पुना International School

Shree Swaminarayan Gurukul, Zundal

SCIENCE -X

(BIOLOGY)

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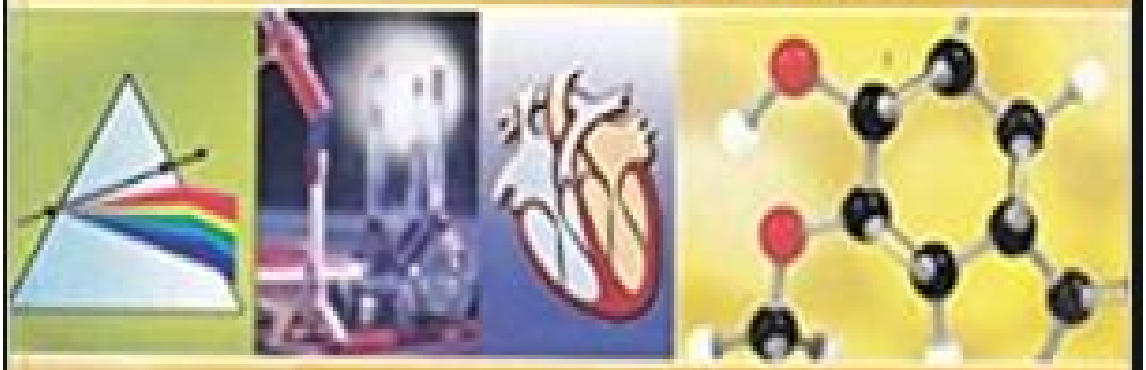
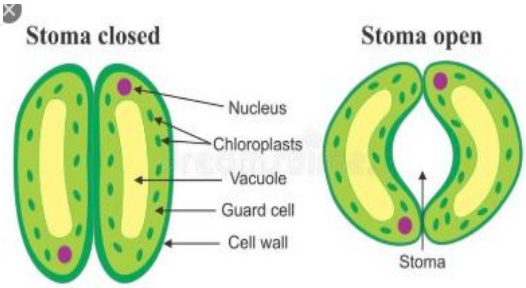


Textbook for Class X

INDEX



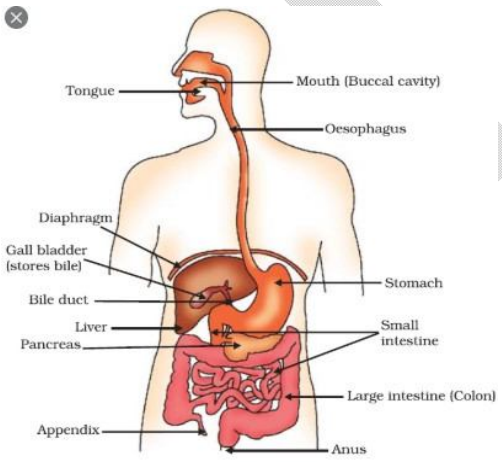
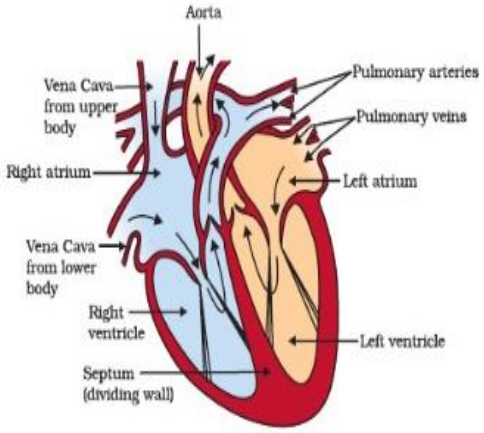


Figure 6.6 Human alimentary canal



Chapter - 6

Life Processes

Page No. 95

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

Ans. As in multicellular organisms, all the cells are not in direct contact with environment, simple diffusion does not meet the requirement of all the body cells to get sufficient oxygen.

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

Ans. All the living organism must have movement at molecular levels along with respiration and other life process like nutrition, respiration, transportation and excretion to be called alive.

3. What are outside raw materials used for by an organism?

Ans. Outside raw materials used for by an organism includes:

a. Food

b. Water

c. Oxygen

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

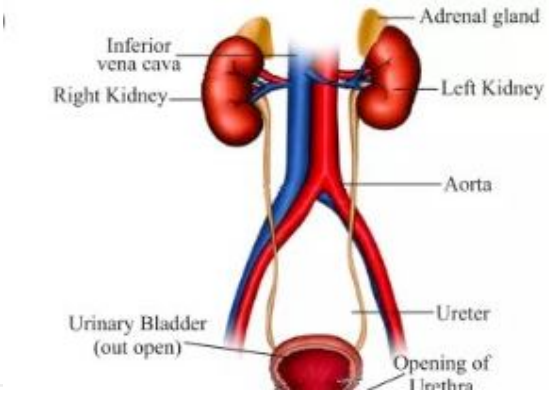
Ans. The processes essential for maintaining life are

a. Nutrition

b. Respiration

c. Transportation

d. Excretion



Page No. 101

1. What are difference between autotrophic and heterotrophic nutrition?

Ans. Differece between autotrophic and heterotrophic nutrition:

Autotrophic Nutrition	**Heterotrophic Nutrition**
The mode of nutrition in which an organism makes its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings with the help of sunlight energy. All green plants.	The mode of nutrition in which an organism cannot makes its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings and depends on other organisms for food. All non- green plants.

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

Ans. (a) Carbon dioxide from atmosphere.

(b) Light from Sun

(c) Water from Soil

(d) Chlorophyll from chloroplast of green plants.

3. What is the role of the acids in our stomach?

Ans. HCl plays following role in our stomach:

(a) Make the medium acidic for action of enzyme pepsin.

(b) Kills the harmful bacteria present in food

(c) Prevents fermentation of food

4. What is the function of digestive enzymes?

Ans. Enzymes break-down the various complex components of food into simple and soluble components so that they can be absorbed easily.

5. How is small intestine deigned to absorb digested food?

Ans. The inner lining of small intestine has numerous finger-like projections called villi which increase the surface area for absorption. The villi are richly supplied with blood vessels which transport the absorbed food to each and every cells of the body. Where, it is utilized to obtaining energy and repair of old tissues.

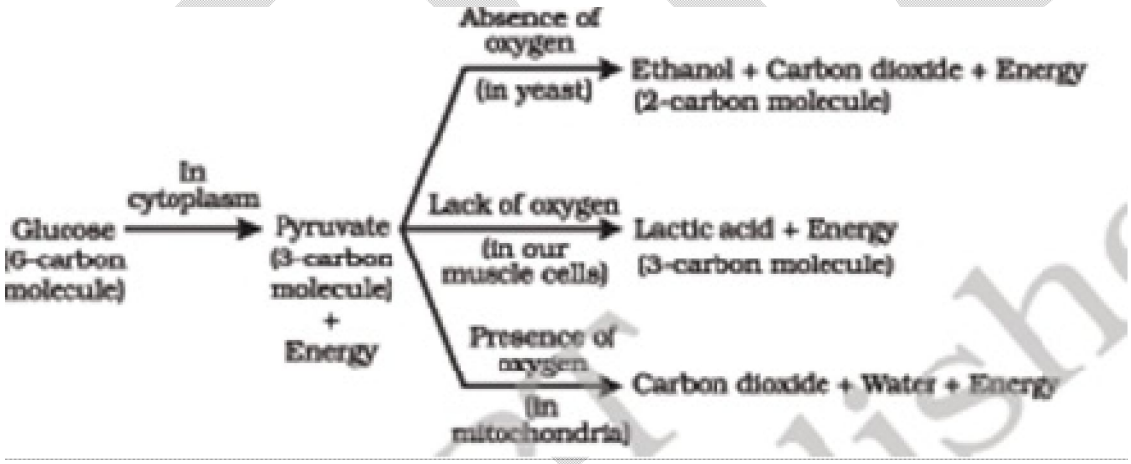
Page No. 105

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

Ans. The rate of breathing is slower in terrestrial organisms as compared to aquatic organisms. This is due to the fact that in water, the amount of oxygen is less as compared to air so, in aquatic organisms the rate of breathing is faster.

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

Ans. The pathways of break-down of glucose in various organisms are as below:



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

Ans. In human beings, a pigment hemoglobin is present in RBC which has high affinity for oxygen. RBC takes up the oxygen from the air in the lungs and carry it to tissues which are deficient in oxygen. Some oxygen is carried in dissolved state in blood plasma. Carbon dioxide is more soluble in water than oxygen is mostly transported in the dissolved form in our blood.

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

Ans. In lungs, the bronchioles terminate in balloon-like structures called alveoli. The alveoli contains network of blood capillaries that increase the surface area for exchange of gases.

Page No. 110

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

Ans. The components of human transport system include:

(a) Heart- receives and pumps the blood.

(b) Arteries- carry oxygenated blood away from the heart to various organs.

(c) Veins- Bring back blood to heart.

(d) Capillaries- exchange of various materials and gases between blood and tissues.

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

Ans. The separation of the right and left side of heart is useful to prevent oxygenated blood and deoxygenated blood from mixing. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals that constantly use the energy to maintain their body temperature.

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

Ans. The transport system of higher plants consists of xylem and phloem. Xylems have vessels and trachieds to transport water and minerals from root to other part of the plants.

Phloem, which consists of sieve tubes and companion cells, transport food from leaves to storage organs and other parts of plant.

4. How are water and minerals transported in plants?

Ans. Water and minerals are transported in plants through xylem which consists of trachieds and vessels. Water and minerals absorbed by root hairs present in root by osmosis is passed to xylem tissues of root. From root xylem it passes to stem xylem and thus water reaches to leaves.

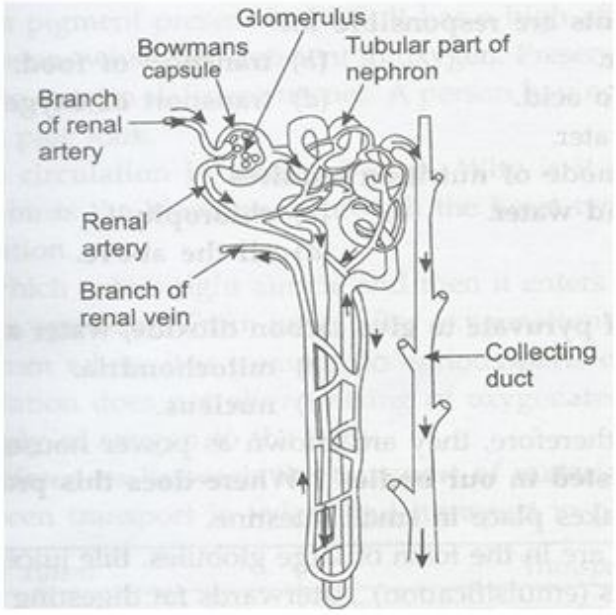
5. How is food transported in plants?

Ans. Food is transported in plants through phloem which consists of sieve tubes, sieve cells and companion cells. The food prepared in leaves in soluble form transported to leaves phloem. Active transport of food passes to all other parts of plants.

Page No. 112

1. Describe the structure and functioning of nephron.

Ans. Each nephron is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney called glomerulus is associated with the cup shaped Bowman's capsule that collects the filtered urine. Nephron filters the blood in order to remove nitrogenous waste. They also absorb some useful substance such as glucose, amino acids, minerals and major amount of water from filtrate.



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

Ans. (i) Plant produces carbon dioxide as wastes during respiration and oxygen as waste during photosynthesis.

(ii) Excess of water is removed through transpiration.

(iii) Some waste products like gums and resins are stored in older xylem tissue.

3. How is amount of urine produced regulated?

Ans. The amount of urine depends on how much excess of water is in the body and how much a water soluble waste is to be excreted. If the amount of water and dissolved wastes in boy are more than amount of urine will be more and if amount of wastes is less the amount of urine produced will be less.

TEXTBOOK EXERCISE

1. The kidneys in human beings are parts of the system for

(a) nutrition

(b) respiration

(c) excretion

(d) transpiration

Ans. (c) excretion

2. The xylem in plants are responsible for

(a) transport of water

(b) transport of food

(c) transport of amino acids

(d) transport of oxygen

Ans. (a) transport of water

3. The autotrophic mode of nutrition requires

(a) carbon dioxide and water

(b) chlorophyll

(c) sunlight

(d) all of the above

Ans. (d) all of the above

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

(a) cytoplasm

(b) mitochondria

(c) chloroplast

(d) nucleus

Ans. (b) mitochondria

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

Ans. Digestion of fats takes place in small intestine. Fats entering in intestine are in the form of large globules. Bile juice breaks down these large globules into smaller globules. After that fat digesting enzyme lipase present in pancreatic juice and intestinal juice converts it into fatty acids and glycerol.

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

Ans. The saliva contains an enzyme called salivary amylase that breaks down starch which is complex molecule into glucose.

7. What are the necessary conditions for autotrophic nutrition and what are its by-products.

Ans. Conditions necessary for autotrophic nutrition are:

(i) Light

(ii) Chlorophyll

(iii) Water and

(iv) Carbon dioxide

By-products are:

(i) Oxygen and

(ii) Water

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

Ans. Difference between aerobic and anaerobic respiration:

Aerobic respiration	Anaerobic respiration
(i) Takes place in presence of oxygen.	(i) Takes place in absence of oxygen
(ii) Complete oxidation of glucose occurs.	(ii) Incomplete oxidation of glucose occurs.
(iii) More energy is produced.	(iii) Less energy is produced

Anaerobic respiration takes place in yeast, some bacteria and some internal parasites like tapeworm.

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

Ans. The walls of the alveoli is folded and has large surface areas. It contain an extensive

network of blood vessels which provide a surface where the exchange of gases can take place.

10. What would be the consequence of a deficiency of hemoglobin in our bodies?

Ans. Haemoglobin is a pigment present in RBC. It has a high affinity for oxygen. It carries oxygen from lungs to various tissues which are deficient in oxygen. Presence of less hemoglobin will result in less supply of oxygen to tissues. A person having less hemoglobin will get tired soon and will have a pale look.

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

Ans. In mammals and birds the blood goes through the heart twice during each cycle. This is known as double circulation.Deoxygenated blood which enters right auricle and then it enters the right ventricle from where it is pumped to lungs for oxygenation. From lungs after oxygenation it comes to left auricle and then enters left ventricle from where it is pumped to various parts of body.

Such system of circulation does not allow mixing of oxygenated and deoxygenated blood which allows efficient supply of oxygen to the body.

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

Ans. Difference between transport in xylem and phloem:

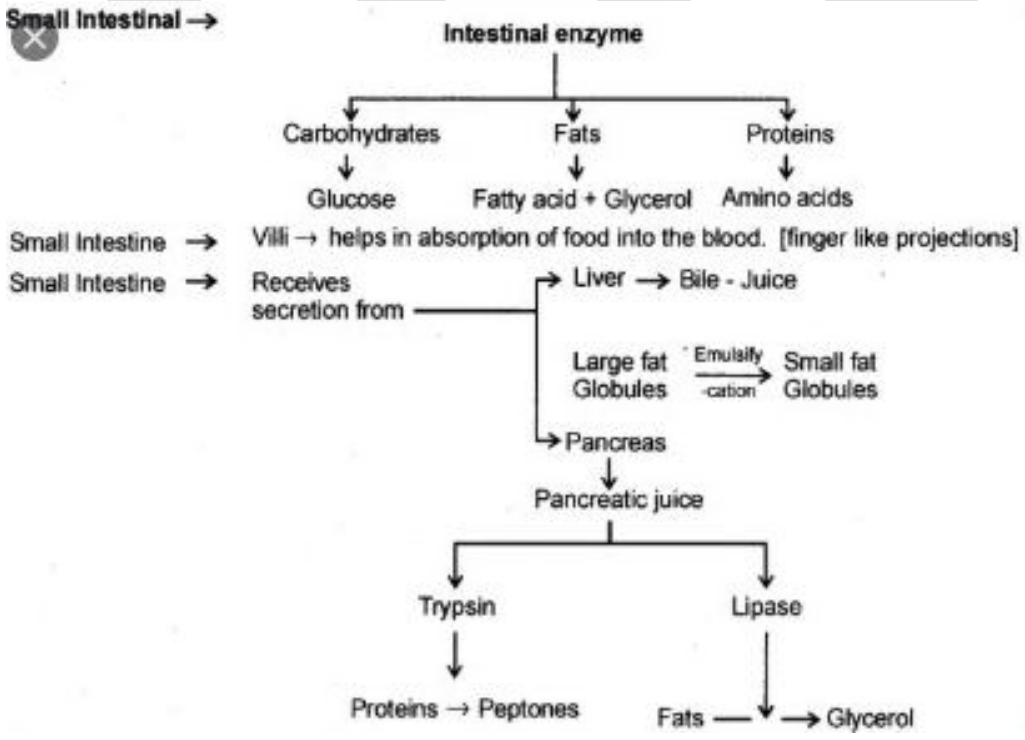
Xylem	Phloem
a. Xylem transport minerals and water from root to leaves. b. Transport is unidirectional. c. Xylem consists of trachieds and vessels.	a. Phloem transport food from leaves to root and storage organs. b. Transport is bidirectional. c. Phloem consists of sieve tubes and companion cells.

13. Compare the functioning of alveoli in the lungs and nephron in the kidneys with

respect to their structure and functioning.

Ans. Comparison between alveoli and nephron:

Alveoli	Nephron
They have thin-walled balloon-like structure. The alveoli provide a surface extensively supplied with blood capillaries for exchange of gases in lungs. Carbon dioxide released in the cavity of alveoli and oxygen is taken by hemoglobin present in RBC of blood.	Nephron is a cluster of very thin walled blood capillaries found in kidney. Each capillaries cluster remains associated with the cup-shaped end of a tube called Bowman's capsule that collects the filtered urine, at the same time the useful substance are reabsorbed.



Chapter - 7

Control and Coordination

Page No. 119

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

Ans. Difference between reflex action and walking:

2.

Reflex action	Walking
(a) Take place without thought.	(a) Takes place after thought.
(b)Controlled by spinal cord.	(b) Controlled by cerebellum.
(c) It is involuntary action	(c) It is a voluntary action.

What happens at the synapse between two neurons?

Ans. At synapse,the electrical impulse generated at dendrite of a neuron is passed on to dendrite of another neuron in form of chemical impulses. The chemical present at synapse is called neurotransmier.

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

Ans. Cerebellum

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

Ans. Smell of agarbatti is detected by olfactory receptors in the temporal lobe of fore-brain. It is first received by olfactory receptors in our nose.

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

Ans. Reflex action are formed in the spinal cord itself although the information also goes on to brain where the encounter remains the memory and make us aware of our action.

1. What are plant hormones?

Ans. They are chemical which help to coordinate growth, development, flowering and response to the environment in plants.

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

Ans. Difference between movement of leaves of sensitive plants and movement of shoot towards light:

Movement of leaves of sensitive plant	Movement of shoot towards light
(i) Growth is not involved.	(i) Growth is involved.
(ii) Movement is away from the source of stimulus (touch).	(ii) Movement is towards the source of stimulus (light).

3. Give an example of a plant hormone that promote growth.

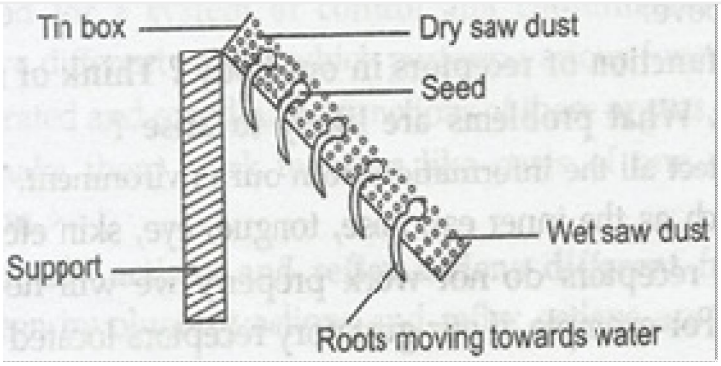
Ans. Auxin promotes growth.

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

Ans. When tendrils come in contact of any support, the part of the tendril in contact does not grow as rapidly as the part away from the object due to auxin secreted moves away from the object in contact. This rapid growth on one side causes tendril to circle around the object.

5. Design an experiment to demonstrate hydrotropism.

Ans. Take a tin box with hole at bottom. Fill it with moist saw dust. Sow some gram seeds in it. Keep the tin box in tilted position. When seeds start germinating, water the saw dust only in lower side of the tin box. You will observe that the radicle move towards the wet saw dust. This shows that root is positively hydrotropic.



Page No. 125

1. How does chemical coordination take place in animals?

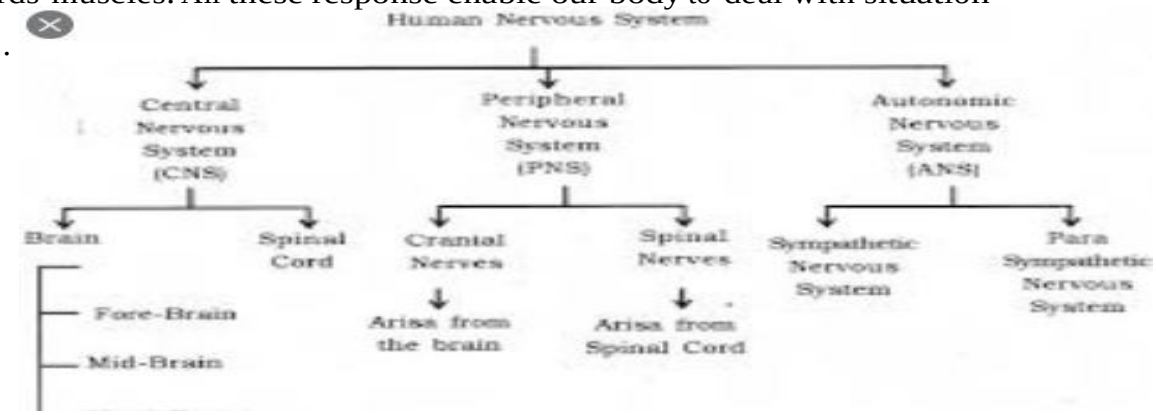
Ans. The chemical coordination is maintained by hormones. These are secreted by endocrine glands. These hormones are poured into blood through which they reach the target tissue or organ to act.

2. Why is the use of iodised salt advisable?

Ans. Iodine is necessary for the thyroid gland to make thyroxin hormone. In case, iodine is absent in our diet, there is a possibility of Goitre. Iodised common salt contains proper content of iodine. To avoid deficiency of iodine, iodised salt is recommended.

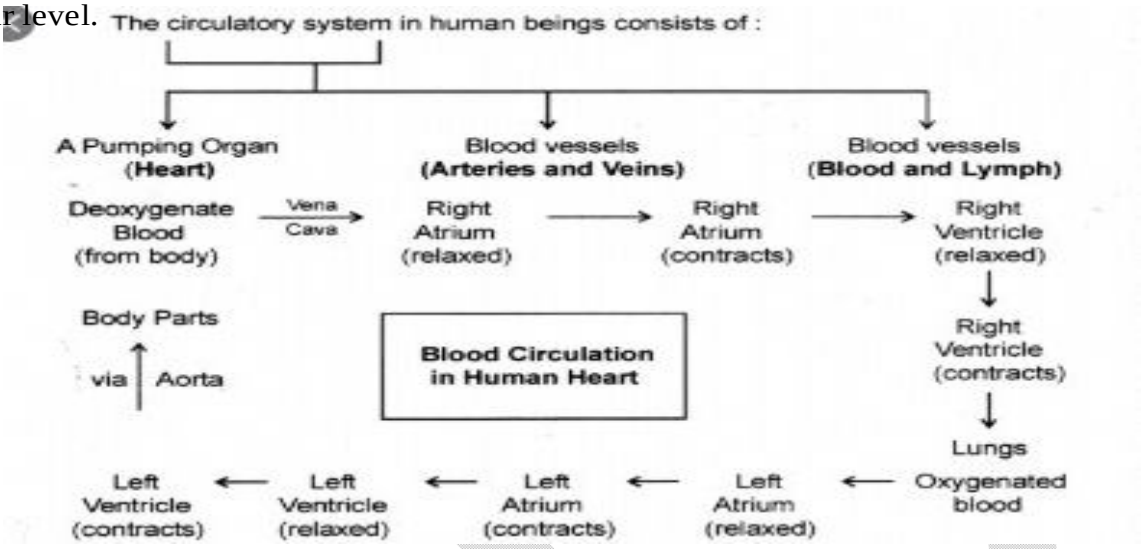
3. How does our body respond when adrenaline is secreted into the blood?

Ans. When adrenaline reaches the various target organ through blood. All these organs respond together to enable our body to deal with situation like running away from scary situation. When adrenaline reaches the heart, it beats faster to supply more oxygen to our muscles. The small arteries around digestive system and skins contracts to divert the blood towards muscles. All these response enable our body to deal with situation



(c) balancing the body

Ans. Diabetes is caused due to non or less secretion of hormone insulin by pancreas. In such person, the blood sugar level is high. Insulin converts extra sugar present in blood into glycogen. Patients suffering from diabetes are given insulin injection to control their blood sugar level.



TEXTBOOK EXERCISES

1. Which of the following is a plant hormone?

(a) Insulin

(b) Thyroxin

(c) Oestrogen

(d) Cytokinins

Ans. (d) Cytokinin.

2. The gap between two neurons is called a

(a) Dendrite

(b) synapse

(c) axon

(c) balancing the body
(d) impulse

Ans. (b) Synapse.

3. The brain is responsible for

(a) thinking

(b) regulating the heartbeat.

(d) all of above.

Ans. (d) All the above.

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

Ans. Receptors detect all the information from our environment. These receptors are located in our sense organs.

In case any of the receptors do not work properly we will not be able to perceive that particular information.

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

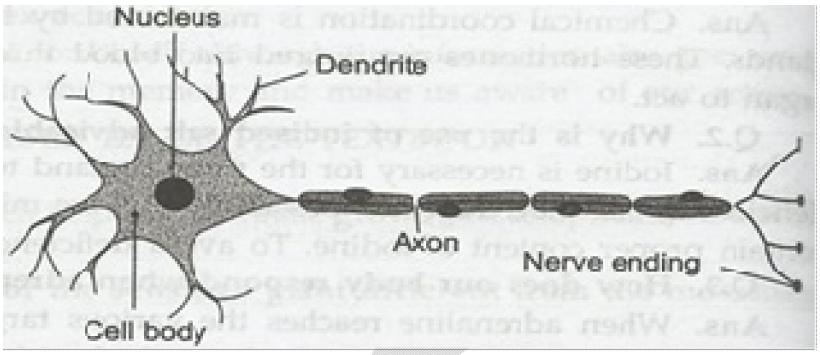
Ans. Neuron acquires particular information through dendrite located on its cell body. This information is then passed on to the axon. Finally, axon ending passes the information into next neuron at the synapse. As soon as the impulse reaches the dendrite, an electrical impulse is generated due to certain chemical changes in neuron. When the impulse reaches axon ending some chemicals released which pass on the impulse to next neuron. These chemicals are known as neurotransmitters.

6. How phototropism does occur in plants?

Ans. Movement of shoot towards light is called phototropism. This movement is caused due

(c) balancing the body

to more growth of cells towards the shaded side of the shoot as compared to the side of shoot



towards light. More growth of cells is due to secretion of auxin towards the shaded side.

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

Ans. (i) Reflex action

(ii) Impulses from various body parts will not conducted to brain.

(iii) Message from brain will not be conducted to various organs.

8. How does chemical coordination occurs in plants?

Ans. Chemical coordination in plants is maintained by plant hormones also known as phytohormones. Some of these hormones promote growth while some inhibit it. Some hormones include auxin, Gibberellins, Cytokinin etc.

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

Ans. An organism has different organs which perform various factions. The survival of an organism depends on integrated and coordinated functions of these organs. Nervous and endocrine system of an organism makes them work together like parts of one machine to accomplish homeostasis or coordination.

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

Ans. Difference between involuntary and reflex actions is as follows:

Involuntary actions	Reflex actions
It is a set of muscles movement over which we do not have control. Such actions are controlled by brain. For example- contraction of muscle of our digestive tract, beating of heart etc.	It is rapid, spontaneous and involuntary activity that is produced in response to a stimulus. It is controlled by spinal cord. Example- removal of hand with jerk when someone touches a hot object.

11. Compare and contrast nervous system and hormonal control and coordination in animals.

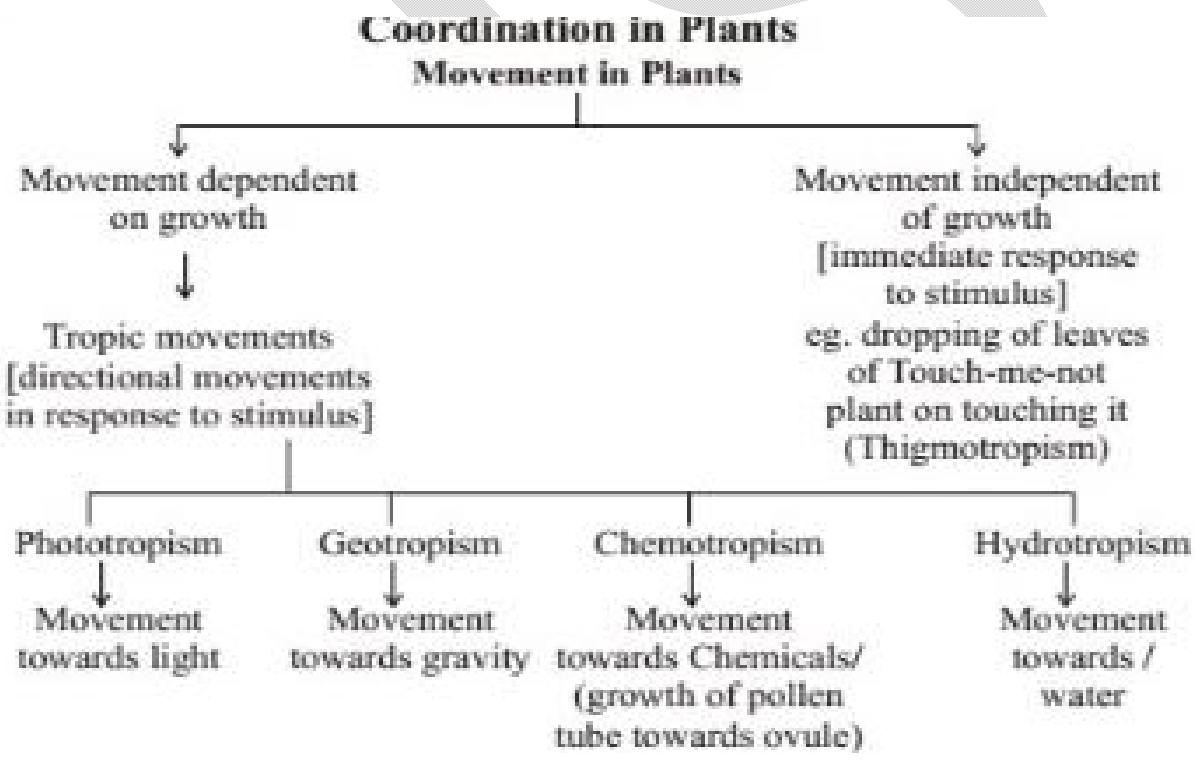
Ans. Difference between nervous control and hormonal control:

Nervous control	Hormonal control
(i) Consists of nerve impulses conducted by neurons from one organ to another organ. (ii) Nervous impulses produce rapid short lasting responses. (iii) Nervous impulses are not specific in their action.	(i) It consists of endocrine system which scretes chemical messenger's hormones secreted directly in blood. (ii) Hormones produce longer lasting responses. (iii)Action of hormones is highly Specific.

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

Ans. Difference between movement in a sensitive plant and movement in our legs:

Movement in sensitive plant	Movement in our legs
(i) There is no specialized tissue in plants for conduction of information. (ii) Plant cells change shape by changing the amount of water in them. (iii) Plant cells do not have specialized proteins.	(i) There is specialized nervous tissue in animals for conduction of information and muscle cells to help in movement. (ii) Muscle cells contract or relax to effect movement. (iii) Muscle cells have specialized protein which help muscles to contract or relax.



Chapter - 9

Heredity and Evolution

Page No. 143

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

Ans. Trait B.

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

Ans. Depending on the nature of variations different individuals would have difference kinds of advantage to adjust in particular habitat. Variation help the individual to have different traits that may develop the organisms more tolerable.

Page No. 147

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

Ans. In Monohybrid cross of Mendel between tall and dwarf pea plant, all progeny in F_1 generation are tall and in F_2 generation, 75% of pea plants are tall but 25% are dwarf. This shows that traits are dominant or recessive.

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

Ans. When a pea plant having round green seeds is crossed with a pea plant having wrinkled yellow seeds in F1 generation all the plants have round yellow seeds. But in F_2 generation two new traits that is round yellow and wrinkled green appear. This shows that traits are inherited independently.

3. A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits-blood

group A or O- is dominant? Why or why not?

Ans. No, the information is not enough because the blood group is determined by a pair of gene. One inherited from mother and other from father. In this case, the child inherited gene for O blood group from mother as well as father.

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

Ans. A child which inherits X chromosome from her father will be a girl and one who inherits Y chromosome from him will be a boy.

Page No. 150

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

Ans. The different ways in which individual with a particular trait may increase are:
(a) Natural selection- Certain variations give survival advantage to individuals in a population in a changed situation resulting in increase of their population.
(b) Genetic drift- Accidents in small population even if they give no survival advantage also lead to increase to certain individual in population.

2. Why are traits acquired during the life-time of an individual not inherited?

Ans. Any change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. Therefore, the traits acquired during life-time on an individual are not inherited.

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

Ans. Small number of surviving tigers will affect the frequency of selection which is essential for survival. For effective selection, the population must consist of an infinitely large number of individual in population.

Page No. 151

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

Ans. Following factors could lead to the rise of new species:

(a) Changes in gene frequency in small breeding isolated populations.

(b) Natural selection

(c) Changes in number of chromosome.

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

Ans. No, because geographical barrier do not allow breeding between such individuals of a population which reproduce sexually. Moreover, asexually reproducing organism pass on the parental DNA to offspring which gives no chance of speciation.

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

Ans. Yes, due to geographical isolation, the two populations are separated. The levels of gene flow between them will decrease. The isolated population will breed with local population resulting in entry of isolated population into new population.

Page No. 156

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

Ans. Analysis of the organ structure in fossils allows us to make estimates of how far evolutionary relationships go. For example, presence of feather in some fossils dinosaurs indicate the birds are closely related to reptiles.

2. Can the wing of a butterfly and the wing of the bat be considered homologous organs?

Ans. No, though the function of wing in both the cases is same but their structural plan and origin in different.

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

Ans. Preserved traces of living organisms are called fossils found under the surface of earth the more recent in origin than the fossils we find in deeper layers.
Fossils also help us to find evolutionary relation between organisms.

Page No. 158

1. 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 humans are a single species *Homo sapiens* which originated in Africa. Some of our ancestors left Africa, while others stayed on. Those who migrated slowly spread across the planets.

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

Ans. Bacteria have better body design because it has so much variation to adjust in different climatic condition.

TEXTBOOK EXERCISES

1. 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

2. 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

3. 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.

4. 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. No, since two copies of traits are inherited from parents, one from mother and the other form father. Unless we know the nature of these two variants of traits we cannot tell which is dominant and which is recessive. Recessive traits appear when both the parents contribute recessive allele. From this statement we can only presume are that both parents are contributing recessive allele.

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

Ans. When we classify organism we look for similarities among organism which allows us to group them. Based on these principles we can work out the evolutionary relationship of the species.

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

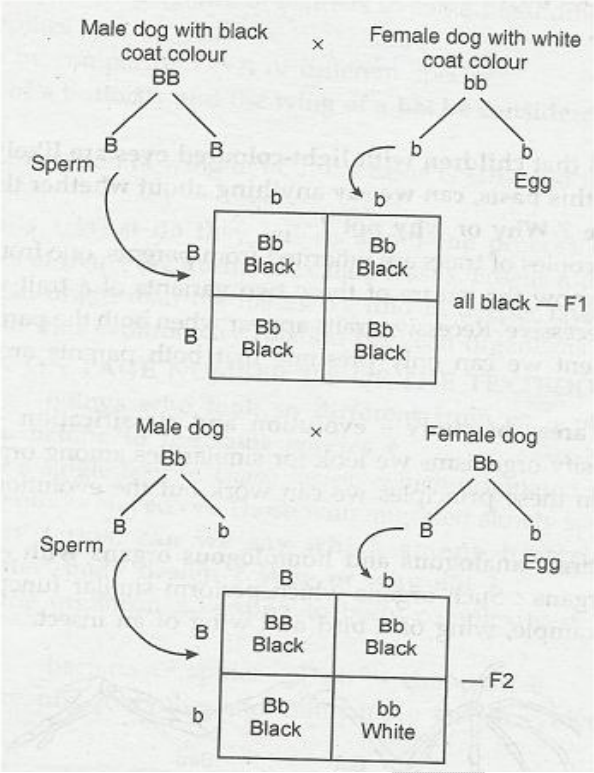
Ans. Analogous organs: Such organs which perform similar function but are different in

structure and origin are called analogous organs. Example- Wings of birds and wings of insects.

Homologous organs: Such organs which may have different functions but similar structure and origin are called homologous organs. Example- fore arm of frogs, lizards and birds.

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

Ans.



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(ii) Study of age of fossils allows us to know which organisms evolved earlier and which later.

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

Ans. The evidence was given by Stanley L. Miller and Harold C. Urey in 1953. They assembled an atmosphere similar to that thought to exist on early earth over water. This was

maintained by them at a temperature just below 100 degree Celcious and sparks were passed through the mixture of gases to stimulus lightening. At the end of week, they found that 15% of the carbon had been converted to simple compounds of carbon including amino acids which make up protein molecules.

10. 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. Variations arise either because of errors in DNA copying or as a result of sexual reproduction. Due to sexual reproduction genetic variability increases in the population from one generation to another. This happens due to the fact that sexually reproducing organism inherits half the genes from each parent. These variations are very important for the process of evolution.

11. 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. No, depending on the nature of variations different individuals have been different kinds of advantages. However, when a drastic change occurs in environment, only those organisms in the population will survive which have an advantageous variation in that population to survive in changed environment.

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

Ans. Equal contribution of male and female parents is ensured in progeny during sexual reproduction. Each trait of progeny is determined by a pair of alleles and gametes of male and female contain one allele. Each allele pairs during fertilisation combine together to determine traits. Thus, the traits of progeny are determined by equal genes from male and female.

Chapter - 8

How Do Organisms Reproduce?

Page No. 128

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

Ans. DNA contains information for the inheritance of features from parents to next generation. DNA presents in nucleus of cells are the information source for making protein. If information is different, different protein will be made that lead to altered body design.

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

Ans. Variations are useful for the survival of species in changed environmental situations. If a population of reproducing organism were suited to a particular niche and if the niche is drastically altered the population could be wiped out. However,if some variations are present some species will survive. Thus, variation is useful to species but not the individual.

Page No. 133

1. How does binary fission differ from multiple fissions?

Ans. Difference between binary fission and multiple fission:

Binary fission	Multiple fission
Splitting of unicellular organisms like amoeba into two equal halves during cell division is termed binary fission.	Division of single-celled organisms such as malarial parasites into many daughter cells simultaneously is termed multiple fission.

2. How will an organism be benefited if it reproduces through spores?

Ans. The spores are covered by thick walls that protect them until they come into contact with suitable moist surface and can begin to grow.Large number of spores also provide survival benefits.

3. Can you think of reasons why more complex organism cannot give rise to new individuals through regeneration?

Ans. Complex organisms are not merely random collection of cells. Specialized cells are organized in them as tissues are organized in organs. These organs have to be placed at definite positions in the body. So, regeneration is not possible in multicellular organism.

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

Ans. (i) Plants raised by vegetative propagation can bear flower and fruits earlier than those produced from seeds.

(ii) Such methods also make possible the propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds

.**(iii)** All plants produced by this method are genetically similar enough to the parent plant to have its all characteristics.

5. Why is DNA coping essential part of the process of reproduction?

Ans. DNA contains information for the inheritance of features from parents to next generation. DNA presents in nucleus of cells are the information source for making protein. If information is different, different protein will be made that lead to altered body design.

Page No. 140

1. How is process of pollination different from fertilization?

Ans. Distinction between pollination and fertilisation:

Pollination	Fertilisation
Pollination refers to the process of transfer of pollen grains from anther to stigma of flower.	Fertilisation refers to fusion of male and female gamete to form a zygote.

2. What is the role of the seminal vesicles and the prostate gland?

Ans. Secretions of seminal vesicles and prostate gland provide fluid medium to sperm to move and also provide nutrition to them.

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

Ans. During puberty breast size begins to increase with darkening of the skin of the nipples at the tip of breasts. Also, girls begin to menstruate at around this time.

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

Ans. The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the wall of uterus. It contains finger-like projections villi on the embryo's side of the tissue. On mother's sides are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass the mother to the embryo and waste products from embryo to mother.

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

Ans. Copper-T cannot protect the woman from acquiring sexually transmitted disease. It will protect her from only unwanted pregnancy.

TEXTBOOK EXERCISE

1. Asexual reproduction takes place through budding in

(a) Amoeba

(b) Yeast

(c) Plasmodium

(d) Leishmania.

Ans. (b) Yeast

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

(a) Ovary

(b) Uterus

(c) Vas deferens

(d) Fallopian tube

Ans. (c) Vas deferens, it is a male reproductive part.

3. The anther contains

(a) Sepals

(b) Ovules

(c) Carpel

(d) Pollen grains.

Ans. (d) Pollen grains.

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

Ans. Sexual reproduction leads to variation due to recombination of genetic material DNA. These variations are essential for survival of species. On the contrary, asexual reproduction does not bring about variations.

5. What are the functions performed by the testis in human beings?

Ans. In human beings, testes perform dual function:

(i) Production of sperms

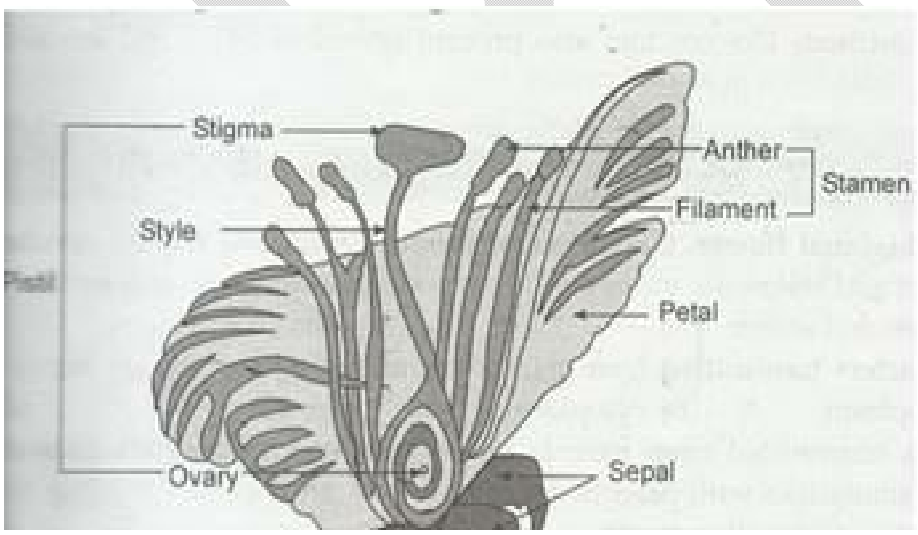
(ii) Secretion of male hormone testosterone.

6. Why does menstruation occurs.

Ans. When in human female, egg is not fertilized, it lives for about one day. Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilized egg. Thus, its lining becomes thick and spongy. This would be required for nourishing the embryo if had fertilized. However, this lining is not required any longer if fertilisation has not occured. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes roughly every month and is known as menstruation.

7. Draw a labeled diagram of the longitudinal section of a flower.

Ans.



8. What are the different methods of contraception?

Ans. Various methods used for regulation of child birth can broadly categories as:

(i) Barrier methods: In this method, physical devices such as condom, diaphragm, cervical cap and Copper-T are used.

(ii) Chemical method: use of spermicidal jelly by woman, oral pills and vaginal pills.

(iii) Surgical method: In surgical method, a small portion of vas deferens in male and the oviduct of female, is surgically removed or ligated. It is called vasectomy in male and Tubectomy in females.

9. How are the modes of reproduction different in unicellular and multicellular organism?

Ans. In unicellular organisms, cell division, or fusion leads to the creation of new individuals.In multicellular organisms with simple body organization budding, fragmentation may work but in complex multicellular organisms only sexual reproduction takes place.

10. How does reproduction help in providing stability to populations of species?

Ans. The consistency of DNA copying during reproduction is important for the maintenance of body designand other features that allow the organism to use the particular niche. Reproduction is, therefore, linked to the stability to populations of species.

11. What could be the reasons for adopting contraceptive methods?

Ans. The sexual act always has the potential to lead to pregnancy. Pregnancy will make major demands on the body and the mind of the woman and if she is not ready for it, her health will adversely affected. Therefore, adopting contraceptive methods are essential. Some contraceptive methods like condom also prevent spread of STDs and lethal diseases like HIV-AIDS.

Chapter - 9
Heredity and Evolution

Page No. 143

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

Ans. Trait B.

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

Ans. Depending on the nature of variations different individuals would have difference kinds of advantage to adjust in particular habitat. Variation help the individual to have different traits that may develop the organisms more tolerable.

Page No. 147

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

Ans. In Monohybrid cross of Mendel between tall and dwarf pea plant, all progeny in F_1 generation are tall and in F_2 generation, 75% of pea plants are tall but 25% are dwarf. This shows that traits are dominant or recessive.

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

Ans. When a pea plant having round green seeds is crossed with a pea plant having wrinkled yellow seeds in F1 generation all the plants have round yellow seeds. But in F_2 generation two new traits that is round yellow and wrinkled green appear. This shows that traits are inherited independently.

3. A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits-blood

group A or O- is dominant? Why or why not?

Ans. No, the information is not enough because the blood group is determined by a pair of gene. One inherited from mother and other from father. In this case, the child inherited gene for O blood group from mother as well as father.

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

Ans. A child which inherits X chromosome from her father will be a girl and one who inherits Y chromosome from him will be a boy.

Page No. 150

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

Ans. The different ways in which individual with a particular trait may increase are:
(a) Natural selection- Certain variations give survival advantage to individuals in a population in a changed situation resulting in increase of their population.
(b) Genetic drift- Accidents in small population even if they give no survival advantage also lead to increase to certain individual in population.

2. Why are traits acquired during the life-time of an individual not inherited?

Ans. Any change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. Therefore, the traits acquired during life-time on an individual are not inherited.

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

Ans. Small number of surviving tigers will affect the frequency of selection which is essential for survival. For effective selection, the population must consist of an infinitely large number of individual in population.

Page No. 151

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

Ans. Following factors could lead to the rise of new species:

(a) Changes in gene frequency in small breeding isolated populations.

(b) Natural selection

(c) Changes in number of chromosome.

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

Ans. No, because geographical barrier do not allow breeding between such individuals of a population which reproduce sexually. Moreover, asexually reproducing organism pass on the parental DNA to offspring which gives no chance of speciation.

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

Ans. Yes, due to geographical isolation, the two populations are separated. The levels of gene flow between them will decrease. The isolated population will breed with local population resulting in entry of isolated population into new population.

Page No. 156

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

Ans. Analysis of the organ structure in fossils allows us to make estimates of how far evolutionary relationships go. For example, presence of feather in some fossils dinosaurs indicate the birds are closely related to reptiles.

2. Can the wing of a butterfly and the wing of the bat be considered homologous organs?

Ans. No, though the function of wing in both the cases is same but their structural plan and origin in different.

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

Ans. Preserved traces of living organisms are called fossils found under the surface of earth the more recent in origin than the fossils we find in deeper layers.
Fossils also help us to find evolutionary relation between organisms.

Page No. 158

1. 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 humans are a single species *Homo sapiens* which originated in Africa. Some of our ancestors left Africa, while others stayed on. Those who migrated slowly spread across the planets.

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

Ans. Bacteria have better body design because it has so much variation to adjust in different climatic condition.

TEXTBOOK EXERCISES

1. 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

2. 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

3. 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.

4. 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. No, since two copies of traits are inherited from parents, one from mother and the other form father. Unless we know the nature of these two variants of traits we cannot tell which is dominant and which is recessive. Recessive traits appear when both the parents contribute recessive allele. From this statement we can only presume are that both parents are contributing recessive allele.

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

Ans. When we classify organism we look for similarities among organism which allows us to group them. Based on these principles we can work out the evolutionary relationship of the species.

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

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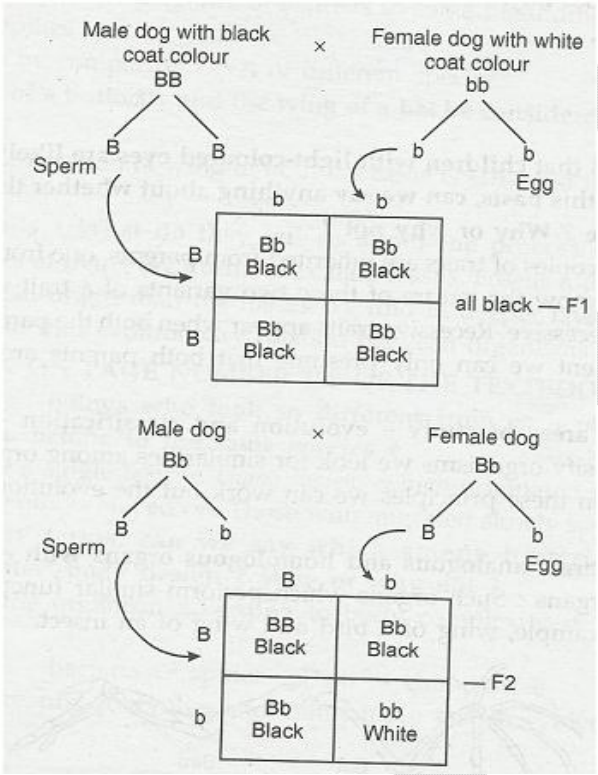

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Chapter - 15

Our Environment

Page No. 257

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

Ans. Substances which can be acted upon by micro-organism (decomposer) are called biodegradable. For example- vegetable wastes, paper, cotton etc.

On the other hand, materials which are not acted upon by decomposers are called non-biodegradable. For example- plastic, glass, polyethene etc.

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

Ans. (a) They will serve as breeding ground for flies and mosquitoes which are carriers of
disease like cholera, malaria etc.

(b) They produce foul smell, thus causing air pollution.

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

Ans. (a) Excess use of non-biodegradable pesticide and fertilizers run off with rain water to water bodies causes water pollution.

(b) They may choke the sever system of city or town that may overflow over roads.

Page No. 261

1. What are trophic levels? Give an example of a food chain and state the different trophic level in it.

Ans. Each step in a food chain constitutes a trophic level. For example,

Grass →	Dear →	Lion
Trophic level I	Trophic level II	Trophic level III

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

s. They decompose dead remains of plants and animals and their wastes organic products into simple inorganic substances which are released into the atmosphere for reuse by the plants. Thus, they help in recycling of materials.

Page No. 264

1. What is a ozone and how does it affects any ecosystem?

Ans. Ozone is a form of oxygen. It has the molecular formula O_3. It is present at a higher level in the atmosphere. It protects the ecosystem from the harmful effects of ultraviolet rays coming from the Sun. UV rays may cause skin cancer, cataract to us.

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

Ans. The following measures can be adopted for reducing the problem of waste disposal:

(i) Reduce the volume of wastes by burning in incinerator.

TEXTBOOK EXERCISES

1. 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. Groups (a), (c) and (d).

2. 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, human

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3. Which of the following are environment-friendly practices?

(a) Carrying cloth-bag 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 the above.

Ans. (d) All of the above.

---

4. What will happen if we kill all the organisms in one trophic level?

Ans. If we kill all the organisms in one trophic level, the number of individuals in the next trophic level will decrease due to non-availability of food. Also, the number of individuals in the previous trophic levels will increase because there is no one to feed on them. This will cause imbalance in the environment.

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

Ans. Yes, the impact of removing all the organisms of a trophic level will be different for different trophic levels. The effect will be time related. If we remove all the producers, primary consumers will be affected instantly. Secondary consumers will affect after a gap and tertiary consumers after a longer gap.

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

different levels of the ecosystem?

Ans. The phenomenon of progressive increase in concentration of certain harmful non-biodegradable chemicals such as DDT at different trophic levels of food chain is called biological magnifications.

The concentration of harmful chemicals will be different at different trophic levels. It will be lowest in the first trophic level and highest in the last trophic level of the food chain.

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

Ans. (a) Non-biodegradable pesticides and fertilizers run off to water bodies to cause water pollution.

(b) Some of the non-biodegradable pesticides like DDT enter the food chain and cause biomagnifications in humans and other animals.

8. If all the wastes we generate is biodegradable, will this have no impact on the environment?

Ans. It will have only short term impact on environment, the action of decomposers will slow down and some air/water pollution will be caused. However, in longer term, there will be no impact of biodegradable wastes on the environment.

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

Ans. Ozone layer prevents ultraviolet radiations from the Sun from reaching the earth. Ultraviolet rays cause cancer, cataract and damage to the immune system of human beings.

In 1987, United Nations Environment Programme (UNEP) succeeded I forging an agreement between nations to freeze chlorofluorocarbons (CFCs) production to 1986 levels. CFCs are the main cause of ozone layer depletion.

Page No. 269

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

Ans. (a) Plant one tree on every birthday.

(b) Stop using polythene bags.

(c) Switch off unnecessary lights and fans.

(d) Take bus instead of personal vehicles.

(e) Use CFL in place of bulbs.

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

Ans. (a) It can meet the immediate needs of the masses.

(b) We shall be able to get industrial growth.

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

Ans. Exploitation of resources with short-term aims are beneficial for present day generation while managing with long-term perspective are on a sustainable basis and are aimed to fulfill the needs of future generations as well.

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

Ans. Natural resources are given to us given nature. All the individuals have equal right on

these resources like air and water. Industrialists and some other rich persons are who are in power wants to grab all the resources. It is this section which is working against equitable distribution of energy.

Page No. 273

1. Why should we conserve forests and wildlife?

Ans. Forests present a wide biological diversity. They are essential for ecological diversity, to prevent floods and to influence rainfall. Forests help in protection of soil and in retaining sub-soil water.

2. Suggests some approaches towards the conservation of forests.

Ans. (a) Afforestation

(b) Check on indiscriminate cutting of trees.

(c) Check on forest fires.

(d) Check on over-grazing.

Page No. 276

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

Ans. The traditional system of water conservation differs from region to region for example.

(a) Khadin, tanks and nadis in Rajasthan

(b) Bandharas and tals in Maharashtra

(c) Ahars and pyenes in Bihar

(d) Kattas in Karnataka

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

plains or plateau regions.

Ans. In hilly/mountainous areas mostly in Himachal Pradesh, kulhs are used to take water to several villages down the hillside. In largely level terrain, water harvesting structures are mainly crescent shaped earthen embankments or low straight concrete and rubble check dams built across seasonally flooded gullies. They are different from pits and ponds as they store running water.

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

Ans. In Delhi, the source of water in Yamuna. Water from this source is available mostly to all people in Delhi.

TEXTBOOK EXERCISES

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

Ans. We shall follow the principle of three R's

(i) Reduce: Use natural resources in limited quantity avoiding wastage.

(ii) Recycle: Recycle plastic, paper, glass and metal for further use.

(iii) Reuse: Envelops can be reversed for reuse.

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

Ans. (a) Avoid unnecessary use of water coolers, heaters, fans and lights.

(b) Plantation of trees around the school

(c) Preparation of compost

(d) Water harvesting.

(e) Storing separately, the articles that can be recycled.

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 produces? Why do you think so?

Ans. The local people who live in or around the forest area should have the authority to decide the management of forest produces. These people know various practices to use the resources in sustainable manner. These people have been using the forest and wild life resources since ancient times without harming or causing any damage to the environment.

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?

Ans. As an individual

(a) (i) I will not allow cutting of trees.

(ii) I shall plant one tree every year and watch it growing.

(b) (i) I shall use water judiciously.

(ii) I shall immediately repair leaky taps

(c) (i) I shall pool the car for going to office.

(ii) Every Sunday will be no car Sunday.

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

Ans. The following measures can be taken:

(a) Save electricity by switching off unnecessary lights and fan.

(b) Walk or cycle whenever possible.

(c) Use CFL instead of bulbs

(d) Do not wastes food

(e) Repair leaky taps at the earliest instant.

6. List five things you have done over the last one week to- (a) Conserve our natural resources.

(b) Increase the pressure on our natural resources. Ans. (i) not wasted electricity.

(ii) Planted a tree

(iii) Used cloth bag for shopping.

(iv) Not used my car and used public transport.

(b) (i) I forgot to switch off room light and television set when I was away for two days.

(ii) Water kept running when I brushed the teeth and when shaved my beard.

(iii) Household garbage was thrown on the roadside.

(iv) I mixed biodegradable and non-biodegradable wastes.

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

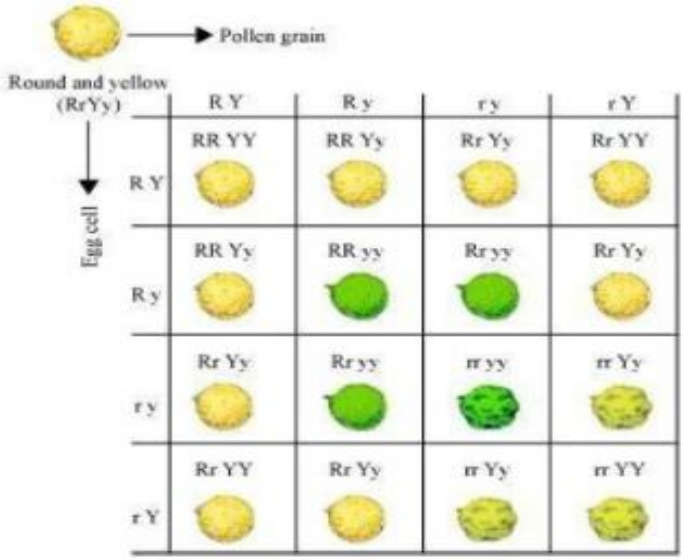
Ans. I shall

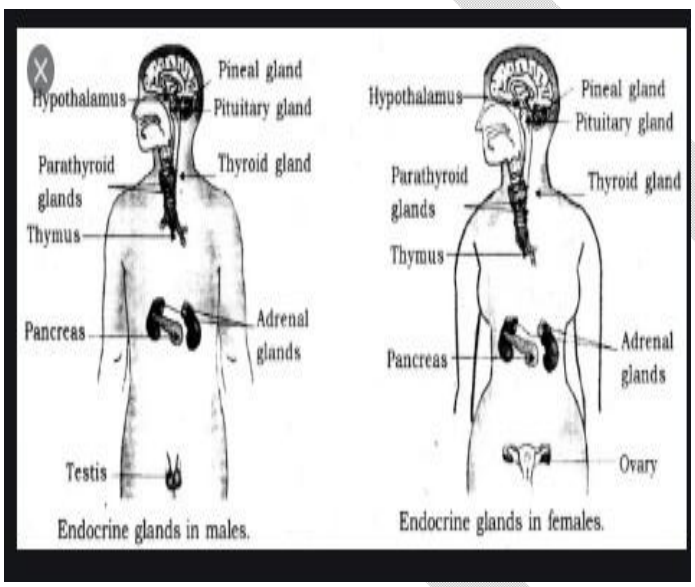
(i) Minimize use of fossils fuels by pooling of car and use of public transport.

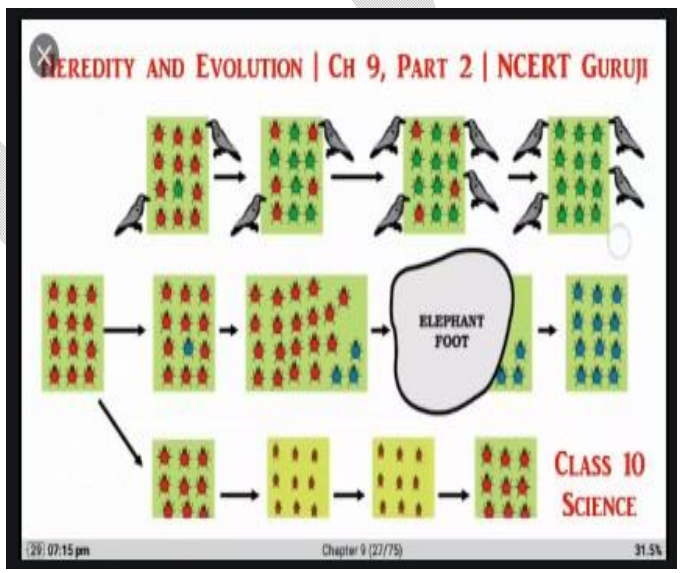
(ii) Recycle plastic, paper, glass etc. **(iii)** Provide for water harvesting **(iv)** Plant more trees.

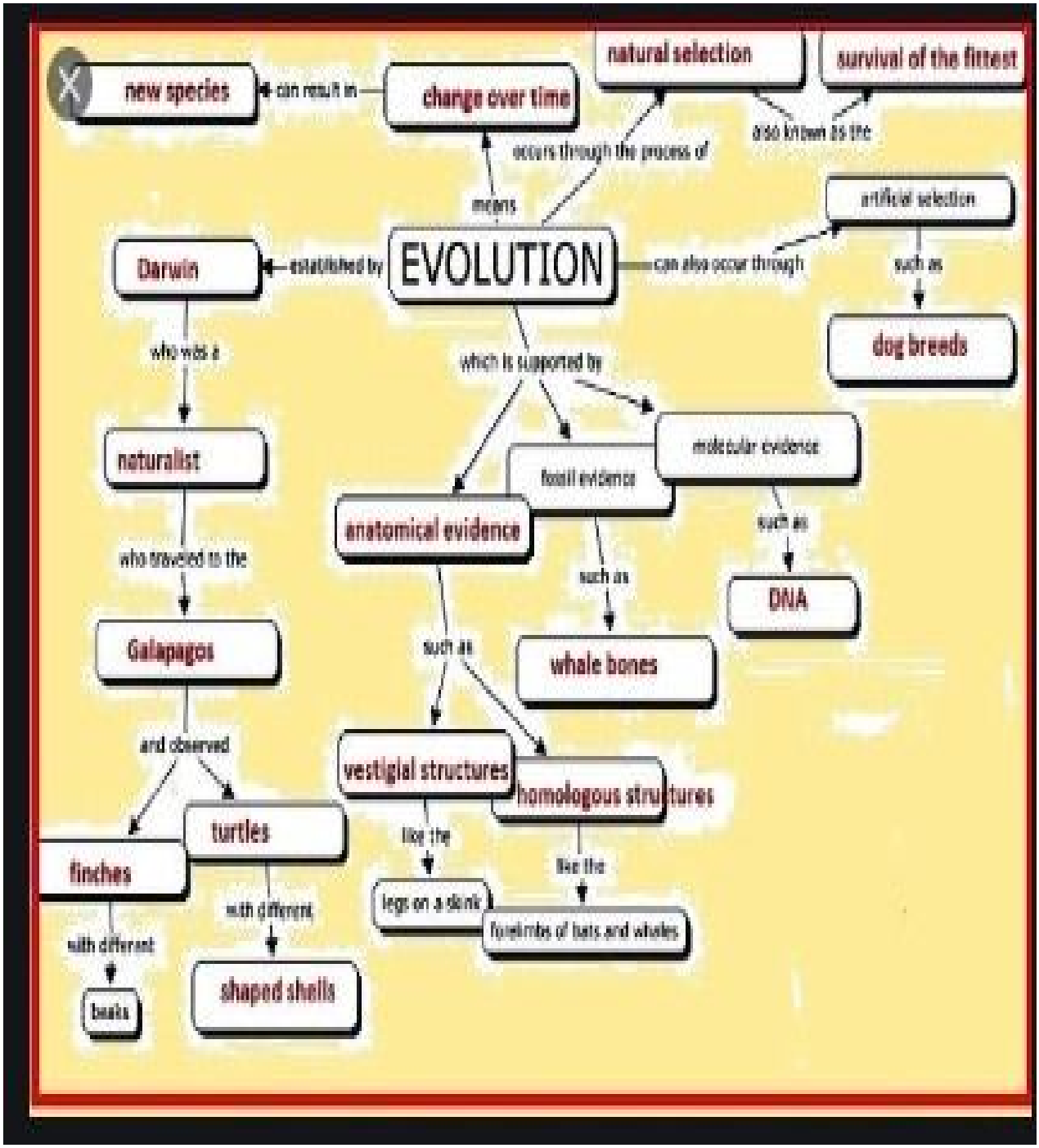
(v) Use the principle of three R's.

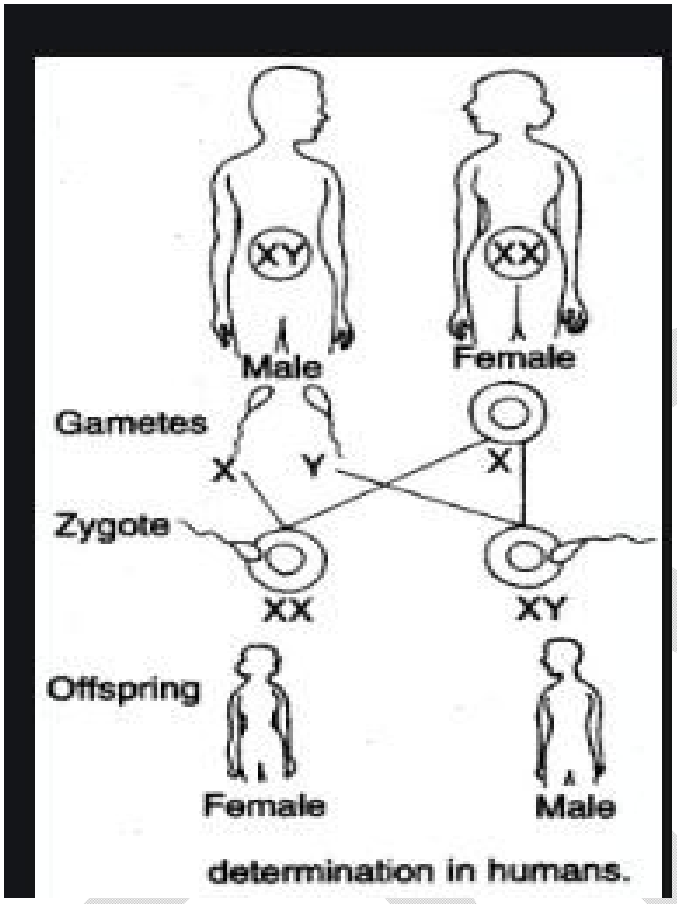
Diagrams








new species
can result in
change over time
natural selection
survival of the fittest
also known as the
occurs through the process of
means
EVOLUTION
Darwin
established by
can also occur through
artificial selection
such as
dog breeds
who was a
naturalist
who traveled to the
Galapagos
and observed
finches
with different
beaks
turtles
with different
shaped shells
which is supported by
anatomical evidence
fossil evidence
molecular evidence
such as
DNA
such as
whale bones
such as
vestigial structures
homologous structures
like the
legs on a skink
like the
forelimbs of bats and whales



determination in humans.


PIS