BASIC SCIENCE FOR Junior Secondary School 3

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JSS3
BASIC SCIENCE
FIRST TERM

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Week 1 & 2

Topic: Drug Abuse III

Introduction

Drug abuse means taking drugs not according to doctor's prescription. It could be by either taking overdose or under dose. Some common hard drugs that are easily abused or misused are heroin, cocaine, valium, madras and Indian hemp. People who abuse drugs easily are athletes, prostitutes and criminals.

Modes of Drug Abuse

1. Self Injection – This involves injecting drugs directly into the blood stream through capillaries, arteries or veins. Injecting drugs is the fastest method for experiencing the high from drug use because it puts the drug directly into the bloodstream. Drugs can be injected into the soft tissue, into the muscle or directly into the vein. Individuals who inject drugs will experience the high within 3 to 5 seconds (immediately).
2. Sniffing/Inhaling/Snorting – Some individuals snort/sniff drugs such as ecstasy, cocaine, heroin and amphetamines. Drugs enter into the bloodstream through the nasal mucus membranes and through the stomach. Individuals snorting/sniffing drugs will experience the drug sensation within about 15 minutes after snorting their drugs.
3. Absorption through the skin – Drugs used in this form are mild body creams. Some are used to maintain the skin while some are used to treat skin diseases.
4. Oral/Swallowing – Ingesting or swallowing drugs is the most common method of drug use. The individual takes the drugs by mouth. The drugs pass to the stomach and then into the bloodstream
5. Rectal – Drugs are delivered into the bloodstream through the rectum's mucus membrane. This is not a common method of drug abuse, drugs that have been taken using this method are cocaine, speed and ecstasy.
6. Smoking – This method gets the drugs into the body's system a bit faster than swallowing the drugs because the smoke goes into the lungs where it quickly moves into the bloodstream. The most common drugs that are smoked are marijuana, heroin, crack and opium.

Effects of Drug Abuse

Drug abuse has so many negative effects, which are:

1. Drug abuse hurts the people who take drugs and the people around them, including families, kids, and babies who aren't yet born.
2. It can lead to damaged nostrils and lungs.
3. It can lead to skin rashes.
4. It can lead to injection abscesses.
5. It can lead to poor academic achievement.
6. It can lead to uncontrollable sexual urge
7. Drug abuse sometimes lead to death
8. They are usually lazy and have wrong attitudes to work
9. Excessive smoking damages the lungs and ruins the health of smokers for life.
10. Regular take of drugs make a person dependent on the drugs and feel cannot do anything else without the drugs.
11. Excessive drug intake can make a person go insane or develop mental problem
12. It can lead to accident
13. It can lead to stomach upset.

Prevention of Drug Abuse

1. Inculcation of Coping Skills: this should involve the determination to stop the abuse of drugs and the need to get rehabilitated.
2. Positive Social Interactions: These should involve avoiding peer partners that are drug abusers as well as not associating with those friends who smoke cigarettes and drink excessively.
3. Healthy Lifestyle:

- Youth should avoid self-medication when they are sick.
- They should avoid smoking and excessive drinking of alcohol.
- They should eat good food (balanced diet) always.
- People should control their desires and appetite.
- There should be open campaign against drug abuse.

- There should be public teaching (enlightenment) through the use of posters and public address system against drug abuse.

Drug Control Agencies

In Nigeria, the drug control agencies are:

National Agency for Food Drug Administration and Control (NAFDAC):

1. The agency ensures that adulterated food is not sold to the public.
2. Ensures that proper quality control of manufacture food is maintained in the industries.
3. Ensures that expired food substances are not sold to Nigerians.
4. Ensures prosecution of offenders to the rules and regulations guiding the manufacturing and sale of processed food materials.
5. Creates enlightenment programme for food manufacturers and vendors.

National Drug Law Enforcement Agency (NDLEA):

1. The agency monitors the movement of hard drugs in and out of the country.
2. Ensure that drug barons are severely punished according to the laws of the country.
3. Organizes orientation and rehabilitation programmes for hard drug users who might wish to give up the habit.

Assessment

- Briefly explain five modes of drug abuse
- List seven negative effects of drug abuse
- Mention five ways to prevent drug abuse

Basic Science JSS 3 First Term

Week 3

Topic: Family Traits (Genetics)

Meaning of Genetics, Heredity and Variation

Genetics: is defined as the study of heredity and variation in living things.The study of heredity, or how the characteristics of living things are transmitted from one generation to the next. Every living thing contains the *genetic* material that makes up DNA molecules. This material is passed on when organisms reproduce. The basic unit of heredity is the gene.

Genetics is the process of a parent passing certain genes to their children. A person's appearance — height, hair color, skin color, and eye color — is determined by genes. Other characteristics affected by heredity are:

- Likelihood of getting certain diseases
- Mental abilities
- Natural talents

An abnormal trait (anomaly) that is passed down through families (inherited) may:

- Have no effect on your health or well-being — for example, the trait might just cause a white patch of hair or an earlobe that is longer than normal
- Have only a minor effect — for example, color blindness
- Have a major effect on your quality or length of life

Heredity (Inheritance): is defined as the transmission of characters from parents to offspring via genes. It is responsible for the similarity and small differences between parents and offspring. Heredity is the sum of the qualities and potentialities genetically derived from one's ancestors. It is also defined as the transmission of traits from ancestor to descendant through the molecular mechanism lying primarily in the DNA or RNA of the genes. Heredity is the passing of phenotypic traits from parents to their offspring, either through asexual reproduction or sexual reproduction. This is the process by which an offspring cell or organism acquires or becomes predisposed to the characteristics of its parent cell or organism.

Variation: is defined as the differences which exist between parents and offspring as well as among the offspring. *Variation*, is any difference between cells, individual organisms, or groups of organisms of any species caused either by genetic differences (genotypic *variation*) or by the effect of environmental factors on the expression of the genetic potentials (phenotypic *variation*).

Therefore, family traits are those inherited characters, which show variations among members of a family. The features that you use to recognize the parents of each child are called Family Traits. These traits are transmittable characters which are passed from parents to offspring from one generation to another. Some characters that are genetically transferred from parents to offspring include

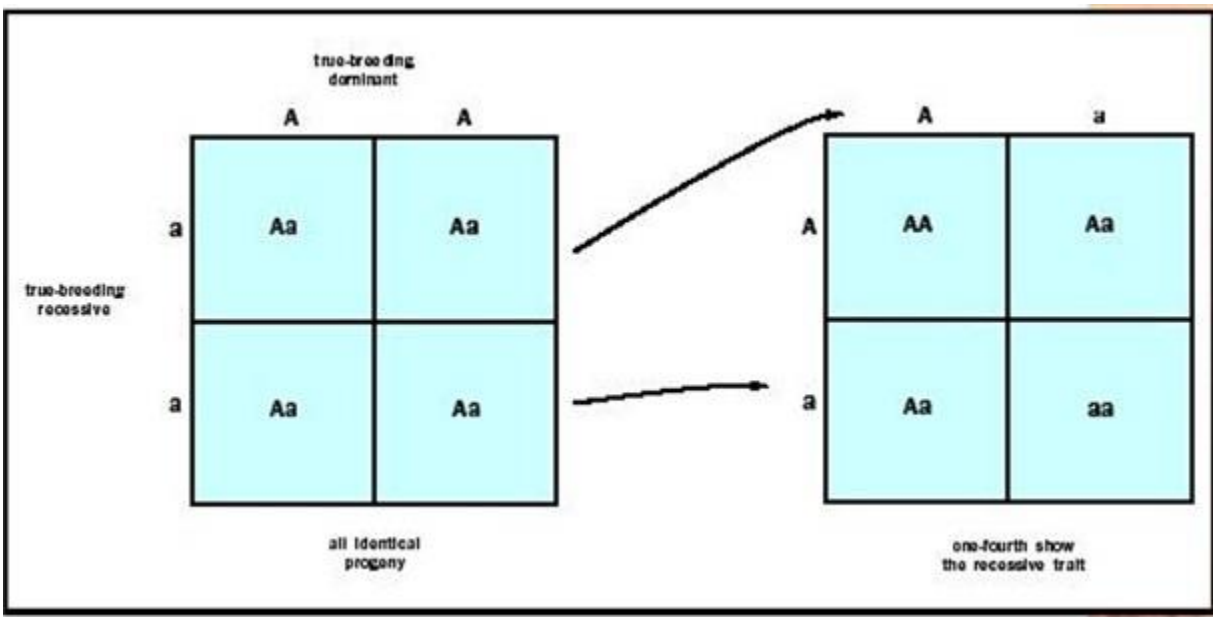
1. shape of face, forehead, eyes, nose, mouth and ears
2. colour of skin, hair and eyes
3. height of the body
4. method of walking
5. quantity of hair, eyebrow and eyelashes and some genetic disease conditions such as albinism, sickle cells anaemia, colour blindness, etc.

Meaning of Dominant and Recessive Traits

Dominant Traits: These are trait that keeps appearing in each successive generation.

Recessive Traits: These are trait present in a living organism, yet they do not appear physically because of the dominant trait in the offspring, but may suddenly appear in successive generation.

For example, a dominant tall man (AA) who married a recessive short woman (aa) may not produce any short child or children. But the children having the recessive traits or genes may produce short child or children by the second generation.



Comparison between Dominant and Recessive Traits

	Dominant Traits	Recessive Traits
1.	Traits are manifested outwardly	Traits are not manifested outwardly
2.	Traits are controlled by dominant genes	Traits are controlled by the recessive genes

Importance of Family Traits

a) Intelligence: Intelligent parents usually give birth to intelligent children. This trait (character) seems to be continuous in most family generations.

b) Diseases: The study of family traits has helped in the understanding of some genetic diseases like albinism, sickle cell anaemia, colour blindness, etc. Prospective spouses are counseled to check their genetic make-up before entering into marriage to avoid transmitting genetic diseases.

c) Resemblance: Family trait also helps to identify a member of a particular family.

d) Family Genealogy: One can easily trace a person's ancestor (lineage) and predict his present and future characteristics through the family traits.

Assessment

- Briefly describe the following terms; Genetics, Heredity, and variation
- Differentiate between dominant and recessive traits

Basic Science JSS 3 First Term

Week 4

Topic: Environmental Hazard (Soil Erosion)

Introduction

Soil is the top layer of the earth crust. Human activities, such as road construction, farming, building of houses, etc., take place on the soil. The top layer of the earth could be washed away as a result of water, wind, volcanic action and rainfall.

Soil erosion is the gradual wearing away of the surface of the earth (topsoil) through the action of wind, rain, etc.

Causes of Soil Erosion

Wind, bush burning and water are the major causes of erosion.

Bush burning: This destroys humus and plant nutrients, which makes the soil loose and the sand can then be washed away by wind or water. Some people burn bushes during game hunting while others burn bushes in order to make new grass grow up for feeding cattle. When the bush is burnt, the surface of the ground is exposed making it possible for rain and wind to remove the top soil, thereby causing erosion.

Farming: Farmers cut the vegetation before tiling the ground on which they intend to plant their crops. Both removal of vegetation and tiling of the ground aid erosion.

Road Construction: The construction of roads involves clearing bushes and the use of heavy equipment such as graders, to work on the ground surfaces. The soil is disturbed by heavy equipment, resulting in the tearing of the soil and thus erosion.

Growth of Towns: As towns grow and houses have to be built, bushes are cut and cleared. This exposes the soil to erosion, Also roofs of houses collect rain water and create heavy downpour onto the soil.

Wind Erosion: Bush clearing exposes the land. Weathering causes a breakdown of the earth's surface. As the wind blows over open surfaces of the earth, particles of the sand or rock are blown away. Wind erosion is common in the desert environment. The wind blows dry sand particles away from the site.

Water Erosion: This is common in dry sandy areas where the water flow washes away large areas of the land. When rain falls, the rain water moves in small temporary trenches. These trenches are often referred to as rill and leads to rill erosion.

Methods of Controlling Soil Erosion

Wind, chemical weathering and human activities as a result of bush clearing for farming are major causes of erosion.

Erosion can be controlled or prevented by:

1. Preventing bush burning
2. Planting trees or grass – This is done to cover the soil. Planting of trees can help control soil erosion. The trees or grass break the force of the raindrops on the soil. This prevents the wearing away of the top soil by wind or water. Trees that can do this most are bamboo and cashew trees, especially in sandy soil since they have extensive root systems.
3. Trees which help to reduce wind erosion are called wind breaks.
4. Making ridges across the land to prevent the washing off of the soil by rain – If ridges are made on hillside farm land, the flood that runs down the slope will be blocked and erosion reduced.

5. Terracing – Terracing means making of a series of ridges or steps that resemble a staircase on a slope. This makes water-flow down the slope to slow down at every step thus breaking the speed of flow of water.
6. Strip cropping – Crops that provide vegetation cover for soils and those that do not can be planted in alternate strips across a slope so that the effect of the rain or flood in exposed parts is checked by vegetation in covered parts.
7. Mulching – Covering beds, ridges or mound in a farm with dry grass is called Mulching. Mulching helps to reduce the loss of soil moisture, controlling the growth of weeds and keeping the soil cool. Mulching is the control method employed by using dry grass to cover ridges and mounds in the farm.
8. Cross bars are ridges made in a farm to stop the rushing of floodwater from one part of the farm to another. This reduces the speed of flow of floodwater as a bump reduces the speed of traffic on a road. In this way, crossbars reduce erosion.

Assessment

- Briefly explain the causes of soil erosion
- Mention five methods of controlling soil erosion

Basic Science JSS 3 First Term

Week 5

Topic: Bush Burning

Introduction

Bush burning is the act of setting forests, weeds and grasses on fire. Farmers clear farmland in preparation for the planting season. The weeds and grasses cleared are often burnt. Forest is a large area of land that is thickly covered with trees. The trees naturally grow on their own or are cultivated by man for different purposes. Mammals, birds and reptiles make the forest their habitat.

Practices that Influence Bush Burning

Some of the practices that influence bush burning include:

1. Bush Clearing: This is the act of removing weeds, grasses and trees so as to plant crops on the farmland.
2. Practice of Crop Rotation: In crop rotation, plants are grown in a particular area and rotated through a period of time (3 or 4 or 5 or 6 years). During this period, the crops grown on a particular area are cleared and burnt.
3. The practice of planting one type of crop on a plot of land at a time. Harvesting same before planting another crop on the same plot of land. After harvesting, the plot of land is cleared.
4. Construction of roads and felling of trees.
5. Building of houses, industries and settlements.
6. Hunting.

Effects of Bush Burning including Economic Consequences

Bush burning has adverse effects on the farmland. It is a practice by farmers to clear an area of bush or forests for planting their crops.

1. It destroys plants community.
2. Humus on the surface of the soil is burnt – loss of soil fertility.
3. Animals that live on the plant community are either killed or forced to move to other suitable surrounding area for their existence.
4. The cleared area is exposed to erosion.

5. Bush burning can make the soil to become powdery and dry over the years. Such a farmland will no longer support plant growth, resulting in a barren land (desert condition).
6. Useful crops, such as oil palm, orange trees, etc may be burnt.
7. Bacteria, earthworm and fungi which bring about decay are also burnt. This causes loss of soil fertility.
8. Low crop yield results from bush burning.

Regulation against Bush Burning

1. There is need for public enlightenment on bush burning.
2. Regulations should be made to prohibit bush burning.

Assessment

- Mention five practices that influence bush burning
- List four effects of bush burning on the economy

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Week 6

Topic: Flooding

Introduction

Flood occurs when a large amount of water covers an area that is usually dry. Flooding may occur after a heavy downpour of rainfall. When a river overflows its banks, flooding may also occur.

Drainage Patterns

The drainage pattern in a city or town may be blocked by refuse. When rain falls, water cannot flow freely in a blocked drainage. Hence, the rain water overflows the drain, spreading over adjourning area. Two main types of drainage patterns are observable: the pattern used in rural areas, i.e. villages, and the pattern used in urban and well-planned areas, i.e. towns and cities.

In the rural areas, drainage is not designed and constructed by competent engineers. In some cases, the villagers dig sloppy and shallow gutters by the sides of the major roads in the village, so the rainwater and waste water poured into them can flow along the roads.

In the urban areas, on the other hand, surface drainage paths are designed and constructed by competent engineers. The floor of the gutter is made of concrete and is designed to have a slope that allows water to flow away easily.

Causes of Flooding

1. Heavy downpour of rainfall
2. Blocked drainage
3. Indiscriminate dumping of refuse into rivers, streams etc.

4. Release of excess water in dams
5. No gutter s on either side of roads

Flooding can be controlled by the following

1. Removing or cleaning materials from the drainage system.
2. Building of high walls to keep rivers from over flowing their banks.
3. Widening of straightening of rivers.
4. Diversion of streams so that they do not overflow into river.
5. Building of dams to hold back water in river.

Effects of Flooding on Community and Farmland

a) The soil becomes waterlogged and often times muddy

b) People cannot travel easily on roads

c) Food crops are damaged

d) Building s may also become submerged in flooded area

e) Where flooding occurs annually, people are moved away from the area.

Assessment

- List five causes of flooding
- Mention ways to control flooding effectively

Basic Science JSS 3 First Term

Week 7 & 8

Topic: Deforestation

Introduction

Deforestation is the act of cutting down of trees in an area.

Forests are of great importance to us and our environment. But the rate at which the trees and forests are cleared is so alarming and could leads to deforestation. Trees are being cut down indiscriminately for timber, firewood, establishment of industries etc. which could pose serious environmental and climatic problems as wildlife is widely affected, leading to destruction of the animals habitat, wild life extinction and soil erosion.

Reasons for Deforestation

1. The reasons for deforestation include:
2. Production of timber for wood works e.g. furniture.
3. Production of firewood and charcoal for domestic and industrial purposes.
4. Urbanization of towns.
5. Establishment of industries, markets, churches, houses, mosques, etc.
6. Construction of roads and bridges, etc.

Effects of Deforestation on the Environment

The effects of deforestation include:

1. Destruction of windbreaks which gives way for adverse wind attack.
2. Soil erosion which causes destruction to farmland and buildings.
3. Global warming caused by large concentration of CO2
4. Intense evaporation of soil water and soil nutrients due to exposure of the soil.
5. Danger to wildlife and possible extinction of some species of plants and animals.
6. Shortage of food due to drought.
7. Destruction of arboreal habitat.
8. Leads to loss of forest resources.

Regulations of Deforestation

Government has enacted laws and strict regulations to control deforestation. In order to protect the forest from excessive exploitation, government has introduced the following regulations on deforestation.

1. Government has set out large expanse of land and forest as reserved areas.
2. Government has made laws that will guide and preserve forests from human destruction.
3. When trees are felled they should be replanted. This process of replanting trees is known as re-afforestation.
4. Anybody who fails to keep any these regulations should be punished or made to pay a heavy fine to deter others from destroying forests.
5. Foresting should be made compulsory in our educational curriculum.

Assessment

- Mention four reasons for deforestation
- List five effects of deforestation or the environment
- Mention four regulations by the government on deforestation

Basic Science JSS 3 First Term

Week 9

Topic: Desertification

Introduction

Nowadays, there are high increases in environmental disasters caused by man's activities. Indiscriminate cutting down of trees, mining, intensive continuous farming, road construction, overgrazing and bush burning are some of man's activities that contribute to environmental degradation such as exposing the soil to intense and ultraviolent radiation of the sun, leading to excessive evaporation, and loosening of the soil texture, making the soil easily eroded by wind and water. Investigations have shown present and future problems that will result if adequate measures are not taken to curb these activities of man. One of the harmful activities of man is desert encroachment or desertification.

Definition

Desertification is the process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agriculture. It is also described as the encroachment of desert into habitable land. Desert encroachment is simply the gradual movement of a desert towards an area causing such an area to become a desert. In a nutshell, desertification is a situation in which an entire area becomes a desert in a short span of time

Geographical Area in Nigeria

There are two broad geographical zones in Nigeria. These are the tropical forest zone and the savanna. These geographical zones are further divided into six areas or belts. These include:

1. The mangrove belts around the delta region,
2. The tropical rain forest zone,
3. Derived savanna,
4. Guinea savanna,
5. Sudan savanna,
6. Sahel savanna.

The zones closer to the dry lands (deserts) are more prone to desertification. Therefore, people living around these zones should adopt appropriate environmental measures to control this adverse effect.

Causes of Desertification

These include:

1. Overgrazing
2. Removal of crop residues for feed/construction use
3. Deforestation for fuel wood and construction materials
4. Inappropriate irrigation practices that lead to salinity
5. Drought
6. Climatic shifts
7. Bush burning

Controls Measures on Desertification

Desertification can be controlled by:

1. Avoiding indiscriminate felling of trees.
2. Adopting rotational grazing.
3. Encouraging bush fallowing and shifting cultivation methods.
4. Establishing wind breaks.

Assessment

- List five causes of deforestation and four control measures on desertification

Basic Science JSS 3 First Term

Week 10

Topic: Depletion of Ozone layer and Its Effects

Introduction

The ozone layer is located in the stratosphere of the atmosphere. The atmosphere is the region of air above the earth surface. There are many gases in the atmosphere. They include carbon (IV) oxide, carbon (II) oxide, ozone and methane. They combine with the chlorofluorocarbons to cause the greenhouse effect. Another layer of the atmosphere is lithosphere. Some water vapour, oxygen and aerosols are found in the stratosphere also.

Importance of the Ozone Layer

The ozone layer contains other gases and materials apart from ozone. Therefore, this layer is important for the following reasons:

1. It brings a cooling effect to the atmosphere and the earth surface.
2. The ozone layer absorbs high energy radiations from the sun. This minimizes the amount of radiation from the sun to the earth surface. These radiations are ultra radiations that cause sunburn to the skin.
3. The presence of the ozone layer prevents the incidence of health hazards like sunburn.

Effects of Depletion of the Ozone Layer

The depletion of the ozone layer refers to the gradual reduction of the amount of ozone in the layer due to the widening of the opening of the ozone layer. The depletion leads to the following consequences:

1. Global Warming: The atmosphere re-radiates the absorbed energy back to the earth surface, by receiving the re-radiated portion of the energy to the earth, the earth surface become warmer. This leads to global warming.
2. Greenhouse Effect: This is a natural situation that keeps the earth surface warm and suitable for continuous life. This additional warming is called greenhouse effect.
3. Ice Melting and Flooding: Over the years, there is outcry of increased heat intensity. This is due to the widening of the ozone layer that has led to greater radiation from the sun. The heat intensity has caused the polar regions of the world to flood as the ice is now melting. Due to flooding, houses are destroyed and thousands of lives are lost in the tropics.

Control Measures against the Ozone Layer Depletion

The following measures can be used to control the depletion of the ozone layer:

1. Regulation on the use of chlorofluorocarbons (CFCs): The CFCs are used to make the compressors of refrigerators. Used refrigerators should be carefully disposed off.
2. Bush Burning: Bush burning produces huge quantity of carbon (IV) oxide, which causes greenhouse effect. Generally, reducing bush burning is a way of lowering the amount of carbon (IV) oxide in the atmosphere.
3. Regular Servicing of Automobiles: A lot of methane, another compound causing depletion of the ozone layer is produced along smoke from exhaust fumes of cars, especially unserviced automobiles. Owners of vehicles should ensure regular servicing of their vehicles.

The Greenhouse Effect

Carbon dioxide has a green house effect. The atmosphere with high carbon dioxide content has become a blanket round the earth, causing a green house effect. The heat of the sun can pass through the atmosphere into space. As a result, the temperature of the earth has been increasing progressively. The effects of global warning are many but scientists admit that only some effects are as yet known. These include

1. Increase in atmospheric temperature
2. Progressive melting of polar ice, in the Arctic and Antartic zones as a result of increase in temperature
3. Rising ocean levels
4. Gradual covering of some low dry lands with water from the oceans.
5. Unusual changes in ocean currents
6. Climatic change

Assessment

- State three importance of the ozone layer
- Mention five effects of depletion of the ozone layer

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BASIC SCIENCE
SECOND TERM

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Basic Science JSS 3 Second Term

Week 1 & 2

Topic: Resources from Living Things

Introduction

We grow plants and rear animals for food, to produce materials that could be used for clothing, shelter and for medicine. Hence, we depend on livings (plants and animals) for resources, such as beans, melon, orange, cassava, vegetables, cocoyam, meat, diary products as well as hide and skin.

Resources from Plants

A lot of plant resources are grown in the gardens and farms for food, commercial purposes, aesthetic values, etc. Such resources from plants include, cotton, rubber, cocoa, groundnut, oil palm, rice, maize, yam, sugar cane, tobacco, flowers, etc. Plant resources include cash and food crops. Cash crops are those that bring a lot of money when sold locally or exported. Examples of cash crops are cocoa, dyes, cotton and rubber. Food crops are those grown mainly for food though they may be sold locally. They include yam, rice, beans, plantain, ornages, mangoes etc Food is very important to human beings. The human body uses food

- to produce energy
- for body building, repair and growth
- for protection of health

Four Major groups of plants resources

- Cash Crops

These are crops produced in large quantities mainly for sale, particularly to people within and outside the country. Cash crops include, wood crops (iroko tree, mahogany, ebony), fibre crops (cotton),oil crops (groundnut, oil palm, coconut). Others are rice , sugarcane, tobacco, etc. These crops provide foreign exchange for the country.

- Food Crops

These are plants resources which serve as source of food. These include, vegetables (pumpkin, lettuce, bitter leaf), root tubers (yam, cassava), fruits (guava, mangoes, oranges), seeds (beans, millets), grains (rice, maize), underground crops (carrot, onion), oil plants (groundnut, cotton, coconut and olive), etc. Food crops provide mainly vitamins and carbohydrates which the body requires, for growth and development.

- Dyes/Textile

These are liquid substances of plant extracts that are used to charge the colour of cloth materials, hairs and houses. Dyes can be extracted in natural form from flowers and leaves or plants e.g. indigo species can be used to dye cloth to make it brighter.

Similarly, crops for textiles are used by textile industries in the production of clothes, ropes, baskets, etc. An example of crops for textiles include, cotton (for cloth production) while fibres from sorrel plant, flax, guinea-hemp, sisal and jute whose fibres are used in rope production. The leaves and fronds of palm tree provide materials for making hats, bags, baskets, etc.

- Drugs/Medicine

Drugs are chemical substances of plants extract used as medicine to cure various health problems and diseases. Drugs are capable of altering behaviour when they are abused. They are good when taken properly but dangerous when taken without the doctor's prescription. Majority of the drugs both tablets and syrups as well as those in powder forms are resources from plants roots, barks and leaves e.g. Cincona species, Garlic species, etc.

Resources from Animals

Animal resources are very vital to the existence of human beings. Animals provide resources which serve as food for growth and development. Such resources include, hide and skin used in the leather industry as well as raw milk for daily products. In addition, the faeces from animals are used for the production of organic manure.

- Hides and Skin

These are major animal resources used in the leather industry. Hides are derived from the skin of large animals, such as camel, horse, buffalo, cattle, etc. Hides are bought, sold or used in leather industries for the production of shoes, bags, purses, belts, garments, etc. Skin refers to the skin of smaller animals, such as goat and rabbits. The skin of these animals is edible. Hides and skins are used to make shoes, bags, belts, leather jackets, luxury chairs and car seat covers.

- Livestock

These are animals mainly birds and mammals that are reared by farmers. Examples of such animals are goats, sheep, cows, pigs, poultry bird (chicken, turkey, ducks), etc., used for decoration while droppings from these livestock are used as manure on farms and gardens.

- Diary Products

Dairy is a place on a farm where milk is kept. Dairy products are milk products got from animal resources such as cow, cattle, etc. The milk which is rich in protein is a major ingredient in the production of cheese, butter and yogurt for human consumption and for export.

Economic Importance of these Resources

Self-Development

- Plant and animal resources serve as food for growth and development.
- Diary products are rich in protein for replacement of worn out tissues.
- Bones and horns of animal resources are used in making furniture.
- They are sources of drugs for treating various health problems.

Societal Development

- Production of plant and animal resources provide raw materials for manufacturing industries
- Wealth engenders peace in a nation – by exporting plant and animal resources to earn money
- Paper and pulp production for the print media.
- Hides and skin are used for leather industries in making bags, rugs, carpets and clothes.
- Flowers for aesthetic purpose in the beautification of homes and major cities.

Assessment

1. Which of these is a Cash crop?
   a. Yam
   b. Cocoa
   c. Beans
   d. Corn
2. Of all these, ____ is a food crop
   a. Cocoa
   b. yam
   c. Rubber
   d. Dye
3. Hides and Skin can be used to make all of the following except ____
   a. shoes
   b. bags
   c. car seat covers
   d. carpet

4. _____ are chemical substances of plants extract used as medicine to cure various health problems and diseases
   a. Drugs
   b. Diary
   c. Textiles
   d. Herbal mixtures

Answers

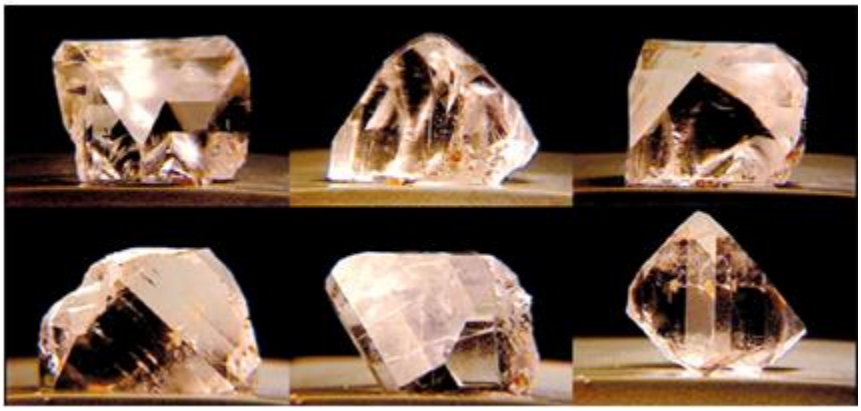
1. B
2. B
3. D
4. A

Basic Science JSS 3 Second Term

Week 3 & 4

Topic: Resources from Non-Living Things (Solid Minerals)

Introduction



Minerals are usually natural endowment to particular communities. Minerals are naturally-occurring substances in the soil. Many minerals resources are found in the environment. Some are solid in nature, others are liquid in form while some are gaseous in nature. In Nigeria, minerals abound in many parts of the country. The presence of such minerals has resulted in the development of such areas. Many industries have been set up to prospect in mineral resources. Exploitation of minerals has in most cases caused strife, kidnapping and wars as is witnessed in the Nigerian Niger Delta areas.

Examples of minerals are petroleum, limestone, gold, coal, tin, salt, lead and zinc etc.

Some solid minerals cannot be used in the form in which they are found when dug out of the soil. They have to be refined into new products, which are useful. The process is called refining. Refining a mineral is done in factories built for a purpose.

Location of Solid Mineral Resources

Solid minerals are found in some areas in Nigeria

The Map of Nigeria

- Limestone is found in Ewekoro in Ogun State, Nkalagu in Ebonyi State and Ukpilla in Edo state
- Gold is found in Ilesha in Osun State, Bida (Niger state)
- Tin and columbite is found in Kuru (Plateau State)
- Coal is found in Udi hills (Enugu State)
- Kaolin is found in Umuahia (Abia state)
- Bitumen is found in Ondo state
- Sand is found in Porthacourt (Rivers State)
- Iron is found in Kogi state
- Lead/Zinc is found in Ebonyi

Characteristics of Solid Materials

- Diamond – Hard and lustrous
- Gold – Lustrous
- Coal – Black
- Marble – Milky
- Iron – Grey/brown

Importance of Solid Mineral Resources

- Iron

This is used to make various types of household tools and office equipment like chairs, tables, door frames, etc. Iron is also used in the construction of bridges and building. Iron ore is used for manufacturing Iron sheets, rods and weights

- Gold, Silver and Diamond

Gold, silver and diamond are used for making jewelleries, earrings, necklaces, medals and trophies. The wealth of a nation in foreign reserve is determine in gold value.

- Coal

Coal is extracted unrefined and used for cooking. Also used in generating fuel. When processed, it can be converted into other useful materials like chemicals, paints, dye and fertilizers. It is also used to generate power, which is used to move trains.

- Clay

Clay is a grayish sticky substance. It is useful in pottery industries. Sometimes, it combines with limestone and can be used to make cement and chalk.

- Limestone

Limestone is a major material for the manufacture of cement used for building houses, construction of bridges, etc.

- Sand

Used in making glass.

- Bitumen

For tarring road surfaces

- Zinc

For making roofing sheets

- Lead

For making car batteries

Assessment

1. Which of these is not a solid mineral
   a. Gold
   b. Iron

c. Petroleum
d. Coal

2. Which of these solid materials is used for the production of cement
   a. Gold
   b. Coal
   c. Limestone
   d. Iron

3. Roofing sheets are made from
   a. Bitumen
   b. Zinc
   c. Coal
   d. Gold

4. ____ can be found in Udi hills
   a. Bitumen
   b. Zinc
   c. Coal
   d. Gold

5. ____ is used in making glass
   a. Sand
   b. Zinc
   c. Coal
   d. Gold

Answers

1. D
2. C
3. B
4. C
5. A

Basic Science JSS3 Second Term

Week 5

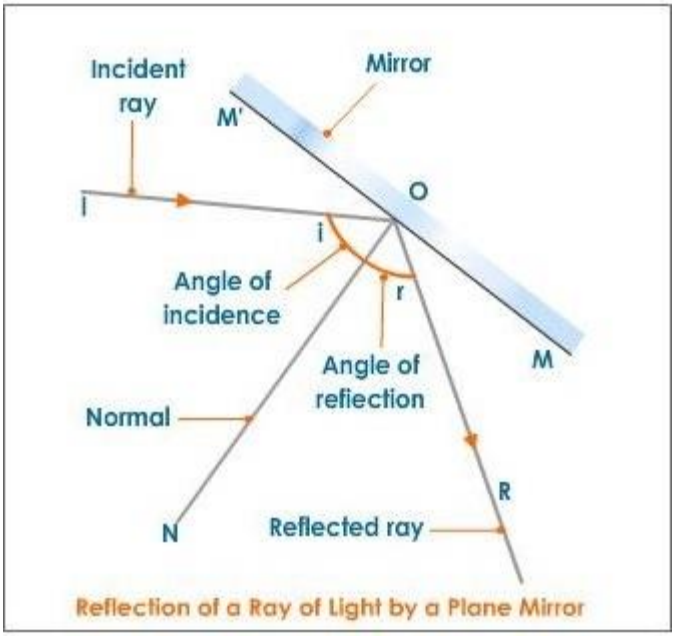
Topic: Light Energy

Introduction

Light is a form of energy. Light energy possesses different properties which make this form of energy very useful to man. Some of these properties include, reflection, refraction, apparent depth in liquids, producing vision in the eye and dispersion or capability of being separated into various colours of the rainbow.

The Concept of Reflection of Light

Reflection is one of the properties of light. It occurs whenever a ray of light strikes a plane or polished smooth surface, such as a mirror.



Note the following terms which are used in explain reflection of light:

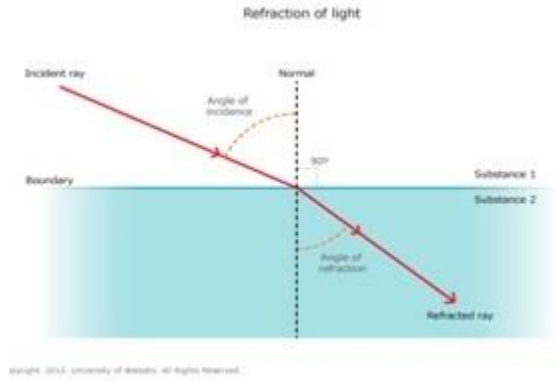
- The line NO is called the normal to the reflecting surface. It is a perpendicular line at O, the point of incidence.
- IO is the incidence ray
- OR is the reflected ray
- Angle ION is the angle of incidence
- Angle NOR is the angle of reflection

Law of reflection state that the angle of incidence is equal to the angle of reflection. Thus $i^{o} = r^{o}$

Reflection occurs at smooth, polished or silvered surfaces whether they are plane or curved.

The Concept of Refraction of Light

Refraction is the bending of light ray when it travels from one medium to another of different density. When the light travels from a dense medium (e.g. water) to a less dense medium (e.g. air), the emergent light ray is bent away from the normal whereas when the light travels from a less dense medium (e.g. air) to a dense medium (e.g. water or glass)



When light travels from air into water, it slows down, causing it to change direction slightly. This change of direction is called refraction. When light enters a more dense substance (higher refractive index), it 'bends' more towards the normal line.

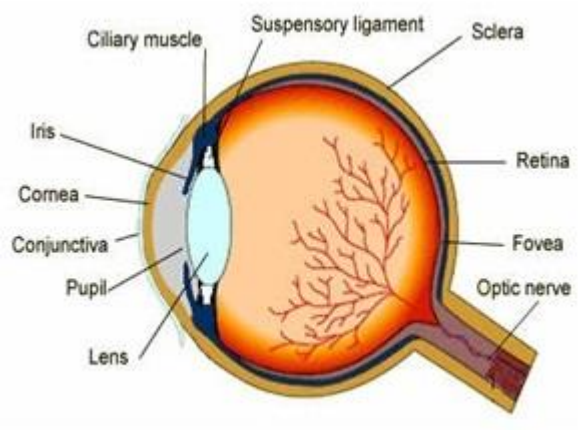
Note that refraction occurs whenever light passes from one medium to another medium of different densities e.g. air to water, glass to water, etc.

Apparent Depth

The bottom of a bucket or beaker appears to be lifted up making the water in the beaker to appear shallower than it actually is. This phenomenon could be dangerous for large and deep pools of water, such as rivers or swimming pools. Apparent depth could be deceptive to children, swimmers and divers who may imagine that the depth of water is small. Such situations had led to the drowning of swimmers and divers.

The Eye and Vision

This is the organ for seeing (sight). With our eyes, we can see things in their varying colours, shapes, sizes, etc. We have two eyes (a pair of eyes) that enable us to have a wide vision.



Parts of the Eye and functions

- Sclera: tough outer white layer of the wall of the eye.
- Cornea: transparent 'window' of the eye, focusing of light on the retina.
- Iris: the coloured sheet of muscle, controls the pupil size so controls entry of light.
- Pupil: a hole in the iris letting light into the back of the eye.
- Ciliary Body: a ring of muscle controlling the shape of the lens.
- Suspensory Ligaments: transfer the pull of the ciliary body to the lens.
- Lens: accommodation — the fine adjustment to the focusing of light onto the retina.
- Retina: light sensitive layer of rods and cones converting light into nerve impulses.
- Fovea or Yellow Spot: a tiny area of densely packed cones for detailed and coloured vision.
- Choroid: a black-pigmented layer preventing internal reflection of light.
- Blind Spot: exit point of the optic nerve cutting through the retina so no rods or cones here.
- Optic Nerve: carries the impulses from the rods and cones to the visual centre of the brain.
- Aqueous Humour: a clear liquid in front of the lens maintaining the shape of the cornea.
- Vitreous Humour: a clear jelly offering support and shape to the back of the eye.

We see an object by the light, which leaves the object and enters the eye. The light enters the eye through the circular opening called the pupils. It strikes the eye lens, which converges it to form an image on the retina.

When the light is too bright, the pupil contracts to make the circular opening smaller, if the light is dull, the pupil opens wider to admit more light. Focusing the image on the retina is achieved by altering the focal length of the eye lens. This is achieved by the contraction or relaxation of the ciliary muscles. The power of the eye to do this is called accommodation.

Dispersion and Rainbow

In this phenomenon, white light is separated into the various component colours, which are red, orange, yellow, green, blue, indigo and violet (ROYGBIV). The separation of white light into the various component colours by a glass prism is called dispersion. The coloured patch of light is called spectrum. A pure spectrum is one in which the colours do not overlap.

Water droplets in the atmosphere behave in a similar way with the prism. That is how the rainbow is formed in the sky by droplets of water, which hang in the atmosphere.

Assessment

Briefly define the following terms;

- Light
- Reflection
- Apparent Depth

Basic Science JSS3 Second Term

Week 6

Topic: Sound Energy

Introduction

Sound is one of many forms of energy with which you must be familiar. Sound is a property of vibrating objects. These objects may be solids, liquids or gases.

Production of Sound

Sound can be produced by different types of objects. Some of the sound are appealing to the ear while others are not. However, you would have observed that there is something common to all sounding objects.

Transmission of Sound

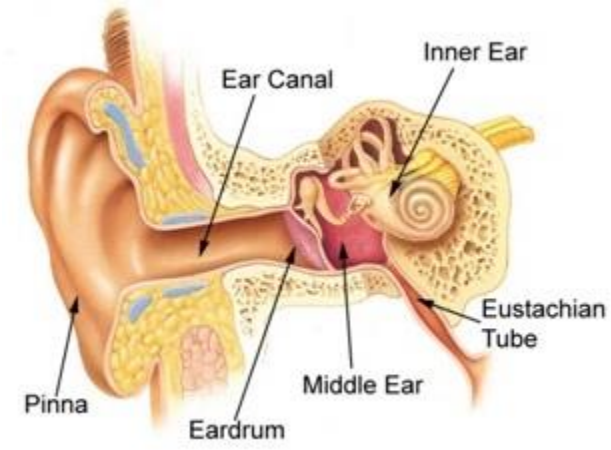
Sound is propagated by means of longitudinal waves though an elastic medium. Typically, such a medium would be air, although sound may be transmitted through liquids and solids. The medium, air for example will at any instant have zones of COMPRESSION, where the air is more dense, and regions of RAREFACTION, where the air is less dense. Apart from transmission through the air, sound is also transmitted through metals and pipes. The sound may however be converted to electrical signals if it has to travel very long distances as the case of land telephones.

Reflection of Sound

Sound waves can be reflected in the same way as light waves. Sound waves are reflected by hard surfaces such as walls, rock and large concrete structures.

When you stood afar from a tall hill, a big building or a cave and you called a friend, after a short while you hear the call again. The phenomenon occurs as a result of the reflection of sound you made. The reflection of sound by a hard object, such as rock is called echo.

Hearing



The ear is an organ of hearing and also helps in maintaining balance. Each person has two ears. The ear has three major parts namely: the outer part, the middle part and the inner part.

With our ears, sounds are heard and the direction from where the sounds are coming from is also known. Sound from the environment reaches the outer ear as vibration in the air. These vibrations are carried through the external auditory meatus to the eardrum which is the opening of the outer ear. The eardrum vibrates and passes the vibrations to the ear bones called the ossicles, which are in the middle ear. The ossicles also vibrate and transmit these vibrations to the oval window. The vibration of the oval window stimulates the sensory cells of the walls of the cochlea where the nerve endings are found and the nerve endings now pick the vibration (message) to the brain for interpretation and are sent back for response through the same nerves. The nerves ending responsible for this are called auditory nerves. Once the interpretation is made, we hear the sound and also detect the direction of the sound.

Assessment

Enumerate on the following;

- Transmission of sound
- Reflection of sound

Basic Science JSS 3 Second Term

Week 7 & 8

Topic: Magnetism

Introduction

Magnets are substances that generally attract object towards themselves. Magnets are important in many areas of science, for example, they are used in radio communication, telegraphs, computers, electric generators, loudspeakers, electromagnets, etc. Apart from these, the properties of magnets make their study interesting and fascinating for young and developing scientists.

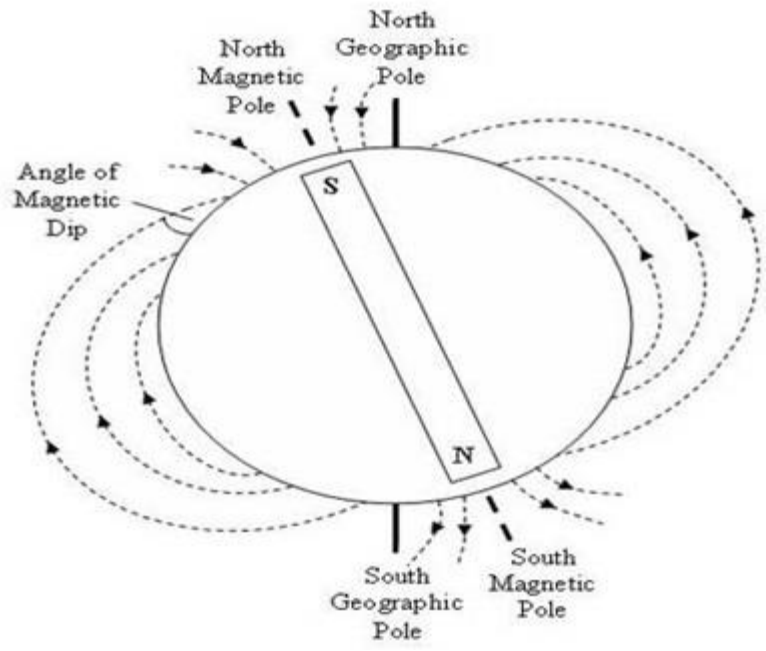
Lodestone

Lodestone is a naturally occurring magnetic oxide of iron. It is therefore a natural. This natural magnet was first discovered in china over 2000 years ago. Observations made at that time revealed that a bar of lodestone which is suspended so that it can swing freely would always point appropriately in a North-South direction. It was equally discovered that iron and steel objects were equally attracted by lodestone and the attraction was mainly towards the ends of the bar.

Lodestone is now known to be a magnetic mineral (magnetic iron oxide). It is a natural magnet.

Law of Magnetism

Magnetism is one of the phenomena by which materials exert an attractive or repulsive force on other materials. Some well known materials that exhibit easily detectable magnetic properties are iron, some steels, and the mineral lodestone; however, all materials are influenced to one degree or another by the presence of a magnetic field, although in most cases the influence is too small to detect without special equipment.



If we put a bar magnet in a plate of iron filings, on bringing out the bar magnet, it is noticed that the iron-filings cling to the magnet with most of them clinging in heavy bunches or clusters around the ends of the magnet. These ends of the bar magnet where the iron filings concentrate are called the poles of the magnet. Such substances that can be attracted by a magnet are known as magnetic substances and this ability of a magnet to attract magnetic substances is called magnetism.

Magnetic Poles and Fields

The position of the magnetic poles on an unmarked magnet may be identified by using iron fillings or magnetic plotting compass. By spreading iron fillings over a broad cardboard paper, placing the paper over a bar magnet and then tapping cluster mostly around the two poles of the magnet,

Alternatively, a plane drawing paper may be placed above the magnet and a magnetic compass needle use to trace the lines of magnetic force on the surface. The outline of the magnet is first traced out. at each point as the compass needle is moved a little at a time, the position of its centre is marked out to trace the path of line of force which will start from a North pole and end at the south pole. Thus, the magnetic line of force is the path a North pole would take if left in the field. The magnetic field is that region of space where magnetic force could be felt.

Also not that:

Uniform earth field, lines of force are parallel and equally spaced.

Field for two opposite isolated poles e.g. N-S lines run from North to South pole.

Two isolated similar poles e.g. N-N with a neutral point occurring in between.

Care of Magnets

1. Magnets are useful delicate instruments. Like other equipment of the science laboratory, magnets require care for them to be active for a long time. For them to last:
2. They must not be dropped carelessly. Careless dropping disorganizes the magnetic domain of the bar.
3. They should not be heated because heating destroys magnetic property
4. They should not be hammered because hammering leads to loss of magnetic effect.
5. Bar magnets should be stored in pairs so that at each ends there should be N-S with soft iron bridge.

Assessment

- State the law of magnetism
- Name four ways to take care of Magnets

Basic Science JSS 3 Second Term

Week 9

Topic: Electric Energy

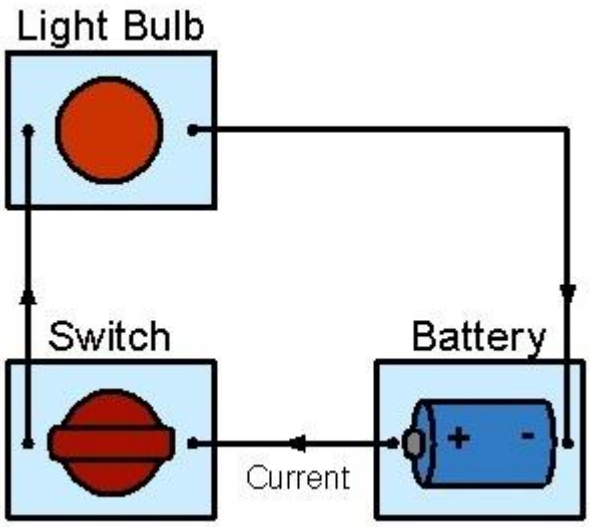
Introduction

Electrical energy plays a dominant role in the economic and social development of nations. It is extensively used in industries, offices and homes for carrying out numerous essential operations. Electrical energy provides a reliable, pollution free energy option for both domestic and industrial purposes.

Concept of Electron Flow

Electrons are tiny negatively charged particles that are found in the atom. The electron moves freely inside the atoms of electrical conductors such as metals. Electrons are invisible to the eye but the effect of their movement can be seen and even measured in every electrical circuit. It is the flow of electrons that produce the flow of electric current

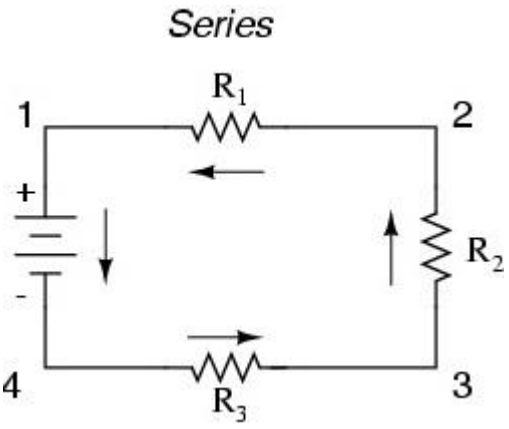
One of the conditions for obtaining electric current is the provision of potential difference between two points. If two such points with a difference in potential are joined together with a metallic conductor such as wire, electrons flow from the low potential point to the higher potential point, whereas electric current would flow from the high potential to the low potential point.



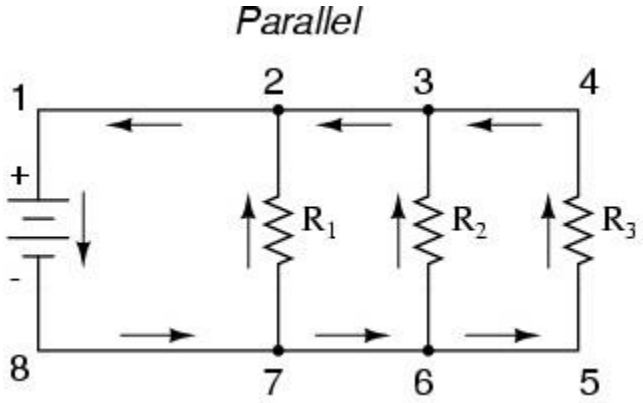
The diagram shows the flow of electrons and current in a closed circuit

Series and Parallel Circuits

The two major ways of connecting electrical circuits are in series or in parallel. In series circuit, circuit elements are joined end to end so that the same current flows through each circuit element in turn, while the potential difference across elements will differ.



In the case of parallel circuit, elements are connected in such a way that the high potential terminal of two circuit elements are joined to one point and the two low potential terminals of the two elements are joined to another point in the circuit. This arrangement is such that there is a uniform potential difference across the two elements whereas the currents flowing in them differ.



Ammeter and Voltmeter

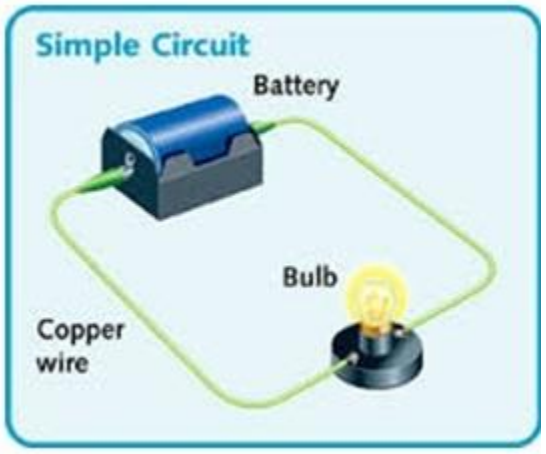
Ammeters and voltmeters are two of the most commonly used measuring instruments in electric circuits. The ammeter is a low resistance instrument which is connected in series circuit in order to measure the value of the current flowing. The resistance of the ammeter is small so that it does not draw much current for its operation. Electric current is measured in Ampere

The voltmeter is a high resistance instrument that is usually connected in parallel with a circuit element so that the potential difference across the element may be measured. In this arrangement, most of the electric current flows through the circuit element while only a little

current flows through the circuit element while only a little current flows through the voltmeter. The unit of measurement of potential difference is the Volt

House Circuit

Houses are wired in parallel because of some advantages of parallel circuit. An example is that if one bulb in a house burns out, others will stay on. However, in a series circuit, all bulbs go off as soon as one of them burns out.



The following elements are in a house circuit: control switch, meter box, fuse box, switches, sockets, lamps and circuit breakers. The functions are as follow:

- Control Switch: This is used to put off every supply to the house when repairs or installation are being made
- Meter Box: This contains the meter used in measuring energy consumption in the home
- Fuse Box: This contains low resistance devices called fuses which melt to cut supply of parts of the house controlled by them when excessive current is being drawn or when there is a sudden bridging in circuit.
- Switches: These are commercially made keys for switching on or off of electric appliances in the house. Examples are the light switch and the fan switch.
- Sockets: These are protected terminals provided to enable devices to be connected when required. Refrigerators, radios, grinders and television sets are usually connected to wall sockets in the home
- Circuit Breaker: This is a modern device that is introduced into house circuits to increase safety in the use of electricity in the home. If there is a short circuit, a large current is drawn through the device which the heats up and breaks the circuit. Some of such devices will fail to reconnect unless the fault has been ratified.

Electric Meter Reading and Billing

The electric meter is installed in house where the Power Holding Authority can access and read them to provide bills for energy use. When an appliance connected to the circuit is switched on in the house, the meter starts to read. You can read the current value consumed energy through the glass covering the meter.

An example of a meter reading form is provided below:

Month: July 2007

Meter Reading		Units Consumed	Cost per Unit	Total Amount #
Previous	Present			To be paid
47896	48167	271	#4.00	1084.00

Assessment

Briefly define the following;

- Electrons
- Ammeter
- Voltmeter
- Circuit

Basic Science JSS 3 Second Term

Week 10

Topic: Skill Acquisition

Introduction

We are living in a very competitive age in which the employers of labour want to hire only the best applicants while the applicant wants to sell his/her services to the employer that offers the best returns. The level of skill which an employee has, determines to a large extent the level of his/her pay as well as the value which the organization places on him/her. Generally, the skills possessed by individuals make the difference in the level of their achievement in life. In any endeavour, a skilled person always produces a better quality output than any unskilled person.

Meaning of Skill Acquisition

Skill acquisition may be viewed as the process of making superlative output a general characteristic of one's behaviour in a given field. It involves a gradual change from less effective behaviour to extremely proficient one. A skilled worker is one who is adept in his/her trade or a person who has attained excellence in a particular trade or understanding. Skill acquisition therefore involves painstaking effort, discipline, practice and drill as well as reviews.

Reasons for Skill Acquisition

Some of the reasons for acquisition of skill may be obvious to you by now. For example, the instances of international footballers and computer programmers who are valued all over the world and receive higher pay than most company executives become pertinent. More importantly other essential reasons include:

1. **Taking Risks**: Taking risks have become a way of life for the scientist, such as in performing unusual experiments or working with untested substances. These could lead to poisoning, injury, explosion or even death. Such scientists require special skills and techniques in order to be successful.
2. **Decision Making**: people are faced with decision making situations on a daily basis, e.g. whether to take the sick to the hospital or to go to a herbal clinic; whether to go to school or drop out, etc. the problem here is how to make good and effective decision. Good decision making would involve a thorough mastery of the problem domain.
3. **Managing Emergency Situations**: Emergency situations generally occur suddenly when people are not prepared for them. Some emergency situations, such as aeroplane crash, motor vehicle crash, fire disasters, kerosene explosion and flood have occurred in the past. Effective skills for managing such situations have to be taught and learned.

4. **Survival Strategy**: These are a number of things which people do consciously or unconsciously which are directed at individual or group survival. Examples include, wearing of clothes to protect the body from cold and heat, eating balanced diet for more efficient body functioning, building and living in houses, seeking medical care when sick, etc. People have learnt and acquired proficient skills for selecting fabrics and making clothes, preparing and preserving food, designing and constructing houses, providing and sustaining medical care, etc. All these are part of survival strategies adopted by man.
5. **Learning to Live Together**: Man by nature lives in communities. It is not usual that a man should live an isolated life because people in a community depend on one another for their various needs. It is therefore important that individuals in a community must understand and respect the customs and traditions and even the laws and other regulations that make for orderliness in society.

Types of Skills

There are many types of skills that are practiced in the society. A few of them will be highlighted here. These include:

1. **Farming Skill**: in farming, there are many people who practice the skill of rearing day-old chickens, broilers, cockrails and eggs, sheep, goats and cows, fish and shrimps. Some others have the skill in producing cereals, legumes, fruits and vegetables. All these are some of the skills possessed by farmers.
2. **Basic Computer Literacy**: Everybody in this age needs to acquire basic computer literacy. The reason is that the computer has acquired an immense stature as a handy device for storing, sending and finding information. It is also a device for learning as well as entertainment. It has an unequalled speed with any other machine that man had made.

Parts of Computer and their Uses

- Central processing unit (CPU): Is the main computer in which information or data are processed and stored
- Monitor: Contains the screen on which processed information or data are displayed.
- Keyboard: Is the device for feeding information into the computer or giving information to the computer and directing it on a particular job and job sequence to be carried out.
- Mouse: Is another device for navigating through computer programmes.
- The uninterrupted power supply unit
- Printer

3. **Photography**: Is the technique of capturing an event, a scene or a thing on a picture. This could be printed and viewed on a card or projected screen. A picture is an image.
4. **Internet**: Internet is a name given to a network of computers which are linked through servers. The internet hosts servers from linked organizations worldwide from which web pages could be reached linking users to various types of essential information and data. International website addresses usually begin with the letters www signifying World Wide Web.
5. **Internet Browsing and E-mail Operation**: The internet browsing entails searching for required or data. In order to do this, one gets connected to the internet and employs a search engine such as google, and then types in the websites address. E-mail operation is the art of opening and operating a website address for forwarding and receiving mails and other data through the computer. In order to do this, one needs to open an e-mail address with one of the e-mail operators, such as yahoomail, hotmail, gmail, etc. an e-mail address may be of the form choices@yahoo.com or oluwole@gmail.com .
6. **Fax**: Fax stands for the shortened form of the word, facsimile, meaning exact copy of writing, picture or print. The fax machine is a microcomputer application for capturing and forwarding exact copy of classified documents to designated places where they may be required for various purposes.
7. **Desktop Publishing and Networking**: Desktop publishing has to do with the use of the computer for compiling, producing and disseminating information and reading materials without going through the rigour of passing through a publisher. Networking entails the linking up of computers through local area connection via cables or servers and joining these servers through the satellite to servers in other parts of the world (internet). Local area network link computers on the net together so that they can share information or work simultaneously on the same or different aspects of a project.

Importance of Skill Acquisition

- The following are some of the importance of skill acquisition:
- Acquisition of functional literacy by all
- Provision of various rewarding means of livelihood and development
- Provision of various enjoyable games, leisure and entertainment
- Widening opportunities of attaining fame

Improved Quality of Life

- People become increasingly aware of practices that help to improve life expectancy
- People learn how to obtain help and information quickly and correctly.

- Easy and convenient communication, such as through the phone, e-mail and money transfer.
- The feat performed by the computer and related items helps man to appreciate the immense potential of the human capacity.

Assessment

- Briefly explain the reasons for skill acquisition
- State the importance of skill acquisition

JSS3
BASIC SCIENCE
THIRD TERM

TABLE OF CONTENT

Basic Science, JSS 3, Second Term,

Week 1

Topic: Reproductive Health

Meaning of Reproductive Health

Reproductive health is the ability of people to have a satisfying and safe sex life and the capability to reproduce as well as the freedom to decide if, when and how often to do so.

Significance of Reproductive Health

Reproductive health is significant because it promotes good sexual health which enhances life and personal relations. It is also a prerequisite for social, economic and human development i.e. human energy and creativity is the driving force of development and this cannot be generated by a sick person. It sets the stage for health beyond the reproductive years for both men and women. Similarly, the health of a newborn is largely a function of the mother's health, and nutritional status and her access to good health care. Furthermore, reproductive health takes care of reproductive health problems at various stages in life, thereby preventing health problems at later stages in life. It contributes enormously to physical and psychosocial comfort and closeness. Reproductive health creates awareness on the dangers associated with disease, abuse, exploitation, unwanted pregnancy, etc.

Care and Protection of the Reproductive System

This is done through:

1. Circumcision of the male at childbirth reducing the effect of micro-organisms on the fore skin of the penis.
2. Regular bathing of the individual and drying of the reproductive organs.
3. Shaving of the pubic hair to avoid the growth of bacteria and fungi.
4. Ensuring thorough cleanliness of the toilet system to avoid contracting diseases, such as candidacies.
5. Washing of undies (pants) regularly.
6. Using sanitary pads by females during menstruation to avoid getting stained and infections.
7. Using tissue paper to clean up after urinating.

Sexually Transmitted Infections (STIs)

These are highly infectious diseases that are spread by sexual contact. They are referred to as venereal diseases (VD). These diseases are caused by bacteria and can survive in human body.

The two most common STIs are syphilis and gonorrhea. Other examples include, HIV/AIDS, genital herpes, etc.

Syphilis

This is caused by a spirochete bacterium called *Treponema pallidum*. The pathogen enters the body through a break in the skin or mucous membrane. The bacteria may attack any kind of body tissue.

This disease is highly contagious. In its early stages, the symptoms appear about 10-25 days after sexual contact with an infected person. The first sign is usually a large but painless ulcer which often appears on the penis or vulva. Other symptoms include nervousness, fever, anaemia, loss of weight and pain in the bones and joints. In the final stages, syphilis may attack the brain, spinal cord and valves of the heart, resulting in paralysis, insanity, blindness, etc.

Treatment

In the early stages, the disease can be cured by a four –day treatment with penicillin injection. Penicillin administered to a pregnant woman will also kill any spirochetes in her foetus. People allergic to penicillin can be given tetracycline or other drugs.

Gonorrhoea

This is caused by a bacterium called *Neissueria gonorrhoeae* and sometimes called gonococcus. There is a white discharge from the urinary tract and a burning sensation during urination in an infected person. The symptoms may be noted 3-5 days in the males. The female may show no symptoms at all. This leads to sterility, blindness in children, etc.

Treatment

A single dose of penicillin injection can cure gonorrhea if it is diagnosed at an early stage.

HIV/AIDS

- HIV- Human Immunodeficiency Virus
- AIDS – Acquired Immune Deficiency Syndrome

This disease is caused by a virus called Human Immunodeficiency Virus (HIV). An infected person with HIV has no symptoms of the disease for some years and can infect others without realizing that they are infected.

HIV can be transmitted sexually through intercourse with an infected person, from infected mother to the child during pregnancy or as a result of breast feeding, during transfusion of infected blood, using unsterilized sharp instruments, etc. however, HIV cannot be transmitted through handshakes, insect bites, water or food.

HIV infects special cells in the immune system called the lymphocytes and monocytes. It eventually destroys these cells and this leaves the individual susceptible to other diseases. This leads to vulnerability to opportunistic infections like tuberculosis, pneumonia, meningitis and possible death.

Coping Skills for Preserving Reproductive Health

1. The coping skill for preserving reproductive health are:
2. Educational empowerment: This provides girls and women information they need which affects their status as well as the control they have over their health and fertility.
3. Multi-sectoral action: Reproductive health encompasses more than biomedical aspects and goes beyond the health sector. Reproductive ill health equally lies in poverty, gender forms of inequality and social injustice, etc. To this end, different sectors can come together to promote reproductive health.
4. Prevention of reproductive tract infections (RTIs), including STIs and HIV/AIDS through preventive counseling. Condom distribution as part of primary health care.
5. Discouragement of harmful practices, such as female genital mutilation.
6. Compulsory sex education in the curriculum.
7. Abortion counseling and family planning.
8. Eating balanced diet.

Assessment

Briefly explain Sexually Transmitted Infections (STIs) you know

Basic Science, JSS 3, Second Term,

Week 2

Topic: Soil

Introduction

Soil is the upper layer of the earth on which we build houses, plant food crops, etc. All soils are mixtures of different sizes of particles. soil contains mineral salts for plant growth and some animals live in the soil.

Types of Soil

There are three types of soil. These are:

- Sandy soil,
- Loamy soil and
- Clayey soil.

Each soil type has its characteristic properties.

Composition of Types of Soil

- Sandy soils contain a high proportion of large particles (sand)
- Clayey soil contains a high proportion of small particles (clay and silt).
- Loamy soils contain nearly equal amounts of sand, clay and silt. It is the most fertile soil for agricultural purposes.

Characteristics Properties of Sandy Soil, Loamy Soil and Clayey Soil

Properties	Sandy Soil	Loamy Soil	Clayey Soil
Texture	Particles are not closely packed (loose)	Particles are closely moderately packed	Particles are packed together
Air Content	High	Moderate	Low
Porosity	High	Moderate	Poor, waterlogged
Water Content	Low	Moderate	High

Humus Content for Plant	Very little	Moderate	Variable
Provision of Support for Plants	Poor	Very good	Only to a small extent
Soil Particles	About 80% sand, 20% clay and silt	50% sand, 50% clay and silt	Sand is less, 40% clay and still about 60%.

Uses of Soil

Soil is used for:

- Agricultural purposes in planting of trees, crops, fish farming, etc.
- Building construction in making cement blocks, bricks, concrete works, etc.
- Road construction, bridges, drainage systems, taming of roads, etc.
- Pottery, decoration-marble
- Making brick oven

Importance of Soil to Plants and Animals

- To anchor plants
- As sources of plant nutrients
- Pathway for drainage
- For agricultural purposes
- For building, moulding, decorating, pottery, road construction, etc.
- As a source of food for some animals e.g. earthworms.
- As living places (habitat) for other animals, e.g. crickets, rats, snakes, ants, termites, etc.

Assessment

- State the uses of soil
- List the importance of soil to plants and animals

Basic Science JSS 3 Third Term

Week 3

Topic: Ethical Issues in Science and Development

Introduction

Over the years science has developed many processes and products which have conferred on the subject the formidable stature it has at the present time. Science could be used productively, such as in the production of food, curing of diseases, earning income for nations and individuals, gainful employment, etc. Science could be used destructively, such as in atomic bomb production, poisons, nuclear war, production of weapons of war and mass destruction, abortions, etc. The view of science, even in the circumstances given above as either productive or destructive, depends on which side one is considering. It should be emphasized here that when a scientist invents or discovers a thing, he/she does not do it with the intention of causing harm or fear. He does it to reveal or document what is possible or what has been happening.

Meaning of Right and Wrong Application of Science

It is sometimes very difficult to classify an application of science as right or wrong. For example, can we say it is right or wrong for women to abort unwanted pregnancies which might have occurred as a result of rape?

- The right application of science from a moral perspective is when the application is used to engender the development of society, such as provision of shelter, improvement of living conditions, improving life expectancy, fighting diseases, producing gadgets that can generate income and employment for the nation and its citizens.
- Wrong use would include any use that will lead to dehumanizing individuals or groups or cause death and suffering. Any use that does not recognize the sacredness of life is a wrong use.

Implications

- Some applications of science are harmful to individuals and even to society. Such applications ought to be controlled. For example, uncontrolled use of drugs leads to drug abuse. This may ruin the individual drug user and may lead to committing serious crimes in society.
- Children may learn new things and negative vocabulary from watching films. However, watching late night films can lead to children being corrupt or commit themselves to premature and unsafe sexual practices.

Adverse Effects on the Country

Wrong application of science can lead a country to undue loss of revenue, especially when lots of citizens spend their resources to buy foreign films and gamble on the internet. Such practices may also result in increasing number of maladjusted citizens.

Assessment

Give the Right and wrong application of science

Basic Science JSS3 Third Term

Week 4

Topic: Family Life Education

Contents:

- **Implication of Teenage Pregnancy**
- **Myths and facts about Pregnancy**

Teenage Pregnancy

This is an unintended pregnancy during adolescence and it occurs in females under the age 20. Teen pregnancies carry extra health risks to both the mother and the baby. Pregnant teenagers face many of the same pregnancy related issues as other women. There are, however, additional concerns for those under 15 of age as they are less likely to be physically developed enough to sustain a healthy pregnancy or to give birth. It is common that at this age, the girl has not completed her education and is completely dependent upon her parents thus unable to provide for the unborn child.

Implication of Teenage Pregnancy

- The children are:

1. Less likely to receive timely and consistent prenatal care.
2. More likely to be born prematurely, to have low birth weight and more serious medical and developmental problems.
3. More likely to live in poverty.
4. More likely to have lower academic performance, worse behavioural outcomes and become school dropouts.
5. More likely to require government assistance and taxpayer-funded programs.
6. More likely to be victims of abuse.
7. More likely to be committed to a juvenile detention facility or prison.
8. More likely to continue the cycle of teen pregnancy by engaging in sex at an earlier age.

The mothers are:

1. More likely to have pregnancy or delivery complications.
2. Less likely to get a high school diploma.

3. Less likely to get a college degree.
4. More likely to live in poverty.
5. Less likely to be in a stable marriage or relationship.
6. More likely to get government help such as welfare, housing assistance and food stamps.

Myths and Facts About Teenage Pregnancy

- **Myth: Everyone is doing it.**Fact: Who, exactly, is everyone? Don't be so gullible. The reality is that less than half of all high school students have had sex – ever.
- **Myth: Girls can't get pregnant during their period.Fact:** Most girls ovulate in the middle of their cycle on about day 14 after their period starts, but some ovulate closer to or during their period. Also it is important to remember that sperm can survive in the body for up to seven days. If you ovulate within a week of having unprotected sex, there is a possibility you can still become pregnant.
- **Myth: You can't get pregnant if you have sex standing up.Fact:** Yes, you can get pregnant this way whether standng or sitting. No matter what position you are in, whenever you are having vaginal sex, especially without any form of protection, you are at risk of getting pregnant. Gravity has no effect on a sperm's ability to travel through the vagina, into the uterus, where it can potentially reach an egg. The truth is that there is no sex position where you can't get pregnant.
- **Myth: Is there an age limit? Can someone be too young to get pregnant?**Fact: No. Once a woman is ovulating, she can become pregnant. This can happen even before your first period (since ovulation begins 14 days before your period).
- **Myth: You're a prude if you wait until you're older.**Fact: Prude? How about Smart. Everyone is different and everyone is unique. And, everyone has a time that is exactly right for them. Truth told, young teens who have sex say they regret it and that they wished they'd waited.
- **Myth: What if the guy "pulls out" before he finishes?**Fact: Once a guy is aroused, he releases pre-ejaculation fluid. That's at least 300,000 sperm swimming upstream. And guess what? **It only takes 1 sperm to fertilize an egg.**
- **Myth: You can't get pregnant the first time you have sex.**

  Fact**:** First time or Tenth time, it doesn't really matter, your chances of becoming pregnant are the same. Even if a girl has never had her period, there is a possibility that she's about to start her first cycle. In that case, then she has already ovulated, which means that an egg is present, and when an egg and sperm are present, pregnancy can occur.

Assessment

- State the Implications of Teenage Pregnancy

Basic Science JSS3 Third Term

Week 5

Topic: Radioactivity

Introduction

Radioactivity is the disposition of certain elements to send out rays on their own. This makes the nuclei break down. It also refers to the particles which are emitted from nuclei as a result of nuclear instability. Because the nucleus experiences the intense conflict between the two stronger forces in nature, it should not be surprising that there are many nuclear isotopes which are unstable and emit some kind of radiation. The most common types of radiation are called alpha, beta and gamma radiation, but there are several other varieties of radioactive decay. The atom has a nucleus around which electrons evolve. The nucleus contains protons and neutrons. A proton has a positive electric charge while the neutron is neutral i.e. it has no charge. The electron has a given negative electric charge. When a radioactive element sends out rays, the structure of its atoms changes, in some cases the number of electrons revolving round the nucleus reduces.

Radioactive Elements

There are naturally occuring radioactive elements and artificial ones. Natural radioactive elements include radium, uranium, plutonium, thorium etc. Artificial radioactive elements are made by using neutrons and protons t bobard the normal atoms of sulphur, iodine and cobalt include sulphur-35, iodine-131 and cobalt-60. They are artificial isotopes and so are called radio-isotopes since they are radioactive elements. Both natural and artificial radioactive elements disintegrate by giving out alpha, beta and gamma rays.

Properties of Radiation

Radiation	Alpha (α) –particles	Beta particles	Gamma (λ) rays
Nature	Helium nuclei $^{4}_{2}H$	High energy electrons	Electromagnetic waves of very short wavelength

Uses of Radioactivity

1. Treatment of Cancer – Cancer of the skin or an organ such as the breast is treated with gamma rays. Once every month or at intervals prescribed by the doctor, the part of the body affacted by the cancer is exposed to gamma rays for a short time. This treatment is called Radiotherapy and it is continued till the affected part is healed.
2. Sterilisation of Fruit and Drinks – In the past, germs in bottld drinks and canned foods were killed by a process called pasteurisation. The bottled drink or food was warmed to a

temperature that killed the germs. In some cases, chemicals were added to the canned food or drinks such as orange juice.

3. Sterilisation of syringes and medical equipment was done in the past with boiling water. It is believed that application of heat to the water in these instruments to 100 degree celcius will kill germs and bacteria. It is now easier to use gamma rays to kill bacteria in syringes and medical equipment.
4. Carbon dating is a method used to find the age of very old objects. The radiation given out in a given time interval is proportionate to the whole radiation that has been given out in the time past. This is because reduction in radiation is proportional to the age of the object.

Dangers of Radioactivity

1. Though alpha particles may not be able to penetrate into the body as they are stopped by the skin's outer layer, they are dangerous and injurious to organs
2. The beta particles can penetrate the body where they damage and destroy cell tissue.
3. Gamma rays are even more dangerous inside the body, they penetrate deeper into the body than the other two rays. They destroy the cells of bodies exposed to them. They also upset the natural chemical reactions of the body and this may cause death or at best injure the parts exposed to them.

Assessment

1. Radioactivity is the spontaneous ____ of the nuclei of some elements to give off radiation in the form of particles or rays
   a. integration
   b. disintegration
   c. aggregation
   d. formation
2. Which of this element is not a natural radioactive element?
   a. sulphur
   b. uranium
   c. radium
   d. thorium
3. The following are artificial radioactive elements except
   a. Sulphur-35
   b. Uranium-238
   c. Cobalt-60
   d. Iodine-131

Answers

1. B
2. A
3. B

Basic Science JSS3 Third Term

Week 6

Topic: Abortion

Abortion

Abortion is the removal of pregnancy tissue, products of conception or the fetus and placenta (afterbirth) from the uterus. It can also be defined as the ending of pregnancy by removing a fetus or embryo before it can survive outside the uterus. An abortion may be caused purposely and is then called an induced abortion, or less frequently, "induced miscarriage".

Reasons for Abortion

- Failure of Contraceptives or Birth control.
- To end an unwanted pregnancy or teenage pregnancy.
- Inability to support or care for a child.
- Pregnancy resulting from rape or incest.
- Poverty
- To prevent the birth of a child with birth defects or severe medical problems. Such defects are often unknown until routine second-trimester tests are done.
- Physical or mental conditions that endanger the woman's health if the pregnancy is continue

Types of Abortion

Medical Abortion – Medical abortions do not involve surgery or other invasive methods but rely on medications to end pregnancy.

Surgical Abortion – All surgical abortions are medical procedures that must be done in a health care provider's office or clinic. Aspiration is an abortion procedure that can be performed on a woman up to 16 weeks after her last period. Dilation and evacuation (D&E) is typically performed during the second trimester (between the 13th and 24th week of pregnancy.) .

Unsafe Abortion – An **unsafe abortion** is the termination of a pregnancy by people lacking the necessary skills, or in an environment lacking minimal medical standards, or both.

Complications of Unsafe Abortion

- Severe damage to internal organs
- A large range of infections
- Uterine perforation when the uterus is pierced by sharp objects
- Incomplete abortions, when all pregnancy tissues aren't pulled out
- Heavy internal bleeding
- Excruciating abdominal pain
- Collapse of the circulatory system
- Abnormal vaginal bleeding

Assessment

- What are the complications of unsafe abortion
- State the reasons of abortion