

Life Processes

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

Solution:

Multi-cellular organism's like humans have very big body and require a lot of oxygen to diffuse into body quickly in order to meet the oxygen requirement. Diffusion is a slow process which will take a lot of time to circulate oxygen to all the body cells. Because of its slow nature diffusion is insufficient to meet the oxygen requirements of multicellular organisms like humans.

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

Solution:

Walking, breathing, growth and other visible changes can be used to determine whether something is alive or dead. However some living things will have changes that are not visible to our eye; Hence, presence of life process is a fundamental criteria to decide whether something is alive.

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

Solution:

Outside raw material is used by organism for food and oxygen. Raw materials requirement varies on the complexity of the organism and the environment it is living.

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

Solution:

Life processes such as respiration, digestion, excretion, circulation and transportation are essential for maintain life.

. What are difference between autotrophic and heterotrophic nutrition?

Solution : Distinction between autotrophic and heterotrophic nutrition:

Autotrophic Nutrition	Heterotrophic Nutrition
Food is synthesised from simple inorganic raw materials such as CO ₂ and water.	Food is obtained directly or indirectly from autotrophs. This food is broken down with the help of enzymes.
Chlorophyll is required.	Chlorophyll is not required.
Food is generally prepared during day time.	Food can be obtained at all time.
All green plants and some bacteria have this type of nutrition.	All animals and fungi have this type of nutrition.

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

Solution :

- (a) Carbon dioxide from atmosphere.
- (b) Light from Sun
- (c) Water from Soil
- (d) Chlorophyll from chloroplast of green plants.

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

Solution : HCl plays following role in our stomach:

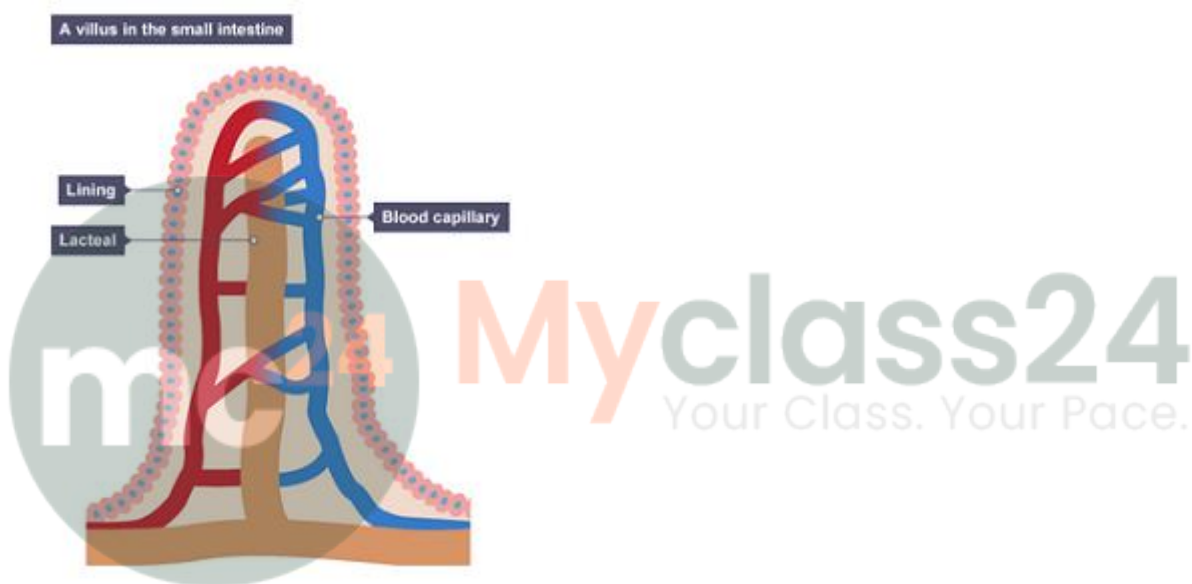
- (a) Make the medium acidic for action of enzyme pepsin.
- (b) Kills the harmful bacteria present in food
- (c) Prevents fermentation of food

8. What is the function of digestive enzymes?

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

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

Solution : 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.



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

Solution : 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 while in aquatic organisms the rate of breathing is faster.

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

Ans: The different ways in which glucose is oxidized to provide energy in various organisms are:

(Image will be uploaded soon)

12. In mammals and birds, why is it necessary to separate oxygenated and deoxygenated blood?

Ans: In Mammals and birds it is important to separate the oxygenated and deoxygenated blood because they are homoeothermic and warm-blooded animals. Due to this character, they can maintain their temperature constant throughout and the changes in their environment do not affect their body temperature regulation. This process also results in a good supply of oxygen in the case of birds and mammals so that optimum oxidation of glucose can take place. So to supply the required amount of oxygen it is important to have separate oxygenated and deoxygenated blood.

13. List three characteristics of the lungs that make them an efficient respiratory surface.

Ans: The characteristics that make lungs an efficient respiratory surface are:

1. Thin: The walls of the alveoli or air sac are very thin resulting in the quick diffusion of gases. They help in the absorption of oxygen inside the blood by inhalation process and also remove the carbon dioxide from the lungs by exhaling it to the outside.
2. Moist: The air sacs are composed of mucus that makes them moist which helps the gases to dissolve easily before diffusing.
3. Large surface area: In the lungs of human beings, its surface area is almost similar to the surface area of the tennis court that helps in the diffusion of gases. The alveoli or air sacs results in increasing the surface area of the lungs for the absorption of oxygen.
4. Good blood supply: The air sacs or alveoli are composed of a large capillary network that helps in the exchange of large volumes of gases. Thus greater the flow of blood in the lungs the greater would be the exchange of gases.

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

Ans: The main components of the transport system in human beings are the heart, blood, and blood vessels and their function are as follows:

- The heart helps in pumping the oxygenated blood throughout the body. From the various parts of the body the deoxygenated blood is accumulated in the heart and from there it goes to the lungs for oxygenation.
- Blood is the main body fluid that helps in the transport of nutrients, oxygen, carbon dioxide, nitrogenous wastes, and hormones. Blood also consists of white blood cells (WBCs) thus making it the main component of our immune system. Blood also consists of platelets that cause the clotting of blood that helps in repairing the damaged blood vessels. Also, the temperature of the body is also maintained by transportation.
- Blood vessels (arteries, veins, and capillaries) are responsible for blood transportation either from the heart to various other body organs or from various body organs to the heart. All arteries carry oxygenated except pulmonary arteries and they transport blood from the heart to various parts of the body while all veins carry deoxygenated blood except pulmonary veins. The material that exchanges between the blood and tissues takes place inside the capillaries.

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

Solution:

- Heart, blood and blood vessels are the main components of transport system in human beings.

Functions of these components

Heart

- Heart pumps oxygenated blood throughout the body. It receives deoxygenated blood from the various body parts and sends this impure blood to the lungs for oxygenation.

Blood

- Blood transports oxygen, nutrients, CO₂, and nitrogenous wastes.

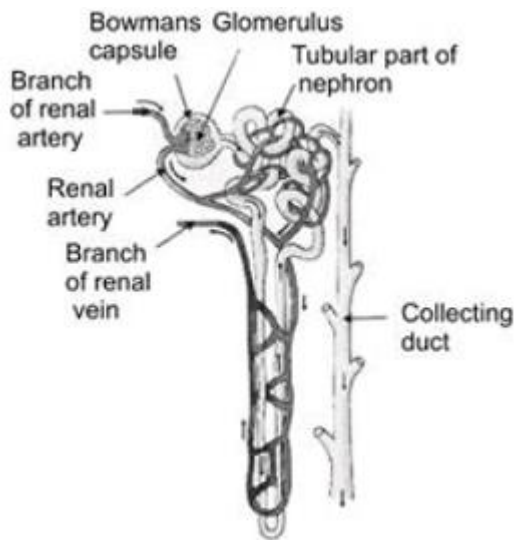
Blood vessels

- Blood vessels, arteries and veins carry blood to all parts of body.

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

Solution:

- Mammals and birds are warm blooded animals which keep their body temperature constant irrespective of the environment they live in. This process requires a lot of oxygen for more cellular respiration so that warm blooded animals produce more energy to balance their body temperature. Hence it is very important for warm blooded animals to separate oxygenated and deoxygenated blood to keep their circulatory system efficient.
- **3. What are the components of the transport system in highly organized plants?**
- **Solution:**
- There are two types of conducting tissues in highly organized plants that carry out transport system 1) Xylem 2) phloem. Xylem conduct water and minerals from roots to rest of the plant parts. Similarly Phloem transports food materials from leaf to other parts of the plant.
- **4. How are water and minerals transported in plants?**
- **Solution:**
- Xylem parts tracheids and vessels of roots, stems and leaves are interconnected to form a continuous system of water-conducting channels that reaches all parts of the plant. Transpiration creates a suction pressure which forces water into xylem cells of roots. After this, there will be a steady movement of water from the root xylem to all parts of the plant connected through conducting interconnected water-conducting channels.
- **5. How is food transported in plants?**
- **Solution:**
- Food is transported in plants by a special organ called as phloem. Phloem transports food materials from leaf to different parts of a plant. Transportation of food in phloem is achieved by the expenditure of energy from ATP. This increases osmotic pressure in the tissue causing water to move. This pressure moves material in the Phloem to the tissues with less pressure. This is helping in transportation of food material as per the needs. Ex: Sucrose
- **19. Describe the structure and functioning of nephron.**
- **Solution :** 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.



-
-

- **20. What are the methods used by plants to get rid of excretory products?**

- **Solution :**

- (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.

-

- **21. How is amount of urine produced regulated?**

- **Solution :** 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 body are more than amount of urine will be more and if amount of wastes is less the amount of urine produced will be less.

-

- **22. The kidneys in human beings are parts of the system for**

- (a) nutrition
- (b) respiration
- (c) excretion
- (d) transpiration

- **Solution :** (c) excretion

-

- **23. The xylem in plants are responsible for**
- (a) transport of water
- (b) transport of food
- (c) transport of amino acids
- (d) transport of oxygen
- **Solution :** (a) transport of water
- **4. The autotrophic mode of nutrition requires**
- (a) carbon dioxide and water
- (b) chlorophyll
- (c) sunlight
- (d) all of the above
- **Solution :** (d) all of the above
-

- **25. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in**
- (a) cytoplasm
- (b) mitochondria
- (c) chloroplast
- (d) nucleus
- **Solution :** (b) mitochondria
- **5. How are fats digested in our bodies? Where does this process take place?**
- **Ans:** Fats are present in the small intestine of our body in the form of large globules. The various juices from the liver (bile juice) and liver (pancreatic juice) are secreted in the small intestine. The bile salts that are released from the bile juice of the liver will help in breaking down the large fat globules into smaller globules so that the pancreatic enzymes (lipases) can easily act on them. The process of breaking down large fat globules into smaller fat droplets is termed emulsification.
-
- **26. What is the role of saliva in the digestion of food?**
- **Ans:** Saliva is a watery fluid that is secreted by the salivary glands present in the mouth. The functions of saliva start from the moistening of food that results in the formation of a food bolus, this food bolus can be easily swallowed and thus saliva helps in the process of digestion of food starting from the mouth. Saliva breaks down starch into maltose and dextrin with the help of an enzyme amylase present in it.
-

- **27. What are the necessary conditions for autotrophic nutrition and what are its by-products?**
- **Ans:** Autotrophic nutrition is the process where the organisms make their own food by themselves; this takes place through the process of photosynthesis. The necessary conditions that are required for autotrophic nutrition are the presence of sunlight along with raw materials that include carbon dioxide, water, and chlorophyll. The by-products of autotrophic nutrition are the carbohydrates in the form of glucose (food) and oxygen which are inhaled by animals.
- $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Sunlight, Energy}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

8. What are the differences between aerobic and anaerobic respiration?

Name some organisms that use the anaerobic mode of respiration?

Solution:

Aerobic respiration

- The process takes place in the presence of free oxygen
- The products of aerobic respiration are CO_2 , water and energy.
- The first step of aerobic respiration (glycolysis) takes place in cytoplasm while the next step takes place in mitochondria.
- The process of aerobic respiration takes place in all higher organisms.
- In this process complete oxidation of glucose takes place.

Anaerobic respiration

- The process takes place in the absence of the free oxygen.
- The products of anaerobic respiration are ethyl alcohol, CO_2 and a little energy.
- Even in anaerobic respiration, the first step takes place in cytoplasm while the next step takes place in mitochondria.
- In this process the glucose molecules is incompletely broken down.
- The process of anaerobic respiration takes place in lower organism like yeast, some species of bacteria and parasites like tapeworm.

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

Solution:

- The lung is an important part of the body. The passage inside the lungs divides into smaller and smaller tubes, which finally terminate in balloon-like structures, called as alveoli.

- The alveoli provide a surface where the exchange of gases can take place. The walls of the alveoli usually contains an extensive network of blood vessels. We know that, when we breathe in, we lift our ribs, flatten our diaphragm and chest cavity becomes larger.
- Because of this action, air is sucked into the lungs and fills the expanded alveoli.
- The blood brings the essential carbon dioxide from rest of the body and supply it to alveoli; the oxygen in the alveolar air is taken up by the blood in the alveolar blood vessels to be transported to the all other cells of the body. During normal breathing cycle, when air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and carbon dioxide to be released.

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

Solution:

Hemoglobin is a protein responsible for transportation of oxygen to the body cells for cellular respiration. Deficiency of Hemoglobin can affect the oxygen carrying capacity of RBC'S. This lead to lack of oxygen in our body cells. Hemoglobin deficiency leads to a disease called as anemia.

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

Solution:

Double circulation means, in a single cycle blood goes twice in the heart. The process helps in separating oxygenated and deoxygenated blood to maintain a constant body temperature.

The double circulatory system of blood includes

- Pulmonary circulation
- Systemic circulation.

Pulmonary circulation:

The right ventricle pumps deoxygenated blood into the lungs where it is oxygenated. The oxygenated blood is brought back to the left atrium, from there it is pumped into the left ventricle and finally blood goes into the aorta for systemic circulation.

Systemic circulation:

The oxygenated blood is pumped to various parts of the body from the left ventricle. The deoxygenated blood from different parts of the body passes through vena cava to reach right atrium. The right atrium transfers the blood into right ventricle.

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

Solution : Difference between transport in xylem and phloem:

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

34. Compare the functioning of alveoli in the lungs and nephron in the kidneys with respect to their structure and functioning.

Solution : Comparison between alveoli and nephron:

Alveoli	Nephrons
Structure	Structure
Alveoli are tiny balloon-like structures present inside the lungs.	Nephrons are tubular structures present inside the kidneys.
The walls of the alveoli are one cell thick and it contains an extensive network of blood capillaries.	Nephrons are made of glomerulus, bowman's capsule, and a long renal tube.
Function	Function
The exchange of O ₂ and CO ₂ takes place between the blood of the capillaries that surround the alveoli and the gases present in the alveoli.	The blood enters the kidneys 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 site of gaseous exchange.	Nephrons are the basic filtration unit.



Myclass24
Your Class. Your Pace.