NCERT Solutions:Biology Class 10

NCERT solutions - Life Process

Q1. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Ans. Unicellular organisms are directly in contact with the environment so their requirement of oxygen is fulfilled by simple diffusion while the body of multi-cellular organisms like humans contains specialized cells and tissues for different kinds of functions. Hence due to the complex structure of the body, multi-cellular organisms can not meet the complete requirement of oxygen by the way of diffusion because their cells are not directly in contact with the surrounding environment.

Q2.What criteria do we use to decide whether something is alive?

Ans. All the things which have the movements like walking, breathing or growing are generally used to decide something is alive or not but there are invisible movements like the movement of molecules which results to have different functions like cellular respiration, digestion, etc results in the formation of different molecules in the living body, in short, all these activities are known as life processes. So the presence of the life process is the criteria to decide something is alive.

Q3.What is the outside raw material used for by an organism?

Ans. The raw material required by an organism depends on its complexity and surrounding environment, the raw materials needed to all organisms are as follows.

Food- The food is obtained from outside of the body for getting energy.

Water-Water is used for the digestion of food.

Oxygen- Oxygen is needed to breakdown food into carbon dioxide and energy.

Carbon dioxide- Carbon dioxide is needed to plants for the process of photosynthesis.

Q4.What processes would you consider essential for maintaining life?

Ans. Life processes such as respiration, transportation, excretion, nutrition, reproduction etc are needed for maintaining life.

Q5.What are the differences between autotrophic nutrition and heterotrophic nutrition?

Ans.

Sr.No.	Autotrophic nutrition	Heterotrophic nutrition
1	Food is synthesized from simple inorganic raw materials such as CO_2 and H_2O.	Food is obtained from autotrophs. This food is then broken down by the enzymes.
2	Chlorophyll is required	Chlorophyll is not required
3	Food is generally prepared at day time	Food can not be obtained at all time
4	All the green plants and some bacteria have this type of nutrition.	All the animals and fungi have this type of nutrition.

Q6.Where do plants get each of the raw materials required for photosynthesis?

Ans.The following raw materials required for photosynthesis

(i) CO_2 enters the cells of leaves through stomata.

(ii) Water is absorbed by the roots of plants.

(iii) Sunlight is absorbed by chlorophyll and other green parts of the plants.

Q7.What is the role of the acid in our stomach?

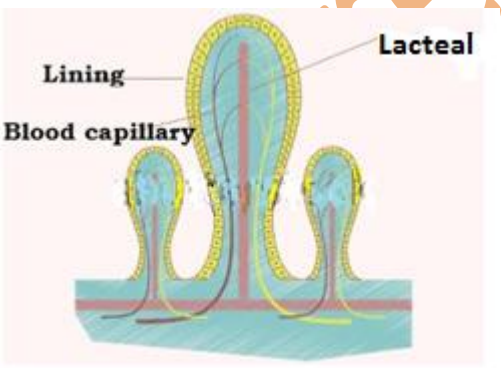
Ans. The role of acid HCl secreted by the wall of the stomach to kill the bacteria ingested with the food and maintains the ph. value of stomach so that enzymes could be secreted from the stomach wall for the digestion of food. It also activates the secretion of digestive juices in the pancreas, which further breaks down the food before absorption of the food in the intestine.

Q8.What is the function of digestive enzymes?

Answer- The function of digestive enzymes like amylase, lipase, pepsin, trypsin, lactase, maltase, etc secreted by stomach, pancreas, and small intestine is to breakdown complex food particles into simple food particle. These simple particles can be easily absorbed by the blood and thus transported to all cells of the body.

Q9.How is the small intestine designed to absorb digested food?

Ans. The small intestine has millions of tiny finger-like projections called villi. These villi are designed to increase the surface area for efficient absorption of food. Within these villages many blood vessels are present that absorb digested food and carry it to the bloodstream, then it is transported to every cell of the body.

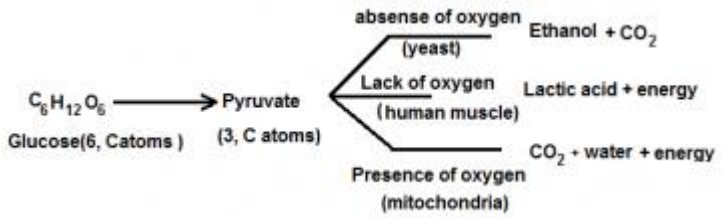


Q10.What advantages over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Answer- The amount of oxygen in the air is higher than the oxygen dissolved in the water. The terrestrial animals do not have to breathe faster for obtaining oxygen like aquatic animals because they get oxygen from the atmosphere whereas aquatic animals take oxygen from water so they are needed adaptation for getting required oxygen and thus breathe faster as compared to terrestrial animals.

Q11.What are the different ways in which glucose is oxidized to provide energy in various organisms?

Answer- During the cellular respiration in all organism 6 C atoms molecule of glucose is broken down into 3 C atoms molecule of pyruvate. Thereafter further pyruvate is broken in different ways in case of different organisms.



Anaerobic respiration- It occurs in the absence of oxygen. In yeast during the process of fermentation pyruvate is converted into ethanol, CO_2, and energy.

Aerobic respiration- It occurs in the presence of oxygen. In this process, pyruvate converted into CO_2, water, and energy. The release of energy is more in the case of Aerobic respiration as compared to Anaerobic respiration.

Lack of oxygen- It occurs due to vigorous activities. Due to lack of oxygen, the molecule of pyruvate converted into lactic acid and energy which results in cramp in muscles.

Q12.How is oxygen and carbon dioxide transported in human beings?

Answer-Carbon dioxide-As a result of respiration in our body cells CO_2 is formed which dissolves in the plasma of blood, this deoxygenated blood carried out from all parts of our body through the veins then it is transported to the lungs through the pulmonary artery. In the lungs, CO_2 diffused out and expelled out through the nostril.

Oxygen-Oxygen inhaled by us reaches to the lungs where it is diffused into the blood transported by the heart through the pulmonary artery and combines with hemoglobin forming oxyhemoglobin and then carried to the heart through the pulmonary veins. This oxygenated blood is pumped out by the heart to all parts of the body through the arteries and thus oxygen reaches every cell.

Q13.How are the lungs designed in human beings to maximize the area for the exchange of gases?

Answer- When we inhale air the diaphragm which separates the abdomen from the lungs dilated and as a result, the lungs also dilated as air comes into the lungs. Then O_2 diffuses into the blood through alveoli of the lungs which is made up of many capillaries. During the exhale the diaphragm contracted and space between the lungs and diaphragm becomes less which makes the lungs contracted and CO_2 diffuses into the lungs through alveoli of the lungs and expelled through our nostril.

Q14.What are the components of the transport system in human beings? What are the functions of these components?

Answer-Heart- The role of the heart is to receive deoxygenated blood from all parts of the body and send it to the lungs for oxygenation thereafter pumps this pure blood to all parts of the body.

Blood – Blood is called a connective tissue because each cell of the body gets nutrients, oxygen, water, etc from the blood. The blood transports waste products released by each cell of the body.

Blood vessels- The blood vessels are of three kinds.

(i) Veins- The role of veins is to carry deoxygenated blood from all parts of the body to the heart.

(ii) Artery- The role of the artery is to transport oxygenated blood to all parts of the body.

(iii)Capillaries- The role of the capillary is to serve oxygenated blood from arteries to tissues of our body and feed deoxygenated blood from the tissues back to veins.

Q15.Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Answer- The mammals and birds live almost every part of the earth. They are required more energy for maintaining their body temperature because these kinds of organisms exist in hotter and cooler both places. The birds and animals have separate oxygenated and deoxygenated blood for getting an efficient supply of oxygen. So, efficient supply of oxygen releases more energy that is required by their body to maintain body temperature.

Q16.What are the components of the transport system in highly organized plants?

Answer- There are two kinds of conducting tissues in highly organized plants.

(i) Xylem- The role of xylem is to conduct water and minerals absorbed by the roots from the soil to the leaves.

(ii) Phloem- The role of phloem is to conduct food prepared by the leaves to all parts of the plant.

Q17.How are water and minerals transported in plants?

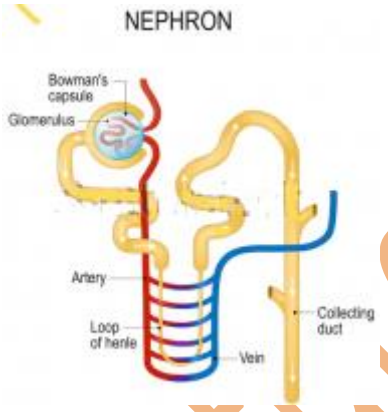
Answer- The root cells take mineral in the form of ions from the soil, it makes the difference in concentration between roots and soil, thus making a steady movement of water by the way of osmotic pressure. All xylem cells of roots, stem, and leaves are connected, the water transports from one cell to another through osmosis and ultimately reaches to leaves. Transpiration(loss of water from leaves) from the leaves increases this suction pressure, it forces the water into the xylem cell of the roots from the soil and thus maintains the flow of water and minerals from roots to leaves.

Q18.How is food transported in plants?

Ans. The food is transported through phloem tissues. All phloem cells of leaves, stem, and roots are connected. The food prepared by the leaves have more concentration compared to other parts obviously so it transported to other parts by the process of osmosis, the energy for this process is imparted by the ATP released during the photosynthesis.

Q19.Describe the structure and functioning of nephrons.

Answer- The nephron is the basic filtering unit of kidneys (cell of the kidney). It is responsible for removing waste products, stray ions and excess water. The main components of the nephron are glomerulus, Bowman's capsule and long renal tubule.



- The blood enters the kidney through the renal artery which branches into many capillaries associated with glomerulus.
- Blood advances into Bowman's capsule and here water and solutes transfers to nephron.
- In the proximal tubule, some substances such as amino acids, glucose and salts are selectively reabsorbed and unwanted molecules are added in the urine.
- The filtrate then moves down into the loop of Henle where more water is absorbed.
- From here, the filtrate moves upwards into the distal tube and finally to the collecting duct. Collecting duct collects urine from many nephrons.
- The urine formed in each kidney enters a long tube called the ureter. From ureter, it gets transported to the urinary bladder and then into the urethra**.**

Q20.What are the methods used by plants to get rid of excretory products?

Ans. The excess water in the leaves excreted by the way of transpiration. The excess CO_2 and O_2 are excreted by the way of respiration and photosynthesis through the stomata of leaves respectively. The unwanted products like non-starch polysaccharides and certain hydrophobic substances which are referred to as gum generally stored in old xylem or in leaves.Certain waste products stored in the vacuole of cells.

Q21.How is the amount of urine produced regulated?

Answer-The amount of urine produced depends on excess water and waste material dissolved in it. The habitat of organism regulates urine production in the body. The hormone such as Antidiuretic hormone (ADH) secreted by the hypothalamus a part of the brain which is stored and released by pituitary glands is also acted on the kidney for controlling the amount of water excreted in the urine.

Q22.The kidneys in human beings are a part of the system for

(a) Nutrition

(b) Respiration

(c) Excretion

(d) Transportation

Answer-In human beings kidneys are a part of the system for excretion.

Q23.The xylem in plants are responsible for

(a) Transport of water

(b) Transport of food

(c) Transport of amino acids

(d) Transport of oxygen

Answer- The xylems in plants are responsible for the transport of water.

Q24.The autotrophic mode of nutrition requires

(a) Carbon dioxide and water

(b) Chlorophyll

(c) Sunlight

(d) All of the above

Answer-(d) The autotrophic mode of nutrition requires carbon dioxide, water, chlorophyll, and sunlight.

Q25.The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

(a) cytoplasm

(b)mitochondria

(c)chloroplast

(d)nucleus

Answer- The breakdown of pyruvate to give carbon dioxide, water, and energy takes place in mitochondria.

Q26.How are fats digested in our bodies? Where does this process take place?

Answer- The fat in the food entered the small intestine in the form of a large globule (spherical pills). The bile acid secreted by the liver converts this large globule into a small globule or emulsify the fat (transformation of fat into small droplets). After the emulsification of fat, the lipase secreted by the pancreas further breaks down the fat into fatty acids and glycerol which is then absorbed by the intestine. This process of fat digestion occurs in the small intestine.

Q27.What is the role of saliva in the digestion of food?

Answer-The digestion of food is initiated from the mouth. The saliva is secreted from a salivary gland located at the bottom of the tongue. The role of saliva moistens the food and makes food bolus so that the food could be swallowed easily. Saliva contains the enzyme amylase which changes carbohydrate into simple sugar like maltose and dextrin which is further broken down in the small intestine.

Q28.What are the necessary conditions for autotrophic nutrition and what are its byproducts?

Answer-The autotrophic nutrition takes place through the process of photosynthesis. The required condition for photosynthesis is CO_2, water, chlorophyll pigments, and sunlight. Carbohydrates and oxygen are the byproducts of autotrophic nutrition.

$$6CO_2 + 6H_2O \xrightarrow[Chlorophyll]{Sunlight} C_6H_{12}O_6 + 6O_2$$

Q29.What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Aerobic respiration	Anaerobic respiration
It takes place in the presence of oxygen	It takes place in the absence of oxygen
It involves the exchange of gases between the organism and the environment	Exchange of gases between an organism and outside environment is absent
It occurs in cytoplasm and mitochondria	It occurs only in the cytoplasm
It always releases CO2 and H2O	The products formed depends on organisms
It yields 36 ATP's	It yields 2 ATP's

Ans. The anaerobic respiration occurs in yeast, some of the bacteria, worms in intestine like askaris and tapeworm etc.

Q30. How are the alveoli designed to maximize the exchange of gases?

Answer-Alveoli has a thickness of almost one cell, has a balloon-like structure and moist surface and surrounded by many blood capillaries, these millions of alveoli extended on the surface of lungs increase the surface area of lungs and provides more exposure for the exchange of gases. During inhale and exhale the ribs lifted up and diaphragm flattened air is sucked into the lungs and CO_2, O_2 exchanged through the millions of alveoli by the way of diffusion from blood to alveoli and alveoli to the blood.

Q31.What would be the consequences of a deficiency of hemoglobin in our bodies?

Answer- The oxygen is transported by hemoglobin from the heart to all parts of the body through arteries. The deficiency of hemoglobin in the blood will result in less supply of oxygen in our body cell which may cause exhaustion, dizziness or shortness of breath. Deficiency of hemoglobin may also cause anemia.

Q32.Describe double circulation in human beings. Why is it necessary?

Answer- Double circulation means the heart receives deoxygenated blood from all parts of the body through the veins and transports oxygenated blood to all parts of the body through the arteries. It is required to make the circulatory system more efficient and maintain body temperature.

Q33.What are the differences between the transport of materials in xylem and phloem?

Ans.

Xylem	Phloem
Xylem tissues help in the transports of water and minerals.	Phloem tissues help in the transports of the food
Water is transported upwards from roots to parts of the plants.	Food is transported in both upward and downward directions.
Transport in xylem occurs with the help of simple physical forces such as simple transpiration pull.	Transport of food in the phloem requires energy in the form of ATP.

Q34.Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Alveoli are tiny balloon-like structure present inside the lungs	Nephrons are tubular structure present inside the kidney
The walls of alveoli are one cell thick and it contains an extensive network of blood capillaries.	Nephrons are made of glomerulus, Bowman's capsules and long renal tube.
The exchange of gases CO2 and O2 takes place between the blood of capillaries that surrounds alveoli and gases present in the alveoli.	The blood enters the kidney through the renal artery. The blood is entered here and the nitrogenous waste in the form of urine is collected by collecting duct.
Alveoli are the sites of gaseous exchange.	Nephrons are the basic filtration units.

Q1. What is the difference between a reflex action and walking?

Ans..Reflex action is the involuntary action that occurs in response to a particular stimulus around us. The reflex action occurs without involvement of conscious areas of brain responsible for thinking. Reflex action is the exchange of communication between the peripheral nerves and brain through spinal cord..On the other hand voluntary actions are those which occur under the

control of cerebrum , the largest part of the brain which is responsible for thinking, memory, emotions and intelligence. Walking is the action that requires thinking so it is a voluntary action.

Q2. What happens at the synapse between two neurons?

Ans. In response to the stimulus the nerve impulse generated and reaches to axon located at the end of neuron , the impulse triggers the neuron to generate a chemical known as neurotransmitter,the space between two neurons where this event occurs known as synapse, the generated neuron transmitter then transports to dendrite of next neuron and produces nerve impulse,this is the ways how the communication is exchanged from all cells of the body to the brain.

Q3. Which part of the brain maintains posture and equilibrium of the body?

Ans.Cerebellum which is a part of Hind brain is responsible for Controls the motor functioning hence it is the part reengaged in the maintenance of posture and equilibrium of the body.

Q4. How do we detect the smell of an agarbatti (incense stick)?

Ans.Smell of an agarbatti is detected by Nose, olfactory receptors present in the nose sends electrical signal to the fore brain. Fore brain interprets this signal as the incense stick to be detected as smell.

Q5. What is the role of the brain in reflex action?

Ans. Reflex actions are formed instantaneously in response to the stimulus that has no time to think. For instance the sensory nerves that detect the heat are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is known as reflex arc.

Reflex action are generated in spinal cord and the information also reaches brain. This helps the brain to record this event and remember it for future use. Brain helps the person the person to get awareness of the stimulus and prevent himself from that situation again.

Q6. What are plant hormones?

Ans. Plant hormones are the organic substances produces at certain sites of the plant and are translocated to other parts based on the requirement. Plant hormones help to coordinate growth, development and responses to the environment. Ex: Auxin’s Gibberlin’s, cytokines, abscisic acid and ethylene.

Q7. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

Ans.

S.No	Movement of leaves of the sensitive plant	Movement of shoot towards light
`1	It does not depend on the direction of stimulus applied.	Depends on the direction of stimulus applied.
2	Called as Nastic movement	Called as tropic movement
3	Touch is the stimulus	Light is the stimulus
4	Caused by the sudden loss of water from the swellings at the base of leaves	Caused by the unequal growth on the two sides of the shoot.
5	Not a growth movement	Growth movement
6	Occurs very fast	Occurs slowly

Q8. Give an example of a plant hormone that promotes growth

Ans.Auxins and Gibberlins are the hormone responsible for the growth of plant.

Auxins are responsible for the cell elongation in shoot and also regulates growth.

Gibberlin is responsible for stem elongation and germination.

Q9. How do auxins promote the growth of a tendril around a support?

Ans. Auxins are the plant hormones produces at the tip of a shoot and root. Auxins are present at the tip of tendrils. When tendrils are attached around any support their growth is slowed down as auxins are sensitive to touch. This make them move to the other side of the tip to get support this makes the other side grow faster than the side of tendril in contact with the support and the tendril bends towards the support.

Q10. Design an experiment to demonstrates hydrotropism in plants.

Ans.Procedure :

i. Plant a seedling in a vessel containing soil.

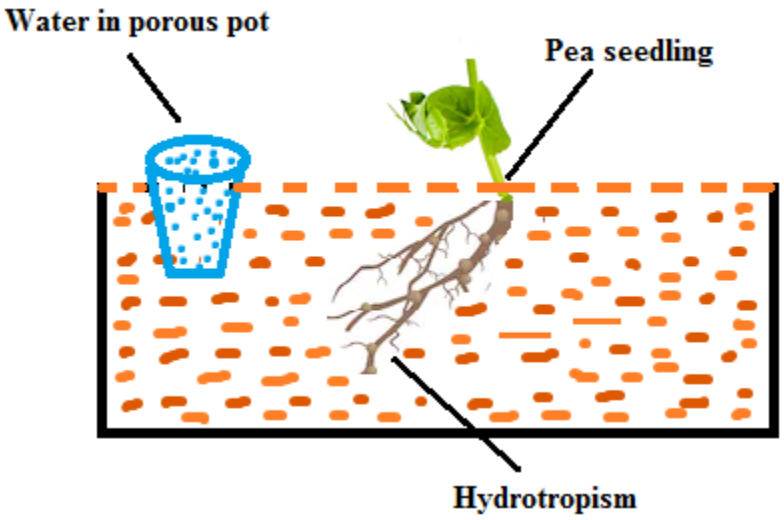
ii. Adjacent to the seedling put a porous pot containing water.

iii. Leave the set up for few days.

Observation :

iv. On examining the roots it is observed that the roots bend towards the source of water and do not grow straight.result :

It confirms that plant shows hydrotropism as the roots bend towards the porous pot of water. As hydrotropism is a plant growth response in which the direction of growth is determined by a stimulus of the gradient in water concentration.



Q11.How does chemical coordination take place in animals?

Ans. Chemical coordination takes place in animals with the help of chemical messengers called as hormones. Hormones are the chemic fluids that are secreted by specific glands of the endocrine gland. Hormones regulate the growth, development, and homeostasis of the animals.

Q12.Why is the use of iodized salt advisable solution:

Ans.Usage of Iodized salt is advisable to avoid the deficiency of Iodine. If the intake of iodine is low, the release of thyroxine from the thyroid gland will be decreased. This affects fat, carbohydrate and protein metabolism

Thus a person may have a goiter problem in case if the intake of iodine is lowered

Q13.How does our body respond when adrenaline is secreted into the blood?

Ans. Adrenaline hormone is secreted in large amounts when a person is frightened, or mentally disturbed. When it reaches the heart, it beats faster to supply more oxygen to our muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. It also raises the blood pressure and allows more glucose to enter into the blood. All these responses together enable our body to deal with emergency situations.

Adrenaline is a hormone secreted when a person is frightened or mentally disturbed. When Adrenaline reaches heart, the heartbeat will increase to increase blood supply to our muscles. Adrenaline also increases the breathing rate because of the contraction of the diaphragm and the rib muscles. Adrenaline rush also increases blood pressure and allows entry of more glucose into the blood. These altogether occur when our body responds to the secretion of adrenaline into our blood.

Q14.Why are some patients of diabetes treated by giving injections of insulin?

Ans. Diabetes is a condition where insulin hormone is produced less or stopped by pancreatic cells of a person. Insulin regulates blood glucose by converting extra glucose to glycogen. When insulin is not produced adequately person's blood glucose level which leads to adverse effects. In order to maintain insulin and blood glucose level diabetes patients are treated with injections of insulin.

Q15. Which of the following is a plant hormone?

(a) Insulin

(b) Thyroxin

(c) Oestrogen

(d) Cytokinin

Answer is d) cytokinin.

Cytokinin is a plant hormone whereas Insulin, Thyroxin, Oestrogen are the hormones produced by animals.

Q16.The gap between two neurons is called a

(a) Dendrite.

(b) Synapse.

(c) Axon.

(d) Impulse.

Solution:

The answer is (b) Synapse

Dendrite is a short branched extension of a nerve cell, along which impulses received from other cells at synapses are transmitted to the cell body.

An axon or nerve fiber is a long, slender projection of a nerve cell or neuron in vertebrates that typically conducts electrical impulses known as action potentials away from the nerve cell body. The function of the axon is to transmit information to different neurons, muscles, and glands.

Impulse an electrical signal that travels along axon.

Q17.The brain is responsible for

(a) Thinking.

(b) Regulating the heartbeat.

(c) Balancing the body.

(d) all of the above.

Answer is (d) all the above

Brain is responsible for thinking, brain regulates the heartbeat, and it balance the body.

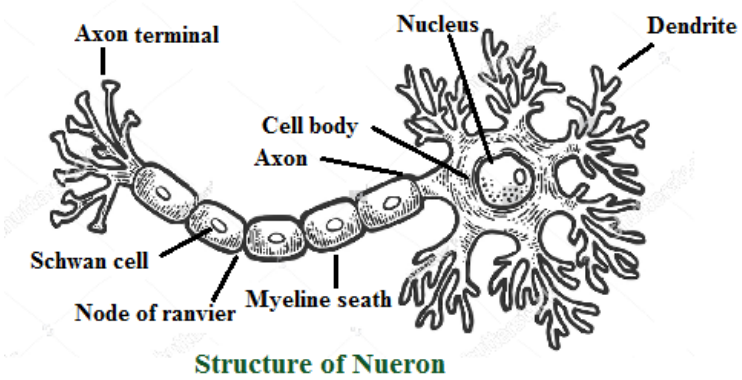
Q18.What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

Ans. Receptors are present throughout our body mainly sense organs. Receptors collect the information about changes that happen around us and send the signal to information to brain

which render effector mechanism against the change. When receptors do not work properly, the environmental stimuli are not able to create nerve impulses and body does not respond.

Q19.Draw the structure of a neuron and explain its function.

Ans. Neurons are nerve cells which are functional units of the nervous system. Three main parts of neurons are Dendrites, Axons and cell body.



Structure of Nueron

Dendrite: Detects information and sends it to cell body

Cell Body: Maintains growth of the cell

Axon: Conducts messages away from cell body and signal to next neuron.

Q20.How does phototropism occur in plants?

Ans. Directional movement and growth of plant in response to light is called as phototropism. Phototropism occurs due to increased auxin on the dark side and decreased auxin on the illuminated side. Because of presence of more auxin, leaf in the darker side grows faster causing it to bend towards the source of light.

Q21.Which signals will get disrupted in case of a spinal cord injury?

Ans. In case of a spinal cord injury Reflex action – Impulses from various body parts will not be conducted to brain. Message from brain will not be conducted to various organs of the body.

Q22.How does chemical coordination occur in plants?

Ans. Plant growth, development and responses to the environment is controlled and coordinated by a special class of chemical substances known as hormones. Hormones are produced in one part of the plant and are transported to all the needy parts of the plant. The five major types of phytohormone are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.

Q23.What is the need for a system of control and coordination in an organism?

Ans. There are various organs in an organism. These organs must be carefully controlled and coordinated for the survival of an organisms. In the body of an organism various fluids are secreted from the glands of the endocrine system. These hormones are responsible for the overall growth and development of an organism. All others daily decision that includes voluntary and involuntary action are controlled by central nervous system (CNS).

Coordination is needed for all human activities we perform. Our nervous system receives information from surroundings which is processed and response is ilicited. The endocrine system (hormonal system) helps in integrating various metabolic activities like reproduction, development, and all reflex actions (cope up with various give up situations).

The hormonal system in plants helps in process of photosynthesis; they need carbon dioxide, water and sunlight. The stomatal opening in leaves opens up to allow in carbon dioxide gas, the roots bend towards water and the stem grows towards sunlight, the tendrils in climbing pants are supported by the hormonal system of the plant body.

Thus, we have need of control and coordination system in an organisms.

Q24.How are involuntary actions and reflex actions different from each other?

Reflex actions	**Involuntary actions**
1. Rapid automatic responses to a stimulus without the conscious involvement of the brain	1. Occurs without the consciousness of an organism
2. Controlled by spinal cord	2. Controlled by mid brain or medulla oblongata
3. Very quick and instantaneous	3. Relatively slower
4. May involve any muscle or a gland	4. Involves only smooth muscles
5. Can be conditioned	5. Cannot be influenced by external conditioning
Examples: Blinking of eyes, salivation	Examples: Beating of heart, blood circulation

Q25.Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

Ans.

	Nervous control		**Hormonal Control**
1	It is consist of nerve impulses between PNS, CNS and Brain.	1	It consists of endocrine system which secretes hormones directly into blood.
2	Here response time is very short.	2	Here response time is very long.
3	Nerve impulses are not specific in their action.	3	Each hormone has specific actions.
4	The flow of information is rapid.	4	The flow of information is very slow.

Q26.What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

Ans.

Sl. no	Movement in sensitive plants		Movement in our legs
1	The movement in a sensitive plant is a response to stimulus (touch) which is an involuntary action.	1	Movement in our legs is a voluntary action.
2	No special tissue is there for the transfer of information	2	A complete system CNS and PNS is there for the information exchange.
3	Plant cells do not have specialized protein for movements.	3	Animal cells have specialized protein which help muscles to contract.

NCERT solutions for class 10 Chapter 8 How do organism reproducePage 128

Q1.What is the importance of DNA copying in reproduction?

Ans.DNA copying in reproduction is important because of the following features

(i) DNA coping maintains the characteristics of the species according to the change in the environment.

(ii) It is a code for designing the species in the next generation.

(iii) DNA copying is the key to evolution,it leads to the formation of new species.

(iv) DNA copying evokes the survival of the organism.

Q2.Why is variation is beneficial to species but not necessarily for the individual?

Ans. Variation is beneficial to the species because variation provides means of adaptability of the species in a particular nitch.If the variation is not there among the species then the species might be finished . Variation is not necessarily beneficial to the individual because in the changing condition few individuals may be extinct or die out but a percentage of the species modifies them and follows survival for the fittest one and thus new species are originated that is the formula for evolution of evolution.

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Q1. How does binary fission different from multiple fission?

Ans.

Binary Fission	Multiple Fission
In binary fission parent cell divedes into two equal half daughter cells	In multiple fission parent cell divides into more than two daughter cells
This process occurs in favourabe condition	This process occurs in unfavourable condition
Binary fission takes place in amoeba,paraemecium	Multiple fission takes place in plasmodium etc

Q2.How will an organism be benefitted if it reproduces through spores?

Ans. An organism be benefitted if it reproduces through spores because spores are covered with thick layers that defend them from adverse conditions as for example heat and cold. The spores can be transferred from one place to other through the animal, air and water, therefore it benefits them to have well productivity. When spores get favourable conditions(moisture) they explode and settle down on the earth and grow again. All these features make the spores live successfully in unfavourable conditions.

Q3. Can you think of reasons why more complex organisms can not give rise to new individuals through regeneration?

Ans. All complex organisms have different systems for different functions in the body. Systems are made of organs, all organs are made of tissues and all tissues are made of cells, thus complex

organisms are highly differentiated to performed specialized functions. The key point in the case of the complex organism that different types of tissues are composed of different type of cells, so any cut to the part of a complex organism, can not be reproduced to an organism, as an example any part of the human body can not be reproduced to a new individual,in contrary to this body of simple organism are made of similar types of the cell,therefore any part of their body can be reproduced to new individual.

Q4.Why is vegetative propagation is practiced for growing some types of plants?

Ans. Vegetative propagation is used to grow plants that don't generate seeds, for example, rose, jasmines, and other plants.

Vegetative propagation also protects plants from diseases.

Vegetative propagation also maintains the quality of the plant because the plants which are produced through vegetative propagation are more similar than the plants produced by the seeds.

Q5.Why is DNA copying an essential part of the process of reproduction?

Ans. DNA copying is an essential part of the process of reproduction because this process transfers the characteristics of the parent to the offspring. DNA transferred to the next generation is not the exact copy of the parent,it varies from generation to generation, this variation of DNA copying protects the organism from changing environment.

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Q1.How is the process of pollination different from fertilization?

Ans. The process of transferring pollen from the male part of the flower(anther) to the female part of the flower (stigma) is known as pollination and the fusion of male and female gametes is known as fertilization.

Pollination	Fertilization
The process of transferring pollen from the male part of the flower (anther) to the female part of the flower (stigma) is known as pollination	The process of uniting male gametes and female gametes is known as fertilization
Pollination occures only in the plants	Fertilization is the common process that occures in every organisms
Pollination is external process since it takes place in external part of the flowers	Fertilization is the internal process that takes place inside the body of organism
There are two types of pollination self pollination and cross pollination	There are two types of fertlization internal fertilization and external fertilization.

Q2.What is the role of seminal vesicles and prostate glands?

Ans. The role of seminal vesicles and prostate glands is to secrete fluids that are part of semen, the fluids secreted by seminal vesicles make two-thirds part of the semen, it prepares the passage for sperms. Prostate glands secret the fluids that contain nutrients and slightly alkaline in nature, it nourishes the sperms and neutralizes the acidic medium in the urethra and vaginal track.

Q3. What are the changes seen in girls when at the time of puberty?

Ans. At the time of puberty, girls have some changes.

Their breast enlarged

Hips become in a rounded shape

The pitch of sounds increases

Q4. How does the embryo get nourishment inside the mother's body?

Ans. The embryo inside the uterus is connected to the uterine wall through a special tissue placenta that is developed in the mother's body during the pregnancy. The nutrients from the blood of the mother transfer to the embryo through the placenta and when the embryo develops to the foetus then waste products also transfers from the foetus to the mother's blood in the same way.

Q5. If a woman is using Copper-T, will it help in protecting her from sexually transmitted diseases?

Ans. Copper -T is an intrauterine contraceptive divice , in this device copper ions prevents sperms to reach eggs and thus it cancels the fertilization process in the uterus. Since it does not provide any barrier against the mixing of fluids of two individuals therefore sexually transmitted disease can not be protected through Copper-T.

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Exercise

Q1. Asexual reproduction takes place through budding in

(a) Amoeba

(b) Yeast

(c) Plasmodium

(d) Leishmania

Ans.(b) Yeast

Q2. Which of the following is not a part of the female reproductive system in human beings?

(a) Ovary

(b) Uterus

(c) Vas deferens

(d) Fallopian tube

Ans.(c) Vas deferens

Q3. The anther contains

(a) Sepals

(b) Ovules

(c) Pistil

(d) Pollen grains

Ans.(d) Pollen grains

Q4. What are the advantages of sexual reproduction over asexual reproduction?

Ans. The advantages of sexual reproduction over asexual reproduction are following.

(i) The organisms produced by sexual reproduction have the character of both the parents.

(ii) During sexual reproduction variations in DNA occurs this change is necessary for the adaptability of the organism in changing environment.

(iii) The organisms produced by the asexual reproduction are just a clone,there is no variation which is necessary for the evolution of species, in this respect the organisms produced by sexual reproduction can survive in a better way.

Q5. What are the functions performed by the testis in human being?

Ans. The testis in human being produces sperms and testosterone hormone which is responsible for building up body mass and muscles. The testis also produces androgen an important hormone responsible to develop secondary sexual characteristics like body hair growth, voice change, bone and muscle development.

Q6.Why does menstruation occur?

Ans. The ovary of women releases an egg every month and at the same time uterus prepares itself to receive a fertilized eggs, the inner lining of the uterus thickened and blood supplied by the body to the inner lining of the uterus for the formation of the embryo but when eggs are not fertilized this thicken layer inside the uterus broken up slowly and results in menstruation.

Q7.Draw a labelled diagram of the longitudinal section of a flower.

Q8. What are different methods of contraception?

Ans. The different methods of contraception are used as follows

Barrier method: In this method sperms are prevented by applying a barrier like condoms for males and females, diaphragm in female,in this method a cap is installed at the opening of the cervix that prevents sperms to drift onwards.

Pills: The pills contain hormones that are utilized to block eggs and thus fertilization doesn't take place, two types of pills are used oral pills and vaginal pills.

Surgical method: For males, the kind of surgery vasectomy is utilized in which vase deferens is blocked and transportation of sperms are prevented to go further into the vagina. For female tubectomy is utilized in which the fallopian tube is blocked so the fertilized eggs don't enter the uterus.

Intra-Uterine Devices: These devices are used in females in which the device in implanted into the fallopian tubes and thus flow of fertilized eggs is blocked, its example is Copper T.

Heredity : We look like our parents due to the process of heredity,heredity is the transmission of the traits from one generation to next generation, as an example colour of the eye,blood group or diseases like diabetes etc.

Genes: Heredity is determined by genes, genes are transmitted from one generation to next generation in the form of pair of traits known as alleles, alleles are are copies of genes. One copy of gene from the sperm and other copy from the egg is transmitted to next generation.

Homogygous and Heterogygous traits: When transmitted copies of the genes (alleles) are identical then it is homogygous trait for that gene and when both transmitted copies are different then it is heterogygous for that gene.

Dominant and Recessive trait: The traits which are highlighted in next generation are known as dominant traits and the traits which are suppressed in next generation are known as Recessive traits.

NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

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Q1. If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the population, which trait is likely to have arisen earlier?

Ans. In asexual reproduction, the parent cell reproduces a similar daughter cell. It is given to us that trait B exists in 60 % of the population of a species and trait A exists in 10 % of the total population of the species since trait B represents a larger population as compared with trait A therefore trait B is likely to have arisen earlier.

Q2. How does the creation of variations in a species promote survival?

Ans. The creation of variation in a species promote survival because variation protects the species from the adverse atmospheric condition, in changing atmospheric condition the variation causes the species to adapt themself, as an example bacteria variants which are fitted in adverse condition like heat and cold survive better, such bacteria spreads faster compared to those bacteria which couldn't fit in that condition. Therefore the creation of variation in a species promotes survival.

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Q1. How do Mendel's experiments show that traits may be dominant or recessive?

Ans. Mendel shows that traits may be dominant or recessive through his experiment of monohybrid cross (single trait). In his first experiment, he considered a single trait i.e tallness of pea plant, for that he fertilized a tall plant(TT) to a dwarf plant (tt), which results in all tall plants in the F1 generation, thereafter he fertilized two TT plants of F1 generation through artificial pollination and found the result in F2 generation that one-fourth plants were seen, dwarf. Mendel concluded to that fact the tall plants produced in F1 generation were not the real tall TT plants which he had taken for the experiment, practically those plants of the F1 generation were Tt plants means the dwarfness of the plants were not seen, here in F1 generation tallness of pea plants shown is a dominant trait and since dwarfness is not seen in F1 so it is a recessive trait.

Plants taken for experiments =(TT),(TT)

F1 generation = (Tt),(Tt),(Tt),(Tt), in Tt, T trait is dominant, t trait is recessive

F2 generation =(Tt),(Tt),(Tt),(tt), in Tt, T trait is dominant, t trait is recessive and in tt, t trait is dominant and T is recessive.

Q2. How do Mendel's experiments show that traits are inherited independently?

Ans. Mendel's experiments show that traits are inherited independently, for this experiment he took two pea plants differing from each other by two characters, he crossed one plant with yellow and rounded seed to another plant with green and wrinkled seed. In (F1) first-generation, it results in the plants with yellow rounded seeds, and F2 generation results in the plants with round yellow, round green, and wrinkled yellow seeds, thus Mendel concluded to the fact that traits are inherited independently.

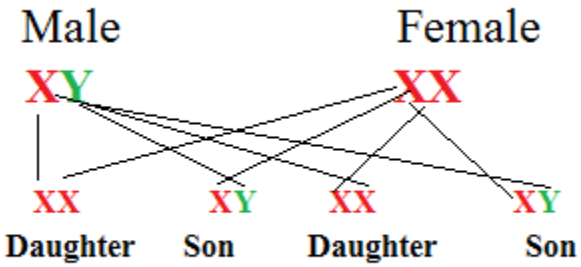
Q3. A man with blood group A marries a woman with blood group O and their daughter had blood group O, Is this formation enough to tell you which of the traits - blood group A or O - is dominant? Why or why not?

Ans. The information that a man with blood group A marries a woman with blood group O and their daughter had blood group O is not sufficient to tell that blood group A or O is dominant. The father's blood group A tells that it may have homozygous traits AA or heterozygous AO, mother's blood group O tells that she may have homozygous trait OO or AO. Since genotypically 50-50 % of traits has to be transferred to next-generation, In both the cases the daughter must have the blood group O, therefore we can't say which of traits A or O is dominant since generally A, B and AB traits are dominant and O is recessive.

NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

Q4. How is the sex of the child determined in human beings?

Ans. In a human being, the male has the XY chromosomes where x shows the trait of female and y shows the trait of male and a female has XX chromosomes where both traits show the trait of girls. Therefore in males, 50 % of chromosomes are of each one X and Y, when fertilization occurs Y chromosomes in sperm fuse X chromosomes in eggs,a boy is produced, and when X chromosome in sperm fuses X chromosome in female a girl is produced.



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Q1. What are the different ways in which individuals with a particular trait may increase in a population?

Ans. The population of an individual with a particular trait may increase in a population in the following ways.

(i). The trait is beneficial to the population: A group of species use camouflage to blend into their surrounding, it helps them to defend from predators, such traits help them to increase their population. For example, the green colour in beetles is favourable as it helps them camouflage against predators.

(ii). Genetic drift: if a population faces an accident such that majority of its members get killed, the remaining members will pass on their traits to the subsequent generations. This will lead to an increase of the trait in the population.

(iii). By mutation: In reproduction during cell division the mistake in DNA copying is beneficial for the species to survive in changing circumstances, thus helps the species to increase their population.

(iv). Naturally Selection: If a trait is useful to the population, it will increase naturally. It may be direct the evolution of species population by adaptions to fit their environment better.

Q2. What are traits acquired during the lifetime of an individual not inherited?

Ans. The acquired traits during a lifetime of an individual are influenced by the surroundings. These traits are not coded by the DNA of the germ cells, this happens because an acquired trait involves a change in non-reproductive tissues(somatic cells) which cannot be inherited.

Q3. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

Ans 1. The small numbers of surviving tigers is a cause of worry because it can result in the loss of genetic variability. This sudden extinction of the tigers and their genes will affect the diversity of nature. The decrease in the tiger population results in a decrease in the genetic pool of tigers. This might even lead to extinction.

2. During the long process of evolution, these tigers carry the genes which have made them adapt to the particular environment. Genes responsible for the survival would not be able to contribute to future generation survival if the tigers became extinct due to any disease or by hunting.

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Q1. What factors could lead to the rise of a new species?

Ans. There are many factors that lead to the rise of a new species. Listed below are the few factors:

1. Genetic drift

2. Natural selection

3. Genetic mutation

4. Reproductive isolation

5. Environmental factors on the isolated populations.

6. Quantum of genetic variant inherited from one generation to the next generation.

Q2. Will geographical isolation to be a major factor in the speciation of a self-pollinating plant species? Why or why not?

Ans. No, geographical isolation will not be a major in the speciation of self-pollinating plant species. Geographical isolation creates the separation of the population. It is because in self-pollinating species, new variants are not formed and they do not show any variation in the population. After self-pollination, the homozygous line evolve. In contrast, after cross-pollination, the homozygous line evolves and it results in the variation of traits in the population.

Q3. Will geographical isolation to be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

Ans. No, geographical isolation will not be the major factor in the speciation of asexually reproducing organisms. This is because there is no exchange of genetic material with the other species in such organisms. They pass on the parent DNA to the offspring which leaves no chance of speciation.

NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

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Q1. Give an example of characteristics being used to determine how close two species are in evolutionary terms.

Ans. In the example of man and ape, both of these two organisms are closed to each other in evolutionary terms because they have similar body designs as an example the hair in their body and mammary glands. In the case of the fish and man, the fish have jaws, vertebral columns and a brainbox which is matched with the man but the fish looks quite different from the man that leads to the distant relationship between both of the organism. There are two characteristics to determine how close are two species are in evolutionary terms.

Homologues and analogues organs are two characteristics to determine how close are two species are in evolutionary terms.

Homologous organs are similar organs in basic structure but perform different functions, this characteristic shows divergent evolution.

Analogous organs are different organs in basic structure but perform the same function, these characteristics show convergent evolution.

Q2. Can the wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?

Ans. No, wing of bat and wings of butterfly should not be considered as homologous organs because they have different structure and origin but have the same function of flying so they are analogous organs.

Q3. What are fossils? What do they tell us about the process of evolution?

Ans. Fossils are the preserved remains or traces of animals, plants and other organisms from the past.

Fossils help us in many ways like:

1. They give great insight into the evaluation. For example, the pattern of fossil distribution gives us an idea of the time in history when various species were formed and extinct.

2. They help us in establishing evolutionary relations between present organisms. Example: Archaeopteryx (connecting link between reptiles and birds).

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Q1. Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

Ans. All human beings, even though they have different size, colour and looks, belong to the same species because they have similar DNA sequences and have descended from same ancestors. Also, they are capable of reproducing among themselves. These variations may have arisen due to environmental factors, mutation and mixing characteristics during reproduction.

Q2. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a 'better' body design? Why or why not?

Ans. No, we cannot say that there is a better body design as these organisms evolved according to their needs to survive in the environment. If a chimpanzee has strong limbs capable of multiple actions, the bacteria can survive in extreme conditions where other organisms cannot. Hence there is no better body design.

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NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

Exercise

Q1. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short.

This suggests that the genetic make-up of the tall parent can be depicted as:

(a) TTWW

(b) TTww

(c) TtWW

(d) TtWw

Ans. (c) TtWW

Q2. An example of homologous organs is:

(a) our arm and a dog's fore-leg

(b) our teeth and an elephant's tusks

(c) potato and runners of grass

(d) all of the above

Ans. (d) All of the above

Q3. In evolutionary terms, we have more in common with:

(a) a Chinese school-boy

(b) a chimpanzee

(c) a spider

(d) a bacterium

Ans. (a) a Chinese school-boy

Q4. A study found that children with light-coloured eyes are likely to have parents with light coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

Ans. Let the trait of light -coloured eye is represented by LL, in this study children have the trait LL with their parents having the traits LL, in this case, it is obvious that parents with LL will produce children with LL trait, in homozygous LL of parent we can't say that light eye colour trait is dominant or recessive until we have the information of at least three generations.

Q5. How are the areas of study evolution and classification interlinked?

OR

Two areas of study namely 'evolution' and classification are interlinked. Justify this statement.

Ans. Classification of organism tells us how closed are organism to each other that information feeds us about their common ancestor. The differentiation among the organisms tells us the distant relationship among them, these variations among the species enable them to adapt to particular environmental conditions, this is all about evolution.

NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

Q6. Explain the terms analogous and homologous organs with examples.

Ans. **Analogous Organs:** The organs which have a different basic structure to each other between two organisms but perform the same functions. As an example, the wings of birds and insects are different in structure, both of them are evolved independently but the wings of both of them are used for flight.

Homologous organs: The organs which have a similar structure between two organisms but perform different functions. As example, wings of birds and fins of fish, both of them evolved from the same origin, but fins of fish are used to swim and wings are used to flight.

Q7.Outline a project which aims to find the dominant coat colour in dogs.

Ans. We choose one male dog of homozygous black colour(BB) and a female dog of homozygous white colour (ww) and cross them then observing the colour coat in the offspring. If there exist all the black colour dogs(Bb) in the progeny then the black colour coat is dominated and If there exist all the brown colour dogs(Bb) in the progeny then the brown colour coat is dominated.

Q8.Explain the importance of fossils in deciding evolutionary relationships.

Ans. The fossils give us the following information

(i) Evolutionary process of life in the earth.

(ii) The structure of the organism that enable us to lik with present creatures available in the earth.

(iii) Fossils of theropods dinosaurs and dinosaurs with features give us an idea that birds are descended from the dinosaurs.

(iv) Wich animals evolved earlier and which were evolved later

(v) The fossils which were found on near the surface are more complex than the fossils which were found deeper inside the earth.

Q9.What evidence do we have for the origin of life from inanimate matter?

Sanley L. Miller and Harold C. Urey gave proof with respect to beginning of life from inanimated matter. They managed an environment like that existed on early earth. The environment had molecules like ammonia, methane, hydrogen sulfide and water, but no oxygen.

The blend was kept up with at a temperature just underneath 100°C and sparkes were passed through the combination of gases. They observed the result after a weak, 15% carbon from methane had been changed over to simple molecules of carbon like amino acids which make up protein particles. In this way, life emerged on earth.

Q10.Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually ?

Ans. Sexual reproduction gives rise to more viable variations than asexual reproduction because in asexual reproduction there is neglected error in DNA that results neglected variations in the offspring,In asexual reproductions the progeny is either more or less similar to the parents.So there are more chances of the organism to be extinct due to lack of variations.

In sexual reproduction during gamet formation metiosis occures between homologous chromosomes of male and female and cell division takes place which brings about new gene formation which is transferred to new generation ,in this matter natural selections is processed ,in the natural selection those variations which has more addaptive value undergoes to the formation of new species .

Q11.How is the equal genetic contribution of male and female parents ensured in the progeny?

Ans.In the human cell there are total 46 chromosomes or 23 pair of chromosomes. During the process of reproduction, each pair of chromosomes contributes one chromosome to the offspring,thus half of the chromosomes are transferred to children from each parent. Among 23 pairs of chromosomes 22 pairs are same in male and female which are known as autosomes and rest one pair is sex chromosomes that is different in male and female and decides sex of the child. In male there is pair of XY chromosomes and female XX pair. When X of male reproduces X of female then offspring is a female and when Y of female reproduces X of female then the offspring is a male.

NCERT Solutions of Class 10 Science Chapter 9 Heredity and Evolution

Q12.Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

Ans.In sexual reproduction the variations that confer an advantage to an individual will survive in a population. All the variation occuring are not beneficial for the survival of organism,only those variation which has more adaptive value in changing environment causes the survival of the species.

Variation among the species makes them fit for changing environment.The organism which are adamant to the changes themselvels can't survive in changing environment.

NCERT solutions of class 10 science chapter 14- Sources of Energy

We need energy for doing work. we get energy from the food and plants get energy from the food prepared by themselves through the process of photosynthesis ,on the similar way all the machines like fan, TV, AC, car manufacturering plants etc are required energy for doing work. We get the energy for driving various machines from the fossil fuel. but excess use of the fossil fuel will leave the earth free from these resources and over and above the issue of increasing

pollution is more prevalent which is causing global warming. So just now the humans have the greatest chalange of finding the suitable sources of energy.

NCERT solutions of chapter 14 -sorces of energy

Q1, What is a good source of energy?

Ans.A good source of energy would be one have following properties.

1.The fuel used by us would do large amount of work per unit volume or mass.

2.The fuel would be easily accessible.

3.The fuel would be easy to store.

4.It is most important that a fuel must be economical.

Q2.What is a good fuel?

Ans. A good fuel must have following qualities.

1.Proper heat be released on burning.

2.It should release least amount of smoke.

3.It should be available easily.

Q3.If you could use any source of energy for heating your food, which one would you use and why?

Ans. We use LPG, the liquid petroleum gas for heating the food since it releases larger amount of energy on heating it produces least amount of heat and easily available and most important that it is economical.

NCERT solutions of chapter 14 -sorces of energy

Page no. 348

Q1.What are the disadvantages of fossil fuels?

Ans.Burning of fossil fuel like coal and petroleum products releases carbon dioxide, carbon monoxide, nitrogen oxides sulphur dioxide. some of these gases are responsible for increasing pollution due to green house effect and some of them causes acid rain which pollutes water bodies and soil .

Q2.Why are we looking at alternate sources of energy?

Ans. The fuel coal and petroleum products are the major sources of energy, these are non-renewable sources ,thus limited in stock, it takes krores of years in their formation inside the earth over and above excess use of coal and petroleum products leads pollution which is dangerous for human health and survival of other organism like plants and animals. We are needed alternative sources of energy that could meet our requirement of energy and prevent us from increasing pollution.

Q3.How has traditional use of wind and water energy been modified for our convenience?

Ans.In past the energy of flowing water was used to provide mechanical energy like grinding the grains and wind was used for separating the grains out of chaff and lifting the ground water through a windmill. Now both of water and wind are used as a renewable source of energy for the production of electricity, hydropower plants are used, in which obstructed water(dam) preserves potential energy the falling water from a certain height is capable to rotate the rotor that moves the armature of the dynamo thereby produces electricity and energy of wind is also used to rotate the rotors of windmills and further it rotates the armature of dyomo and produces electricity.

NCERT solutions of chapter 14 -sorces of energy

Page no. 253

Q1.What kind of mirror concave, convex or plain would be the best suited for use in a solar cooker? Why?

Ans.Solar cooker is used for cooking food so concave mirror is used in it because concave mirror converge the sun rays at its focal point that increases the temperature inside it and thus accessed to cook the food.

Q2. What are the limitations of energy that can be sustained from the ocean?

Ans. The ways of driving energy from the oceans are tidal energy, wave energy and ocean thermal energy. The tides sometimes high and low due to varying position of moon and the earth, tidal energy is harnessed by constructing a dam across a narrow opening to the sea, the turbine fixed at opening and then rising of tides gives mechanical energy to turbine which is converted into electrical energy but such areas are limited in the coast of sea.

The waves in the sea is generated by the strong winds blowing across the sea, at the sea shore by the use of devices this wave energy is utilised to rotate the turbine and producing electricity but areas of such strong waves are very limited.

There is a difference in temperature of surface water of sea and of depth, this temperature difference is utilised to run turbine of gerator and thus electricity is produced,but for the production of electricity in such a way the difference between the surface of ocean and depth should be 20 K or more

Q3. What is geothermal energy?

Ans.The heat is generated due to the collision between tectonics plates inside the earth that forms molten rocks,these molten rocks are pushed upward and trapped in certain region inside the earth ,when underground water come in contact with these hot rocks steam is generated.Sometime hot water from that region finds outlet at the earth surface ,such outlets at the earth surface known as hot springs. The steam trapped in rocks is routed through a pipe to a turbine and used to generate electricity.

Q4.What are the advantages of nuclear energy?

Ans.Nuclear energy is derived through the process of nuclear fission in which the nucleus of heavy atom is fragmented into two atoms of lighter nuclei in this process massive heat is generated,this heat is utilised to produce heat and further for the production of electricity. The fission of uraniumg atom produces 10 millions times the energy we get from the combustion of single carbon atom.

NCERT solutions of chapter 14 -sorces of energy

Page no. 253

Q1.Can any source of energy be pollution free? Why or why not?

Ans. There is not any source which is pollution free ,fossil fuels generate green house gases like carbon dioxide, carbon monoxide, nitrogen dioxide and sulphur dioxide even renewable sources are not pollution free like solar energy, actually solar energy is pollution free but the devices used for this purpose are manufactured by the industry has certain expiry and ultimately mixes with soil causing soil pollution. Nuclear energy geothermal energy wind energy also releases other types of pollutions.

Q2.Hydrogen has been used as a rocket fuel, Would you consider it a cleaner fuel than CNG? Why or why not?

Ans.Hydrogen is used as a rocket fuel that is the best alternative of fossil fuel. Hydrogen on burning produces water as a result of its reaction with atmoshpheric oxygen, while CNG on burning produces water and carbon dioxide although as compared with other fossil fuels it is least poluted .Therefore hydrogen is cleaner fuel than CNG.

NCERT solutions of chapter 14 -sorces of energy

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Q1.Name two energy sources that you would consider to be renewable. Give reasons for choices.

Ans. The best renewable sources of energy are to be considered solar energy and geothermal energy, both sources of these energy are non -exhautible and are convenient to use and releases neglected pollution to the earth other sources of energy like ocean and wind energy are accessible only in certain areas but these sources of energy could be accessed to everywhere in the earth.

Q2.Give the names of two energy sources that you would consider to be exhautible. Give reasons for your choices.

Ans. Two sources of energy coal and petroleum products are exhaustible .Since at present most of the energy we utilise in vehicles, aeroplane ,ship and power plants comes from fossil fuels. It takes millions of years in their processing so their excess use will lead to be finished out of the earth .

NCERT solutions of chapter 14 -sorces of energy

Exercises

Q1.4 solar water heater cannot be used to get hot water on

(a) a sunny day (b) a cloudy day

(c) a hot day (d) a windi day

Ans. (b) a cloudy day

Q2.Which of the following is not an example of a biomass energy source?

(a) Wood (b) gobar gas

(c) nuclear energy (d) coal

Ans.(d) nuclear energy

Q3.Most of the sources of energy we use represent stored solar energy.Which of the following is not ultimately derived from Sunis energy.

(a) geothermal energy (b) Wind energy

(c) nuclear energy (d) bio mass

Ans. (c) nuclear energy

Q4.Compare and contrast fossil fuel and the Sun as a direct sources of energy .

Ans. Fossil fuel is exhaustible and Sun is ever green thus it's non -exhautible source of energy

Fossil fuels are costlier than Sun's energy.

There are limited sources of fossil fuels inside the earth and it's biggest portion is inside the bottom of ocean which is very difficult to be explored while sun's energy is uniformly distributed on the earth.

Fossil fuels on burning releases harmful products like CO_2,CH_4,NO_2 and SO_2 which causes air pollution .Energy of sun is derived through solar panel which releases neglected pollution .

We can use the energy of fossil fuel in all seasons but Sun's energy can't be used on a rainy or cloudy day.

Fossil fuels are conventional and Sun is non-conventional source of energy.

Q6.Compare and contrast bio-mass and hydroelectrity as sources of energy.

Ans. Bio-mass and hydroelectricity both are renewable sources of energy, we wouldn't have to worry about bio-mass and hydroelectricity sources getting used up the way fossil fuels would get finished one day.

Bio-mass like wood, charcoal and biogas on burning releases harmful gases while hydroelectricity doesn't release such gases.

Bio-mass as a biogas plant is easy and economical to install but establishing a hydroelectricity plant we are needed to build a large dam .The dams can be constructed only a limited number of places preferably in hilly areas. Large areas of agricultural land and human habitation are to be sacrificed as they get submerged. The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is also a green house gases.

In spite of using both sources of energy bio-mass and hydroelectricity for the purpose of energy, they are used for other purposes also. The slurry in biogas plants has to be changed periodically, so it is used as a manure and large lake formed on the surface of dam is used to develop fisheries tourism and for irrigation purposes.

Q6.What are the limitations of extracting energy from -

(a) the wind? (b) waves? (c) tides?

Ans(a)The kinatic energy of wind is harnessed by the windmill. Windmills consist of a structure similar to a large electric fan that is erected at some height on a rigid support. To generate electricity, the rotatory motion of the windmill is used to turn the turbine of the electric generator. The support of a single windmill is quite small and cannot be used for commercial purposes. Therefore, a number of windmills are erected over a large area, which is known as wind energy farm. The energy output of each wind mill in a farm is coupled together to get electricity on a commercial scale. Therefore wind energy farms can be established only at those places where wind blows for the greater part of a year. The wind speed should also be higher

than 15 km/h to maintain the required speed of the turbine .For a 1 MW generator ,the farm needs about 2 hectares of land. Since tower and blades of the windmill are exposed to rain sun storm and cyclone, they need a high level of maintenance.

(b) In order to extract energy from the waves, very strong ocean waves are needed.

(c) In order to extract energy from the tides, the sun, the moon and the earth should be in a straight alignment and the tides should be very strong.

Q7. On what basis would you classify energy sources as

(a) renewable and non-renewable?

(b) exhaustible and inexhaustible?

Are the options given in (a) and (b) the same?

Ans(a) Renewable and non-renewable:

Renewable resources are those which replenish on their own and are easily available in nature. Like solar energy, tidal energy, wind energy, bio mass.

Non-renewable energy resources are those which do not replenish on their own and have limited availability in nature. Like fossil fuels which includes petroleum, coal and natural gas.

(b) exhaustible and inexhaustible:

Exhaustible source of energy are those which deplete after few hundred years. Like coal and petroleum.

Inexhaustible source of energy are those which do not deplete and are available in abundant quality. Like solar and wind energy.

Q8. What are the qualities of an ideal source of energy?

Ans. Following are the qualities of an ideal source of energy:

1. It should be economical

2. It should be easy available

3. Pollution free

4. Easy transportation and storage

5. The amount of energy produced when burnt should be huge.

Q9. What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?

Ans. Advantages:

The heart source for a solar cooker is sunlight. It is a clean renewable and inexhaustible source of energy. As its availability is unlimited, it will be pocket- friendly.

Disadvantages:

It doesn't work on a Cloudy day.

Q10.What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?

Ans. Industrialization demands for more energy and to fulfil these demands fossil fuels are used as they are readily available. Due to their harsh usage, it has an impact on the environment. Too much exploitation of fossil fuels had led to greenhouse effect resulting in global warming.

But there are few possibilities of reducing this by reducing the usage of fossil fuels and opting for alternate sources of energy. Reduce the unnecessary usage of electricity and water. Opt for public transportation and lessen using own vehicles. These are a few small steps that can be implemented to reduce energy consumption.

NCERT solutions of class 10 science chapter 15- Our Environment

NCERT solutions of Class 10 science chapter 15-our environment are created here for helping the class 10 students to boost their preparation of the cbse board exam. All NCERT solutions are explained scientifically in a proper way. NCERT solutions of class 10 science chapter -15 will give complete idea of the environment in which we are living.

The chapter -our environment is consist of useful peaces of information regarding the safeguard of bour environment because our environment is in danger by the excess use of fossil fuels, here in this chapter there are given complete idea about the settlement of waste materials whether it is biodegradable or non-biodegradable wastes.

Q1.Why are some substances biodegradable and some non-biodegradable?

Ans. The food eaten by us is digested by us, digestion is the process in which enzymed secreted by our body breaks up the complex molecules to simple molecules, on the same way molecules of ome of the waste or dead animal or plants are changed to simple molecules through the bacteria available in the environment and then absorbed by the soil as a nutrients. and minerals.,these processes are known as biological process and such substances which are acted by enzymes in settling them to their different components known as biodegradable.

Some of the substance burried by us or eaten by us are not changed to their components by the biological processes or bacteria known as non-biodegrable,such as plastic , coal and other hydrocarbon. These substances may be inert and simply persist in the environment for a long time or may harm our ecosystem.

Q2.Give any two ways in which biodegradable substances would affect the environment.

Ans. The bacteria acts on waste material like food peels of vegetables and fruits, dead animals and their remieders dumped in dustbin and the open area converts them into their comments ,in this process foul smelling gases are released that makes impure air of adjoining area.

The dumping of biodegradable waste also breeds mosquito and flies which carries bacteria to our food items and their bite to our body causing different kind of diseases .

Q3.Give any two ways in which non -biodegradable substances would affect the environment.

Ans.The food items packaged by polythene when eaten by cow or other animal ,it is choked up inside their intestine that may cause their death.

If the use of polythene is continued, it's layer on the earth will obstruct the rainwater to go inside the soil of earth that would result the agricultural field become barren and underground water lower up seaking the dryness inside the earth and the land will be fragmented into many pieces.

Page 261

Q1.What are trauphic levels? Give all example of a food chain and state the different trauphic levels in it.

Ans.The trauphic levels are groups of animals in which every organisms get food from the environment in such a way that they depend on each other.

Example. Snake, frog, insects grass in which grass is first trauphic level ,insects second trauphic level ,frog third trauphic level and snake is fourth trauphic level.

Please follow us on pintrest

Q2.What is the role of decomposers in the ecosystem?

Ans. The role of decomposers or so called saprophites decomposes the dead plants and animals and their remieders into their components that are absorbed by the soil. Decomposers (bacteria) converts atmospheric nitrogen gas into nitrgeneous compounds making the soil enriched with nutrients for plants.

Page no. 264

Q1.What is ozone and how does it affect any ecosystem?

Ans. When UV rays of sunlight incident on our atmosphere, it splitted up oxygen molecule into atoms .Since oxygen atom is highly reacted, it combines with oxygen molecule and thus forms ozone gas, the layer of ozone protect us from dangerous UV rays that causes skin cancer ,so if UV rays are allowed to enter the atmosphere ,the survival of all the organisms will be endangered. Ozone gas itself is a harmful gas to human health.

Q2.How can you help in reducing the problem of waste disposal?Give any two methods.

Ans. The waste disposal can be treated with three R's reuse reduction and recycle. We have to mimise the use of non biodegradable substance like plastics and polythene and prefer them to be recycled and reuse

The waste material which are biodegradable can be used to generate energy ,since biodegradable substances ultimately transformer into soil, so that can be used to build small beautiful region adaptable for different kinds of plants which may become as a tourist spot.

Exercise

Q1. Which of the following groups contain only biodegradable items?

(a) Grass, flowers and leather

(b) Grass, wood and plastic

(c) Fruit-peels, cake and lime-juice

(d) Cake, wood and grass

Ans. The groups (a) Grass, flowers and leather (c) Fruit,-peels, cake and lime-juice (d) Cake, wood and Grass are consist of all biodegradable items and the group (b) Grass, wood and plastic doesn't contain all biodegradable items because plastics is non -biodegradable item.

Q2. Which of the following constitute a food-chain?

(a) Grass, wheat and mango

(b) Grass, goat and human

(c) Goat, cow and elephant

(d) Grass, fish and goat

Ans.(b) Grass, goat and human

Q3. Which of the following are environmental-friendly practices?

(a) Carrying cloth-bags to put purchases in while shopping

(b) Switching off unnecessary lights and fans

(c) Walking to school instead of getting your mother to drop you on her scooter

(d) All of these above

Ans. (d) All of these above

Q4. What will happen if we kill all the organisms in one tropic level?

Ans. If we kill all the organisms of one tropic level, it will lead to an increase in the number of organisms at the lower tropic level and decrease in the number of organisms at the higher trophic level. This will result in disruption in the food web and hence the ecosystem.

Q5. Will the impact of removing all the organisms in a tropic level be different for differ tropic levels? Can the organisms of any tropic level be removed without causing any damage to the ecosystem?

Ans. Yes, the impact of removing all the organisms in a tropic level will be different for differ tropic levels. It will not be possible to remove any organism in any trophic level without causing damage to the ecosystem.

Q6. What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem?

Ans. Biological magnification can be defined as the progressive increase in the concentration of non-biodegradable wastes in the food chain. As there is an increase in the magnification at the primary level of the ecosystems, all the other levels do get affected and the concentration may vary when compared to first level.

Q7. What are the problems caused by the non-biodegradable wastes that we generate?

Ans. Following are the problems caused by the non-biodegradable wastes:

1. These substances cannot be decomposed by the microorganisms.

2. As the quantity increases, dumping becomes a problem.

3. Non-biodegradable wastes like heavy metals may enter the food chain in the upper trophic levels.

4. They may escape to the ground water which causes soil infertility and disturbance in ph of the soil.

Q8. If all the waste we generate is biodegradable, will this have no imapact on the environment?

Ans. The production of a large amount of biodegradable waste will create a threat to the environment. The degradation of such huge amount of biodegradable material requires a large number of decomposers which are not available. Incomplete degradation will result in the breeding ground for flies causing the spread of diseases. Emission of foul smell can also make life miserable.

Q9. Why is damage to the ozone layer a cause for concern? What steps are being taken to limit this damage?

Ans. The ozone layer is a protective cover for the earth. It prevents harmful UV rays from entering the earth as these rays harmful and can result in skin cancer. But the air pollutants like chlorofluorocarbons (CFCs) are the main reason for the depletion of ozone layers. Too much UV rays are harmful to plants as they affect photosynthesis, destroy planktons and decomposers. These are the reasons why damage of ozone layer is a cause of concern.

Steps taken to limit this is that many developing and developed countries have signed and are obeying the directions of UNEP(United Nations Environment Programme) to freeze or limit the production and usage of CFCs.

Natural resources

1. What changes can you make in your habits to become more environment-friendly?

Solution

In order to become more environment-friendly, the following practices can be incorporated in our day-to-day lives:

- Turning off any electrical appliance (such as TV's, water heaters, lights, fans, and air conditioners) when they are not in use.
- Avoiding the wastage of water by fixing any leaking taps or pipes as soon as possible. Also, the amount of water consumed must be controlled. For example, the tap should not be left running while brushing teeth.

- Disposing of plastic and glass wastes in recycling bins (many plastics take a long time to decompose and can have adverse effects on the environment).
- Using recyclable and eco-friendly products instead of the convenient plastic products. For example, using paper or cloth bags instead of polythene bags is an environment-friendly habit.

2. What would be the advantages of exploiting resources with short-term aims?

Solution

Overconsumption of resources with short-term interests in mind will give a boost to the economy. However, the increased growth of the economy will be short-lived since the exploitation of resources is not sustainable. Exploiting resources for the sake of short-term goals will be beneficial to the present generations but not for future generations.

3. How would these advantages differ from the advantages of using a long-term perspective in managing our resources?

Solution

The long-term model of resource consumption enables the conservation of the resources for them to be used by future generations. This will enable the economy to grow over a longer timeframe. It also provides more time for technology to advance and discover new, sustainable energy sources (such as nuclear fusion and fuel cells). All in all, the long-term perspective in managing of resources has significantly greater advantages when compared to the short-term perspective.

4. Why do you think that there should be an equitable distribution of resources? What forces would be working against an equitable distribution of our resources?

Solution

Equitable distribution of resources enables every human to receive their share of the resources and makes sure that everyone has the basic requirements for life (such as food, water, shelter, etc.). The forces that work against equitable distribution include:

- The regional distribution of resources (such as soil and minerals).
- Corruption and greed of some humans
- Uneven distribution of resources between the rich and the poor.

In-text Questions – 2 Page: 275

1. Why should we conserve forests and wildlife?

Solution

The conservation of forests is very important for the stability of the environment. Forests serve as a home to a huge variety of life-forms. Destruction of these forests can disturb the food chain and lead to the extinction of many important species. Also, forests

protect the soil from erosion and play a vital role in the water cycle. The loss of forests can severely affect the day-to-day lives of humans.

2. Suggest some approaches towards the conservation of forests.

Solution

Some steps that can be taken to conserve forests include:

Planting of trees to combat deforestation.

Placement of security forces in forests to prevent the poaching and smuggling of forest resources.

Incorporating steps to protect the forest dwellers without disturbing their lifestyles.

Avoiding the conversion of forest land into roads, buildings, and dams.

In-text Questions – 3 Page: 278

1. Find out about the traditional systems of water harvesting/ management in your region.

Solution

In populated metropolitan cities, the primary sources of water include groundwater and lakes. Groundwater is harvested with the help of borewells whereas pipes harvest water directly from the lakes. The harvested water is then stored in water tankers placed at strategic locations throughout the city.

2. Compare the above system with the probable systems in hilly/ mountainous areas or plains or plateau regions.

Solution

In **hilly regions**, rainwater is often collected and channelled with the help of a stream. The stream is diverted to different areas with the help of canals for the purpose of irrigation. In mountainous regions, water is commonly obtained from the rivers that flow from the glaciers.

In the **plains**, water is obtained from many natural sources such as lakes and rivers. Groundwater is also harvested with the help of borewells for irrigation and human consumption.

3. Find out the source of water in your region/locality. Is water from this source available to all people living in that area?

Solution

In metropolitan cities, the primary source of water is groundwater. This water is made available to all people in the city. However, poor infrastructure in some localities makes it difficult for some people to obtain the water.

Exercises Questions Page: 280

1. What changes would you suggest in your home in order to be environment-friendly?

Solution

Some important changes that can help make homes more environment-friendly include:

- Segregation of the garbage into biodegradable waste (food waste) and non-biodegradable waste (plastics).
- Use of eco-friendly products such as cloth shopping bags and paper cups instead of plastics.
- Avoiding the wastage of electricity by switching off the electrical appliances that are not in use.
- Avoiding the wastage of water by quickly fix leaking taps and incorporating practices that reduce water wastage (such as closing the taps while brushing and using water judiciously while bathing).

2. Can you suggest some changes in your school which would make it environment-friendly?

Solution

Some important changes that can help make schools more environment-friendly include:

- Providing a platform for students and teachers to report any leaking taps so that they can be quickly repaired by the school plumber.
- Students and teachers must make sure all the lights and fans are switched off when the classes end for the day.
- Setting up waste segregation bins for biodegradable waste and non-biodegradable waste throughout the school.
- Promoting the use of transport methods such as bicycles and school buses.

3. We saw in this chapter that there are four main stakeholders when it comes to forests and wildlife. Which among these should have the authority to decide the management of forest produce? Why do you think so?

Solution

The government's forest department should have the authority because they are a branch of the government which is elected by the people. However, these forest authorities must not be corrupt and must not accept bribes from poachers/smugglers. The forest authorities can use the resources of the government to effectively protect and preserve the forest areas.

4. How can you as an individual contribute or make a difference to the management of (a) forests and wildlife, (b) water resources and (c) coal and petroleum?

Solution

(a). An individual can contribute to the management of forest and wildlife resources by:

- Organizing and participating in rallies that protest against deforestation and wildlife poaching.
- Volunteering for many non-government organizations (NGOs) that work towards the protection of forests and wildlife.
- Organizing and participating in group activities that involve the planting of new trees in forest areas.

(b). An individual can contribute towards the management of water resources by:

- Avoiding the wastage of water in their daily lives by using water judiciously.
- Spreading awareness about the importance of water management by participating in rallies/ activities.
- Promoting practices such as rainwater harvesting and discouraging the discharge of wastewater and sewage into lakes and rivers.

(c). An individual can contribute towards the management of non-renewable energy sources such as coal and petrol by:

- Using fuel-efficient transportation methods such as carpooling, use of public transport, and use of bicycles.
- Using energy-efficient light sources such as CFLs and LEDs instead of ordinary bulbs.
- Using solar water heaters instead of electric heaters for heating water.

5. What can you as an individual do to reduce your consumption of the various natural resources?

Solution

Some practices that can be followed by individuals in order to reduce their consumption of natural resources include:

- Use of fuel-efficient transport options such as carpooling, bicycles, and public transport.
- Judicious use of water and avoidance of its wastage.
- Use of recycled products such as recycled paper and bottles to reduce the demand for natural resources.
- Promoting the use of renewable resources by using solar water heaters instead of electric heaters.

6. List five things you have done over the last week to (a) conserve our natural resources. (b) increase the pressure on our natural resources.

Solution

Practices for the conservation of natural resources include:

- Use of bicycles and public transport while travelling to reduce fuel consumption.

- Use of recycled paper and other recycled products.
- Segregation of garbage into biodegradable and non-biodegradable bins.
- Avoiding the wastage of water by using it judiciously and fixing any leaking taps/pipes.

Practices that deplete natural resources include:

- Wastage of electrical energy by leaving electrical appliances on after use.
- Wastage of water by ignoring any leaking pipes/taps and leaving the tap on while brushing.
- Excessive use of plastic products such as polythene bags.

7. On the basis of the issues raised in this chapter, what changes would you incorporate in your lifestyle in a move towards the sustainable usage of our resources?

Solution

The following changes can be incorporated into the lifestyles of individuals in order to move towards a sustainable usage of natural resources:

- Segregate the waste generated in homes into biodegradable and non-biodegradable waste.
- Avoid the wastage of electricity by switching off lights, fans, and other electrical appliances when not in use.
- Use water judiciously and avoid its wastage by quickly repairing any leaking taps/pipes.
- Avoid the wastage of water by regulating the quantity of water consumed for bathing, washing clothes, brushing, etc.
- Practising environment-friendly methods such as rainwater harvesting and planting of trees.
- Usage of recycled products such as recycled paper and bottles.
- Usage of eco-friendly products such as cloth shopping bags and paper cups instead of non-biodegradable polythene bags and disposable plastic cups.