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## CHAPTER – 5

# THE FUNDAMENTAL UNIT OF LIFE

### **CELL**

Cell is called the fundamental unit of life.

A cell is capable of independent existence and can carry out all the functions which are necessary for a living being. A cell carries out nutrition, respiration, excretion, transportation and reproduction; the way an individual organism does. Unicellular organisms are capable of independent existence which shows a cell's capability to exist independently. Due to this, a cell is called the fundamental and structural unit of life. All living beings are composed of the basic unit of life, i.e. cell.

### **CELL THEORY (Schleiden, Schwann and Virchow):**

- All living organisms are composed of one or more cells.
- The cell is the basic unit of structure, function, and organization in all organisms.
- All cells come from preexisting, living cells.

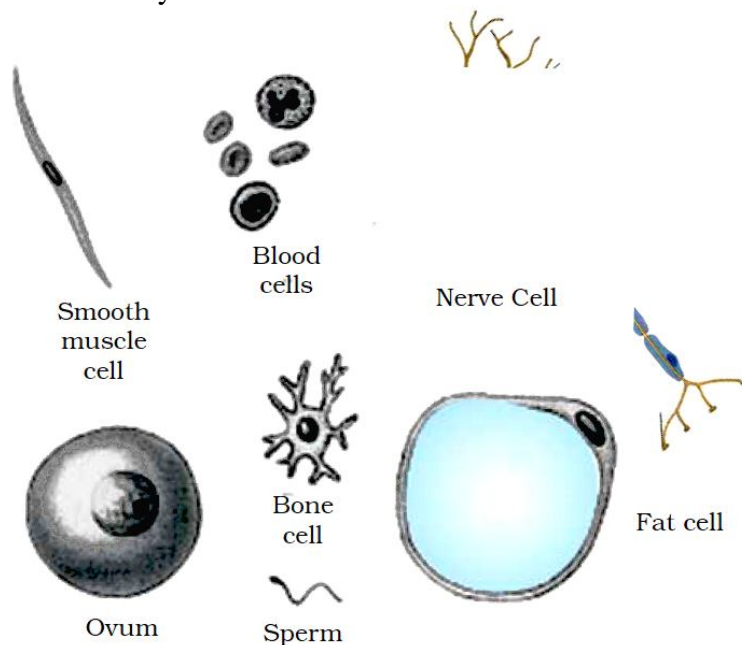
### **CELL SIZE, SHAPE AND NUMBER**

There is much variation in size, shape and number of cells in different organisms, and also in various parts of the body. Most of the cells are only a few micrometres in diameter and are visible only with the help of a microscope.

Cells may be spherical, spindle shaped, elongated, polyhedral or irregular in shape. The shape of the cells is determined by the specific function they perform.

The number of cells is related to the size of the organ or body. Thus, small organisms have limited number of cells, while the larger ones such as elephant, whale or banyan tree have a countless number of cells.

Some organisms can also have cells of different kinds. Look at the following picture. It depicts some cells from the human body.



*Various cells from the human body*

## INTEXT QUESTIONS PAGE NO. 59

### Q1. Who discovered cells, and how?

**Answer:** Cells were discovered in 1665 by an English Botanist, Robert Hooke. He used a primitive microscope to observe cells in a cork slice.

### Q2. Why is the cell called the structural and functional unit of life?

**Answer:** Cells constitute various components of plants and animals. A cell is the smallest unit of life and is capable of all living functions. Cells are the building blocks of life. This is the reason why cells are referred to as the basic structural and functional units of life. All cells vary in their shape, size, and activity they perform. In fact, the shape and size of the cell is related to the specific functions they perform.

## STRUCTURE OF CELL

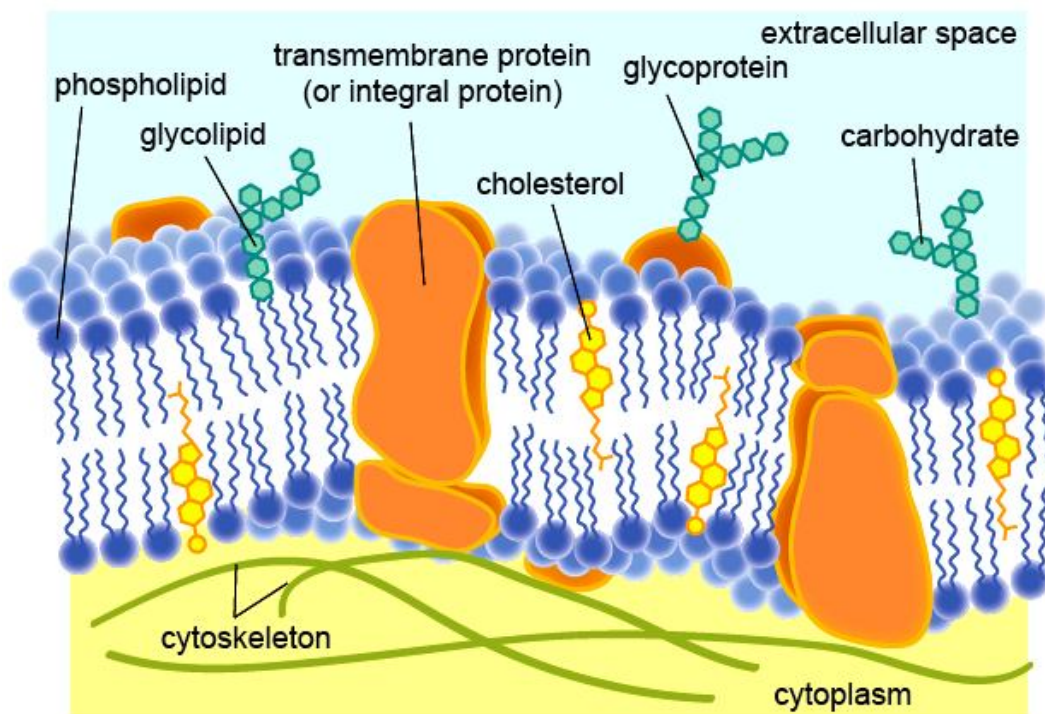
### PROTOPLASM

A cell is made of life giving substance called protoplasm. The protoplasm is a highly organised jelly like, viscous, semifluid, composed of molecules of various chemicals. Most of these are organic molecules such as proteins, carbohydrates, fats, nucleic acid etc. Protoplasm is commonly called the ' physical basis of life' .

A plant cell consists of a cell wall and protoplast. Cell wall is absent in animal cells. Protoplast denotes the whole of protoplasm present in a cell. It is differentiated into plasma membrane, nucleus and cytoplasm.

### PLASMA MEMBRANE

Plasma membrane is a semi-permeable membrane. It is composed of bilayer of lipid and protein. This is the outermost covering of the cell that separates the contents of the cell from its external environment. The plasma membrane allows or permits the entry and exit of some materials in and out of the cell. It also prevents movement of some other materials. The cell membrane, therefore, is called a selectively permeable membrane.



## Functions of Plasma Membrane

- Plasma membrane selectively regulates the entry and exit of the substances into and out of the cell. Therefore, it is called a selectively permeable membrane or semipermeable membrane.
- It provides an outer boundary to the cell and protects the cell from injury.
- It allows the flow of materials and information between different organelles of the same cell, as well as between the adjacent cells.
- It provides some organic connections between the adjacent cells.

## INTEXT QUESTIONS PAGE NO. 61

**Q1. How do substances like CO<sub>2</sub> and water move in and out of the cell? Discuss.**

**Answer:**

The cell membrane is selectively permeable and regulates the movement of substances in and out of the cell.

**Movement of CO<sub>2</sub>:** CO<sub>2</sub> is produced during cellular respiration. Therefore, it is present in high concentrations inside the cell. This CO<sub>2</sub> must be excreted out of the cell. In the cell's external environment, the concentration of CO<sub>2</sub> is low as compared to that inside the cell. Therefore, according to the principle of diffusion, CO<sub>2</sub> moves from a region of higher concentration (inside the cell) towards a region of lower concentration (outside the cell). Similarly, O<sub>2</sub> enters the cell by the process of diffusion when the concentration of O<sub>2</sub> inside the cell is low as compared to its surroundings.

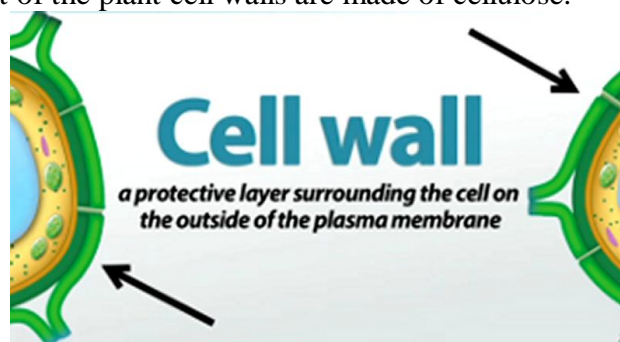
**Movement of water:** Water moves from a region of high concentration to a region of low concentration through the plasma membrane. The plasma membrane acts as a semi-permeable membrane, and this movement of water is known as osmosis. However, the movement of water across the plasma membrane of the cell is affected by the amount of substance dissolved in water.

**Q2. Why is the plasma membrane called a selectively permeable membrane?**

**Answer:** The cell membrane or the plasma membrane is known as a selectively permeable membrane because it regulates the movement of substances in and out of the cell. This means that the plasma membrane allows the entry of only some substances and prevents the movement of some other materials.

## CELL WALL

Cell wall is made of cellulose. Cell wall is present only in plant cells. It is a rigid protective covering outside the plasma membrane. Presence of cell wall in plant cells distinguishes them from animal cells. Most of the plant cell walls are made of cellulose.



The cell wall consists of three layers namely, middle lamella, primary wall and secondary wall. The middle lamella is a thin amorphous cement like layer between two adjacent cells. Primary

wall is the first formed wall of the cell and is produced inner to the middle lamella. The secondary wall is a thick layer found inner to the primary wall.

### **Functions of Cell Wall:**

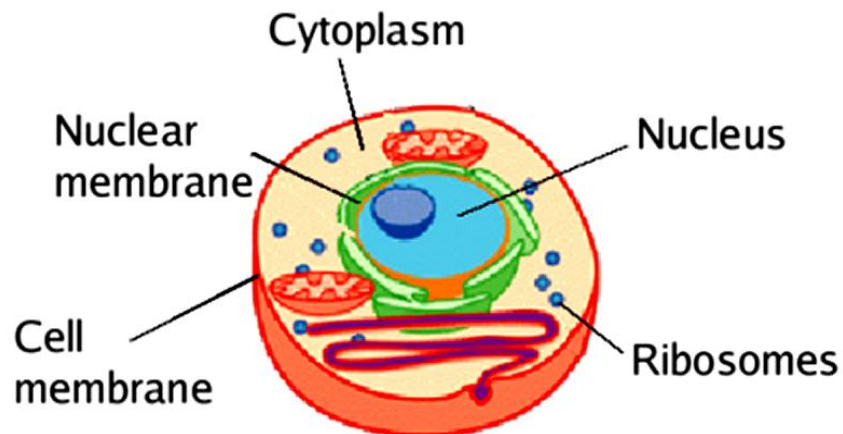
- Cell wall gives a definite shape to the plant cells.
- It provides mechanical strength to the cell.
- It protects the protoplasm against injury.
- It gives rigidity to the cell.

### **CYTOPLASM**

A cell is enclosed in a membranous casing and is filled with a liquid substance which is called the cytoplasm. There are many cell organelles in a typical cell. Some of the main structures of a cell are as follows: The cytoplasm is the fluid content inside the plasma membrane. It also contains many specialised cell organelles. Each of these organelles performs a specific function for the cell.

### **Functions of Cytoplasm**

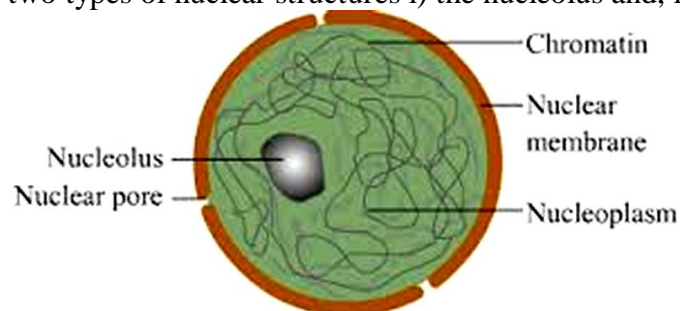
- Cytoplasm helps in intracellular distribution of enzymes, nutrients and other biomolecules within the cell.
- Synthesis of different types of biomolecules such as proteins, nucleotides, fatty acids etc., takes place in the cytoplasm.



### **NUCLEUS**

Nucleus is the major central structure in the cell. It is a dense spherical structure embedded in the cytoplasm. Nucleus has a double membraned envelope called nuclear envelope. Nuclear envelope encloses a ground substance called nucleoplasm or karyolymph. The nuclear envelope possesses many pores called nuclear pores.

The nucleoplasm has two types of nuclear structures i) the nucleolus and, ii) chromatin.



**Structure of a Nucleus**

The nucleolus is a spherical body rich in protein and RNA. It is the site of ribosome formation. There may be one or more nucleoli in the nucleoplasm. The chromatin is a network of fine threads composed of genetic material DNA (Deoxyribo nucleic acid) and proteins. During cell division chromatin is condensed into thick cord like structures called Chromosomes. The chromosomes contain genes and each gene is responsible for one hereditary character of the organism. Genes contain information for inheritance of features from parents to next generation in the form of DNA molecule.

### **Functions of Nucleus:**

- i) Nucleus controls all the metabolic activities of the cell.
- ii) It controls the inheritance of characters from parents to off-springs.
- iii) It controls cell division.

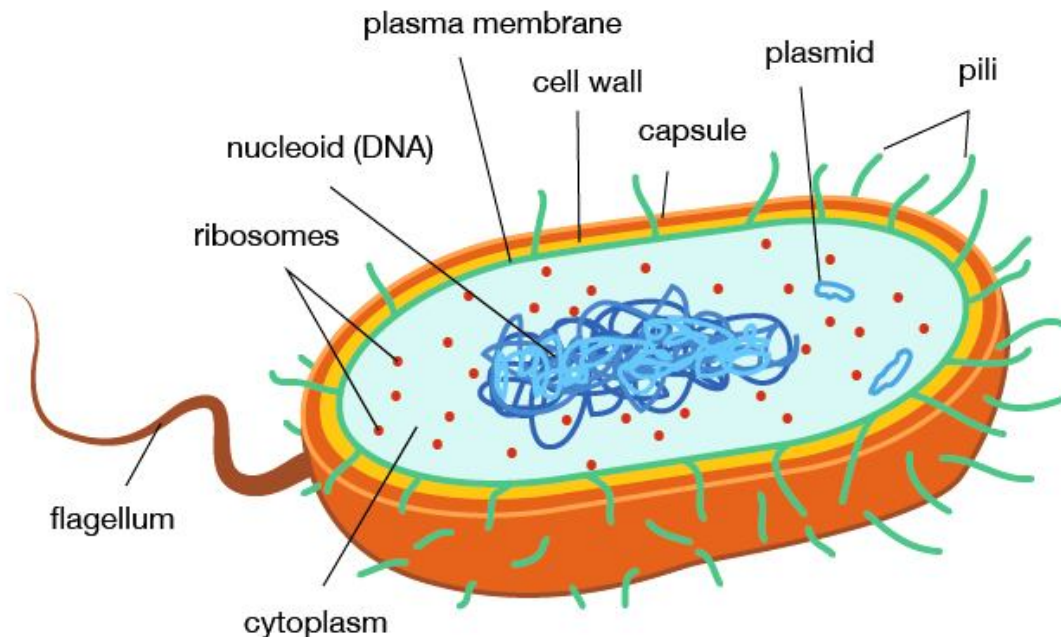
## **PROKARYOTES AND EUKARYOTES**

Based on the complexity of organization, especially nuclear organization, the cells are classified into two types.

- i) Prokaryotic cells.
- ii) Eukaryotic cells.

## **PROKARYOTIC CELLS**

The cells of Bacteria and Cyano Bacteria (blue green algae) lack a well organised nucleus and are called prokaryotic cells. Their DNA (Deoxyribo Nucleic Acid) is not enclosed by a nuclear membrane. They also lack membrane bound organelles. The organisms which possess prokaryotic cells are called prokaryotic organisms or prokaryotes. They are considered to be primitive organisms.

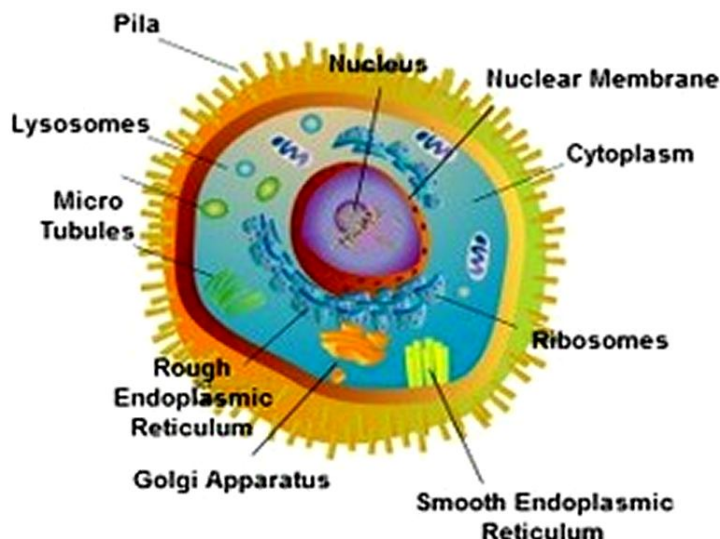


## **EUKARYOTIC CELLS**

The cells of all plants (except bacteria and cyano bacteria) and animals possess a well organised nucleus and are called Eukaryotic cells. Their genetic material is enclosed by a nuclear membrane. They possess membrane bound organelles like Endoplasmic reticulum,

golgi body, mitochondria, plastids and vacuoles. The organisms which possess eukaryotic cells are called Eukaryotic organisms or eukaryotes.

## Eukaryotic Cell



### INTEXT QUESTIONS PAGE NO. 63

**Q1. Fill in the gaps in the following table illustrating differences between prokaryotic and eukaryotic cells.**

<u>Prokaryotic Cell</u>	<u>Eukaryotic Cell</u>
1. Size : generally small ( 1-10 $\mu\text{m}$ ) $1 \mu\text{m} = 10^{-6} \text{ m}$	1. Size: generally large ( 5-100 $\mu\text{m}$ )
2. Nuclear region: _____ _____ and known as _____	2. Nuclear region: well defined and surrounded by a nuclear membrane
3. Chromosome: single	3. More than one chromosome
4. Membrane-bound cell organelles absent	4. _____ _____ _____

**Answer:**

<u>Prokaryotic Cell</u>	<u>Eukaryotic Cell</u>
1. Size : generally small ( 1-10 $\mu\text{m}$ ) $1 \mu\text{m} = 10^{-6} \text{ m}$	1. Size: generally large ( 5-100 $\mu\text{m}$ )
2. Nuclear region: <u>poorly defined because of the absence of a nuclear membrane</u> , and is known as <u>nucleoid</u>	2. Nuclear region: well defined and surrounded by a nuclear membrane
3. Chromosome: single	3. More than one chromosome
4. Membrane-bound cell organelles absent	4. <u>Membrane-bound cell organelles such as mitochondria, plastids, etc., are present</u>

## **CELL ORGANELLES**

A cell performs a variety of functions such as i) Synthesis of complex molecules and their breakdown, ii) Production of energy, iii) Secretion of certain substances, etc.. These activities of the cell are performed by different cell organelles. These organelles are enclosed by membranes. To understand the functioning of the cell, it is necessary to know briefly about the structure of cell organelles.

### **ENDOPLASMIC RETICULUM**

Endoplasmic reticulum is a complicated and interconnected system of membrane bound channels and tubules.

It is spread throughout the cytoplasm and is continuous with the plasma membrane and nuclear membrane.

There are two types of Endoplasmic Reticulum.

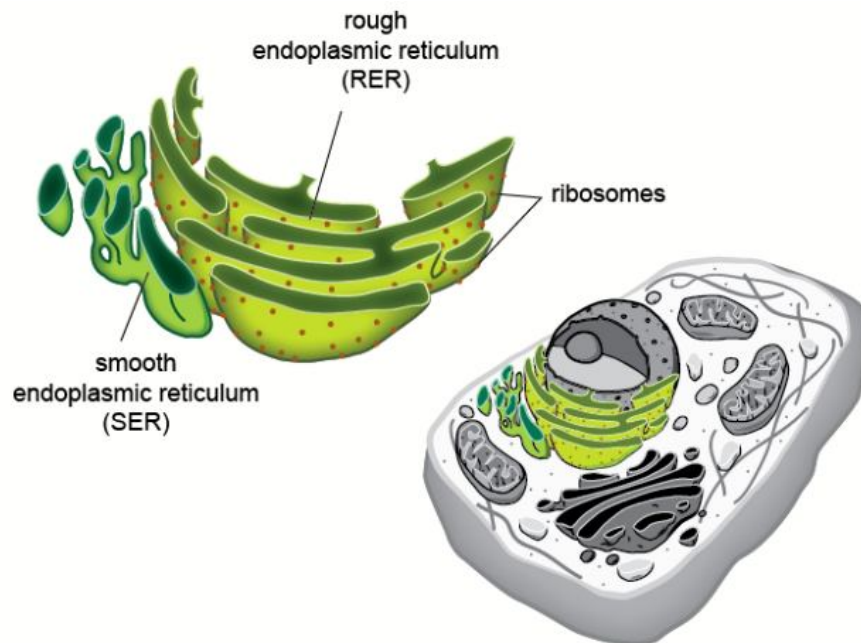
- a) Rough Endoplasmic Reticulum. (RER)
- b) Smooth Endoplasmic Reticulum. (SER)

#### **Rough endoplasmic reticulum (Granular endoplasmic reticulum)**

They are found in cells which synthesize proteins. This type of endoplasmic reticulum possesses rough walls because the ribosomes remain attached with membrane of endoplasmic reticulum.

#### **Smooth endoplasmic reticulum (Agranular endoplasmic reticulum)**

They are found in cells which synthesize lipid. The walls are smooth and ribosomes are not attached to its membrane.



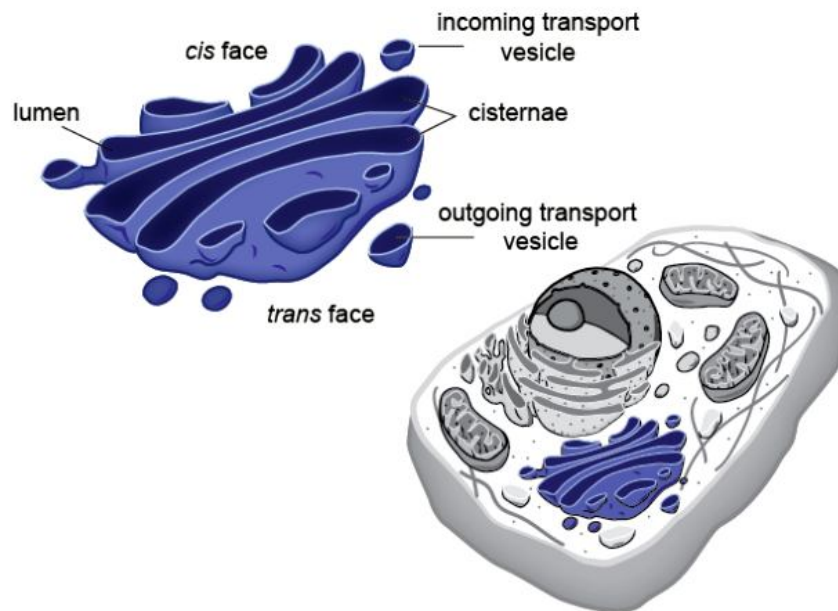
#### **Functions of Endoplasmic Reticulum**

- Endoplasmic Reticulum (E.R) provides large surface area for the metabolic activities of the cell.
- Rough endoplasmic reticulum plays an important role in protein synthesis.
- Smooth endoplasmic reticulum is involved in the synthesis of steroid, hormones and lipids.



## GOLGI COMPLEX OR GOLGI APPARATUS

The Golgi apparatus was first described by Camillo Golgi. Golgi complex consist of saucer-like compartments called cisternae, network of interconnecting tubules, vesicles and vacuoles at the peripheral regions. In plant cells, Golgi apparatus is referred to as dictyosomes.



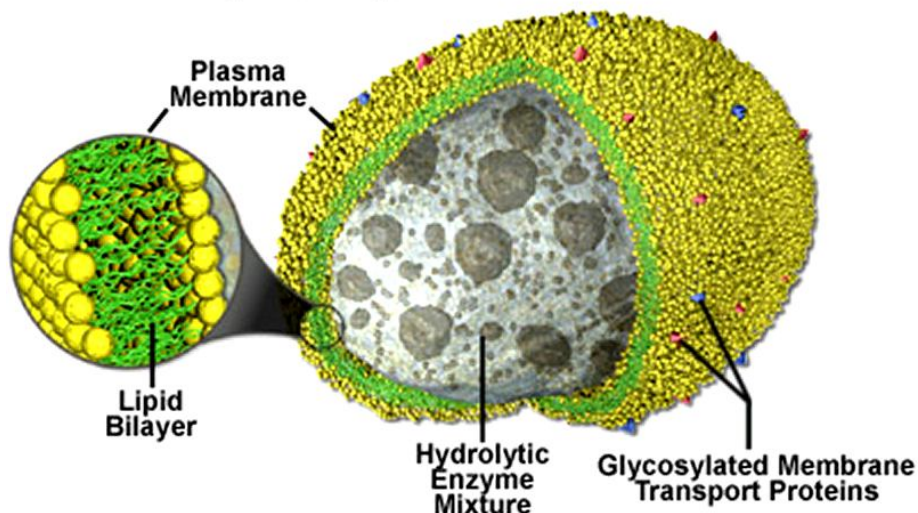
### Functions of Golgi Complex

- Golgi apparatus is involved in the formation of lysosomes.
- It is also responsible for the synthesis of cell wall and cell membrane.

## LYSOSOMES

Lysosomes are small membrane bound vesicles which contain various types of digestive enzymes. These serve as intracellular digestive system, hence they are called digestive bags. They are produced by the joint activity of Endoplasmic reticulum and Golgi apparatus. If the membrane of Lysosome happens to get ruptured, the enzymes of Lysosome would digest the entire cellular structure causing death of the cell. So Lysosomes are called 'suicide bags'.

### Anatomy of the Lysosome



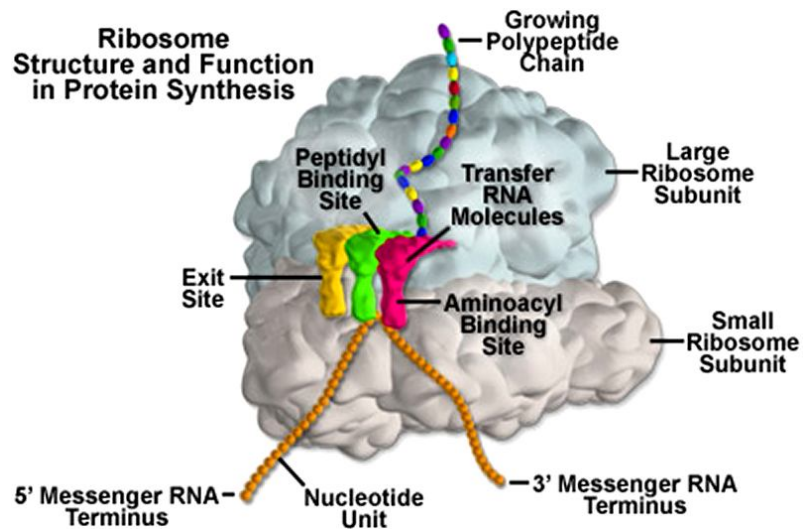
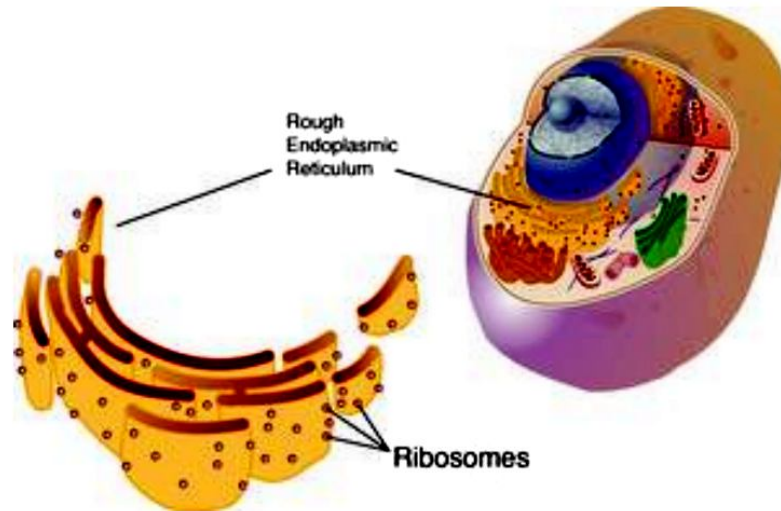
### Functions of Lysosomes

- Lysosomes are involved in the intracellular digestion of food particles ingested by the cell through endocytosis.

- The lysosomes of WBCs (White blood cells) destroy pathogens and other foreign particles and thus take part in natural defence of the body.

## **RIBOSOMES**

Ribosomes are small granular structures made up of ribo nucleic acids (RNA) and proteins. They occur free in the cytoplasm as well as attached to the outer surface of the rough endoplasmic reticulum. Each ribosome consists of two subunits – a small subunit and a large subunit. At the time of protein synthesis many ribosomes get attached to messenger RNA and form a structure called polyribosome or polysome.



### **Functions of Ribosomes**

Ribosomes play an important role in protein synthesis. So they are called, ' protein factories' of the cell.

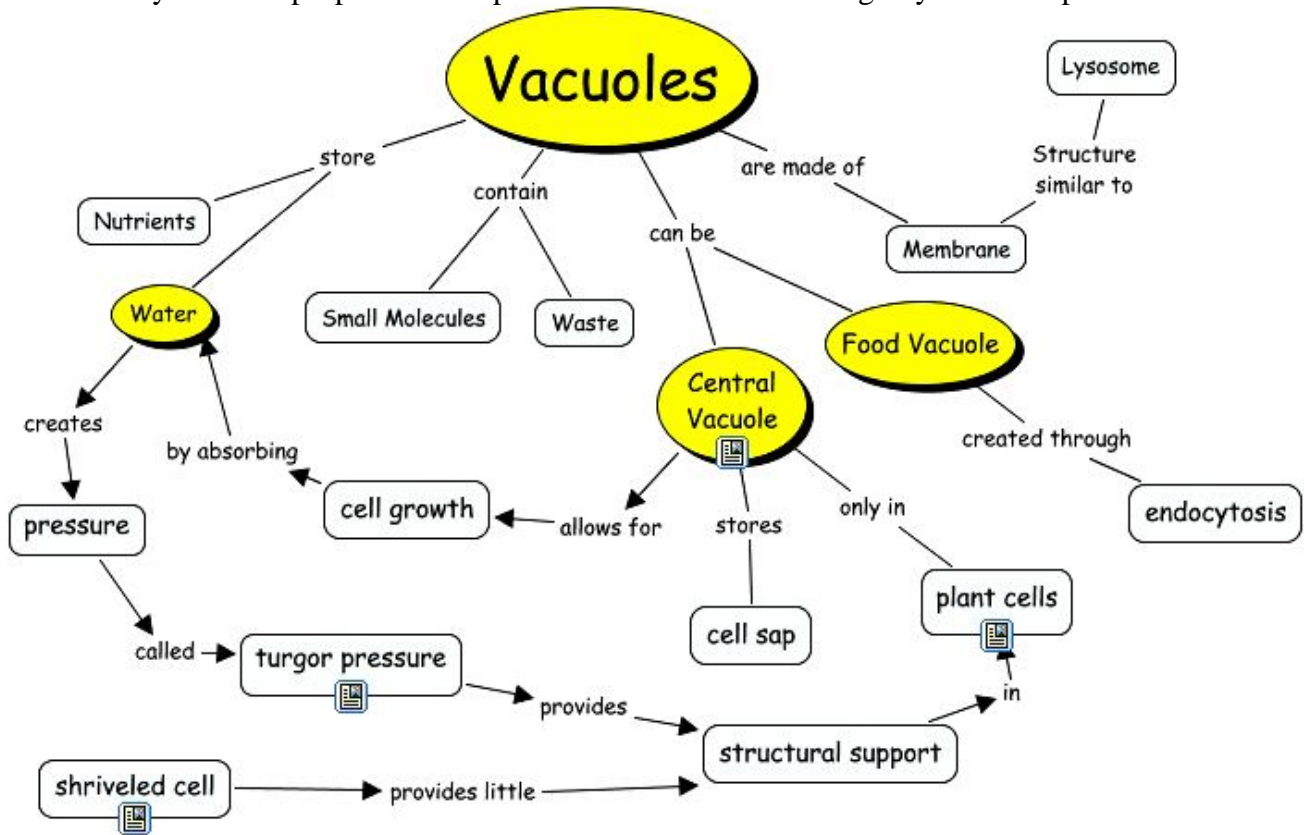
## **VACUOLES**

Vacuoles are fluid– filled sacs bound by a single membrane and are present in plant cells as well as in certain protozoans as food vacuoles and contractile vacuoles. In plant cells, major portion of the cell is occupied by vacuoles and are bound by the definite membrane called tonoplast.

Vacuoles of plants are filled with cell sap containing minerals, sugars, amino acids and dissolved waste products.

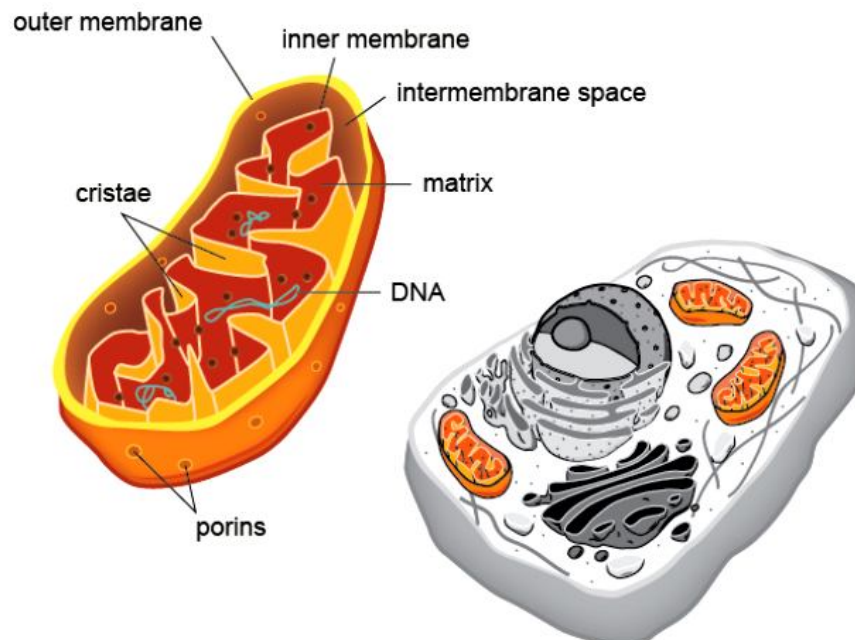
## Functions of Vacuoles

- Vacuoles store and concentrate mineral salts as well as nutrients.
- They maintain proper osmotic pressure in the cell for its turgidity and absorption of water.



## MITOCHONDRIA

Mitochondria are globular or cylindrical organelles. Each mitochondrion is bound by two membranes – an outer continuous membrane and an inner membrane thrown into folds called cristae. These cristae divide the inner chamber incompletely. The inner chamber is filled with homogenous dense material called the matrix. The cristae have pin headed bodies called F1 particles or Oxysomes which play an important role in respiration.



The matrix of mitochondria contains enzymes necessary for the oxidation of food during respiration and release of energy in the form of ATP molecules. Therefore mitochondria are called power houses of the cell. The mitochondria contain proteins, lipids and a small amount of DNA.

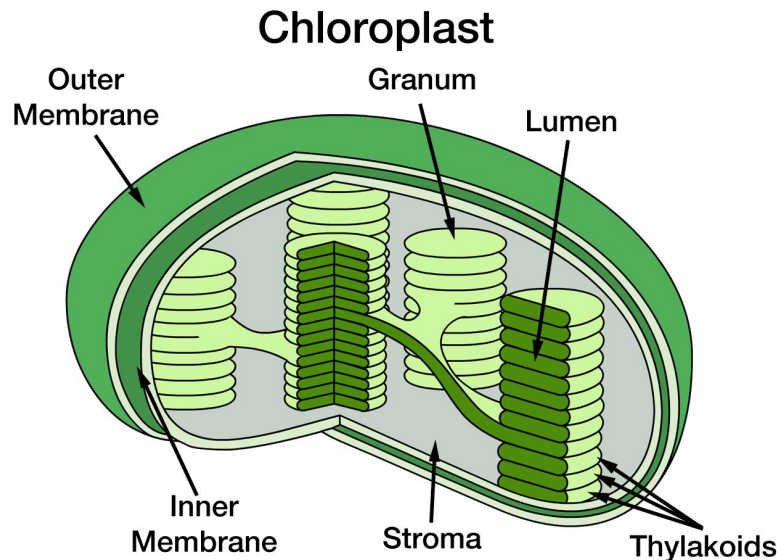
### Functions of Mitochondria

- Mitochondria synthesize energy rich compounds such as ATP.
- Mitochondria provide important intermediates for the synthesis of several biochemicals like chlorophyll, cytochromes, steroids, aminoacids etc.

## PLASTIDS

Plastids are disc or oval shaped organelles which occur in plant cells only. Plastids are of three types. They are Leucoplasts, Chromoplasts and Chloroplasts.

- Leucoplasts:** These are colourless plastids which store food in the form of starch, lipids and proteins
- Chromoplasts:** These are yellow or reddish in colour due to the presence of pigments other than chlorophyll. Chromoplasts provide colour to many flowers and fruits.
- Chloroplasts:** These are green coloured plastids which possess the photosynthetic pigment chlorophyll.



Each chloroplast consists of a double membraned envelope and a matrix. The inner membrane is arranged along the length of the plastids as lamellae. At certain regions, the lamellae are thickened and appear like pile of coins. These are called the grana. Each granum consists of disc shaped membranous sacs called thylakoids. Inside these grana, the chlorophyll is located. The non-thylakoid portion of the matrix is called stroma. It contains a number of enzymes involved in photosynthesis.

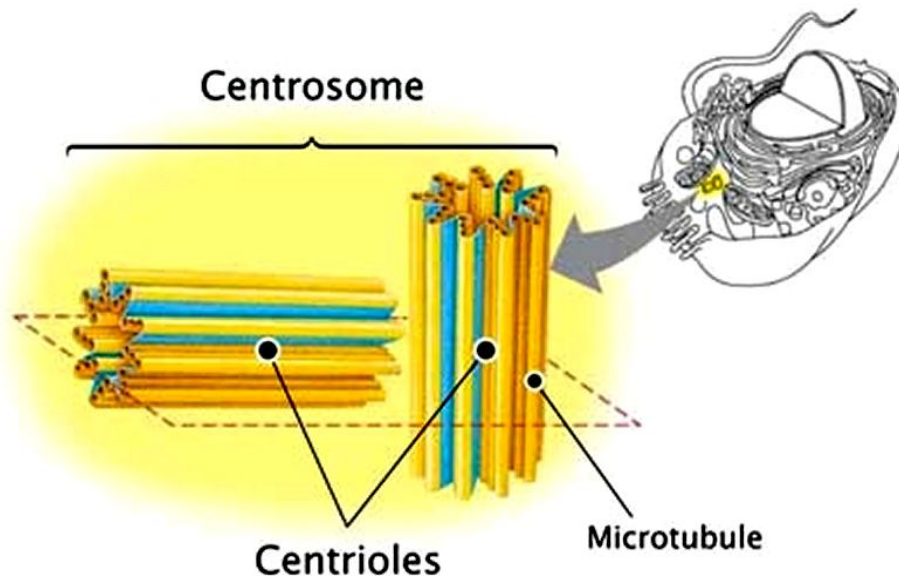
**Functions of Plastids:** Leucoplasts are responsible for storing food; such as carbohydrates, protein and lipid. Chromoplasts impart various colours to the plant parts. A leaf of a plant is green in colour because of chloroplast. Chloroplast is the site of photosynthesis.

## CENTROSOME

Centrosome is present in animal cells and in certain lower plants. It is absent in prokaryotic cells and in higher plant cells. It is located near one pole of the nucleus. It contains a pair of small, hollow granules called centrioles.

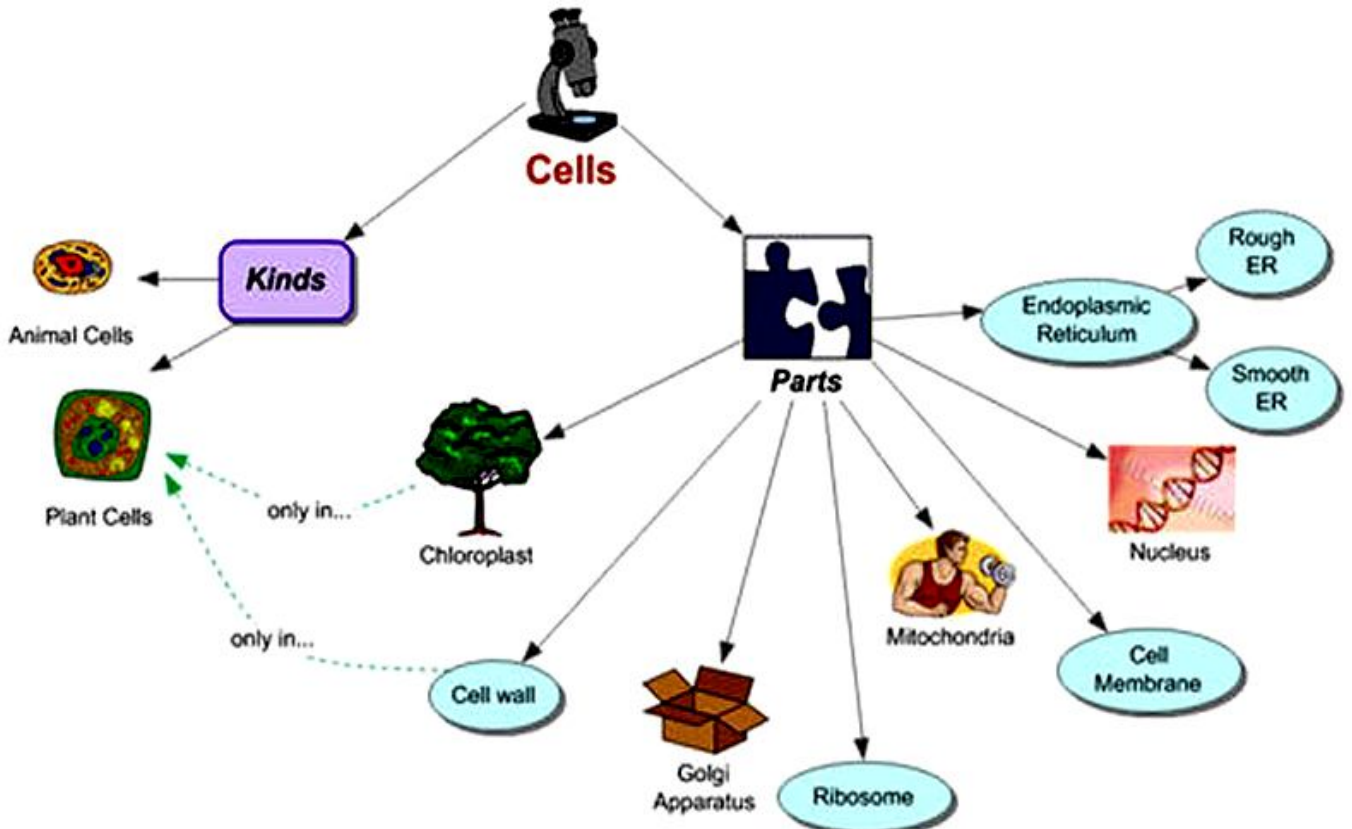
## Functions of Centrioles

Centrioles play an important role in the formation of spindle fibres during cell division.



## SUMMARY

## STRUCTURE OF CELL

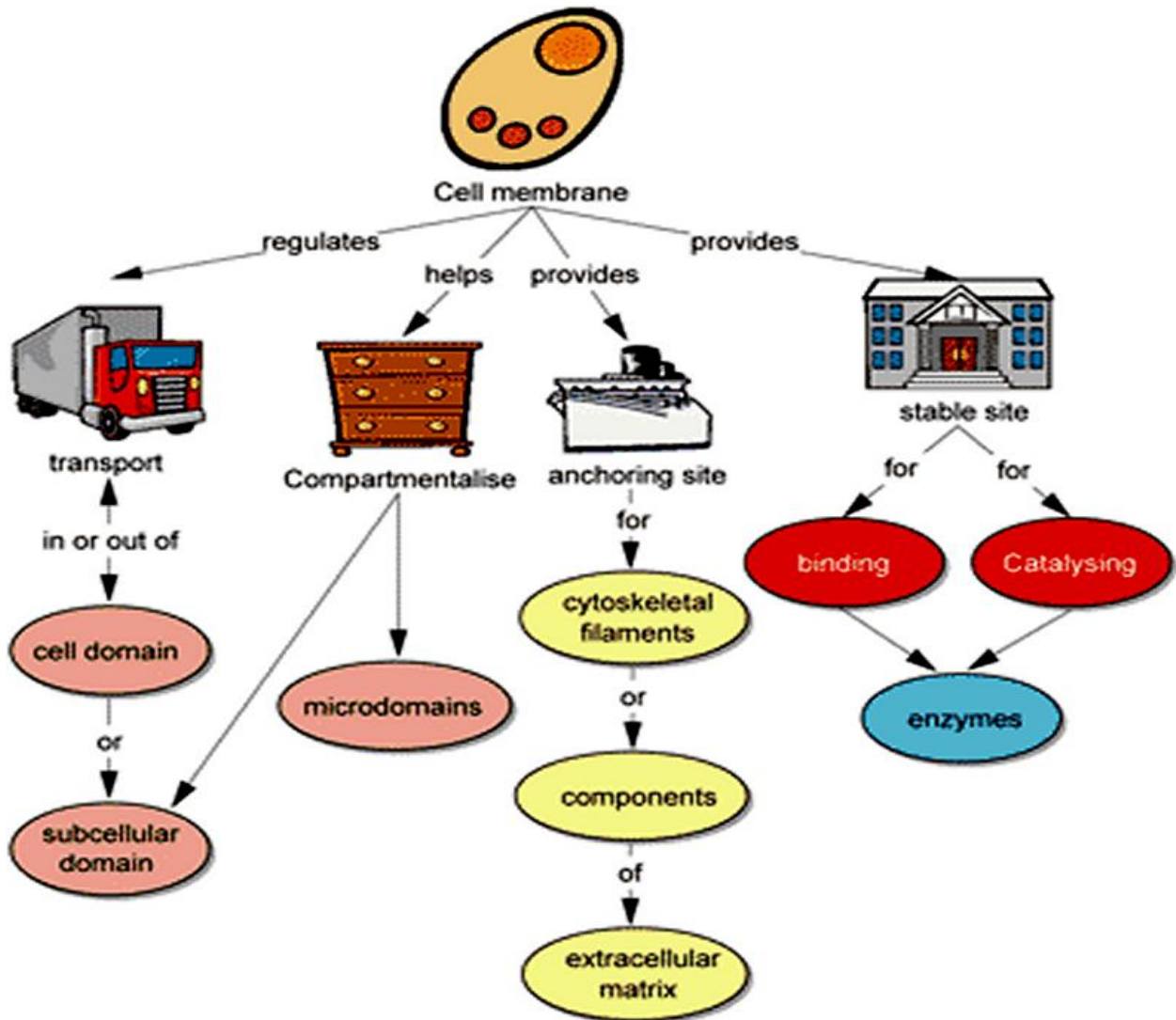


## HISTORY OF DISCOVERY OF CELLS

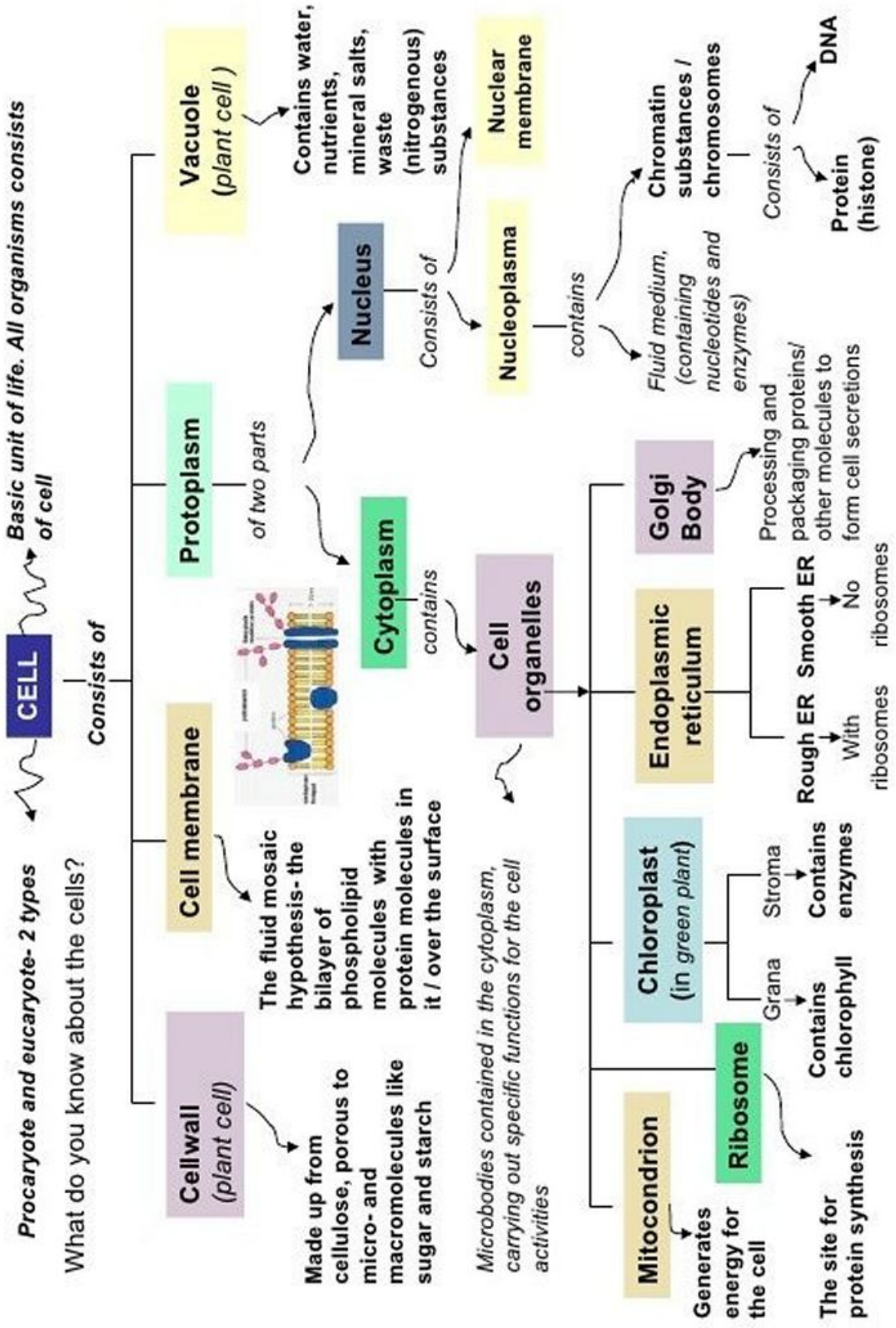
- Robert Hooke was the first to discover cell (1665).
- Leeuwenhoek was the first to discover free living cells in pond water (1674).
- Robert Brown discovered the nucleus (1831).

- Purkinje coined the term 'protoplasm (1839).
- Schleiden (1838) and Schwann (1839) proposed the Cell Theory. Virchow (1855) made further addition to the cell theory.
- The discovery of electron microscope (1940) made it possible to study the structures of cell organelles.

## **FUNCTION OF CELL MEMBRANE**



# CELL CONCEPT MAP



## INTEXT QUESTIONS PAGE NO. 63

**Q1. Can you name the two organelles we have studied that contain their own genetic material?**

**Answer:** Mitochondria and plastids are the two organelles that contain their own genetic material. Both these organelles have their own DNA and ribosomes.

**Q2. If the organisation of a cell is destroyed due to some physical or chemical influence, what will happen?**

**Answer:** Cell is the smallest unit of life, which is capable of all living functions. If the organisation of a cell is destroyed due to some physical or chemical influence, then the ability of the cell to perform all living functions such as respiration, nutrition, excretion, etc. would be affected.

**Q3. Why are lysosomes known as suicide bags?**

**Answer:** Lysosomes are membrane-bound vesicular structures that contain powerful digestive enzymes. These enzymes are capable of breaking down any foreign food particle or microbes entering the cell. Sometimes, lysosomes can cause self-destruction of a cell by releasing these digestive enzymes within the cells. Hence, they are also known as 'suicidal bags'.

**Q4. Where are proteins synthesized inside the cell?**

**Answer:** Ribosomes are the site for protein synthesis. Ribosomes are very small structures found either in a free state, suspended in the cytoplasm, or attached to the surface of the endoplasmic reticulum. They are composed of ribonucleic acids and proteins.

## EXERCISE QUESTIONS PAGE NO. 66 and 67

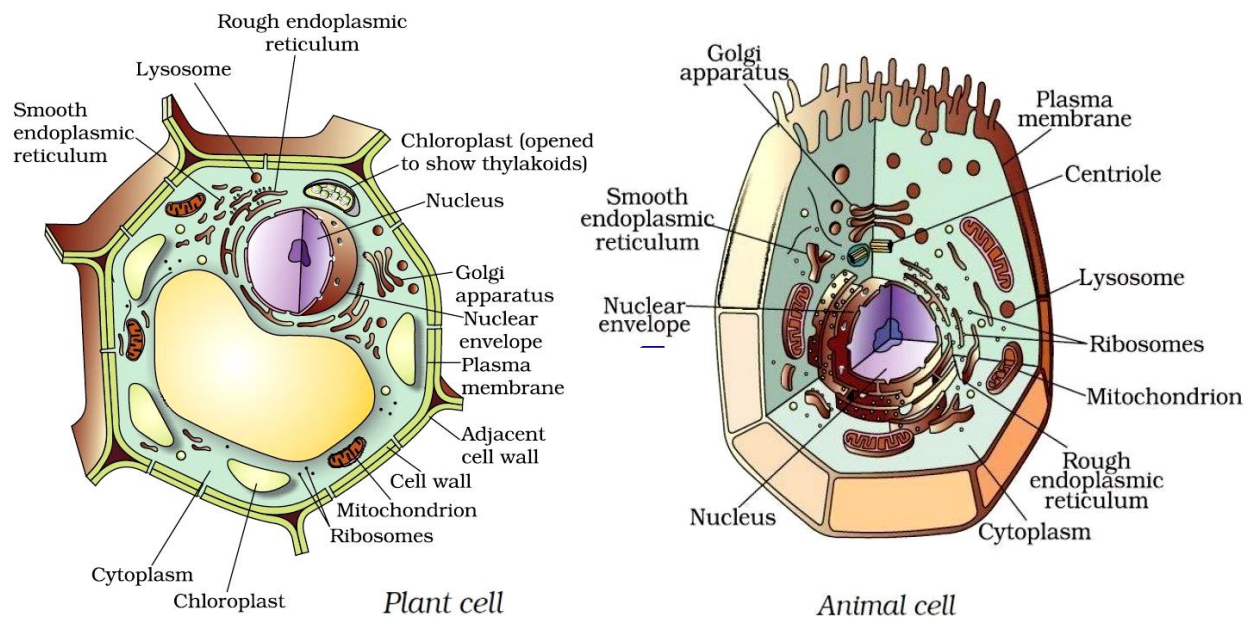
**Q1. Make a comparison and write down ways in which plant cells are different from animal cells.**

**Answer:**

### Differences between Plant cell and Animal cell

S.No.	Plant cell	Animal cell
1.	Plant cell has an outer rigid cell wall which is made up of cellulose.	Animal cell lacks a cell wall.
2.	Plant cell is larger than animal cell.	Animal cell is comparatively smaller in size.
3.	Plant cell has large vacuoles which occupy more space in the cell.	Animal cell usually lacks vacuoles. Even if they are present, they occur in minute sizes.
4.	Centrosome is present only in the cells of some lower plants.	All the animal cells have centrosomes.
5.	Lysosomes are found only in the eukaryotic plant cells.	Lysosomes are found in all animal cells.
6.	Plant cell contains plastids.	Plastids are absent
7.	Mostly, starch is the storage material.	Glycogen is the storage material.





**Q2. How is a prokaryotic cell different from a eukaryotic cell?**

**Answer:**

Differences between Prokaryotic cell and Eukaryotic cell

Prokaryotic Cell		Eukaryotic Cell	
1.	It is generally smaller (1-10 micro metre) in size	1.	It is comparatively larger (5-100 micro metre) in size.
2.	It lacks a well organised nucleus as its nuclear material is not surrounded by a nuclear membrane.	2.	It contains a well organized nucleus as its nuclear material is surrounded by a nuclear membrane.
3.	It has a single chromosome	3.	It has more than one chromosome.
4.	Nucleolus is absent	4.	Nucleolus is present
5.	It lacks membrane bound cell organelles.	5.	It possess membrane bound cell organelles.
6.	Cell division occurs by fission or budding. Mitotic and meiotic divisions are absent	6.	Cell division takes place by mitosis and meiosis.
7.	Ribosomes are smaller	7.	Ribosomes are larger

**Q3. What would happen if the plasma membrane ruptures or breaks down?**

**Answer:** If the plasma membrane of a cell is ruptured, then the cell will die. The plasma membrane regulates the movement of substances in and out of the cell by diffusion or osmosis. Thus, if the plasma membrane is ruptured, then the cell might leak out its contents.

**Q4. What would happen to the life of a cell if there was no Golgi apparatus?**

**Answer:** If there was no Golgi apparatus in the cell, then most activities performed by the Golgi apparatus will not take place.

(i) Membranes of the Golgi apparatus are often connected to ER membranes. It collects simpler molecules and combines them to make more complex molecules. These are then packaged in small vesicles and are either stored in the cell or sent out as per the requirement.

Thus, if the Golgi apparatus is absent in the cell, then the above process of storage, modification, and packaging of products will not be possible.

(ii) The formation of complex sugars from simple sugars will not be possible as this takes place with the help of enzymes present in Golgi bodies.

(iii) The Golgi apparatus is involved in the formation of lysosomes or peroxisomes. Thus, if the Golgi body is absent in a cell, the synthesis of lysosomes or peroxisomes will not be possible in the cell.

**Q5. Which organelle is known as the powerhouse of the cell? Why?**

**Answer:** Mitochondria are known as the powerhouse of cells. Mitochondria create energy for the cell, and this process of creating energy for the cell is known as cellular respiration. Most chemical reactions involved in cellular respiration occur in the mitochondria. The energy required for various chemical activities needed for life is released by the mitochondria in the form of ATP (Adenosine triphosphate) molecules. For this reason, mitochondria are known as the powerhouse of cells.

**Q6. Where do the lipids and proteins constituting the cell membrane get synthesised?**

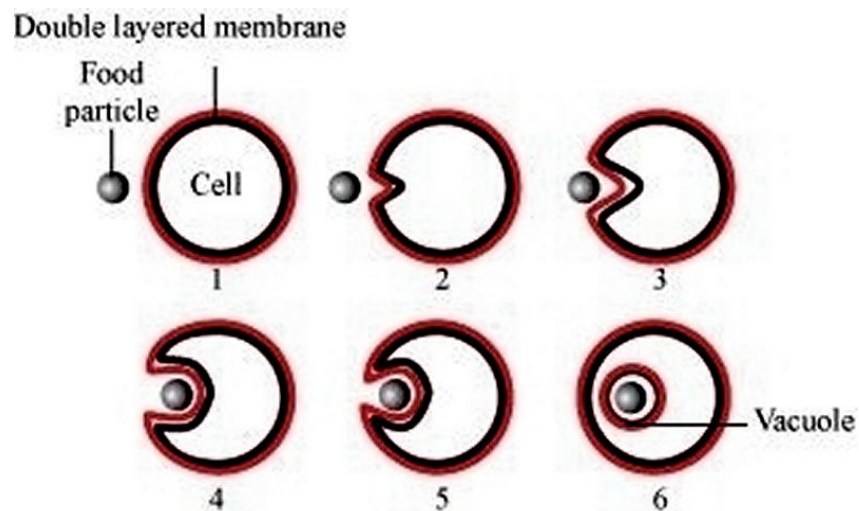
**Answer:** Lipids and proteins constituting the cell membrane are synthesized in the endoplasmic reticulum.

SER (Smooth endoplasmic reticulum) helps in the manufacturing of lipids.

RER (Rough endoplasmic reticulum) has particles attached to its surface, called ribosomes. These ribosomes are the site for protein synthesis.

**Q7. How does an *Amoeba* obtain its food?**

**Answer:** Amoeba obtains its food through the process of endocytosis. The flexibility of the cell membrane enables the cell to engulf the solid particles of food and other materials from its external environment.

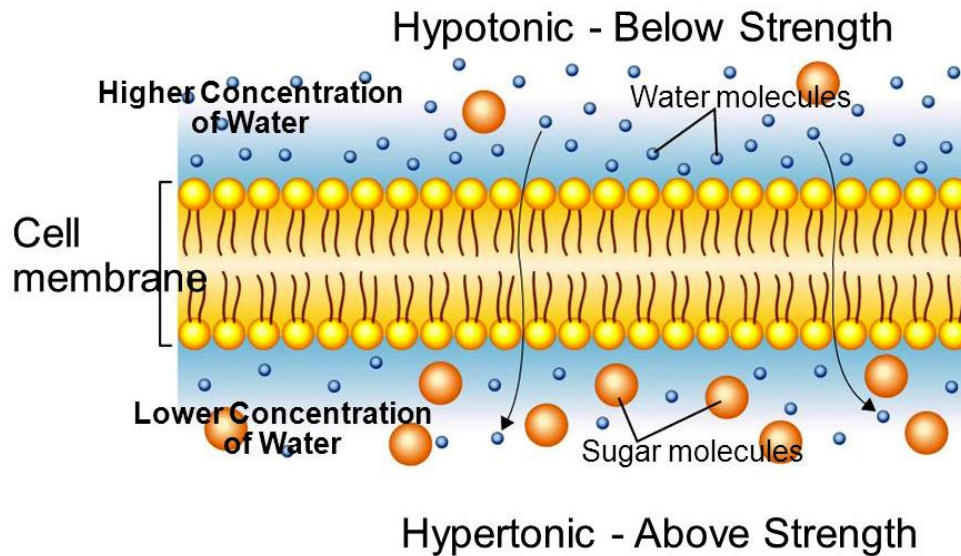


**Cell engulfing food particle**

**Q8. What is osmosis?**

**Answer:** The movement of water molecules from a region of high concentration to a region of low concentration through a selectively permeable membrane is called osmosis. It is a special case of diffusion, where the medium is water.

For example, if the medium surrounding the cell has a higher water concentration than the cell i.e., if the solution is a dilute solution, then the cell will gain water by osmosis.



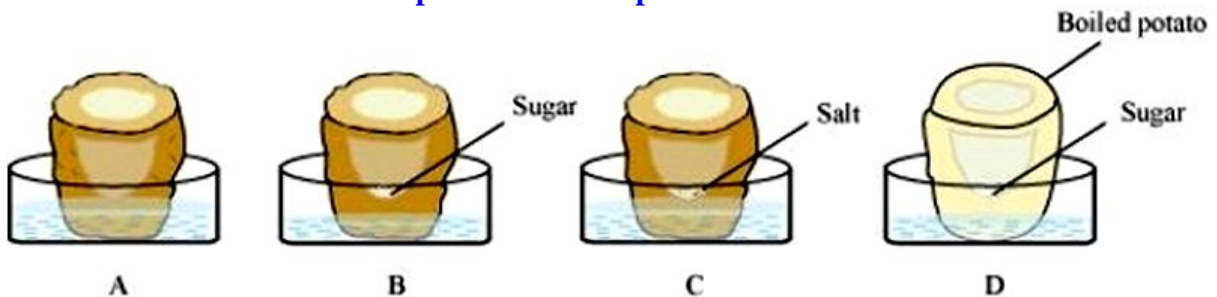
**Q9. Carry out the following osmosis experiment: Take four peeled potato halves and scoops each one out to make potato cups. One of these potato cups should be made from a boiled potato. Put each potato cup in a trough containing water. Now,**

- (a) Keep cup A empty
- (b) Put one teaspoon sugar in cup B
- (c) Put one teaspoon salt in cup C
- (d) Put one teaspoon sugar in the boiled potato cup D.

**Keep these for two hours. Then observe the four potato cups and answer the following:**

- (i) Explain why water gathers in the hollowed portion of B and C.
- (ii) Why is potato A necessary for this experiment?
- (iii) Explain why water does not gather in the hollowed out portions of A and D.

**Answer:** Experimental set up



- (i) Water gathers in the hollowed portions of set-up B and C because water enters the potato as a result of osmosis. Since the medium surrounding the cell has a higher water concentration than the cell, the water moves inside by osmosis. Hence, water gathers in the hollowed portions of the potato cup.
- (ii) Potato A in the experiment acts as a control set-up. No water gathers in the hollowed portions of potato A.
- (iii) Water does not gather in the hollowed portions of potato A because potato cup A is empty. It is a control set-up in the experiment.

Water is not able to enter potato D because the potato used here is boiled. Boiling denatures the proteins present in the cell membrane and thus, disrupts the cell membrane. For osmosis, a semi-permeable membrane is required, which is disrupted in this case. Therefore, osmosis will not occur. Hence, water does not enter the boiled potato cup.

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**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 5**  
**THE FUNDAMENTAL UNIT OF LIFE**

1. Define Cell
2. What will happen to a cell if its nucleus is removed?
3. Who proposed the Cell theory ?
4. What is Nucleoid ?
5. Fill in the blanks:-
  - (a) New cells are formed from \_\_\_\_\_.
  - (b) Movement of water molecules from their higher concentration to their lower concentration through a semi-permeable membrane is called \_\_\_\_\_.
  - (c) The functional components of cell are \_\_\_\_\_, \_\_\_\_\_ & \_\_\_\_\_.
  - (d) Protoplasm has two parts- \_\_\_\_\_ & \_\_\_\_\_.
  - (e) Nucleus, mitochondria & plastids have their own \_\_\_\_\_ & \_\_\_\_\_.
  - (f) The shrinkage or contraction of the contents of the cell away from the cell wall is known as \_\_\_\_\_.
  - (g) The process by which Amoeba can engulf a food particle is \_\_\_\_\_.
  - (h) \_\_\_\_\_ is the manufacture of lipids required for making cell membrane.
  - (i) A cell that lacks nuclear membrane is called a prokaryotic cell & the nuclear region is called \_\_\_\_\_.
  - (j) Movement of materials in & out of the cell takes place by \_\_\_\_\_ & \_\_\_\_\_.
6. Identify and name the following cell structures:
  - a) The undefined nuclear region of Prokaryotic cell.
  - b) Site of energy release inside the cell.
7. Name the kind of plastid which is important for photosynthesis in leaves of the plants.
8. Name the two components of chromosomes.
9. When does the chromatin network separate out to form chromosomes?
10. Name the cell organelle that detoxifies poisons and drugs.
11. Name the cell organelle that is associated with protein synthesis.
12. Name a cell which changes its shape.
13. Name the functional unit of DNA that carries genetic informations.
14. Expand the word DNA.
15. State the primary functions of plasma membrane.



- 31.** Double membrane is absent in -  
(a) Mitochondrion (b) Chloroplast  
(c) Nucleus (d) Lysosome
- 32.** Cell organelle found only in Plant is -  
(a) Golgi apparatus (b) Mitochondria  
(c) Plastids (d) Ribosomes
- 33.** Organisms lacking nucleus and membrane bound organelle are -  
(a) Diploids (b) Prokaryotes  
(c) Haploids (d) Eukaryotes
- 34.** Animal cell is limited by -  
(a) Plasma membrane (b) Shell membrane  
(c) Cell wall (d) Basement membrane
- 35.** The network of Endoplasmic Reticulum is present in the -  
(a) Nucleus (b) Nucleolus  
(c) Cytoplasm (d) Chromosomes
- 36.** Lysosome are reservoirs of -  
(a) Fat (b) RNA  
(c) Secretary Glycoprotein (d) Hydrolytic Enzymes
- 37.** The membrane surrounding the vacuole of a plant cell is called -  
(a) Tonoplast (b) Plasma membrane  
(c) Nuclear membrane (d) Cell wall
- 38.** Cell secretion is done by -  
(a) Plastids (b) ER  
(c) Golgi apparatus (d) Nucleolus
- 39.** Centrioles are associated with -  
(a) DNA synthesis (b) Reproduction  
(c) Spindle formation (d) Respiration
- 40.** Main difference between animal cell and plant cell is -  
(a) Chromosome (b) Ribosome  
(c) Lysosome (d) Endoplasmic Reticulum
- 41.** Animal cell lacking nuclei would also lack in -  
(a) Chromosome (b) Ribosome  
(c) Lysosome (d) Endoplasmic Reticulum
- 42.** Plasmolysis occurs due to -  
(a) Absorption (b) Endosmosis

(c)Osmosis (d)Exosmosis

**43.** A plant cell becomes turgid due to -

- (a) Plasmolysis (b) Exosmosis  
(c) Endosmosis (d) Electrolysis

**44.** Solute concentration is higher in the external solution -

- (a) Hypotonic (b) Isotonic  
(c) Hypertonic (d) None of the above

**45.** A cell placed in hypertonic solution will -

- (a) Shrink (b) Show Plasmolysis  
(c) Swell up (d) No change in shape or size

**46.** The radiant energy of sunlight is converted to chemical energy and is stored as -

- (a) AMP (b) ADP  
(c)ATP (d) APP

**47.** Which of the following organelle does not have membrane?

- (a) Ribosome (b) Nucleus  
(c) Chloroplast (d) Mitochondria

**48.** Root hair absorbs water from soil through -

- (a) Osmosis (b) Active transport  
(c) Diffusion (d) Endocytosis

**49.** The number of lenses in compound light microscope is -

- (a) 2 (b)3 (c) 4 (d)1

**50.** The history of the cell began in 1665 with the publication of Micrographia in London by -

- (a) Robert Hooke (b) Robert Brown  
(c) Strasburger (d)Dujardin

**51.** Cell inclusions are -

- (a) Non-living materials present in the cytoplasm  
(b) Another name of cell organelle  
(c) Cytoskeletal framework of cell  
(d) Combined name for cell wall and plasma membrane

**52.** Which cell organelle is not bounded by a membrane -

- (a) Ribosome (b) Lysosome  
(c)ER (d)Nucleus

**53.** Which of the following cellular part possess a double membrane?

- (a) Nucleus (b) Chloroplast  
(c)Mitochondrion (d)All of the above

- 54.** Cristae and Oxysomes are associated with -
- (a) Mitochondria (b) Plastids  
(c) Golgi apparatus (d) Plasma membrane
- 55.** Karyotheca is another name of -
- (a) Nuclear envelope (b) Nucleus  
(c) Nuclear pores (d) Nucleolus
- 56.** Cell organelle that acts as supporting skeletal framework of the cell is -
- (a) Golgi apparatus (b) Nucleus  
(c) Mitochondria (d) ER
- 57.** Plastids are present in -
- (a) Animal cell only  
(b) Plant cells only  
(c) Both animal cells and Plant cells  
(d) Neither animal nor plant cell
- 58.** Cell wall of plant is chiefly composed of -
- (a) Hemicellulose (b) Cellulose  
(c) Phospholipids (d) Proteins
- 59.** Intercellular connections of plant cells are called -
- (a) Middle lamella (b) Micro fibrils  
(c) Matrix (d) Plasmodesmata
- 60.** Genes are located on the -
- (a) Chromosomes (b) Nucleolus  
(c) Nuclear membrane (d) Plasma membrane
- 61.** Chromatin consists of -
- (a) RNA (b) DNA  
(c) RNA and histones (proteins) (d) DNA and histones (proteins)
- 62.** Different types of chromosomes can be recognized by the positions of the following separating the two arms -
- (a) Centromere (b) Genes  
(c) Spindle (d) Nucleus
- 63.** Name of the process that requires energy provided by ATP -
- (a) Diffusion (b) Osmosis  
(c) Active transport (d) Plasmolysis
- 64.** What is the advantage of multicellularity over unicellularity?
- 65.** What are the chromosomes made up of?



66. A cell placed in a solution swells up. What kind of solution is it? Why does it happen?
67. Why are lysosomes known as “suicidal bags”?
68. Why is the nucleus so significant in a cell?
69. Differentiate between plant and animal cells.
70. Give the major functions of the following cell organelles-
71. Why is the cell known the 'fundamental and structural unit of life ' ?
72. What is a semi permeable membrane? what are the differences between semi permeable membrane and selectively permeable membrane?
73. Which cell in the human body does not have the mitochondria?
74. What are plastids? Write their functions?
75. Which structure of animal cells forms the asters of spindle ?
76. Name two semi- autonomous organelles?
77. Which cell organelle is rich in acid hydrolases?
78. Which cell organelles are called ribonucleoprotine particle?
79. Differentiate between SER and RER
80. What is the difference between eukaryotes and prokaryotes?
81. What is the difference between osmosis and diffusion.
82. Where are peroxisomes found ?
83. What are the chemical reactions take place in cytoplasm, nucleoplasm, and in mitochondria?
84. What is Diffusion?
85. What is dictyosomes ?
86. What would happen if an animal cell is kept in distilled water for 24 hours.
87. Give 5 examples of single celled organisms.
88. What are multicellular organisms ? Give an example.
89. Which cell organelle is commonly referred as the suicidal bags of the cell.
90. Name the process through which an amoeba acquires its food from the external surroundings.
91. State the functions of chromosome in a cell.
92. What is Biogenesis?
93. Who discovered Golgi Apparatus?
94. Name the cell organelle which is involved in the formation of lysosomes.
95. What is Endosmosis?



**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 5**  
**THE FUNDAMENTAL UNIT OF LIFE**

1. Who expanded cell theory by suggesting that all cells arise from pre-existing cells?
2. In which year electron microscope was invented?
3. Name the book in which Robert Hooke published his observations about cork cells.
4. Who discovered nucleus in the cell?
5. Name the two postulates of the cell theory.
6. Who coined the term 'protoplasm'?
7. Name the largest cell?
8. Name the world's smallest cell.
9. Name the smallest cell in human body.
10. Name the biggest cell in human body.
11. Name the longest cell in human body.
12. Name the cell in human body which cannot reproduce.
13. Give an example of anucleate cell i.e. cell without nucleus.
14. Give an example of cells containing two nuclei (Binucleate).
15. Give examples of cells which are multi-nucleate (i.e. having many nuclei).
16. What is the plasma membrane composed of?
17. Who proposed fluid-mosaic model of cell or plasma membrane?
18. Is plasma membrane permeable or selectively permeable?
19. What are different types transport of components across cell membrane?
20. Define Passive Transport.
21. What is diffusion?
22. Define Osmosis. What are different types of osmosis? Give examples of osmosis.
23. What is plasmolysis?
24. What would happen if the plasma membrane ruptures or breaks down?
25. What do you mean by Endocytosis? How does an Amoeba obtain its food?
26. Define Exocytosis.
27. Why are lysosomes known as suicide bags?
28. What happens to a cell (plant cell or animal cell) when placed in the following solutions:
  - (a) Hypotonic solution
  - (b) Isotonic solution
  - (c) Hypertonic solution

- 29.** Place a de-shelled egg in water for five minutes. What do you observe? (Note: De-shelled egg means, the shell of an egg is removed by dissolving it in dilute hydrochloric acid. The shell is mostly calcium carbonate. A thin outer skin now encloses the egg.)
- What will happen if a de-shelled egg in a concentrated salt solution for 5 minutes?
- 30.** Put dried raisins in plain water and leave them for some time. Then place them in concentrated solution of sugar or salt. What do you observe in both cases?
- 31.** Viruses are
- (a) Uni cellular micro-organisms
  - (b) Bi-Cellular micro-organisms
  - (c) Multi-cellular micro-organisms
  - (d) Non-cellular micro-organisms
- 32.** Who is known as Father of Biology?
- 33.** Who discovered Golgi apparatus?
- 34.** Which cell organelle is known as "protein factory"?
- 35.** What is the energy currency of the cell called?
- 36.** When chromosomes are visible in the nucleus?
- 37.** Which of the following is NOT involved in the synthesis of proteins?
- (a) rough ER
  - (b) smooth ER
  - (c) Golgi body
  - (d) ribosomes
- 38.** Are plastids present in all cells? What are its types?
- 39.** Name the sac like structure which form the grana?
- 40.** What are the conditions for osmosis?
- 41.** Will the temperature have any effect on the process of the osmosis?
- 42.** What is osmoregulation?
- 43.** Which organ of the plant body helps in osmoregulation?
- 44.** Which organelle of the cell in animals helps in osmoregulation?
- 45.** What are centrosomes? What functions do they perform?
- 46.** Who is known as 'Father of Microscopy'?
- 47.** Are Viruses Prokaryotic or Eukaryotic?
- 48.** Which of the following often distinguishes plant cells from animal cells?
- (a) centrioles
  - (b) nucleus
  - (c) chromatin

(d) rough ER

49. Which cell organelle is called "kitchen of plant"?
50. Which cell organelle is called 'control center'?
51. Which cell organelle is called 'transport system'?
52. What is Endoplasmic Reticulum(ER)? Name its types?
53. What are the functions of Endoplasmic Reticulum (ER)?
54. What are the components nucleus?
55. What is the function of nucleoplasm?
56. How chromatic network is related to chromosomes?
57. What are chromosomes?
58. What is the full form of DNA and RNA?
59. Who discovered Virus?
60. What are the function of nucleus?
61. Why can't single cells grow very large? Or Big organisms like human beings are multi-cellular? Why can't such big organisms be a single large cell?
62. Why do vegetable vendors (subzi-walla) regularly sprinkle water on the vegetables in their baskets?
63. Why do we stain cells while observing under microscope? List commonly used stains.
64. Are there any exceptions to cell theory proposed by Schleiden & Schwann and Virchow? If yes, what are those?
65. What is the thickness of cell membrane?
66. Why is mitochondria absent in red blood cells?
67. Name the cell organelles which their own DNA and Ribosomes.
68. What is cytoskeleton?
69. Name the cell organelles involved in synthesis, packaging and movement of protein (or other macromolecules) inside a cell.
70. Which of the following is an example of a single cell that does not function as a full fledged organism?
  - (a) White blood cells (WBC)
  - (b) Amoeba
  - (c) WBC and Amoeba
  - (d) Paramecium



**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 5**  
**THE FUNDAMENTAL UNIT OF LIFE**

1. Which of the following can be made into crystal?
  - (a) A Bacterium
  - (b) An Amoeba
  - (c) A Virus
  - (d) A Sperm
2. A cell will swell up if
  - (a) The concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium
  - (b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell
  - (c) The concentration of water molecules is same in the cell and in the surrounding medium
  - (d) Concentration of water molecules does not matter
3. Chromosomes are made up of
  - (a) DNA
  - (b) protein
  - (c) DNA and protein
  - (d) RNA
4. Which of these options are not a function of Ribosomes?
  - (i) It helps in manufacture of protein molecules
  - (ii) It helps in manufacture of enzymes
  - (iii) It helps in manufacture of hormones
  - (iv) It helps in manufacture of starch molecules
  - (a) (i) and (ii)
  - (b) (ii) and (iii)
  - (c) (iii) and (iv)
  - (d) (iv) and (i)
5. Which of these is not related to endoplasmic reticulum?
  - (a) It behaves as transport channel for proteins between nucleus and cytoplasm
  - (b) It transports materials between various regions in cytoplasm
  - (c) It can be the site of energy generation
  - (d) It can be the site for some biochemical activities of the cell

6. Following are a few definitions of osmosis. Read carefully and select the correct definition
- (a) Movement of water molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane
  - (b) Movement of solvent molecules from its higher concentration to lower concentration
  - (c) Movement of solvent molecules from higher concentration to lower concentration of solution through a permeable membrane
  - (d) Movement of solute molecules from lower concentration to higher concentration of solution through a semipermeable membrane
7. Plasmolysis in a plant cell is defined as
- (a) break down (lysis ) of plasma membrane in hypotonic medium
  - (b) shrinkage of cytoplasm in hypertonic medium
  - (c) shrinkage of nucleoplasm
  - (d) none of them
8. Which of the following are covered by a single membrane?
- (a) Mitochondria
  - (b) Vacuole
  - (c) Lysosome
  - (d) Plastid
9. Find out the false sentences
- (a) Golgi apparatus is involved with the formation of lysosomes
  - (b) Nucleus, mitochondria and plastid have DNA; hence they are able to make their own structural proteins
  - (c) Mitochondria is said to be the power house of the cell as ATP is generated in them.
  - (d) Cytoplasm is called as protoplasm
10. Find out the correct sentence
- (a) Enzymes packed in Lysosomes are made through RER (rough endoplasmic reticulum)
  - (b) Rough endoplasmic reticulum and smooth endoplasmic reticulum produce lipid and protein respectively
  - (c) Endoplasmic reticulum is related with the destruction of plasma membrane
  - (d) Nucleoid is present inside the nucleoplasm of eukaryotic nucleus
11. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
- (a) Golgi apparatus
  - (b) Lysosomes
  - (c) Smooth endoplasmic reticulum
  - (d) Vacuoles

12. The proteins and lipids, essential for building the cell membrane, are manufactured by
- (a) rough endoplasmic reticulum
  - (b) golgi apparatus
  - (c) plasma membrane
  - (d) mitochondria
13. The undefined nuclear region of prokaryotes are also known as
- (a) nucleus
  - (b) nucleolus
  - (c) nucleic acid
  - (d) nucleoid
14. The cell organelle involved in forming complex sugars from simple sugars are
- (a) endoplasmic reticulum
  - (b) ribosomes
  - (c) plastids
  - (d) golgi apparatus
15. Which out of the following is not a function of vacuole?
- (a) Storage
  - (b) Providing turgidity and rigidity to the cell
  - (c) Waste excretion
  - (d) Locomotion
16. Amoeba acquires its food through a process, termed
- (a) exocytosis
  - (b) endocytosis
  - (c) plasmolysis
  - (d) exocytosis and endocytosis both
17. Cell wall of which one of these is not made up of cellulose?
- (a) Bacteria
  - (b) *Hydrilla*
  - (c) Mango tree
  - (d) Cactus
18. Silver nitrate solution is used to study
- (a) endoplasmic reticulum
  - (b) golgi apparatus
  - (c) nucleus
  - (d) mitochondria

**19.** Organelle other than nucleus, containing DNA is

- (a) endoplasmic reticulum
- (b) golgi apparatus
- (c) mitochondria
- (d) lysosome

**20.** Kitchen of the cell is

- (a) mitochondria
- (b) endoplasmic reticulum
- (c) chloroplast
- (d) golgi apparatus

**21.** Lipid molecules in the cell are synthesized by

- (a) smooth endoplasmic reticulum
- (b) rough endoplasmic reticulum
- (c) golgi apparatus
- (d) plastids

**22.** Cell arises from pre-existing cell was stated by

- (a) Haeckel
- (b) Virchow
- (c) Hooke
- (d) Schleiden

**23.** Cell theory was given by

- (a) Schleiden and Schwann
- (b) Virchow
- (c) Hooke
- (d) Haeckel

**24.** The only cell organelle seen in prokaryotic cell is

- (a) mitochondria
- (b) ribosomes
- (c) plastids
- (d) lysosomes

**25.** Organelle without a cell membrane is

- (a) ribosome
- (b) golgi apparatus
- (c) chloroplast
- (d) nucleus



**26.** 1  $\mu\text{m}$  is

- (a)  $10^{-6}$  m
- (b)  $10^{-9}$  m
- (c)  $10^{-10}$  m
- (d)  $10^{-3}$  m

**27.** Lysosome arises from

- (a) endoplasmic reticulum
- (b) golgi apparatus
- (c) nucleus
- (d) mitochondria

**28.** Living cells were discovered by

- (a) Robert Hooke
- (b) Purkinje
- (c) Leeuwenhoek
- (d) Robert Brown

**29.** Select the odd one out

- (a) The movement of water across a semi permeable membrane is affected by the amount of substances dissolved in it.
- (b) Membranes are made of organic molecules like proteins and lipids
- (c) Molecules soluble in organic solvents can easily pass through the membrane.
- (d) Plasma membranes contain chitin sugar in plants

**30.** Why are lysosomes known as ‘suicide-bags’ of a cell?

**31.** Do you agree that “A cell is a building unit of an organism”. If yes, explain why?

**32.** Why does the skin of your finger shrink when you wash clothes for a long time?

**33.** Why is endocytosis found in animals only?

**34.** A person takes concentrated solution of salt, after sometime, he starts vomiting. What is the phenomenon responsible for such situation? Explain.

**35.** Name any cell organelle which is non membranous.

**36.** We eat food composed of all the nutrients like carbohydrates, proteins, fats, vitamins, minerals and water. After digestion, these are absorbed in the form of glucose, aminoacids, fatty acids, glycerol etc. What mechanisms are involved in absorption of digested food and water?

**37.** If you are provided with some vegetables to cook. You generally add salt into the vegetables during cooking process. After adding salt, vegetables release water. What mechanism is responsible for this?

**38.** If cells of onion peel and RBC are separately kept in hypotonic solution, what among the following will take place? Explain the reason for your answer.

- (a) Both the cells will swell.
- (b) RBC will burst easily while cells of onion peel will resist the bursting to some extent.
- (c) a and b both are correct.
- (d) RBC and onion peel cells will behave similarly.

**39.** Bacteria do not have chloroplast but some bacteria are photoautotrophic in nature and perform photosynthesis. Which part of bacterial cell performs this?

**40.** Match the following A and B

(A)	(B)
(a) Smooth endoplasmic reticulum	(i) <i>Amoeba</i>
(b) Lysosome	(ii) Nucleus
(c) Nucleoid	(iii) Bacteria
(d) Food vacuoles	(iv) Detoxification
(e) Chromatin material and nucleolus	(v) Suicidal bag

**41.** Write the name of different plant parts in which chromoplast, chloroplast and leucoplast are present.

**42.** Name the organelles which show the analogy written as under

- (a) Transporting channels of the cell——
- (b) Power house of the cell——
- (c) Packaging and dispatching unit of the cell——
- (d) Digestive bag of the cell——
- (e) Storage sacs of the cell——
- (f) Kitchen of the cell——
- (g) Control room of the cell——

**43.** How is a bacterial cell different from an onion peel cell?

**44.** How do substances like carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) move in and out of the cell?

**45.** How does amoeba obtain its food?

**46.** Name the two organelles in a plant cell that contain their own genetic material and ribosomes.

**47.** Why are lysosomes also known as “scavengers of the cells”?

**48.** Which cell organelle controls most of the activities of the cell?

**49.** Why do plant cells possess large sized vacuole?

**50.** How are chromatin, chromatid and chromosomes related to each other?

- 51.** Which kind of plastid is more common in
- (a) roots of the plant
  - (b) leaves of the plant
  - (c) flowers and fruits
- 52.** What are the consequences of the following conditions?
- (a) A cell containing higher water concentration than the surrounding medium
  - (b) A cell having low water concentration than the surrounding medium.
  - (c) A cell having equal water concentration to its surrounding medium.
- 53.** Draw a plant cell and label the parts which
- (a) determines the function and development of the cell
  - (b) packages materials coming from the endoplasmic reticulum
  - (c) provides resistance to microbes to withstand hypotonic external media without bursting
  - (d) is site for many biochemical reactions necessary to sustain life.
  - (e) is a fluid contained inside the nucleus
- 54.** Illustrate only a plant cell as seen under electron microscope. How is it different from animal cell?
- 55.** Draw a neat labelled diagram of an animal cell.
- 56.** Draw a well labelled diagram of an eukaryotic nucleus. How is it different from nucleoid?
- 57.** Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?
- 58.** In brief state what happens when
- (a) dry apricots are left for sometime in pure water and later transferred to sugar solution?
  - (b) a Red Blood Cell is kept in concentrated saline solution?
  - (c) the Plasma-membrane of a cell breaks down?
  - (d) rheo leaves are boiled in water first and then a drop of sugar syrup is put on it?
  - (e) golgi apparatus is removed from the cell?
- 59.** Draw a neat diagram of plant cell and label any three parts which differentiate it from animal cell.
- 60.** Draw a neat diagram of animal cell and label any three parts which differentiate it from plant cell.
- .....

## CHAPTER – 6

# TISSUES

## TISSUES

The body of plants and animals is made up of different types of cells. These cells originate from a single cell by repeated divisions and get differentiated during development. In unicellular organisms all the body functions are performed by a single cell. But in multicellular organisms, different functions are performed by different groups of cells.

The groups of cells having a common origin and performing similar functions are called **tissues**. Several tissues are organized to form tissue system and the tissue systems form the organs and several organs into organism.



Study of tissues is called **Histology**

**Tissue and Division of Labour:** In complex organisms, different tasks are carried out by different organs and organ systems. Tissues are the first step towards division of labour in complex organisms.

## INTEXT QUESTIONS PAGE NO. 69

**Q1. What is a tissue?**

**Answer:** A group of cells that are similar in structure and/or work together to achieve a particular function is called tissue.

**Q2. What is the utility of tissues in multi-cellular organisms?**

**Answer:** In multicellular organisms, the body system is based on the division of labour. It means the cells performing a specific function are grouped together to form a particular tissue. The different tissues are organized in a way to provide highest efficiency in functioning of the body.

## PLANT TISSUES

Plant tissues are of two main types, viz. meristematic tissue and permanent tissue.

### MERISTEMATIC TISSUE

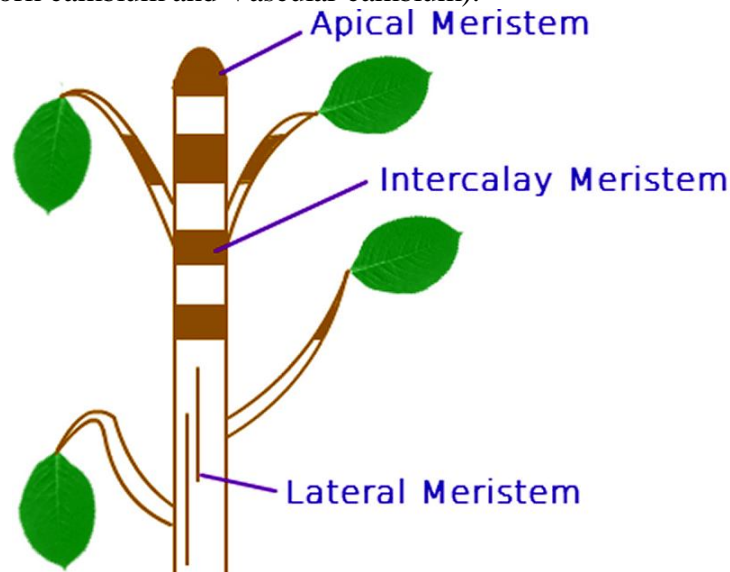
The growth of plants occurs only in certain specific regions. This is because the dividing tissue also known as meristematic tissue (Meristos – divisible) is located only at these points.

The meristematic tissues are made up of group of similar and immature cells, which can divide and form new cells. Meristematic cells divide continuously and thus help in increasing the length and thickness of the plant. Depending upon the position, meristematic tissues are of three types. They are as follows:

i) **Apical meristems:** Apical meristem is present at the growing tips of stems and roots and increases the length of the plant body. They are responsible for growth in length, i.e. primary growth.

ii) **Intercalary meristems:** These meristems occupy base of the leaves and the base of the internodal regions in plants such as grasses (mostly in monocotyledonous plants). These help in elongation of the internodes.

iii) **Lateral meristems:** This includes the meristematic tissues occupying the lateral regions of the stems and roots which bring about increase in the width of the plant body. (e.g. Cork cambium and Vascular cambium).



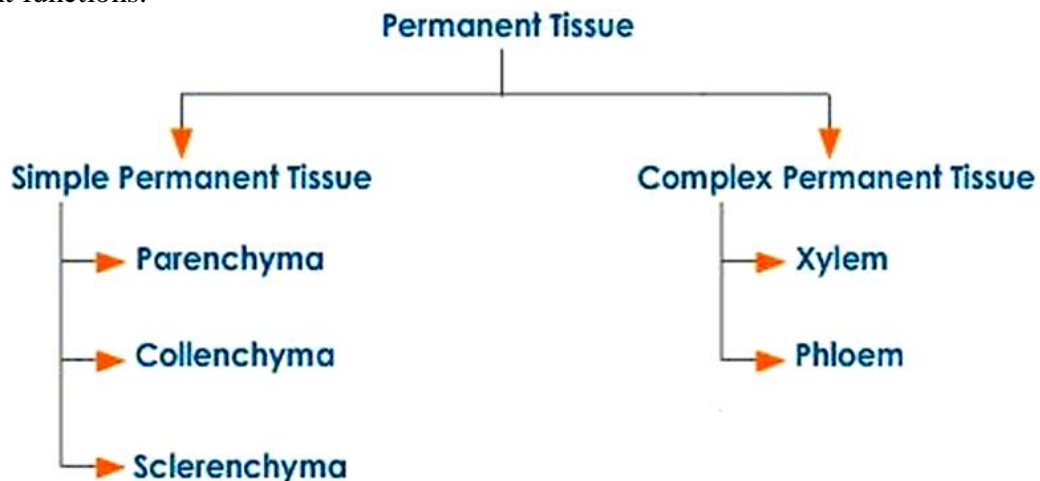
### Characteristic features of Meristematic tissues

- The meristematic cells may be round, oval, polygonal or rectangular in shape.
- Their cell walls are thin, elastic and made up of cellulose.
- They are closely arranged without intercellular spaces.
- They have dense cytoplasm with large nucleus.

### PERMANENT TISSUE:

Once the cells of meristematic tissue divide to a certain extent, they become specialized for a particular function. This process is called differentiation. Once differentiation is accomplished, the cells lose their capability to divide and the tissue becomes permanent tissue.

Some cells produced by meristematic tissues stop dividing and form a permanent tissue. They have definite structure and function. They are differentiated into various types to perform different functions.



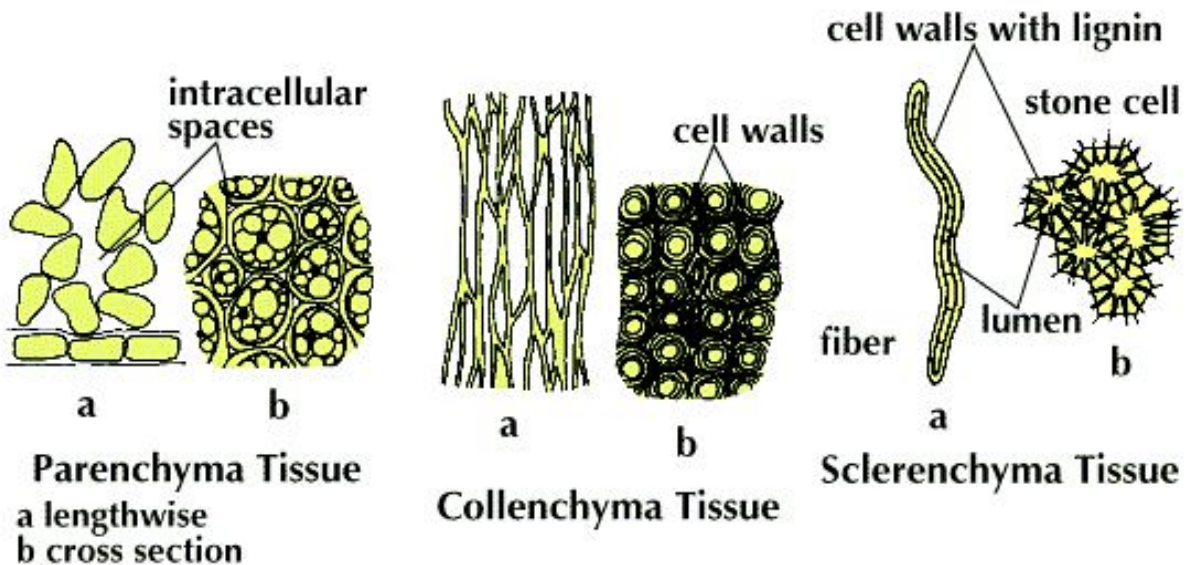
The permanent tissues are classified as

- i) Simple tissues and
- ii) Complex tissues

### **SIMPLE TISSUES**

A tissue with the cells of similar structure (one type of cells) and function is called simple tissue. It is of three types.

1. Parenchyma
2. Collenchyma
3. Sclerenchyma

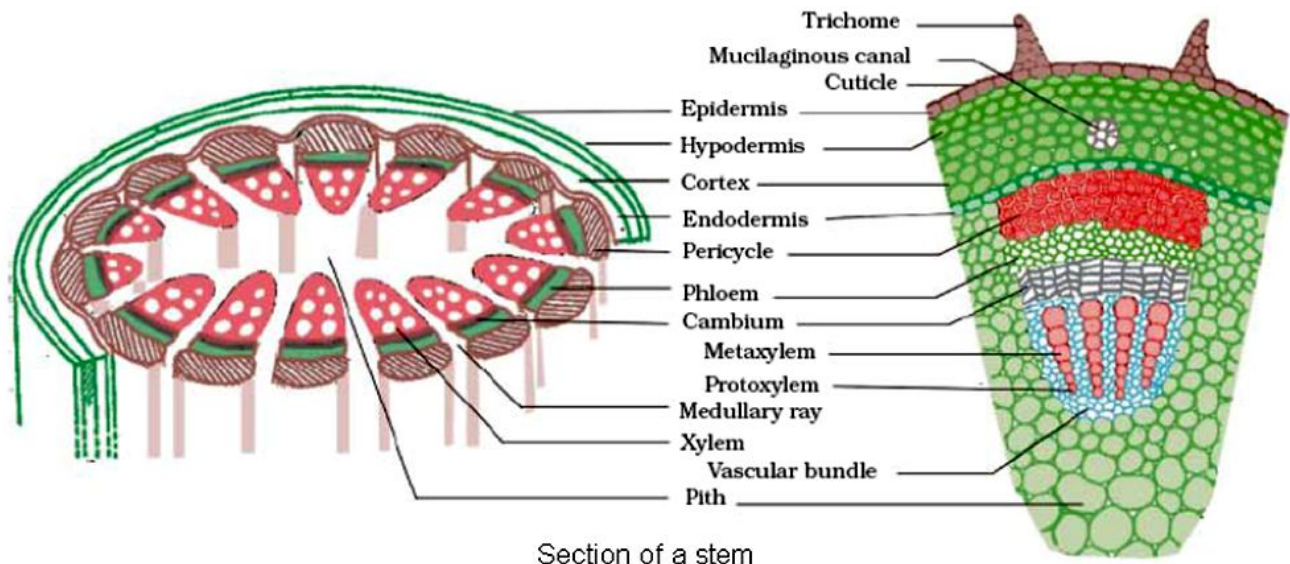


### **PARENCHYMA**

The cells of parenchyma have thin cell wall. They are loosely packed; with lot of intercellular spaces between them. They are living cells. They are generally present in all organs of a plant. They are oval or spherical or rectangular or cylindrical in shape. The cell wall is made of cellulose and pectic materials. Parenchyma makes the largest portion of a plant body. Parenchyma mainly works are packing material in plant parts. The main function of parenchyma is to provide support and to store food. In some plant parts, parenchyma has chlorophyll as well. In that case, parenchyma carries out photosynthesis and is then termed as chlorenchyma. In aquatic plants, large air cavities are present in parenchyma. This provides buoyancy to the plant, and then the parenchyma is known as aerenchyma.

### **COLLENCHYMA**

The cells of collenchyma are polygonal in cross section and have unevenly thickened walls. These thickenings are due to the deposition of more cellulose, hemi-cellulose and pectin. The thickening is confined to the corners of the cells. They generally occur in the dicot stem in two or more layers below the epidermis. It is absent in the roots. It also occurs in petiole and pedicel. Like Parenchyma, Collenchyma is also a living tissue. The main function of Collenchyma is to provide strength and flexibility to the growing organs like young stem.



Section of a stem

## SCLERENCHYMA

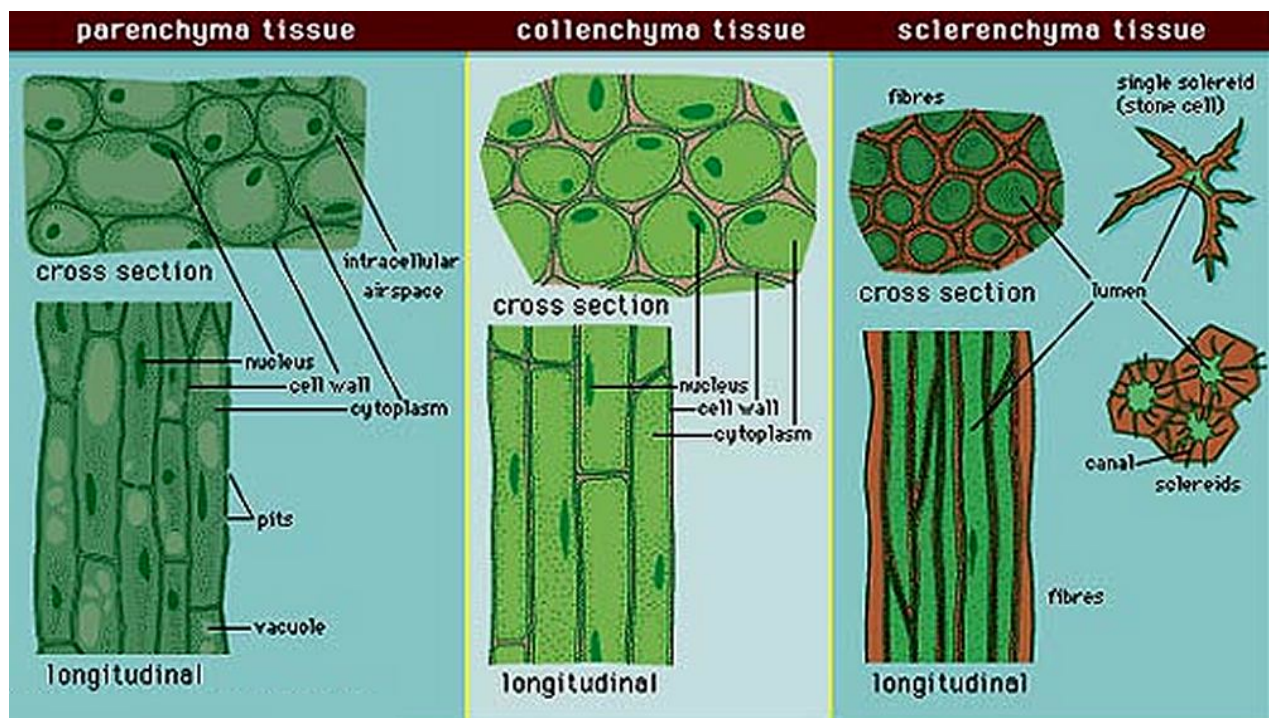
It is a dead tissue. The cells are thick with lignified walls. They give mechanical support to the organs. This has two types of cells – Sclereids and Fibres.

### Sclereids

Sclereids are stone cells which are commonly found in shells of the nut, pulp of certain fruits such as Pear and Sapota.

### Fibres

The fibres are elongated strands with simple pits throughout its length.



## COMPLEX PERMANENT TISSUES

### XYLEM

Xylem is mainly concerned with the transport of nutrients, water and minerals upwards in the plant body. It forms a continuous tube through the roots, stems, leaves, flowers and fruits by the fusion of elongated cells.

It is composed of different kinds of cells namely,

1. Tracheids
2. Xylem vessels.
3. Xylem fibres
4. Xylem parenchyma.

### **Tracheids**

Tracheids are elongated, tapering cells with blunt ends. They have lignified secondary wall. They are the chief water conducting elements in Pteridophytes and Gymnosperms.

### **Xylem vessels**

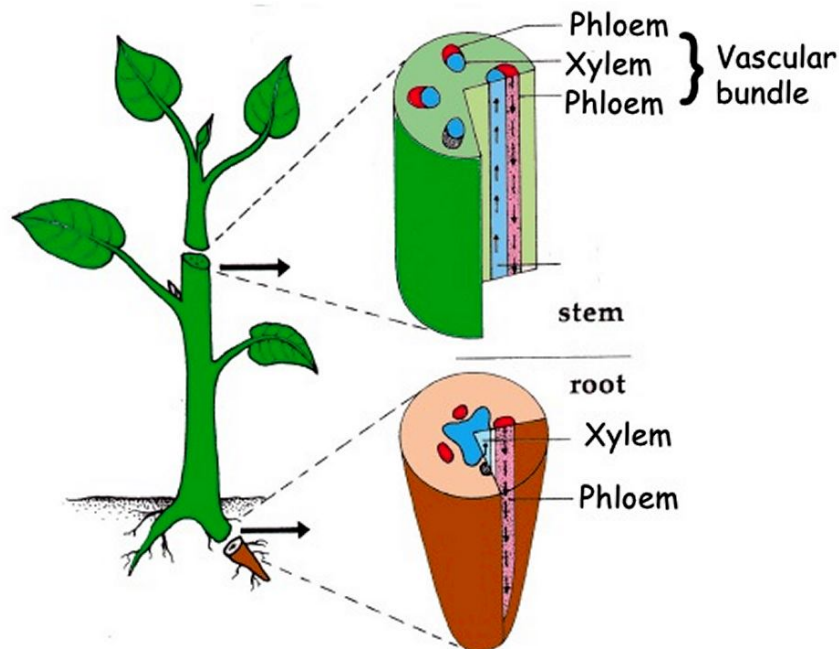
Xylem vessels have perforations at the end and are placed one above the other like a long pipe line. They are seen in the xylem of angiosperms. They conduct water, mineral nutrients and also provide mechanical strength to the plant body.

### **Xylem Fibres**

The fibres of Sclerenchyma associated with the xylem are known as xylem fibres. They give additional mechanical strength to the plant. They are also called wood fibres.

### **Xylem Parenchyma**

The parenchyma cells associated with xylem are known as xylem parenchyma. It is the only living tissue amongst xylem cells. They store food reserves in the form of starch and fat. They also help in conduction of water.



## **PHLOEM**

Phloem conducts food materials from leaves to the other parts of the plant. It is made up of four types of cells.

1. Sieve elements
2. Companion cells
3. Phloem fibres
4. Phloem parenchyma

### **Sieve elements**

Sieve elements are the conducting elements of the phloem. Sieve elements are of two types – sieve cells and sieve tubes.



Sieve cells are present in Pteridophytes and Gymnosperms where as sieve tubes are present in Angiosperms.

### Companion cells

Companion cells are thin walled elongated specialized Parenchyma cells. They are associated with sieve elements. They have a prominent nucleus and cytoplasm. They help the sieve tube in conduction of food materials in angiosperms.

### Phloem fibres

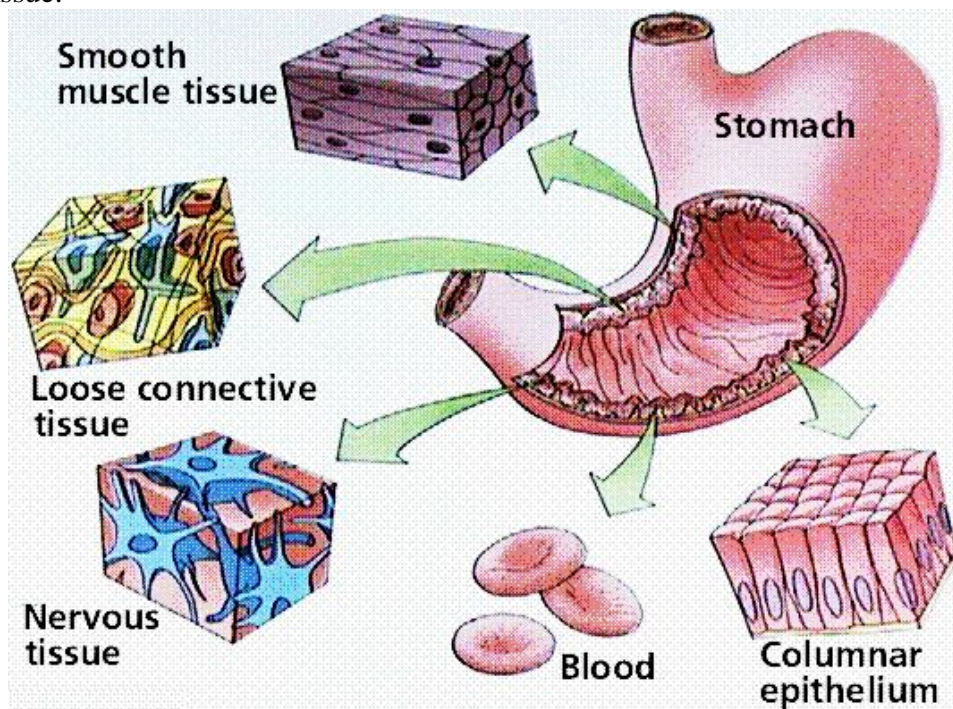
The fibres of sclerenchyma associated with phloem are called phloem fibres. They are also called bast-fibres. They give mechanical support to the plant. Among the four types of phloem cells, phloem fibres are the only dead tissues.

### Phloem parenchyma

The parenchyma cells associated with phloem are called phloem parenchyma. They store starch and fats.

## ANIMAL TISSUES

Animal tissues are of four types, viz. epithelial tissue, connective tissue, muscular tissue and nervous tissue.



## EPITHELIAL TISSUE:

The epithelial tissue forms the covering or lining of most of the organs. The cells of epithelial tissue are tightly packed and form a continuous sheet. There is small amount of cementing materials between the cells and no intercellular space is present. Permeability of the epithelial tissue plays a great role in exchange of materials among various organs it also plays an important role in osmoregulation. All epithelial tissues are separated by the underlying tissue by an extracellular fibrous basement membrane.

Epithelial tissues are of following types:

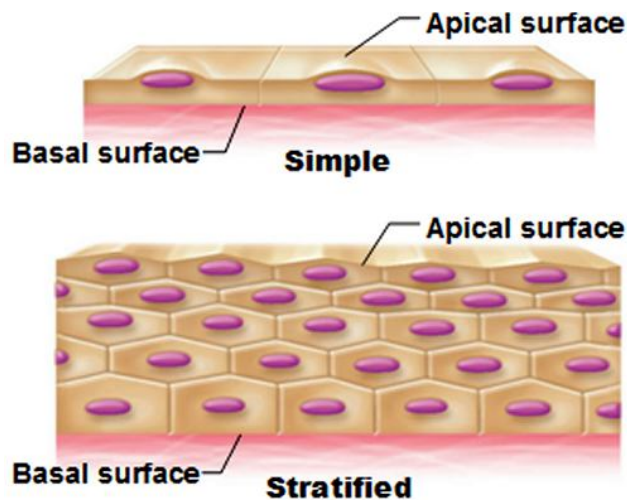
1. Simple Epithelium
2. Cuboidal Epithelium
3. Columnar Epithelium
4. Stratified Epithelium

## Simple Epithelium

The simple epithelium is composed of a single layer of cells. This type of epithelial tissue forms the lining of blood vessels and alveoli. Thin layer of cells facilitates exchange of substances; in such cases.

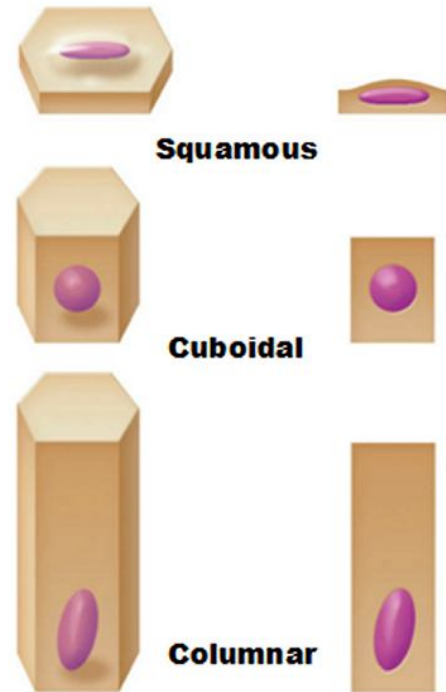
## Cuboidal Epithelium

The cells are cube-shaped in cuboidal epithelium. Linings of kidney tubules and ducts of salivary glands are composed of cuboidal epithelium. Cuboidal cells provide mechanical support. Cells of epithelium may play the role of secretion and then they are called glandular epithelium.



**(a) Classification based on number of cell layers**

**Note that basal cells regenerate; as apical cells slough off, they are replaced by basal cells**



**(b) Classification based on cell shape**

## Columnar Epithelium

Cells are column-shaped in columnar epithelium. Columnar epithelium facilitates secretion and absorption. For example; the lining of intestine is composed of columnar epithelium. In some organs, columnar epithelium has cilia present on the outer surface. Cilia facilitate movements of certain substances. The ciliated epithelium in the respiratory tract pushes the mucus forward.

## Stratified Epithelium

Cells of the stratified epithelium are in many layers. Skin is an example of stratified epithelium. Stratification of layers prevents wear and tear.

## CONNECTIVE TISSUE:

The cells of a connective tissue are loosely scattered in a matrix. The matrix can be a fluid, jelly like, dense or rigid. The nature of matrix depends on the function a connective tissue serves. Following are the various connective tissues:

### Areolar (Loose) Connective Tissue

Areolar tissue is found between skin and muscles, around blood vessels and nerves and in bone marrow. Areolar tissue fills the gap between tissues and provides support. It also helps in repair of tissues.

## Dense connective tissue(Fibrous connective tissue)

It has thicker, denser fibers and fewer cells. The matrix is made up mostly of collagen fibers, with fibroblasts arranged in rows. This type of connective tissue forms tendons and ligaments, which attach muscle to bone and bone to bone, respectively.

## Adipose Tissue

Adipose tissue is composed of fat globules. This tissue is found below the skin and beneath the organs. Adipose tissue provides insulation and works as a cushion.

## Bone

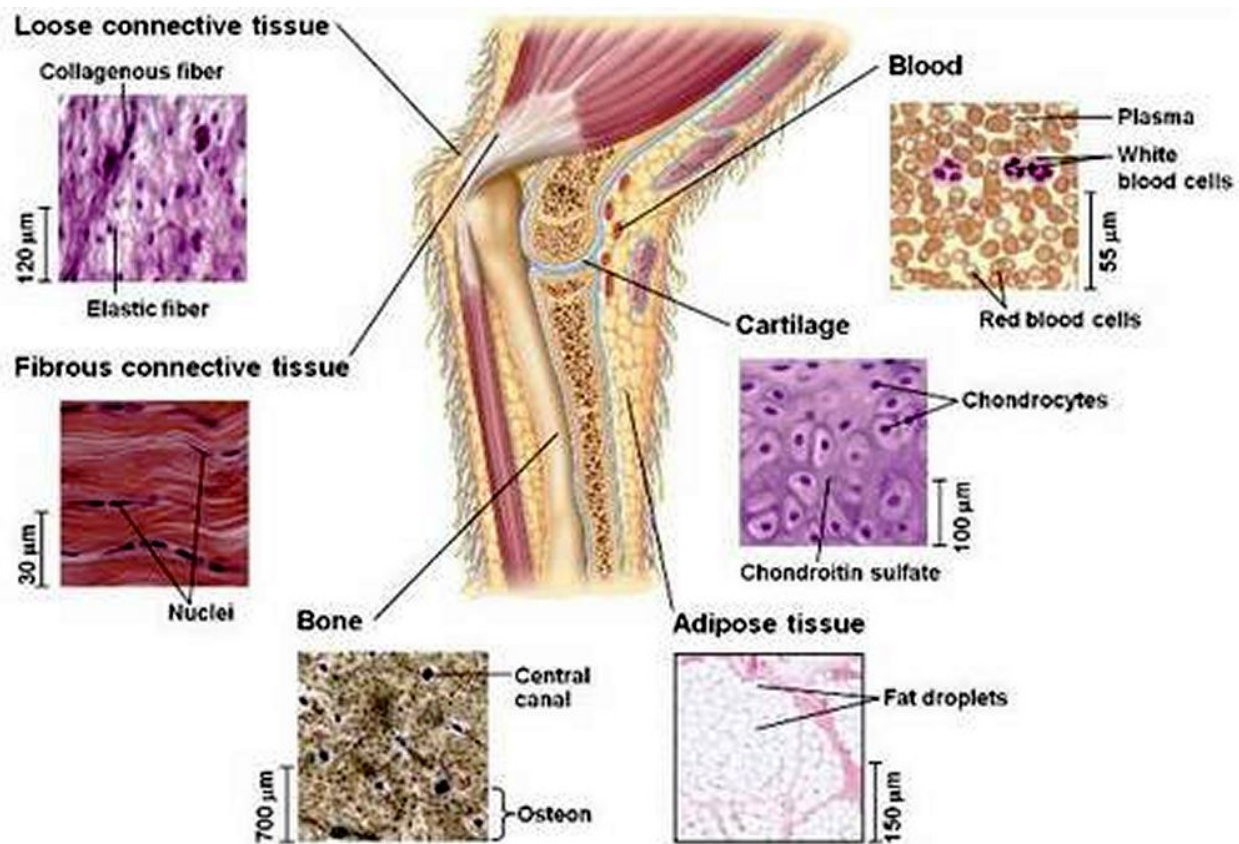
Bone is mainly composed of osteoblasts. Bone makes the skeletal system. Skeletal system is responsible for providing structural framework to the body. It provides protection to important organs and facilitates movements.

## Cartilage

Cartilage is mainly composed of chondrioblasts. Cartilage is present at the ends of articular bones. Cartilage is also present in external ear, bronchii, etc.

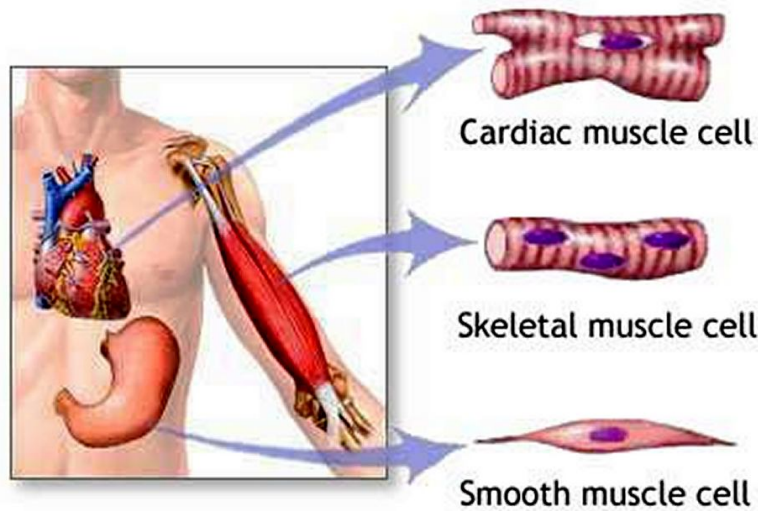
## Blood

Blood is composed of blood cells, platelets and plasma. Blood plays an important role in transportation of various substances in the body. It also helps in osmoregulation and temperature control.



## MUSCULAR TISSUE

Muscular tissue is composed of muscle cells. Muscle cells are specialized cells which have the capability to contract and expand. Due to contraction and expansion, muscles facilitate various kinds of movements in the body. Muscular tissues are of three types:



### Striated Muscles

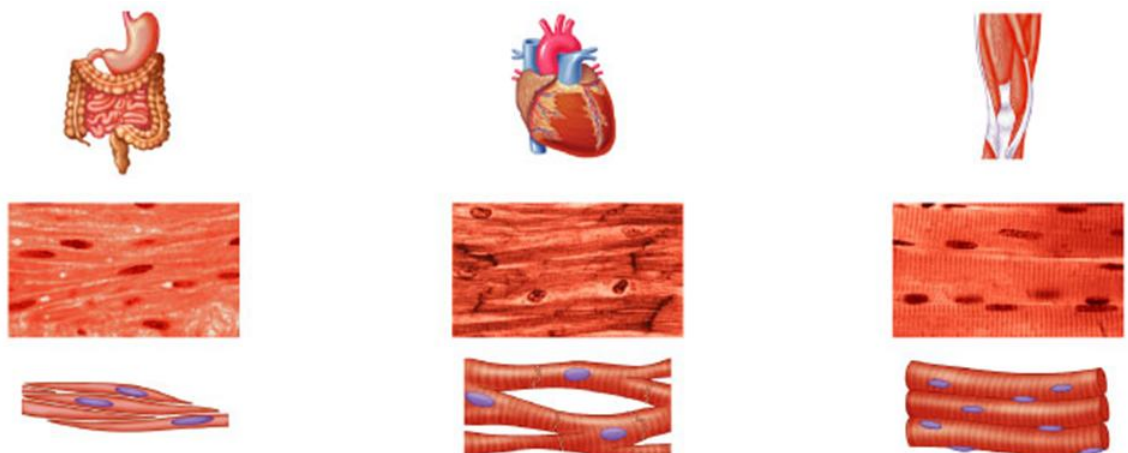
The cells of striated muscles are in the form of long, unbranched fibres. Cells are multinucleate. Light and dark bands (striations) are present on muscle fibres; which gives the name striated muscles. Striated muscles are found in those organs where voluntary movement is possible, e.g. hands, legs, back, neck, etc.

### Smooth Muscles

The cells of smooth muscles are spindle shaped and each has one nucleus. Smooth muscle is found in those organs where involuntary movement is possible, e.g. alimentary canal.

### Cardiac Muscles

The cells of cardiac muscles are in the form of branched fibres. Striations are present and cells are uninucleate. These are found in the heart. Cardiac muscles are capable continuous contraction and relaxation throughout the life.



#### Smooth muscle

- has spindle-shaped, nonstriated uninucleated fibers.
- occurs in walls of internal organs.
- is involuntary.

#### Cardiac muscle

- has striated, branched, uninucleated fibers.
- occurs in walls of heart.
- is involuntary.

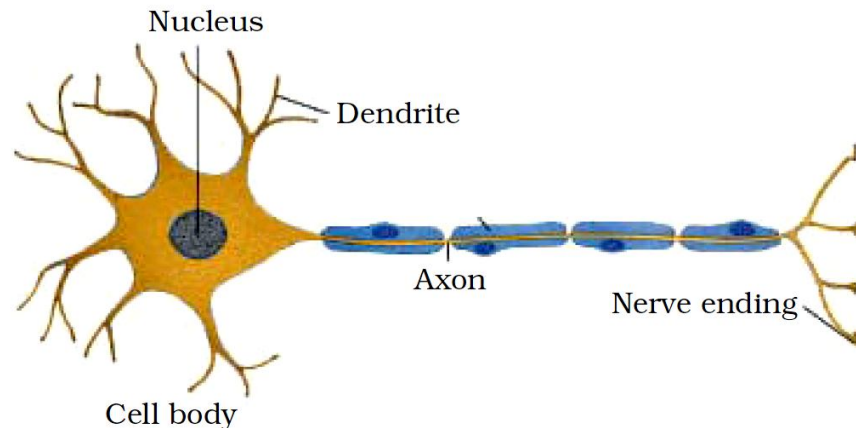
#### Skeletal muscle

- has striated, tubular, multinucleated fibers.
- is usually attached to skeleton.
- is voluntary.

## NERVOUS TISSUE

All cells possess the ability to respond to stimuli. However, cells of the nervous tissue are highly specialised for being stimulated and then transmitting the stimulus very rapidly from one place to another within the body. The brain, spinal cord and nerves are all composed of the nervous tissue. The cells of this tissue are called nerve cells or neurons.

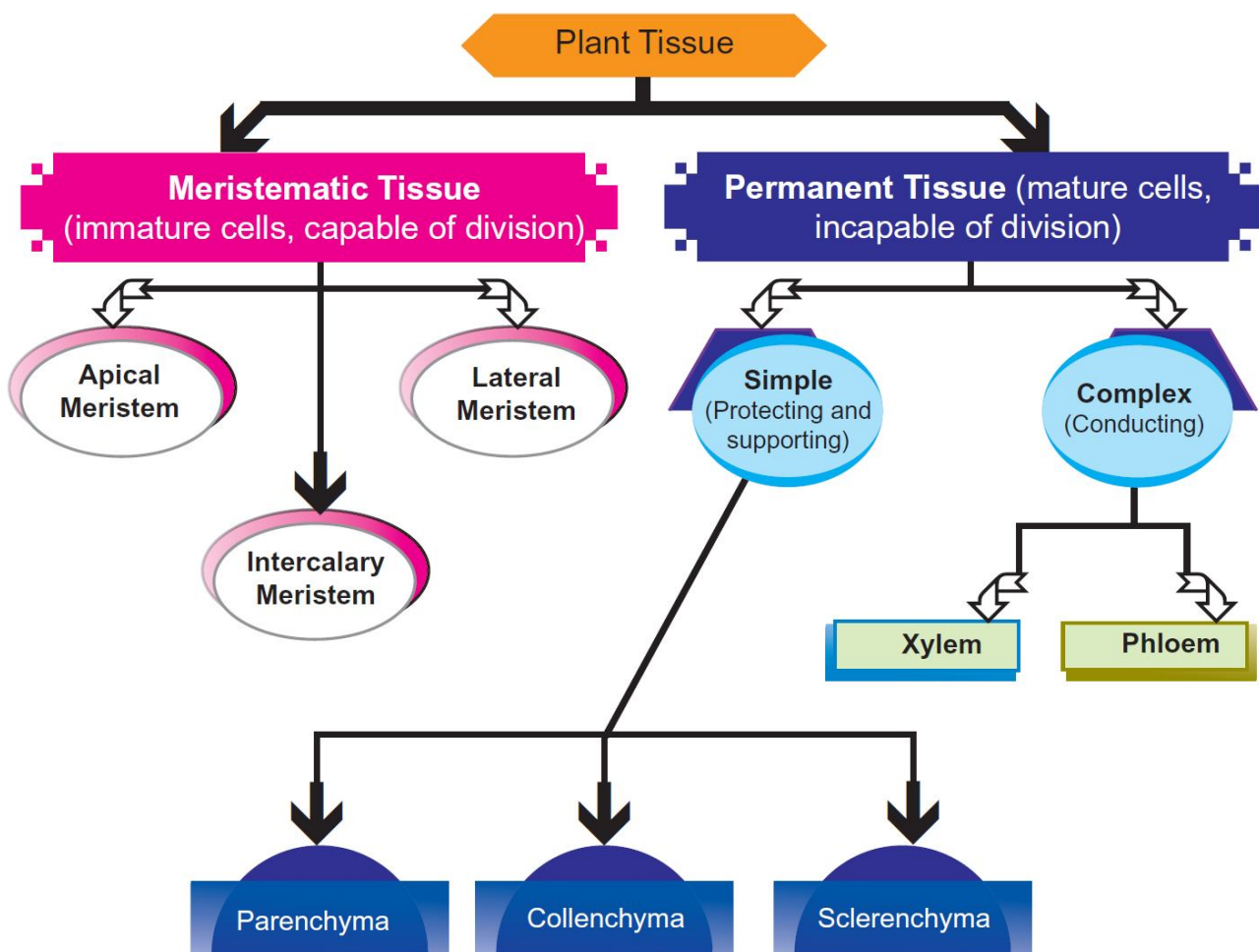
A neuron consists of a cell body with a nucleus and cytoplasm, from which long thin hair-like parts arise.



Usually each neuron has a single long part, called the axon, and many short, branched parts called dendrites. An individual nerve cell may be up to a metre long. Many nerve fibres bound together by connective tissue make up a nerve.

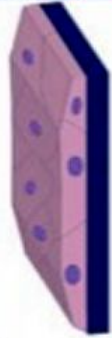
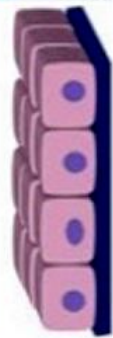
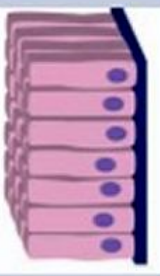

## SUMMARY

### CLASSIFICATION OF PLANT TISSUE

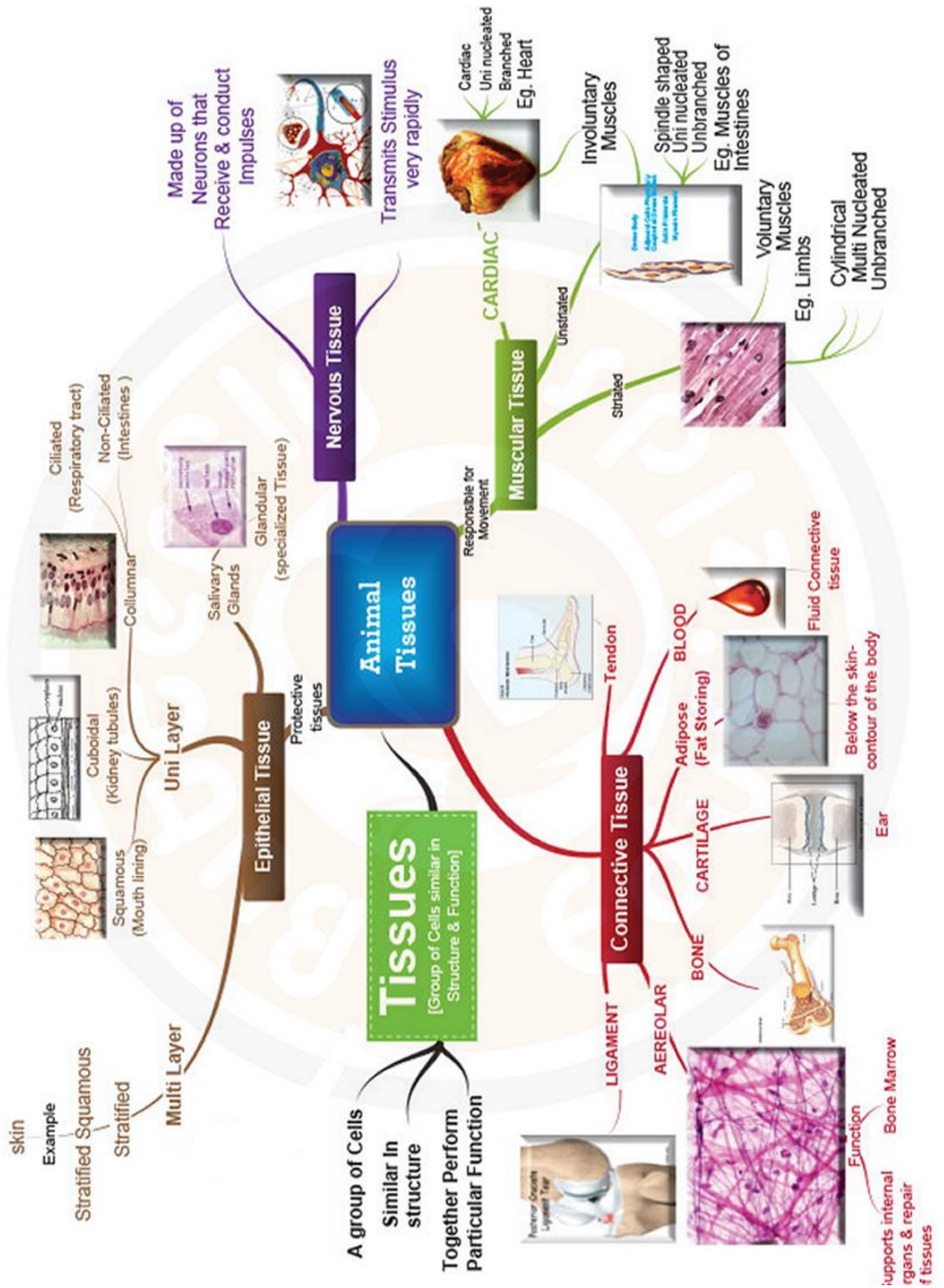


## TYPES OF EPITHELIAL TISSUE

Different epithelia show different structures as they perform different functions

Type of Epithelium	Structure	Location in the body	Function
Squamous epithelium 	Cells are thin, flat, irregular cells which fit like floor tiles to form delicate lining called <b>PAVEMENT EPITHELIUM</b> <b>Nuclei in centre</b>	Oesophagus, lining of mouth, alveoli of the lungs, blood vessels	Protects the underlying tissue from injury, grems Exchange of gases in lungs and materials between cells and blood
Cuboidal epithelium 	Cells are cuboidal with round nucleus in centre <b>Nuclei in centre</b>	Kidney tubules, duct of salivary glands	Gives mechanical support At times the epithelial tissue folds, forms a gland that secretes substances. Such epithelium is called <b>GLANDULAR EPITHELIUM</b>
Columnar epithelium 	Cells are more tall and less wide ( <b>PILLAR LIKE</b> ), placed side by side. Nucleus is situated near the base. <b>Nuclei near base</b>	Inner lining of intestine, In respiratory tract, cells have cilia (hair like) that move and push the mucus to clear it. Such epithelium is called <b>CILIATED COLUMNAR EPITHELIUM</b>	Helps in absorption excretion and secretion
Striated squamous epithelium 	Squamous flat cells arranged in many layers to prevent wear and tear of parts.	Skin (to prevent wear and tear) tongue, oesophagus lining of mouth.	Protection, prevent wear and tear

# CLASSIFICATION OF ANIMAL TISSUE



## INTEXT QUESTIONS PAGE NO. 74

**Q1. Name types of simple tissues.**

**Answer:** The three main types of simple tissues are: (i) Parenchyma (ii) Collenchyma (iii) Sclerenchyma

**Q2. Where is apical meristem found?**

**Answer:** Apical meristem is present in growing tips of stems and roots of plants. It helps in increasing the length of the stem and the root.

**Q3. Which tissue makes up the husk of coconut?**

**Answer:** The husk of coconut is made up of sclerenchymatous tissue.

**Q4. What are the constituents of phloem?**

**Answer:** The constituents of phloem tissue are:

- (i) Sieve tubes (tubular living cells with perforated end walls)
- (ii) Companion cell (living cells)
- (iii) Phloem parenchyma (living cells)
- (iv) Phloem fibres (non-living and sclerenchyma cells)

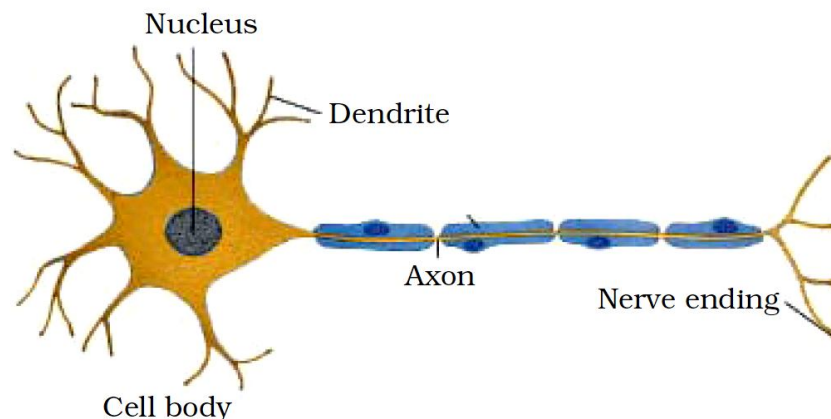
## INTEXT QUESTIONS PAGE NO. 78

**Q1. Name the tissue responsible for movement in our body.**

**Answer:** The movement of our body depends on muscular tissue. It consists of elongated cells (muscle fibres).

**Q2. What does a neuron look like?**

**Answer:** A neuron consists of a cell body with a nucleus and cytoplasm. It has two important extensions known as the axon and dendrites. An axon is a long thread-like extension of nerve cells that transmits impulses away from the cell body. Dendrites, on the other hand, are thread-like extensions of cell body that receive nerve impulses. Thus, the axon transmits impulses away from the cell body, whereas the dendrite receives nerve impulses. This coordinated function helps in transmitting impulses very quickly.



**Q3. Give three features of cardiac muscles.**

**Answer:** Three features of cardiac muscles are:

- (i) Cardiac muscles are involuntary muscles that contract rapidly, but do not get fatigued.
- (ii) The cells of cardiac muscles are cylindrical, branched, and uninucleate.
- (iii) They control the contraction and relaxation of the heart.

**Q4. What are the functions of areolar tissue?**

**Answer:** Functions of areolar tissue:

- (i) It helps in supporting internal organs.
- (ii) It helps in repairing the tissues of the skin and muscles.



## **EXERCISE QUESTIONS PAGE NO. 66 and 67**

**Q1. Define the term “tissue”.**

**Answer:** A group of cells that are similar in structure and/or work together to achieve a particular function is called tissue.

**Q2. How many types of elements together make up the xylem tissue? Name them.**

**Answer:** The following four types of elements make up xylem tissue:

- (i) Xylem tracheids (tubular unicellular).
- (ii) Xylem vessels (multicellular).
- (iii) Xylem parenchyma (stores food and helps in sideways conduction of water).
- (iv) Xylem fibres (provide mechanical support).

**Q3. How are simple tissues different from complex tissues in plants?**

**Answer:**

<b>Simple tissue</b>	<b>Complex tissue</b>
These tissues consist of only one type of cells.	These tissues are made up of more than one type of cells.
The cells are more or less similar in structure and perform similar functions.	Different types of cells perform different functions. For example, in the xylem tissue, tracheids help in water transport, whereas parenchyma stores food.
Three types of simple tissues in plants are parenchyma, collenchyma, and sclerenchyma.	Two types of complex permanent tissues in plants are xylem and phloem.

**Q4. Differentiate between parenchyma, collenchyma and sclerenchyma on the basis of their cell wall.**

**Answer:**

<b>Parenchyma</b>	<b>Collenchyma</b>	<b>Sclerenchyma</b>
Cell walls are relatively thin, and the cells in parenchyma tissues are loosely packed.	The cell wall is irregularly thickened at the corners, and there is very little space between the cells.	The cell walls are uniformly thickened, and there are no intercellular spaces.
The cell wall in this tissue is made up of cellulose.	Pectin and hemicellulose are the major constituents of the cell wall.	An additional layer of the cell wall composed mainly of lignin is found.

**Q5. What are the functions of the stomata?**

**Answer:** Functions of the stomata:

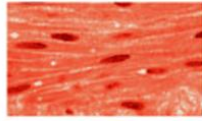
- (i) They allow the exchange of gases (CO<sub>2</sub> and O<sub>2</sub>) with the atmosphere.
- (ii) Evaporation of water from the leaf surface occurs through the stomata. Thus, the stomata help in the process of transpiration.

**Q6. Diagrammatically show the difference between the three types of muscle fibres.**

**Answer:**

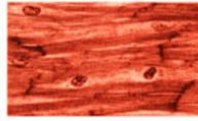
The three types of muscle fibres are:

Striated muscles, smooth muscles (unstriated muscle fibre), and cardiac muscles.



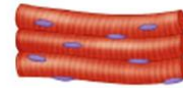
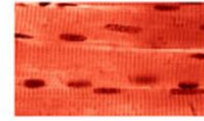
**Smooth muscle**

- has spindle-shaped, nonstriated uninucleated fibers.
- occurs in walls of internal organs.
- is involuntary.



**Cardiac muscle**

- has striated, branched, uninucleated fibers.
- occurs in walls of heart.
- is involuntary.



**Skeletal muscle**

- has striated, tubular, multinucleated fibers.
- is usually attached to skeleton.
- is voluntary.

**Q7. What is the specific function of the cardiac muscle?**

**Answer:** The specific function of the cardiac muscle is to control the contraction and relaxation of the heart.

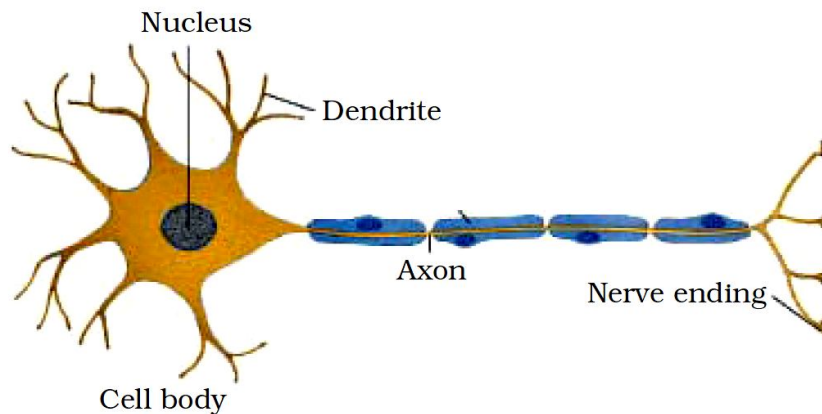
**Q8. Differentiate between striated, unstriated and cardiac muscles on the basis of their structure and site/location in the body.**

**Answer:**

Striated muscle	Unstriated muscle	Cardiac muscle
<b>On the basis of structure:</b>		
Cells are cylindrical	Cells are long	Cells are cylindrical
Cells are not branched	Cells are not branched	Cells are branched
Cells are multinucleate	Cells are uninucleate	Cells are uninucleate
Alternate light and dark bands are present	There are no bands present	Faint bands are present
Its ends are blunt	Its ends are tapering	Its ends are flat and wavy
<b>On the basis of location:</b>		
These muscles are present in body parts such as hands, legs, tongue, etc.	These muscles control the movement of food in the alimentary canal, the contraction and relaxation of blood vessels, etc.	These muscles control the contraction and relaxation of the heart

**Q9. Draw a labelled diagram of a neuron.**

**Answer:**



**Q10. Name the following.**

- (a) Tissue that forms the inner lining of our mouth.
- (b) Tissue that connects muscle to bone in humans.
- (c) Tissue that transports food in plants.
- (d) Tissue that stores fat in our body.
- (e) Connective tissue with a fluid matrix.
- (f) Tissue present in the brain.

**Answer:**

- (a) Tissue that forms the inner lining of our mouth → Epithelial tissue
- (b) Tissue that connects muscle to bone in humans → Dense regular connective tissue (tendons)
- (c) Tissue that transports food in plants → Phloem
- (d) Tissue that stores fat in our body → Adipose tissue
- (e) Connective tissue with a fluid matrix → Blood
- (f) Tissue present in the brain → Nervous tissue

**Q11. Identify the type of tissue in the following: skin, bark of tree, bone, lining of kidney tubule, vascular bundle.**

**Answer:**

**Skin:** Stratified squamous epithelial tissue

**Bark of tree:** Simple permanent tissue

**Bone:** Connective tissue

**Lining of kidney tubule:** Cuboidal epithelial tissue

**Vascular bundle:** Complex permanent tissue

**Q12. Name the regions in which parenchyma tissue is present.**

**Answer:**

Leaves, fruits, and flowers are the regions where the parenchyma tissue is present.

**Q13. What is the role of epidermis in plants?**

**Answer:**

Epidermis is present on the outer surface of the entire plant body. The cells of the epidermal tissue form a continuous layer without any intercellular space. It performs the following important functions:

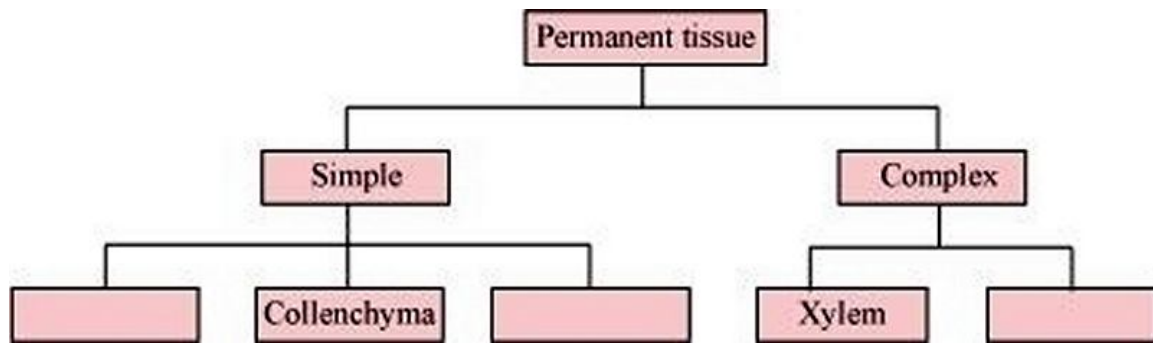
- (i) It is a protective tissue of the plant body
- (ii) It protects the plant against mechanical injury
- (iii) It allows exchange of gases through the stomata

**Q14. How does the cork act as a protective tissue?**

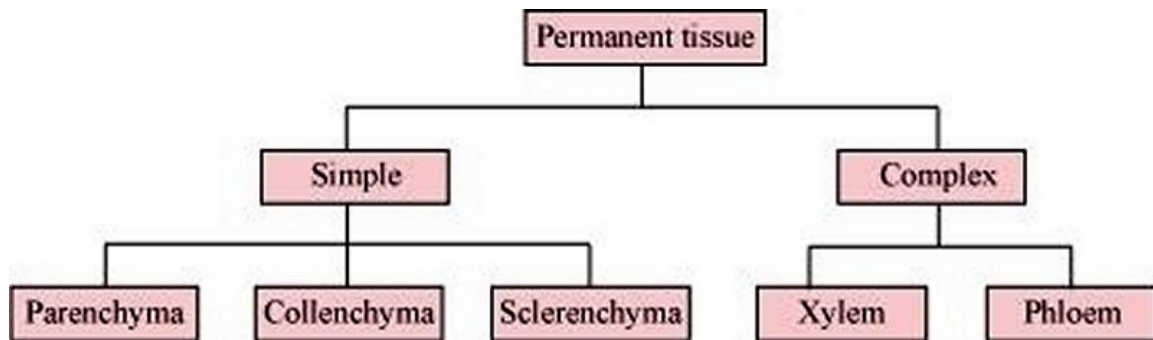
**Answer:**

The outer protective layer or bark of a tree is known as the cork. It is made up of dead cells. Therefore, it protects the plant against mechanical injury, temperature extremes, etc. It also prevents the loss of water by evaporation.

Q15. Complete the table:



Answer:



.....

**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 6**  
**TISSUES**

**Fill in the blanks**

1. \_\_\_\_\_ is the process by which unspecialised structures become modified and specialised for performing specific functions.
2. Differentiation results in \_\_\_\_\_ (division/ summation/integration) of labour.
3. The study of the structure of tissues and organs is known as \_\_\_\_\_ .
4. Based on ability to divide, plant tissues may be classified as \_\_\_\_\_ and \_\_\_\_\_ tissues.
5. Meristematic cells possess the power of cell \_\_\_\_\_ .
6. Permanent tissues are those which have lost the capacity to \_\_\_\_\_ .
7. (Parenchyma/ Collenchyma/ Sclerenchyma) \_\_\_\_\_ is a widely distributed, simple plant tissue.
8. (Parenchyma/ Collenchyma/ Sclerenchyma) \_\_\_\_\_ is a strong and flexible mechanical tissue.
9. \_\_\_\_\_ and \_\_\_\_\_ are the conducting tissues or vascular tissues, also called complex tissues.
10. The cell walls of \_\_\_\_\_ (Parenchyma/ Collenchyma/ Sclerenchyma) tissue are made up of cellulose hemicellulose and pectin
11. \_\_\_\_\_ is the parenchyma with large number of chloroplasts.
12. (Xylem/Phloem) \_\_\_\_\_ is popularly known as wood.
13. Xylem is composed of \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ and \_\_\_\_\_ .
14. Tracheids are \_\_\_\_\_ (living/dead) cells \_\_\_\_\_ (with/without) protoplasts.
15. Protective tissues include \_\_\_\_\_ and \_\_\_\_\_ .
16. Epithelial cells have \_\_\_\_\_ (little/large) intercellular substances.
17. (Connective/Muscular/Epithelial) \_\_\_\_\_ tissue serve to 'connect' or 'bind' the cells of other tissues in the body and gives them rigidity and support.
18. (Tendon/Ligament/Cartilage) \_\_\_\_\_ is made up of white fibres and connects muscles to bones.
19. Bone is surrounded by a connective tissue known as \_\_\_\_\_.
20. Striated muscles are \_\_\_\_\_ (voluntary/involuntary) while smooth muscles are \_\_\_\_\_ (voluntary/involuntary).

21. Based on functions performed, list the types of animal tissues.
22. Which tissues are called covering or protective tissues?
23. Where do we find epithelial tissues on animal body?
24. What are the general identifying features of epithelial tissues?
25. Based on layer and shape of cells, how Epithelial tissues can be classified?
26. The surface of Simple squamous epithelium is \_\_\_\_\_. (choose the correct option)
  - (a) Permeable
  - (b) Selectively Permeable
  - (c) Impermeable
  - (d) All of the these
27. What is the shape of simple squamous tissue?
28. Where do you find simple squamous in an animal body?
29. What is the main function of simple squamous epithelium?
30. What is simple stratified epithelium? Where do we find these tissues?
31. What is main purpose of stratified epithelium?
32. What is the shape of cuboidal epithelium? Where do we find these tissues?
33. These are somewhat square or cuboid in shape. Cuboidal epithelium is found in kidney tubules, ducts of salivary glands etc.
34. What is the main function of cuboidal epithelium?
35. How will you identify Columnar epithelium? Where are these tissues located?
36. What is the main purpose of columnar epithelium?
37. What type of epithelium tissues are found in respiratory tract and in intestinal lining? How are these tissues different from each other?
38. Where do we find glandular columnar epithelia? What are their main role?
39. What is Haematology?
40. What is the common characteristic in different connective tissues?
41. Name different types of connective tissues?
42. What are the constituents of connective tissues?
43. List the type of intercellular matrix present in the following connective tissues.
  - (a) Blood
  - (b) Lymph
  - (c) Bone
  - (d) Cartilage
  - (e) Tendons
  - (f) Ligaments

(g) Areolar Tissue

(h) Adipose tissue

44. What are constituents of blood tissue?
  45. What does plasma contain?
  46. Name different types of white blood corpuscles.
  47. List the functions of blood cells
  48. Where blood is formed in our body?
  49. Name the two fluid connective tissues.
  50. Why type of inter cellular matrix is found in bone tissue? What are its constituents?
  51. Identify the location of the following connective tissues.
    - (a) Blood
    - (b) Lymph
    - (c) Bone
    - (d) Cartilage
    - (e) Tendons
  52. Which connective tissue connects two bones?
  53. Which connective tissue connects bones to muscles?
  54. Name the constituents of matrix found in cartilage.
  55. Where do we find Areolar tissue? What are its functions?
  56. Name the fat-storing tissues? Where are they located? How do these tissue help?
  57. What are different types of muscle tissues? Also list which of these are voluntary or involuntary.
  58. Why are striated muscles called skeletal muscles?
  59. What are identification marks of striated muscles when seen under microscope?
  60. Identify which type of muscles tissues are associated with the following body actions
    - (a) locomotion
    - (b) iris movement to control size of pupil
    - (c) peristaltic movements of the oesophagus
    - (d) heart beat
    - (e) movement of blood in blood vessels
  61. How will you identify cardiac muscles cells under a microscope?
  62. Which muscle tissues show characteristics of both striated and unstriated muscles?
  63. Where do we find cardiac tissues? What are the functions of cardiac tissues?
  64. Do all cells respond to stimuli or this ability is possessed by nerve cells only?
  65. What is the unit of nervous tissues?
-

66. Where do we find nerve cells?
67. How long a nerve cell can be?
68. How are muscles tissues related to nerve cells?
69. Name the three distinct parts of a neuron.
70. What is myelin sheath? Where do we find it?
71. What happens in polio disease?
72. In plants which of the following have the capability of cell division?
- (a) Parenchyma
  - (b) Scelerenchyma
  - (c) Xylem
  - (d) Apical Meristem
73. The growth in plants is
- (a) limited to certain regions
  - (b) uniform in all parts
  - (c) limited to top region
  - (d) limited to roots only.
74. Intercalary meristems are found
- (a) at internodes and base of leaves
  - (b) at growing tips of roots
  - (c) beneath the bark
  - (d) at the tips of stem
75. Cells of the tissue have dense cytoplasm, thin cellulose walls and prominent vacuoles.  
Identify the tissue.
- (a) Collenchyma
  - (b) Scelerenchyma
  - (c) Meristem
  - (d) Parenchyma
76. Dead long and narrow cells in a plant belong to which tissue?
- (a) Parenchyma
  - (b) Scelerenchyma
  - (c) Collenchyma
  - (d) Phloem
77. Bone is an example of \_\_\_\_\_
- (a) Muscular tissues
  - (b) Connective tissues



(c) Epithelial tissues

(d) Nervous tissues

**78.** Which animal tissue are usually separated from the underlying tissue by an extracellular fibrous basement membrane?

(a) Muscular tissues

(b) Connective tissues

(c) Epithelial tissues

(d) Nervous tissues

**79.** Oesophagus and the lining of the mouth are also covered with which tissues?

(a) Squamous epithelium

(b) Ciliated epithelium

(c) Areolar connective

(d) Striated muscle tissues

**80.** Husk of a coconut is made of which tissues?

(a) Parenchyma tissue

(b) Sclerenchymatous tissue

(c) Collenchyma

(d) Xylem



**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 6**  
**TISSUES**

1. The study of tissues is called ...
  - a) cytology
  - b) embryology
  - c) histology
  - d) pathology
2. Which of the following statement is NOT true?
  - (a) Most of the plant tissues are supportive type.
  - (b) Tissues ensure division of labour.
  - (c) Sedantry existence contribute to the organ system design in animals.
  - (d) Organ systems are far more complex in animals than in plants.
3. Many kinds of tissues organise to form a/an
  - (a) organ
  - (b) organ system
  - (c) body system
  - (d) organelle
4. Parenchyma is a type of \_\_\_\_
  - (a) simple tissue
  - (b) complex tissue
  - (c) xylem
  - (d) phloem
5. Which of the following is not a simple tissue?
  - (a) xylem
  - (b) parenchyma
  - (c) collenchyma
  - (d) sclerenchyma
6. The husk of the coconut is made up of?
  - (a) collenchyma
  - (b) sclerenchyma
  - (c) apical meristem
  - (d) intercalary meristem

7. The basic principle based on which categorise plant tissues as meristematic and permanent is:
- (a) capacity to do photosynthesis
  - (b) capacity to divide
  - (c) capacity to locomote
  - (d) complexity to perform a function.
8. Which type of tissue has lignified cell walls?
- (a) Parenchyma
  - (b) Collenchyma
  - (c) Sclerenchyma
  - (d) cambium
9. Which tissue is responsible for the length of the plant?
- (a) Apical meristem
  - (b) lateral meristem
  - (c) Intercalary meristem
  - (d) Epidermis
10. The girth of the stem or root increases due to \_\_\_\_
- (a) Apical meristem
  - (b) Cambium
  - (c) Intercalary meristem
  - (d) Epidermis
11. Which meristem is present at the base of the leaves or internodes on twigs?
- (a) Apical meristem
  - (b) Cambium
  - (c) Intercalary meristem
  - (d) Epidermis
12. Which of the following statements is incorrect?
- (a) Some tissues in plants divide throughout the life
  - (b) Cell growth in animals is more uniform as compared to plants
  - (c) Animals have more dead tissues as compared to plants
  - (d) There is no demarcation of dividing and non-dividing regions in animals
13. What are the identifying features of meristematic tissues?
- (a) thick cellulose wall, small vacuoles, dense cytoplasm, small nuclei
  - (b) thin cellulose wall, almost no vacuoles, dense cytoplasm, prominent nuclei
  - (c) thin cellulose wall, no vacuoles, sparse cytoplasm, prominent nuclei

(d) thick cellulose, large vacuoles, sparse cytoplasm, small nuclei

**14.** A permanent slide shows thin walled isodiametric cells with a large vacuole. The slide contains:

- (a) Parenchyma cells
- (b) Nerve cells
- (c) Sclerenchyma cells
- (d) Collenchyma cells

**15.** Aditi observed following observations while looking into a permanent slide.

- (i) Cells are long and cylindrical
- (ii) Light and dark bands are present.

It could be a slide of :

- (a) striated muscle fibre
- (b) smooth muscle fibre
- (c) neuron
- (d) parenchyma cells

**16.** The inner lining of blood vessels is made up of which tissues?

- (a) Nervous tissue
- (b) Epithelial tissue
- (c) Connective tissue
- (d) Muscle tissue

**17.** What is a tissue?

**18.** What is histology?

**19.** Explain the statement 'Tissues exhibit division of labour'. Give examples.

**20.** What is the utility of tissues in multi-cellular organisms?

**21.** Why do plants have more dead tissues as compared to animals?

**22.** Why do plant tissue require less amount of energy in comparison to animal tissues?

**23.** Why do animals tissues require more energy as compared to plant tissues?

**24.** Name types of simple tissues.

**25.** Where is apical meristem found?

**26.** Which tissue helps in increasing the length of stem and root?

**27.** Which tissues are responsible for the axial growth of plants?

**28.** Which tissue makes up the husk of coconut?

**29.** What are the constituents of phloem?

**30.** Name the tissue responsible for the movement in our body.

**31.** What does a neuron looks like?

**32.** Identify which of the following plant tissues are living or dead?

- Apical Meristem
- Parenchyma
- Aerenchyma
- Collenchyma
- Sclereids
- Tracheids
- Xylem Fibres
- Xylem Parenchyma
- Phloem fibre
- Phloem Parenchyma
- Vessel
- Sieve Tubes

**33.** Give three features of cardiac muscles.

**34.** What are the functions of areolar tissue?

**35.** List the characteristics of meristematic tissues.

**36.** Where do we find intercalary meristem?

**37.** Which tissues are responsible for the secondary growth of plants?

**38.** What do you mean by 'Differentiation' in plant tissues?

**39.** What is the shape of Parenchyma cells?

**40.** What is the structure and nature of Parenchyma tissue?

**41.** Where do you find Parenchyma cells in Plants?

**42.** What are the identifying features of collenchyma tissue?

**43.** Where do you find collenchyma tissues in plants?

**44.** Which tissue primarily attributes to easy bending of various parts of plants (like stem, leaves)?

**45.** Which plant tissues are often called as stone cells?

**46.** Deepa was shown two slides of plant tissues: parenchyma and sclerenchyma. She can identify sclerenchyma by the

- (a) location of nucleus
- (b) size of cells
- (c) thickness of cell walls
- (d) position of vacuoles

**47.** What is aerenchyma?

**48.** What is the primary surface tissue of the entire plant?

49. How does epidermis help xerophytes?
  50. Which meristem replaces epidermis as the protective covering?
  51. List the functions of epidermis.
  52. Which tissue is known as living mechanical tissue?
  53. Why the cell walls of collenchyma tissues are unevenly thickened?
  54. Are Collenchyma tissues present in roots of the plants?
  55. Usually Shrubs and herbs grow in open places and are exposed to forceful winds. But they do not break. Why?
  56. Name the chemical released by cork cells?
  57. How are complex tissues different from simple tissues?
  58. Name two types of complex tissues.
  59. Why are Xylem and Phloem are called vascular or conducting tissues?
  60. Which plant tissue is considered to have played an important role in survival of terrestrial plants?
  61. Why vascular tissue is considered a distinctive feature responsible for survival of plants in terrestrial plants?
  62. Is xylem (or phloem) homogenous tissue or heterogeneous tissue?
  63. List the cellular elements of xylem tissue?
  64. What is the role of xylem tissue?
  65. Name the cellular elements of Phloem tissue.
  66. List functions of phloem tissue?
  67. Which Phloem cellular element has tubular structure with perforated walls?
  68. Why are Xylem and Phloem known as conducting tissues?
  69. Why are Xylem and Phloem called as vascular tissues?
  70. Why are Xylem and Phloem known as complex permanent tissues?
  71. Why do meristematic cells lack vacuoles?
  72. Muscles contain special proteins called \_\_\_\_\_ that help in muscle movement.
    - (a) receptor proteins
    - (b) enzymes
    - (c) nucleic proteins (DNA, RNA)
    - (d) contractile proteins (actin and myosin)
- .....

**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 6**  
**TISSUES**

1. Which of the following tissues has dead cells?
  - (a) Parenchyma
  - (b) Sclerenchyma
  - (c) Collenchyma
  - (d) Epithelial tissue
2. Find out incorrect sentence
  - (a) Parenchymatous tissues have intercellular spaces
  - (b) Collenchymatous tissues are irregularly thickened at corners
  - (c) Apical and intercalary meristems are permanent tissues
  - (d) Meristematic tissues, in its early stage, lack vacuoles
3. Girth of stem increases due to
  - (a) apical meristem
  - (b) lateral meristem
  - (c) intercalary meristem
  - (d) vertical meristem
4. Which cell does not have perforated cell wall?
  - (a) Tracheids
  - (b) Companion cells
  - (c) Sieve tubes
  - (d) Vessels
5. Intestine absorb the digested food materials. What type of epithelial cells are responsible for that?
  - (a) Stratified squamous epithelium
  - (b) Columnar epithelium
  - (c) Spindle fibres
  - (d) Cuboidal epithelium
6. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be the possible reason?
  - (a) Tendon break
  - (b) Break of skeletal muscle
  - (c) Ligament break
  - (d) Areolar tissue break

7. While doing work and running, you move your organs like hands, legs etc. Which among the following is correct?
- (a) Smooth muscles contract and pull the ligament to move the bones
  - (b) Smooth muscles contract and pull the tendons to move the bones
  - (c) Skeletal muscles contract and pull the ligament to move the bones
  - (d) Skeletal muscles contract and pull the tendon to move the bones
8. Which muscles act involuntarily?
- (i) Striated muscles
  - (ii) Smooth muscles
  - (iii) Cardiac muscles
  - (iv) Skeletal muscles
- (a) (i) and (ii)
  - (b) (ii) and (iii)
  - (c) (iii) and (iv)
  - (d) (i) and (iv)
9. Meristematic tissues in plants are
- (a) localised and permanent
  - (b) not limited to certain regions
  - (c) localised and dividing cells
  - (d) growing in volume
10. Which is *not* a function of epidermis?
- (a) Protection from adverse condition
  - (b) Gaseous exchange
  - (c) Conduction of water
  - (d) Transpiration
11. Select the incorrect sentence
- (a) Blood has matrix containing proteins, salts and hormones
  - (b) Two bones are connected with ligament
  - (c) Tendons are non-fibrous tissue and fragile
  - (d) Cartilage is a form of connective tissue
12. Cartilage is not found in
- (a) nose
  - (b) ear
  - (c) kidney
  - (d) larynx



**13.** Fats are stored in human body as

- (a) cuboidal epithelium
- (b) adipose tissue
- (c) bones
- (d) cartilage

**14.** Bone matrix is rich in

- (a) fluoride and calcium
- (b) calcium and phosphorus
- (c) calcium and potassium
- (d) phosphorus and potassium

**15.** Contractile proteins are found in

- (a) bones
- (b) blood
- (c) muscles
- (d) cartilage

**16.** Voluntary muscles are found in

- (a) alimentary canal
- (b) limbs
- (c) iris of the eye
- (d) bronchi of lungs

**17.** Nervous tissue is not found in

- (a) brain
- (b) spinal cord
- (c) tendons
- (d) nerves

**18.** Nerve cell does not contain

- (a) axon
- (b) nerve endings
- (c) tendons
- (d) dendrites

**19.** Which of the following helps in repair of tissue and fills up the space inside the organ?

- (a) Tendon
- (b) Adipose tissue
- (c) Areolar
- (d) Cartilage

- 20.** The muscular tissue which function throughout the life continuously without fatigue is
- (a) skeletal muscle
  - (b) cardiac muscle
  - (c) smooth muscle
  - (d) voluntary muscle
- 21.** Which of the following cells is found in the cartilaginous tissue of the body?
- (a) Mast cells
  - (b) Basophils
  - (c) Osteocytes
  - (d) Chondrocytes
- 22.** The dead element present in the phloem is
- (a) companion cells
  - (b) phloem fibres
  - (c) phloem parenchyma
  - (d) sieve tubes
- 23.** Which of the following does not lose their nucleus at maturity?
- (a) Companion cells
  - (b) Red blood cells
  - (c) Vessel
  - (d) Sieve tube cells
- 24.** In desert plants, rate of water loss gets reduced due to the presence of
- (a) cuticle
  - (b) stomata
  - (c) lignin
  - (d) suberin
- 25.** A long tree has several branches. The tissue that helps in the side ways conduction of water in the branches is
- (a) collenchyma
  - (b) xylem parenchyma
  - (c) parenchyma
  - (d) xylem vessels
- 26.** If the tip of sugarcane plant is removed from the field, even then it keeps on growing in length. It is due to the presence of
- (a) cambium
  - (b) apical meristem

- (c) lateral meristem
- (d) intercalary meristem

**27.** A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years the nail will

- (a) move downwards
- (b) move upwards
- (c) remain at the same position
- (d) move sideways

**28.** Parenchyma cells are

- (a) relatively unspecified and thin walled
- (b) thick walled and specialised
- (c) lignified
- (c) none of these

**29.** Flexibility in plants is due to

- (a) collenchyma
- (b) sclerenchyma
- (c) parenchyma
- (d) chlorenchyma

**30.** Cork cells are made impervious to water and gases by the presence of

- (a) cellulose
- (b) lipids
- (c) suberin
- (d) lignin

**31.** Survival of plants in terrestrial environment has been made possible by the presence of

- (a) intercalary meristem
- (b) conducting tissue
- (c) apical meristem
- (d) parenchymatous tissue

**32.** Choose the wrong statement

- (a) The nature of matrix differs according to the function of the tissue
- (b) Fats are stored below the skin and in between the internal organs
- (c) Epithelial tissues have intercellular spaces between them
- (d) Cells of striated muscles are multinucleate and unbranched

**33.** Animals of colder regions and fishes of cold water have thicker layer of subcutaneous fat. Describe why?

**34.** The water conducting tissue generally present in gymnosperm is

- (a) vessels
- (b) sieve tube
- (c) tracheids
- (d) xylem fibres

**35.** Match the column (A) with the column (B)

- | (A)                                    | (B)                    |
|--|------------------------|
| (a) Fluid connective tissue            | (i) Subcutaneous layer |
| (b) Filling of space inside the organs | (ii) Cartilage         |
| (c) Striated muscle                    | (iii) Skeletal muscle  |
| (d) Adipose tissue                     | (iv) Areolar tissue    |
| (e) Surface of joints                  | (v) Blood              |
| (f) Stratified squamous epithelium     | (vi) Skin              |

**36.** Match the column (A) with the column (B)

- | (A)                  | (B)                            |
|----------------------|--------------------------------|
| (a) Parenchyma       | (i) Thin walled, packing cells |
| (b) Photosynthesis   | (ii) Carbon fixation           |
| (c) Aerenchyma       | (iii) Localized thickenings    |
| (d) Collenchyma      | (iv) Buoyancy                  |
| (e) Permanent tissue | (v) Sclerenchyma               |

**37.** If a potted plant is covered with a glass jar, water vapours appear on the wall of glass jar.

Explain why?

**38.** Name the different components of xylem and draw a living component?

**39.** Draw and identify different elements of phloem.

**40.** Write true (T) or false (F)

- (a) Epithelial tissue is protective tissue in animal body.
- (b) The lining of blood vessels, lung alveoli and kidney tubules are all made up of epithelial tissue.
- (c) Epithelial cells have a lot of intercellular spaces.
- (d) Epithelial layer is permeable layer.
- (e) Epithelial layer does not allow regulation of materials between body and external environment.

**41.** Differentiate between voluntary and involuntary muscles. Give one example of each type.

**42.** Water hyacinth float on water surface. Explain.

**43.** Which structure protects the plant body against the invasion of parasites?

**44.** Differentiate the following activities on the basis of voluntary (V) or involuntary (I V) muscles.

- (a) Jumping of frog
- (b) Pumping of the heart
- (c) Writing with hand
- (d) Movement of chocolate in your intestine

**45.** Fill in the blanks

- (a) Lining of blood vessels is made up of———.
- (b) Lining of small intestine is made up of ———.
- (c) Lining of kidney tubules is made up of———.
- (d) Epithelial cells with cilia are found in———of our body.

**46.** Fill in the blanks

- (a) Cork cells possess ———on their walls that makes it impervious to gases and water.
- (b) ——— have tubular cells with perforated walls and are living in nature.
- (c) Bone possesses a hard matrix composed of ———and ———.

**47.** Why is epidermis important for the plants?

**48.** Fill in the blanks

- (a) ———are forms of complex tissue.
- (b) ———have guard cells.
- (c) Cells of cork contain a chemical called———
- (d) Husk of coconut is made of ———tissue.
- (e) ———gives flexibility in plants.
- (f) ———and ———are both conducting tissues.
- (g) Xylem transports ———and ———from soil.
- (h) Phloem transport ———from ———to other parts of the plant.

**49.** Differentiate between sclerenchyma and parenchyma tissues. Draw well labelled diagram.

**50.** Describe the structure and function of different types of epithelial tissues. Draw diagram of each type of epithelial tissue.

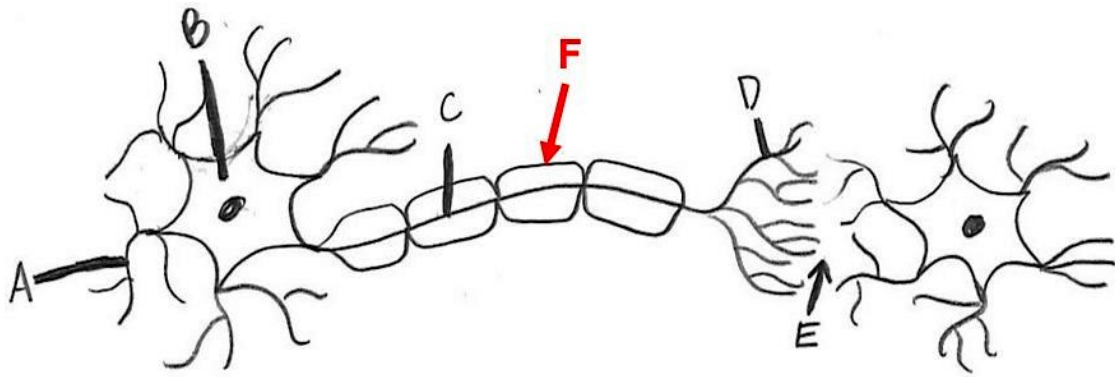
**51.** Draw well labelled diagrams of various types of muscles found in human body.

**52.** Give reasons for

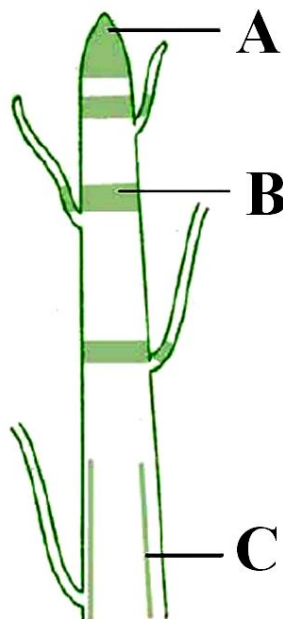
- (a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.
- (b) Intercellular spaces are absent in sclerenchymatous tissues.
- (c) We get a crunchy and granular feeling, when we chew pear fruit.
- (d) Branches of a tree move and bend freely in high wind velocity.

(e) It is difficult to pull out the husk of a coconut tree.

53. List the characteristics of cork. How are they formed? Mention their role.
54. Why are xylem and phloem called complex tissues? How are they different from one other?
55. (a) Differentiate between meristematic and permanent tissues in plants  
(b) Define the process of differentiation  
(c) Name any two simple and two complex permanent tissues in plants.
56. Label the parts of the neuron below:



57. (a) Observe the diagram given below carefully and label the regions marked A, B and C in the diagram.



(b) Which meristematic tissue is responsible for increase in length of root and for the transformation of the stem of a plant into trunk when it grows into a tree.



## CHAPTER – 7

# DIVERSITY IN LIVING ORGANISMS

### CLASSIFICATION

**Biodiversity:** The variety of living beings found in geographical area is called biodiversity of that area. Amazon rainforests is the largest biodiversity hotspot in the world.

**Need for Classification:** Classification is necessary for easier study of living beings. Without proper classification, it would be impossible to study millions of organisms which exist on this earth.

### BASIS OF CLASSIFICATION

Ancient Greek thinker Aristotle classified living beings on the basis of their habitat. He classified them into two groups, i.e. those living in water and those living on land. But his classification was too simple to justify inclusion of a particular organism into a particular group.

Some examples of scientific bases of classification are as follows:

**Organization of nucleus:** Nucleus may or may not be organized in an organism. On this basis, organisms can be divided into two groups, viz. prokaryotes and eukaryotes.

#### (a) Prokaryotes:

When nucleus is not organized, i.e. nuclear materials are not membrane bound; the organism is called prokaryote.

#### (b) Eukaryotes:

When nucleus is organized, i.e. nuclear materials are membrane bound; the organism is called eukaryote.

**Number of cells:** An organism can be composed of a single cell or many cells. An organism with a single cell is called unicellular organism. On the other hand, an organism with more than one cell is called multicellular organism.

### Mode of Nutrition

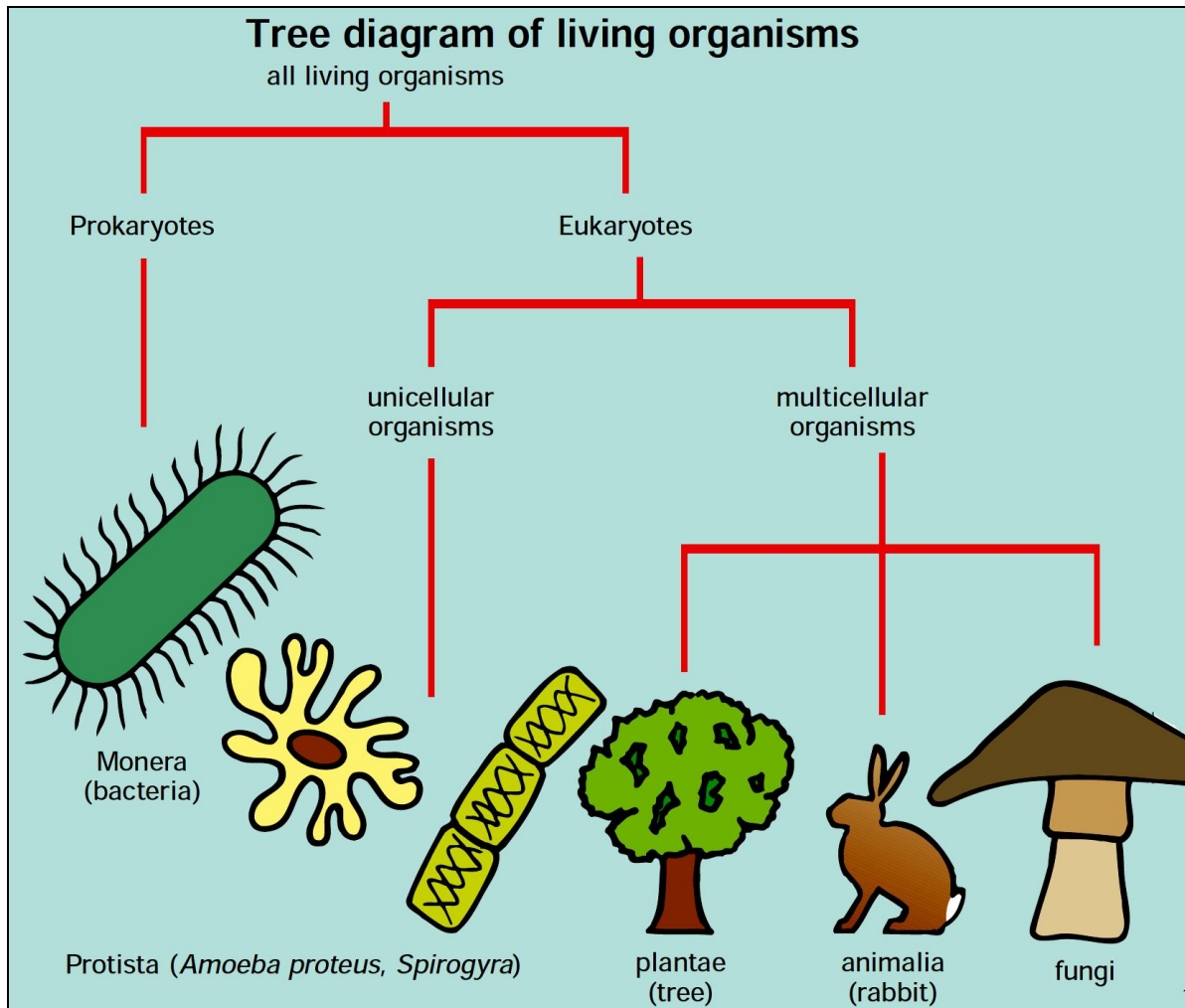
On this basis, organisms can be divided into two broad groups, i.e. autotrophs and heterotrophs. An autotroph makes its own food, while a heterotroph depends on other organisms for food.

### Level of Organisation

Even in case of multicellular organisms, there can be different levels of organization. When a cell is responsible for all the life processes, it is called cellular level or organization. When some cells group together to perform specific function, it is called tissue level of organization. When tissues group together to form some organs, it is called organ level of organization. Similarly organ system level of organization is seen in complex organisms.

### Classification and Evolution

It is a well established fact that all the life forms have evolved from a common ancestor. Scientists have proved that the life begun on the earth in the form of simple life forms. During the course of time, complex organism evolved from them. So, classification is also based on evolution. A simple organism is considered to be primitive while a complex organism is considered to be advanced.

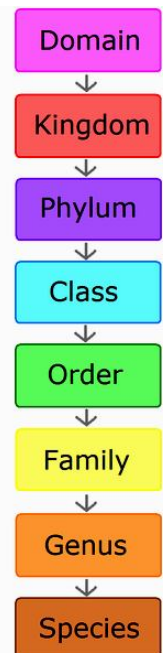


### FIVE KINGDOM CLASSIFICATION BY ROBERT WHITTAKER (1959)

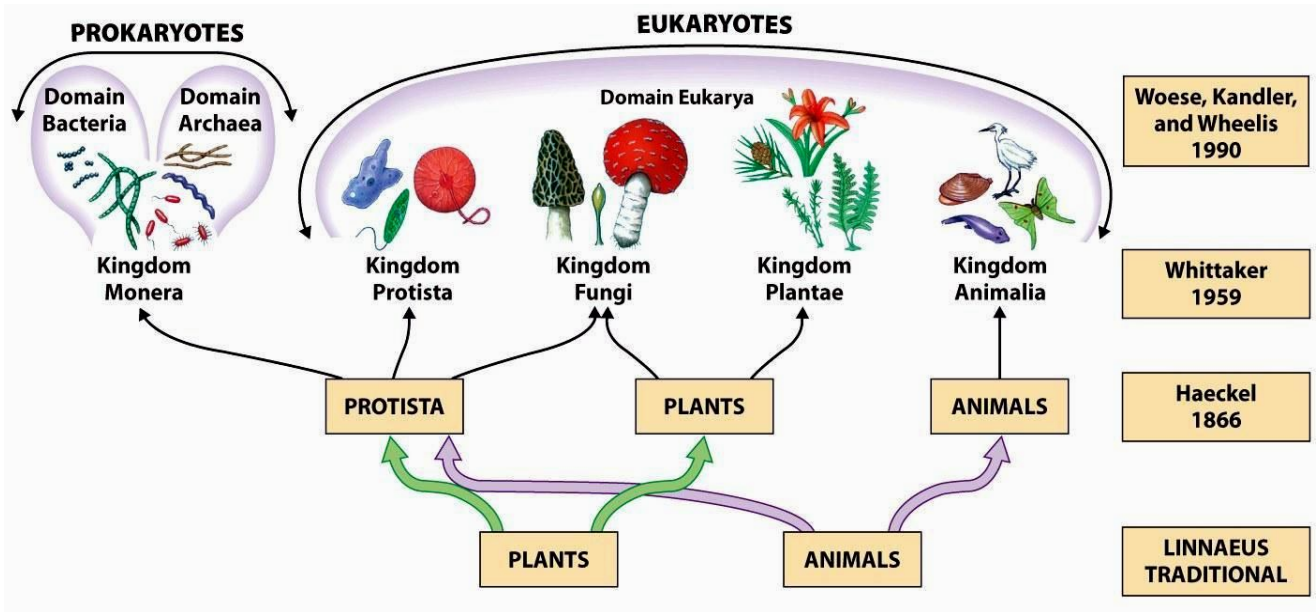
This is the most accepted system of classification.

The classification Whittaker proposed has five kingdoms: Monera, Protista, Fungi, Plantae and Animalia, and is widely used. These groups are formed on the basis of their cell structure, mode and source of nutrition and body organisation. Further classification is done by naming the sub-groups at various levels as given in the following scheme:

Thus, by separating organisms on the basis of a hierarchy of characteristics into smaller and smaller groups, we arrive at the basic unit of classification, which is a 'species'. The important characteristics of the five kingdoms of Whittaker are as follows:





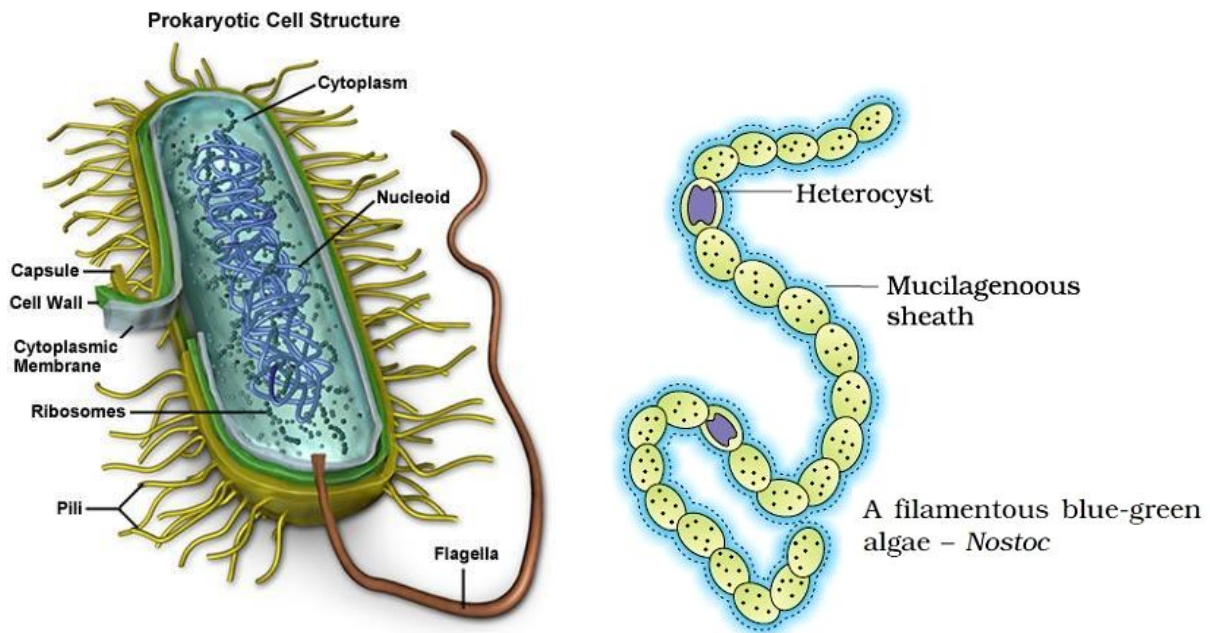


## I. MONERA

These are prokaryotes; which means nuclear materials are not membrane bound in them. They may or may not have cell wall.

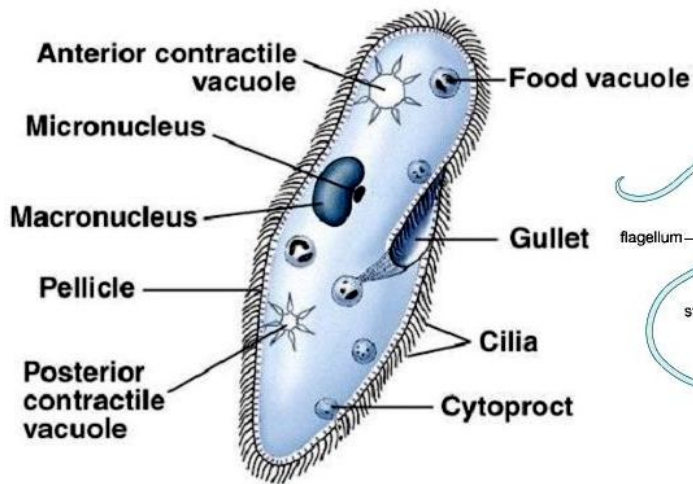
The mode of nutrition of organisms in this group can be either by synthesising their own food (autotrophic) or getting it from the environment (heterotrophic).

All organisms of this kingdom are unicellular. Examples: bacteria, blue green algae (cyanobacteria) and mycoplasma.

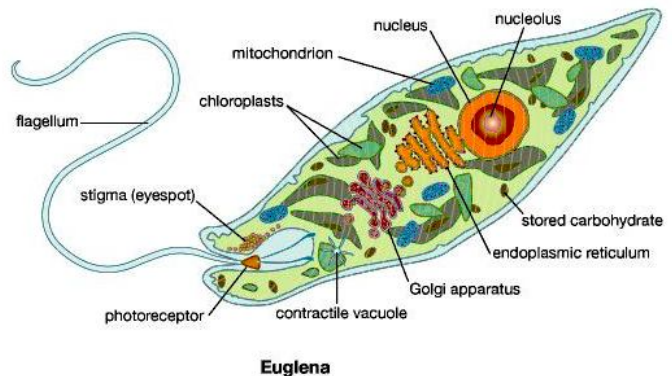


## 2. PROTISTA

These are eukaryotes and unicellular. Some organisms use cilia or flagella for locomotion. They can be autotrophic or heterotrophic. Examples: unicellular algae, diatoms and protozoans.



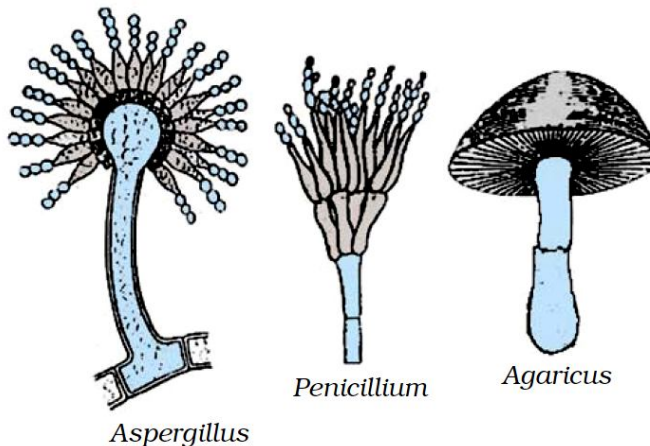
**Fig. Paramecium**



**Euglena**

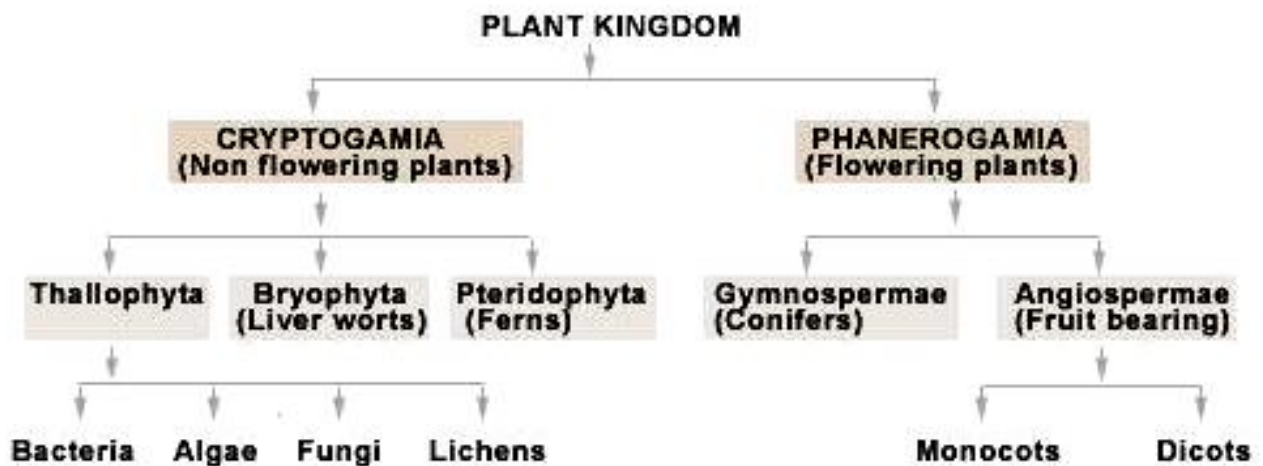
### 3. FUNGI

These are heterotrophic and have cell wall. The cell wall is made of chitin. Most of the fungi are unicellular. Many of them have the capacity to become multicellular at certain stage in life. They feed on decaying organic materials. Such a mode of nutrition is called saprophytic. Some fungi live in symbiotic relationship with other organisms, while some are parasites as well. Examples: yeast, penicillium, aspergillus, mucor, etc.



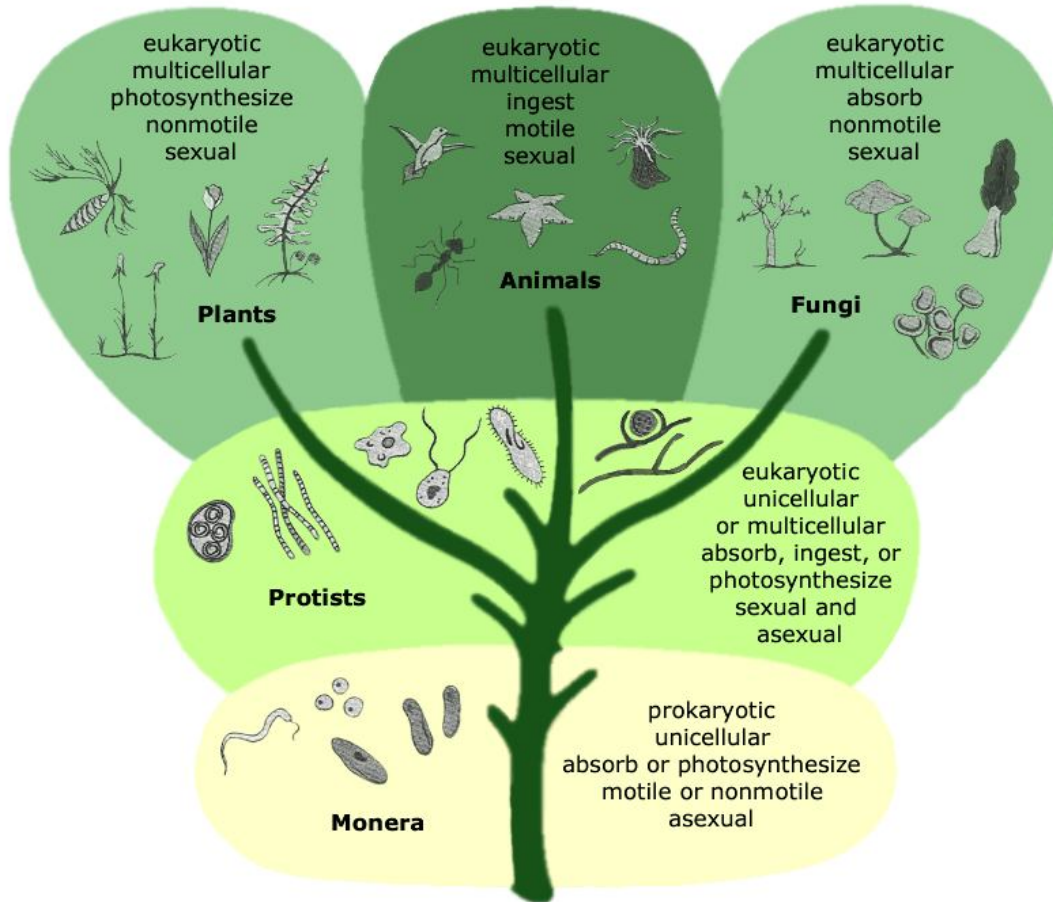
### 4. PLANTAE

These are multicellular and autotrophs. Presence of chlorophyll is a distinct characteristic of plants, because of which they are capable of doing photosynthesis. Cell wall is present.



## 5. ANIMALIA

These are multicellular and heterotrophs. Cell wall is absent.



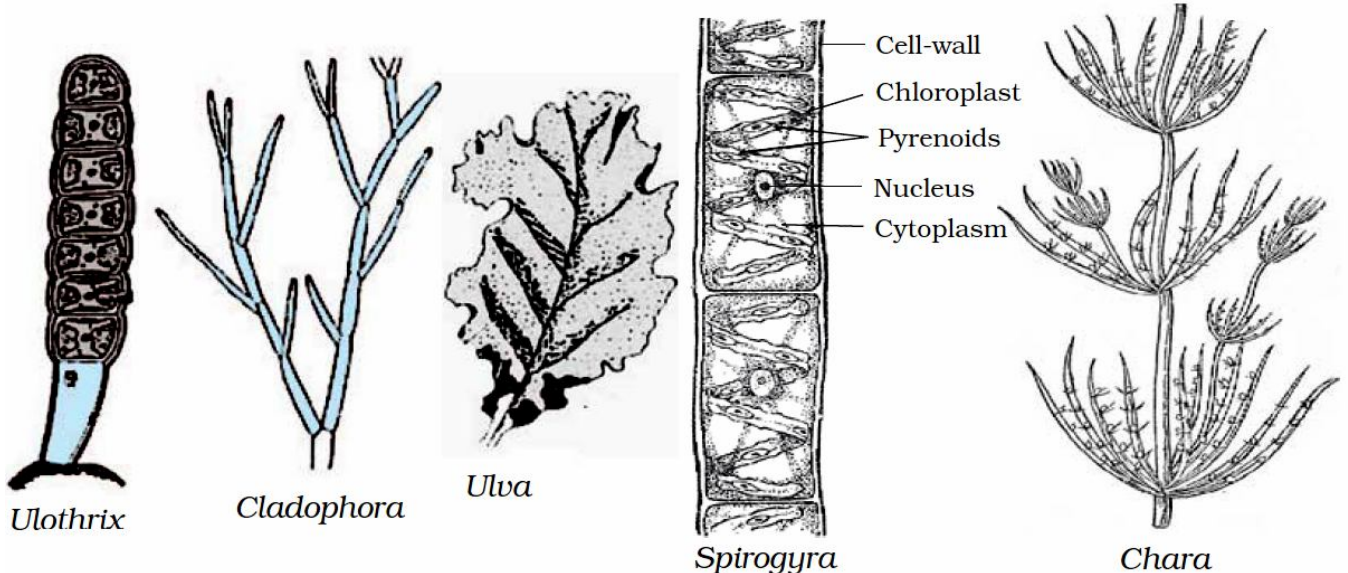
**The Five-kingdom System of Classification**

## PLANTAE (PLANT KINGDOM)

The Plant Kingdom can be further classified into five divisions. Their key characteristics are given below:

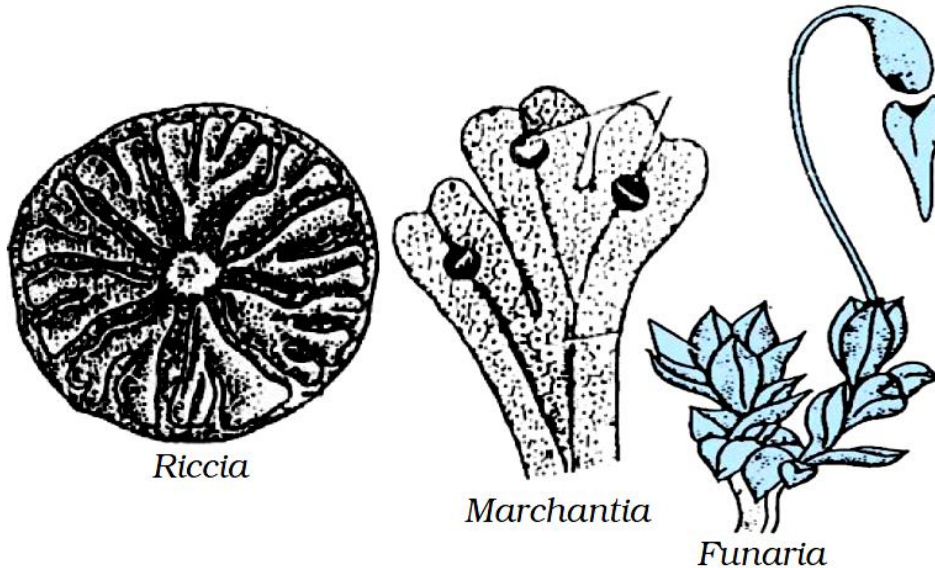
### 1. THALLOPHYTA

The plant body is simple thallus type. The plant body is not differentiated into root, stem and leaves. They are commonly known as algae. Examples: Spirogyra, chara, volvox, ulothrix, etc.



## 2. BRYOPHYTA

Plant body is differentiated into stem and leaf like structure. Vascular system is absent, which means there is no specialized tissue for transportation of water, minerals and food. Bryophytes are also known as the amphibians of the plant kingdom, because they need water to complete a part of their life cycle. Examples: Moss, marchantia.



## 3. PTERIDOPHYTA

Plant body is differentiated into root, stem and leaf. Vascular system is present. They do not bear seeds and hence are called cryptogams. Plants of rest of the divisions bear seeds and hence are called phanerogams. Examples: Marsilear, ferns, horse tails, etc.

The **primary root is short-lived** and is soon replaced by **adventitious roots**

**Stem** may be aerial or underground.

The **leaves** may be scaly (*Equisetum*), simple and sessile (*Lycopodium*) or large and pinnately compound (*Ferns*).

The leaves in pteridophyta are small (**microphylls**) as in *Selaginella* or large (**macrophylls**) as in *Ferns*.

In pteridophytes, the xylem consists of only **tracheids** and phloem consists of **sieve cells** only.

**Secondary growth is not seen** in Pteridophytes due to **absence of cambium**.



## 4. GYMNOSPERMS

They bear seeds. Seeds are naked, i.e. are not covered. The word 'gymnos' means naked and 'sperma' means seed. They are perennial plants. Examples: Pine, cycas, deodar, etc.

The plant body i.e. sporophyte is differentiated into root, stem and leaves

**ROOTS :**

Specialized **Coralloid roots of Cycas** show association with  $N_2$ -fixing blue-green algae and **Pinus** show association with **endophytic fungi called mycorrhizae**

**STEM :**

The gymnospermic **stem** is mostly erect, aerial, solid and cylindrical.  
In **Cycas**, it is **unbranched**, while in **Pinus, Cedrus and conifers** it is **branched**

**LEAVES :**

The **leaves** are dimorphic.  
The **foliage leaves** are simple, needle like or pinnately compound  
**Scale leaves** are small, membranous and brown.



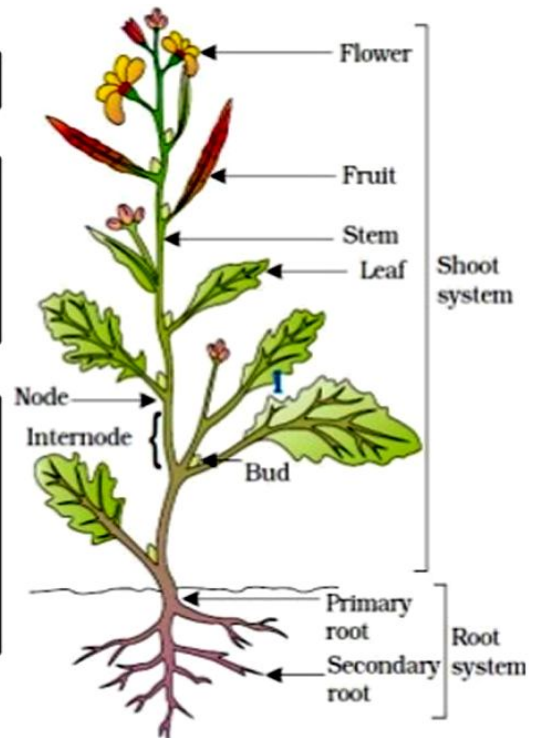
**5. ANGIOSPERMS**

The seeds are covered. The word ‘angios’ means covered. There is great diversity in species of angiosperm. Angiosperms are also known as flowering plants, because flower is a specialized organ meant for reproduction. Angiosperms are further divided into two groups, viz. monocotyledonous and dicotyledonous.

Most advanced division of the flowering plants

Highly evolved plants, primarily adapted to terrestrial habitat.  
**Wolffia** is the **smallest** angiosperm, 1 mm in size and **Eucalyptus** grows to over 100 meters.

The plant body is differentiated into **root, stem and leaves**.  
It has **flowers, fruits and seeds**.  
Vascular tissues are well developed.  
Xylem shows **vessels or tracheae** while phloem has **sieve tubes and companion cells**.



**(a) Monocotyledonous**

There is single seed leaf in a seed. A seed leaf is a baby plant. Examples: wheat, rice, maize, etc.

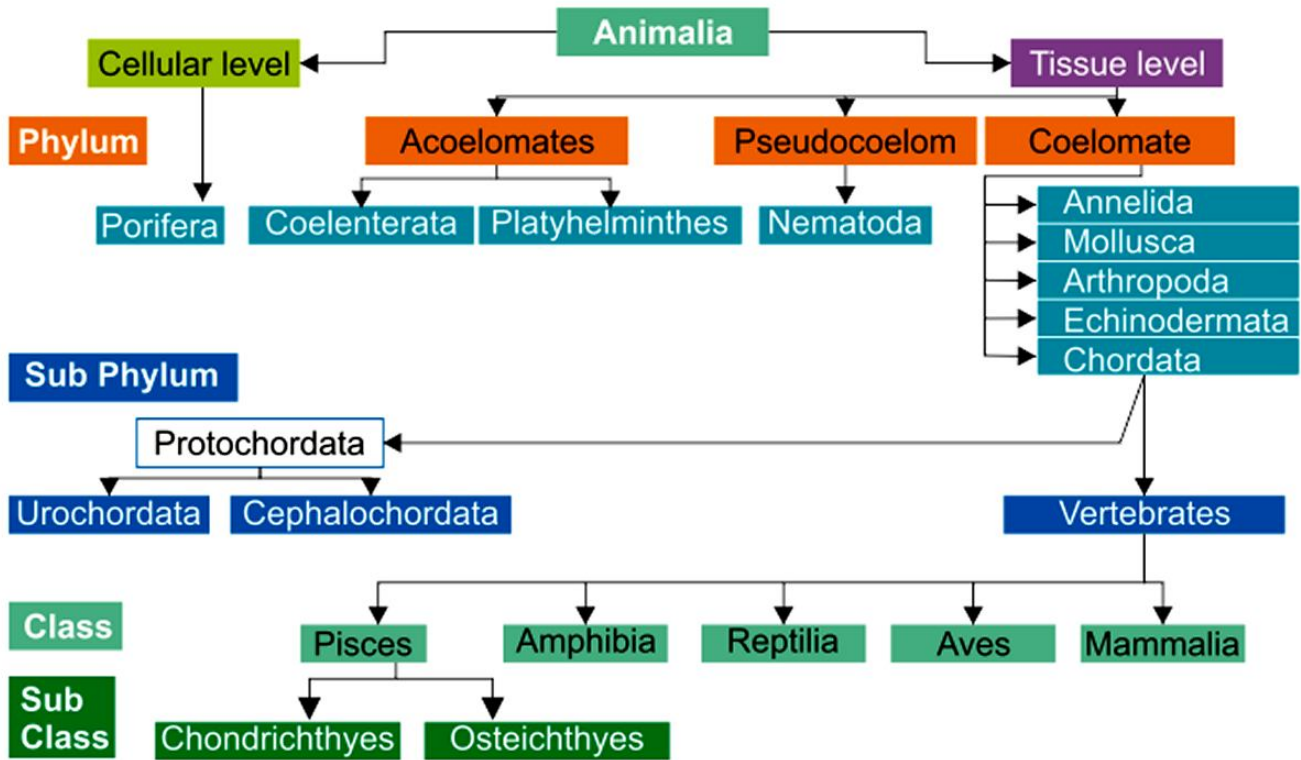
**(b) Dicotyledonous**

There are two cotyledons in a seed. Examples: Mustard, gram, mango, etc.

# KINGDOM ANIMALIA

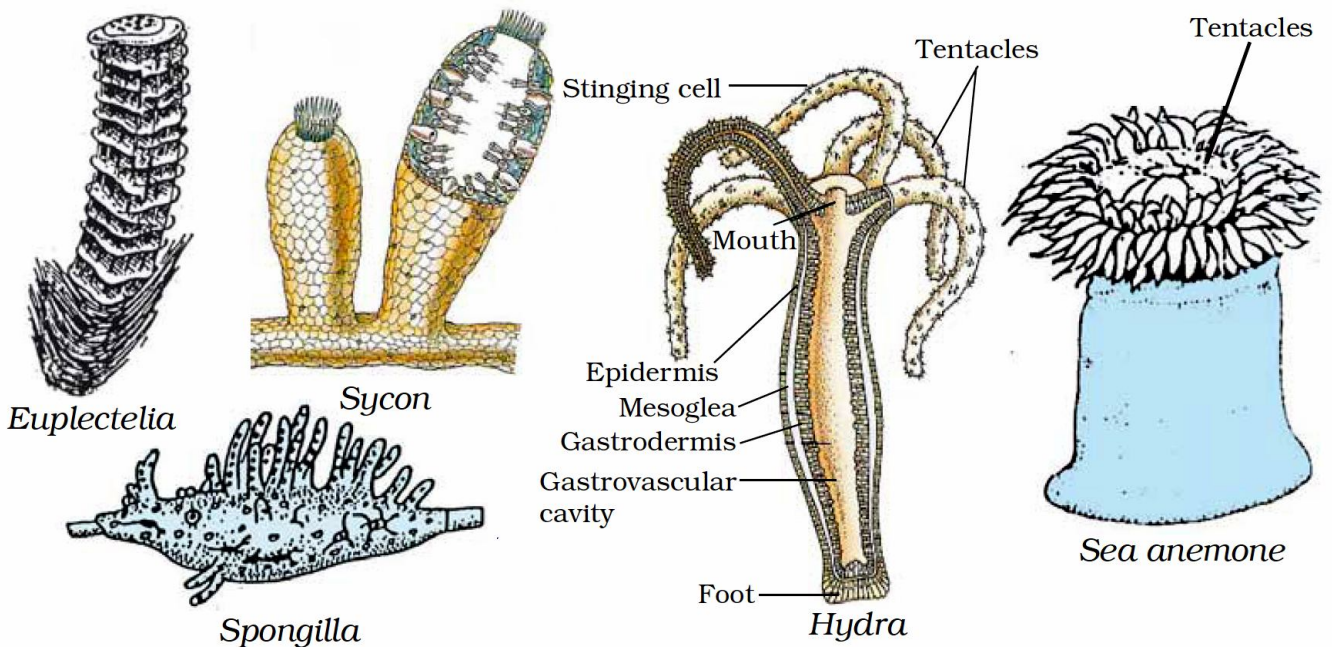
The animal kingdom is classified into different phyla. Their detail is given below:

## Classification of Kingdom Animalia



### 1. PORIFERA

These animals have pores all over their body. The pores lead into the canal system. Water flows through the canal system and facilitates entry of food and exchange of other materials. The animal is not differentiated into tissues. The body is covered with a hard outer skeleton. These are commonly known as sponges. They are marine animals. Examples: Sycon, spongilla, euplectelea, etc.



**Fig. Porifera**

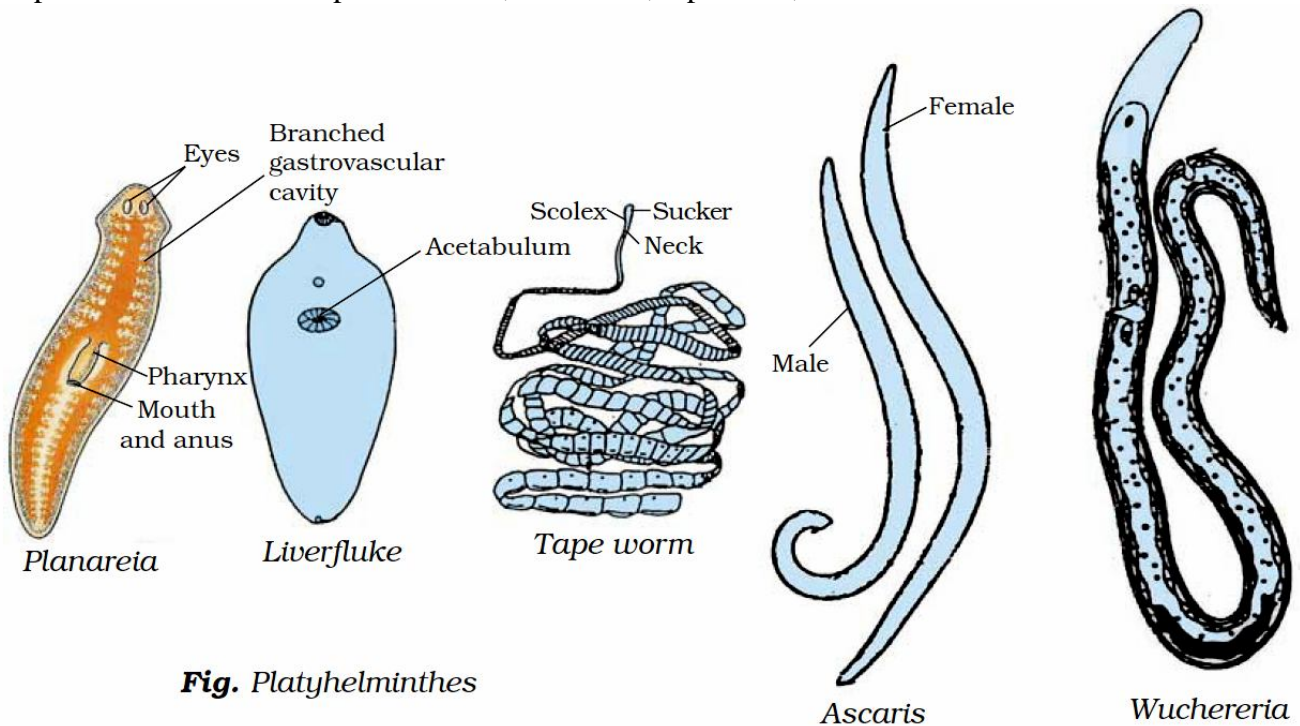
**Fig. Coelenterata**

## 2. COELENTERATA

The body is made up of a coelom (cavity) with a single opening. The body wall is made up of two layers of cells (diploblastic). Some of the species live a solitary life while others live in colonies. Examples: Hydra, Jelly fish, Sea anemone, etc.

## 3. PLATYHELMINTHES

The body is flattened from top to bottom and hence the name platyhelminthes. These are commonly known as flatworms. The body wall is composed of three layers of cells (triploblastic). Because of three layers, it is possible to form some organs as well. But a proper coelom is absent in platyhelminthes and hence proper organs are absent. They are free-living or parasitic animals. Examples: Planaria, liver fluke, tapeworm, etc.



**Fig.** Platyhelminthes

**Fig.** Nematodes (Aschelminthes)

## 4. NEMATOHELMINTHES

The body is bilaterally symmetric and there are three layers in the body wall. Animals are cylindrical in shape. A pseudocoelom is present and hence organs are absent. Examples: Roundworms, pinworms, filarial parasite (Wuchereria), etc.



**Nereis**

**Leech**

## 5. ANNELIDA

True body cavity is present in these animals. The body is divided into segments and hence the name annelida. Each segment is lined one after another and contains a set of organs. Examples: Earthworm, leech, Nereis, etc.

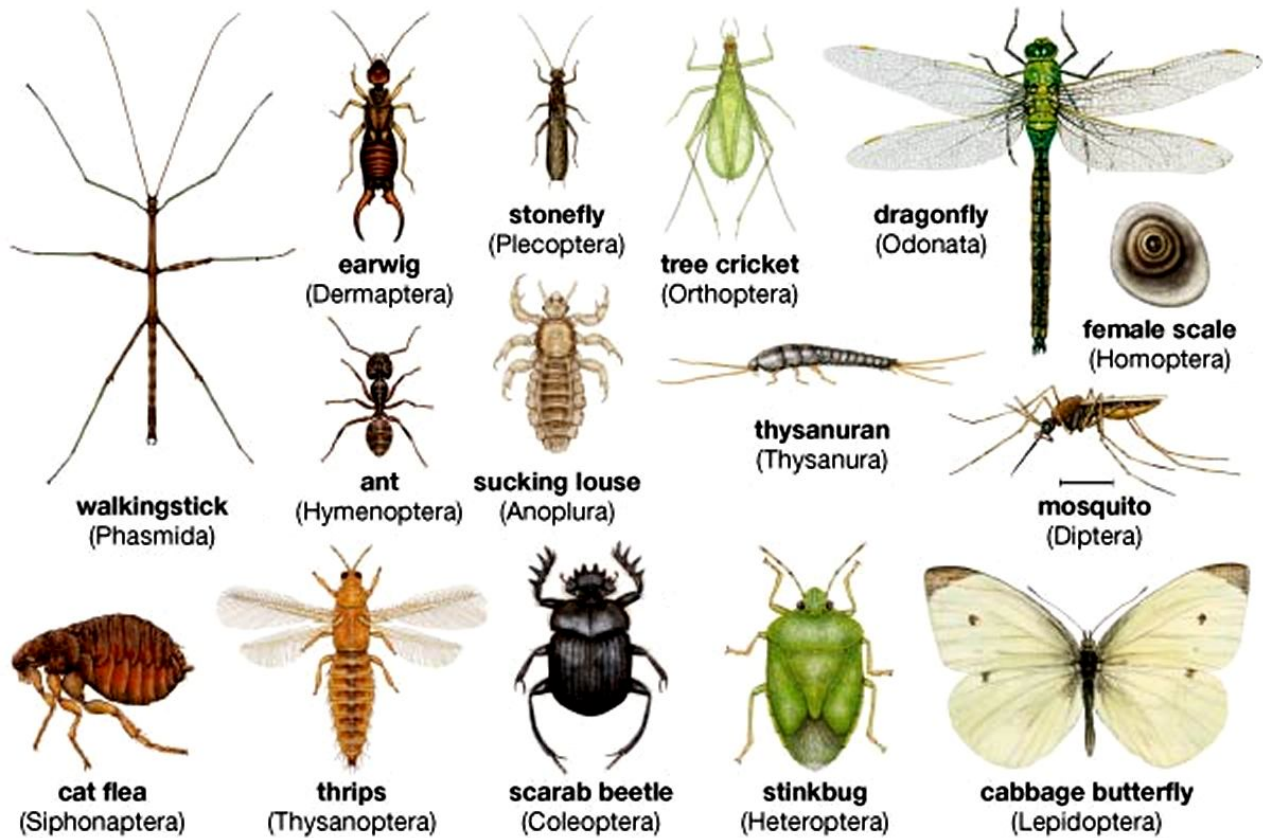


**Earthworms**

## 6. ARTHROPODA

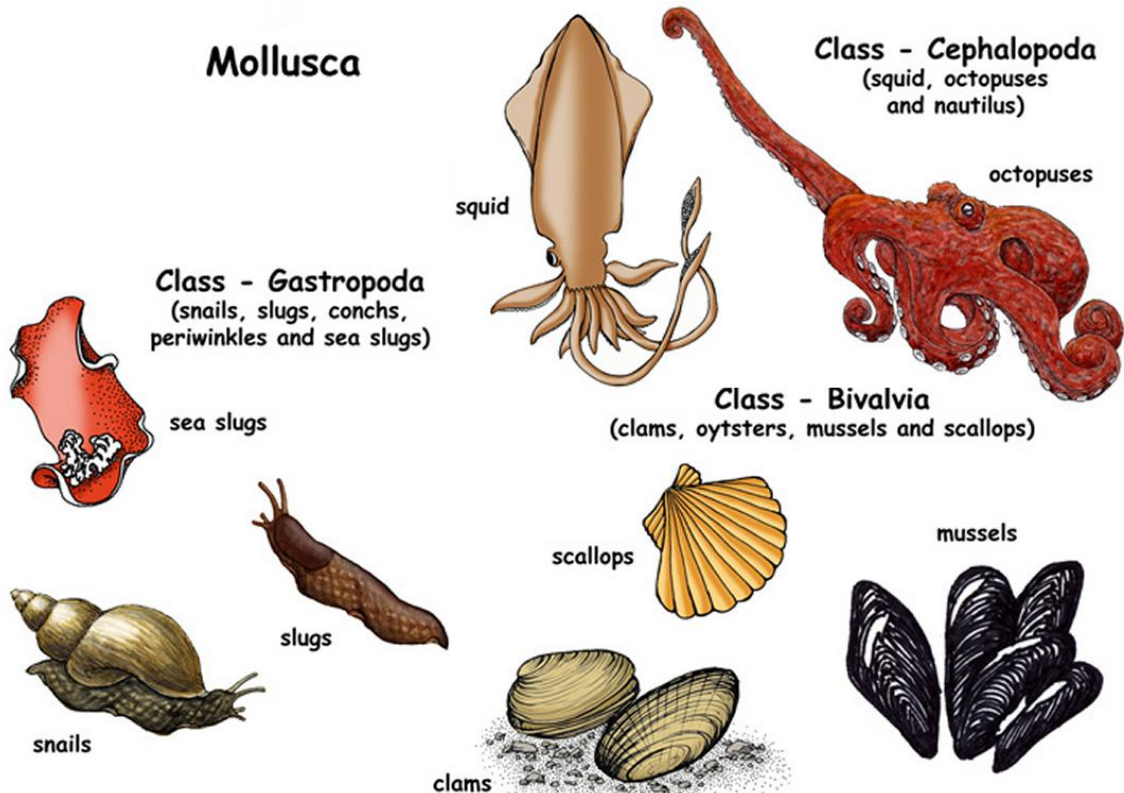
Animals have jointed appendages which gives the name arthropoda. Exoskeleton is present which is made of chitin. This is the

largest group of animals; in terms of number of species. Circulatory system is open, which means blood flows in the coelomic cavity. Examples: cockroach, housefly, spider, prawn, scorpion, etc.



## 7. MOLLUSCA

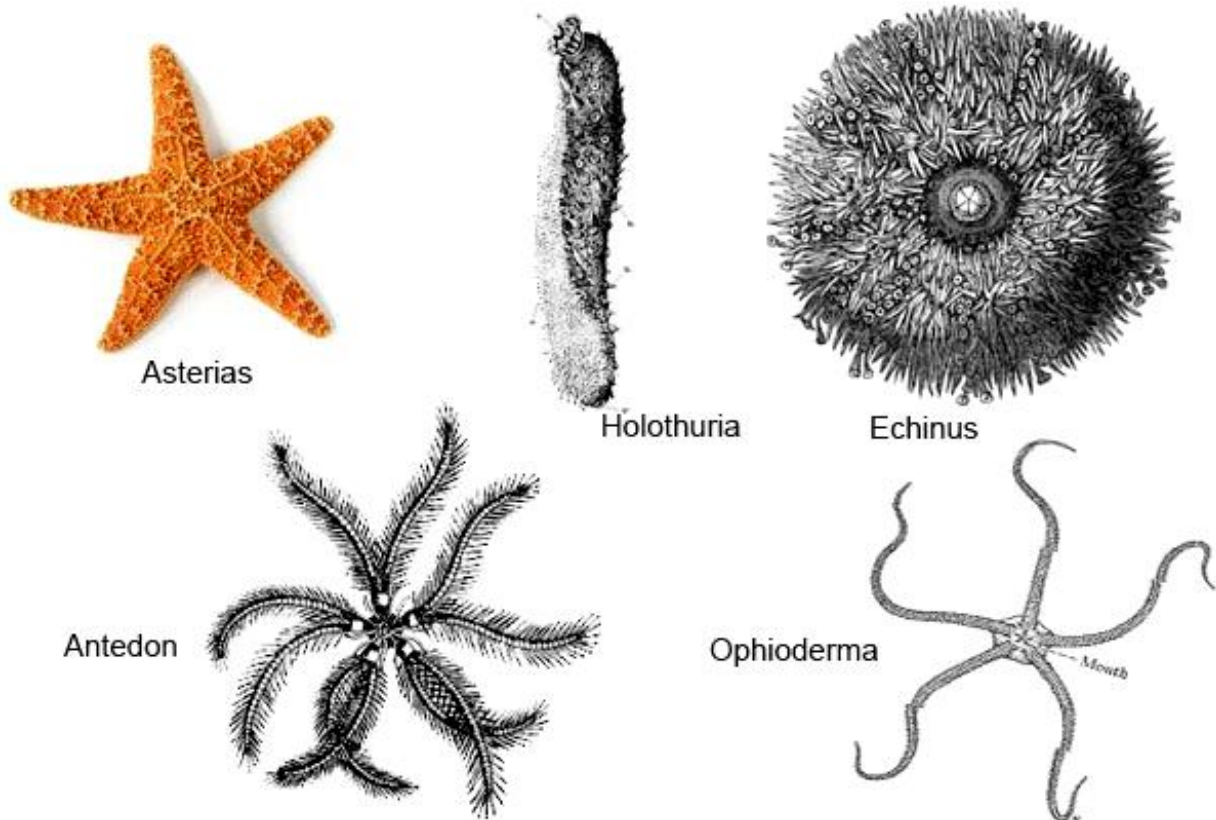
The animal has soft body; which is enclosed in a hard shell. The shell is made of calcium carbonate. Circulatory system is open and kidney like organ is present for excretion. The body has well developed muscular feet for locomotion. Examples: Snail, mussels, octopus, etc.





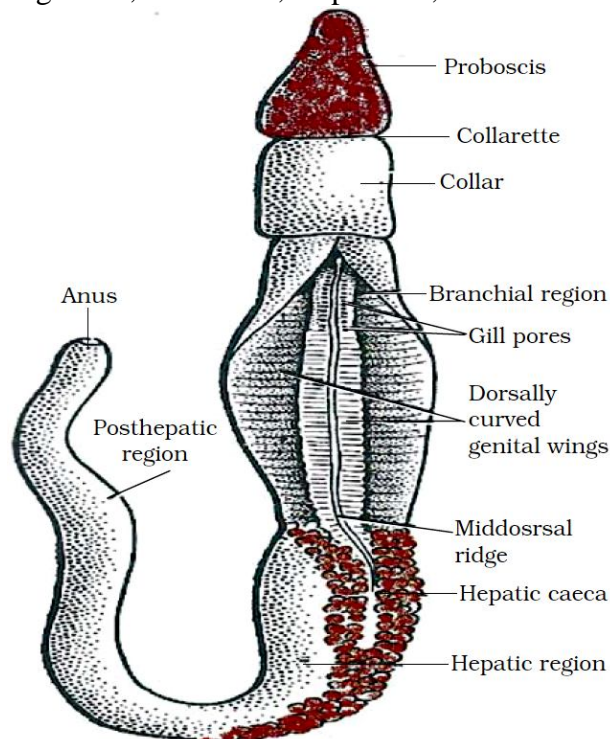
## 8. ECHINODERMATA

The body is covered with spines, which gives the name echinodermata. Body is radially symmetrical. The animals have well developed water canal system, which is used for locomotion. Skeleton is made of calcium carbonate. Examples: Starfish, sea urchins, etc.



## 9. PROTOCHORDATA

Animals are bilaterally symmetrical, triploblastic and coelomate. Notochord is present at least at some stages of life. Notochord is a long rod-like structure which runs along the back of the animal. This provides attachment points for muscles. It also separates the nervous tissues from the gut. Examples: Balanoglossus, herdmania, amphioxus, etc.



**Fig. A** Protochordata: *Balanoglossus*

## 10. VERTEBRATA:

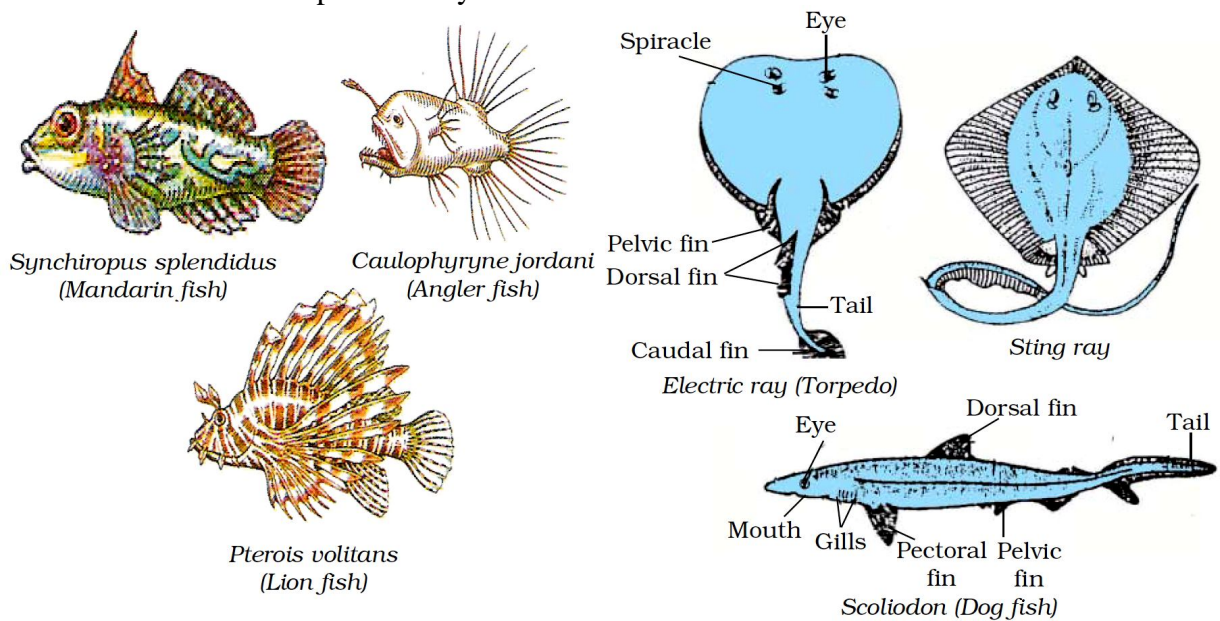
The notochord is replaced by a spinal column during embryonic stage. Following are the main characteristics of vertebrates:

- Notochord present; which is replaced by spinal column.
- Dorsal nerve chord is present.
- Animals are triploblastic and coelomate.
- Animals have paired gill pouches.

Vertebrates are divided into two super classes, viz. pisces and tetrapoda.

### A. PISCES

They are commonly known as fish. The body is streamlined. Muscular tail is present which assists in locomotion. Body is covered with scales. Paired gills are present; which can breathe oxygen dissolved in water. They are cold-blooded animals. The heart has only two chambers. They lay eggs. Fishes can be bony or cartilaginous. Shark is an example of cartilaginous fish. Rohu and katla are examples of bony fish.

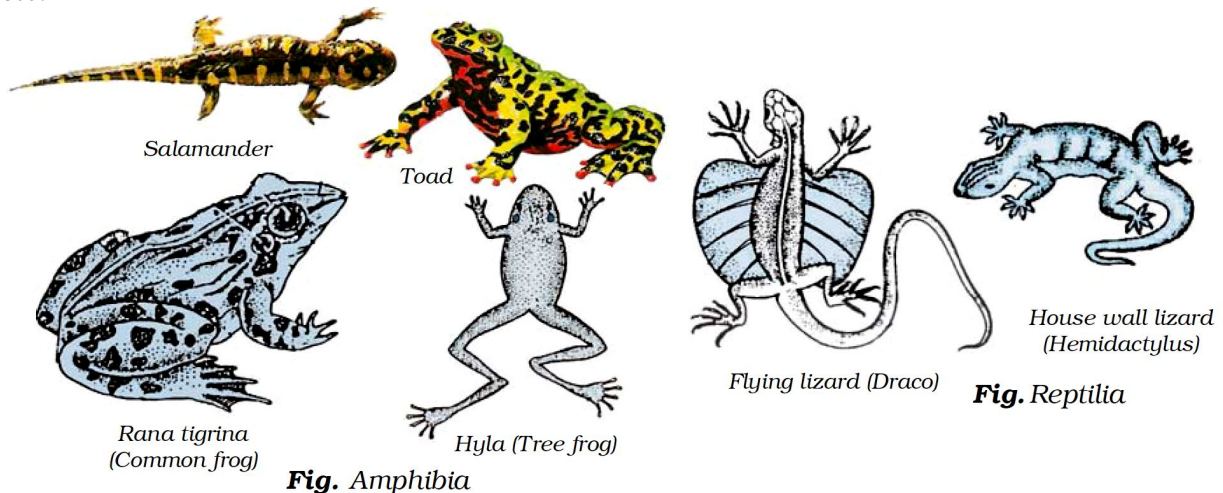


### B. TETRAPODA

Animals have four limbs for locomotion and hence the name tetrapoda. Tetrapoda is divided into four classes, viz. amphibia, reptilia, aves and mammalia.

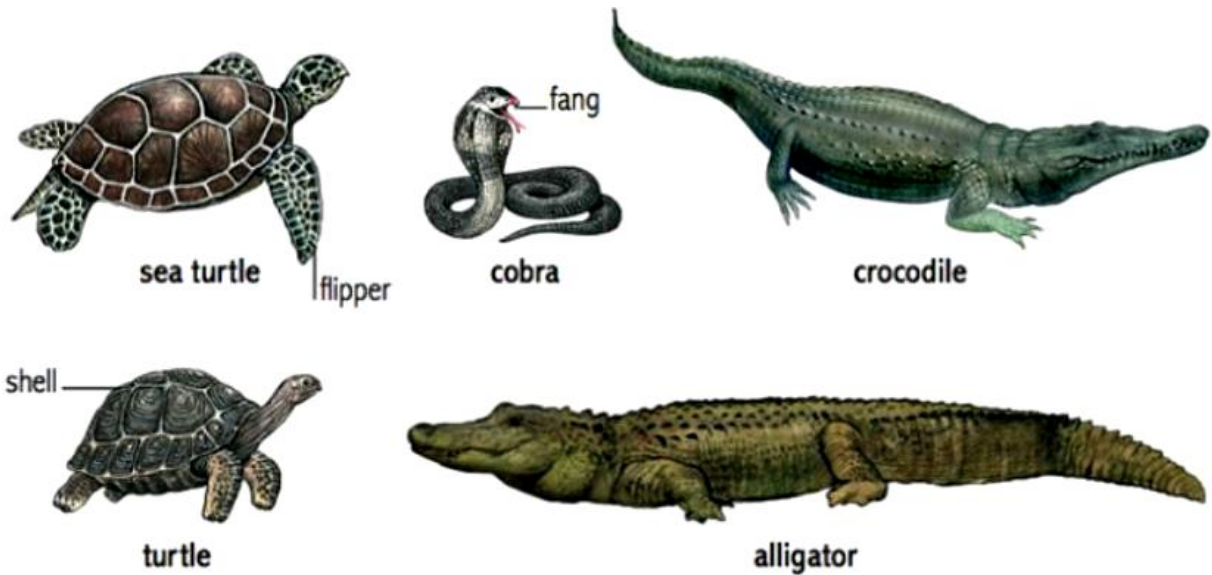
#### (1) Amphibia:

These animals are adapted to live both in water and land. Mucus glands on skin keep the skin moist. The animals breathe through skin when in water and through lungs when on land. The heart has three chambers. These are cold blooded animals. Examples: Frog, toad, salamander, etc.



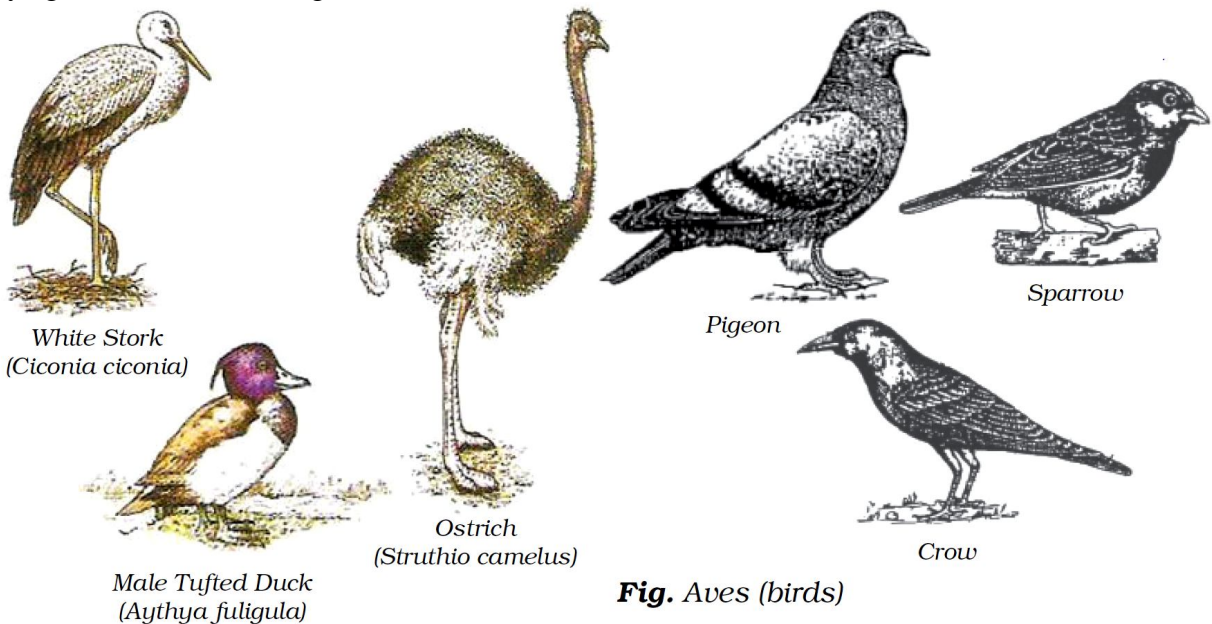
## (2) Reptilia:

These animals show crawling movement for locomotion. Skin is hardened to form scales. Most of the reptilians have three chambered heart but crocodile has four-chambered heart. They don't need water to lay eggs, rather eggs are covered with hard shells and laid on land. Examples: snakes, lizards, crocodile, turtle, etc.



## (3) Aves:

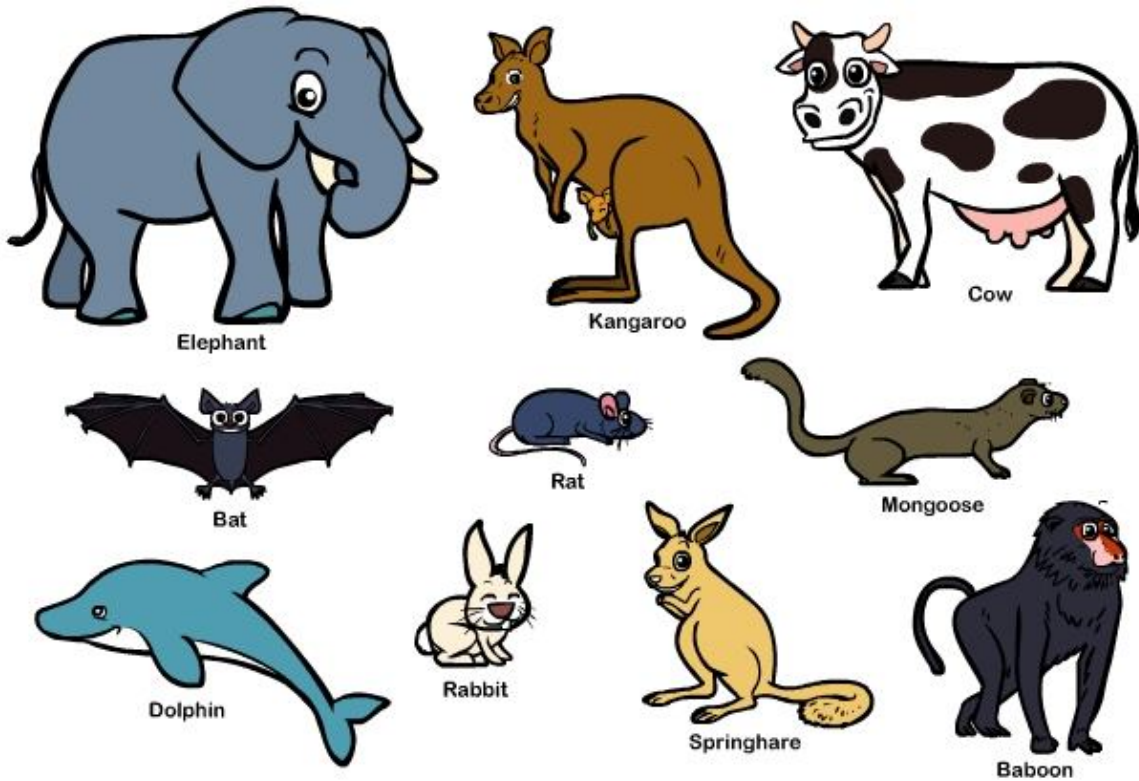
The body is covered with feathers. Forelimbs are modified into wings. These are warm-blooded animals. The heart has four chambers. Bones are hollow (pneumatic); which assists in flying. All the birds belong to this class.



**Fig. Aves (birds)**

## (4) Mammalia:




The body is covered with hairs. Skin has sweat glands and sebaceous glands. Mammary glands are present in females and are used for nourishing the young ones. Most of the mammals give birth to young ones and are called viviparous. Some of the mammals lay eggs and are called oviparous. Examples: human, chimpanzee, lion, platypus, horse, etc.



### BINOMIAL NOMENCLATURE OF ORGANISMS:

The system of binomial nomenclature was proposed by Carolus Linneaus (1707 – 1778). Conventions of writing biological name are as follows:

- The biological name is composed of two terms. The first term is called genetic name and the second term is called species name.
- The genus name starts with a capital letter, while the species name starts with a small letter.
- In print, the scientific name is written in italics.
- When handwritten, the genus name and species name need to be underlined separately.

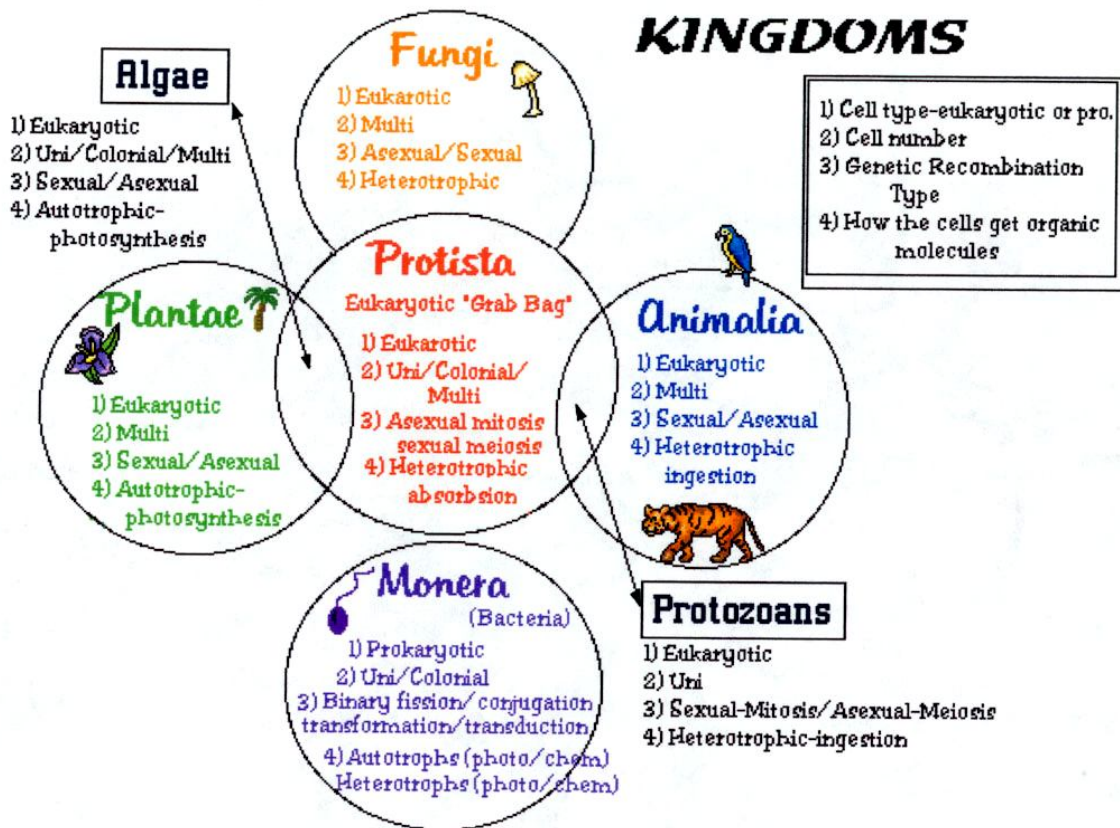
			
Kingdom	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Arthropoda
Class	Mammalia	Aves	Insecta
Order	Rodentia	Passeriformes	Odonata
Family	Castoridae	Icteridae	Gomphidae
Genus and species	<i>Castor canadensis</i>	<i>Icterus galbula</i>	<i>Gomphus spicatus</i>

- System of assigning scientific/binomial names to organisms designed by Carolus Linneaus in 18<sup>th</sup> century
- Based on idea that every species has a Latin name, made up of two parts
- First part is the name of the **genus**
- Second part specifies the **species**
- Name should be printed in italics (underlined if hand written) and first part capitalized

Example: Binomial name for Humans is *Homo sapiens*

## POINTS TO REMEMBER

## FIVE CLASSIFICATION OF KINGDOM



## The hierarchy of classification – Groups :-

Living organisms have been broadly classified into five main kingdoms. They are :-

i) Monera ii) Protista iii) Fungi iv) Plante v) Animalia

Each kingdom has been further classified into smaller sub - groups at various levels as :-

Kingdom

Phylum (for plants) / Division (for animals)

Class

Order

Family

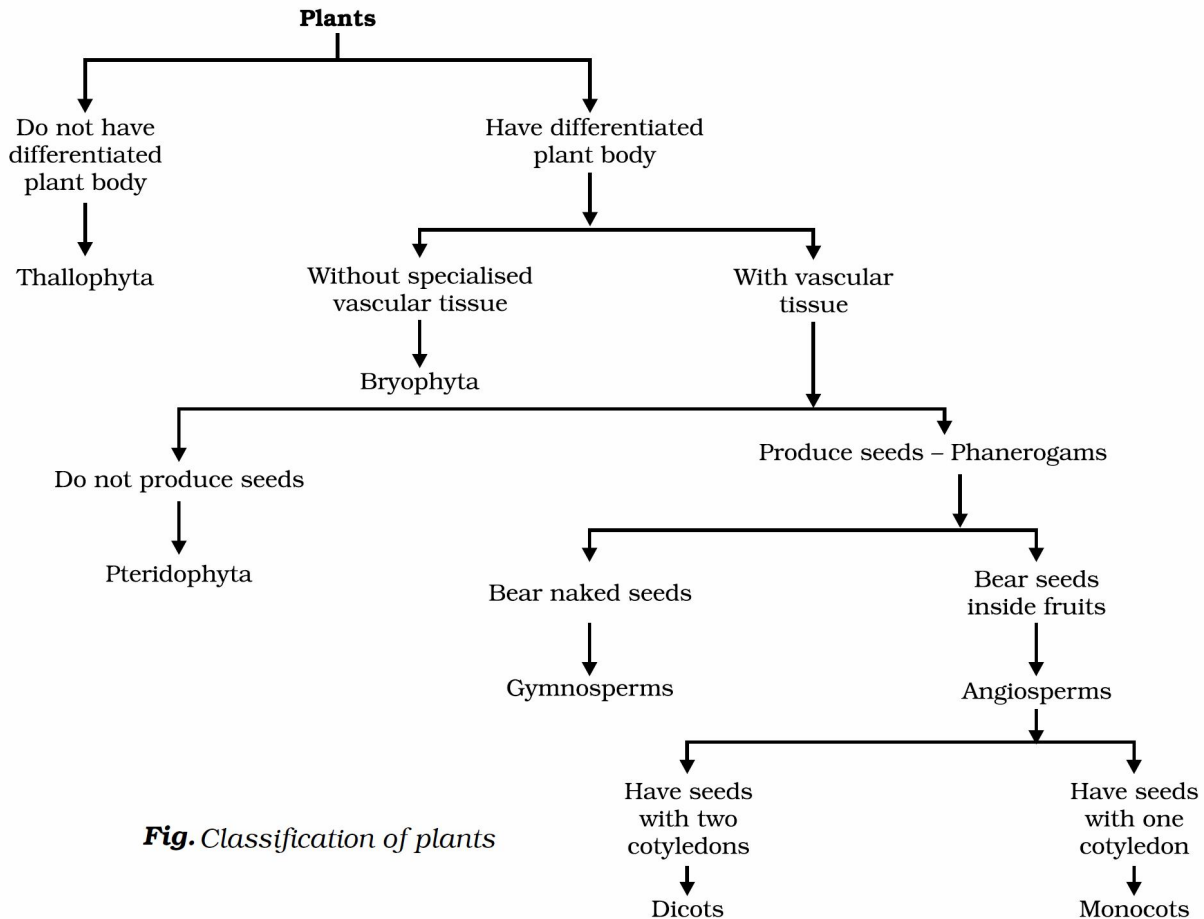
Genus

Species

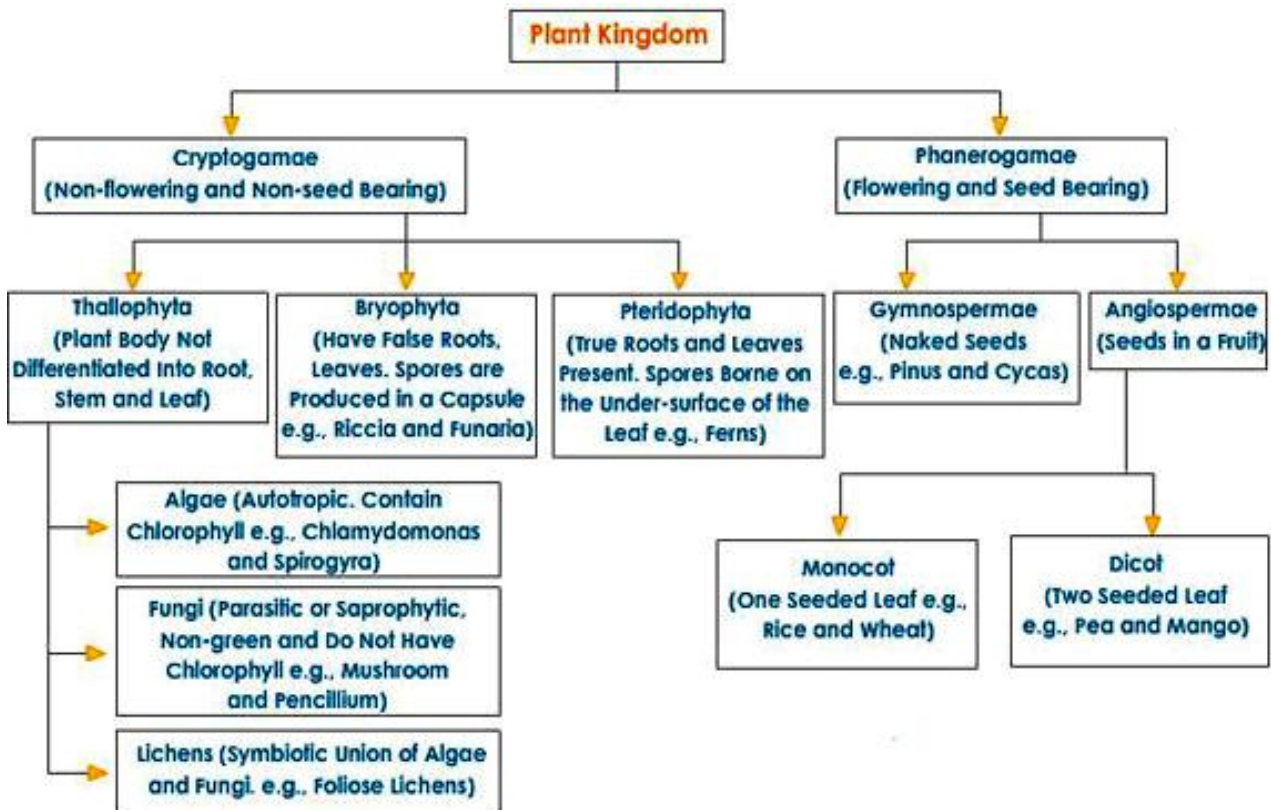
By arranging organisms on the basis of hierarchy and characteristics into smaller and smaller groups we arrive at the basic unit of classification called species.

**Species :-** is group of organisms which are similar enough to breed and perpetuate.

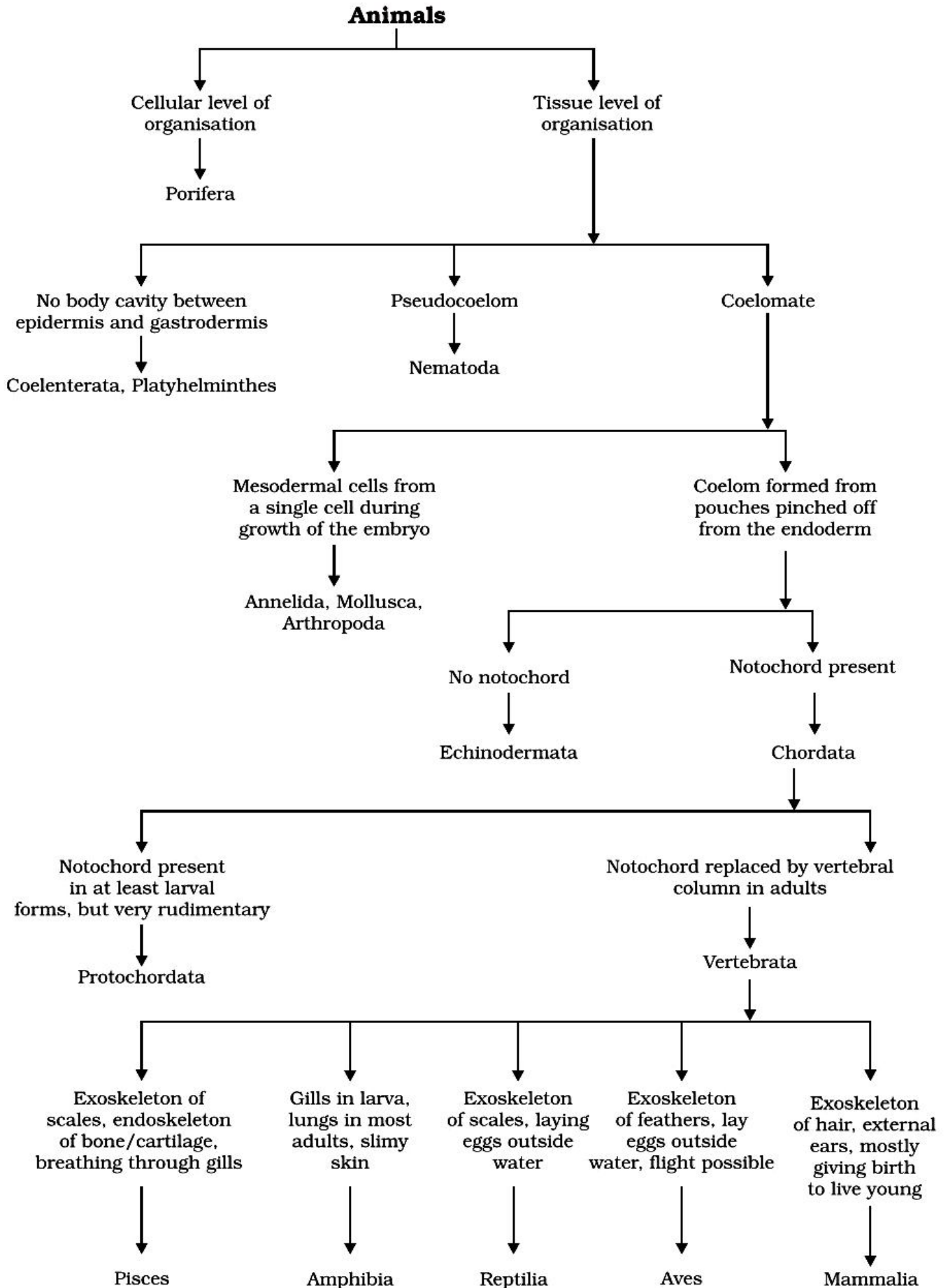
# PLANT KINGDOM



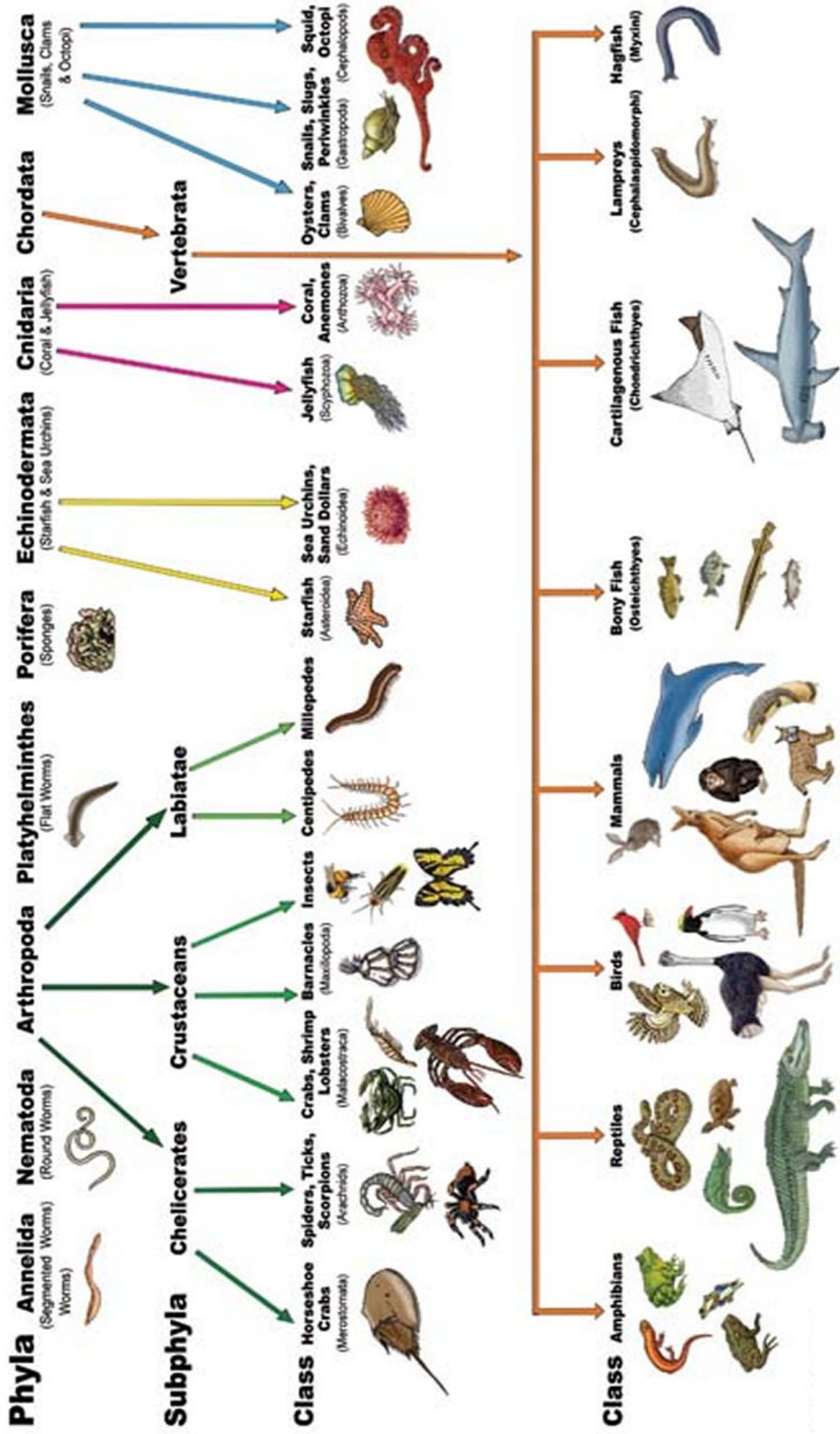
**Fig.** Classification of plants



# ANIMAL KINGDOM



# Animal Kingdom





## **INTEXT QUESTIONS PAGE NO. 82**

**Q1. Which do you think is a more basic characteristic for classifying organisms?**

**(a) the place where they live.**

**(b) the kind of cells they are made of. Why?**

**Answer:** The kind of cells an organism is made of is more basic characteristic of classifying organism because it gives a scientific angle to classification. Moreover, a particular dwelling place can be full of organisms of a wide variety.

**Q2. What is the primary characteristic on which the first division of organisms is made?**

**Answer:** Organisation of nucleus is the primary characteristic on which the first division of organisms is made. Based on this, organisms can be either prokaryotic or eukaryotic.

**Q3. On what bases are plants and animals put into different categories?**

**Answer:** Plants are autotrophs, while animals are heterotrophs. Cell wall is present in plant cells, while it is absent in animal cells. Plants do not need to move from one place to another, while most of the animals need to move in search of food.

## **INTEXT QUESTIONS PAGE NO. 83**

**Q1. Which organisms are called primitive and how are they different from the so-called advanced organisms?**

**Answer:** An organism which is simple is called primitive. On the other hand, an organism with high level of division of labour; by formation of organs and organ system is called advanced.

**Q2. Will advanced organisms be the same as complex organisms? Why?**

**Answer:** Complexity in body design evolves because of necessity to adapt according to the changing environment. Hence, a complex organism would be an advanced one; in comparison to a simple organism.

## **INTEXT QUESTIONS PAGE NO. 85**

**Q1. What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?**

**Answer:** Organisms which are prokaryotes belong to the kingdom Monera. On the other hand, organisms which are eukaryotes and unicellular belong to the kingdom Protista.

**Q2. In which kingdom will you place an organism which is single-celled, eukaryotic and photosynthetic?**

**Answer:** Plant Kingdom

**Q3. In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?**

**Answer:** Species will have the smallest number of organisms with a maximum of characteristics in common. On the contrary, kingdom will have the largest number of organisms.

## **INTEXT QUESTIONS PAGE NO. 88**

**Q1. Which division among plants has the simplest organisms?**

**Answer:** Thallophyta

**Q2. How are pteridophytes different from the phanerogams?**

**Answer:** In pteridophytes, the reproductive organs are hidden and they do not produce seeds. In phanerogams, reproductive organs are conspicuous and they produce seeds.

**Q3. How do gymnosperms and angiosperms differ from each other?**

**Answer:** Seeds are naked in gymnosperms, while they are covered in angiosperms. Gymnosperms do not bear flowers, while angiosperms bear flowers.

**INTEXT QUESTIONS PAGE NO. 94**

**Q1. How do poriferan animals differ from coelenterate animals?**

**Answer:** In porifera, body has numerous pores, which are absent in coelenterates. Body has a cavity in coelenterates, while it is absent in porifera.

**Q2. How do annelid animals differ from arthropods?**

**Answer:** Segmented body in annelids, while true segmentation is absent in arthropods. Arthropods have jointed appendages, which are absent in annelids.

**Q3. What are the differences between amphibians and reptiles?**

**Answer:** Amphibians need water to lay eggs and fertilization is external. Reptilians do not need water to lay eggs and fertilization is internal. Amphibians use both skin and lungs for breathing. Reptilians breathe through lungs only.

**Q4. What are the differences between animals belonging to the Aves group and those in the mammalian group?**

**Answer:** In aves, body is covered with feathers; while in mammals, body is covered with hairs. Mammary glands are absent in aves. Forelimbs of aves are modified into wings which is not the case in mammals. Aves are oviparous, while most of the mammals are viviparous.

**EXERCISE QUESTIONS PAGE NO. 43, 44**

**Q1. What are the advantages of classifying organisms?**

**Answer:-** There are millions of species on this earth. For anybody, it is impossible to study about each of them in his lifetime. Classification makes it easy to study the organisms; on the basis of certain common characters.

**Q2. How would you choose between two characteristics to be used for developing a hierarchy in classification?**

**Answer:-** We need to look at the fact if given character is present in a small number of organisms or a larger number of organisms. In the first case, the commonality of characters would represent a species. In the latter case, the commonality of characters would represent a higher taxa; like genus, family, order or phylum.

**Q3. Explain the basis for grouping organisms into five kingdoms.**

**Answer:** Following points explain the basis of grouping organisms into five kingdoms.

**Organization of nucleus:** Organisms with unorganized nucleus are kept under the kingdom Monera. Those with organized nucleus are kept in other kingdoms.

**Number of cells:-** Unicellular eukaryotes are kept in the kingdom Protista, while multicellular eukaryotes are kept in other kingdoms.

**Mode of nutrition and presence of cell wall:** Heterotrophic organisms in which cell wall is present are taken under the kingdom fungi. Autotrophic organisms in which cell wall is present are taken in the kingdom Plantae. Organisms in which cell wall is absent are taken in the kingdom Animalia.

**Q4. What are the major divisions in the Plantae? What is the basis for these divisions?**

**Answer:** The major divisions of Plantae and the basis for these divisions are as follows:

- **Thallophyta:** Simple body design; with no differentiation into root, stem and leaves.
- **Bryophyta:** Body is differentiated into stem and leaf-like structures. Vascular system is absent.
- **Pteridophyta:** Body is differentiated into root, stem and leaves. Vascular system is present. Reproductive organs are inconspicuous. Seeds are not produced.
- **Gymnosperms:** Seeds are naked.
- **Angiosperms:** Seeds are covered.

**Q5. How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?**

**Answer:** In the plant kingdom, morphological characters are taken into consideration while deciding about the divisions. Morphology is the study of shapes and forms of various parts. In the animal kingdom, anatomical characters are taken into consideration while deciding about subgroups. Anatomy is the study of various organs' design in animals.

**Q6. Explain how animals in Vertebrata are classified into further subgroups.**

**Answer:** Vertebrates are classified into further subgroups on following bases:

1. **Pisces:** The body is streamlined. Muscular tail is present which assists in locomotion. Body is covered with scales. Paired gills are present; which can breathe oxygen dissolved in water. They are cold-blooded animals. The heart has only two chambers. They lay eggs.
2. **Tetrapoda:** Animals have four limbs for locomotion and hence the name tetrapoda. Tetrapoda is divided into four classes, viz. amphibia, reptilia, aves and mammalia.
  - a. **Amphibia:** These animals are adapted to live both in water and land. Mucus glands on skin keep the skin moist. The animals breathe through skin when in water and through lungs when on land. The heart has three chambers. These are cold blooded animals. Examples: Frog, toad, salamander, etc.
  - b. **Reptilia:** These animals show crawling movement for locomotion. Skin is hardened to form scales. Most of the reptilians have three chambered heart but crocodile has four-chambered heart. They don't need water to lay eggs, rather eggs are covered with hard shells and laid on land. Examples: snakes, lizards, crocodile, turtle, etc.
  - c. **Aves:** The body is covered with feathers. Forelimbs are modified into wings. These are warm-blooded animals. The heart has four chambers. Bones are hollow (pneumatic); which assists in flying. All the birds belong to this class.
  - d. **Mammalia:** The body is covered with hairs. Skin has sweat glands and sebaceous glands. Mammary glands are present in females and are used for nourishing the young ones. Most of the mammalians give birth to young ones and are called viviparous. Some of the mammals lay eggs and are called oviparous. Examples: human, chimpanzee, lion, platypus, horse, etc.

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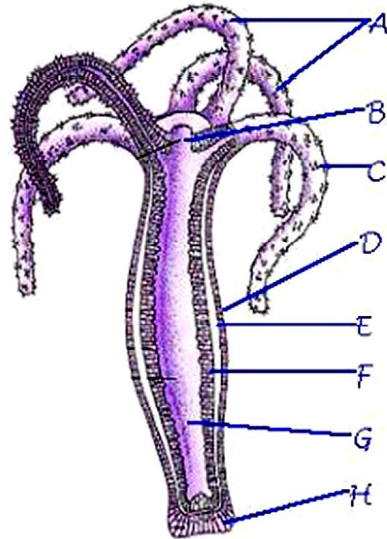
**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 7**  
**DIVERSITY IN ORGANISMS**

1. What do you mean by bio diversity?
  2. Why do we classify organisms?
  3. What are the advantages of classification?
  4. Define Taxonomy.
  5. Who is known as father of taxonomy?
  6. Give three examples of the range of variations that you see in lifeforms around you.
  7. What is the primary reason for such a huge diversity we find in animals and plants?
  8. Which do you think is a more basic characteristic for classifying organisms? (a) the place where they live. (b) the kind of cells they are made of. Why?
  9. What is the primary characteristic on which the first division of organisms is made?
  10. Define Taxon.
  11. On what bases are plants and animals put into different categories?
  12. Who wrote the book The Origin of Species?
  13. Which region of the earth is called the region of megadiversity?
  14. Name five countries that lie in the region of megadiversity.
  15. Define evolution.
  16. Based on evolution, primarily how organisms are categorized?
  17. Which organisms are called primitive and how are they different from the so-called advanced organisms?
  18. Will advanced organisms be the same as complex organisms? Why?
  19. Name the book written by Carolus Linnaeus on classification of organisms.
  20. In how many kingdoms Carolus Linnaeus dividing living beings?
  21. Name the levels of classification proposed by Linnaeus. What happens to similarities among organisms as we go from top to bottom level?
  22. In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?
  23. Name the scientist who created the third kingdom for all microscopic unicellular organisms. What did he call it?
  24. Who identified the Fungi as a separate multicellular eucaryotic kingdom and introduced five kingdoms? Name the five kingdoms.
-

25. Explain the basis for grouping organisms into five kingdoms.
  26. What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?
  27. In which kingdom will you place an organism which is singlecelled, eukaryotic and photosynthetic?
  28. In which kingdom you will place an organism which is multicellular, eukaryotic, non-green heterotroph or saprophytic, lacks chlorophyll and has absorptive mode of nutrition?
  29. In which kingdom, you will place an organism which is multicellular, eukaryotic, heterotroph, lacks chlorophyll and has ingestive mode of nutrition.
  30. What is the contribution of Carl Woese (1977) in classification of living beings?
  31. Name the organisms which are outside the classification.
  32. According to the five-kingdom system, which kingdom contains organisms whose structure is composed of prokaryotic cells?
  33. Blue green algae are classified with bacteria and placed in kingdom Monera.
  34. What (a) What are saprophytes? (b) Name the kingdom to which they belong. (c) What is the cell wall of fungi made up of?or
  35. How do the saprophytes get their food? Give two examples of a saprophyte.
  36. What is Symbiotic? Give example of organisms which exhibit this relationship.
  37. Classify the following organisms into their respective kingdoms as per Whittaker's five-kingdom system.
  38. What are the major divisions in the Plantae? What is the basis for these divisions?
  39. Give examples of Thallophyta plants.
  40. Why are Thallophytes called non-embryonic plants?
  41. Which division among plants has the simplest organisms?
  42. What is a thallus?
  43. Why bryophytes are called the amphibians of the plant kingdom?
  44. List important characteristics (at least three) of bryophytes.
  45. Give examples of bryophytes.
  46. What are the uses of bryophytes?
  47. How are Pteridophytes' bodies organised?
  48. How do thallophytes and pteridophytes differ from each other? Write two differences.
  49. Name the plants that are called "First vascular land plants".
  50. On what basis plants are divided into two sub-kingdoms?
  51. How are pteridophytes different from the phanerogams?
  52. How Phanerogams are divided further chiefly?
-

53. What are naked-seeded plants are called?
  54. Give two examples of Gymnosperms.
  55. Define Cryptograms.
  56. How do gymnosperms and angiosperms differ from each other?
  57. How Angiosperms are divided further?
  58. Write the differences between monocots and dicots.
  59. What are the general characteristics found in all animals?
  60. In how many Phyla, the animal kingdom is divided into?
  61. Name the phylum to which the following are included. (i) Spider (ii) Cockroach (iii) Prawn (iv) Housefly
  62. Write two important characteristics of sponges (Phylum: Porifera)
  63. What is osculum?
  64. Do sponges have nervous system?
  65. Give examples of Porifera or Sponges.
  66. Identify the phylum having following characteristics: multi-cellular, radially symmetrical, aquatic, hollow gut.
  67. What are four main features of phylum coelenterata?
  68. 'Animals belong to phylum coelenterata are diploblastic.' What do you mean by the term diploblastic?
  69. Which animal phylum is commonly called as flatworms?
  70. Which animal phylum is considered to be first triploblastic animals?
  71. Write important features about Phylum Plathelminthes.
  72. How do poriferan animals differ from coelenterate animals?
  73. Which phylum is commonly called roundworms or pinworms?
  74. Give examples of animals belong to Nematoda.
  75. Name a parasitic disease caused by members of Nematoda.
  76. Name the first animals (phylum) that have true body cavity.
  77. Leeches and Earthworms belong to which phylum?
  78. Differentiate between Annelida and Nematode.
  79. Name the largest group (phylum) of animals.
  80. Give examples of Arthropod animals.
  81. What is the most striking feature of phylum Arthropoda?
  82. How is body of Arthropods segmented?
  83. What is the type of circulatory system present in Arthropods?
  84. How do annelid animals differ from arthropods?
-

85. Give examples of animals that belong to Phylum Mollusca.
86. What kind of circulatory system is found in animals from Mollusca phylum?
87. How is locomotion brought in animals belonging to Mollusca phylum?
88. Name the phylum to which Star fish and Sea urchin belong to?
89. Name the phylum to which this organism belongs. Write any two characteristic feature of the phylum.
90. Label A to H in the given diagram of hydra.



91. What is a notochord? What does it do?
92. Give examples of organisms which belong to Phylum Protochordata.
93. List three important characteristics of Phylum Protochordata.
94. Why are Bats and whales classified as mammals?
95. A plant specimen was found without differentiated roots.(a) Which plant structure helps in attaching this plant to the substratum?(b) To which group you will keep this plant?(c) Which plant could it be?
96. Why is there a need for classification and systematic naming of living organisms?



**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 7**  
**DIVERSITY IN ORGANISMS**

1. Who introduced the system of scientific nomenclature of organisms?
2. In which Kingdom, an organism does not have a well defined nucleus and organelles?
3. In the hierarchy of classification, which group will have the largest number of organisms?
4. Which in your opinion is more basic characteristic for classifying organism. The place where they live in or the kind of cells they are made of?
5. Give examples of the organisms that have cilia and flagellum for moving around.
6. In the hierarchy of classification, which group will have the smallest number of organisms and a maximum number of similar characteristics?
7. Name the substance which makes the cell wall of fungi.
8. Name a symbiotic life form that grows on the bark of a tree as large, coloured patches.
9. In which kingdom would you place an organism which is unicellular, eukaryotic and photosynthetic?
10. What is the primary characteristic on which the first division of organisms is made?
11. What is the mode of nutrition in Mushroom?
12. Eichler classified the plant kingdom into two sub-kingdoms. Name the two sub kingdoms.
13. Name the kingdom which includes the simplest form of eukaryotes.
14. Do Protozoans have eyes?
15. Name the simplest of plants that do not have a well-differentiated body design.
16. Which division of plants are often called amphibians of the plant kingdom?
17. Woese introduced by dividing the Monera kingdom into two sub-kingdoms. Name the two?
18. Write the name of the group of plants, which produces seeds, but not fruits.
19. Amar, Ujala and Anara wrote the scientific name of mango as follows. Who wrote it correctly. 1) Amar - Mangifera Indica 2) Ujala - Mangifera indica 3) Anara - mangifera indica
20. Algae belongs to which division of Plantae?
21. Name the three divisions of Plantae that have inconspicuous reproductive organs. What are their seeds called?
22. Name the two groups of Plantae that are commonly called phanerogams.
23. Identify the division of Plantae having following characteristics: i).Seeds not enclosed within fruit. ii).Flowers represented as cones (unisexual) iii). Ovules not located in ovary.



24. Identify plant group which has parallel venation, scattered vascular bundles, flower petals/parts in multiple of three, fibrous roots.
25. Identify the plant groups which has net like veins in leaves, flower parts in group of fours or fives, vascular bundles are in a ring and two seed leaves.
26. Give two examples of Bryophyta plants?
27. Give two examples of Pteridophytes
28. Pines and Deodar belong to which group of Plants?
29. Sunflower, Maize, Wheat and Pea belong to which group of plants?
30. Identify which of the following are monocots and dicots: garlic, onion, tomatoes, corn, peppers, potatoes, wheat, beans
31. Minimal body design, have holes which lead to canal system that helps in circulating water, marine habitat. Which division of Animalia it refers to?
32. Hydra, Jelly Fish, corals belong to which group of animals?
33. Commonly called flatworm, bilateral symmetrical, acoelomates are the features of which animal division?
34. Filarial worms, (Ascaris)round worms, (Wuchereria)pin worms belong to which group of animalia?
35. Which is the largest group of animals?
36. Identify the Animalia group having following features: i). jointed legs ii). bilaterally symmetrical segmented body iii). blood filled body cavity (open circulatory system)
37. Which worms cause elephantiasis. Name the group it belongs to?
38. Give three examples of organisms that are arthropods.
39. Give three examples of Molluscs
40. What type of circulatory system do Molluscs have?
41. Spiny skin, marine, triploblastic coelomates having water-driven tube system for locomotion. What type of group are we talking of?
42. Give three examples of animals belong to Echinodermata
43. Give three examples of Protochordata animals.
44. What is the main basis of differentiation between vertebrates and non-vertebrates?
45. Cold blooded, two chamber heart, stream lined body, scales on skin, gills present, aquatic life. Which group of vertebrates are we referring to?
46. Amphibian heart is divided into how many chambers?
47. Name the fish which is entirely made of cartilage.
48. Name the fish having skeleton made of both bone and cartilage.

- 49.** No scales on skin, mucus glands on skin, three chambered heart, respiration through gills, lungs and skin, oviparous, live on land and in water. Name the group of these vertebrates.
- 50.** Give three examples of Amphibians.
- 51.** Snakes, turtles, lizards and crocodiles belong to which category of vertebrates?
- 52.** Name a reptile which has four chambered heart.
- 53.** What changes are evolved in limbs of aves?
- 54.** Give three examples of flightless birds.
- 55.** Four Chambered heart, mostly viviparous, skin covered with hairs, skin contains sweat and oil glands, four chambered heart. Which category of vertebrates are we talking about?
- 56.** Give examples of egg laying mammals
- 57.** Give an example of marsupial mammal
- 58.** Give an example of mammal that can fly.

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**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 7**  
**DIVERSITY IN ORGANISMS**

1. Find out incorrect sentence
  - (a) Protista includes unicellular eukaryotic organisms
  - (b) Whittaker considered cell structure, mode and source of nutrition for classifying the organisms in five kingdoms
  - (c) Both Monera and Protista may be autotrophic and heterotrophic
  - (d) Monerans have well defined nucleus
2. Which among the following has specialised tissue for conduction of water?
  - (i) Thallophyta
  - (ii) Bryophyta
  - (iii) Pteridophyta
  - (iv) Gymnosperms
  - (a) (i) and (ii)
  - (b) (ii) and (iii)
  - (c) (iii) and (iv)
  - (d) (i) and (iv)
3. Which among the following produce seeds?

(a) Thallophyta	(b) Bryophyta
(c) Pteridophyta	(d) Gymnosperms
4. Which one is a true fish?

(a) Jellyfish	(b) Starfish
(c) Dogfish	(d) Silverfish
5. Which among the following is exclusively marine?

(a) Porifera	(b) Echinodermata
(c) Mollusca	(d) Pisces
6. Which among the following have open circulatory system?
  - (i) Arthropoda
  - (ii) Mollusca
  - (iii) Annelida
  - (iv) Coelenterata
  - (a) (i) and (ii)
  - (b) (iii) and (iv)
  - (c) (i) and (iii)
  - (d) (ii) and (iv)

7. In which group of animals, coelom is filled with blood?
- (a) Arthropoda
  - (b) Annelida
  - (c) Nematoda
  - (d) Echinodermata
8. Elephantiasis is caused by
- (a) Wuchereria
  - (b) Pinworm
  - (c) Planarians
  - (d) Liver flukes
9. Which one is the most striking or (common) character of the vertebrates?
- (a) Presence of notochord
  - (b) Presence of triploblastic condition
  - (c) Presence of gill pouches
  - (d) Presence of coelom
10. Which among the following have scales?
- (i) Amphibians
  - (ii) Pisces
  - (iii) Reptiles
  - (iv) Mammals
- (a) (i) and (iii)
  - (b) (iii) and (iv)
  - (c) (ii) and (iii)
  - (d) (i) and (ii)
11. Find out the false statement
- (a) Aves are warm blooded, egg laying and have four chambered heart
  - (b) Aves have feather covered body, fore limbs are modified as wing and breathe through lungs
  - (c) Most of the mammals are viviparous
  - (d) Fishes, amphibians and reptiles are oviparous
12. Pteridophyta do not have
- (a) root
  - (b) stem
  - (c) flowers
  - (d) leaves
13. Identify a member of porifera
- (a) *Spongilla*
  - (b) *Euglena*
  - (c) *Penicillium*
  - (d) *Hydra*

- 14.** Which is not an aquatic animal?
- (a) Hydra
  - (b) Jelly fish
  - (c) Corals
  - (d) Filaria
- 15.** Amphibians do not have the following
- (a) Three chambered heart
  - (b) Gills or lungs
  - (c) Scales
  - (d) Mucus glands
- 16.** Organisms without nucleus and cell organelles belong to
- (i) fungi
  - (ii) protista
  - (iii) cyano bacteria
  - (iv) archae bacteria
- (a) (i) and (ii)
  - (b) (iii) and (iv)
  - (c) (i) and (iv)
  - (d) (ii) and (iii)
- 17.** Which of the following is not a criterion for classification of living organisms?
- (a) Body design of the organism
  - (b) Ability to produce one's own food
  - (c) Membrane bound nucleus and cell organelles
  - (d) Height of the plant
- 18.** The feature that is not a characteristic of protochordata?
- (a) Presence of notochord
  - (b) Bilateral symmetry and coelom
  - (c) Jointed legs
  - (d) Presence of circulatory system
- 19.** The locomotory organs of Echinodermata are
- (a) tube feet
  - (b) muscular feet
  - (c) jointed legs
  - (d) parapodia
- 20.** Corals are
- (a) Poriferans attached to some solid support
  - (b) Cnidarians, that are solitary living
  - (c) Poriferans present at the sea bed
  - (d) Cnidarians that live in colonies

**21.** Who introduced the system of scientific nomenclature of organisms

- (a) Robert Whittaker
- (b) Carolus Linnaeus
- (c) Robert Hooke
- (d) Ernst Haeckel

**22.** Two chambered heart occurs in

- (a) crocodiles
- (b) fish
- (c) aves
- (d) amphibians

**23.** Skeleton is made entirely of cartilage in

- (a) Sharks
- (b) Tuna
- (c) Rohu
- (d) None of these

**24.** One of the following is not an Annelid

- (a) Nereis
- (b) Earthworm
- (c) Leech
- (d) Urchins

**25.** The book Systema Naturae was written by

- (a) Linnaeus
- (b) Haeckel
- (c) Whittaker
- (d) Robert Brown

**26.** Karl Von Linne was involved with which branch of science?

- (a) Morphology
- (b) Taxonomy
- (c) Physiology
- (d) Medicine

**27.** Real organs are absent in

- (a) Mollusca
- (b) Coelenterata
- (c) Arthropoda
- (d) Echinodermata

**28.** Hard calcium carbonate structures are used as skeleton by

- (a) Echinodermata
- (b) Protochordata
- (c) Arthropoda
- (d) Nematoda

- 29.** Differentiation in segmental fashion occurs in
- (a) Leech
  - (b) Starfish
  - (c) Snails
  - (d) Ascaris
- 30.** In taxonomic hierarchy family comes between
- (a) Class and Order
  - (b) Order and Genus
  - (c) Genus and Species
  - (d) Division and Class
- 31.** The 5-Kingdom classification has given by
- (a) Morgan
  - (b) R. Whittaker
  - (c) Linnaeus
  - (d) Haeckel
- 32.** Well defined nucleus is absent in
- (a) blue green algae
  - (b) diatoms
  - (c) algae
  - (d) yeast
- 33.** The 'Origin of Species' is written by
- (a) Linnaeus
  - (b) Darwin
  - (c) Hackel
  - (d) Whittaker
- 34.** Meena and Hari observed an animal in their garden. Hari called it an insect while Meena said it was an earthworm. Choose the character from the following which confirms that it is an insect.
- (a) Bilateral symmetrical body
  - (b) Body with jointed legs
  - (c) Cylindrical body
  - (d) Body with little segmentation
- 35.** Write true (T) or false (F)
- (a) Whittaker proposed five kingdom classification.
  - (b) Monera is divided into Archaeobacteria and Eubacteria.
  - (c) Starting from Class, Species comes before the Genus.
  - (d) *Anabaena* belongs to the kingdom Monera.
  - (e) Blue green algae belongs to the kingdom Protista.
  - (f) All prokaryotes are classified under Monera.

**36. Fill in the blanks**

- (a) Fungi shows———mode of nutrition.
- (b) Cell wall of fungi is made up of ——.
- (c) Association between blue green algae and fungi is called as——.
- (d) Chemical nature of chitin is ——.
- (e) ——has smallest number of organisms with maximum number of similar characters
- (f) Plants without well differentiated stem, root and leaf are kept in ——.
- (g) ——are called as amphibians of the plant kingdom.

**37.** You are provided with the seeds of gram, wheat, rice, pumpkin, maize and pea. Classify them whether they are monocot or dicot.

**38. Match items of column (A) with items of column (B)**

(A)	(B)
(a) Naked seed	(A) Angiosperms
(b) Covered seed	(B) Gymnosperms
(c) Flagella	(C) Bryophytes
(d) <i>Marchantia</i>	(D) <i>Euglena</i>
(e) <i>Marsilea</i>	(E) Thallophyta
(f) <i>Cladophora</i>	(F) Pteridophyta
(g) <i>Penicillium</i>	(G) Fungi

**39. Match items of column (A) with items of column (B)**

(A)	(B)
(a) Pore bearing animals	(A) Arthropoda
(b) Diploblastic	(B) Coelenterata
(c) Metameric segmentation	(C) Porifera
(d) Jointed legs	(D) Echinodermata
(e) Soft bodied animals	(E) Mollusca
(f) Spiny skinned animals	(F) Annelida

**40.** Classify the following organisms based on the absence/presence of true coelom (i.e., acoelomate, pseudocoelomate and coelomate) *Spongilla*, Sea anemone, Planaria, Liver fluke *Wuchereria*, *Ascaris*, *Nereis*, Earthworm, Scorpion, Birds, Fishes, Horse.

**41.** Endoskeleton of fishes are made up of cartilage and bone; classify the following fishes as cartilagenous or bony Torpedo, Sting ray, Dog fish, Rohu, Angler fish, Exocoetus.

**42.** Classify the following based on number of chambers in their heart. Rohu, *Scoliodon*, Frog, Salamander, Flying lizard, King Cobra, Crocodile, Ostrich, Pigeon, Bat, Whale

**43.** Classify Rohu, *Scoliodon*, Flying lizard, King Kobra, Frog, Salamander, Ostrich, Pigeon, Bat, Crocodile and Whale into the cold blooded/warm blooded animals.

**44.** Name two egg laying mammals.



**45. Fill in the blanks**

- (a) Five kingdom classification of living organisms is given by \_\_\_\_\_.
- (b) Basic smallest unit of classification is \_\_\_\_\_.
- (c) Prokaryotes are grouped in Kingdom \_\_\_\_\_.
- (d) *Paramecium* is a protista because of its \_\_\_\_\_.
- (e) Fungi do not contain \_\_\_\_\_.
- (f) A fungus \_\_\_\_\_ can be seen without microscope.
- (g) Common fungi used in preparing the bread is \_\_\_\_\_.
- (h) Algae and fungi form symbiotic association called \_\_\_\_\_.

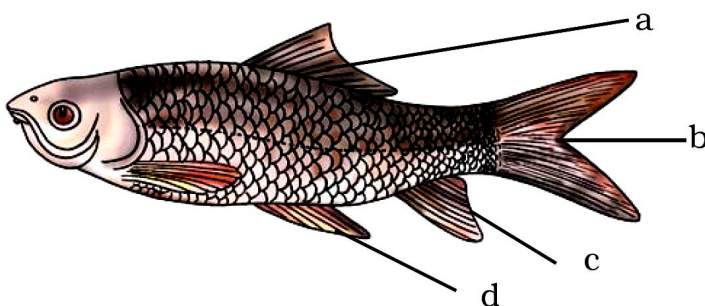
**46. Give True (T) and False (F)**

- (a) Gymnosperms differ from Angiosperms in having covered seed.
- (b) Non flowering plants are called Cryptogamae.
- (c) Bryophytes have conducting tissue.
- (d) *Funaria* is a moss.
- (e) Compound leaves are found in many ferns.
- (f) Seeds contain embryo.

**47. Give examples for the following**

- (a) Bilateral, dorsiventral symmetry is found in\_\_\_\_\_.
- (b) Worms causing disease elephantiasis is\_\_\_\_\_.
- (c) Open circulatory system is found in\_\_\_\_\_where coelomic cavity is filled with blood.
- (d) \_\_\_\_\_are known to have pseudocoelom.

**48. Label a, b, c and d. given in below figure. Give the function of (b)**



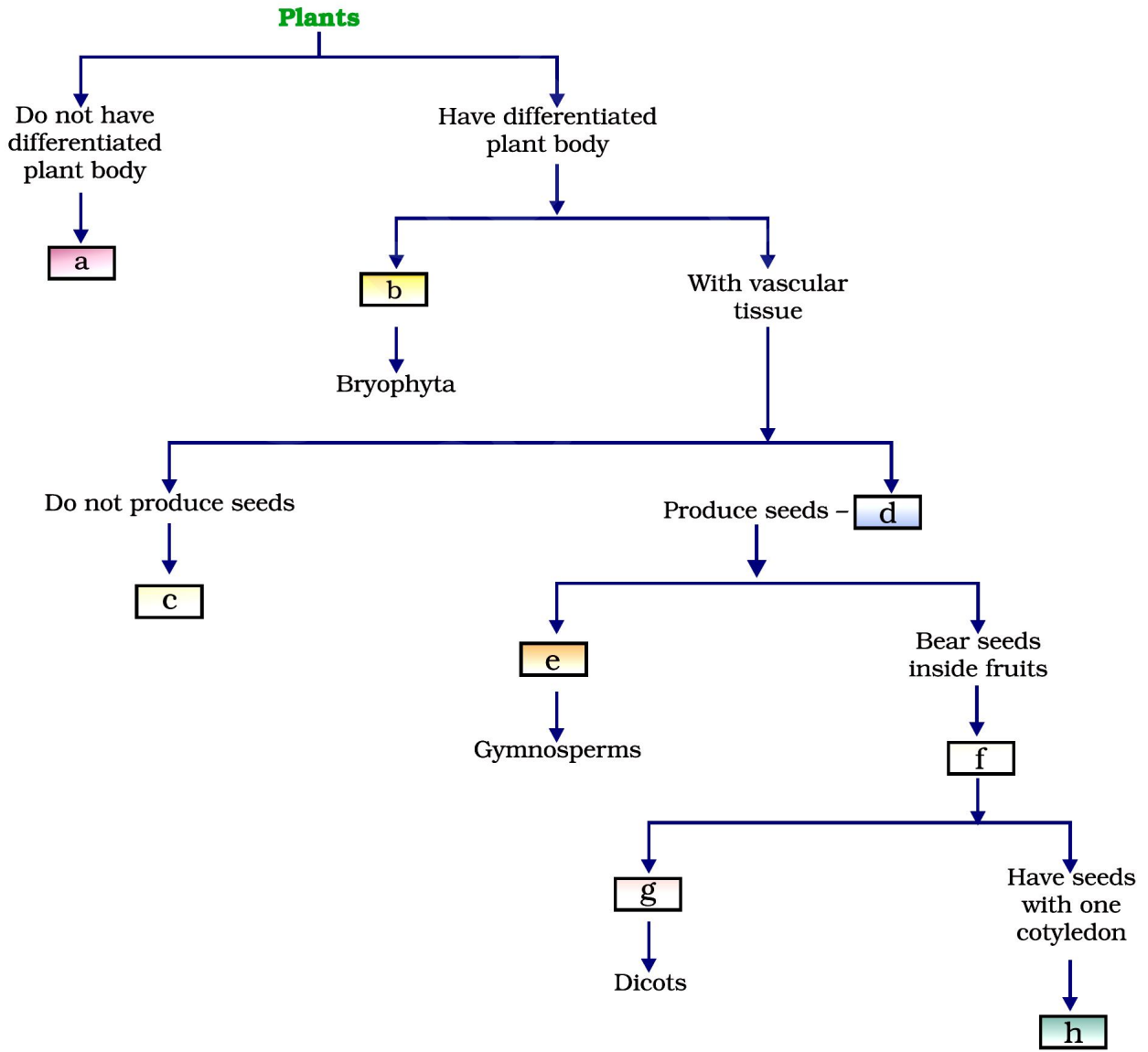
**49. Write names of few thallophytes. Draw a labelled diagram of *Spirogyra*.**

**50. Thallophyta, bryophyta and pteridophyta are called as 'Cryptogams'. Gymnosperms and Angiosperms are called as 'phanerogams'. Discuss why? Draw one example of Gymnosperm.**

**51. Define the terms and give one example of each (a) Bilateral symmetry (b) Coelom (c) Triploblastic**

**52. You are given leech, *Nereis*, *Scolopendra*, prawn and scorpion; and all have segmented body organisation. Will you classify them in one group? If no, give the important characters based on which you will separate these organisms into different groups.**

53. Fill in the boxes given in below figure with appropriate characteristics/plant group (s)



- 54. Which organism is more complex and evolved among Bacteria, Mushroom and Mango tree. Give reasons.
- 55. Differentiate between flying lizard and bird. Draw the diagram.
- 56. List out some common features in cat, rat and bat.
- 57. Why do we keep both snake and turtle in the same class?



## CHAPTER – 13

# WHY DO WE FALL ILL

### HEALTH AND ITS FAILURE

Good health is a very hard thing to measure, but it is one of life's most precious things. The World Health Organisation has defined health as a state of complete physical, mental and social well-being.

Community health can be defined as "All the personal health along with the environmental services for the importance of health of community".

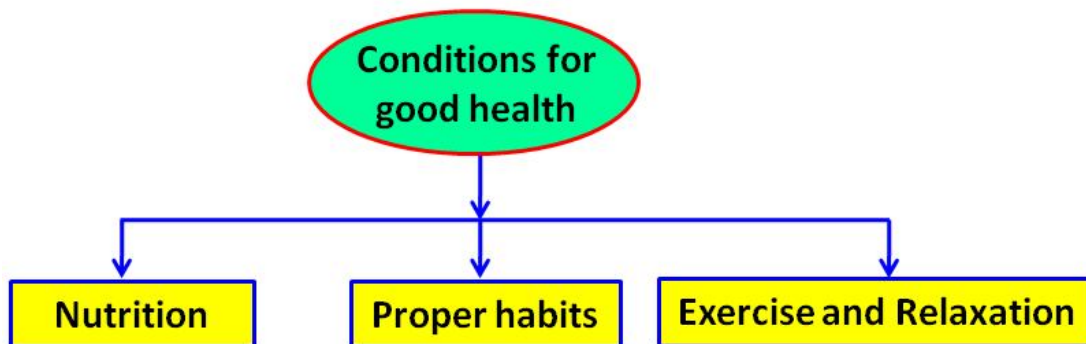
#### Some of the health services are given below:

- (i) Establishment of health care services like primary health centers, district hospitals, community health centers, medical colleges, all Indian institutes, regional hospitals etc.
- (ii) Provision of safe drinking water and proper disposal of garbage.
- (iii) Prevention of harmful insect breeding sites.
- (iv) Management of different types of environmental pollution by Central and State Pollution Control Boards.
- (v) Preventive vaccinations against number of diseases like tuberculosis, diphtheria, whooping cough, tetanus, measles, hepatitis, etc.
- (vi) Provision of family planning advices and services.
- (vii) Provision of medical care to school going children.
- (viii) Prevention of food adulteration.
- (ix) Health education.

### CONDITIONS ESSENTIAL FOR GOOD HEALTH

There are several conditions which have to be fulfilled for good health. The important ones are

- (i) Nutrition,
- (ii) Proper habits, and
- (iii) Exercise and relaxation.



#### (i) Nutrition

Nutrition can be defined as the procurement of substances necessary for growth, development, maintenance and activities of a living organism.

We obtain food from various plant and animal sources. In order to keep healthy and energetic, we need to take food. It takes care of the daily energy need also. We consume energy even while sleeping. Energy requirement depends on individual, age and special need. Growing children, pregnant women and nursing mothers need more energy.

## **(ii) Proper Habits**

Another important aspect of good health is to observe proper dietary habits that are consumption of balanced diet and at fixed time. Good personal and domestic hygiene is very essential. Take full care of the following aspects.

- Your food should be fresh and kept away from dust, flies, insect and microbes to avoid any infection and spoilage.
- Utensils should be kept clean.
- You should wash your face and hands with soap before eating or handling the food.
- Food should be cooked with good feelings and cheerful state.
- Smoking, chewing tobacco, drinking alcohol, taking addictive drugs are bad habits and should be avoided.
- They can have damaging effects on our body and mind.

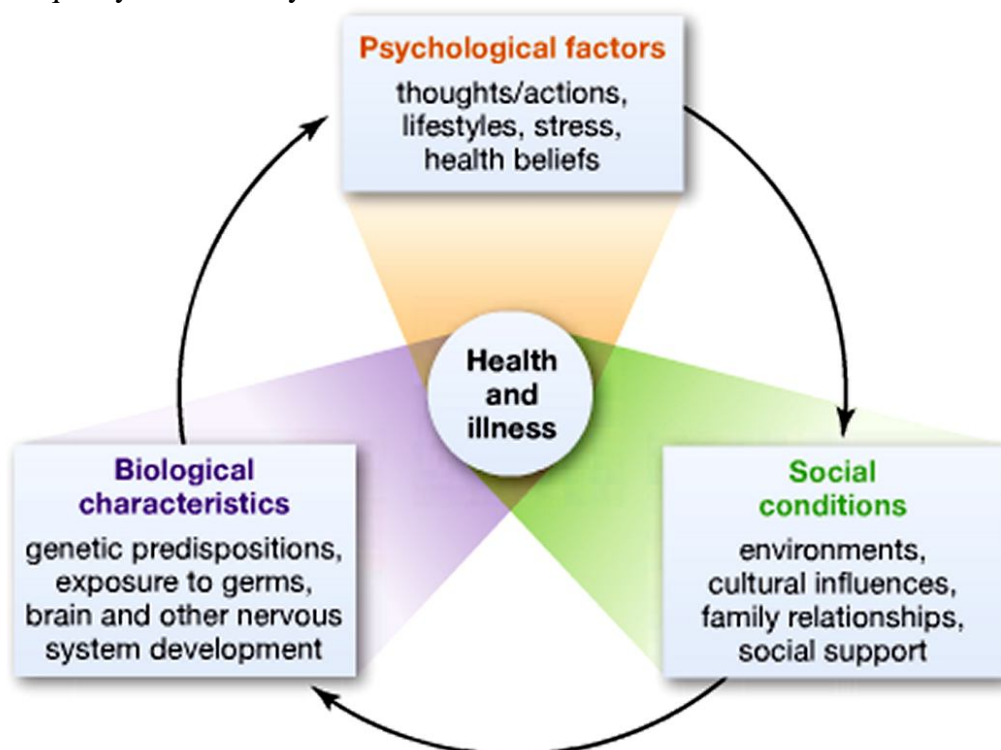
## **(iii) Exercise and Relaxation**

Regular exercise is necessary to keep our body fit. These exercises vary with age, physical condition and nature of work of the individual. In the case of sedentary worker, exercise is even more essential. Another aspect of health is regular sleep and relaxation. The duration of sleep also varies with age and nature of work. Infants sleep for long hours, which is necessary for them to grow. For children, an average of eight hours of sound sleep is sufficient. For adults six hours of sleep is enough. Relaxation improves the capacity to work. Relaxation may be defined as an activity or recreation, which provides a relief or diversion from work or effort. There are various ways of relaxation. Yoga and meditation relax the body and mind. Listening to music and reading magazines are also relaxing.

## **PERSONAL AND COMMUNITY ISSUES BOTH MATTER FOR HEALTH**

Health is a state of physical, mental and social well being. The conditions necessary for good health are :-

- i) Good physical and social environment.
- ii) Good economic conditions.
- iii) Social equality and harmony.



- Good physical and social environment includes clean surroundings, good sanitation, proper garbage disposal and clean drinking water.
- Good economic conditions includes job opportunities for all for earning to have nutritious food and to lead a healthy life.
- Social equality and harmony are necessary for a healthy and peaceful life.

### **DISTINCTIONS BETWEEN 'HEALTHY' AND 'DISEASE-FREE'**

<b>Healthy</b>	<b>Disease free</b>
It is a state of physical, mental and social well being.	It is a state of absence from diseases.
It refers to the individual, physical and social environment.	It refers only to the individual.
The individual has good health.	The individual may have good health or poor health.

### **DISEASE AND ITS CAUSES**

A person may be regarded as suffering from a disease when his body does not function properly. Minor and major disorders of the body may lead to diseases. Infectious diseases are caused by germs. One of the greatest achievements in the history of mankind is the demonstration by Pasteur, Koch and others of germs or microbes that cause diseases. Microbes are the microscopic organisms such as virus, bacteria, some fungi and protozoans that are responsible for causing diseases in human beings. Cholera, tetanus, typhoid, diphtheria and pneumonia are some common diseases caused by bacteria. Polio, common cold, influenza, measles, chicken pox and AIDS are diseases caused by virus. Amoebic dysentery and malaria are caused by protozoans.

<b>Name of the disease</b>	<b>Medium</b>
Tuberculosis, pneumonia, diphtheria, influenza, measles and common cold	Air
Cholera, typhoid, dysentery and diarrhoea	Food, water
Leprosy, ringworm and scabies	Skin contact
Malaria, filarial and plaque	Insects

### **ACUTE AND CHRONIC DISEASES**

When a person is affected by a disease either the normal functioning or the appearance of one or more systems of the body changes for the worse. These changes give rise to signs of the disease called symptoms. On the basis of the symptoms the physicians look for the signs of a particular disease and conduct tests to confirm the disease.

**Types of diseases :-** Diseases are of different types. They are :- i) Acute diseases :- are diseases which last only for a short period of time and does not have long term effect on health. Eg:- cold, cough, typhoid, cholera etc. ii) Chronic disease :- are diseases which lasts for a long time and has long term drastic effect on health. Eg :- diabetes, tuberculosis, elephantiasis, arthritis, cancer etc.

#### **Difference between Acute Disease and Chronic Disease**

<b>Acute Disease</b>	<b>Chronic Disease</b>
They are short duration disease.	They are long lasting disease.
Patient recovers completely after the cure.	Patient does not recover completely.
There is no loss of weight or feeling of tiredness afterward.	There is often loss of weight of feeling of tiredness.
There is short duration loss of work and efficiency.	There is a prolonged loss of work and efficiency.

## **CHRONIC DISEASES AND POOR HEALTH**

Chronic disease is a disease that persists for a long time. Chronic diseases are the major cause of death and disability worldwide.

The total number of people dying from chronic diseases is double that of all infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and parental conditions, and nutritional deficiencies combined. 80% of chronic disease deaths occur in low and middle income countries and half are in women. Without action to address the causes, deaths from chronic disease will increase by 17% between 2005 and 2015.

### **Chronic diseases**

- Cardiovascular diseases, mainly heart disease and
- Stroke;
- Cancer;
- others, such as mental disorders, vision and hearing
- impairment, oral diseases, bone and joint disorders,
- chronic respiratory diseases;
- diabetes;
- genetic disorders.

### **HEART DISEASE**

There are many forms of heart disease. Coronary heart disease, also known as coronary artery disease or ischaemic heart disease, is the leading cause of death globally. It is caused by disease of the blood vessels (atherosclerosis) of the heart.

### **STROKE**

Stroke is a disease of the brain caused by interference to the blood supply. Stroke and heart disease are the main cardiovascular diseases.

### **CANCER**

Cancer describes a range of diseases in which abnormal cells proliferate and spread out of control. Other terms used are tumours and neoplasms. There are many types of cancer and all organs of the body can become cancerous.

### **CHRONIC RESPIRATORY DISEASES**

Diseases of the lung take many forms. Chronic obstructive respiratory disease and asthma are the most common forms.

Chronic obstructive respiratory disease is caused by irreversible obstruction of the larger airways in the lung; asthma is caused by reversible obstruction of the smaller airways in the lung.

### **DIABETES**

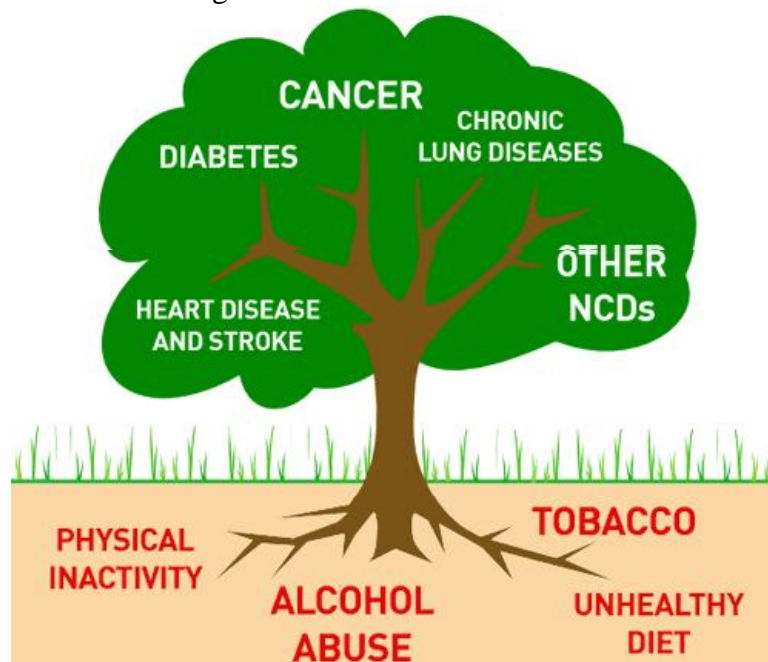
Diabetes is characterized by raised blood glucose (sugar) levels. This results from a lack of the hormone insulin, which controls blood glucose levels, and/or an inability of the body's tissues to respond properly to insulin. The most common type of diabetes is type 2, which accounts for about 90% of all diabetes and is largely the result of excessive weight and physical inactivity. The usual childhood form of diabetes (type 1 diabetes) is caused by an absolute lack of insulin. Without insulin, type 1 diabetes is rapidly fatal.

### **WHAT CAUSES CHRONIC DISEASES?**

The causes (risk factors) of chronic diseases are well established and well known; a small set of common risk factors are responsible for most of the main chronic diseases. These risk factors are modifiable and the same in men and women:

- unhealthy diet;
- physical inactivity;
- tobacco use.

These causes are expressed through the intermediate risk factors of raised blood pressure, raised glucose levels, abnormal blood lipids, overweight and obesity. The major modifiable risk factors, in conjunction with the non-modifiable risk factors of age and heredity, explain the majority of new events of heart disease, stroke, chronic respiratory diseases and some important cancers. The relationship between the major modifiable risk factors and the main chronic diseases is similar in all regions of the world.



### **OTHER RISK FACTORS**

Many more risk factors for chronic diseases have been identified, but they account for a smaller proportion of disease. Harmful alcohol use is an important contributor to the global burden of disease but its relationship to chronic disease is more complex. Other risk factors for chronic disease include infectious agents that are responsible for cervical and liver cancers, and some environmental factors, such as air pollution, which contribute to a range of chronic diseases including asthma and other chronic respiratory diseases.

### **PSYCHOSOCIAL AND GENETIC FACTORS ALSO PLAY A ROLE.**

#### ➤ **Childhood risk**

There is now extensive evidence from many countries that conditions before birth and in early childhood influence health in adult life. For example, low birth weight is now known to be associated with increased rates of high blood pressure, heart disease, stroke and diabetes.

#### ➤ **Risk accumulation**

Ageing is an important marker of the accumulation of modifiable risks for chronic disease: the impact of risk factors increases over the life course.

#### ➤ **Underlying determinants**

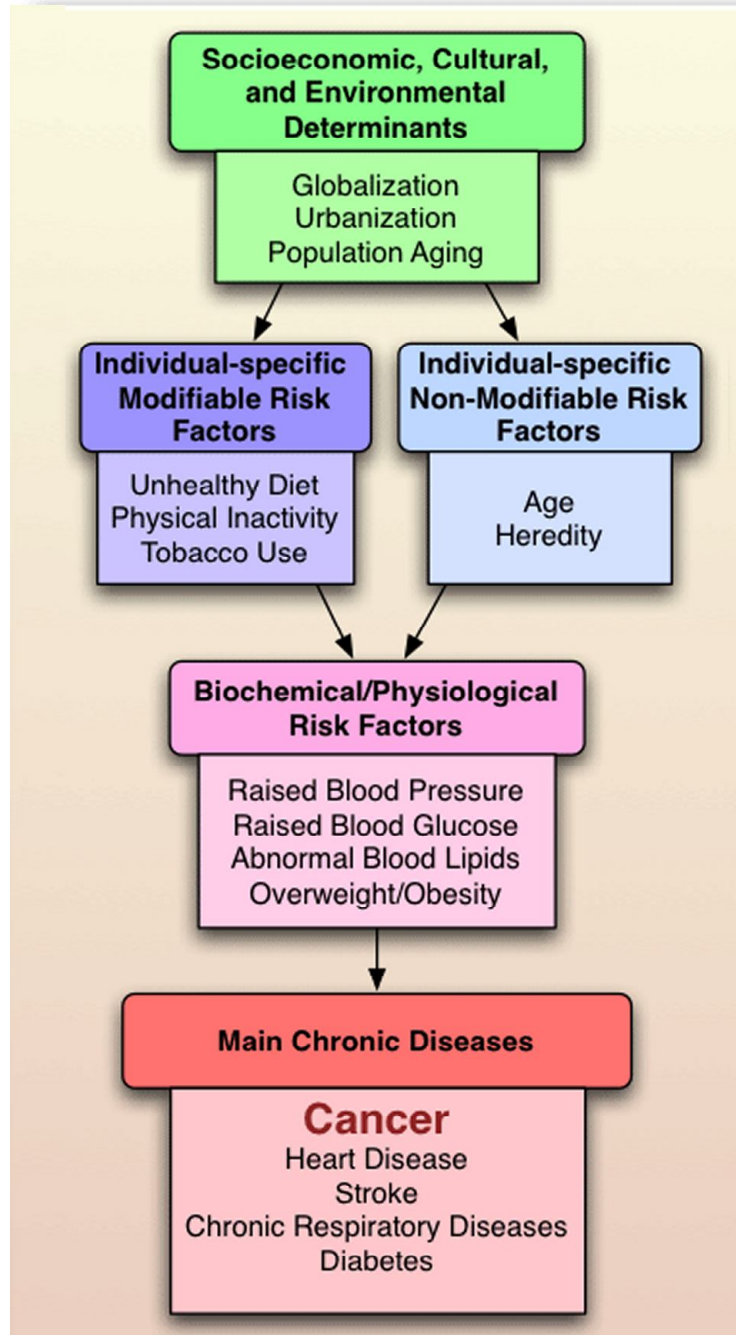
The underlying determinants of chronic diseases are a reflection of the major forces driving social, economic and cultural change – globalization, urbanization, population ageing, and the general policy environment.

#### ➤ **Poverty**

Chronic diseases and poverty are interconnected in a vicious circle. At the same time, poverty and worsening of already existing poverty are caused by chronic diseases. The poor are more vulnerable for several reasons, including greater exposure to risks and decreased access to health services.

#### ➤ **Psychosocial stress also plays a role.**

# Causes of Chronic Diseases



## INFECTIOUS AND NON-INFECTIOUS CAUSES

Infectious diseases (Communicable diseases) :- are diseases which spread from an infected person to a healthy person through air, water, food, vectors, physical contact or sexual contact. Eg :- common cold, chicken pox, mumps, measles, typhoid, cholera, tuberculosis, malaria, AIDS etc.

Non-infectious diseases (Non-communicable diseases) :- are diseases which are not spread from an infected person to a healthy person. Eg :- beri beri, rickets, scurvy, night blindness, diabetes, cancer, high blood pressure etc. 5) Causes of diseases :- Diseases are caused by :- i) Pathogens like virus, bacteria, fungi, protozoans or worms. ii) Poor health and under



nourishment. iii) Malfunctioning of body parts. iv) Environmental pollution. v) Genetic disorders.

## INFECTIOUS AGENTS

Infectious diseases are caused by microorganisms such as viruses, bacteria, fungi or parasites and can spread between individuals.

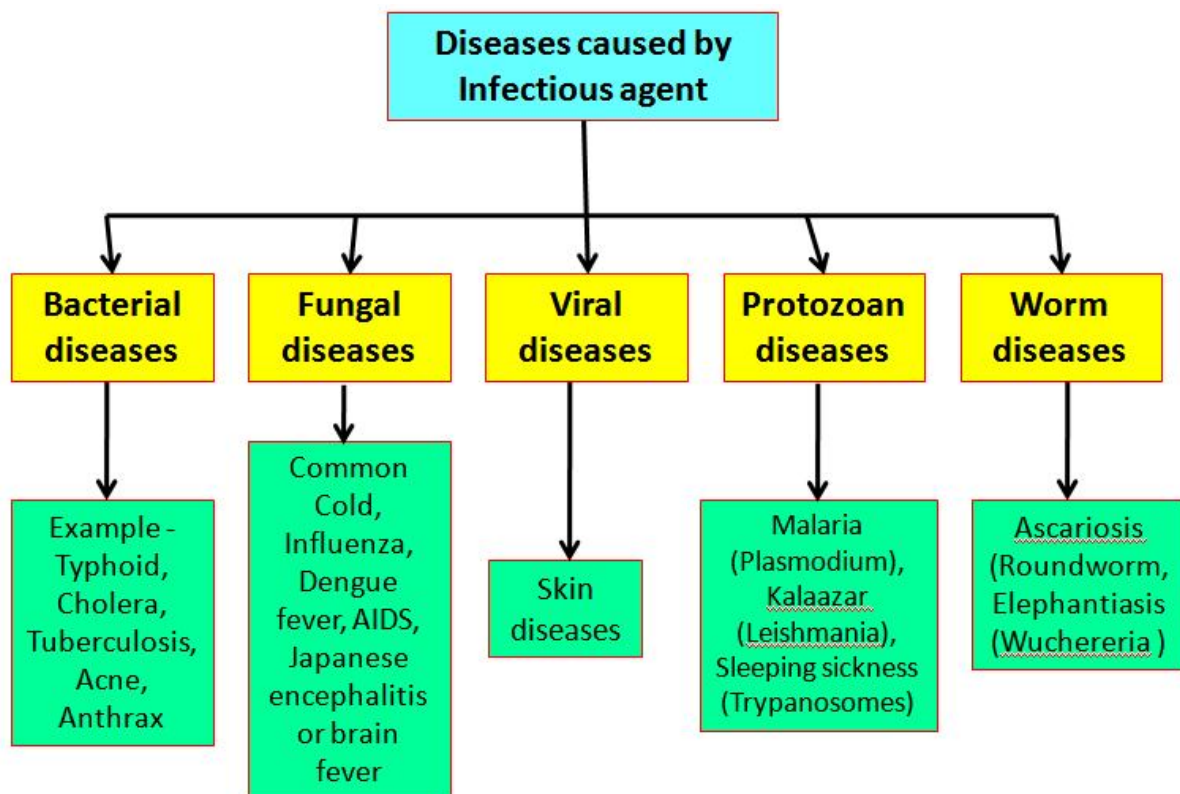
Microorganisms that cause disease are collectively called pathogens.

Pathogens cause disease either by disrupting the bodies normal processes and/or stimulating the immune system to produce a defensive response, resulting in high fever, inflammation and other symptoms.

Infectious diseases can be spread from one person to another, for example through contact with bodily fluids, by aerosols (through coughing and sneezing), or via a vector, for example a mosquito.

Infectious diseases can be caused by:

- **Bacteria.** These one-cell organisms are responsible for illnesses such as strep throat, urinary tract infections and tuberculosis.
- **Viruses.** Even smaller than bacteria, viruses cause a multitude of diseases — ranging from the common cold to AIDS.
- **Fungi.** Many skin diseases, such as ringworm and athlete's foot, are caused by fungi. Other types of fungi can infect your lungs or nervous system.
- **Parasites.** Malaria is caused by a tiny parasite that is transmitted by a mosquito bite. Other parasites may be transmitted to humans from animal feces.

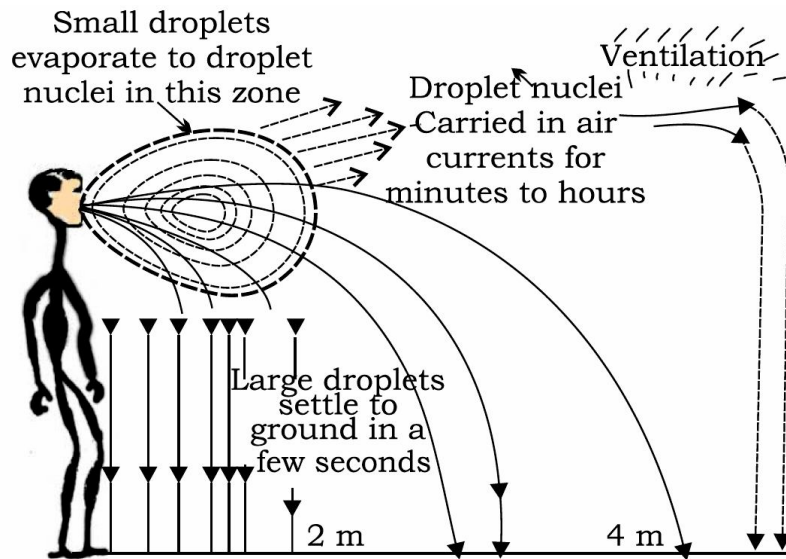


## MEANS OF SPREAD

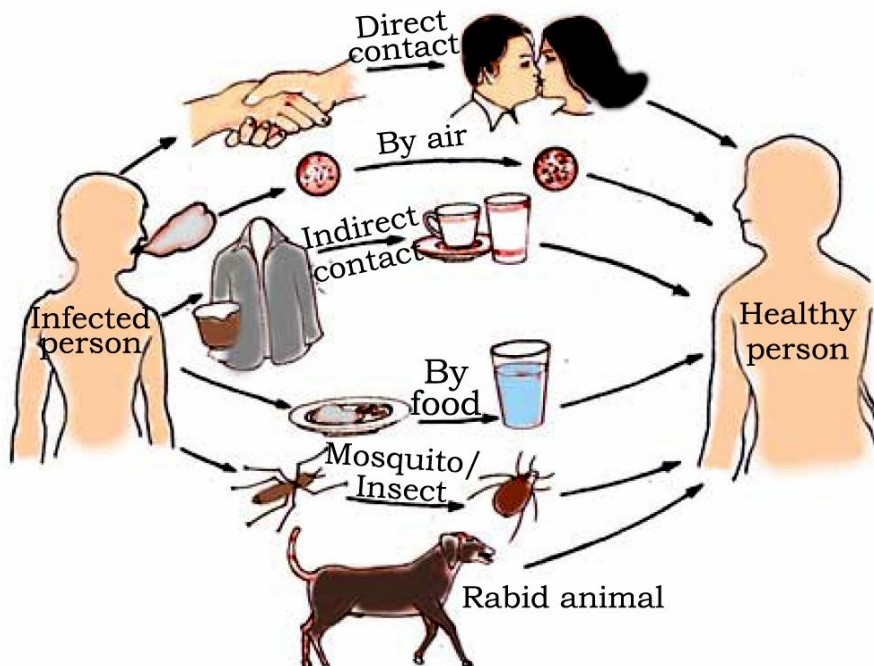
Infectious diseases spread from an infected person to a healthy person through air, water, food, vectors, physical contact and sexual contact.

- i) Through air :- Common cold, Tuberculosis, Pneumonia etc.
- ii) Through water :- Cholera, Amoebic dysentery etc.
- iii) Through vectors :- Mosquitoes :- Malaria, Dengue, Yellow fever etc. Flies :- Typhoid, Tuberculosis, Diarrhoea, Dysentery etc.
- iv) Through sexual contact :- Syphilis, AIDS. AIDS virus can also spread through blood transfusion and from the mother to her child during pregnancy and through breast feeding.

The below figure shows how Air-transmitted diseases are easier to catch the closer we are to the infected person. However, in closed areas, the droplet nuclei recirculate and pose a risk to everybody. Overcrowded and poorly ventilated housing is therefore a major factor in the spread of airborne diseases.



Disease can also be spread through water. This occurs if the excreta from someone suffering from an infectious gut gets mixed with water. Eg cholera, gets mixed with the drinking water used by people living near by. The cholera causing microbes will enter new hosts through the water they drink and cause disease in them. Such diseases are much more likely to spread in the absence of safe supplies of drinking water.



**Fig.** Common methods of transmission of diseases.

The sexual act is one of the closest physical contacts two people can have with each other. Not surprisingly, there are microbial diseases such as syphilis or AIDS that are transmitted by sexual contact from one partner to the other. However, such sexually transmitted diseases are not spread by casual physical contact. Casual physical contacts include handshakes or hugs or sports, like wrestling, or by any of the other ways in which we touch each other socially. Other than the sexual contact, the AIDS virus can also spread through blood to blood contact with infected people or from an infected mother to her baby during pregnancy or through breast feeding.

## ORGAN-SPECIFIC AND TISSUESPECIFIC MANIFESTATIONS

Disease causing microbes enter the body by different means and goes to different organs and tissues.

- Microbes which enters through the nose are likely to go to the lungs. ( Bacteria which cause tuberculosis of lungs).
- Microbes which enter through the mouth are likely to stay in the gut ( Bacteria which causes Typhoid) or liver (Bacteria which causes Jaundice).
- Virus which causes AIDS enter the body through sexual organs during sexual contact and spreads through the lymph to all parts of the body and damages the immune system.
- Malaria-causing microbes, entering through a mosquito bite, will go to the liver, and then to the red blood cells.
- The virus causing Japanese encephalitis, or brain fever, will similarly enter through a mosquito bite goes and infects the brain.

## PRINCIPLES OF TREATMENT

The treatment of infectious diseases consists of two steps. They are to reduce the effects of the disease (symptoms) and to kill the microbes which caused the disease.

**i) To reduce the effects of the disease :-** This can be done by taking medicines to bring down the effects of the disease like fever, pain or loose motions etc. and by taking bed rest to conserve our energy.

**ii) To kill the microbes :-** This can be done by taking suitable antibiotics and drugs which kills the microbes and the disease is cured.

## PRINCIPLES OF PREVENTION

There are two ways of prevention of infectious diseases. They are general ways and specific ways.

**i) General ways of prevention :-** Public hygiene is most important for prevention of infectious diseases. Proper and sufficient food for every one will make people healthy to resist infection. Air borne diseases can be prevented by living in conditions that are not crowded. Water borne diseases can be prevented by providing safe drinking water. Vector borne diseases can be prevented by providing clean environment.

**ii) Specific ways of prevention :-** The specific ways to prevent infectious disease is immunisation by taking vaccines. Vaccines provide immunity from infectious diseases like tetanus, diphtheria, whooping cough, measles, polio etc. Our body has an immune system which fights microbial infection. When this system first sees an infectious microbe, it kills the microbe and remembers it. So if the microbe enters the body the next time, it responds more vigorously. Vaccines mimic the infectious microbe and strengthens our immune system and protects the body from infectious diseases.

## IMMUNISATION

Immunisation gives a very good level of protection against many serious diseases.

It uses your body's natural defence mechanism, the immune response, to build resistance to specific infection.

There are three reasons why we immunise children.

- **First**, immunisation prevents children from becoming ill with unpleasant and serious infectious diseases, which have a risk of complications and long-term side effects.
- **Second**, we immunise to try and help protect all children in the population. The more people who are immunised, the less of the infectious disease there is around so the less chance there is of anyone catching it. When levels of immunisation against an infectious disease are really, really high - then something happens called 'herd immunity' where the risk of the disease occurring is so low that even those who cannot be immunised are unlikely to be affected.
- **Third**, we immunise to try and wipe out as many infectious diseases as we can everywhere in the world.

<b>National Immunization Schedule</b>		
<b>For Infants</b>	<b>Vaccine &amp; Dose</b>	<b>Route</b>
At Birth 6 weeks	BCG 0.1ml + OPV 2drops( 0 dose) BCG 0.1ml [if not at birth] DPT-1 0.5ml + OPV-1 2drops	Intradermal Intradermal I/M + Oral
10 weeks 14 weeks 9-12 months	DPT-2 + OPV-2 DPT-3 + OPV-3 Measles 0.5ml + Vit. A 2ml	I/M + Oral I/M + Oral Deep S/C + Oral
At 18 months At 24, 30, 36 months	DPT + OPV[Boosters-1] Vitamin A 2ml	I/M + Oral Oral
At 5-6 years	DT[Booster-2]	I/M
At 10 and 16 years	Tetanus Toxoid	I/M
<b>For Pregnant Women</b>	<b>Vaccine &amp; Dose</b>	<b>Route</b>
Early in Pregnancy	TT-1 or Booster	I/M
One month after TT-1	TT-2	I/M

### SUPPLEMENTARY NOTES

#### CAUSES OF INFECTIOUS DISEASES (INFECTIOUS AGENTS)

##### VIRUSES

Viral diseases are extremely widespread infections caused by viruses, a type of microorganism. There are many types of viruses that cause a wide variety of viral diseases. The most common type of viral disease is the common cold, which is caused by a viral infection of the upper respiratory tract (nose and throat). Other common viral diseases include:

- Chickenpox
- Flu (influenza)

- Herpes
- Human immunodeficiency virus (HIV/AIDS)
- Human papillomavirus (HPV)
- Infectious mononucleosis
- Mumps, measles and rubella
- Shingles
- Viral gastroenteritis (stomach flu)
- Viral hepatitis
- Viral meningitis
- Viral pneumonia

Viral diseases are contagious and spread from person to person when a virus enters the body and begins to multiply. Common ways that viruses spread from person to person include:

- Breathing in air-borne droplets contaminated with a virus
- Eating food or drinking water contaminated with a virus
- Having sexual contact with a person who is infected with a sexually transmitted virus
- Indirect transmission from person to person by a virus host, such as a mosquito, tick, or field mouse
- Touching surfaces or body fluids contaminated with a virus

Viral diseases result in a wide variety of symptoms that vary in character and severity depending on the type of viral infection and other factors, including the person's age and overall health. Common symptoms of viral diseases include flu-like symptoms and malaise.

Viral diseases are not treatable with antibiotics, which can only cure bacterial diseases and infections. However, the most common viral diseases, the common cold and the flu, are self-limiting in generally healthy people. This means that the viral infection causes illness for a period of time, then it resolves and symptoms disappear as your immune system attacks the virus and your body recovers.

In some cases, viral diseases can lead to serious, possibly life-threatening complications, such as dehydration, bacterial pneumonia, and other secondary bacterial infections. People at risk for complications include those who have a chronic disease or a suppressed or compromised immune system, and the very young and very old. In addition, certain types of sexually transmitted viral infections, such as HIV/AIDS and HPV, can lead to serious complications and death. Seek prompt medical care if you think you have a viral disease, especially if you are at risk for complications, or if you believe you have been exposed to a sexually transmitted disease.

Seek immediate medical care if you, or someone you are with, have serious symptoms of an illness or a viral disease, such as shortness of breath, chest pain, passing out (fainting), or a change in alertness or consciousness.

## **SYMPTOMS OF VIRAL DISEASES**

Symptoms of viral diseases vary depending on the specific type of virus causing infection, the area of the body that is infected, the age and health history of the patient, and other factors. The symptoms of viral diseases can affect almost any area of the body or body system. Symptoms of viral diseases can include:

- Flu-like symptoms (fatigue, fever, sore throat, headache, cough, aches and pains)
- Gastrointestinal disturbances, such as diarrhea, nausea and vomiting
- Irritability
- Malaise (general ill feeling)
- Rash
- Sneezing
- Stuffy nose, nasal congestion, runny nose, or postnasal drip

- Swollen lymph nodes
- Swollen tonsils
- Unexplained weight loss

In infants, signs of a viral disease can also include:

- Bulging of the soft spot on the top of the head
- Difficulty with feeding
- Excessive crying or fussiness
- Excessive sleepiness

### **Serious symptoms that might indicate a life-threatening condition**

In some cases, viral diseases can result in serious complications, such as dehydration or pneumonia. Seek immediate medical care (call 911) if you, or someone you are with, have any of the following symptoms:

- Change in alertness or level of consciousness
- Chest pain
- Deep, wet chest cough that produces yellow, green or brownish phlegm
- High fever (higher than 101 degrees Fahrenheit)
- Lethargy or unresponsiveness
- Seizure
- Shortness of breath, wheezing, or difficulty breathing
- Stiff neck
- Yellowing of the skin and whites of the eyes (jaundice)

### **WHAT CAUSES VIRAL DISEASES?**

Viral infections occur when a virus enters the body and invades the inside of the body's cells in order to reproduce. If the body's immune system is unable to fight off the virus, it multiplies and spreads to other cells, repeating the process and leading to a widespread infection.

### **Types of viruses**

There are many types of viruses that cause a wide variety of viral infections or viral diseases. In fact, there are more than 200 different viruses that can cause a cold or an upper respiratory infection. Other common viruses include the following:

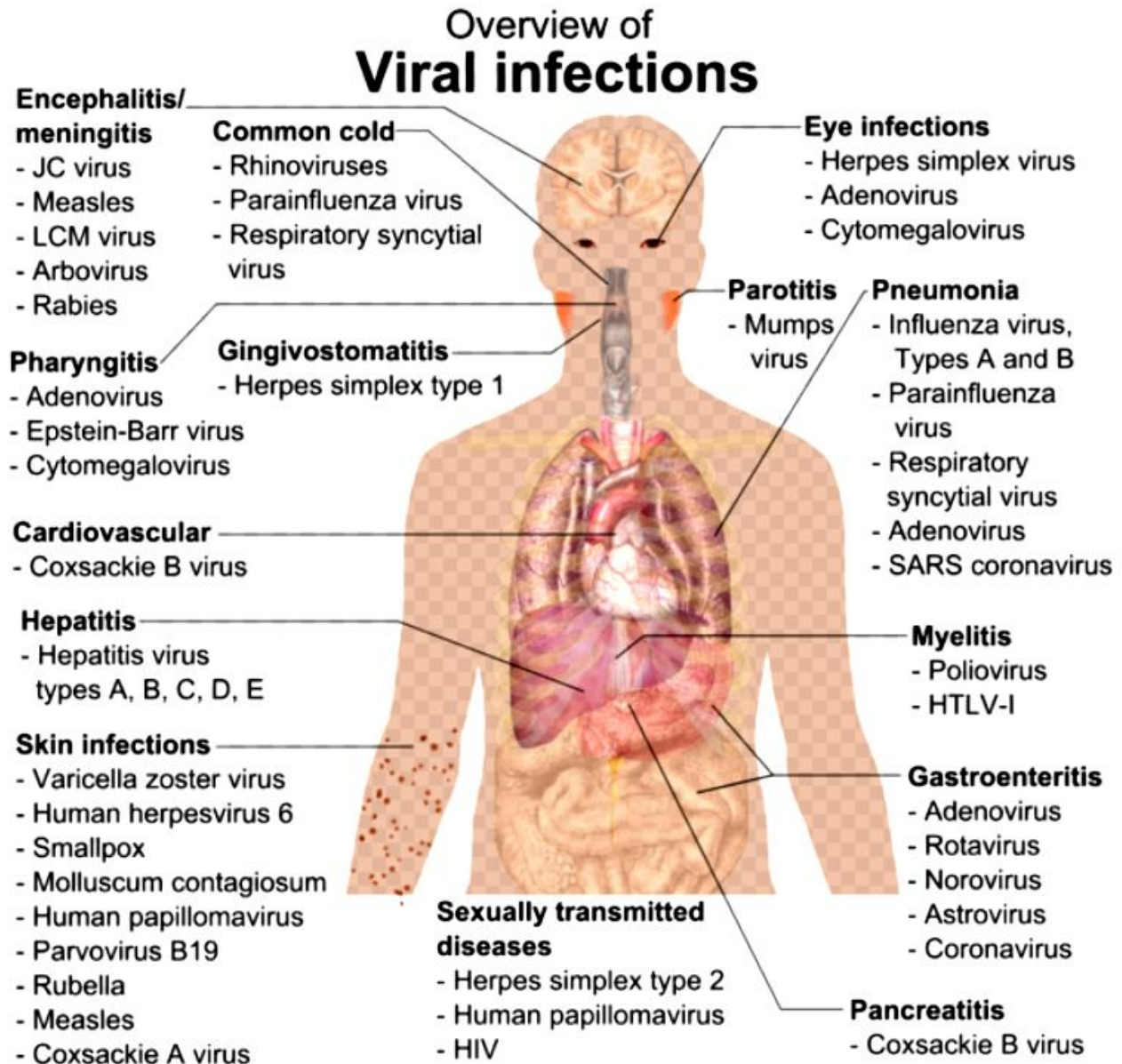
- Epstein-Barr virus causes infectious mononucleosis (cytomegalovirus causes a very similar disease in some people).
- Human immunodeficiency virus (HIV) causes AIDS.
- Human papillomaviruses (HPV) cause HPV infection, cervical dysplasia, genital warts, and cervical cancer.
- Influenza viruses, such as H1N1, cause influenza (flu).
- Respiratory syncytial virus (RSV) causes lower respiratory tract infections in young children.
- Rhinoviruses cause the common cold.
- Rotavirus, enteroviruses and noroviruses cause viral gastroenteritis.
- Varicella zoster virus causes shingles and chickenpox.
- West Nile virus causes West Nile fever.

### **Various ways to become infected with a virus**

Our body infected with a virus in a variety of ways including:

- Being bitten by an animal infected with a virus
- Being bitten by an insect infected with a virus, such as with West Nile virus
- Breathing in air-borne droplets contaminated with a virus
- Eating food or drinking water contaminated with a virus
- Having sexual contact with a person who is infected with a sexually transmitted virus

- Sharing needles for tattooing or drug use with an infected person
- Touching infected feces or body fluids and not washing your hands before eating or touching your mouth, eyes or nose
- Touching surfaces contaminated with a virus
- Transmission of a virus from an infected mother to her baby during pregnancy or delivery



### What are the risk factors for contracting viral diseases?

Viral diseases can occur in any age group or population. Everybody contracts viral diseases during their life, although in some cases, the virus does not cause obvious symptoms. Risk factors for catching a viral disease or developing complications of a viral disease include:

- Advanced age
- Compromised immune system due to an immunodeficiency disorder, HIV/AIDS, cancer or cancer treatment, kidney disease, or other condition
- History of chronic disease, such as asthma, COPD, diabetes, tuberculosis, or heart disease
- Malnourishment
- Not getting enough rest and having high levels of stress

- Not washing your hands frequently, especially before eating or after using the restroom, or after touching common surfaces
- Sharing needles to inject drugs or for tattooing
- Unprotected sex including vaginal, oral and anal sex with a partner who has had one or more other sexual partners
- Young age including infancy and elementary-school-age children

### **Reducing your risk of viral diseases**

We can lower your risk of catching or spreading a viral disease by:

- Abstaining from sexual activity, or only engaging in sexual activities within a mutually monogamous relationship in which neither partner is infected with a sexually transmitted disease
- Avoiding contact of your hands with your eyes, nose and mouth, which can transmit a virus into the body
- Avoiding contact with a person who has a viral disease
- Covering your mouth and nose with your elbow (not your hand) or a tissue when sneezing or coughing
- Eating a well-balanced diet that includes sufficient amounts of fruits and vegetables
- Sufficient rest
- Using a new condom for each sex act
- Using a sterile, unused needle for each act of tattooing or injectable drug use
- Using appropriate antibacterial cleaners to clean your hands and surfaces
- Vaccination as recommended by your health care provider for viral diseases, such as chickenpox, shingles, influenza, HPV, hepatitis B, hepatitis A, measles, and mumps
- Washing your hands with soap and water for at least 15 seconds after contact with a person who has a viral disease, before eating, or after using the restroom or touching feces, body fluids, surfaces, or foods that are potentially contaminated with viruses

### **How are viral diseases treated?**

Treatment of viral infections varies depending on the specific virus and other factors. General treatment measures are aimed at relieving your symptoms so that you can get the rest you need to keep up your strength and recover without developing complications.

General treatments for viral infections include:

- Acetaminophen (Tylenol) or ibuprofen (Motrin, Advil) for fever, body aches, and pain
- Drinking extra fluids
- Getting extra rest and sleep
- Maintaining good nutrition

Depending on the type of viral infection and the presence of complications, a wide variety of other treatments may be needed. For example, a human papillomavirus (HPV) infection that leads to cervical dysplasia can be treated by surgical removal of the abnormal cells on a woman's cervix.

In general, it is recommended that children younger than age six not use cold or cough medications because of the risk for serious side effects. In addition, people with a viral disease should not use aspirin or products that contain aspirin because of the risk of developing a rare but life-threatening condition called Reye syndrome. Reye syndrome has been linked to taking aspirin during a viral illness, such as a cold or the flu.

Prescription medications used to treat viral diseases

In some cases, certain medications may be prescribed to treat viral diseases:

- Antiretroviral medications, which can help people with HIV/AIDS lead longer lives. Antiretroviral medications hinder the ability of HIV to reproduce, which slows the spread of HIV in the body.



- Antiviral drugs, which minimize the severity and length of some viral infections, such as the flu and shingles, especially in people who are at a high risk for serious complications. For example, the drugs oseltamivir (brand name Tamiflu) and zanamivir (brand name Relenza) may be prescribed for some cases of flu. These drugs are not appropriate for all people with the flu.

Antibiotics, which are not prescribed for viral diseases because they are ineffective in the treatment of viral infections, may be prescribed if a person with a viral disease develops a secondary bacterial infection, such as bacterial pneumonia, bacterial bronchitis, or encephalitis.

### **Complementary treatments**

Complementary and traditional treatments will not cure a viral disease but may help to increase comfort, promote rest, and minimize symptoms of viral diseases. Some possible treatments include:

- Chicken soup to help break up congestion and provide easy-to-digest nutrients and extra fluids to help keep up strength
- Supplements or products that contain vitamin C, echinacea, or zinc
- Using a vaporizer
- Using mentholated ointments on the chest

### **What are the possible complications of viral diseases?**

In some people, viral diseases can break down the body's defenses and lead to more serious infections and life-threatening complications. Therefore, it is important to visit your health care provider when you have symptoms of a viral infection. Once the underlying infection has been determined, following the treatment plan outlined by your health care provider can help reduce any potential complications including:

- Acute bronchitis
- Cervical cancer (from human papillomavirus infection)
- Dehydration
- Frequent life-threatening, opportunistic infections
- Otitis media (ear infection)
- Pneumonia
- Secondary bacterial infection
- Seizures
- Shock and coma
- Sinusitis
- Worsening of asthma

### **BACTERIA**

Bacteria are single-celled microorganisms.

They come in many shapes including ball-, rod- and spiral-shaped.

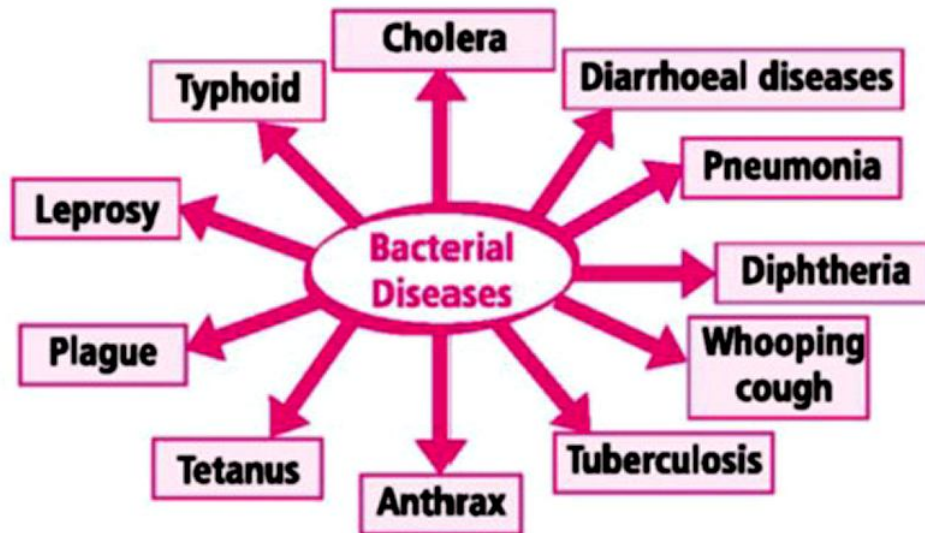
Most bacteria are not harmful and some are actually beneficial. Less than one per cent of bacteria will actually make you ill.

Infectious bacteria can grow, divide and spread in the body, leading to infectious disease.

Some infectious bacteria give off toxins which can make some diseases more severe.

Bacteria are spread in many ways including:

- Spread by aerosols (through coughing and sneezing). For example, Streptococcus.
- Spread by surface and skin contact. For example, Staphylococcus aureus, including MRSA.
- Spread through body fluids, such as blood and saliva. For example, meningococcal disease (meningitis).



Antibiotics are usually given to treat severe bacterial infections.  
Antibiotic resistance in bacteria is a significant problem.

### **TYPHOID (ENTERIC FEVER)**

- Typhoid is a common bacterial disease caused by a rodlike bacterium. *Salmonella typhi*, which is commonly found in the intestine of man.
- Certain humans function as carriers without suffering from it. Mary Mallon, called Typhoid Mary was such a case. She was a cook and typhoid carrier, who continued to spread the disease for several years through her food preparation.

#### **Mode of transmission of Typhoid**

- Incubation period varies from 1-3 weeks, average 2 weeks.
- Typhoid spreads through food and water contaminated with faeces of the patient. House flies may carry the pathogens from the faeces to the food, milk and water.

#### **Symptoms of Typhoid**

- This disease is characterised by the inflammation of ileum and colon, liver and spleen also become enlarged, abdominal pain, pea-soup diarrhoea which may become haemorrhagic, constant fever, extreme weakness, vomiting, rash of rose coloured spots called rose spots on the upper abdomen and sore throat.
- Typhoid is diagnosed by Widal Test.

#### **Prevention and treatment Typhoid**

- Any patient with typhoid requires the highest standards of nursing together with isolation and hygienic disposal of faeces.
- The two most important preventive measures are proper sewage treatment and purification of water supplies.
- Contamination of food can be reduced by personal hygiene and control of flies.
- TAB vaccine provides immunity for about 3 years.
- Antibiotics like ampicillin and chloramphenicol are used to treat typhoid.

### **CHOLERA**

- Cholera commonly called haiza is a water-borne disease caused by the bacterium, *Vibrio cholerae*.
- Robert Koch discovered this disease.

#### **Mode of transmission of Cholera**

- Incubation period varies from a few hours to 2-3 days.

- It spreads through contaminated food and drinks.
- The causative bacterium secretes cholera toxin, enterotoxin which induces excessive secretion of an isotonic electrolyte solution by the intestinal mucosa. This solution is lost in stool.

### **Symptoms of Cholera**

- Cholera is mainly characterized by sudden onset of profuse, effortless, rice-water like stools, vomiting and rapid dehydration, loss of minerals and muscular cramps.

### **Prevention and treatment of Cholera**

- Proper sanitation and hygienic conditions are the best methods of prevention.
- Cholera vaccine is effective for six months only.
- Fluid and salt lost is restored by Oral Rehydration Solution (ORS). It is water with a small amount of sugar and salt.
- Antibiotics like tetracycline and chloramphenicol are used to treat cholera.

## **DIARRHOEAL DISEASES**

- Diarrhoeal diseases are group of diseases caused by different bacteria such as Shigella dysenteriae, Escherichia coli, Campylobacter, Salmonella and Clostridium.

### **Mode of transmission of Diarrhoeal diseases**

- Incubation period is variable.
- Epidemics are common in overcrowded insanitary conditions.
- It spreads through food poisoning, contaminated food, water or drinks, clothes, utensils and bed sheets.

### **Symptoms of Diarrhoeal diseases**

- This is characterised by mild diarrhoea i.e., loose stools if infected by E. coli, frequent stools with blood and mucus and abdominal cramps if infected by Shigella. Other symptoms are dehydration, diminished appetite, fever, low B.P., increase in pulse rate etc.

### **Prevention and treatment of Diarrhoeal diseases**

- One should avoid contaminated food and water.
- ORS is given repeatedly to check dehydration and loss of minerals.

## **PNEUMONIA**

- Pneumonia is a serious disease of lungs characterised by accumulation of mucus/fluid in alveoli and bronchioles to that extent that breathing becomes difficult.
- It is caused by Streptococcus pneumoniae or Diplococcus pneumoniae, and Haemophilus influenzae.

### **Mode of transmission of Pneumonia**

- Incubation period is of 1-3 days.
- A healthy person acquires the infection by inhaling the droplets/aerosols released by an infected person or even by sharing glasses and utensils with an infected person.

### **Symptoms**

- The onset of pneumonia is usually sudden with a single shaking chill, followed by fever, pain with breathing on the side of lung involved, increased pulse and respiratory rates and cough.
- In severe cases the lips and finger nails turn grey to bluish in colour.

### **Prevention and treatment of Pneumonia**

- The patients should be isolated and healthy persons should not share their belongings.

- Pneumococcal conjugate vaccine (PCV13) is available.
- Drugs against pneumonia are erythromycin, tetracycline and sulphamide. If untreated, pneumonia leads to death.

## **DIPHTHERIA**

- Diphtheria is an acute infectious disease in children mostly characterized by the development of a grey adherent false membrane over the upper respiratory tract or throat.
- It is caused by toxigenic strains of *Corynebacterium diphtheriae* (rod shaped, Gram +ve bacterium).

### **Mode of transmission of Diphtheria**

- Incubation period is of 2- 5 days.
- Endotoxin produced by pathogen causes nasal diphtheria, pharyngeal diphtheria and laryngotracheal diphtheria.
- The germs are present in the discharges from the nose and throat of patients and also of healthy people who act as the “carriers”.
- The patients and the carriers spread the disease through acts like kissing, talking, coughing and sneezing.

### **Symptoms of Diphtheria**

- Symptoms are fever, sore throat, sometimes vomiting, headache, epithelial necrosis by endotoxin and oozing of semisolid material in the throat which develops into a grey false but tough membrane.
- The membrane chokes the air passage. Sometimes, bacterium infects the heart, nerve cells and adrenal glands.
- In severe cases, respiratory tract is blocked causing difficulty in breathing and even death due to choking.
- ‘Schick test’ tests the presence of antitoxin and the state of hypersensitivity to diphtheria toxin.

### **Prevention and treatment of Diphtheria**

- One should avoid close contact with the patient.
- DPT (diphtheria, pertussis and tetanus) vaccine is available.
- Erythromycin is used to treat diphtheria.

## **WHOOPING COUGH (PERTUSSIS)**

- Whooping cough is caused by *Bordetella pertussis* and is a common childhood disease affecting the respiratory system.

### **Mode of transmission**

- It has an incubation period of 10 – 16 days.
- It spreads by droplet infection or by direct contact.

### **Symptoms of Whooping cough (Pertussis)**

- It causes loss of appetite, fever, running nose, fatigue, sneezing and constant cough leaving the child breathless, tired and red in face.
- Later the voice becomes hoarse and the cough gives a whoop or a loud crowing sound while inhaling.
- The child usually vomits and there is frothy discharge from his mouth and nose.
- There may be other complications like vomiting, convulsions and pneumonia.

### **Prevention and treatment of Whooping cough (Pertussis)**

- Immunisation of the disease is done in infants by DPT vaccination at six weeks, three months and five months.
- Erythromycin antibiotic is used for the treatment.

## **TUBERCULOSIS**

- Tuberculosis (TB), also called Koch's disease is caused by rod-shaped, Gram +ve bacteria, *Mycobacterium tuberculosis*.
- The bacterium releases a toxin, tuberculin which destroys the organs it infects.
- It can affect almost any tissue or organ in the body like the lungs, lymph nodes, brain, bones and joints but disease of the lung is by far the most frequent.

### **Mode of transmission of Tuberculosis**

- Incubation period is 3 to 6 weeks or may be years.
- It spreads through sneezing, coughing, contaminated food and water.

### **Symptoms of Tuberculosis**

- Constant cough and in severe cases sputum with blood, pain in chest while coughing, loss of body weight, failure of appetite, slight rise of temperature in the evening are the symptoms of lung T. B.
- Sputum, tuberculin, X-ray and gastric analysis are carried out to diagnose tuberculosis.
- Tuberculin test is also called Mantoux test.

### **Prevention and treatment of Tuberculosis**

- BCG (*Bacillus Calmette Guerin*) vaccine for TB was obtained from bovine bacillus by Calmette and Guerin in 1921.
- Before giving vaccination to any individual it is important to check if they are already suffering from TB or have recovered from it.
- The test is to puncture the skin with a special instrument which has a ring of six short needles (the Heaf test). This introduces tuberculin, purified from dead tubercle bacilli.
- In the absence of past or present TB the skin shows no reaction, but if an individual has the disease or has recovered, then the skin swells and reddens at the injection site. This indicates a substantial immunity and no vaccine is offered.
- Some of the anti-tuberculosis drugs are streptomycin, rifampicin, isoniazid, thiazazone, PAS (Para amino salicydic acid) etc.
- Direct observation treatment (DOT) is a programme under WHO for treatment of TB across the world.

## **ANTHRAX (BIOWAR DISEASE)**

- Anthrax is an acute infectious disease caused by airborne, spore-forming, rod-like, non-motile bacterium, *Bacillus anthracis*.
- *Bacillus anthracis* can be easily grown in the laboratory. Anthrax spores can be produced in a dry form which can be stored as particles.
- These particles can be used in biological warfare. Spores are infective in dry form, not in wet form.
- It most commonly occurs in wild and domestic vertebrates (cattle, sheep, goats, camels, antelopes, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissues from infected animals.

### **Mode of transmission of Anthrax (Biowar disease)**

- Infected animals shed, a large number of bacilli (bacteria) in the discharges from the mouth, nose and rectum which sporulate in the soil. These spores are source of infection.
- It requires thousands of spores to cause human infection. Anthrax does not spread from human to human.

### **Types of Anthrax of Anthrax (Biowar disease)**

- Anthrax infection can occur in three different forms: cutaneous (skin), gastrointestinal (by ingestion) and pulmonary (by inhalation).
  - (i) Cutaneous anthrax occurs when bacteria enter through skin cuts and wounds. A skin lesion begins as a papule and soon becomes a vesicle and breaks, discharging bloody serum. This vesicle, in about 36 hours, becomes a bluish-black necrotic mass (dead tissue). It consists of minute particles rich in spores.
  - (ii) Gastrointestinal anthrax is caused by taking under-cooked meat of infected animals. Patient experiences chill, high fever, body aches, nausea, vomiting, bloody diarrhoea, loss of appetite, and frequent haemorrhages from the mucous membranes and in the skin.
  - (iii) Pulmonary anthrax is acquired by inhaling dust containing *B. anthracis*. Pulmonary anthrax is often called wool-sorter's disease.

### **Symptoms of Anthrax (Biowar disease)**

- Initial symptoms resemble those of common cold. Later there is difficulty in breathing, cough, fever, fast pulse and cardiovascular collapse.
- If left untreated, anthrax in all forms can lead to septicemia and death.
- Death is apparently due to oxygen depletion, secondary shock, increased vascular permeability, respiratory failure and cardiac failure.

### **Prevention and treatment of Anthrax (Biowar disease)**

- The only known effective prevention against anthrax is the anthrax vaccine. The vaccine was developed from an attenuated strain *B. anthracis*.
- A suitable antibiotic like ciprofloxacin is quite effective, particularly if used in the initial stages of disease. But in cattle, ciprofloxacin may be effective only in chronic area.
- Antibiotics should be given to unvaccinated individuals exposed to pulmonary anthrax. Penicillin, tetracycline and fluoroquinolones are effective if administered before the onset of lymphatic spread or septicemia.

### **TETANUS (LOCK JAW)**

- Lock jaw disease is caused by the spores of *Clostridium tetani* that enter through wounds.

### **Mode of transmission**

- Incubation period is of 3-25 days during which the bacterium secretes a powerful exotoxin tetanospasmin into the tissue, and blood carries it to the central nervous system and brings about tetanus of muscles.
- Its infection is acquired by contamination of wounds with tetanus spores as these infected spores are abundant in the soil manured with animal dung.
- Spores may survive for 60 or more years in contaminated soil.

### **Symptoms of Tetanus (Lock jaw)**

- Symptoms include painful muscular spasms especially of neck and jaw.
- Lock jaw condition occurs when the patient cannot open the mouth. Convulsions and paralysis of muscles, difficulty in chewing and swallowing, fever and headache are the other symptoms.

### **Prevention and treatment**

- All wounds should be treated carefully and cleaned with iodine solution.
- Immunisation of infants by DPT should be done.
- ATS (antitetanus serum) injection within 24 hours of injury provides passive immunity while TT (tetanus toxoid) gives active immunity.

## **PLAGUE (BLACK DEATH)**

- Plague is caused by a rod-shaped non-motile bacterium called *Pasteurella/Yersinia pestis* and is transmitted by the bite of infected rat flea, *Xenopsylla cheopis*.
- The first authenticated plague epidemics in India in modern times occurred in 1895-96 and from 1898 onwards the disease was appreciably manifest, reaching a peak in the year 1907.
- *Pasteurella pestis* endoparasite of gut of rat flea (which is an ectoparasite of rat and mouse).
- Head louse (*Pediculus*) and bedbug (*Cimex*) may also transmit the germs from man to man.

### **Prevention and treatment of Plague (Black death)**

- Plague is confirmed by Wayson stain test.
- Anti-plague vaccine, spray of insecticides, killing of rats, nose caps and high cots (rat flea can jump upto 45 cm) are some preventive measures.
- Streptomycin or oral tetracycline is effective against plague.

## **LEPROSY (HANSEN'S DISEASE)**

- Leprosy is a contagious chronic bacterial disease caused by *Mycobacterium leprae* which is characterised by the chronic infection of the skin and other tissues.

### **Mode of transmission of Leprosy (Hansen's disease)**

- The incubation period is very long and averages upto 2-5 years.
- Infection occurs by prolonged contact with leprosy patients.
- The bacilli leave the body in nasal discharge, from the throat during coughing, sneezing and even speaking and through broken skin lesions.

### **Symptoms of Leprosy (Hansen's disease)**

These include appearance of light coloured patches on the skin, thickening of the nerves, partial or total loss of sensation in the affected parts of the body.

- These are accompanied by fever, pain, ulcers and skin eruptions. Deformities of toes and fingers may also develop.

Lepromin test is used to evaluate leprosy using an intradermal injection of a lepromin. This test classifies the type of leprosy based on reaction.

- Tuberculoid leprosy gives positive test with lepromin while lepromatous leprosy is negative to lepromin test.

### **Prevention and treatment of Leprosy (Hansen's disease)**

- No vaccine is available.
- Leprosy is treated with drugs like rifampicin, dapsone, and clofazimine.

## **FUNGI**

Fungi are microorganisms characterised by cell walls made from a substance called chitin.

Most fungi are harmless to humans and some are edible.

Other fungi can be infectious and may lead to life-threatening diseases.

Fungi reproduce by releasing spores that can be picked up by direct contact or even inhaled.

Fungal infections often affect the lungs, skin or nails. Some infections may also penetrate the body to affect organs and cause whole-body infections.

Examples of fungal infections include:

- Athlete's foot: itching, scaling or cracking of the skin
- Ringworm: reddish, itchy, scaly rash usually on the skin and scalp
- Thrush: caused by the fungus *Candida albicans* which can infect the mouth, vagina, stomach and urinary tract.

Fungi that commonly cause skin diseases are called dermatophytes. “Dermatophytes” doesn't refer to a particular group of fungi, but rather to the fact that they attack the dermis, or skin. Fungal infections of the skin can be treated with topical creams as well as prescription drugs.

### Athlete's Foot

The best-known fungal skin infection is athlete's foot. It infects approximately 10 percent of the United States population. It is most common among adolescents and adults; however, it may affect people of any age.

Athlete's foot can grow on the feet in different forms, including the following:

**Interdigital:** Infection occurs between the toes, with scaling, fissuring, or softened skin.

**Moccasin:** The fungi grows as a thick scaling over the entire sole of the foot (like a moccasin) and causes discomfort.

**Vesicular:** The fungi appear as small, itchy blisters near the instep.

**Ulcerative:** The infection involves peeling, oozing discharge, and a strong odor that usually starts as red, itchy swelling between the toes.

A good way to combat athlete's foot is to keep feet clean and dry. Topical powders or creams may also help to control infection. Unfortunately, athlete's foot is tough to eliminate and often comes back.

Summary of Human Fungal Diseases			
Disease	Symptoms	Fungus	Route of transmission
Athlete's foot	fluid-filled blisters, scaly skin, itching	<i>Trichophyton</i> species (Ascomycete) or <i>Epidermophyton</i> species	contact with skin lesions or contaminated floors
Ringworm	ring-shaped skin lesions	<i>Microsporum</i> , <i>Trichophyton</i> (Ascomycetes)	contact with skin lesions, contaminated floors, or contaminated objects
Vaginal yeast infection	burning sensation, itching, discharge	<i>Candida</i>	contact with fecal material, diabetes; antibiotic treatments increase susceptibility
Tinea cruris (jock itch)	intense itching, ring-shaped lesions	<i>Microsporum</i> , <i>Trichophyton</i> (Ascomycetes)	contact with skin lesions, contaminated floors, or contaminated objects
Histoplasmosis	fever, chills, headache, body aches, chest pains, nonproductive cough	<i>Histoplasma capsulatum</i> (Ascomycete)	inhalation of airborne conidia

### Scalp Itch

Scalp itch is a fungal infection of the scalp and hair. It usually occurs in young children, but may appear in all age groups. It is contagious and may be spread from child to child in a school or day care setting.

An antifungal drug called riseofulvin cures scalp itch in one to three months.

### Nail Fungus

Nail fungus is most common in adolescents and adults, especially among people who have frequent manicures. These infections can manifest themselves in a variety of patterns. Sometimes a portion of the nail becomes thick and brittle. Other times, the fungi attack the cuticle and the growth spreads out from there. This cuticle-based infection is common in AIDS patients.



## PARASITES

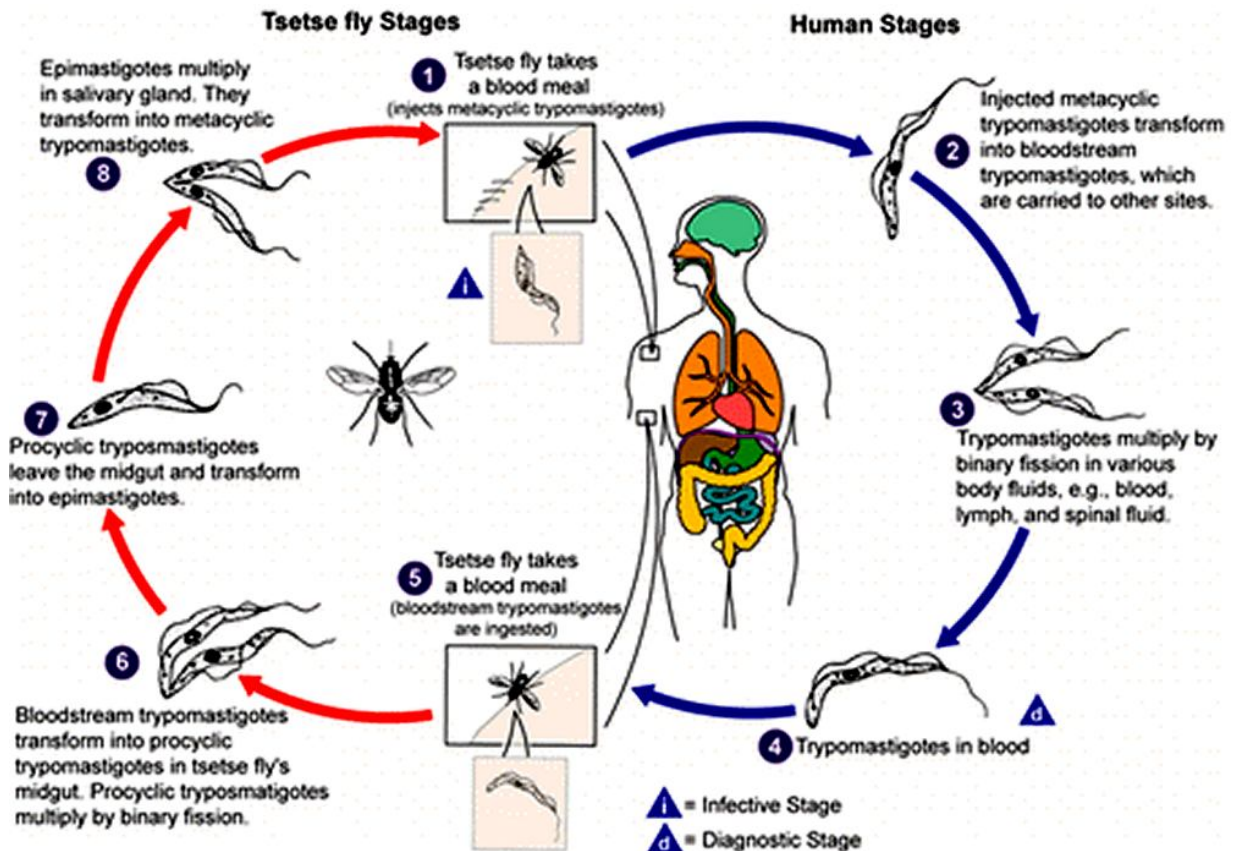
A parasite is an organism that lives off another organism, typically attaching itself to feed from the victim's blood, bowels, or other various bodily fluids. Parasitic diseases are more common than most people realize, and can strike anyone regardless of race, age, or social status. A certain amount of parasites are normally found on the skin and bedding of every human being. Dust mites, and other tiny, harmless mites, are commonly found in all household. Harmful parasites, however, can cause a great deal of damage to the human body if not properly treated.

## PARASITIC DISEASES SYMPTOMS

Parasites such as roundworms feed off the human waste in the intestines. Symptoms of various worm infestation include itching, usually of the anus or vaginal area, weight loss, increased appetite, abdominal pain, bowel obstructions, vomiting, disturbed sleep, worms present in the stools or vomit, diarrhea, anemia, symptoms of pneumonia, food poisoning symptoms, aching muscles or joints, or a generally feeling of illness. These symptoms can range from barely noticeable to very severe.

## PARASITIC DISEASES CAUSES

Parasitic disease is typically caused by the parasite's entry into the body via the skin or mouth. It is not unusual to pick up parasitic infections from soil, typically by either walking barefoot and allowing entry through the feet, or by placing the hands in the dirt and eventually placing the fingers in the mouth. Often people carry a parasite without ever knowing it.



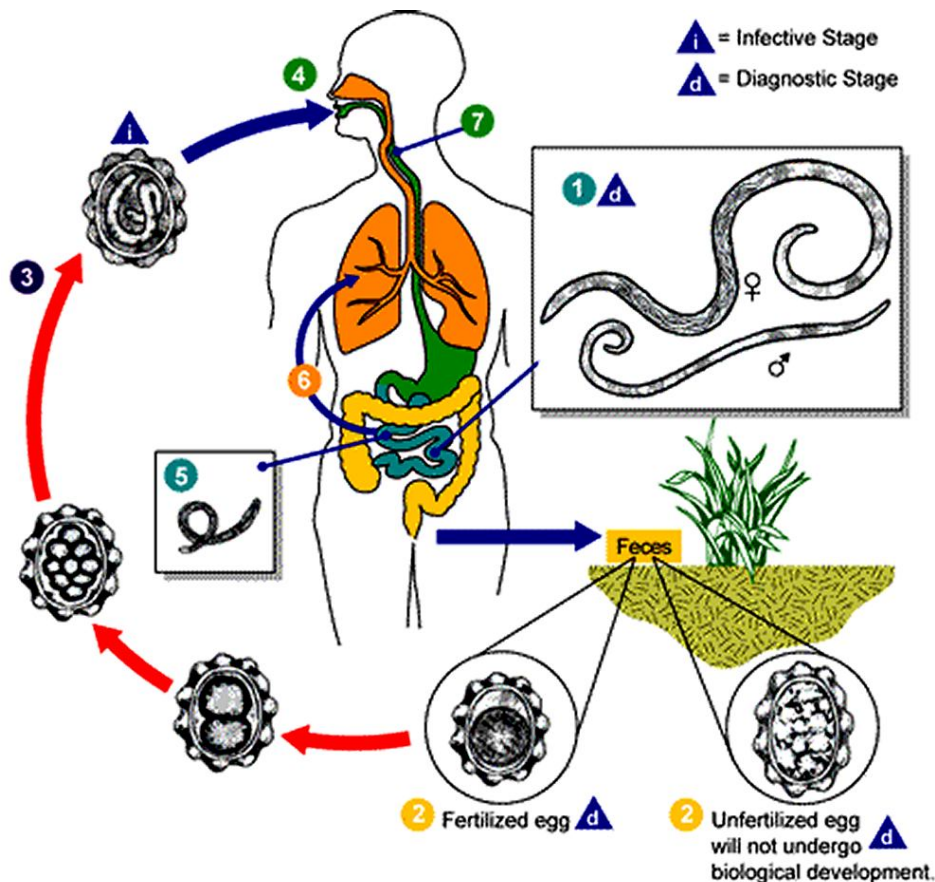
Parasites such as lice are caused through human contact with a person who is infected with lice. Ticks can be picked up through walking outdoors, close contact with a dog or cat, or being brought in from outside in various packages. Mosquitoes are parasites which simply attack humans for their blood and leave as quickly as they came.

## PARASITIC DISEASES RISK FACTOR

Risk factors for parasites include children who play outdoors in the dirt, close contact with pets, farming, gardening, outdoor activities that include walking near wooded areas, digging in the dirt, walking outside barefoot, being in close or sexual contact with someone who has specific parasites, or sometimes simply the act of walking from the car to the house. Parasites exist in the world and can not be avoided simply by avoiding being outdoors. Parasites can be found in foods, especially undercooked or exotic foods.

Physicians typically do not screen for parasites without cause. Blood tests or fecal samples can determine parasites, but not all parasites. Pinworms require a nightly anal test, typically for three nights, where a sticky slide is placed on either side of the anus to pick up any eggs that have been laid. Analyzing the slide under a microscope can determine the presence of pinworm.

The majority of parasitic diseases are not dangerous. However, extreme cases may cause weight loss, dehydration from chronic diarrhea, symptoms which mimic pneumonia, anemia, fatigue, Lyme disease from ticks, Malaria from mosquitoes, or a host of uncomfortable bowel syndromes.



## PARASITIC DISEASES TREATMENT

Treatment of parasitic disease is typically nothing. Most often there are no symptoms, or symptoms are so mild that there is no concern, and thus physicians are not told to consider the symptoms as a possible parasitic disease. Unless there are serious symptoms or the infestation is large enough to cause health problems, most parasitic diseases will clear up on their own.

For serious symptomatic cases, medication can be administered to kill the parasite or to relieve the symptoms caused by the parasite. Pinworm discomfort can be handled with an anti itch cream, while Lyme disease can only be treated by treating the symptoms. Medication such as mebendazole, pyrantel pamoate, and albendazole are effective medications in killing worm infestations.

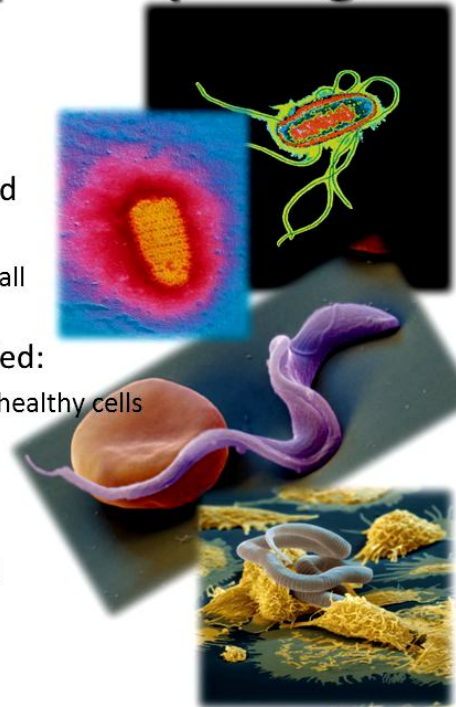
When dealing an infestation of worms or other parasites, self care can be as simple as keeping clean. Frequent bathing, cleaning clothes and bed clothes, wearing clean underclothing to bed, and checking for parasites are the best ways to deal with a parasitic disease. Washing hands frequently, especially after outdoor activities can help reduce the chances of a parasitic disease.

## **PARASITIC DISEASES PREVENTION**

Coping with a parasitic disease can be stressful, more so when the patient believes that parasites come from being dirty. Parasites can be contracted regardless of the cleanliness of the home. While hand washing and overall cleanliness are positive ways to prevent parasitic infections and diseases, they in now way guarantee that parasites won't infect a family member.

## **There are different types of pathogens**

- **Bacteria** are single-celled organisms:
  - Cause illness by destroying cells, release toxic chemicals
  - Ex: Food poisoning, MRSA
- **Viruses** are genetic material surrounded by a protein coat:
  - Force host cells to make more viruses, small
  - Ex: Flu, Cold, HIV
- **Fungi** can be multicellular or single-celled:
  - Take nutrients from host cells by piercing healthy cells
  - Occur in warm and damp places
  - Ex: Athlete's foot
- **Protozoa** are single-celled organisms.
  - Use host cells to complete their life cycles
  - Take nutrients from host cell
  - Ex: Malaria



### **Review: Parasite**

#### **Means of spread of infectious diseases :-**

**Infectious diseases spread from an infected person to a healthy person through air, water, food, vectors, physical contact and sexual contact.**

**i) Through air :- Common cold, Tuberculosis, Pneumonia etc.**

**ii) Through water :- Cholera, Amoebic dysentery etc.**

**iii) Through vectors :-**

**Mosquitoes :- Malaria, Dengue, Yellow fever etc.**

**Flies :- Typhoid, Tuberculosis, Diarrhoea, Dysentery etc.**

**iv) Through sexual contact :- Syphilis, AIDS.**

**AIDS virus can also spread though blood transfusion and from the mother to her child during pregnancy and through breast feeding.**

# Infectious Diseases

## Disease/ Infection

**Influenza**



**Measles**

**Meningitis**  
(Meningococcal)



**Mumps**

**Ringworm**



**Rubella**

**Salmonella**

**Scabies**

**Slapped cheek**  
(Human parvovirus infection)

**Streptococcal  
sore throat**



**Whooping cough**  
(Pertussis)

## This disease is spread by ...

Coughing and sneezing and direct contact with respiratory droplets.

Coughing and sneezing.  
Also direct contact with the nose/throat secretions of an infected person.

Close physical contact, such as kissing. Sleeping in the same room.

Contact with infected saliva, eg, coughing, sneezing, kissing and sharing food and drink.

Contact with infected person's skin, clothes or personal items. Also through contaminated floors and shower stalls.

Coughing and sneezing.  
Also direct contact with the nose/throat secretions of an infected person.

Undercooked food (eg, chicken and meat); food/water contaminated with faeces from infected person or animal; direct spread from infected person or animal.

Direct skin contact with the infected person, and sharing sheets and clothes.

Coughing and sneezing. The virus may be passed from mother to child during pregnancy.

Usually contact with the secretions of a strep sore throat. Sometimes through contaminated food.

Coughing. Adults and older children may pass on the infection to babies.

## Time between exposure and sickness

1–4 days

7–18 days,  
usually 10 days to onset  
and 14 days to rash

2–10 days, usually  
3–4 days

12–25 days, usually  
16–18 days

10–14 days

14–23 days, usually  
16–18 days

6–72 hours, usually  
12–36 hours

Days–weeks

4–20 days

1–3 days

5–21 days, usually  
7–10 days

## Early signs

Sudden onset of fever with cough, sore throat, muscular aches and headache.

Running nose and eyes, cough, fever and a rash.

Generally unwell, fever, headache, vomiting, sometimes a rash.  
**Urgent treatment is required!**

Pain in jaw, then swelling in front of ear and fever.

Flat spreading ring-shaped lesions.

Fever, swollen neck glands and a rash on the face, scalp and body.  
Rubella during early pregnancy can cause abnormalities in the baby.

Stomach pain, nausea, fever and diarrhoea.

Itchy rash in places such as forearm, around waist, between fingers and buttocks and under armpits.

Red cheeks and lace-like rash on body.

Headache, vomiting, sore throat.

Running nose, persistent cough followed by "whoop", vomiting or breathlessness.

## How long is the child infectious?

From 1 day before, up to 7 days after illness onset.

From the first day of illness until 4 days after the rash begins.

For 24 hours after antibiotics are started.

For one week before swelling appears until 9 days after.

While lesions are present, and while fungus persists on contaminated material.

From 7 days before rash starts until at least 4 days after it has appeared.

Until well, and possibly weeks or months after.

Until 24 hours after treatment is started.

For variable time up to appearance of rash.

For 24 hours after antibiotics are started.

From runny nose stage and for 3 weeks after onset of cough if not treated with antibiotics, or until 5 days of antibiotic treatment.

## Exclusion of child from kindergartens, schools, etc

Restrict contact activities until well.†

At least 4 days from onset of rash.

Until well enough to return.

Until 9 days after swelling develops, or until child is well, whichever is sooner.

Restrict contact activities, eg, gym and swimming, until lesions clear.

7 days from appearance of rash.

Until well with no further diarrhoea.†

24 hours after treatment is started.

Unnecessary unless child is unwell.

Until 24 hours after antibiotics started.

21 days from onset of coughing, or after 5 days of antibiotics.

# Infectious Diseases

Disease/  
Infection

**Campylobacter**

**Chickenpox**

**Conjunctivitis**  
(viral or bacterial)

**Cryptosporidium**  
**Giardia**

**Gastroenteritis**  
(viral)

**Glandular fever**

**Hand, foot and  
mouth disease**

**Hepatitis A**



**Hepatitis B**

(immunisation usually prevents this illness)

**Impetigo**  
(School sores)

This disease is  
spread by ...

Undercooked food (eg, chicken and meat); food/water contaminated with faeces from infected person or animal. Direct spread from infected person or animal.

Coughing and sneezing.  
Also direct contact with weeping blisters.

Direct contact with discharge from the eyes or with items contaminated by the discharge.

Food or water contaminated with faeces from infected person or animal. Direct spread from infected person or animal.

Food or water contaminated with faeces from infected person or animal. Direct spread from infected person.

Transfer of saliva.

Coughing or poor hand washing. Direct spread from an infected person.

Food or water contaminated with faeces from infected person. Direct spread from infected person.

Close physical contact with the blood or body fluids of an infected person.

Direct contact with discharge from infected skin.

Time between  
exposure and  
sickness

1–10 days,  
usually 2–5 days

10–21 days,  
usually 14–16 days

12 hours–12 days

**Cryptosporidium** 1–12 days,  
average about 7 days  
**Giardia** 3–25 days,  
usually about 7–10 days

1–3 days

4–6 weeks

3–5 days

15–50 days,  
usually 28–30 days

6 weeks–6 months,  
usually 2–3 months

Usually a few days,  
variable

Early signs

Stomach pain, fever and diarrhoea.

Fever and spots with a blister on top of each spot.

Irritation and redness of eye. Sometimes there is a discharge.

Stomach pain and diarrhoea.

Vomiting, diarrhoea and fever.

Sore throat, swollen glands in the neck, fever. Vague ill health for some time.

Fever, rash on soles and palms and in mouth. Flu-like symptoms.

Nausea, stomach pains, general sickness. Jaundice a few days later.

Similar to Hepatitis A.

Scabby sores on exposed parts of body.

How long is the  
child infectious?

Until well, and possibly several weeks after.

From up to 5 days before appearance of rash until lesions have crusted (usually about 5 days).

While there is a discharge from the eyes, the child is infectious.

Until well, and possibly several weeks after. Giardia can be cleared by medication.

While vomiting and diarrhoea last, and up to 8 days after illness starts.

Prolonged – possibly for one year or more.

While the child is unwell and possibly longer, because virus is excreted in faeces for weeks after.

From about 2 weeks before signs appear until 1 week after jaundice starts.

Blood and body fluids may be infectious several weeks before signs appear, until weeks or months later. A few people are infectious for years.

Until 24 hours after treatment with antibiotics has started or until sores are healed.

Exclusion of child  
from kindergartens,  
schools, etc

Until well with no further diarrhoea.<sup>†</sup>

For one week from date of appearance of rash.<sup>†</sup>

While there is a discharge from the eyes.<sup>†</sup>

Until well with no further diarrhoea.<sup>†</sup>

Until well with no further vomiting or diarrhoea.<sup>†</sup>

Until well enough to return.

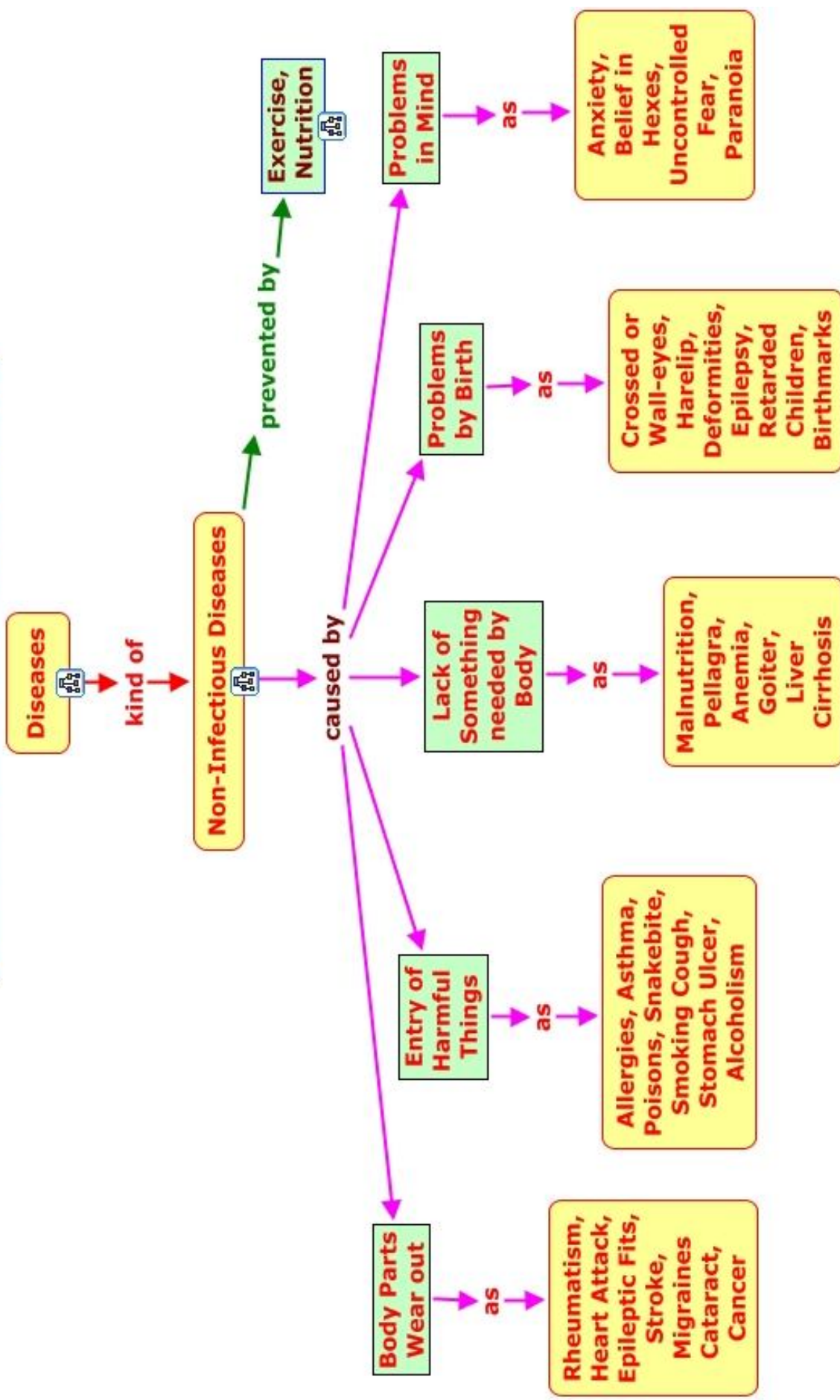
While the child is feeling unwell. Unnecessary if the child is well.<sup>†</sup>

7 days from the onset of jaundice.<sup>†</sup>

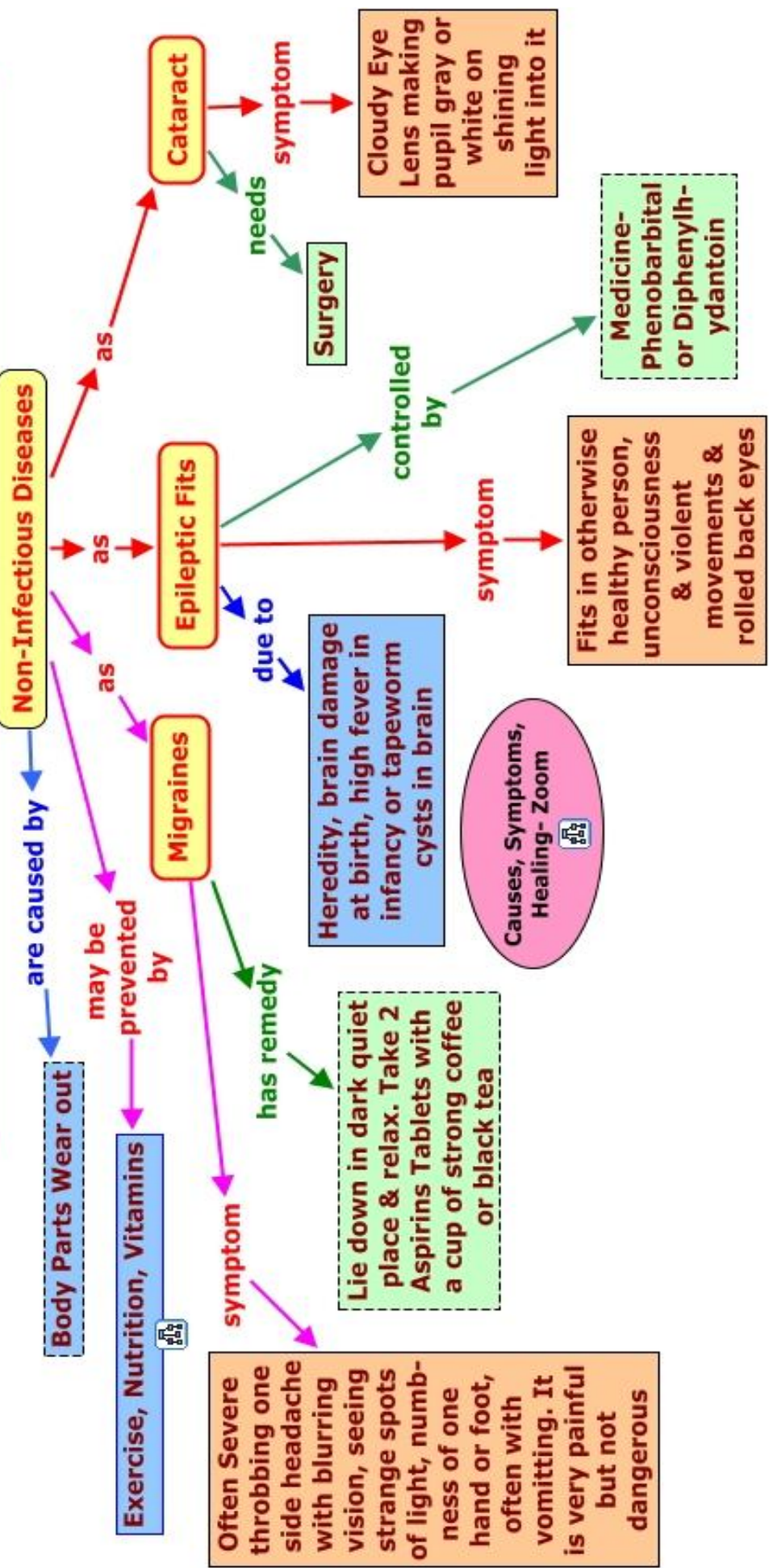
Until well.<sup>†</sup>

Until 24 hours after treatment has started.<sup>†</sup>

# Zoom- Non-Infectious Diseases & Causes



# Zoom- Non-Infectious Diseases - Migraines, Epileptic Fits, Cataract



## **INTEXT QUESTIONS PAGE NO. 178**

**Q1. State any two conditions essential for good health.**

**Answer:**

Good health of a person depends on

- (i) social environment.
- (ii) public cleanliness.
- (iii) good economic conditions and earnings.
- (iv) social equality and harmony.

**Q2. State any two conditions essential for being free of disease.**

**Answer:**

The conditions essential for being free of diseases

- (i) Taking good food (balanced diet)
- (ii) Maintaining personal and public hygiene.

**Q3. Are the answers to the above questions necessarily the same or different? Why?**

**Answer:**

The answers are not same all the time. Because the meaning of health varies from person to person. For example, good health for a dancer may be being able to stretch his body into difficult but graceful positions. On the other hand, good health for a musician may mean having enough breathing capacity in his/her lungs to control his/her voice.

There is one similarity in both the cases. If the conditions essential for good health are maintained, then there are no chances of getting a disease.

## **INTEXT QUESTIONS PAGE NO. 180**

**Q1. List any three reasons why you would think that you are sick and ought to see a doctor. If only one of these symptoms were present, would you still go to the doctor? Why or why not?**

**Answer:**

When there is a disease, its symptoms and signs appear. These symptoms may be headache, cough, loose-motions, wound with pus, etc. These symptoms indicate disease but do not tell what the disease is. So, it is advisable to go to the doctor to diagnose any signs of a disease on the basis of these symptoms. The doctor will get laboratory tests done, if required for the confirmation of a particular disease.

**Q2. In which of the following case do you think the long-term effects on your health are likely to be most unpleasant?**

**If you get jaundice,**

**If you get lice,**

**If you get acne.**

**Why?**

**Answer:**

Lice and acne will not cause long lasting effects on our body. But in case of jaundice, there will be severe long lasting effects. For example:

- (i) High temperature, headache and joint pains.
- (ii) Feeling of nausea and vomiting.
- (iii) Initiating rashes.

The patient will suffer from poor health and will recover by taking complete bed rest for sometime.



**Q1. Why are we normally advised to take bland and nourishing food when we are sick?**

**Answer:**

In case of illness, the normal functions of the body get disturbed. So, a nourishing food is required which is easily digestible and contains all the nutrients. Therefore, bland and nourishing food is advised to take during sickness.

**Q2. What are the different means by which infectious diseases are spread?**

**Answer:**

Infectious diseases spread by different means. These are:

(i) **Through air** An infected person when sneezes or coughs releases droplets containing germs. These droplets infect another healthy person through air and microbes enter a new body. Examples of such diseases are common cold, pneumonia and tuberculosis.

(ii) **Through water** If the water source is polluted by the excreta of infectious persons having gut diseases and this water is used by other people they will be infected by diseases. For example, cholera, amoebiasis, hepatitis spread through water.

(iii) **Through sexual contact** Some diseases like AIDS and syphilis, etc., are transmitted by sexual contact. Other than this, AIDS virus also spread through blood, infected syringes, infected mother to her baby during pregnancy and through breast feeding.

(iv) **Through vectors** There are some animals which act as intermediaries or vectors for a particular diseases. The vectors carry diseases from infected person to the healthy person. For example, mosquito spread malaria causing organism in humans, while sucking their blood.

**Q3. What precautions can you take in your school to reduce the incidence of infectious diseases?**

**Answer:**

To prevent the incidence of infectious diseases in school following precautions can be taken:

(i) Avoid contact of students suffering from air borne diseases like common cold, cough, eye, flu, etc.

(ii) By checking the availability of clean drinking water in school.

(iii) Clean surroundings in school will not allow the growth and multiplication of vectors.

(iv) Starting childhood immunisation programme in schools.

**Q4. What is immunisation?**

**Answer:**

Immunisation is a process of administration (injecting) of vaccine into a healthy person in order to develop immunity against a disease. Immunity means the ability of a body to recognise, destroy and eliminate external disease causing agents. This immunisation through administering vaccine is called vaccination. Vaccine contains disease-causing organisms in a diluted or weakened form or in living or dead form. It prevents further infection by microbes from causing the disease. The diseases like small pox, rabies, diphtheria chicken pox, polio, hepatitis are controlled by vaccination. Small pox is eliminated from the world through a world wide vaccination programme.

**Q5. What are the immunisation programmes available at nearest health centre in locality? Which of these diseases are the major health problems in your area?**

**Answer:**

The following immunisation programme is available at the nearest health centre in our locality

(i) Immunisation for infants—DPT, BCG, polio, measles and MMR.

(ii) For children—Typhoid, TT, DT, small pox and TAB.

(iii) For pregnant woman— TT and hepatitis-B.

The diseases like typhoid, polio, measles, tetanus are the major health problems in our locality. To prevent these diseases, our government have initiated expanded immunisation programme all over the country.

**EXERCISE QUESTIONS PAGE NO. 188**

**Q1. How many times did you fall ill in the last one years? What were the illnesses?**

**(a) Think of one change you could make in your habits in order to avoid any of/most of the above illnesses.**

**(b) Think of one change you would wish for in your surroundings in order to avoid any of/most of the above illnesses.**

**Answer:** I fell ill twice in the last one year. The disease, I first suffered from was diarrhoea and secondary the dengue fever.

(a) The changes I brought in my habits after suffering from these disease to protect myself in near future are

(i) I will always drink clean, pure water and wash hands before eating anything.

(ii) I will live in clean surroundings where disease spreading vectors could not multiply. For example, mosquitoes.

(b) Pure drinking water should be available always. The intake of impure water is the main cause of many infectious diseases.

**Q2. A doctor/nurse/health-worker is exposed to more sick people than others in the community. Find out how she/he avoids getting sick herself/himself.**

**Answer:** A doctor/nurse/health-worker take following precautions to avoid become sick themselves

(i) Wear masks while diagnosing mouth or chest infections.

(ii) Clean their hands and wear gloves even while doing minor surgeries.

(iii) Get immunisation done against all the infectious diseases.

(iv) Take balanced diet (rich in proteins especially) to strengthen their immune system.

(v) Dispose off blood samples, urine or stool, sputum, etc., carefully.

**Q3. Conduct a survey in your neighbourhood to find out what the three most common diseases are. Suggest three steps that could be taken by your local authorities to bring down the incidence of these diseases.**

**Answer:** I conducted a survey in my neighbourhood and found following three most common diseases.

Diseases	Symptoms	Steps could be Taken by Local Authorities to Bring Down the Incidence
<b>Typhoid</b>	Headache and fever which remains high in the second week and then declines	<ul style="list-style-type: none"> <li>➤ Proper hygiene in surrounding areas of living.</li> <li>➤ Safe disposal of excreta and other wastes.</li> <li>➤ Providing TAB and typhoid oral vaccine.</li> </ul>
<b>Cholera</b>	Painless watery diarrhoea, effortless vomiting	<ul style="list-style-type: none"> <li>➤ Good sanitary condition in community.</li> <li>➤ Provision of clean, purified drinking water.</li> <li>➤ Providing standard cholera vaccination in the locality.</li> </ul>
<b>Dengue fever</b>	High fever with headache, weakness and joint pains	<ul style="list-style-type: none"> <li>➤ Maintenance of hygienic conditions in community .</li> <li>➤ Preventing the mosquito breeding sites.</li> <li>➤ Public awarness programme against mosquito borne diseases.</li> </ul>

**Q4. A baby is not able to tell her/his caretakers that she/he is sick. What would help us to find out (a) that the baby is sick? (b) What is the sickness?**

**Answer:**

(a) Symptoms to help in finding out that the baby is sick are:

- (i) continuous crying
- (ii) drooping of eyes
- (iii) redness of eyes
- (iv) high temperature of body.

(b) Signs which help to indicate the sickness in baby

- (i) loose motions, stomach pain indicate diarrhoea.
- (ii) high fever, headache, muscular pain, feeling of shivering and cold indicate malaria.
- (iii) redness and persistent rubbing of eyes indicate eye flu.
- (iv) pale skin, yellow urine, yellowing of eyes indicate jaundice.
- (v) doctors suggest for laboratory tests, if there is fever with no other symptoms to find out the kind of sickness.

**Q5. Under which of the following conditions is a person most likely to fall sick?**

**(a) When she is recovering from malaria.**

**(b) When she has recovered from malaria and is taking care of someone suffering from chicken pox.**

**(c) When she is on a four-day fast after recovering from malaria and is taking care of someone suffering from chicken pox. Why?**

**Answer:**

In condition (c), a person is most likely to fall sick. The reasons are:

(a) Due to malaria, the body becomes weak and loss of body fluids occur. In this condition, if she takes four days fast, her recovery from malaria related weakness will not occur and she will become more weak.

(b) Her immune system is already weak due to malaria and if she takes care of someone suffering from chicken pox, there is high probability that she may also suffer this disease.

**Q6. Under which of the following conditions are you most likely to fall sick?**

**(a) When you are taking examinations.**

**(b) When you have travelled by bus and train for two days.**

**(c) When your friend is suffering from measles. Why?**

**Answer:**

In condition (c), chances of falling sick are maximum. Measles is an infectious viral disease of young children which spreads through nasal or throat discharge. In contact of a friend suffering from measles can cause you sick.

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**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 13**  
**WHY DO WE FALL ILL**

1. Which one of the following is an infectious disease?
  - (a) diphtheria
  - (b) diabetes
  - (c) hypertension
  - (d) cancer
2. Elephantiasis disease can have
  - (a) short-term affect on our health
  - (b) no effect on our health
  - (c) long term affect on our health
  - (d) sometimes bad effect on our health
3. Ascaris worm lives in which part of human body?
  - (a) kidneys
  - (b) liver
  - (c) small intestine
  - (d) large intestine
4. Microbes which enter the body through nose most likely affect
  - (a) liver
  - (b) heart
  - (c) brain
  - (d) lungs
5. Which of the following is a viral infection?
  - (a) Dipteria
  - (b) Influenza
  - (c) Cholera
  - (d) Typhoid
6. HIV virus when active in body mainly attacks on
  - (a) lungs
  - (b) liver
  - (c) immunity
  - (d) nerves
7. An Organism which carries pathogens is termed as
  - (a) host

- (b) vector
  - (c) parasite
  - (d) predator
- 8.** Diseases which are always present in certain location are called?
- (a) epidemic diseases
  - (b) endemic diseases
  - (c) acute diseases
  - (d) chronic diseases
- 9.** DPT vaccines are administered to develop immunity against
- (a) Tetanus
  - (b) Diphtheria
  - (c) Pertussis
  - (d) All of these
- 10.** Anti-viral drugs are difficult to make because, viruses
- (a) live outside the host cells
  - (b) live inside the host cells
  - (c) live in consumed food particles
  - (d) live in blood stream
- 11.** BCG vaccine is used to develop immunity against
- (a) jaundice
  - (b) polio
  - (c) influenza
  - (d) tuberculosis
- 12.** Which of the following is a communicable disease?
- (a) Rickets
  - (b) Scurvy
  - (c) Marasmus
  - (d) Cholera
- 13.** The causative organism for malaria is a:
- (a) bacteria
  - (b) protozoa
  - (c) virus
  - (d) fungi
- 14.** Vaccination helps in controlling diseases because
- (a) it develops resistance against the pathogen attack

- (b) it kills the pathogens causing disease
- (c) it blocks the food supplied to pathogens
- (d) it does not allow pathogens to multiply in hosts

**15.** ORS is given in

- (a) diarrhoea
- (b) measles
- (c) typhoid
- (d) tetanus

**16.** Which of the following is an example of nutritional deficiency disease?

- (a) Hypertension
- (b) Rickets
- (c) Diabetes
- (d) Gastroenteritis

**17.** Define Health? What do you interpret when we say a person is in good health?

**18.** State any two conditions essential for good health.

**19.** What are three dimensions of health? Are they interrelated?

**20.** Kidneys of a person do not filter urine properly. How does it affect physical, mental and social dimensions of that person?

**21.** State any two conditions essential for being free of disease.

**22.** Are the answers to the above questions (Q2 and Q5) and necessarily the same or different? Why?

**23.** What is a balanced diet?

**24.** A hefty boy of 12 years often picks fights with others. Do you think he is in good health? If so, then explain your answer.

**25.** How do you define 'disease'?

**26.** State and explain in brief the four major factors, which are the causes of disease.

**27.** Is there any difference between 'being healthy' and 'disease free'?

**28.** How do we identify a disease?

**29.** What is the difference between symptoms and signs of a disease?

**30.** List any three reasons why you would think that you are sick and ought to see a doctor. If only one of these symptoms were present, would you still go to the doctor? Why or why not?

**31.** Based on duration or persistence, how diseases are categorised?

**32.** Give examples of Acute diseases.

**33.** Give four examples of Chronic diseases.

34. Differentiate between Acute Diseases and Chronic Diseases.
  35. What are congenital diseases? Give two examples of such disease.
  36. Name a disease which was earlier considered to be chronic but now can be treated in short duration?
  37. A baby is not able to tell her/his caretakers that she/he is sick. What would help us to find out (a) that the baby is sick? (b) what is the sickness?
  38. What are acquired diseases?
  39. Write few common signs and symptoms of a disease if brain is affected.
  40. List any two differences between infectious and non-infectious diseases. Write any one example of each disease.
  41. What are infectious agents? What are the different infectious agents?
  42. What is 'germ theory of disease'? Who proposed it?
  43. What are Koch's Postulates?
  44. List the diseases caused by viruses?
  45. Give three examples of bacterial diseases.
  46. Give examples of fungal diseases.
  47. List three diseases caused by protozoans.
  48. Name the pathogen causes peptic ulcer.
  49. List the diseases caused by worms?
  50. Name the the protozoan pathogen that causes kala-azar.
  51. Name the microbe which causes acne.
  52. What is the scientific name of roundworm? Where do we find it commonly in human body? Name the disease caused by it.
  53. Why is it important that we think of these categories of infectious agents?
  54. How do antibiotics (say Penicillin) work on bacteria but not on human beings?
  55. Define antibiotic? Explain how it is able to control bacterial infections but not viral infections.
  56. Explain why antibiotics are more effective in curing bacterial diseases than viral diseases.
  57. Why taking an antibiotic is not effective in the common cold?
  58. Give two examples of bacterial antibiotics.
  59. Give an example of fungal antibiotic.
  60. Why are we normally advised to take bland and nourishing food when we are sick?
  61. What are the different means by which infectious diseases are spread?
  62. If a person has persistent cough and breathlessness, most likely which of the following organ is affected
-

63. What is the alternate name of brain fever? Which vector is responsible for this disease?
64. Name the vector which causes malaria.
65. Name the vector which causes dengue, chikengunia and yellow fever.
66. Name the vector that can cause sleeping sickness.
67. Name the diseases that can spread through housefly.
68. Name the vectors which can cause rabies.
69. A doctor/nurse/health-worker is exposed to more sick people than others in the community.  
Find out how she/he avoids getting sick herself/himself.
70. What precautions can you take in your school to reduce the incidence of infectious diseases?
71. What do you mean by immunity?
72. What is immunisation?
73. What is antigen?
74. What are antibodies?
75. What is colostrum? Why is mothers milk strongly advised to new borns?
76. What are the immunisation programmes available at the nearest health centre in your locality? Which of these diseases are the major health problems in your area?
77. What are epidemic and endemic diseases?
78. Which organ is affected if a person is suffering from jaundice?
79. What do you mean by Phagocytosis?
80. Why is it not necessary to give Hepatitis A vaccine to children?
81. What are the basic principles involved in medical treatment for diseases?
82. Why it is advisable to breast feed the baby for first few several weeks? Why Colostrum is good for infants?
83. How do Skin, Hairs, Saliva form the first line of defense against diseases?

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**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 13**  
**WHY DO WE FALL ILL**

1. What does the word health mean?
2. Name any two Symptoms of diseases..... (Cough& loose motions)
3. The disease which last for only a short period of time is called.....( Acute Disease)
4. State whether Tuberculosis is aChronic Disease or Acute Disease..... (Chronic Disease)
5. Mention the causal organism for Sleeping sickness ..... (Trypanosoma)
6. Sleeping sickness is caused by.....
7. Elephantiasis is caused by.....
8. Mention two Air born diseases1.....2.....
9. Mention two Sexually Transmitted Diseaes1.....2.....
10. Mention two Viral Diseaes1.....2.....
11. What is called vector. Give one example.
12. Give two examples of Chronic diseases.
13. Distinguish between Infectious and Non-infectious diseases.
14. Write a short notes on Small Pox.
15. What is immunity? Write short notes on it.
16. What is Vaccination? Give the details, how it works in human body.
17. Write three reasons for Cancers.
18. What are the basic five principles of treatment for diseases.
19. How Hygiene could help you to maintain good health and mention five situations to take care about health.
20. How does the health of an organism depend upon the surroundings?
21. What do we mean by “disease”?
22. What are symptoms?
23. How do you distinguish between acute and chronic diseases?
24. What are the various causes of diseases?
25. Name some common infectious diseases
26. Explain the effect of antibiotic penicillin on bacterial cells.
27. Why are human cells not affected by penicillin?
28. Why are antibiotics ineffective against viruses?
29. How do communicable or infectious diseases spread?
30. How does AIDS spread?

31. What are vectors? Name some vector transmitted diseases.
32. The disease-causing microbes enter the body through different means. Where do they go then?. Do all microbes go to the same tissue or organ, or do they go to different ones?
33. The signs and symptoms of a disease depend upon the tissue or organ targeted. Explain.
34. How does HIV damage our body?
35. How do we kill microbes?
36. What feature of our body protects us from catching infectious diseases?
37. Describe the principle behind vaccination.
38. Name some diseases for which vaccines are available.
39. Who were awarded nobel prize for discovery of treatment of peptic ulcer?
40. List some general principles of prevention.
41. State any two conditions essential for good health.
42. State any two conditions essential for being free of disease.
43. Are the answers to the above questions necessarily the same or different? Why?
44. List any three reasons why you would think that you are sick and ought to see a doctor. If only one of these symptoms were present, would you still go to the doctor? Why or why not?
45. In which of the following case do you think the long-term effects on your health are likely to be most unpleasant? a) if you get jaundice, b) if you get lice, c) if you get acne. Why?
46. Why we are normally advised to take bland and nourishing food when we are sick?
47. How are acute diseases different from chronic diseases?
48. What is the full form of AIDS? Name the causal organism.
49. State two conditions essential for keeping good health.
50. Define (a) health (b) disease.
51. Why are antibiotics not effective for viral disease?
52. Explain giving reasons –(a) Balanced diet is necessary for maintaining health body. (b) Health of an organism depends upon the surrounding environmental conditions.
53. Explain the Natural and acquired immunity?
54. What are the two ways to treat and infectious disease?
55. What do the sign and symptoms indicate if person is suffering from any disease? Based on the duration of diseases what are the difference between categories of diseases? Differentiate between them giving one example of each.



**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 13**  
**WHY DO WE FALL ILL**

1. Which one of the following is not a viral disease?
  - (a) Dengue
  - (b) AIDS
  - (c) Typhoid
  - (d) Influenza
2. Which one of the following is not a bacterial disease?
  - (a) Cholera
  - (b) Tuberculosis
  - (c) Anthrax
  - (d) Influenza
3. Which one of the following disease is not transmitted by mosquito?
  - (a) Brain fever
  - (b) Malaria
  - (c) Typhoid
  - (d) Dengue
4. Which one of the following disease is caused by bacteria?
  - (a) Typhoid
  - (b) Anthrax
  - (c) Tuberculosis
  - (d) Malaria
5. Which one of the following diseases is caused by protozoans?
  - (a) Malaria
  - (b) Influenza
  - (c) AIDS
  - (d) Cholera
6. Which one of the following has a long term effect on the health of an individual?
  - (a) Common cold
  - (b) Chicken pox
  - (c) Chewing tobacco
  - (d) Stress
7. Which of the following can make you ill if you come in contact with an infected person?
  - (a) High blood pressure
  - (b) Genetic abnormalities
  - (c) Sneezing
  - (d) Blood cancer

- 8.** AIDS cannot be transmitted by
- (a) sexual contact
  - (b) hugs
  - (c) breast feeding
  - (d) blood transfusion
- 9.** Making anti-viral drugs is more difficult than making anti-bacterial medicines because
- (a) viruses make use of host machinery
  - (b) viruses are on the border line of living and non-living
  - (c) viruses have very few biochemical mechanisms of their own
  - (d) viruses have a protein coat
- 10.** Which one of the following causes kala-azar?
- (a) *Ascaris*
  - (b) *Trypanosoma*
  - (c) *Leishmania*
  - (d) Bacteria
- 11.** If you live in a overcrowded and poorly ventilated house, it is possible that you may suffer from which of the following diseases
- (a) Cancer
  - (b) AIDS
  - (c) Air borne diseases
  - (d) Cholera
- 12.** Which disease is not transmitted by mosquitoes?
- (a) Dengue
  - (b) Malaria
  - (c) Brain fever or encephalitis
  - (d) Pneumonia
- 13.** Which one of the following is not important for individual health?
- (a) Living in clean space
  - (b) Good economic condition
  - (c) Social equality and harmony
  - (d) Living in a large and well furnished house
- 14.** Choose the wrong statement
- (a) High blood pressure is caused by excessive weight and lack of exercise.
  - (b) Cancers can be caused by genetic abnormalities
  - (c) Peptic ulcers are caused by eating acidic food
  - (d) Acne is not caused by staphylococci
- 15.** We should not allow mosquitoes to breed in our surroundings because they
- (a) multiply very fast and cause pollution
  - (b) are vectors for many diseases
  - (c) bite and cause skin diseases
  - (d) are not important insects

- 16.** You are aware of Polio Eradication Programme in your city. Children are vaccinated because
- (a) vaccination kills the polio causing microorganisms
  - (b) prevents the entry of polio causing organism
  - (c) it creates immunity in the body
  - (d) all the above
- 17.** Viruses, which cause hepatitis, are transmitted through
- (a) air
  - (b) water
  - (c) food
  - (d) personal contact
- 18.** Vectors can be defined as
- (a) animals carry the infecting agents from sick person to another healthy person
  - (b) microorganisms which cause many diseases
  - (c) infected person
  - (d) diseased plants
- 19.** Give two examples for each of the following
- (a) Acute diseases
  - (b) Chronic diseases
  - (c) Infectious diseases
  - (d) Non-infectious diseases
- 20.** Name two diseases caused by Protozoans. What are their causal organisms?
- 21.** Which bacterium causes peptic ulcers? Who discovered the above pathogen for the first time?
- 22.** What is an antibiotic? Give two examples
- 23.** Fill in the blanks
- (a) Pneumonia is an example of \_\_\_\_\_ disease.
  - (b) Many skin diseases are caused by\_\_\_\_\_.
  - (c) Antibiotics commonly block biochemical pathways important for the growth of \_\_\_\_\_.
  - (d) Living organisms carrying the infecting agents from one person to another are called \_\_\_\_\_.
- 24.** Name the target organs for the following diseases
- (a) Hepatitis targets\_\_\_\_\_.
  - (b) Fits or unconsciousness targets \_\_\_\_\_.
  - (c) Pneumonia targets \_\_\_\_\_.
  - (d) Fungal disease targets \_\_\_\_\_.
- 25.** Who discovered 'vaccine' for the first time? Name two diseases which can be prevented by using vaccines.

**26. Fill in the blanks**

- (a) \_\_\_\_\_ disease continues for many days and causes \_\_\_\_\_ on body.
- (b) \_\_\_\_\_ disease continues for a few days and causes no longer term effect on body.
- (c) \_\_\_\_\_ is defined as physical, mental and social well-being and comfort.
- (d) Common cold is \_\_\_\_\_ disease.
- (e) Many skin diseases are caused by \_\_\_\_\_.

**27. Classify the following diseases as infectious or non-infectious.**

- (a) AIDS
- (b) Tuberculosis
- (c) Cholera
- (d) High blood pressure
- (e) Heart disease
- (f) Pneumonia
- (g) Cancer

**28. Name any two groups of micro-organisms from which antibiotics could be extracted.**

**29. Name any three diseases transmitted through vectors.**

**30. Explain giving reasons**

- (a) Balanced diet is necessary for maintaining healthy body.
- (b) Health of an organism depends upon the surrounding environmental conditions.
- (c) Our surrounding area should be free of stagnant water.
- (d) Social harmony and good economic conditions are necessary for good health.

**31. What is a disease? How many types of diseases have you studied? Give examples.**

**32. What do you mean by disease symptoms? Explain giving two examples?**

**33. Why is immune system essential for our health?**

**34. What precautions will you take to justify “prevention is better than cure”.**

**35. Why do some children fall ill more frequently than others living in the same locality?**

**36. Why are antibiotics not effective for viral disease?**

**37. Becoming exposed to or infected with an infectious microbe does not necessarily mean developing noticeable disease. Explain.**

**38. Give any four factors necessary for a healthy person.**

**39. Why is AIDS considered to be a ‘Syndrome’ and not a disease?**

.....

## CHAPTER – 14

# NATURAL RESOURCES

### RESOURCES ON THE EARTH

#### **Biosphere:**

The whole combination of animals, plants and non-living beings which by their interaction make the planet earth a live and vibrant place is called biosphere.

#### **Biotic Components:**

Living things constitute the biotic component of the biosphere.

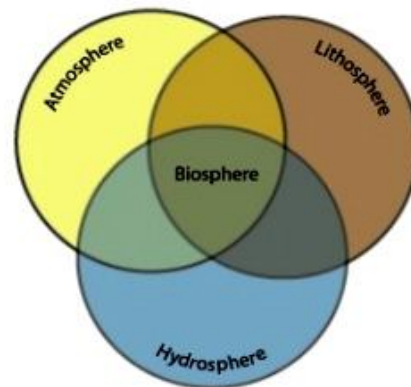
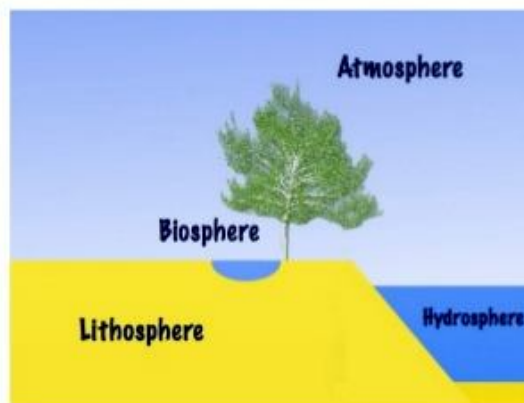
#### **Abiotic Components:**

The air, the water and the soil form the non-living or a biotic component of the biosphere. The air is called the hydrosphere, the water is hydrosphere and the soil is called lithosphere.

### Resources on the earth

The natural resources of the earth are air, water, soil, minerals and living organisms.

The outer crust of the earth is the **lithosphere**. The water on the earth is the **hydrosphere**. The layer of the air around the earth is the **atmosphere**. Living organisms are found where the atmosphere, hydrosphere and lithosphere interact and is the **biosphere**.

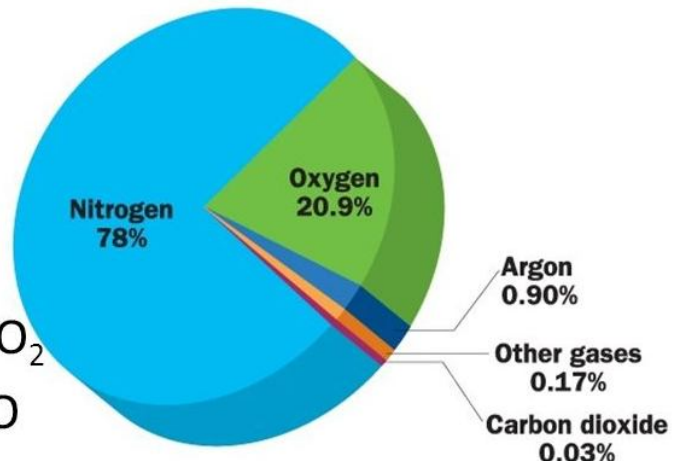


### AIR

Air is a mixture of many gases like nitrogen, oxygen, carbon dioxide and water vapour. All living beings need oxygen to break down glucose molecules and get energy for their activities. This results in the production of carbon dioxide. Another process which results in the consumption of oxygen and the concomitant production of carbon dioxide is combustion. This includes not just human activities, which burn fuels to get energy, but also forest fires. Despite this, the percentage of carbon dioxide in our atmosphere is a mere fraction of a percent because of carbon dioxide fixation.

## Air is a mixture of different gasses

- Nitrogen  $N_2$
- Oxygen  $O_2$
- Noble Gasses Ar
- Carbon Dioxide  $CO_2$
- Water Vapour  $H_2O$

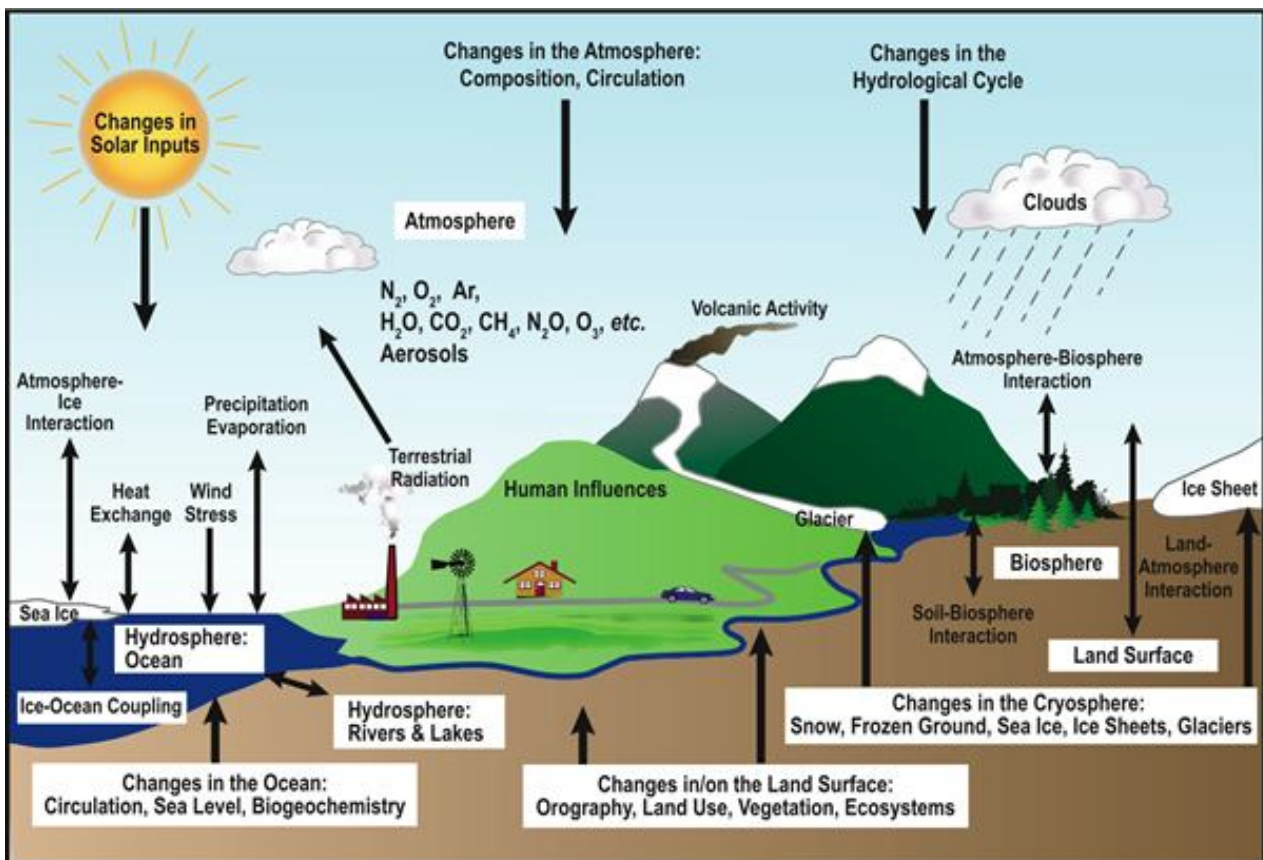


### Carbon Dioxide Fixation

- (i) Green plants convert carbon dioxide into glucose in the presence of Sunlight and
- (ii) Many marine animals use carbonates dissolved in sea-water to make their shells.

### The Role of the Atmosphere in Climate Control:

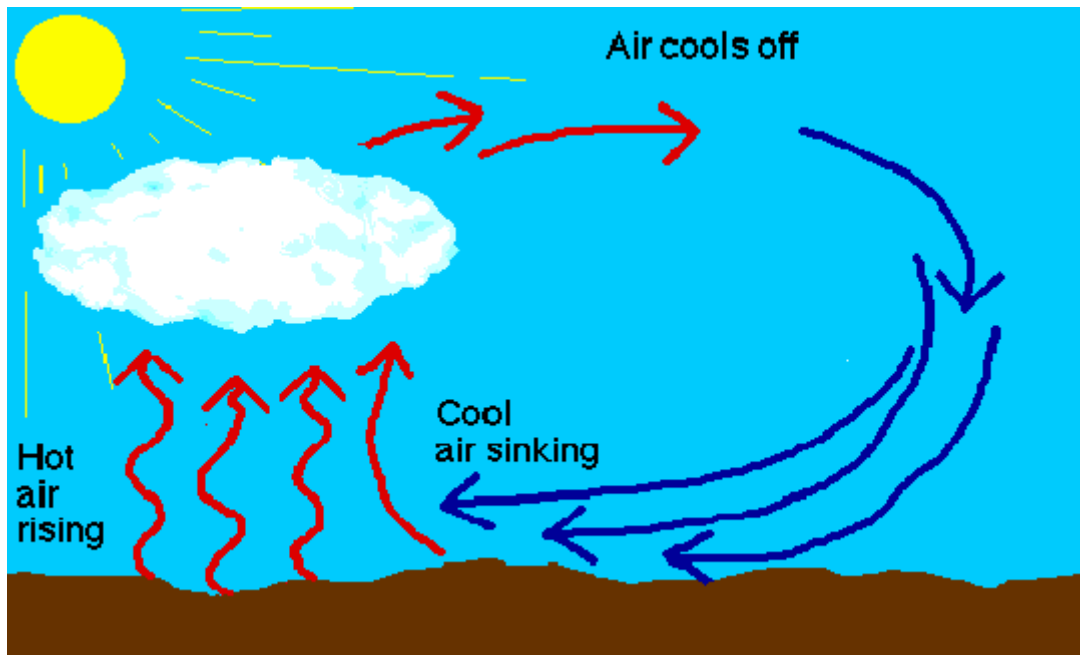
Atmosphere covers the Earth, like a blanket. We know that air is a bad conductor of heat. The atmosphere keeps the average temperature of the Earth fairly steady during the day and even during the course of the whole year. The atmosphere prevents the sudden increase in temperature during the daylight hours. And during the night, it slows down the escape of heat into outer space. The moon, which is about the same distance from the Sun that the Earth is, with no atmosphere, the temperature ranges from  $-190^{\circ}C$  to  $110^{\circ}C$ .





## THE MOVEMENT OF AIR: WINDS

These phenomena are the result of changes that take place in our atmosphere due to the heating of air and the formation of water vapour. Water vapour is formed due to the heating of water bodies and the activities of living organisms. The rise in temperature creates a low pressure zone which attracts cool air from high pressure zone and pushes up the hot air. Thus the atmosphere can be heated from below by the radiation that is reflected back or re-radiated by the land or water bodies. On being heated, convection currents are set up in the air.

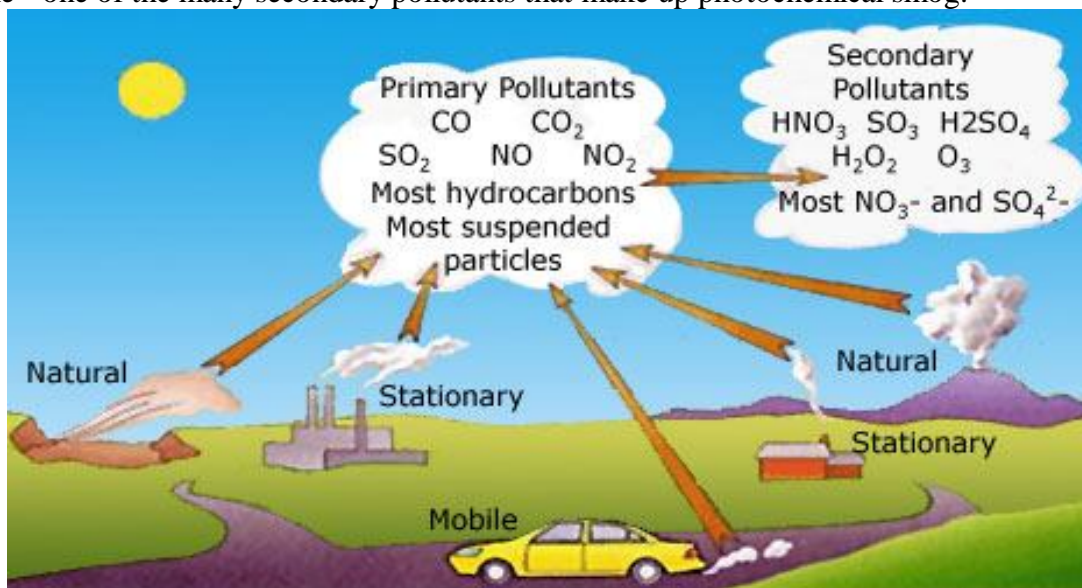


## AIR POLLUTION

An air pollutant is known as a substance in the air that can cause harm to humans and the environment. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or man-made.

Pollutants can be classified as either primary or secondary. Usually, primary pollutants are substances directly emitted from a process, such as ash from a volcanic eruption, the carbon monoxide gas from a motor vehicle exhaust or sulfur dioxide released from factories.

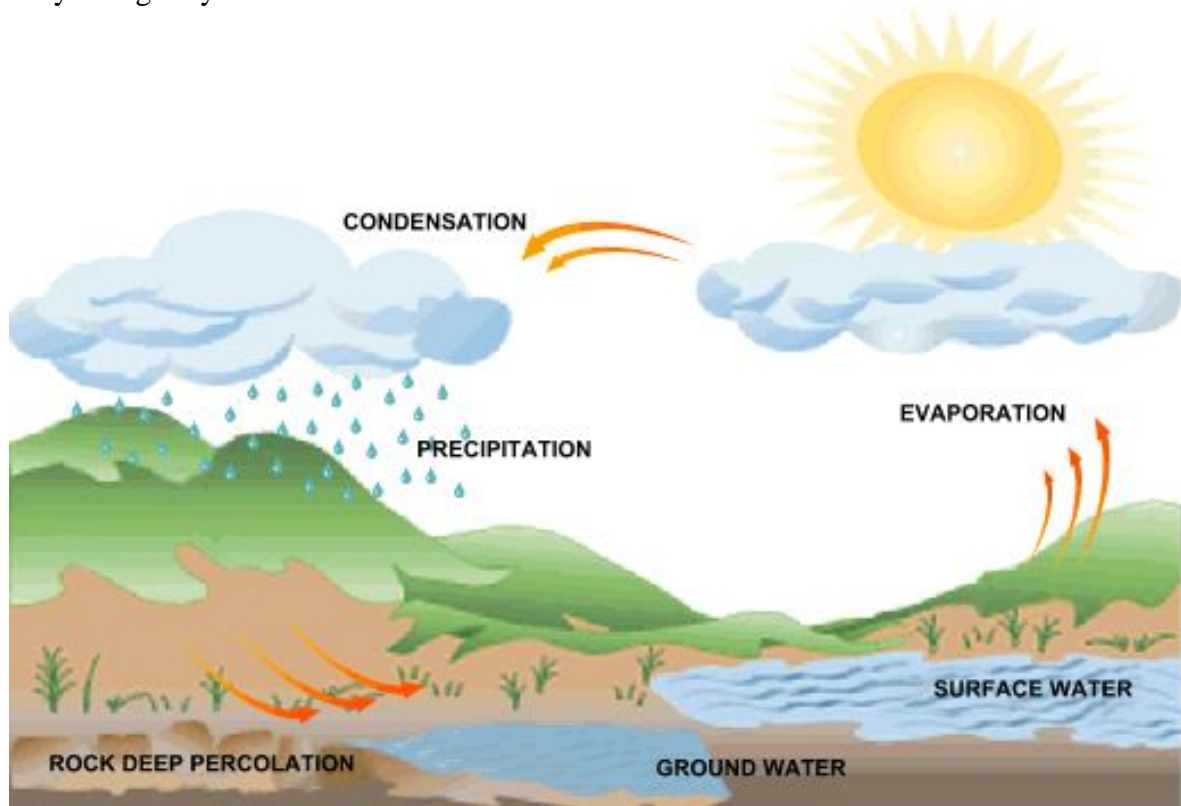
Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. An important example of a secondary pollutant is ground level ozone - one of the many secondary pollutants that make up photochemical smog.



## **RAIN**

When water bodies are heated during the day, a large amount of water evaporates and goes into the air. Some amount of water vapour also gets into the atmosphere because of various biological activities. This air also gets heated. The hot air rises up carrying the water vapour with it. As the air rises, it expands and cools. This cooling causes the water vapour in the air to condense in the form of tiny droplets. This condensation of water is facilitated if some particles could act as the 'nucleus' for these drops to form around. Once the water droplets are formed, they grow bigger by the 'condensation' of these water droplets. When the drops have grown big and heavy, they fall down in the form of rain.

Rainfall patterns are decided by the prevailing wind patterns. In large parts of India, rains are mostly brought by the southwest or north-east monsoons.



## **WATER: A WONDER LIQUID**

Water occupies a very large area of the Earth's surface and is also found underground. Some amount of water exists in the form of water vapour in the atmosphere. Most of the water on Earth's surface is found in seas and ocean and is saline. Fresh water is found frozen in the ice-caps at the two poles and on snow covered mountains. The underground water and the water in rivers, lakes and ponds is also fresh. However, the availability of fresh water varies from place to place. Practically every summer, most places have to face a shortage of water. And in rural areas, where water supply systems have not been installed, people are forced to spend considerable amounts of time in fetching water from faraway sources.

**Importance of Water:** All cellular processes take place in a water medium. All the reactions that take place within our body and within the cells occur between substances that are dissolved in water. Substances are also transported from one part of the body to the other in a dissolved form. Hence, organisms need to maintain the level of water within their bodies in order to stay alive. Terrestrial life-forms require fresh water for this because their bodies cannot tolerate or get rid of the high amounts of dissolved salts in saline water. Thus, water sources need to be easily accessible for animals and plants to survive on land.

## WATER POLLUTION

Water pollution is the contamination of water bodies such as lakes, rivers, ocean and groundwater caused by human activities, which can be harmful to organisms and plants that live in these water bodies. Some of the causes of water pollution are shown in below figure:



We use the term water-pollution to cover the following effects:

1. The addition of undesirable substances to water-bodies. These substances could be the fertilizers and pesticides used in farming or they could be poisonous substances, like mercury salts which are used by paper-industries. These could also be disease-causing organisms, like the bacteria which cause cholera.
2. The removal of desirable substances from water-bodies. Dissolved oxygen is used by the animals and plants that live in water. Any change that reduces the amount of this dissolved oxygen would adversely affect these aquatic organisms. other nutrients could also be depleted from the water bodies.
3. A change in temperature. Aquatic organisms are used to a certain range of temperature in the water-body where they live, and a sudden marked change in this temperature would be dangerous for them or affect their breeding. The eggs and larvae of various animals are particularly susceptible to temperature changes.

## SOIL

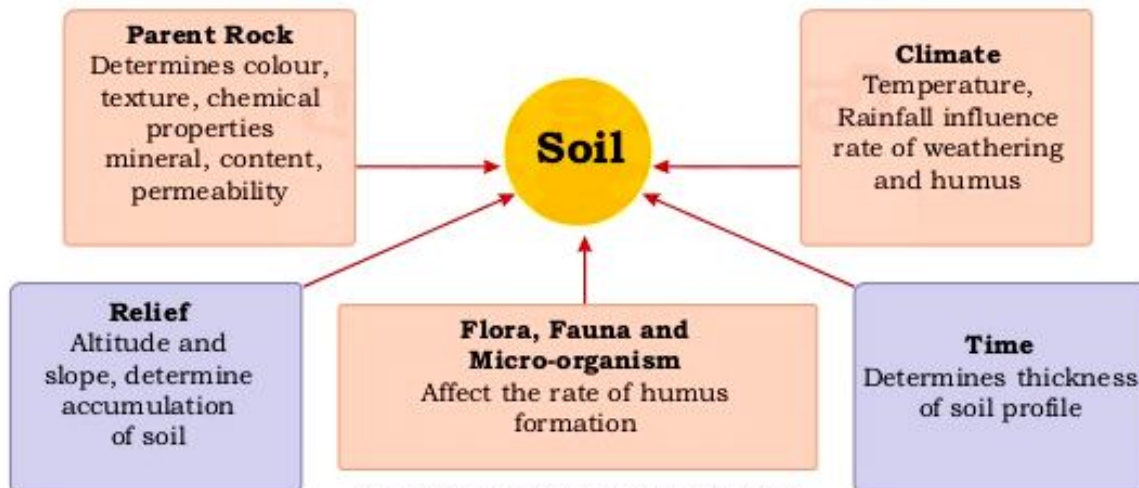
Soil is an important resource that decides the diversity of life in an area. The outermost layer of our Earth is called the crust and the minerals found in this layer supply a variety of nutrients to life-forms.

The factors or processes that make soil:

- **The Sun:** The Sun heats up rocks during the day so that they expand. At night, these rocks cool down and contract. Since all parts of the rock do not expand and contract at the same rate, this results in the formation of cracks and ultimately the huge rocks break up into smaller pieces.
- **Water:** Water helps in the formation of soil in two ways. One, water could get into the cracks in the rocks formed due to uneven heating by the Sun. If this water later freezes, it would cause the cracks to widen. Two, flowing water wears away even hard rock over long periods of time. Fast flowing water often carries big and small particles of rock downstream. These rocks rub against other rocks and the resultant abrasion causes the rocks to wear down into smaller and

smaller particles. The water then takes these particles along with it and deposits it further down its path. Soil is thus found in places far away from its parent rock.

- **Wind:** In a process similar to the way in which water rubs against rocks and wears them down, strong winds also erode rocks down. The wind also carries sand from one place to the other like water does.



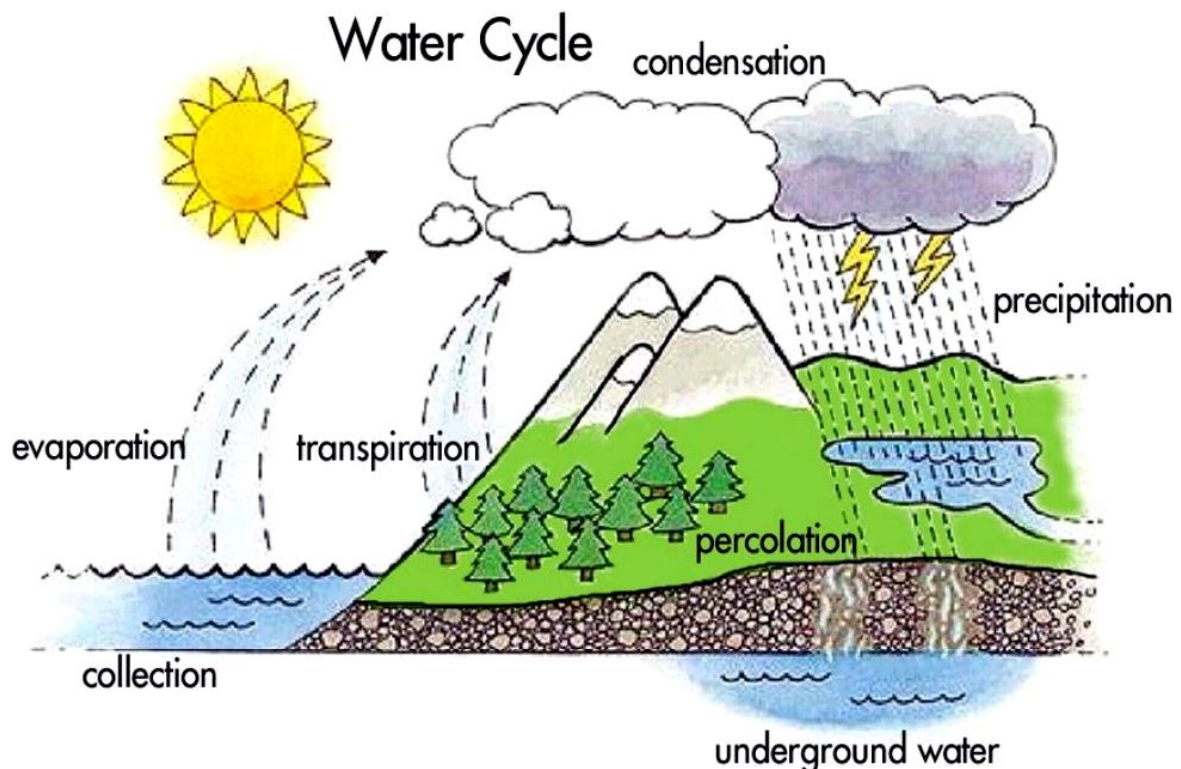
*Fig. Factors affecting soil formation*

## **BIOGEOCHEMICAL CYCLES**

A constant interaction between the biotic and abiotic components of the biosphere makes it a dynamic, but stable system. These interactions consist of a transfer of matter and energy between the different components of the biosphere.

## **THE WATER-CYCLE**

The water cycle, also known as the hydrologic cycle, describes the continuous movement of water on, above, and below the surface of the earth.



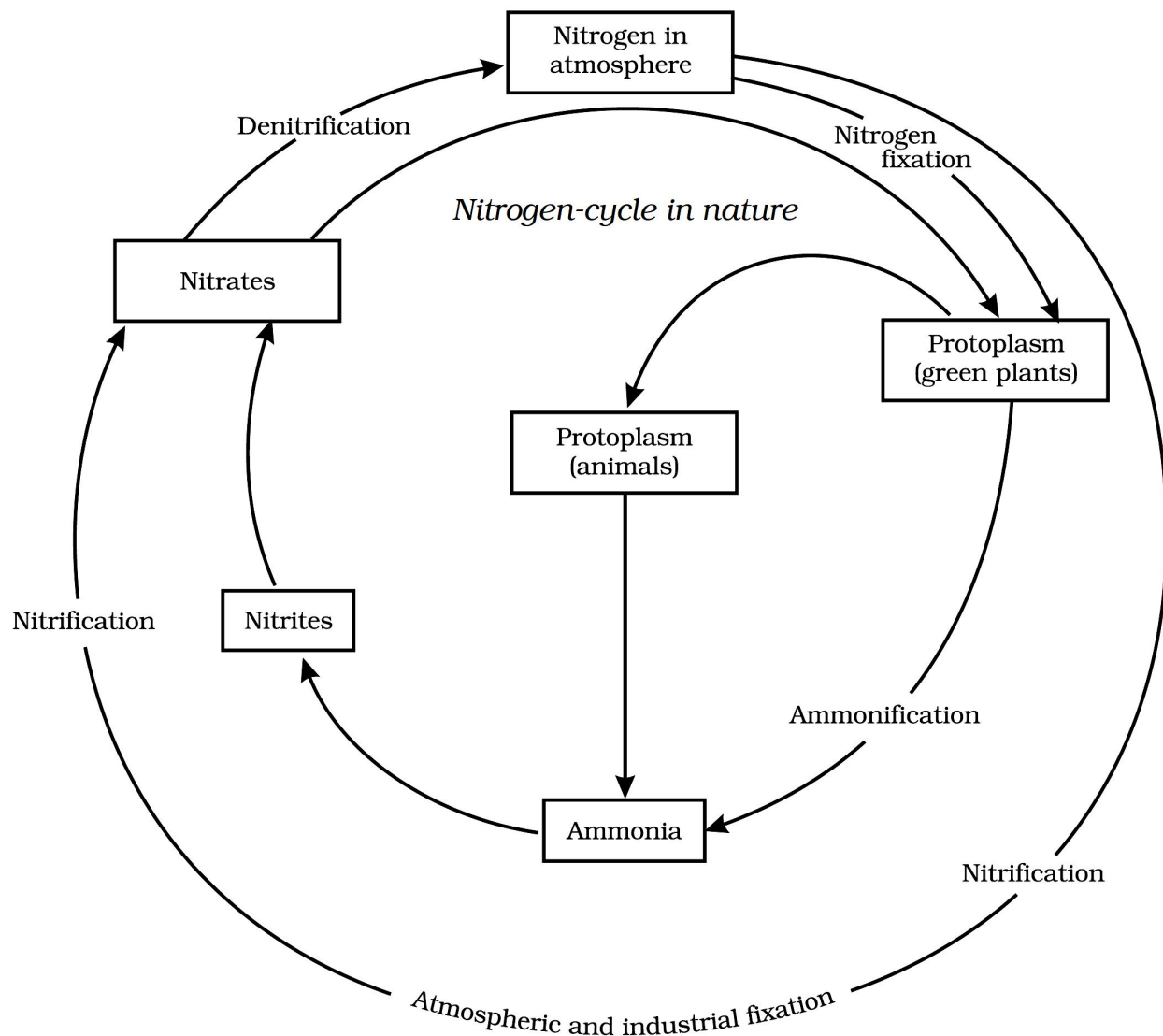
Water can change states among liquid, vapour and ice at various places in the water cycle. Although the balance of water on Earth remains fairly constant over time, individual

water molecules can come and go. The sun, which drives the water cycle, heats water in the oceans. Water evaporates as vapor into the air. Ice and snow can sublime directly into water vapor. Rising air currents take the vapor up into the atmosphere where cooler temperatures cause it to condense into clouds. Air currents move clouds around the globe, cloud particles collide, grow, and fall out of the sky as precipitation. Some precipitation falls as snow and can accumulate as ice caps and glaciers, which can store frozen water for thousands of years. Snow packs can thaw and melt, and the melted water flows overland as snowmelt. Most precipitation falls back into the oceans or onto land, where the precipitation flows over the ground as surface runoff. A portion of runoff enters rivers in valleys in the landscape, with stream flow moving water towards the oceans. Runoff and groundwater, are stored as freshwater in lakes.

Not all runoff flows into rivers. Much of it soaks into the ground as infiltration. Some water infiltrates deep into the ground and replenishes aquifers, which store huge amounts of freshwater for long periods of time. Some infiltration stays close to the land surface and can seep back into surface-water bodies (and the ocean) as groundwater discharge. Some groundwater finds openings in the land surface and emerges as freshwater springs. Over time, the water reenters the ocean, where our water cycle started.

### THE NITROGEN-CYCLE

The nitrogen cycle is the biogeochemical cycle that describes the transformations of nitrogen and nitrogen-containing compounds in nature. It is a cycle which includes gaseous components.



Earth's atmosphere is about 78% nitrogen, making it the largest pool of nitrogen. Nitrogen is essential for many biological processes; it is crucial for any life here on Earth. It is in all amino acids, is incorporated into proteins, and is present in the bases that make up nucleic acids, such as DNA and RNA. In plants, much of the nitrogen is used in chlorophyll molecules which are essential for photosynthesis and further growth.

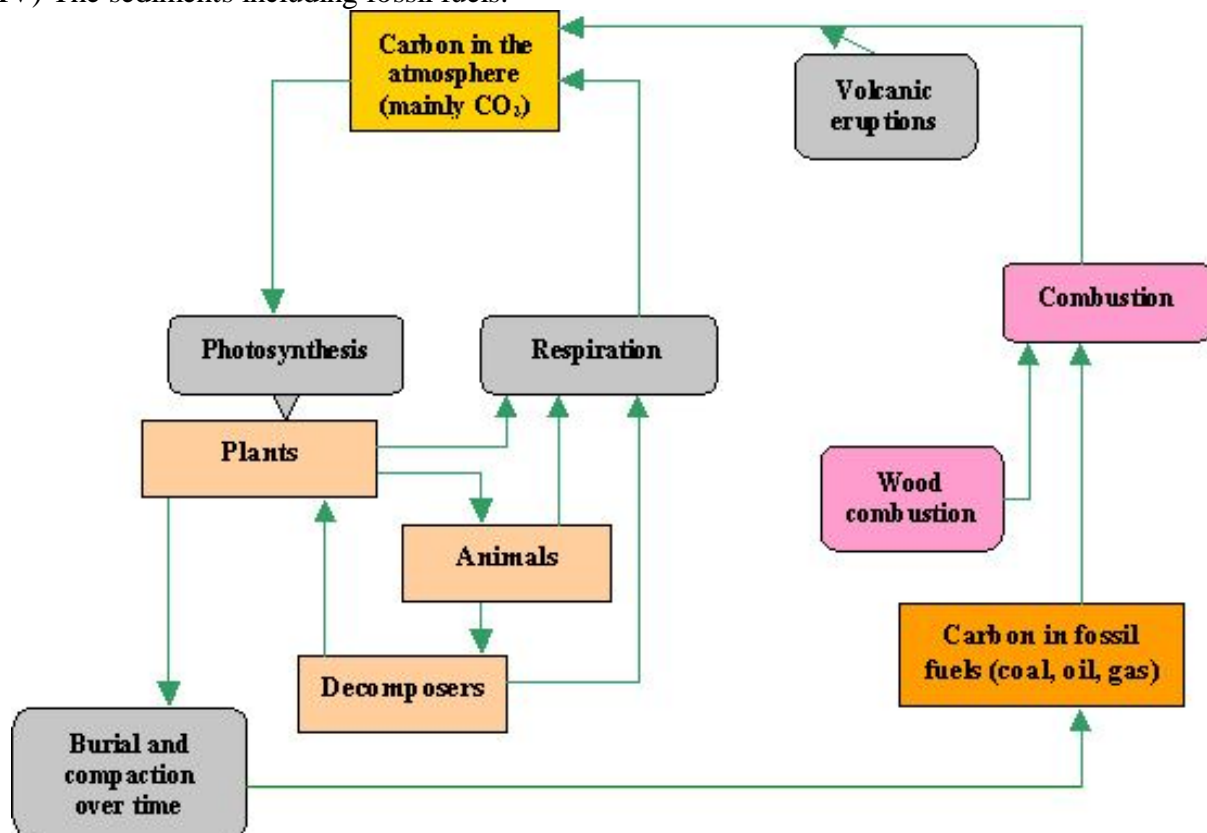
Processing, or fixation, is necessary to convert gaseous nitrogen into forms usable by living organisms. Some fixation occurs in lightning strikes, but most fixation is done by free-living or symbiotic bacteria. These bacteria have the nitrogenase enzyme that combines gaseous nitrogen with hydrogen to produce ammonia, which is then further converted by the bacteria to make its own organic compounds. Some nitrogen fixing bacteria, such as Rhizobium, live in the root nodules of legumes (such as peas or beans). Here they form a mutualistic relationship with the plant, producing ammonia in exchange for carbohydrates. Nutrient-poor soils can be planted with legumes to enrich them with nitrogen. A few other plants can form such symbioses. Nowadays, a very considerable portion of nitrogen is fixated in ammonia chemical plants.

### THE CARBON-CYCLE

The carbon cycle is the biogeochemical cycle by which carbon is exchanged among the biosphere, pedosphere, geosphere, hydrosphere, and atmosphere of the Earth.

The cycle is usually thought of as four major reservoirs of carbon interconnected by pathways of exchange. These reservoirs are:

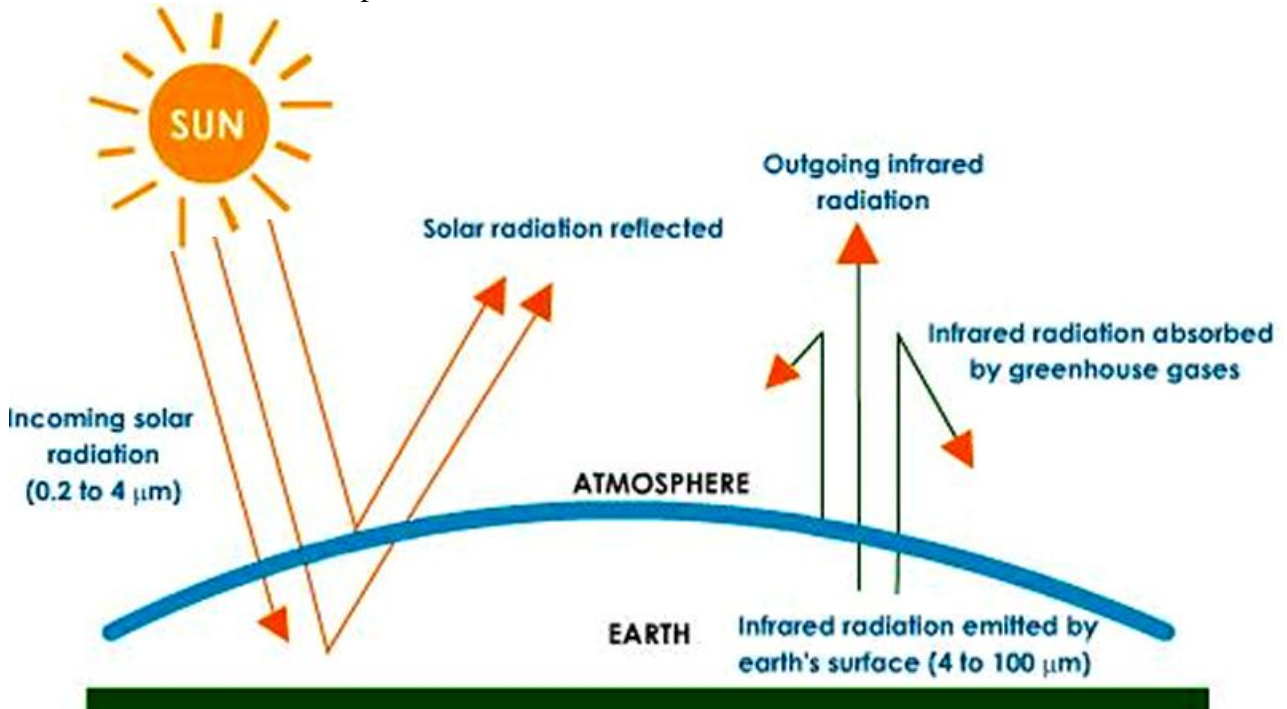
- (I) The atmosphere.
- (II) The terrestrial biosphere, which is usually defined to include fresh water systems and non-living organic material, such as soil carbon.
- (III) The oceans, including dissolved inorganic carbon and living and non-living marine biota,
- (IV) The sediments including fossil fuels.



### THE GREENHOUSE EFFECT

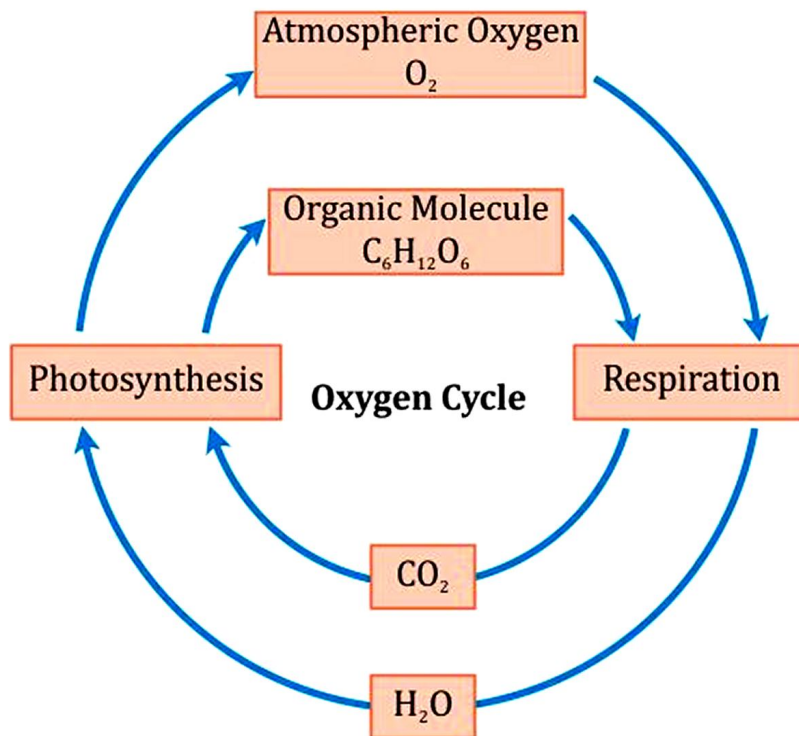
The greenhouse effect refers to the change in the steady state temperature of a planet or moon by the presence of an atmosphere containing gas that absorbs and emits infrared

radiation. Greenhouse gases, which include water vapor, carbon dioxide and methane, warm the atmosphere by efficiently absorbing thermal infrared radiation emitted by the earth's surface, by the atmosphere itself, and by clouds. As a result of its warmth, the atmosphere also radiates thermal infrared in all directions, including downward to the Earth's surface. Thus, greenhouse gases trap heat within the surface-troposphere system. The greenhouse effect is one of several factors that affect the temperature of the Earth.



### THE OXYGEN-CYCLE

The oxygen cycle is the biogeochemical cycle that describes the movement of oxygen within and between its three main reservoirs: the atmosphere (air), the biosphere (living things), and the lithosphere (earth's crust). The main driving factor of the oxygen cycle is photosynthesis, which is responsible for the modern Earth's atmosphere and life.



## Energy Cycle

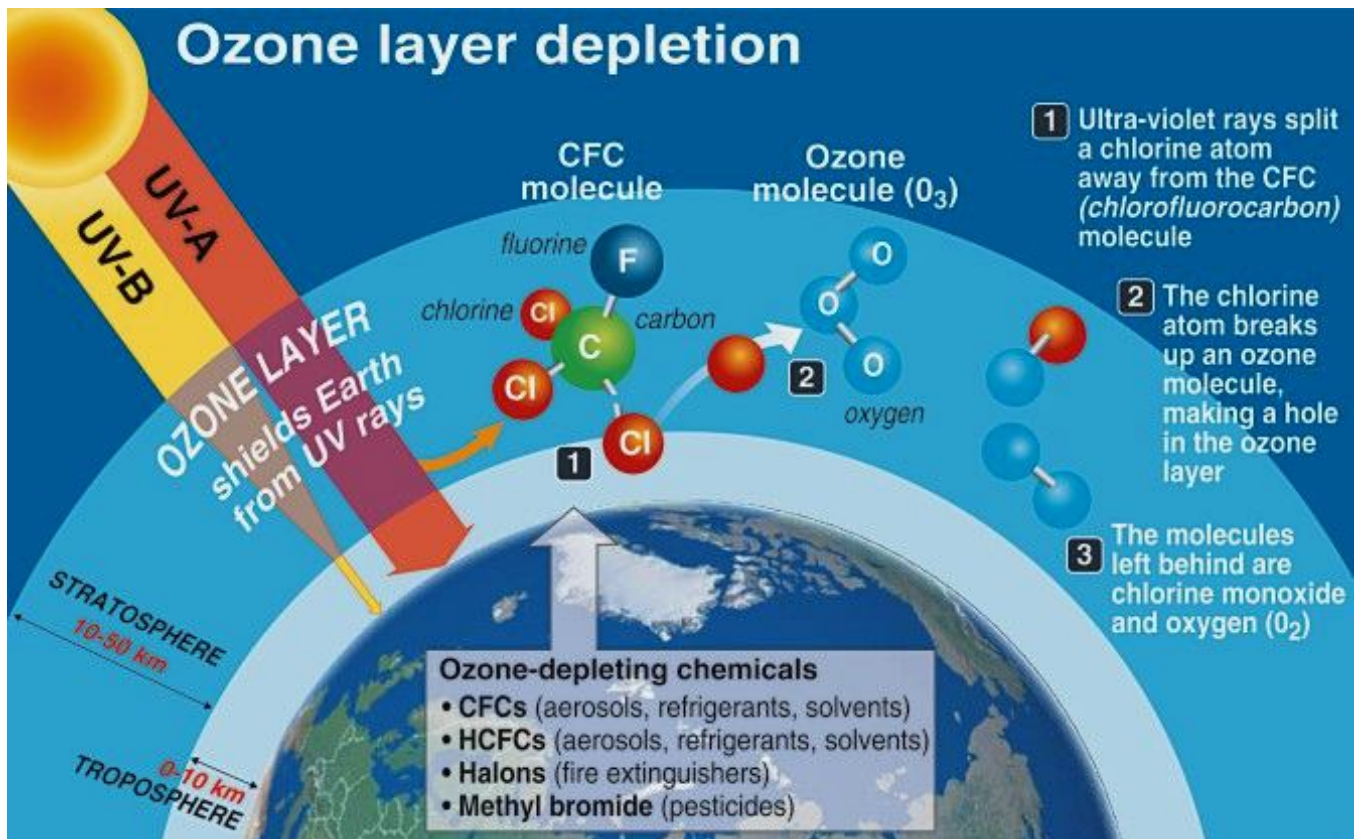
All the above mentioned cycle can be grouped or explained as energy cycle on this earth. In fact sun is the main source of energy for every activity on earth. This energy facilitates the everlasting cycle of all resources in the biosphere. This system ensures that whatever we take from earth and its atmosphere we return it in some way or other. A living organism is made of Carbon, Oxygen, Nitrogen and other elements. All living organisms need regular dose of these elements to continue life. During lifetime all these things are returned to the atmosphere in some way. For example we return oxygen in the form of carbon dioxide and return water in the form of sweat or urine.

Ultimately when a living being dies, then the body gets decomposed by decomposers, like bacteria. These decompose the body into basic elements out of which it was originally made. That is how the everlasting cycle of life goes on.

## OZONE LAYER

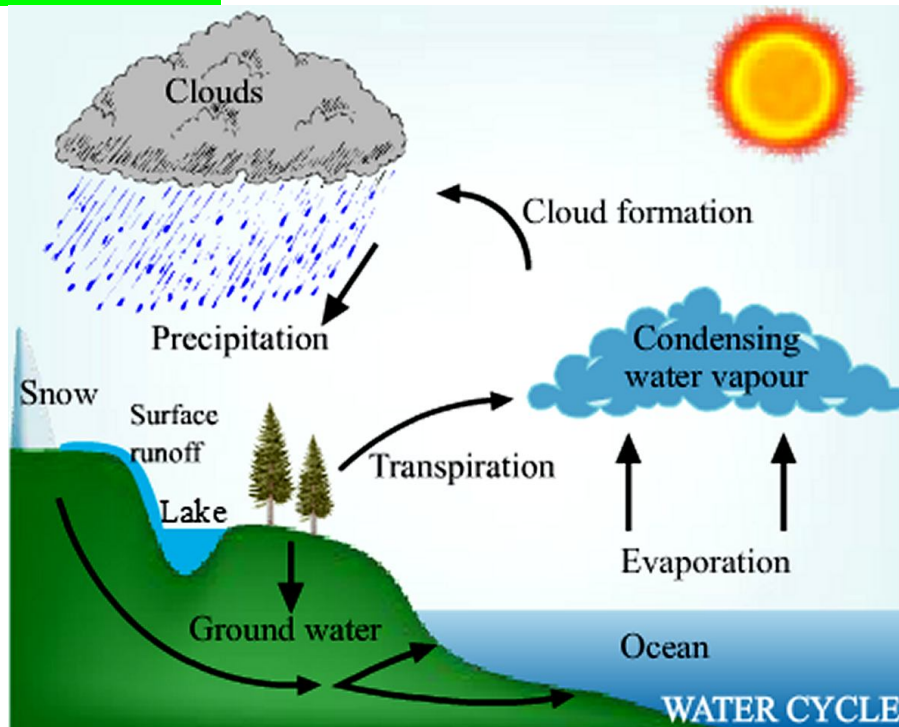
The ozone layer is a layer in earth's atmosphere which contains relatively high concentrations of ozone. This layer absorbs 93-99% of the sun's high frequency ultraviolet light, which is potentially damaging to life on earth. Over 91% of the ozone in Earth's atmosphere is present here. It is mainly located in the lower portion of the stratosphere from approximately 10 km to 50 km above Earth's surface, though the thickness varies seasonally and geographically.

Because of heavy use of CFCs (Chlorofluorocarbons) in refrigerators and pressurized cans by human the ozone layer has broken at some places. This has caused an alarming rise in ultraviolet radiation leading to increased cases of skin cancers.





## POINTS TO REMEMBER

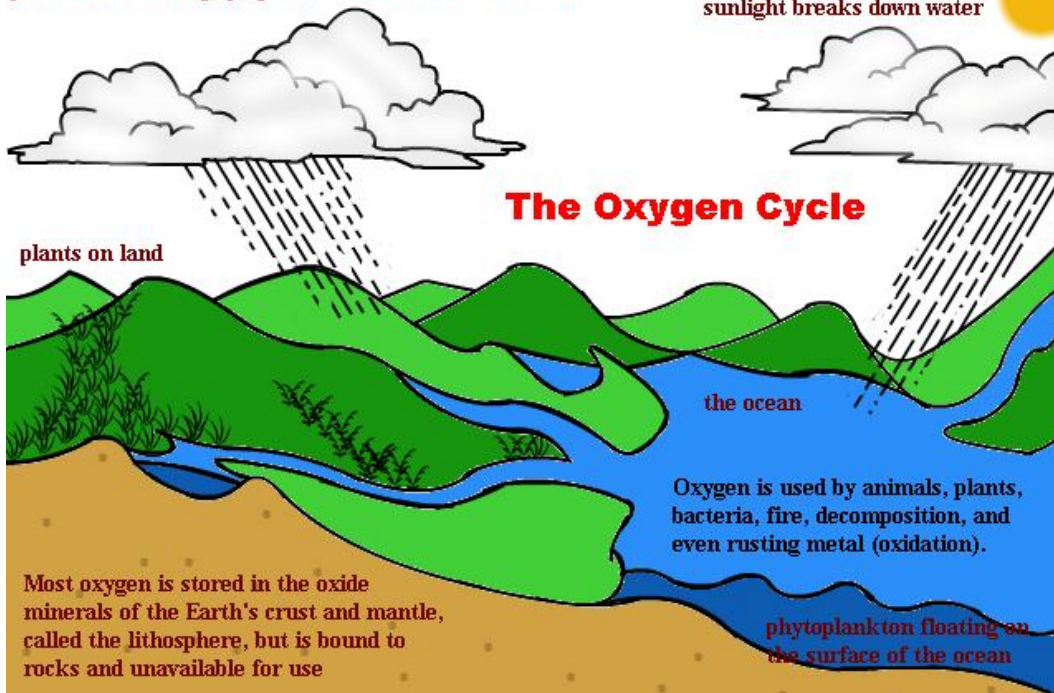


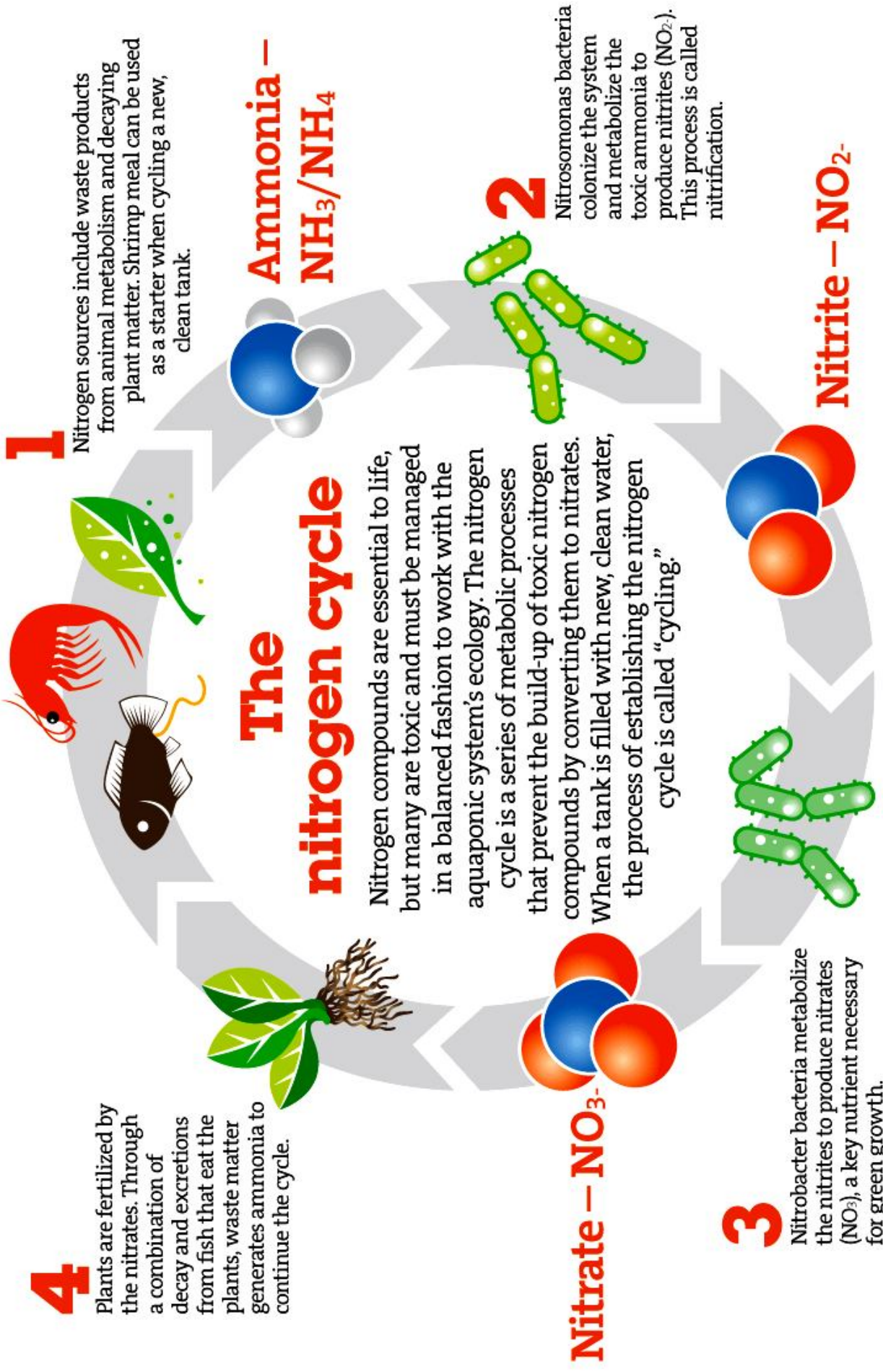
## OXYGEN CYCLE

- The oxygen in the atmosphere is freed by the process of photolysis. The energy in the sunlight breaks the oxygen bearing oxygen to produce free oxygen. Oxygen molecule is broken down by UV rays from the sun. This cycle shields earth from harmful UV rays.
- In the biosphere, oxygen undergoes cycles of respiration and photosynthesis. Humans and animals breathe in oxygen. This oxygen is used in metabolic processes and carbon dioxide given out. Plants and phytoplanktons undergo process of photosynthesis where carbon dioxide is used in the presence of sunlight to form carbohydrates and oxygen.
- In the lithosphere, oxygen is fixed in minerals like silicates and oxides. Oxygen from these minerals is freed by chemical weathering. When the mineral bearing oxygen is exposed to chemical reaction, the mineral wears down free oxygen is produced.

Most available oxygen comes from photosynthesis by plants on land and phytoplankton on the ocean's surface

Some oxygen is made in the atmosphere, when sunlight breaks down water





**1**

Nitrogen sources include waste products from animal metabolism and decaying plant matter. Shrimp meal can be used as a starter when cycling a new, clean tank.

**Ammonia –  
NH<sub>3</sub>/NH<sub>4</sub>**

**2**

Nitrosomonas bacteria colonize the system and metabolize the toxic ammonia to produce nitrites (NO<sub>2</sub>). This process is called nitrification.

**Nitrite – NO<sub>2</sub>-**

**The nitrogen cycle**

Nitrogen compounds are essential to life, but many are toxic and must be managed in a balanced fashion to work with the aquaponic system's ecology. The nitrogen cycle is a series of metabolic processes that prevent the build-up of toxic nitrogen compounds by converting them to nitrates. When a tank is filled with new, clean water, the process of establishing the nitrogen cycle is called "cycling."

**4**

Plants are fertilized by the nitrates. Through a combination of decay and excretions from fish that eat the plants, waste matter generates ammonia to continue the cycle.

**Nitrate – NO<sub>3</sub>-**

**3**

Nitrobacter bacteria metabolize the nitrites to produce nitrates (NO<sub>3</sub>), a key nutrient necessary for green growth.



## INTEXT QUESTIONS PAGE NO. 193

### Q1. How is our atmosphere different from the atmosphere on Venus and Mars?

**Answer:** The atmosphere of Earth contains a mixture of many gases like nitrogen (78.08%), oxygen (20.95%), carbon dioxide (0.03%) and water vapour (in varying proportion). On the other hand, the atmosphere on Venus and Mars mainly contains carbon dioxide, *i.e.*, about 95-97%. It may be the reason that due to this, no life is known to exist in both Venus and Mars.

### Q2. How does the atmosphere act as a blanket?

**Answer:** The atmosphere mainly contains air which is a bad conductor of heat. Due to this, the atmosphere keeps the average temperature of the Earth fairly balanced during the day and even throughout the year. The atmosphere prevents the sudden increase in temperature during the daylight hours and during the night, it slows down the escape of heat into the outer space. In this way, atmosphere acts as a blanket.

### Q3. What causes winds?

**Answer:** Winds occur due to unequal heating of atmospheric air. The heat causes rising up of air along with water vapour. As the air rises, it expands and cools. This cooling causes the water vapour in the air to condense. The condensation of water occurs if some particles (like dust particles) act as the 'nucleus' for these drops to stick around. These tiny droplets grow bigger by more and more condensation of other water droplets and finally form the clouds.

### Q4. How are clouds formed?

**Answer:** Water evaporates from water bodies and goes into the atmosphere. Air also becomes hot due to sunlight and starts rising up taking along with water vapour. As the air rises up, it expands and cools. This cooling of air causes water vapour in the air to condense. The process of condensation of water occurs, if some particles (like dust) act as the 'nucleus' for these drops to form around. None these small droplets grow and become big by more and more condensation of other droplets of water. These steps form the clouds.

### Q5. List any three human activities that you think would lead to air pollution.

**Answer:** The following activities lead to air pollution:

- (i) Excessive burning of fossil fuels, *i.e.*, coal and petroleum produces high amount of oxides of nitrogen and sulphur. These oxides mix with air and cause acid rain leading to many harmful effects.
- (ii) Many industries release high amount of poisonous gases into the atmosphere causing air pollution.
- (iii) Forest fires, excessive use of chlorofluorocarbons (CFCs) used in refrigerators, excessive mining and ore refining release harmful gases into the air leading to pollution.

## INTEXT QUESTIONS PAGE NO. 194

### Q1. Why do organisms need water?

**Answer:** Organisms need water because:

- (i) Cellular processes need water for their functioning.
- (ii) Substances dissolve in water for reactions to take place within the cells.
- (iii) Transportation of substances within the body need water.
- (iv) Water helps in digestion of food and its absorption in the blood.
- (v) It helps to maintain body temperature.

### Q2. What is the major source of freshwater in the city/town/village where you live?

**Answer:** In city/town/village, the major source of water is underground water. It is drawn with the help of hand pumps and tube-wells. The other nearby sources are rivers, lakes and ponds.

### **Q3. Do you know of any activity which may be polluting this water source?**

**Answer:** The activities which may be polluting the water bodies are:

- (i) Disposal of garbage or sewage from cities/towns and from factories.
- (ii) Hot water may be released from the industries which may disturb the temperature of water body leading to death of many aquatic organisms.

## **INTEXT QUESTIONS PAGE NO. 196**

### **Q1. How is soil formed?**

**Answer:** The formation of soil takes place in the following ways:

- (i) Rocks near the surface of Earth are broken down by various physical, chemical and some biological processes. This process takes millions of years.
- (ii) This weathering leads to the formation of fine particles called soil.
- (iii) Some other factors also lead to the formation of soil. These are:
  - (a) Sun causes heating of rocks that causes cracking and breaks down them into small particles.
  - (b) Water dissolve rocks by freezing and fast flowing.
  - (c) Wind causes erosion of rocks by fast blowing.
  - (d) Liches and mosses grow on rock surfaces and break them into powder down and form a thin layer of soil. The big trees sometimes enter into cracks in the rocks and force them to break further during their growth.

### **Q2. What is soil erosion?**

**Answer:** Soil erosion is the process of removal of top soil. It is rich in humus and nutrients. The agents of soil erosion are mainly flowing water or wind. If soil erosion is continued for a long time, the land becomes infertile and barren due to the loss of its valuable nutrients.

### **Q3. What are the methods of preventing or reducing soil erosion?**

**Answer:** Preventive methods of soil erosion

- (i) **Afforestation** Planting more trees reduces soil erosion.
- (ii) **Contour Ploughing** Ploughing land in furrows across the natural slope of the land helps trap water and prevent the washing away of top soil along with it.
- (iii) **Step (terrace) Farming** Farmers form a series of steps by making horizontal strips supported by walls to catch the descending water. It gives the water sufficient time to percolate into the soil and nourish the crop.
- (iv) **Soil Cover** After harvesting a crop, soil is covered with dried vegetation to prevent its erosion.
- (v) **Overgrazing** Grasses tend to bind soil particles to prevent their erosion. If overgrazing is allowed, the grasses are uprooted and soil gets eroded.

## **INTEXT QUESTIONS PAGE NO. 201**

### **Q1. What are the different states in which water is found during the water cycle?**

**Answer:** Water can be seen in water cycle in its all three different states.

These are:

- (i) **Gaseous State** It occurs in the form of water vapour. It evaporates from the surface of water bodies and mixes with air.
- (ii) **Liquid State** Water vapour condense high up in the atmosphere. It falls on the Earth in the form of rain.
- (iii) **Solid State** It is formed by the freezing of liquid droplets in the upper layer of atmosphere. These droplets fall on the Earth in the form of snow, hail or sleet.

**Q2. Name two biologically important compounds that contain both oxygen and nitrogen.**

**Answer:** The biologically important compounds that contain both oxygen and nitrogen are nitrates ( $\text{NO}_2^-$ ) and nitrites ( $\text{NO}_3^-$ ). These are important forms of nitrogen to be utilized by the plants to synthesize biomolecules like proteins.

**Q3. List any three human activities which would lead to an increase in the carbon dioxide content of air.**

**Answer:** The human activities which would lead to an increase in  $\text{CO}_2$  content of air are:

- (i) **Respiration** is the natural way to release of  $\text{CO}_2$  by both plants and animals. It is balanced by the release of oxygen by plants. So, it is not harmful for the environment.
- (ii) **Deforestation** increases the level of  $\text{CO}_2$  in the environment. Trees carry out photosynthesis and convert  $\text{CO}_2$  into organic compounds such as glucose, starch, etc. In their absence,  $\text{CO}_2$  cannot be utilized.
- (iii) **Combustion of fuels** leads to increase in  $\text{CO}$  level in the atmosphere. Fuels are burnt to carryout activities like cooking, transportation and in industrial processes.

**Q4. What is the greenhouse effect?**

**Answer:** Some gases called greenhouse gases, e.g.,  $\text{CO}_2$  prevent the escape of heat from the Earth. When the amount of such gases increases more than their normal levels, the average temperature of the Earth increases. This is called greenhouse effect.

**Q5. What are the two forms of oxygen found in the atmosphere?**

**Answer:** The two forms of oxygen found in the atmosphere are:

- (i) Elemental oxygen is normally found in the form of diatomic molecule ( $\text{O}_2$ ) in the lower part of atmosphere. It is about 21% in the air and non-poisonous.
- (ii) Ozone is found in the stratosphere part of atmosphere. It contains three atoms of oxygen ( $\text{O}_3$ ). It is the poisonous form of oxygen.
- (iii) Some other forms of oxygen are also found in the combined state. In Earth's crust, it is found as the oxides of most metals and silicon and also as carbonate, sulphate, nitrate and other minerals. In other forms, it is the part of biological molecules like carbohydrates, proteins, fats and nucleic acids, etc.

**EXERCISE QUESTIONS PAGE NO. 201, 202**

**Q1. Why is the atmosphere essential for life?**

**Answer:** Atmosphere is important for life due to following reasons:

- (i) It keeps the average temperature of the Earth steady during the day and even throughout the year.
- (ii) It prevents the sudden increases in temperature during the daylight hours.
- (iii) The gases it contains are required for sustaining life on Earth. These gases are:
  - (a) Oxygen which is required for respiration by all living organisms.
  - (b) Carbon dioxide is used in photosynthesis by plants to synthesize food.
  - (c) Nitrogen provides inert atmosphere and an important components of proteins.
- (iv) A thick layer of ozone (in stratosphere) of atmosphere, filters the harmful UV radiations reaching the Earth. The UV rays produce harmful effects on all living organisms.

**Q2. Why is water essential for life?**

**Answer:** Water is essential for life because of these reasons:

- (i) It provides medium to carryout all the cellular processes.
- (ii) All the reactions that occur in our body and within cells occur between substances that are dissolved in water
- (iii) It is required for the transportation of materials from one part of the body to the other.
- (iv) It helps to maintain body temperature.
- (v) Water makes up about 70% of body weight of all the living organisms.

**Q3. How are living organisms dependent on soil? Are organisms that live in water totally independent of soil as a resource?**

**Answer:** Living organisms depend on soil in the following ways:

- (i) It provides natural habitat for various living organisms, *e.g.*, bacteria, fungi, algae, earthworms, etc. These help to maintain the fertility of soil.
- (ii) Earthworm performs all its activities in the soil. It maintains the fertility of soil by releasing nitrogen rich excreta.
- (iii) Many animals like rats, rabbits, etc., make their home in the soil.
- (iv) Soil helps to bind the roots of plants to provide them anchorage. The nutrients in soil are absorbed by the plants for their growth and development.

All organisms that live in water are totally dependent on soil because the mineral nutrients are present in water in the dissolved form. But, their recycling depends on the decomposers which are present in soil beds. For this, all water bodies have soil beds which contain decomposers for the recycling of nutrients.

**Q4. You have seen weather reports on television and in newspapers. How, do you think we are able to predict the weather?**

**Answer:** Meteorologists collect information regarding the pattern of temperature, speed of wind, air pressure and all other features which influence weather. All these information are collected by remote sensing and weather forecast satellites. This information is then compiled in meteorological departments which prepare a weather report that is displayed on the maps. This information is further transmitted through radio, television and newspaper.

**Q5. We know that many human activities lead to increasing levels of pollution of the air, water-bodies and soil. Do you think that isolating these activities to specific and limited areas would help in reducing pollution?**

**Answer:** Isolating human activities to specific and limited areas would definitely help in reducing pollution to some extent. For example,

- (i) If sewage and garbage generated by homes and industries is treated properly before discharging into water sources, it will reduce water pollution and cause less harm to the aquatic life.
- (ii) If hot water generated by the industries is collected at common place, allowed to cool and then discharged in water bodies, will not affect the breeding capacity of aquatic organisms.
- (iii) If commercial areas, factories and industries are shifted to the isolated area far away from residential areas, it can reduce the effect of air pollution on people.

**Q6. Write a note on how forests influence the quality of our air, soil and water resources.**

**Answer:** Forests influence the quality of air, soil and water resources in following ways:

- (i) Influence of forests on air occurs in these ways:
    - (a) Forests help to maintain oxygen and carbon dioxide balance in the air. They reduce the level of CO<sub>2</sub> in the air and to prevent greenhouse effect.
    - (b) These maintain temperature of the environment.
    - (c) Forests increase the rate of photosynthesis in surrounding region.
  - (ii) Influence of forests in quality of soil:
    - (a) Trees spread their roots deep inside the Earth and bind the soil particles firmly. This reduces soil erosion.
    - (b) Forests help to maintain nutrient cycles (biogeochemical cycles) in the atmosphere.
  - (iii) Influence of forests in quality of water:
    - (a) Trees help to maintain water cycle.
    - (b) Forests conserve water and make them available on the surface of Earth as water sources.
- .....

**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 14**  
**NATURAL RESOURCES**

1. Hot air is \_\_\_\_\_ than cold air.
2. Green plants convert carbon dioxide into glucose in the presence of \_\_\_\_\_.
3. The life-supporting zone of the Earth where the atmosphere, the hydrosphere and the lithosphere interact and make life possible, is known as the \_\_\_\_\_.
4. The space among the soil particles are filled with \_\_\_\_\_.
5. Dead remains of plants and animals is called \_\_\_\_\_.
6. Water covers \_\_\_\_\_% of the Earth's surface.
7. On planets like Venus and Mars the major component of the atmosphere is \_\_\_\_\_.
8. The fossil fuels like coal and petroleum contain small amounts of \_\_\_\_\_ and \_\_\_\_\_ which are primarily responsible for acid rain.
9. The substances that cause pollution are called \_\_\_\_\_.
10. \_\_\_\_\_ is the region of atmosphere where ozone layer is present.
11. \_\_\_\_\_ is formed due to condensation of water vapours in the lower region of atmosphere.
12. \_\_\_\_\_ is a major factor in deciding the soil structure because it causes the soil to become more porous and allows water and air to penetrate deep underground.
13. Ozone hole was first detected over \_\_\_\_\_.
14. The eggs and larvae of various aquatic animals are particularly susceptible to \_\_\_\_\_ changes.
15. Corbett National Park is famous for?
  - (a) Neel Gai
  - (b) Snakes
  - (c) Rhinoceros
  - (d) Tigers
16. Green plants of an ecosystem are called.
  - (a) Producers
  - (b) Decomposers
  - (c) Consumers
  - (d) None of these
17. Energy flow in the ecosystem is
  - (a) unidirectional
  - (b) bidirectional



- (c) multidirectional
- (d) none of these

**18.** Two important groups of detritivores are

- (a) Animals and Plants
- (b) Prokaryotes and Algae
- (c) Prokaryotes and Fungi
- (d) Plantae and Prokaryotes

**19.** Which of the following is a nonrenewable energy source?

- (a) natural gas
- (b) solar energy
- (c) wind energy
- (d) tidal energy

**20.** Which of the following organisms is incorrectly paired with its trophic level?

- (a) cyanobacteria - primary producer
- (b) honey bee - primary consumer
- (c) zooplankton - primary producer
- (d) eagle - tertiary consumer

**21.** Where do terracing help the most in soil conservation?

- (a) Hill regions
- (b) Wet areas
- (c) Deserts
- (d) Plains

**22.** Which trophic level is considered to be the most vulnerable to extinction?

- (a) producer level
- (b) primary consumer level
- (c) secondary consumer level
- (d) tertiary consumer level

**23.** In which sphere of the environment Ozone layer is located?

- (a) Troposphere
- (b) Stratosphere
- (c) Mesosphere
- (d) Thermosphere

**24.** Solar radiations heat up:

- (a) Land faster than the water bodies
- (b) Land slower than the water bodies
- (c) Equally both land and water bodies
- (d) Neither land nor water bodies

25. What is lithosphere?
26. What is hydrosphere?
27. What is atmosphere?
28. List the four zones of the atmosphere.
29. What is biosphere?
30. How is our atmosphere different from the atmosphere on Venus and Mars?
31. How does the atmosphere act as a blanket?
32. What causes winds?
33. How are clouds formed?
34. Which gets heated faster land or water?
35. Define air-pollution? (Short Answer Q)
36. List any three human activities that you think would lead to air pollution.
37. Name two diseases caused due to an increased content of pollutants in the air produced due to the burning of fossil fuels.
38. What is smog?
39. How do fossil fuel cause air pollution?
40. Meenakshi saw reduction in greenish layer of lichens at the bark of trees at the biology garden of the school. The garden was few metres away from diesel generator placed for electricity backup. She immediately informed the school authorities to check the pollution level of diesel and kerosene used in the generator. (a) How reduction in Lichens layer is related to pollution?(b) What measures should be taken by school authorities to check the reduction?(c) What qualities are shown by Meenakshi by informing school about the Lichens?
41. Give an example of fungi which are known as 'indicator of air pollution'.
42. Why do organisms need water?
43. Water is known as 'A Wonder Liquid'. Justify this statement by giving any two reasons.
44. What are the effects of acid rain?
45. What are biogeochemical cycles? Names two examples.
46. In which regions is soil erosion very difficult to revert?
47. What is meant by depletion of ozone layer? Mention one important feature of ozone in atmosphere. Identify the factors responsible for the formation of ozone hole
48. Why is water essential for life?



**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 14**  
**NATURAL RESOURCES**

1. The atmosphere of the earth is heated by radiations which are mainly
  - (a) Radiated by the sun
  - (b) Re-radiated by land
  - (c) Re-radiated by water
  - (d) Re-radiated by land and water
2. If there were no atmosphere around the earth, the temperature of the earth will
  - (a) Increase
  - (b) Go on decreasing
  - (c) increase during day and decrease during night
  - (d) Be unaffected
3. What would happen, if all the oxygen present in the environment is converted to ozone?
  - (a) We will be protected more
  - (b) It will become poisonous and kill living forms
  - (c) Ozone is not stable, hence it will be toxic
  - (d) It will help harmful sun radiations to reach earth and damage many life forms.
4. One of the following factors does not lead to soil formation in nature
  - (a) The sun
  - (b) Water
  - (c) Wind
  - (d) Polythene bags
5. The two forms of oxygen found in the atmosphere are
  - (a) Water and ozone
  - (b) Water and oxygen
  - (c) Ozone and oxygen
  - (d) Water and carbon-dioxide
6. Name the process in which water vapour changes to a liquid.
7. Which gas is the chief component of Earth's atmosphere?
8. Name the substance that reduces the amount of dissolved oxygen in water.
9. Which gas is formed in the layers of Earth due to bacterial decomposition in the absence of oxygen?
10. Name the rays essential for formation of ozone in atmosphere.
11. Name the elements present in fossil fuels, which cause air pollution.

12. In a coastal region, what would be the direction of wind during the day?
  13. When clouds cool down, water droplets fall to the land as rain, hail or snow. Name the phenomenon.
  14. Name the organisms found to be very sensitive to the levels of contaminants like sulphur dioxide in the air.
  15. What do you mean by humus?
  16. Give two examples of exhaustible natural resources.
  17. Name two atmospheric gases responsible for causing acid rain.
  18. How would you define the term atmosphere?
  19. What do you understand by the term 'Natural resources'?
  20. What is strip-cropping?
  21. What portion of our country's geographical area is covered by forest?
  22. Name any two examples of inexhaustible natural resources.
  23. How much air is required by a normal human being in one day?
  24. What is conversion of ammonia into nitrates called?
  25. State the role of the atmosphere in climate control?
  26. How following factors contribute in formation of soil ? (a) wind (b) water (c) Sun
  27. Acid rain and smog are said to be the consequences of air pollution. How are they caused?  
What are the ill effects of breathing polluted air on human health?
  28. What is Smog?
  29. What is green house effect? List two green house gases. State the ultimate effect of increase in green house gases in the environment.
  30. What makes the biosphere dynamic but stable system ?
  31. The atmosphere acts as a blanket. How ?
  32. What is soil? How is it formed? State the major factor that decides the structure of a soil.  
What role does it play ?
  33. Write the importance of ozone in the atmosphere.
  34. (a) List two activities of man which lead to environmental pollution. (b) List any two uses of carbon in living organisms.
  35. List two forms of oxygen found in the atmosphere. Name the process(s) by which (i) oxygen from the atmosphere is used up. (ii) oxygen is returned to the atmosphere
  36. State various steps and processes involved in the nitrogen cycle in nature. Also show cycling of various nutrients in this cycle.
  37. Write a note on how forests influence the quality of air, soil and water resources.
-

38. How is atmosphere on our Earth different from the atmosphere on Venus and Mars ? State two ways by which percentage of carbon dioxide is fixed on the earth.
39. “Urbanization and industrialisation is mainly responsible for the increase in environment pollution” Justify this statement and suggest ways and means to check it.
40. Why is the atmosphere essential for life?
41. Why is water essential for life?
42. How are living organisms dependent on the soil? Are organisms that live in water totally independent of soil as a resource?
43. You have seen weather reports on television and in news paper. How do you think we are able to predict the weather?
44. We know that many human activities lead to increasing levels of pollution of air, water bodies and soil. Do you think that isolating these activities to specific and limited areas would help in reducing pollution?
45. Write a note on how forests influence the air, soil and water resources.
46. What is ‘Water Cycle’ ? Explain the process of water cycle.
47. Write a short note on ‘Nitrogen Fixation’
48. Explain the ‘Nitrogen Cycle
49. Discuss the consequences of the increase in the concentration of Carbon Dioxide and other Green House gases in the atmosphere
50. What are the causes of Soil Erosion?

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**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 14**  
**NATURAL RESOURCES**

1. What is soil erosion ? List two activities which cause soil erosion.
2. What is green house effect ? How is it caused ?
3. Many municipal Corporations are trying water harvesting to improve the availability of water. Give reason.
4. Rain water sometimes contains traces of acid. Why ? Explain in brief.
5. Define the term 'Smog'. Name two types of diseases caused by regularly breathing the polluted air.
6. Give reasons of the following : (i) We are lucky that ozone is not stable near the earth's surface. (ii) The combustion of fossil fuels increases the amount of suspended particles in air.
7. Why is water so necessary for all living organisms ? Mention any two points in support of your answer. 'Water is known as A Wonder Liquid'. Justify this statement by giving any two reasons.
8. What is atmospheric fixation of Nitrogen ?
9. What is soil erosion ? State any one way by which it can be prevented.
10. What is humus ? What is the role of earth worms in increasing the quantity of humus ?
11. List two ways by which carbon dioxide is 'fixed' in the environment.
12. Name two diseases caused due to an increased content of pollutants in the air produced due to the burning of fossil fuels. [2011 (T-II)]
13. The heaps of solid waste are a menace. Give two reasons.
14. How addition of undesirable substances and change in temperature affect the water life.
15. State any two harmful effects each of : (a) Air pollution and (b) Water pollution
16. What is the role of atmosphere in climate control ?
17. What percentage of nitrogen and oxygen is present in air ?
18. Mention any two human activities which are responsible for water pollution.
19. Mention the role of ozone layer in the atmosphere.
20. Give reason Lichens do not grow in Delhi whereas they commonly grow in Manali or Darjeeling.
21. What causes acid rain? Mention any damage caused by it on living organisms.
22. What is Green House Effect ? Name compounds causing depletion of Ozone layer ?
23. How do Sun and wind influence the formation of soil ?
24. List any two consequences of global warming.
25. Mention any four measures that should be taken to maintain the soil fertility.
26. Give the chemical formula of ozone. What is its role in atmosphere ?

27. How the presence of pollutants present in the air does affect our health ?
28. Name two air pollutants which when dissolve with water gives rise to acid rain.
29. Name two measures that can be taken to reduce water pollution.
30. Suggest two methods to control air pollution.
31. Differentiate between biodegradable and nonbiodegradable pollutants.
32. Name the process that returns oxygen to the atmosphere.
33. Write the condition responsible for poor visibility in cold weather.
34. Which symbiotic life forms can grow on stones and help in the formation of soil ? Write the mode of their action for making soil from rocks.
35. Why does moon have very cold and very hot temperature variations i.e. from  $-190^{\circ}\text{C}$  to  $110^{\circ}\text{C}$  even though it is at the same distance from the sun as earth ?
36. Why does Mathura refinery pose problem to the Taj Mahal ?
37. Explain the role of atmosphere as a blanket. List the factors deciding the rainfall patterns.
38. State the effect of the following on aquatic organisms– (a) Removal of dissolved oxygen  
(b) Change in temperature
39. How do forest play an important role in maintaining water cycle.
40. Name the two gases given out by burning of fossil fuels which dissolve in rain water to form acid rain.
41. Why is atmosphere essential for life? Write two points in support of your answer.
42. List any four activities that you think would lead to air pollution.
43. How are clouds formed ?
44. Why do terrestrial forms require fresh water ?
45. Mention any two processes involved in water cycle.
46. How do fossil fuel cause air-pollution ?
47. What is top soil ? Mention any two factors that decide which plants will thrive on that soil.
48. How do the rivers from land, add minerals to sea water?
49. How can we prevent the loss of top soil?
50. Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?
51. Lichens are called pioneer colonisers of bare rock. How can they help in formation of soil?
  5. Why do people love to fly kites near the seashore?
52. Why does water need conservation even though large oceans surround the land masses?
53. "Soil is formed by water." If you agree to this statement then give reasons.
54. During summer, if you go near the lake, you feel relief from the heat. Why?
55. "The flow of energy is unidirectional whereas the biogeochemical transfer is cyclic".  
Explain why ?
56. Justify the statement "The nitrogen cycle is supposed to be an ideal cycle in the biosphere".
57. List three ways to control soil pollution.

58. In coastal area, wind current moves from the sea towards the land during day; but during night it moves from land to the sea. Discuss the reason.
59. Following are a few organisms (a) lichen (b) mosses (c) mango tree (d) actus. Which among the above can grow on stones; and also help in formation of soil? Write the mode of their action for making soil.
60. Why does moon have very cold and very hot temperature variations, eg. from  $-190^{\circ}\text{C}$  to  $110^{\circ}\text{C}$  even though it is at the same distance from the Sun as the Earth is?
61. There is mass mortality of fishes in a pond. What may be the reasons?
62. Soil formation is done by both abiotic and biotic factors. List the names of these factors by classifying them as abiotic and biotic?
63. All the living organisms are basically made up of C, N, S, P, H and O. How do they enter the living forms? Discuss.
64. Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?
65. Why are root nodules useful for the plants?
66. Many human activities lead to increasing levels of pollutions of air, water bodies and soil. "Isolating these activities to specific and limited areas would not help in reducing pollution". Justify this statement giving at least five reasons.
67. Explain with the help of a labelled diagram carbon cycle in nature.
68. Describe green house effect. How the presence of green house gases would lead to global warming ? Explain.
69. Draw a neat labelled diagram of water cycle in nature.
70. With the help of a neat labelled diagram, depict the cycling of carbon in nature.
71. Mention the two ways in which carbon dioxide is fixed in the environment.
72. Make neat and labelled sketch of Nitrogen cycle in nature.
73. Describe in brief the role of Nitrogen fixing bacteria and of lightening in fixing atmospheric nitrogen.
74. In coastal area, wind current moves from sea towards the land during day; but during night it moves from land to sea. Discuss the reason.
75. How are CFCs harmful for the environment and living beings ?
76. What are the forms of oxygen found in the atmosphere ?
77. "Forests influence the quality of our air, soil and water resources". Justify the statement.
78. Mention the two forms of oxygen found in atmosphere.
79. Name the form of oxygen absorbing U.V. rays.
80. Draw flow diagram of oxygen cycle.
81. What do you understand by ozone layer depletion ?
82. What is air pollution ? How does air pollution affect animal and plant life ?
83. Draw a labelled diagram to show carbon cycle in nature.



- 84.** What are the two ways by which CO<sub>2</sub> is returned to the atmosphere ?
- 85.** What are the causes of increase in the concentration of carbon dioxide in the atmosphere?  
How is carbon dioxide converted into organic compounds? Justify with the help of a labelled diagram.
- 86.** Why is circulation of water necessary in the environment ? Discuss any two human activities which are disturbing the water cycle.
- 87.** With the help of a labelled diagram show the cycling of carbon in nature. What are the two ways in which carbon di-oxide is fixed in the environment.
- 88.** With the help of diagram depict the oxygen cycle in nature. What is the % of oxygen present in atmosphere ? What is the role of ozone layer and how is it getting depleted ?
- 89.** How do clouds formed in the sky ? Draw the biogeochemical cycle involved in it. What are the different states in which water is found in the water cycle ?
- 90.** What are biogeochemical cycles ? Draw a labelled diagram to illustrate cycling of oxygen in nature. Write the means of returning oxygen to the atmosphere.
- 91.** What is nitrogen fixation ? Why do plant need to fix nitrogen ? Draw a labelled diagram to illustrate nitrogen - cycle.
- 92.** Draw a labelled diagram of carbon cycle in nature. Describe the role of photosynthesis and respiration in carbon cycle.
- 93.** Study the given figure of Nitrogen cycle and mention what do A, B, C, D, E represents.  
What will happen if step A does not occur? Write the role of N<sub>2</sub> fixing bacteria in the
- 94.** Biosphere. Name two biologically important compounds that contains both O<sub>2</sub> and N<sub>2</sub>
- 95.** What are the types of natural resources?
- 96.** Why plants do not utilise nitrogen directly from atmosphere?
- .....

**ASSIGNMENT QUESTIONS SET – 4**  
**CHAPTER – 14**  
**NATURAL RESOURCES**

1. The atmosphere of the earth is heated by radiations which are mainly
  - (a) radiated by the sun
  - (b) re-radiated by land
  - (c) re-radiated by water
  - (d) re-radiated by land and water
2. If there were no atmosphere around the earth, the temperature of the earth will
  - (a) increase
  - (b) go on decreasing
  - (c) increase during day and decrease during night
  - (d) be unaffected
3. What would happen, if all the oxygen present in the environment is converted to ozone?
  - (a) We will be protected more
  - (b) It will become poisonous and kill living forms
  - (c) Ozone is not stable, hence it will be toxic
  - (d) It will help harmful sun radiations to reach earth and damage many life forms.
4. One of the following factors does not lead to soil formation in nature
  - (a) the sun
  - (b) water
  - (c) wind
  - (d) polythene bags
5. The two forms of oxygen found in the atmosphere are
  - (a) water and ozone
  - (b) water and oxygen
  - (c) ozone and oxygen
  - (d) water and carbon-dioxide
6. The process of nitrogen-fixation by bacteria does not take place in the presence of
  - (a) molecular form of hydrogen
  - (b) elemental form of oxygen
  - (c) water
  - (d) elemental form of nitrogen
7. Rainfall patterns depend on
  - (a) the underground water table
  - (b) the number of water bodies in an area
  - (c) the density pattern of human population in an area
  - (d) the prevailing season in an area
8. Among the given options, which one is not correct for the use of large amount of fertilisers and pesticides?
  - (a) They are eco-friendly
  - (b) They turn the fields barren after some time
  - (c) They adversely affect the useful component from the soil
  - (d) They destroy the soil fertility

9. The nitrogen molecules present in air can be converted into nitrates and nitrites by
- (a) a biological process of nitrogen fixing bacteria present in soil
  - (b) a biological process of carbon fixing factor present in soil
  - (c) any of the industries manufacturing nitrogenous compounds
  - (d) the plants used as cereal crops in field
10. One of the following processes is not a step involved in the water-cycle operating in nature
- (a) evaporation
  - (b) transpiration
  - (c) precipitation
  - (d) photosynthesis
11. The term “water-pollution” can be defined in several ways. Which of the following statements does not give the correct definition?
- (a) The addition of undesirable substances to water-bodies
  - (b) The removal of desirable substances from water-bodies
  - (c) A change in pressure of the water bodies
  - (d) A change in temperature of the water bodies
12. Which of the following is not a green house gas?
- (a) Methane
  - (b) Carbon dioxide
  - (c) Carbon monoxide
  - (d) Ammonia
13. Which step is not involved in the carbon-cycle?
- (a) Photosynthesis
  - (b) Transpiration
  - (c) Respiration
  - (d) Burning of fossil fuels
14. ‘Ozone-hole’ means
- (a) a large sized hole in the ozone layer
  - (b) thinning of the ozone layer
  - (c) small holes scattered in the ozone layer
  - (d) thickening of ozone in the ozone layer
15. Ozone-layer is getting depleted because of
- (a) excessive use of automobiles
  - (b) excessive formation of industrial units
  - (c) excessive use of man-made compounds containing both fluorine and chlorine
  - (d) excessive deforestation.
16. Which of the following is a recently originated problem of environment?
- (a) Ozone layer depletion
  - (b) Green house effect
  - (c) Global warming
  - (d) All of the above
17. When we breathe in air, nitrogen also goes inside along with oxygen. What is the fate of this nitrogen?
- (a) It moves along with oxygen into the cells
  - (b) It comes out with the CO<sub>2</sub> during exhalation
  - (c) It is absorbed only by the nasal cells
  - (d) Nitrogen concentration is already more in the cells so it is not at all absorbed.

**18.** Top-soil contains the following

- (a) Humus and living organisms only
- (b) Humus and soil particles only
- (c) Humus, living organisms and plants
- (d) Humus, living organisms and soil particles.

**19.** Choose the correct sequences

- (a) CO<sub>2</sub> in atmosphere → decomposers → organic carbon in animals → organic carbon in plants
- (b) CO<sub>2</sub> in atmosphere → organic carbon in plants → organic carbon in animals → inorganic carbon in soil
- (c) Inorganic carbonates in water → organic carbon in plants → organic carbon in animals → scavengers
- (d) Organic carbon in animals → decomposers → CO<sub>2</sub> in atmosphere → organic carbon in plants

**20.** Major source of mineral in soil is the

- (a) parent rock from which soil is formed
- (b) plants
- (c) animals
- (d) bacteria

**21.** Total earth's surface covered by water is

- (a) 75%
- (b) 60%
- (c) 85%
- (d) 50%

**22.** Biotic component of biosphere is not constituted by

- (a) producers
- (b) consumers
- (c) decomposer
- (d) air

**23.** An increase in carbondioxide content in the atmosphere would not cause

- (a) more heat to be retained by the environment
- (b) increase in photosynthesis in plants
- (c) global warming
- (d) abundance of desert plants

**24.** Oxygen is returned to the atmosphere mainly by

- (a) burning of fossil fuel
- (b) respiration
- (c) photosynthesis
- (d) fungi

**25.** Low visibility during cold weather is due to

- (a) formation of fossil fuel
- (b) unburnt carbon particles or hydrocarbons suspended in air
- (c) lack of adequate power supply
- (d) none of these

**26.** Growth of Lichens on barren rocks is followed by the growth of

- (a) moss
- (b) ferns
- (c) gymnosperms
- (d) algae

- 27.** Marked temperature changes in aquatic environment can affect
- (a) breeding of animals
  - (b) more growth of aquatic plants
  - (c) process of digestion in animals
  - (d) availability of nutrients.
- 28.** Soil erosion can be prevented by
- (a) raising forests
  - (b) deforestation
  - (c) excessive use of fertilizer
  - (d) overgrazing by animals
- 29.** What happens when rain falls on soil without vegetational cover?
- (a) Rain water percolates in soil efficiently
  - (b) Rain water causes loss of surface soil
  - (c) Rain water leads to fertility of the soil
  - (d) Rain water does not cause any change in soil
- 30.** Oxygen is harmful for
- (a) ferns
  - (b) nitrogen fixing bacteria
  - (c) chara
  - (d) mango tree
- 31.** Rivers from land, add minerals to sea water. Discuss how?
- 32.** How can we prevent the loss of top soil?
- 33.** How is the life of organisms living in water affected when water gets polluted?
- 34.** During summer, if you go near the lake, you feel relief from the heat, why?
- 35.** In coastal area, wind current moves from the sea towards the land during day; but during night it moves from land to the sea. Discuss the reason.
- 36.** Following are a few organisms (a) lichen (b) mosses (c) mango tree (d) cactus  
Which among the above can grow on stones; and also help in formation of soil? Write the mode of their action for making soil.
- 37.** Soil formation is done by both abiotic and biotic factors. List the names of these factors by classifying them as abiotic and biotic?
- 38.** All the living organisms are basically made up of C, N, S, P, H and O. How do they enter the living forms? Discuss.
- 39.** Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?
- 40.** Why does moon have very cold and very hot temperature variations eg, from  $-190^{\circ}\text{C}$  to  $110^{\circ}\text{C}$  even though it is at the same distance from the sun as the earth is?
- 41.** Why do people love to fly kites near the seashore ?
- 42.** Why does Mathura refinery pose problems to the Taj Mahal?
- 43.** Why do not lichens occur in Delhi whereas they commonly grow in Manali or Darjeeling?
- 44.** Why does water need conservation even though large oceans surround the land masses?
- 45.** There is mass mortality of fishes in a pond. What may be the reasons ?

46. Lichens are called pioneer colonisers of bare rock. How can they help in formation of soil?
47. "Soil is formed by water." If you agree to this statement then give reasons
48. Fertile soil has lots of humus. Why?
49. Why step farming is common in hills?
50. Why are root nodules useful for the plants?
51. How do fossil fuels cause air pollution?
52. What are the causes of water pollution? Discuss how you can contribute in reducing water pollution.
53. A motor car, with its glass totally closed, is parked directly under the sun. The inside temperature of the car rises very high. Explain why?
54. Justify "Dust is a pollutant" ?
55. Explain the role of the Sun in the formation of soil.
56. Carbon dioxide is necessary for plants. Why do we consider it as a pollutant?



## CHAPTER – 15

# IMPROVEMENT IN FOOD RESOURCES

### **INTRODUCTION**

There is a need to introduce production efficiency of crops and livestock because

1. rapid increase in population
2. No major scope of increasing area of land under cultivation.

Increase in food production without degrading our environment and disturbing the ecological balance i.e. **Sustainable Practices** are required in agriculture and animal husbandry.

### **TYPES OF CROPS**

Cereals: wheat, rice, maize, millets and sorghum. Provide carbohydrates for energy requirements.

Pulses: pea, gram, black gram, green gram, pigeon pea and lentil. Provide proteins

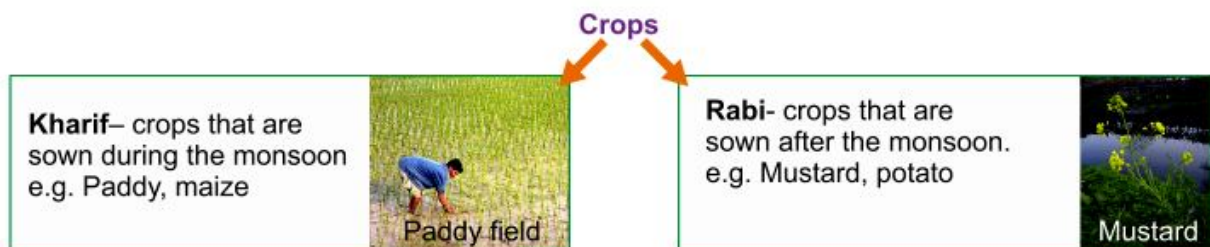
Oilseeds: soya bean, ground nut, sesame, castor, mustard, linseed and sun flower. Provide necessary fats.

Vegetables, spices and fruits provide vitamins and minerals.

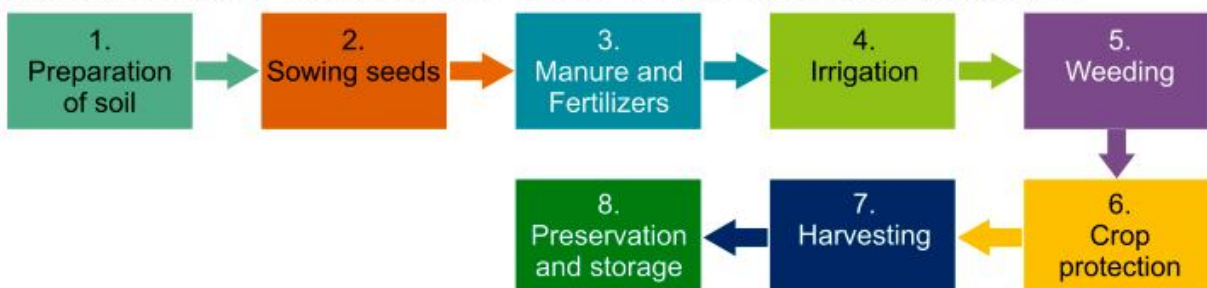
Crop means plants of same origin grown together in bulk. Every crop requires different climatic condition, while some crops grow together on one season. The climatic condition, warmth, photo-period for growth and completion is required for different crops.

Two seasonal change types :

- a) Kharif crops
- b) Rabi crops.



Agricultural Practices- Practices used to cultivate crops are called agricultural practices.



Main seasonal plants are divided into two broad categories. The crops that grow in monsoon period is called Kharif crops which is around June to October. The crops that are harvested in winter period are called Rabi crops which are around November to April.

## **RABI CROPS**

Rabi crops or Rabi harvests are the crops in agriculture that are sown in winter or cold season. They are harvested in the spring. Rabi is Arabic word which in actual means “spring”. Thus the word “Rabi” is used frequently in subcontinent. Rabi is grown around the month of November to April in our subcontinent. The water collected from the rain in this season is the main source of water in these plants. Rabi crops require greater amount of irrigation. Thus heavy raining may ruin a Kharif crop but it is healthy and beneficial for Rabi crops. These crops are then taken out at departure of the monsoon rains. The harvesting may begin by April or may. Major Rabi crops that are harvested in subcontinents are wheat, grams, peas, mustard, linseed and barley. Most of the crops are under Rabi season. It is an integral crop in our area.

## **KHARIF CROPS**

Kharif crop refers to the farming, plowing, reaping and harvesting of any household plant sown in the rainy season. It is derived from mochas words in subcontinent. In subcontinent they are popularly known as monsoon plants. They are cultivated for autumn harvest. By the beginning of first rain in July during south west rainy season in monsoon the crops are sown. Its begins at April 16 to October 15 in Pakistan, while in India Kharif season varies state to state in may and ending latest by January. Popularly in subcontinent it starts in June and ends by October. The Indian subcontinent is referred to areas covering India, Pakistan, Nepal and Srilanka. These crops are totally dependent on quantity of rain and water as well as its timings. Too much or too less will affect its growth and the whole effort can go wasted. The harvesting period coincides with the beginning of winter/ autumn in Indian subcontinent it is called Kharif period or Kharif crops. The major Kharif crops that are harvested in sub continent are paddy, soya-bean, maize, pigeon-pea, and cotton, green and black grams.

## **DIFFERENCE BETWEEN KHARIF AND RABI CROPS**

- Kharif crops sown between April and May while Rabi crops are sown between September and October.
- Kharif crops are harvested after monsoon rains while Rabi crops are produced after winter.
- Kharif crops are popularly known as monsoon crops while Rabi crops are called winter or spring crops.
- Kharif crops are completely relying over the rain like if less or more in quantity while Rabi can deal with whatever water is present for irrigation. Rain has less impact over Rabi crops.
- The major examples that can be counted as Kharif crops are sunflower, rice, sugar cane, soya bean and tea while Rabi crops can be wheat, barley, pea, gram and mustard.

## **INTEXT QUESTIONS PAGE NO. 204**

**Q1. What do we get from cereals, pulses, fruits and vegetables?**

**Answer:**

- (i) Cereals provide us with carbohydrates. Also, they are a rich source of energy.
- (ii) Pulses give us proteins.
- (iii) Fruits and vegetables are a rich source of vitamins and minerals. A small amount of proteins, carbohydrates, and fats are also present in them.

## **IMPROVING CROP YIELD**

The practices involved in farming are divided into three stages. They are

- (a) Choice of seeds for planting
- (b) Nurturing of the crop plants
- (c) Protection of the growing and harvested crops from loss.



Hence the major activities for improving crop yields can be classified as

- (i) Crop variety improvement
- (ii) Crop production improvement
- (iii) Crop protection improvement

## CROP VARIETY IMPROVEMENT

This approach depends on finding a crop that can give a good yield. Some of the factors for which variety improvement is done are:

- **Higher yield:** for increasing the productivity per acre.
- **Improved quality:** quality considerations vary from crop to crop as per the requirements.
- **Biotic and abiotic resistance:** crops should have sufficient resistance to biotic factors (diseases, insects and nematodes) and abiotic stresses (heat, cold, frost etc.)
- **Change in maturity duration:** the shorter the duration, the more economical is the variety.
- **Wider adaptability:** it can be grown in different climatic conditions.
- **Desirable agronomic characteristics:** tallness and profuse branching for fodder crops. Dwarfness is desired for cereals.

### Common factors for crop improvement

○ Higher Yield	To increase the productivity of the crop per acre.
○ Improved Quality	Quality of crop products vary from crop to crop. Baking quality in wheat, protein quality in pulses, oil quality in oil seeds, etc.
○ Biotic and abiotic resistance	Crop production is decreased due to biotic (diseases, insects, pests, etc.,) and abiotic factors (heat, cold, salinity and drought). Varieties resistant to these stresses can improve crop production.
○ Change in maturity pattern	Shorter maturity period; uniform maturity makes the harvesting process easy and reduces losses during harvesting.
○ Wider Adaptability	One variety can be grown under different climatic conditions in different areas. Developing varieties of wider adaptability helps in stabilizing crop production.
○ Desirable agronomic characters	Tallness and profuse branching are desirable characters for fodder crops. Dwarfness is desired in cereals. Developing varieties of desired agronomic characters give higher productivity.

This can be achieved by two methods; hybridisation and genetically modified crops.

### **1. Hybridisation**

In genetics, hybridisation is the process of combining different varieties or species of organisms which are genetically dissimilar to create a hybrid. It can be inter varietal, inter specific, intergeneric.

### **2. Genetically modified crops**

Here the crop is improved by introducing a gene that would provide desired characteristics.

## **INTEXT QUESTIONS PAGE NO. 205**

### **Q1. How do biotic and abiotic factors affect crop production?**

#### **Answer:**

A variety of biotic factors such as pests, nematodes, diseases, etc. can reduce the net crop production. A pest causes damage to agriculture by feeding on crops. For example, boll weevil is a pest on cotton. It attacks the cotton crop, thereby reducing its yield. Weeds also reduce crop productivity by competing with the main crop for nutrients, light, and space.

Similarly, abiotic factors such as salinity, temperature, etc. affect the net crop production. Some natural calamities such as droughts and floods are unpredictable. Their occurrence has a great impact on crops sometimes, destroying the entire crop.

### **Q2. What are the desirable agronomic characteristics for crop improvements?**

#### **Answer:**

The desirable agronomic characteristics for crop improvements are:

- (i) Tallness and profuse branching in any fodder crop.
- (ii) Dwarfness in cereals.

These desirable agronomic characteristics help in increasing crop productivity.

## **CROP PRODUCTION MANAGEMENT**

It involves different practices carried out by farmer to achieve higher standards of crop production. It includes the following:

1. NUTRIENT MANAGEMENT
2. IRRIGATION
3. CROPPING PATTERN

## **NUTRIENT MANAGEMENT**

The higher yields of crops mainly depend upon input applications like improved seeds, fertilizers and modern techniques of sowing and harvesting. Plants require a number of nutrients for their growth and development.

Plants get nutrients from air, water and soil. Nearly 16 elements are essential for plant growth and reproduction.

On the basis of the requirement by the plants, they are further classified into Macro Nutrients and Micro Nutrients.

## **MACRO NUTRIENTS**

Elements which are needed in large quantities for growth of the plants are called Macro Nutrients. They are Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorous, Sulphur, Potassium, Calcium, Magnesium and Iron.

## **MICRO NUTRIENTS**

Elements which are needed by the plants in very small quantities are called Micro Nutrients. They are Manganese, Copper, Molybdenum, Zinc, Boron and Chlorine.

Deficiency of these nutrients affects physiological processes in plants including reproduction, growth and susceptibility to diseases. To increase the yield, the soil can be enriched by supplying these nutrients in the form of manure and fertilizers.

## **INTEXT QUESTIONS PAGE NO. 206**

### **Q1. What are macro-nutrients and why are they called macronutrients?**

**Answer:**

Macro-nutrients are nutrients required in relatively large quantities for growth and development of plants. They are six in number. Since they are required in large quantities, they are known as macro-nutrient. The six macro-nutrients required by plants are nitrogen, phosphorus, potassium, calcium, magnesium, and sulphur.

### **Q2. How do plants get nutrients?**

**Answer:**

Plants require sixteen essential nutrients from nature for their growth and development. All these nutrients are obtained from air, water, and soil. Soil is the major source of nutrients. Thirteen of these nutrients are available from soil. The remaining three nutrients (carbon, oxygen, and hydrogen) are obtained from air and water.

## **MANURE**

Manure is an organic substance and is prepared by the decomposition of plant and animal wastes.

### **Advantages of Manure**

- Manure helps in enriching the soil with organic matter and nutrients.
- It helps in increasing the soil fertility.
- Water holding capacity of soil is increased.
- Helps in improving soil texture.
- Save our environment from excessive use of fertilizers.

**Manure** is classified into **two types** according to the biological material used:

### **COMPOST AND VERMI-COMPOST**

**Composting:** It is the process in which farm waste material (cow dung, domestic waste, sewage waste etc) is decomposed in pits. Compost is the aerobically decomposed remnants of organic matter which is rich in nutrients.

**Vermicomposting:** It is the process which involves use of earthworms to hasten the process of decomposition of plant and animal refuse.

### **GREEN MANURE**

Leguminous plants like Sunn-hemp or Cluster Bean are grown and then mulched by ploughing them back into the soil. This helps in enriching the soil with Nitrogen and Phosphorus.

## **FERTILIZERS**

Fertilizers are chemicals commercially produced in factories and used as plant nutrients. They supply Nitrogen, Phosphorus, Potassium, etc., They are used to ensure good vegetative growth giving rise to healthy plants.

**Advantage:** They help in good vegetative growth and produce healthy plants.

**Disadvantage :**

- Excessive use of fertilizer leads to pollution of water.
- Continuous use of fertilizer lead to decrease in soil fertility because organic matter of the soil cannot be replenished as microorganisms present in soil get harmed due to fertilizer.

Application of fertilizers results in higher yield of crops. At the same time, it increases the cost of farming. As the fertilizers are water soluble chemicals, large part of the fertilizers applied is washed away due to excessive irrigation. They are not fully absorbed by the plants.

This excess fertilizer is washed away into the ponds, lakes, canals and rivers, resulting in the growth of unwanted plants like Water Hyacinth, algae, etc. These plants disturb the water bodies and the flow of water. As a result, fishes and other living organisms do not get sufficient sunlight and oxygen and die.

### DIFFERENCES BETWEEN MANURES AND FERTILIZERS

Manures	Fertilizers
1. Manure is a natural substance obtained by the decomposition of cattle dung, human waste and plant waste.	1. Fertilizer is a mineral or chemical compound containing nutrients like Sulphur, Phosphorous, Nitrogen, etc.
2. Manures are organic substances.	2. Fertilizers are inorganic compounds.
3. Manures can be prepared in fields.	3. Fertilizers are manufactured in factories.
4. Manures contain all nutrients but in small quantities.	4. They contain higher quantities of one or more specific nutrients.
5. Manures add plenty of humus to soil and improve the texture of the soil.	5. Fertilizers do not result in the addition of humus to the soil.
6. Manures are not easily absorbed because they are less soluble in nature.	6. Fertilizers are soluble in water and it is easily absorbed.
7. Manures are less soluble; they are not easily washed away from the soil and hence their effect is long lasting.	7. Fertilizers are easily washed away by water and hence their effect is of shorter duration and require repeated application.

☞ Fertilizers which are derived from living organisms are called Bio-fertilizers. The main source of bio-fertilizers are bacteria, cyanobacteria and fungi. Bio-fertilizers are renewable and nonpolluting sources of plant nutrients. They also improve the soil condition. Rhizobium and Cyanobacteria such as Anabaena and Nostoc are some common bio-fertilizers.

### INTEXT QUESTIONS PAGE NO. 207

**Q1. Compare the use of manure and fertilizers in maintaining soil fertility.**

**Answer:**

Manures increase soil fertility by enriching the soil with organic matter and nutrients as it is prepared by the decomposition of animal excreta and plant wastes. On the other hand, fertilizers are mostly inorganic compounds whose excessive use is harmful to the symbiotic

micro-organisms living in soil. Their excessive use also reduces soil fertility. Hence, fertilizers are considered good for only short term use.

## **ORGANIC FARMING**

It's a farming system in which use of chemicals such as fertilizers, herbicides, pesticides etc are reduced. It involves the use of following components:

- a) Organic manure
- b) Recycled farm waste
- c) Bio-agents such as culture of blue green algae in preparation of bio fertilizers
- d) Bio pesticides such as leaves of neem or turmeric for grain storage
- e) Healthy cropping patterns such as mixed cropping, intercropping and crop rotation which will also help in controlling growth of weed, pest and insects.

## **IRRIGATION**

Irrigation is necessary for crops to get water during their growing season.

*Source of irrigation:*

- **Wells:** There are two types of wells, namely dug wells and tube wells. In a dug well, water is collected from water bearing strata. Tube wells can tap water from the deeper strata. From these wells, water is lifted by pumps for irrigation.
- **Canals:** This is usually an elaborate and extensive irrigation system. In this system canals receive water from one or more reservoirs or from rivers. The main canal is divided into branch canals having further distributaries to irrigate fields.
- **River Lift Systems:** In areas where canal flow is insufficient or irregular due to inadequate reservoir release, the lift system is more rational. Water is directly drawn from the rivers for supplementing irrigation in areas close to rivers.
- **Tanks:** These are small storage reservoirs, which intercept and store the run-off of smaller catchment areas.
- **Rain water harvesting**
- **Watershed management:** building of small check dams which helps in increasing ground water level and helps in reducing soil erosion.

## **CROPPING PATTERNS**

Different ways of growing crops can be used to give maximum benefit.

### **MIXED CROPPING**

It is growing of two or more crops simultaneously on the same piece of land. It is also known as multiple cropping. This type of cropping leads to an improvement in the fertility of the soil and hence increase in crop yield because when the two crops are properly chosen, the products and refuse from one crop help in the growth of the other crop plant and vice-versa. Mixed cropping is an insurance against crop failure due to abnormal weather and plant pests.

Soyabean + pigeon pea, Maize + urad dal (black gram), Groundnut + sunflower, Wheat + Chick Pea.

**Advantages of Mixed cropping:**

- No risk of crop failure,
- Increase in yield,
- Improvement in soil fertility
- Minimizing Pest Damage.

## Cropping patterns - Allows soil to retain nutrients

**1. Mixed cropping** – practice of growing two or more crops simultaneously in the same field.  
Soyabean + Pigeon pea  
Cotton + Mung bean

**2. Crop rotation** is the practice of growing a series of dissimilar/different types of crops in the same area in sequential seasons



**3. Intercropping** – practice of growing two or more crops simultaneously in the same field in rows with definite row patterns such as 1:1, 1:2 or 1:3



### Advantages:

1. Improves soil structure and fertility.
2. Increases productivity per unit area.
3. Mitigates the build-up of pathogens and pest.

### INTER CROPPING

Intercropping is the agricultural practice of cultivating two or more crops in the same space at the same time in a definite pattern. Row- type intercropping involves the component crops arranged in alternate rows. This may also be called **alley cropping**. A variation of row cropping is strip cropping, where multiple rows (or a strip) of one crop are alternated with multiple rows of another crop. Intercropping also uses the practice of sowing a fast growing crop with a slow growing crop, so that the fast growing crop is harvested before the slow growing crop starts to mature.

### DIFFERENCE BETWEEN INTER CROPPING AND MIXED-CROPPING

Sr. No	Inter Cropping	Mixed Cropping
1	The main object is to utilize the space left between two rows of main crop	To get at least one crop under favorable conditions
2	More emphasis is given to the main crop	All crops are cared equally
3	There is no competition between both crops	There is competition between all crops growing
4	Inter crops are of short duration & are harvested much earlier than main	The crops are almost of the same duration
5	Sowing time may be same or different	It is same for all crops
6	Crops are sown in different rows without affecting the population of main crop when sown as sole crop	Either sown in rows or mixed without considering the population of either hope so this help uh thumbs up plz..

### SELECTION OF CROPS FOR MIXED CROPPING AND INTERCROPPING:

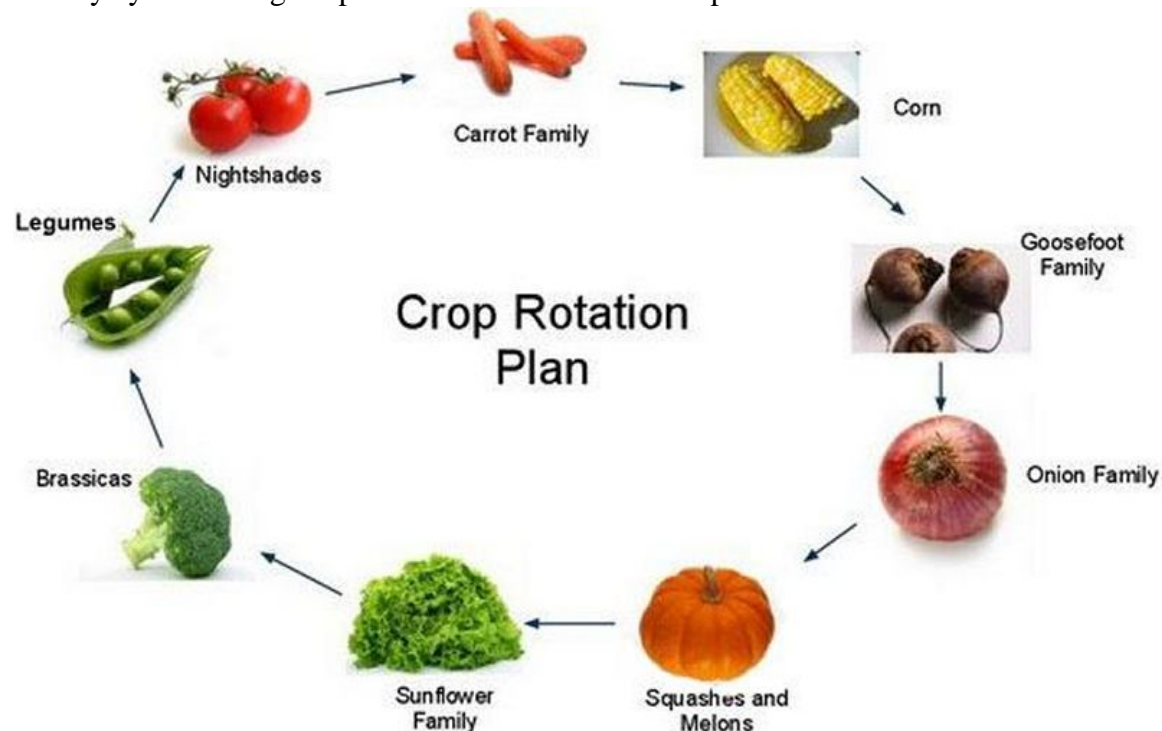
Crops are chosen whose nutrient requirements are different so that maximum utilisation of the soil nutrients takes place. Also, their water needs, rooting patterns etc are different. Besides the advantages mentioned for mixed cropping,

### **Intercropping has the following additional advantages:**

- Application of pesticides and fertilizers is more convenient due to well defined patterns of crops.
- Harvesting of crops is also easier.

### **CROP ROTATION**

It is the practice of growing a series of dissimilar types of crops in the same area in sequential seasons for various benefits such as to avoid the buildup of pathogens and pests that often occurs when one species is continuously cropped. Crop rotation also seeks to balance the fertility demands of various crops to avoid excessive depletion of soil nutrients. A traditional component of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops. Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.



### **Advantages:**

Crop rotation avoids a decrease in soil fertility, as growing the same crop repeatedly in the same place eventually depletes the soil of various nutrients. A crop that leaches the soil of one kind of nutrient is followed during the next growing season by a dissimilar crop that returns that nutrient to the soil or draws a different ratio of nutrients, for example, rice followed by cottons. By crop rotation farmers can keep their fields under continuous production, without the need to let them lay fallow, and reducing the need for artificial fertilizers, both of which can be expensive. Rotating crops adds nutrients to the soil.

### **CROP PROTECTION MANAGEMENT**

Field crops are infested by a large number of weeds, insect pests and diseases. If weeds and pests are not controlled at the appropriate time then they can damage the crops so much that most of the crop is lost. When the crop is in the field, it needs protection against:

- **Weeds** e.g.– Xanthium, Parthenium (weeds are considered to be harmful as they compete for food, space and light with the desired crop. They reduce crop production taking up the nutrients meant for the crops.

- **Insect Pests** - Insect pests attack the plants in three ways: (i) they cut the root, stem and leaf, (ii) they suck the cell sap from various parts of the plant, and (iii) they bore into stem and fruits. They thus affect the health of the crop and reduce yields.
- **Pathogens**- Microbes like bacteria, fungi and viruses cause diseases. Spores of these pathogens may be transmitted through soil, water and air.

**To control these :**

Herbicides, Pesticides, fungicides should be used.

**Weed control methods** also include mechanical removal. Preventive methods such as proper seed bed preparation, timely sowing of crops, intercropping and crop rotation also help in weed control. Some other preventive measures against pests are the use of resistant varieties, and summer ploughing, in which fields are ploughed deep in summers to destroy weeds and pests.

**Prevention for preventing the growth of weeds,**

- Proper seed bed preparation,
- timely growing of crops,
- intercropping , crop rotation,
- use of resistant varieties and
- summer ploughing is done.

**INTEXT QUESTIONS PAGE NO. 208**

**Q1. Which of the following conditions will give the most benefits? Why?**

- (a) Farmers use high-quality seeds, do not adopt irrigation or use fertilizers.
- (b) Farmers use ordinary seeds, adopt irrigation and use fertilizer.
- (c) Farmers use quality seeds, adopt irrigation, use fertilizer and use crop protection measures.

**Answer:**

(c) Farmers using good quality seeds, adopting irrigation, using fertilizers, and using crop protection measures will derive most benefits.

(i) The use of good quality seeds increases the total crop production. If a farmer is using good quality seeds, then a majority of the seeds will germinate properly, and will grow into a healthy plant.

(ii) Proper irrigation methods improve the water availability to crops.

(iii) Fertilizers ensure healthy growth and development in plants by providing the essential nutrients such as nitrogen, phosphorus, potassium, etc.

(iv) Crop protection measures include various methods to control weeds, pests, and infectious agents. If all these necessary measures are taken by a farmer, then the overall production of crops will increase.

**STORAGE OF GRAINS**

Factors responsible for such losses are biotic— insects, rodents, fungi, mites and bacteria, and abiotic— inappropriate moisture and temperatures in the place of storage.

**Negative Effects of these factors on grains:**

- Degradation in quality,
- loss in weight,
- poor germinability,
- discoloration of produce-
- Leads to poor marketability



## **PREVENTION AND CONTROL METHODS USED BEFORE GRAINS ARE STORED:**

- ☞ Cleaning of produce before storage
- ☞ Drying of produce first in sunlight and then in shade to reduce moisture content
- ☞ Fumigation using chemicals (fumigants) to kill pests

## **INTEXT QUESTIONS PAGE NO. 209**

**Q1. Why should preventive measures and biological control methods be preferred for protecting crops?**

**Answer:**

Preventive measures and biological control methods should be preferred for protecting crops because excessive use of chemicals leads to environmental problems. These chemicals are also poisonous for plants and animals. Preventive measures include proper soil and seed preparation, timely sowing of seeds, intercropping and mixed cropping, usage of resistant varieties of crops, etc. On the other hand, biological control methods include the usage of bio-pesticides that are less toxic for the environment. An example of bio-pesticides is *Bacillus thuringiensis*, which is an insect pathogen that kills a wide range of insect larvae. Therefore, both preventive measures and biological control methods are considered eco- friendly methods of crop protection.

**Q2. What factors may be responsible for losses of grains during storage?**

**Answer:**

During the storage of grains, various biotic factors such as insects, rodents, mites, fungi, bacteria, etc. and various abiotic factors such as inappropriate moisture, temperature, lack of sunlight, flood, etc. are responsible for losses of grains. These factors act on stored grains and result in degradation, poor germinability, discolouration, etc.

## **ANIMAL HUSBANDRY**

**The branch of agriculture which deals with the feeding, shelter, health and breeding of domestic animals such as cattle, pigs, horses and fowls is called animal husbandry.**

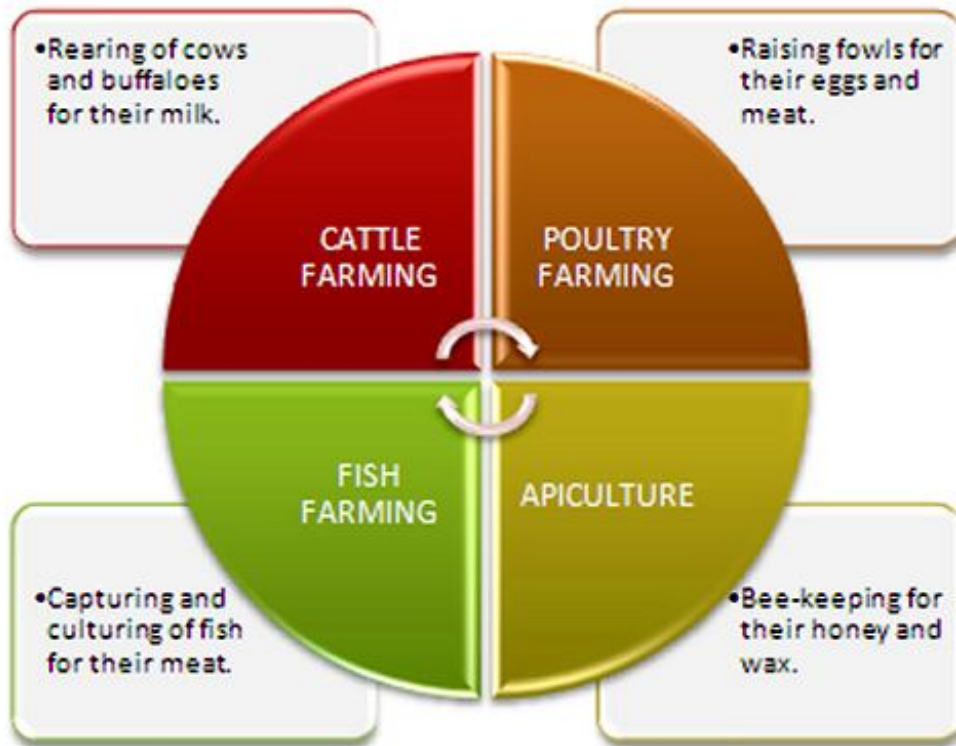
The various elements of animal husbandry are :

1. Proper feeding of animals.
2. Provision for clean drinking water for animals.
3. Proper shelter for animals.
4. Prevention and cure of animal diseases.
5. Proper breeding of animals.

## **ADVANTAGES OF ANIMAL HUSBANDRY**

As animal husbandry is scientific management of farm animals, it serves many uses for human beings.

- It helps in enhancing milk production
- It increases egg production
- It increases meat production
- It increases fish production
- It helps in proper management of agricultural wastes.



The rearing of animals on large scale is called **animal husbandry**. **Food, shelter and health** are the most important aspect of animal husbandry.

Meat, egg, milk, honey, silk, lac, wool and leather are the products that we get from animals.

Useful animals can be divided into the following categories based on the products they give us.

**Milk yielding animals** - dairy animals - cows, buffalo and goat

**Meat and egg yielding animals** - sheep, pig, fish, poultry and duck

**Draught animals** - mule, donkey, horse, bullock

**Wool and skin yielding animals** - sheep, goat, cow, buffalo and camel

**Animals yielding other products** - honey from bees, silk from silk moth and pearls from oyster

## **CATTLE FARMING**

A cattle farming is the practice of rearing cattle by providing facilities for raising livestock.

Livestock includes domestication of cows, buffaloes, sheep, goats, pigs etc. A cattle farming is carried out to raise cows and buffaloes as important livestock. The two major species of Indian cattle are *Bos indicus*, or cows, and *Bos bubalis*, or buffaloes.

### **MILCH ANIMALS AND DROUGHT ANIMALS**

On basis of their utility, cattle are classified into two types namely milch animals and draught animals.

- Milch animals or dairy animals produce milk. Males of this type are not useful for working on farm.
- Draught animals are used for carrying out agricultural work like tilling, irrigation and carting. Cows belonging to this category are poor milk-yielding varieties.

**Dairy Farming:** On the other hand, near the first and last quarters of the moon, when the pulls of the sun and the moon act at right angles to each other, high tides are exceptionally low, and are called **neap tides**.

**High milk yielding breeds.**



**Common diseases in cattle:**

- Anthrax
- Food and mouth disease
- Worms

## **MANAGEMENT PRACTICES FOR CATTLE FARMING**

Management practices for cattle include cleaning, sheltering and feeding.

- a) Cleaning involves periodic washing to get rid of dirt and loose hair.
- b) Shelter facilities include well ventilated roof sheds which protect cattle from rain, cold and sun.
- c) Feeding of cattle includes supply of uncontaminated and balanced diet. Animal feed are of two types namely roughage feed and concentrate feed.
  - Roughage feed contains high fibre content and provides energy. It comprises fodder grasses, silage and legumes rich in fibre.
  - Concentrate feed is a mixture of cereals, seeds and oilseed cake rich in protein content. This type of feed is easily digestible and it helps the animal in increasing body weight.
- d) Cattle should be protected from diseases. Diseases in cattle are caused by both external and internal parasites. External parasites live on the skin and cause skin diseases. Internal parasites affect the stomach and intestinal parts. Certain preventive measures of diseases in animals are listed.
  - Proper disposal of dead animals and animal wastes.
  - Shelters should be clean, dry and well ventilated.
  - Periodic visit of veterinary physician to check the animals.
  - Hygienic management of animals and animal products.
- e) Infectious diseases are caused by pathogens like bacteria, viruses and fungi. Sheds should be cleaned and disinfected regularly. Vaccination against various diseases should be provided to farm animals. Vaccination should be given against various diseases.
- f) Milk production centres should be maintained for the animals which give birth to young ones. Milk production depends on duration of lactation period. Lactation period is the

period following the birth of a calf during which milk is produced by the animal. Lactation period can be enhanced by administering certain hormonal injections.

- g) Cross-breeding is done between foreign and local breeds of animals to facilitate the growth of animals with desired qualities. e.g. Foreign breed like Jersey cow, with long lactation period, is crossed with local breed like Red Sindhi cow, with high resistance to disease, to obtain offspring of desired qualities like long lactation period and high resistance to diseases.

### **ADVANTAGES OF CROSS-BREEDING**

Cross-breeding helps in the development of certain desired characteristics in animals.

- To increase milk production
- To increase resistance against diseases.
- To enhance the varieties with longer lactation period.
- To rely on less amount of quality feed.

### **INTEXT QUESTIONS PAGE NO. 210**

**Q1. Which method is commonly used for improving cattle breeds and why?**

**Answer:**

Cattle farming is commonly used for improving cattle breeds. The purpose of cattle farming is to increase the production of milk and draught labour for agricultural work. Dairy animals (females) are used for obtaining milk and draught animals (males) are engaged in agricultural fields for labour work such as carting, irrigation, tilling, etc. Cross breeding between two good varieties of cattle will produce a new improved variety. For example, the cross between foreign breeds such as Jersey Brown, Swiss (having long lactation periods) and Indian breeds such as Red Sindhi, Sahiwal (having excellent resistance power against diseases) produces a new variety having qualities of both breeds.

### **POULTRY FARMING**

Poultry farming is the practice of raising fowl for egg production and chicken meat. Fowls are used for producing eggs and broilers are used for producing meat.

Cross –breeding is common in poultry to develop new varieties with the desirable traits. e.g Indian breed Aseel is cross-bred with the foreign breed Leghorn.

Cross-breeding is used to develop offspring with desirable traits. The desirable traits includes:

- number and quality of chicks;
- dwarf broiler parent for commercial chick production;
- summer adaptation capacity/ tolerance to high temperature;
- low maintenance requirements;
- reduction in the size of the egg-laying bird with ability to utilise more fibrous cheaper diets formulated using agricultural by-products.

**Management practices for poultry farming are elucidated.**

- Maintaining optimum temperature
- Providing hygienic housing conditions
- Providing a protein-rich diet with high levels of vitamin A and K, and
- Preventing and controlling pests and diseases.

**Poultry farming** is the practice of raising birds like chickens, turkeys, ducks and geese for meat or eggs for food. They are kept in shelters called poultry farms.



Hen varieties such as **Rhode Island Red**, **Black Minorca** and **HH260** have been developed for **eggs**.



Rhode Island Red



Minorca

**Brahma** and **Cochin** are bred for their **meat**. **Plymouth Rock** is ideal for egg production and meat.



Brahma White



Cochin Chicken

## **INTEXT QUESTIONS PAGE NO. 211**

**Q1. Discuss the implications of the following statement:**

**“It is interesting to note that poultry is India’s most efficient converter of low fibre food stuff (which is unfit for human consumption) into highly nutritious animal protein food.”**

**Answer:**

Poultry in India is the most efficient converter of low fibre food stuff into highly nutritious animal protein food. In poultry farming, domestic fowls are raised to produce eggs and chicken. For this, the fowls are given animal feeds in the form of roughage, which mainly consists of fibres. Thus, by feeding animals a fibre rich diet, the poultry gives highly nutritious food in the form of eggs and chicken.

**Q1. What management practices are common in dairy and poultry farming?**

**Answer:**

Common management practices in dairy and poultry farming are:

- (i) Proper shelter facilities and their regular cleaning.
- (ii) Some basic hygienic conditions such as clean water, nutritious food, etc.
- (iii) Animals are kept in spacious, airy, and ventilated place.
- (iv) Prevention and cure of diseases at the right time is ensured.

**Q2. What are the differences between broilers and layers and in their management?**

**Answer:**

Layers are meant for egg production, whereas broilers are meant for poultry meat. Nutritional, environmental, and housing conditions required by broilers are different from those required by egg layers. A broiler chicken, for their proper growth, requires vitamin rich supplements especially vitamin A and K. Also, their diet includes protein rich food and enough fat. They also require extra care and maintenance to increase their survival rate in comparison to egg layers.

## **FISH FARMING**

Fish farming is also called as aquaculture. This is culturing of fish for commercial purposes. Fish is a cheap source of animal protein.

## **TYPES OF FISHERY**

### **a) Fin fishery and Shell fishery**

Fish production involves fin fishery and shell fishery. Two main species of finned true fish are Catla and Rohu, and that of shellfish such as prawns and molluscs.

### **b) Capture fishery and culture fishery**

Fish are obtained by capture fishing as an economic source for their meat.

- Capture fishing involves capturing of fish from sea water or fresh water. Culture fishing involves culturing the fish in small enclosures.
- Capture fishing is classified into marine fishery and inland fishery depending upon the resources used for fishing.

Culture fishery involves rearing of fish in small structures like wells.

- Fish farming can be done in the rice field where both grains and fish can be harvested from the farm.
- As feeding habits of fish differ from species to species, many varieties can be reared on the same farm. Composite fish farming is rearing of different varieties of fish in the same area. e.g. Composite fish farming includes Catla, the surface feeders, Rohu, feed in the middle zone of a pond, Mrigal and common carp, the bottom feeders, and grass carp, feeding on weeds. These species can co-exist in a single pond, and thus, increase the yield of fish from the pond.

### **c) Marine fishery and Inland fishery**

- Mariculture is the culture of fish in marine water.
- Marine fishery involves fishing in salt water regions.
- Some examples of marine fish are Pomphret, Tuna and Mackerel.
- Fish are captured by locating large schools of fish, in the open sea, with the help of satellites and echo-sounders.
- Marine fish of high economic value are farmed in seawater. Shellfish, such as prawns, mussels and oysters are also farmed in seawater. Oysters are cultivated for their pearls.

### **Distinguishing features between Capture fishery, Mariculture and Aquaculture**

<b>CAPTURE FISHERY</b>	<b>MARICULTURE</b>	<b><u>AQUACULTURE</u></b>
Fishes are caught from natural water resources.	Involves culturing and harvesting of fin fishes and shell fishes.	Involves culturing and harvesting of fish, prawns, crabs etc.
No seeding and rearing are required.	Fish seeds are introduced and fish are reared.	Fish and other organisms are seeded and reared.
This type of fishing is done both in marine and inland waters.	Fishing is done only in sea water.	Fishing is done both in fresh water and marine waters.

Inland fisheries involve fresh water canals, ponds, reservoirs, rivers from which fish are captured.

Estuaries are the regions where fresh water mixes with sea water. These are rich sources of fish.

Fish farming encounters the problem of lack of quality seed or eggs. Fish are bred in ponds by hormonal stimulation. Fish are injected with hormones that stimulate the production of eggs or seed. This ensures the supply of pure fish seed in desired quantities.

## **APICULTURE**

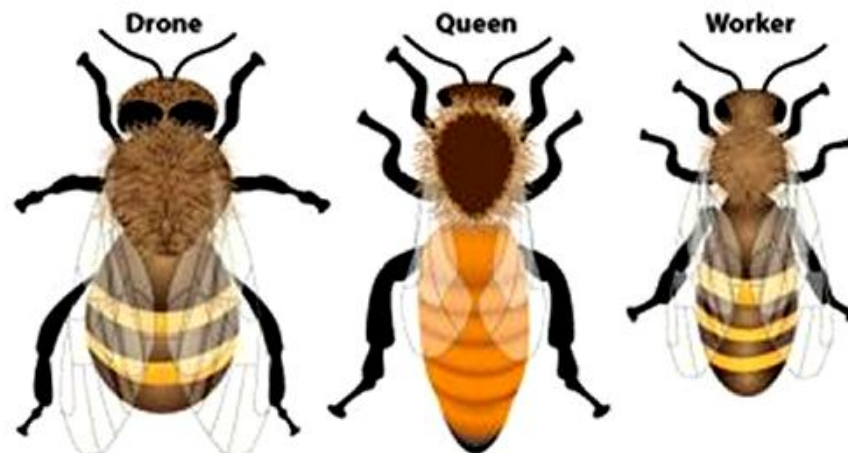
The scientific method of rearing honeybees for honey and wax is called 'Apiculture' or 'Bee keeping'. Beehives are enclosed structures in which honey bees live and raise their young.

- The practice of maintaining honey bee colonies in beehives is called bee-keeping or apiculture. Apiaries or bee farms are established for commercial production of honey.
- Bee-keeping is a cheap and popular agricultural enterprise.
- Honey produced in bee-hives is the source of honey used in food and medicines. Taste and the quality of the honey depend upon the flowers the bees visit for nectar collection.
- Wax obtained from these hives is used in ointments, polishes etc.

## **TYPES OF BEES**

There are three types of bees in a colony.

- a) **Queen** – The only fertile female in the hive and it's function is to lay eggs.
- b) **Drones** – These are fertile male bees and it's function is to mate with queen bee and fertilize the eggs.
- c) **Workers** – These are sterile females. They take care of the queen and young bees, collect nectar build honey combs and protect the bee hive.



## **HONEYBEE VARIETIES**

### **a) Indigenous varieties**

- i. Apis Indica – Common Indian honey bee.
- ii. Apis dorsata – Rock bee
- iii. Apis florea – Little bee.

### **b) Exotic varieties**

- i. Apis mellifera (Italian bee)
- ii. Apis adamsoni (South African bee)

## **ECONOMIC IMPORTANCE OF HONEY BEES**

Honey bees are used in the production of honey and bee wax.

## **USES OF HONEY**

1. Honey is an energy rich food. For eg. 1 Kg of honey contains 3200 calories of energy.
2. Honey contains sugars, minerals, vitamins, enzymes and pollen.
3. Honey is an antiseptic and contains formic acid as the preservative.
4. Honey is a blood purifier, a cure against cough, cold, sore throat, ulcers of tongue, stomach and intestine.
5. Honey is helpful in building up the haemoglobin content of the blood.
6. Honey is used in the preparation of bread, cakes and biscuits.

## **BEE WAX**

It is utilized in the manufacture of cosmetics, lubricants, cold creams, shaving creams, polishes, candles, ointments and in medical preparations.

## **INTEXT QUESTIONS PAGE NO. 213**

### **Q1. How are fish obtained?**

#### **Answer:**

Fish can be obtained by two ways:

- (i) Capture fishing: It is the process of obtaining fish from natural resources.
- (ii) Culture fishery: It is the practice of farming fishes. Farming can be done in both freshwater ecosystem (which includes river water, pond water) and marine ecosystem.

### **Q2. What are the advantages of composite fish culture?**

#### **Answer:**

An advantage of composite fish culture is that it increases the yield of fish. In a composite fish culture, five or six different species are grown together in a single fish pond. Fishes with different food habits are chosen so that they do not compete for food among themselves. Also, this ensures a complete utilization of food resources in the pond. As a result, the survival rate of fish increases and their yield also increases.

### **Q1. What are the desirable characters of bee varieties suitable for honey production?**

#### **Answer:**

Bee varieties having the following desirable characters are suitable for honey production:

- (i) They should yield high quantity of honey.
- (ii) They should not sting much.
- (iii) They should stay in the beehive for long durations.
- (iv) They should breed very well.

### **Q2. What is pasturage and how is it related to honey production?**

#### **Answer:**

Pasturage is the availability of flowers from which bees collect nectar and pollen. It is related to the production of honey as it determines the taste and quantity of honey.

## **EXERCISE QUESTIONS PAGE NO. 12**

### **Q1. Explain any one method of crop production which ensures high yield.**

#### **Answer:**

Crop rotation is one of the methods of crop production that ensures high yield. It is the method of growing two or more varieties of crops on the same land in sequential seasons. A crop utilises some particular nutrients in larger quantities from the soil. Then, if the same crop is grown in subsequent seasons those nutrients will get depleted in the soil. Therefore, crops having different nutrient requirements are rotated. For example, legumes which have nitrogen-fixing bacteria in their root nodules supply the soil with nitrogen. Therefore, these legumes are



rotated with nitrogen requiring cereals such as wheat and maize. This method reduces the need of fertilizers, thereby increasing the overall yield of crops.

## **Q2. Why are manure and fertilizers used in fields?**

### **Answer:**

Manures and fertilizers are used in fields to enrich the soil with the required nutrients. Manure helps in enriching the soil with organic matter and nutrients. This improves the fertility and structure of the soil. On the other hand, fertilizers ensure a healthy growth and development in plants. They are a good source of nitrogen, phosphorus, and potassium. To get an optimum yield, it is instructed to use a balanced combination of manures and fertilizers in the soil.

## **Q3. What are the advantages of inter-cropping and crop rotation?**

### **Answer:**

Inter-cropping and crop rotation both play an important role in increasing the yield of crops. Inter-cropping helps in preventing pests and diseases to spread throughout the field. It also increases soil fertility, whereas crop rotation prevents soil depletion, increases soil fertility, and reduces soil erosion. Both these methods reduce the need for fertilizers. It also helps in controlling weeds and controls the growth of pathogens and pests in crops.

## **Q4. What is genetic manipulation? How is it useful in agricultural practices?**

### **Answer:**

Genetic manipulation is a process where the gene for a particular character is introduced inside the chromosome of a cell. When the gene for a particular character is introduced in a plant cell, a transgenic plant is produced. These transgenic plants exhibit characters governed by the newly introduced gene.

For example, let us assume there is a wild plant that produces small fruits. If the gene responsible for a larger fruit size is introduced in this plant, this plant becomes transgenic, and starts producing larger fruits. Similarly, genes for higher yield, disease resistance, etc. can be introduced in any desired plant.

Therefore, gene manipulation plays an important role in agricultural practices. It helps in improving crop variety. It ensures food security and insect resistant crops. It also improves the quality and yield of crops.

## **Q5. How do storage grain losses occur?**

### **Answer:**

There are various biotic and abiotic factors that act on stored grains and result in degradation, poor germinability, discolouration, etc. Biotic factors include insects or pests that cause direct damage by feeding on seeds. They also deteriorate and contaminate the grain, making it unfit for further consumption. Abiotic factors such as temperature, light, moisture, etc., also affect the seed. They decrease the germinating ability of the seeds and make them unfit for future use by farmers. Unpredictable occurrence of natural calamities such as droughts and floods also causes destruction of crops.

## **Q6. How do good animal husbandry practices benefit farmers?**

### **Answer:**

Cattle farming is one of the methods of animal husbandry that is most beneficial for farmers. Using this method, better breeds of draught animals can be produced. Such draught animals are engaged in agricultural fields for labour work such as carting, irrigation, tilling, etc.

**Q7. What are the benefits of cattle farming?**

**Answer:**

Benefits of cattle farming:

- (i) Good quality and quantity of milk can be produced.
- (ii) Draught labour animals can be produced for agricultural work.
- (iii) New variety that are resistant to diseases can be produced by crossing two varieties with the desired traits.

**Q8. For increasing production, what is common in poultry, fisheries and bee-keeping?**

**Answer:**

The common factor for increasing production in poultry, fisheries, and bee keeping is the proper management techniques that are to be followed. Regular cleaning of farms is of utmost importance. Maintenance of temperature and prevention and cure of diseases is also required to increase the number of animals.

**Q9. How do you differentiate between capture fishing, mariculture and aquaculture?**

**Answer:**

**Capture fishing:** It is the method of obtaining fishes from natural resources.

**Mariculture:** It is the culture of marine fishes for commercial use.

**Aquaculture:** It involves the production of aquatic animals that are of high economic value such as prawns, lobsters, fishes, crabs, etc.



**ASSIGNMENT QUESTIONS SET – 1**  
**CHAPTER – 15**  
**IMPROVEMENT IN FOOD RESOURCES**

**Fill In the Blanks**

1. \_\_\_\_\_ and \_\_\_\_\_ are the main sources of nutrient supply to crops.
2. \_\_\_\_\_ and \_\_\_\_\_ provide us with all our animal and plant food.
3. The science of growing vegetables, fruits and ornamental plants is called \_\_\_\_\_.
4. Composting done using earthworms is called \_\_\_\_\_.
5. Cereals provide us \_\_\_\_\_ (carbohydrates/proteins/fats).
6. Pulses give us \_\_\_\_\_ (carbohydrates/proteins/fats).
7. \_\_\_\_\_ and \_\_\_\_\_ are a rich source of vitamins and minerals.
8. Pests, nematodes etc. are \_\_\_\_\_ (biotic/abiotic) factors that affect crop production.
9. In order to get maximum returns, different crop combinations are grown on the same field in a pre-planned succession. This process is called \_\_\_\_\_.
10. *Apis dorsata* and *Apis florea* are varieties of \_\_\_\_\_ (Indian/Italian) bee.
11. *Apis mellifera* is an \_\_\_\_\_ (India/Italian) variety of honey bee used for commercial production of honey.
12. Crossing between genetically dissimilar plants is called \_\_\_\_\_.
13. Nutrients required by plants in large quantities are called \_\_\_\_\_.
14. Organic substances of animal or plant origin that is added to the soil to increase its fertility and structure are called \_\_\_\_\_.
15. The practice of growing two or more crops simultaneously on the same field is called \_\_\_\_\_.
16. Unwanted plants in the cultivated field are called \_\_\_\_\_.
17. Cattle used for farm labour is called \_\_\_\_\_.
18. Vitamin \_\_\_\_\_ and \_\_\_\_\_ (A, B, C, D, K) levels are kept high in the poultry feeds.
19. *Bos indicus* are the species of \_\_\_\_\_.
20. Pomphret, mackerel, tuna, sardines, and Bombay duck are examples of \_\_\_\_\_ (marine/river) fish.
21. Marine fish capture is done by fishing nets guided by \_\_\_\_\_ and \_\_\_\_\_.
22. Micro-nutrients or Food additives strengthen \_\_\_\_\_ system of the cattle and improve their \_\_\_\_\_ and stimulate digestion.

23. The basic advantages of inter-cropping are that it maintains soil \_\_\_\_\_ and controls \_\_\_\_\_.
  24. Red Sindhi and Sahiwal are breeds of \_\_\_\_\_.
  25. Xanthium, Cyperinus rotundus and Parthenium plants generally grow along paddy plants. Such plants are called \_\_\_\_\_.
  26. What is domestication?
  27. What are the major sources of food? Name the commercial practices we perform to obtain the food.
  28. Name the revolution which led to better and efficient production and availability of milk.
  29. Define animal husbandry.
  30. Name the programmes executed in India to increase food production.
  31. What are the various crops seasons in India?
  32. Name the approaches used to enhance crop yield.
  33. What are milch animals?
  34. What are draught animals?
  35. What is broiler?
  36. Give examples of cereals that give us carbohydrates.
  37. Name some pulses that give us proteins.
  38. Give examples of oilseeds that provide us fats.
  39. Give examples of fodder crops.
  40. Name the biotic factors that affect on crop production.
  41. Name the nutrients that plants take from air?
  42. From where do plants acquire the following nutrients?
    - (i) Nitrogen
    - (ii) Hydrogen
  43. List the nutrients that plants absorb from soil.
  44. What are manures?
  45. What is the full form of IARI?
  46. What are the desirable agronomic characteristics for crop improvement?
  47. What are Macro-nutrients?
  48. List examples of Macro-nutrients for plants?
  49. List the seven micro-nutrients taken by plants?
  50. Based on kinds of biological material used, how many types of manures are there?
  51. What are fertilizers? Give two examples.
  52. Out of manures and fertilizers, which one is nutrient specific?
-

53. What is the most common source of irrigation in India?
54. Give examples of commonly used irrigation systems in our country?
55. What is vermicompost?
56. Manures are useful for short term benefits or long-term benefits?
57. Fertilizers are useful for short term benefits or long-term benefits?
58. What is organic farming?
59. What is the full form of NPK?
60. What is lodging?
61. What is mixed cropping?
62. Give examples of mixed cropping?
63. Define inter-cropping.
64. Give examples of inter-cropping.
65. Name the two common weeds of wheat and rice crop.
66. What are weeds?
67. Give examples of Pesticides
68. Give examples of fumigants.
69. Give examples of two major weeds that grow during Kharif season.
70. Cereals largely fulfill which of the following energy requirement?
  - (a) Proteins
  - (b) Carbohydrates
  - (c) Fats
  - (d) Minerals
71. Which one is not a source of carbohydrate?
  - (a) Rice
  - (b) Millets
  - (c) Sorghum
  - (d) Gram
72. Which of the following is not included in 'organic farming'?
  - (a) compost and vermi-compost
  - (b) chemical fertilizers
  - (c) green manures
  - (d) crop rotation
73. Which one of the following species of honey bee is an Italian species?
  - (a) Apis dorsata
  - (b) Apis florea

(c) *Apis cerana indica*

(d) *Apis mellifera*

**74.** Which of the following is an incorrect statement regarding improvement in crop production?

(a) Tallness is desired in cereals.

(b) Profuse branching is good for fodder crops

(c) Variety resistance to biotic stress is a good factor to improve crops.

(d) Shorter duration of crop from sowing to harvesting is better option.

**75.** Which is the oldest breeding method?

(a) introduction

(b) hybridization

(c) mutation

(d) selection

**76.** Which of the following is not a type of biotic stress?

(a) diseases

(b) insect

(c) frost

(d) nematodes

**77.** Apiculture deals with

(a) Bee Keeping

(b) Rearing Pigs

(c) Rearing Cows and Buffaloes

(d) Rearing Silk Moths

**78.** Red Sindhi, Sahilwal, Jersey, Brown Swiss are breeds of

(a) Pigs

(b) Buffaloes

(c) Cows

(d) Fowl

**79.** Which of the following is not a marine fish?

(a) pomphret

(b) mackerel

(c) catla

(d) sardines



**ASSIGNMENT QUESTIONS SET – 2**  
**CHAPTER – 15**  
**IMPROVEMENT IN FOOD RESOURCES**

1. State one demerit with composite fish culture system.
2. State one importance of photoperiod in agriculture.
3. Name one micronutrient and one macronutrient which plants take from the soil.
4. List two desirable traits for fodder crops.
5. Distinguish between a mullet and a prawn.
6. Name two breeds of cows selected for long lactation period.
7. How does Bombay duck differ from common carp ?
8. How does catla differ from mrigal?
9. Name the two vitamins which are added in the poultry feed.
10. From where do plants acquire the following nutrients?
  - (a) Nitrogen
  - (b) Hydrogen
11. State the reason of introducing Italian bee variety in bee farms.
12. Mention any two activities for the improvement of crop yield.
13. Which nutrients are supplied by cereals and pulses ?
14. Name two fresh initiatives taken to increase the water availability for agriculture.
15. Mention any two advantages of using Italian bee variety in honey production.
16. Name any two weeds of crop field.
17. Define animal husbandry.
18. What are genetically modified crop?
19. Mention the components of food present in vegetable and fruits.
20. Name the cereals which provide us carbohydrate for energy requirement.
21. Give technical term for milk producing females and farm labour animals.
22. Why do we eat pea and groundnut?
23. Name two types of animal feed.
24. Give the full form of FYM.
25. Name two main factors responsible for loss during storage of grain.
26. How much damage to crops can be caused by insects, pests and diseases?
27. Name four macro nutrients important for plants.
28. What is green revolution?
29. What was the aim of white revolution?

30. Name a marine fish.
  31. Name the technique of culturing marine fish.
  32. Which vitamins are found high in broilers?
  33. Which Indian scientist is considered as the father of green revolution?
  34. Name a fibres yielding crop.
  35. Name four types of irrigation systems adopted in our country.
  36. Name the members of a honey-bee family.
  37. Give two hazards of using fertilizers.
  38. Mention two examples of mixed cropping.
  39. Name two factors responsible for losses of grains during storage?
  40. Name an exotic variety of honey bee grown in India.
  41. What is called the rearing of fish on a large scale?
  42. List any two methods adopted in farming for the health of the cattle.
  43. List the two types of food requirements of dairy animals.
  44. What are rabi crops? State any two examples.
  45. List two demerits of the continuous use of fertilizers.
  46. List any two advantages of crop rotation.
  47. List two characteristics each of roughage and concentrate in relation to animal feed.
  48. Mention the two types of food requirements of dairy animals.
  49. "Removal of weeds from cultivated fields during the early stages of growth of crops is essential for a good harvest". Justify the statement.
  50. Farmers use bee-keeping as an additional income generating activity. Give two reasons.
  51. Name any one bottom feeder that can be grown in composite fish culture.
  52. What are the problems faced in such a culture ? How are they overcome?
  53. The shorter the duration of the crop the more economical is the variety. Justify this statement.
  54. What are the long term benefits of using manure in crop production?
  55. What is the major problem in fish farming? How is this problem overcome?
  56. How can insect/pests in crop plants and stored grains be controlled?
  57. What is meant by the term 'green manure'? State its role in agriculture.
  58. How is green manuring done? How is it useful for the soil?
  59. What is pasturage and how is it related to honey production?
  60. What are Rabi and Kharif crops? Give two examples each.
  61. Name two biotic and two abiotic factors that affect crop production.
  62. What is meant by organic farming?
-



63. Compare the use of manure and fertilizers in maintaining soil fertility.
64. What is meant by sustainable agriculture?
65. What are macronutrients and why are they named so? Give examples also.
66. Which component of food is present in pulses ? Also mention its function in the body.
67. Define-green manure and vermicompost.
68. Differentiate between bee keeping and poultry farming.
69. Give two merits and two demerits of fish culture.
70. Suggest two preventive measures for the diseases of poultry birds.
71. List out four useful traits in improved crop?
72. What is a GM crop? Name any one such crop which is grown in India.
73. Define the term photoperiod.
74. Group the following and tabulate them as energy yielding, protein yielding, oil yielding and fodder crop.
75. What type of crops are generally raised in green fields?
76. Write four points on human dependence on plants and animals for food.
77. Distinguish between intercropping and mixed cropping. List any two advantages of intercropping over mixed cropping.
78. State three management practices that are common in dairy and poultry farming.
79. List any three desirable characters of bee varieties suitable for honey production?
80. List any three ways by which the insect/pests attack the plants.
81. List any three desirable characters of bee varieties suitable for honey production?
82. List any six factors for which variety improvement in crops is done.

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**ASSIGNMENT QUESTIONS SET – 3**  
**CHAPTER – 15**  
**IMPROVEMENT IN FOOD RESOURCES**

1. Which one is an oil yielding plant among the following?
  - (a) Lentil
  - (b) Sunflower
  - (c) Cauliflower
  - (d) Hibiscus
2. Which one is not a source of carbohydrate?
  - (a) Rice
  - (b) Millets
  - (c) Sorghum
  - (d) Gram
3. Find out the wrong statement from the following
  - (a) White revolution is meant for increase in milk production
  - (b) Blue revolution is meant for increase in fish production
  - (c) Increasing food production without compromising with environmental quality is called as sustainable agriculture
  - (d) None of the above
4. To solve the food problem of the country, which among the following is necessary?
  - (a) Increased production and storage of food grains
  - (b) Easy access of people to the food grain
  - (c) People should have money to purchase the grains
  - (d) All of the above
5. Find out the correct sentence
  - (i) Hybridisation means crossing between genetically dissimilar plants
  - (ii) Cross between two varieties is called as inter specific hybridisation
  - (iii) Introducing genes of desired character into a plant gives genetically modified crop
  - (iv) Cross between plants of two species is called as inter varietal hybridisation
  - (a) (i) and (iii)
  - (b) (ii) and (iv)
  - (c) (ii) and (iii)
  - (d) (iii) and (iv)
6. Weeds affect the crop plants by

- (a) killing of plants in field before they grow
  - (b) dominating the plants to grow
  - (c) competing for various resources of crops (plants) causing low availability of nutrients
  - (d) all of the above.
7. Which one of the following species of honey bee is an Italian species?
- (a) *Apis dorsata*
  - (b) *Apis florea*
  - (c) *Apis cerana indica*
  - (d) *Apis mellifera*
8. Find out the correct sentence about manure
- (i) Manure contains large quantities of organic matter and small quantities of nutrients.
  - (ii) It increases the water holding capacity of sandy soil.
  - (iii) It helps in draining out of excess of water from clayey soil.
  - (iv) Its excessive use pollutes environment because it is made of animal excretory waste.
- (a) (i) and (iii)
  - (b) (i) and (ii)
  - (c) (ii) and (iii)
  - (d) (iii) and (iv)
9. Cattle husbandry is done for the following purposes
- (i) Milk Production
  - (ii) Agricultural work
  - (iii) Meat production
  - (iv) Egg production
- (a) (i), (ii) and (iii)
  - (b) (ii), (iii) and (iv)
  - (c) (iii) and (iv)
  - (d) (i) and (iv)
10. Which of the following are Indian cattle?
- (i) *Bos indicus*
  - (ii) *Bos domestica*
  - (iii) *Bos bubalis*
  - (iv) *Bos vulgaris*
- (a) (i) and (iii)
  - (b) (i) and (ii)
  - (c) (ii) and (iii)

(d) (iii) and (iv)

**11.** Which of the following are exotic breeds?

(i) Brawn

(ii) Jersey

(iii) Brown Swiss

(iv) Jersey Swiss

(a) (i) and (iii)

(b) (ii) and (iii)

(c) (i) and (iv)

(d) (ii) and (iv)

**12.** Poultry farming is undertaken to raise following

(i) Egg production

(ii) Feather production

(iii) Chicken meat

(iv) Milk production

(a) (i) and (iii)

(b) (i) and (ii)

(c) (ii) and (iii)

(d) (iii) and (iv)

**13.** Poultry fowl are susceptible to the following pathogens

(a) Viruses

(b) Bacteria

(c) Fungi

(d) All of the above

**14.** Which one of the following fishes is a surface feeder?

(a) Rohus

(b) Mrigals

(c) Common carps

(d) Catlas

**15.** Animal husbandry is the scientific management of

(i) animal breeding

(ii) culture of animals

(iii) animal livestock

(iv) rearing of animals

(a) (i), (ii) and (iii)

- (b) (ii), (iii) and (iv)
- (c) (i), (ii) and (iv)
- (d) (i), (iii) and (iv)

16. Which one of the following nutrients is not available in fertilizers?

- (a) Nitrogen
- (b) Phosphorus
- (c) Iron
- (d) Potassium

17. Preventive and control measures adopted for the storage of grains include

- (a) strict cleaning
- (b) proper disjoining
- (c) fumigation
- (d) all of the above

18. Match the column A with the column B

- | (A)              | (B)                       |
|------------------|---------------------------|
| (a) Catla        | (i) Bottom feeders        |
| (b) Rohu         | (ii) Surface feeders      |
| (c) Mrigal       | (iii) Middle-zone feeders |
| (d) Fish farming | (iv) Culture fishery      |

19. Fill in the blanks

- (a) Pigeon pea is a good source of \_\_\_\_\_.
- (b) Berseem is an important \_\_\_\_\_ crop.
- (c) The crops which are grown in rainy season are called \_\_\_\_\_ crops.
- (d) \_\_\_\_\_ are rich in vitamins.
- (f) \_\_\_\_\_ crop grows in winter season.

20. What is a GM crop? Name any one such crop which is grown in India.

21. List out some useful traits in improved crop?

22. Why is organic matter important for crop production?

23. Why is excess use of fertilizers detrimental for environment?

24. Give one word for the following

- (a) Farming without the use of chemicals as fertilizers, herbicides and pesticides is known as \_\_\_\_\_.
- (b) Growing of wheat and groundnut on the same field is called as \_\_\_\_\_.
- (c) Planting soyabean and maize in alternate rows in the same field is called as \_\_\_\_\_.

(d) Growing different crops on a piece of land in pre-planned succession is known as——  
—.

(e) *Xanthium* and *Parthenium* are commonly known as——.

(f) Causal organism of any disease is called as ——.

**25.** Match the following A and B

(A)

(B)

(a) Cattle used for tilling and carting

(i) Milk producing female

(b) Indian breed of chicken

(ii) Broiler

(c) Sahiwal, Red Sindhi

(iii) Drought animals

(d) Milch

(iv) Local breed of cattle

(e) Chicken better fed for obtaining meat

(v) Aseel

**26.** If there is low rainfall in a village throughout the year, what measures will you suggest to the farmers for better cropping?

**27.** Group the following and tabulate them as energy yielding, protein yielding, oil yielding and fodder crop: Wheat, rice, berseem, maize, gram, oat, pigeon gram, sudan grass, lentil, soyabean, groundnut, castor and mustard.

**28.** Define the term hybridization and photoperiod.

**29.** Fill in the blanks

(a) Photoperiod affect the——.

(b) Kharif crops are cultivated from——to——.

(c) Rabi crops are cultivated from——to——.

(d) Paddy, maize, green gram and black gram are——crops.

(e) Wheat, gram, pea, mustard are——crops.

**30.** Cultivation practices and crop yield are related to environmental condition. Explain.

**31.** Fill in the blanks

(a) A total of——nutrients are essential to plants.

(b) ——and——are supplied by air to plants.

(c) ——is supplied by water to plants.

(d) Soil supply——nutrients to plants.

(e) ——nutrients are required in large quantity and called as——.

(f) —— nutrients are needed in small quantity for plants and are called ——.

**32.** Differentiate between compost and vermicompost?

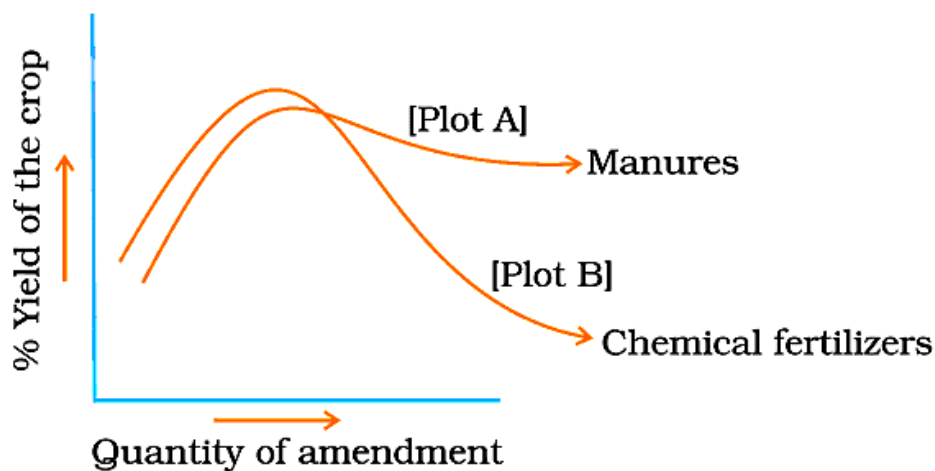
**33.** Arrange these statements in correct sequence of preparation of green manure.

(a) Green plants are decomposed in soil.

(b) Green plants are cultivated for preparing manure or crop plant parts are used.

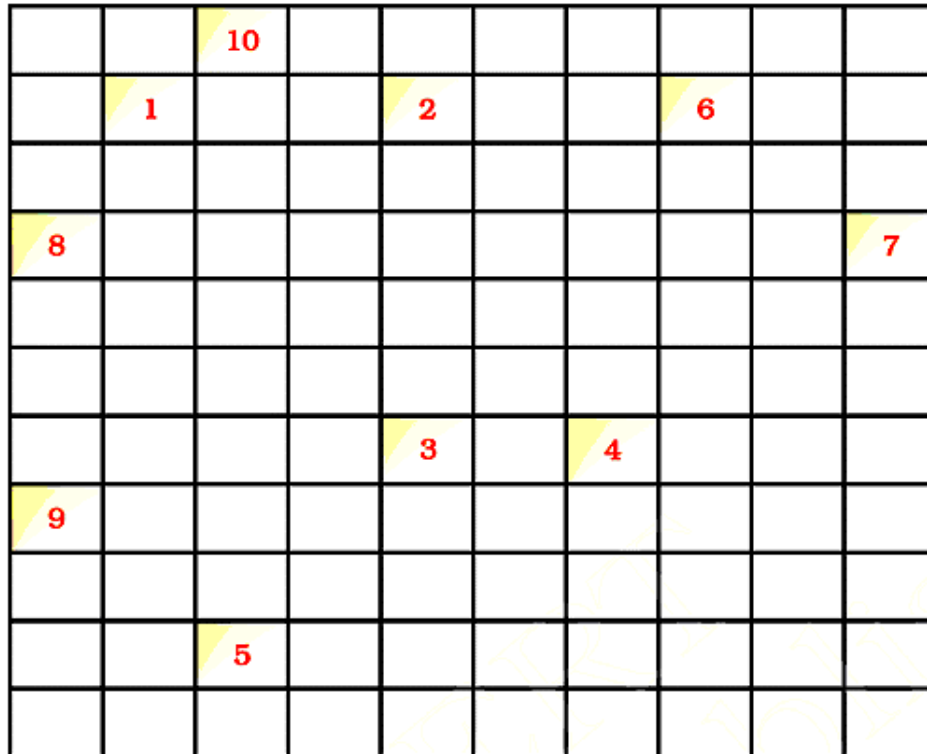
- (c) Plants are ploughed and mixed into the soil.
- (d) After decomposition it becomes green manure.

34. An Italian bee variety *A. mellifera* has been introduced in India for honey production. Write about its merits over other varieties.
35. In agricultural practices, higher input gives higher yield. Discuss how?
36. Discuss the role of hybridisation in crop improvement.
37. Define (i) Vermicompost  
(ii) Green manure  
(iii) Bio fertilizer
38. Discuss various methods for weed control.
39. Differentiate between the following  
(i) Capture fishery and Culture fishery  
(ii) Mixed cropping and Inter cropping  
(iii) Bee keeping and Poultry farming
40. Give the merits and demerits of fish culture?
41. Below Figure shows the two crop fields [Plots A and B] have been treated by manures and chemical fertilizers respectively, keeping other environmental factors same. Observe the graph and answer the following questions.  
(i) Why does plot B show sudden increase and then gradual decrease in yield?  
(ii) Why is the highest peak in plot A graph slightly delayed?  
(ii) What is the reason for the different pattern of the two graphs?



42. What do you understand by composite fish culture?
43. Why bee keeping should be done in good pasturage?
44. Write the modes by which insects affect the crop yield.
45. Discuss why pesticides are used in very accurate concentration and in very appropriate manner?

46. Name two types of animal feed and write their functions.
47. What would happen if poultry birds are larger in size and have no summer adaptation capacity? In order to get small sized poultry birds, having summer adaptability, what method will be employed?
48. Suggest some preventive measures for the diseases of poultry birds.
49. Complete the crossword puzzle:



**Across**

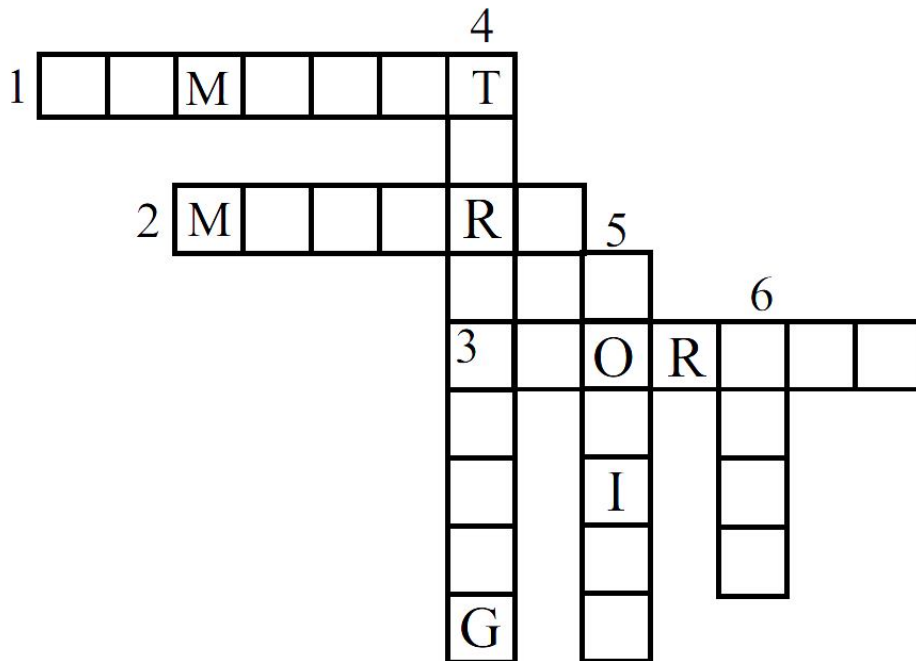
1. Oil yielding plant (9)
3. Crop grown in winter season (4)
5. Fixed by *Rhizobium* (8)
9. Common honey bee (4)

**Downward**

2. Animal feed (6)
4. A micronutrient (5)
6. Unwanted plant in crop fields (4)
7. An exotic breed of chicken(7)
8. Bottom feeders in fish pond(7)
10. A marine fish (4)



50. Complete the crossword puzzle :



**Across**

1. It is prepared from rotten vegetable matter and animal refuse.
2. A major source of nutrients in fields and an organic substance.
3. The cereal grains are dried before \_\_\_\_.

**Downward**

4. Removal of the grains from the chaff.
5. The process of putting the seeds in the soil.
6. The winter season crops like wheat, barley, gram, pea. etc are called.



Wish You All the Best For Your Future