SHOW INTEREST IN TOURISM

In this session, we shall discuss some of the reasons why people do not show interest in tourism. Before that, let me ask you. Do you show interest in tourism? If your answer is no then what accounts for your disinterest in tourism? Are your reasons in line with the reasons we have outlined below?

Learning Outcomes
By the end of the session, the participants be able to:

- state four reasons why people do not show interest in tourism

Reasons why People do not show Interest in Tourism

Ghana as high cost destination
Ghana is considered an expensive tourist destination due to the high cost of hotel accommodation, air transport, and visa fees. DTHE cost could be as a result of the high cost of constructing hotel, high taxes and high fuel and electricity costs. A cursory look at the tourism industry reveals that more than 12 different taxes and levies are paid to various government agencies each year. These include Fire Service levies, environmental levy, Tourism Development levy, Ghana Tourism Authority levies, as well as Food and Drug Authority and Metropolitan, Municipalities, and District Assemblies licenses.

Frequent power outages, high fuel costs and utility tariffs, as well as the large depreciation of the cedi against major foreign currencies have significantly increased operating costs in recent years and have led to the closure of some tourism establishments.

Inadequately resourced and funded tourism industry

Marginal resources have been devoted to developing and promoting the sector. Tourism is still narrowly viewed as tourists and hotels. In many quarters, the tourism industry is still seen as a thing of the past - a plaything for the previously privileged class. Most roads leading to some of these tourists' sites are nothing good to write home about.

Inadequate training, education and awareness

Have you ever visited any of the major tourists sites in Ghana such as Kakum National Park, Mole National Park, Ankasa Game Reserve, Boti Waterfalls, and Lake Bosomtwe? Well, if your answer is yes, well done. On the other hand, if you have not, what would you attribute it to? Perhaps, your answer is lack of adequate public education on the existence of those places. The key players in the tourism industry have not put in place enough measures to educate the general public and the international community about the significance of tourism. Due to this, majority of Ghanaians lack adequate knowledge on the location of tourist sites in the country.

This is sad because if we are unable to provide the needed public education to our own people, then how then do we think that outsiders would show keen interest in tourism? Sensitization and awareness programs are also lacking. These could easily be done through the mass media among others. Besides, most of the tour guides in the tourism industry lack the requisite training that would enable them provide the needed services to tourists. Another major challenge to the tourism industry is the absence of adequate education, training and awareness opportunities. Majority of the people in this country and beyond do not have much information about what goes on in the tourism industry. Skills training at the lowest levels (e.g. barmen, cleaners, porters) are mainly done on an in-house basis.

Inadequate environmental management

Do you know that Ghana is an incredibly unique and rich country? Do you also know that the country has a well-maintained network of protected areas and is globally renowned for its conservation practices? Despite this excellent record in conservation, Ghana is also one of the environmental "hot spots" in the world with 2,000 plant species on the endangered list. Are you surprised? Wait! In addition to that, poor coastal zone management and, in certain instances, unplanned development, aggravate the environmental problems. Ghana has no formal requirements for environmental and social impact assessments to be carried out.

A major threat to the further development of the tourism industry and indeed the sustainability of the population of Ghana is the rapid degradation of the environment. Among the population at large, there is an alarming disregard for the environment; litter has become a national problem; open defecation, washing in water bodies, little awareness of the benefits of conserving the environment among the majority of the population; and for many, environment conservation is rather a luxury - finding jobs and food to eat take priority. Ghana does not as yet have an integrated approach to environmental development and conservationists consider the country to have an extremely poor record in land-use planning. The poor protection of the environment in Ghana will continue to curtail the tourism sector's development.

Poor service

The tourism industry is also facing the problem of a general culture of poor service. Majority of the services provided by the tourism industry are not up to standard that can satisfy the customer. The problem is that this seems to be an accepted norm by the bulk of domestic tourists. Most hotel

industries have been characterized by a limited degree of competitiveness. There are also negative attitudes which exist within the industry towards community tourism products which are sometimes viewed with skepticism and regarded as inferior. There is often a view that what is white and Western is best. The value of the previously neglected people, their culture and their products often tend to be depreciated.

Poor infrastructure and tourism support services at tourism sites

The country lacks adequate infrastructure and tourism support services at most of its tourism sites. Have you ever visited any of the tourist sites in rural areas where most of the attractions are located? What was the nature of the roads? It is often said that Ghana has one of the best infrastructures in the world. However, these infrastructures are limited to the urban centres, which severely limit the participation of people in tourism in the rural areas. Inadequate transportation; poor road networks to tourist sites; poor accommodation, restaurants, and rest stops; and lack of ATM facilities are identified major challenges. It does not mean that there are no world-class hotels and restaurants. There are a few world-class hotels, restaurants, and resorts which are located mainly in major cities – especially Accra and Kumasi. Private operators expect government to provide basic infrastructure, but this is not happening at most tourism sites. In addition, the absence of adequate transportation services prevents rural tourism.

Inadequate investment in the tourism sector

There are attractive opportunities to diversify and grow Ghana's diverse tourism potential in ecotourism, beach tourism, cultural heritage tourism, and conference and business tourism and yet this is not being realized. Most private tourism operators recognize Ghana's potential but they are unable to take advantage of opportunities because they do not have access to affordable capital. There are limited sources of long-term capital for tourism investments.

Tourism security

In addition to the above-mentioned problems, tourism security has been a major issue. It is estimated that the major constraint to tourism growth is the actual and perceived levels of accidents and crime. Well-publicised incidents involving tourists as well as high levels of crime affecting the local population who invariably play host to significant numbers of foreign visitors, significantly constrain overseas tourism growth. Most tourists meet their untimely death in tourist sites. Do you remember the accident that occurred in Kintampo in the Brong Ahafo Region? Good! A rainstorm that claimed the lives of over 20 tourists. In some places, tourists are either devoured by wild animals or get drawn in rivers and seas. Others, because of being allergic to new environment, suffer all kinds of ailments. Also, some indigenous people take advantage of the foreigners and extort them and even make away with tourists' valuable items.

Key ideas

- There are several reasons why people do not show interest in tourism especially in Ghana. These reasons include health, economic, financial, religious, security, poor infrastructure, and poor service offered by stakeholders.

Reflection

- State four reasons why people do not show interest in tourism

Discussion

- How has this session improved your understanding of the reasons why people do not engage in tourism?

SESSION 5: WAYS OF PROMOTING TOURISM

In this session, we shall consider the ways of promoting tourism especially in Ghana.

Learning Outcomes
By the end of this session, you participant will be able to:

- examine five ways of promoting tourism in Ghana

Ways in which tourism is being promoted in Ghana
Some ongoing initiatives to boost the tourism sector include:

A National Tourism Development Plan (2013–2027) has been formulated to serve as the framework for the development of the tourism industry over the next 15 years. The plan provides a comprehensive analysis of Ghana tourism, including tourism resources, institutional and policy framework, tourism infrastructure and services, marketing of Ghana tourism, a tourism statistical system, conservation and environmental issues, and community involvement. The plan aims to consolidate and enhance existing resources in the Accra-Kumasi-Cape Coast triangle and develop new attractions along the beaches and the north-south Volta Lake corridor. The plan articulates the need to develop strategies to market Ghana tourism in targeted international and regional markets. Ministry of Tourism, Culture and Creative Arts (MTCC) and its agencies are implementing the first phase of the Tourism Development Plan, spanning 2013–2017. There is ongoing capacity building at MTCC, GTA, and Hotel, Catering and Tourism Training Centre (HOTCTTC) as well as restructuring of the institutions to improve coordination and effectiveness. MTCC is working with UN World Tourism Organization to seek funding to develop management and master tourism plans for selected tourism resources, including Elmina Castle, Kakum National Park, Kumasi Craft Villages, and Mole National Park. An Accra Visitor Information Centre is close to completion.

A Tourism Development Fund has been set up under the Tourism Act to provide funding for tourism and tourism-related projects and programs, including tourism marketing and capacity building. The Tourism Development Fund is to be financed from a one percent tourism levy payable by patrons of tourism enterprises on goods and services consumed as well as earnings from the fund's operations and investments. Stakeholders have pointed to a number of challenges for the fund. The system to collect the levy is not well developed and stakeholders have not agreed upon a formula for disbursing the funds. The levy has been applied since October 2012 and had accrued GHC 8 million as of September 2014. Star rated hotels contributed 85%, budget hotels contributed 10%, and catering services contributed 5%.

Various incentives are provided under the new Ghana Investment Promotion Centre Act, 2013 (Act 865) to help the private sector boost investment in the tourism sector. These include five-year tax holidays and reduced income tax rates of 20%, though enterprises located outside of regional capitals pay 12.5% income tax. Duty exemptions are also given to new hotels for imports of essential equipment such as refrigerators and air-conditioners. However, stakeholders have pointed out that the facility has been abused, with some operators overestimating their needs and selling the rest in the open market for profit. This has prompted tighter measures and applications for duty exemption are now reviewed on a case-by case basis.

Ghana Tourism Authority has proposed to extend the process of grading and licensing to restaurants, car rental agencies, and travel and tour operations in order to improve the quality of service delivery. Previously, only hotels facilities were graded. GTA is also working with Ghana Hotels Association to develop a standards document that will harmonize hotel service operations to improve quality service delivery and guest satisfaction. The Skills Development Fund, a government initiative, has released over GHc15 million to Ghana Tourism Federation (GHATOF) member

associations to upgrade the skills of service providers in safety and hygiene. GHATOF is also collaborating with HOTCATT to train 300 school leavers for the hospitality industry and 200 industry service providers through mobile training programs.

To address problems in data collection and harmonization in the tourism industry, a multi-sectorial stakeholder committee has been established to facilitate the development of a Tourism Satellite Account (TSA) for Ghana. The objective of TSA, an initiative of the UN World Tourism Organization, is to organize statistical data on tourism from a variety of sources to fully assess the impact of tourism on the economy and its relationship to other sectors. The TSA committee has representation from the MTCC, GTA, Ghana Immigration Service, and Ghana Statistical Service, among others.

Key ideas

- Tourism in your community can be improved through the establishment of tourism fund, conservation of biodiversity, provision of quality tourism facilities, construction of roads leading to tourism centres, etc.

Reflection

- What are the relevant measures that could be put in place to improve tourism in your community?

Discussion

- How has this session improved your understanding of the ways in which tourism in your community can be improved?

SESSION 6: IMPORTANCE OF TOURISM

In this session we shall look at the importance of tourism in Ghana. We shall also look at some of the challenges facing the tourism industry in Ghana. We hope you will enjoy this session as well. Let us join hands in explaining this.

Learning Outcome

By the end of the session, the participant will be able to:

- state four importance of tourism in Ghana

Importance of Tourism in Ghana

Tourism can be an engine of growth, capable of dynamising and rejuvenating other sectors of the economy. The major importance of tourism in Ghana have been explained below,

Tourism represents a significant opportunity for Ghanaians

Employing 212 million people world-wide, generating $3.4 trillion in world gross output and contributing $655 billion of Government tax revenues, travel and tourism is the world's largest industry.

Tourism is the world's largest generator of jobs

The World Travel and Tourism Council estimates that travel and tourism is now the world's largest generator of jobs. In 1995, the industry provided direct and indirect employment for 212 million

people; accounted for 10.7% of the global work force and provided one in every nine jobs. Between 1995 and the year 2000 travel and tourism added one new job every 2.5 seconds and created 125 million new direct and indirect jobs. Tourism already creates 480,000 jobs in Ghana.

The tourism industry creates entrepreneurial opportunities
The tourism industry accommodates a thriving and dynamic informal sector - from craft and fruit vendors to beach vendors, chair rentals, and others. Apart from the opportunities provided in the informal sector, there are many business opportunities to involve previously neglected groups in the tourism business: entertainment, laundry and transportation services, craft rental; arts, craft and curios sales; tour guides and walking tours of places of interest; teaching of African languages and customs to interested visitors; restaurants emphasizing local cuisine; guest houses; beach manicures and pedicures; and much more.

Tourism brings development to rural areas
Many of the prime tourism attractions are not located in the city centres but in the rural areas. Tourism allows rural peoples to share in the benefits of tourism development, promoting more balanced and sustainable forms of development. Tourism provides an alternative to urbanisation, permitting people to continue a rural family existence, enfranchising both women and the youth.

Well-managed tourism is kind to the environment
Unlike the mining and other smoke stack industries, well-managed tourism can help to save the environment. Many forms of tourism development rely on maintaining and even repairing the landscape and its natural features (lakes, rivers, estuaries and wildlife areas). Wildlife tourism - especially in arid regions of the country - is dependent on the restoration of natural vegetation and soil cover. Many State and Private sector projects have spent large amounts on rehabilitating land damaged by commercial farming and other forms of land-use. Tourism which is responsibly practiced furthermore allows for the protection of biodiversity on land used for its purpose.

Tourism builds cross-cultural relations and is a vital force for peace
Through its inherent message of goodwill, hospitality, trust, service without servility, tolerance, interaction and communication, tourism is a most effective mechanism for fostering national and international cultural exchange and understanding among people. It is, therefore, an effective nation-builder and a strong incentive and reason for peace.

Tourism is a final good
Tourism is not a primary export item (like coal, copper and iron ore) that adds little value. Tourism is a final good. This means that all the final touches (value) have to be added in Ghana - be it a taxi ride from the airport, a basket of fruit or flowers in the hotel room, wildlife viewing, binocular rental, skyscraper tour, dive instruction or a meal in a restaurant. This means that the value added in final stages of production is created in Ghana.

Tourism is a foreign exchange generator par excellence
International tourism is the only export item which is exported without leaving the country. This means that every taxi taken, every banana, lychee, mango, orange eaten, every chair sat on or bed slept in, brings in valuable foreign exchange.

Tourism demand is continuous
The consumption of travel takes place over one's lifetime. A holiday taken today does not reduce the demand for the holiday next year, next month or next weekend. This means that the potential market for tourism will continue to grow.

Key ideas

- Tourism is important in several ways. These include the creation of employment, conservation of the environment, generation of revenue to the government, source of livelihood for local dwellers, etc.

Reflection

- Identify any four relevance of tourism to your community.

Discussion

- How has this session improved your understanding of the usefulness of tourism to your local community?