

S M S  
PAMPOR E

Class — 8<sup>th</sup>

Subject : Science

Term-1

Study Material

| S. no. | Name of the Chapter.  |
|--------|-----------------------|
| 1.     | Cell                  |
| 2.     | Metals and non-Metals |
| 3.     | Force and Pressure.   |
| 4.     | Adolescence.          |

## Lesson No. 9

### Force and Pressure

#### *Terminology*

**Force:** Force is any influence that causes an object to undergo a certain change, either concerning its movement, direction or geometrical construction. It is denoted by letter 'F' and its S.I unit is Newton (N).

**Non contact force:** It is the force which exists between the two objects/bodies without any physical contact between them, e.g. magnetic force, gravitational force, etc

**Contact force:** It is the force which exists between the two objects/bodies when there is definite physical contact between them, e.g. muscular force, frictional force, etc.

**Magnetic force:** It is a non contact force which exists between the magnets or between the magnet and magnetic materials such as iron, etc.

**Gravitational force:** It is a non contact force which arises between the objects as a result of their masses. This force can be usually seen between the bodies/objects of large size e.g. between earth and moon.

**Electrostatic force:** It is also a non contact force which exists between charged bodies. The nature of this force can be either attractive or repulsive.

**Muscular force:** It is a contact force which arises as a result of action of muscles.

**Frictional force:** It is an opposing force that comes into play when one body tries to move over the surface of the other body. It is also an example of contact force.

**Gravity:** It is the force of attraction which is exerted by the earth on all the objects towards itself, e.g. if a stone is allowed to fall from a height, it moves downwards towards ground because of gravity.

**Pressure:** It is the force acting per unit area of an object. It is denoted by 'P'.

Its S.I unit is Pascal (Pa) or N/m<sup>2</sup>

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$\text{or } P = F/A$$

**Atmospheric pressure:** It is the force per unit area exerted by the weight of air on the earth's surface.

**Lateral pressure:** The pressure exerted by the liquids on the walls of container is called lateral pressure.

#### *Additional questions*

**Q.1** *What is force? Give various effects of force?*

Ans. Force is a push or pull acting on a body. The various effects of force are summarized as follows:

- (i) A force can cause motion in a stationary body. e.g. A foot ball lying on the ground when kicked begins to move.
- (ii) A force can stop a moving body e.g. The goalkeeper applies force to stop the ball from entering the posts.
- (iii) A force can change the direction of motion e.g. while riding a bicycle we can change the direction of moving bicycle by applying the force on its handle.
- (iv) A force can change the speed of a moving body e.g. By applying the force on the accelerator or brake we can increase or decrease the speed of a moving car.

- (v) A force can change the shape and size of a body e.g. we can increase and decrease the size of spring by compression or stretching it. Similarly we can change the shape of kneaded flour into desired breads.

**Q.2 State units of force.**

Ans. The S. I unit of force is Newton. It is denoted by letter "N"

**Q.3 What is resultant force? Give example.**

Ans. The total force or summation of all forces applied on a body is known as resultant force e.g. if Sabha applies a force of 40N on a body and Faizan applies a force of 50N in the same direction. The resultant force is given as:

$$\begin{aligned} \text{Resultant force} &= \text{Force applied by Sabha} \\ &+ \text{Force applied by Faizan} \\ &= 40 + 50 \\ &= 90\text{N} \end{aligned}$$

If the forces acting on a body are in same direction, the resultant force is found by adding the forces.

If the forces acting on a body are in opposite directions the resultants force is found by subtracting the forces.

**Numerical 1:** In a bullock- cart, each bullock pulls with a force of 1500N in the same direction. Find the resultant force. Give reasons.

**Solution:** In the bullock-cart, bullocks pull in the same direction.

Therefore, the resultant force will be the sum of both the forces (addition of forces).

$$\begin{aligned} \therefore \text{Resultant force} &= 1500\text{N} + 1500\text{N} \\ &= 3000\text{N} \\ &\text{(addition of forces)} \end{aligned}$$

**Numerical 2:** Two boys pull a rope with a force of 250N in opposite direction. What will be the resultant force? Give reason:

**Solution:** Since the boys pull the rope in opposite direction. So, the resultant force acting on the rope is the difference between the two forces.

$$\therefore \text{Resultant force} = 250\text{N} - 250\text{N} = 0\text{N}$$

**Q.4 Name and discuss the different types of forces.**

Ans. Following are the two main types of forces.

(i) Contact forces.

(ii) Non-Contact forces

(i) **Contact forces:** Contact forces are those forces which act only when objects are in physical contact with each other and bring about changes

Contact forces are further classified into following types:

(i) Muscular force

(ii) Mechanical force

(iii) Frictional forces

(i) **Muscular force:** This force is caused by the action of muscles. The force resulting due to the action of muscles is known as muscular force e.g. We use our muscular force during walking, running, pushing and lifting certain objects.

(ii) **Mechanical force:** The force exerted by a machine to do some work is called mechanical force.

However, the machine does not produce force of its own. So, in order to produce force we must supply it with some kind of energy e.g. ceiling fan uses electrical energy to produce mechanical force.

- (iii) **Frictional force:** The force acting along the two surfaces in contact which opposes the motion of one body over the other is called the force of friction.

**Non – Contact Forces:** Non- contact forces are the forces which act when the objects are not in physical contact with each other and bring about changes.

Non-contact forces are further classified as follows:

- (i) Magnetic force
  - (ii) Electrostatic force
  - (iii) Gravitational force.
- (i) **Magnetic force:** The force exerted by a magnet over magnetic materials is called as magnetic force.
- (ii) **Electrostatic force:** The force exerted by a charged body on another charged or uncharged body is known as electrostatic force. e.g. a charged body (comb) can attract small pieces of paper.
- (iii) **Gravitational force:** The force with which two objects attract each other is called a force of gravitation.

**Gravity:** The force exerted due to the attraction between the earth and an object is called the force of gravity or just gravity.

**Pressure:** Pressure is the force acting on a unit area. If P is the Pressure, F is the force and A is the area of contact then,

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$P = \frac{F}{A}$$

The standard unit of measuring force is Newton (N) and the standard unit of measuring area is square meter (m)<sup>2</sup>. Therefore, the standard unit of measuring pressure is Newton per square meter (N/m<sup>2</sup>) which is also called as Pascal.

**Applications of Pressure:**

- (i) A heavy truck is fitted with six to eight wheels. These wheels increase the area of contact on which their weight acts hence reduce their pressure on ground.
- (ii) Skiers use long flat skies to slide over snow, the longer the area of contact, the lesser is the pressure on the snow enabling the skier to slide over the snow with out sinking in the snow.
- (iii) The cutting edges of knives, blades, axes; etc are sharpened. As the cutting edge is sharpened, the area of contact decreases and hence pressure exerted by them increases. Thus this large pressure cuts the objects easily.
- (iv) Foundations of high rise buildings are kept wide so that the pressure due to overlying weight will decrease.
- (v) The tip of a sewing needle is sharp and pointed. This may put the force on a very small area of the cloth, producing a large pressure sufficient to pierce the cloth being stitched.
- (vi) A wide steel belt is provided over the wheels of army tanks, so that they exert less pressure on the ground.

**Pressure due to liquids:** All liquids have weight. So a liquid contained in a vessel exerts pressure on its walls and bottom. However magnitude of pressure due to liquid varies with respect to depth which is greater at bottom and lesser at top. Besides pressure exerted by the liquids on the walls of a container is known as **lateral pressure**.

**Applications of liquid pressure:**

1. The wall of a dam is made thicker at bottom. This is because water pressure increases with depth, so a thicker wall can withstand a greater pressure exerted by the water at greater depth.
2. Water supply tank is placed at high place in the building. This is because when the tanks are placed at a greater height. The pressure of water will be large enough to force the water to reach the taps of the houses.

**Atmospheric pressure:-** Atmospheric pressure is the weight of a column of atmosphere upon one unit area on the earth's surface. At sea level, the atmosphere exerts a pressure of 1kg per 1cm<sup>2</sup> of land surface.

***Applications of Atmospheric Pressure:***

Atmospheric pressure is applicable in following situations.

1. Using a drinking straw to suck up fruit juice.
2. Suction of liquid using syringe.
3. Rubber suction pads are used on the walls to hang clothes and calendars.

**Barometer:** Atmospheric pressure is measured by an instrument called barometer.

***Text book questions***

***Q.1 Give two examples each of situations in which you push or pull to change the state of motion of objects.***

Ans. A small cart moving on road when pulled comes into rest.

A ball rolling on ground is in state of motion. If an obstacle is kept in its way it stops and comes into rest.

***Q.2 Give two examples of situations in which applied force causes change in the shape of an object.***

Ans. The kneaded (wet flour) can be set into different kinds of shapes.

Similarly, an inflated balloon is pressed with two hands, its shape changes from spherical to oblong.

***Q.3 A blacksmith hammers a hot piece of iron which making a tool. How does the force due to hammering affect the piece of iron?***

Ans. The hammer acts as an agent of force which helps it to change the shape of hot iron piece in to a desired iron tool.

***Q.4 An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. It was found that the balloon sticks to the wall. What force might be responsible for the attraction between the balloon and the wall?***

Ans. This attraction is due to electrostatic force.

***Q.5 Name the forces acting on a plastic bucket containing water held above ground level in your hand. Discuss why the forces acting on the bucket do not bring a change in its state of motion***

Ans. The forces that act on a bucket are muscular force and force of gravity due to earth. Since the force of gravity is overcome by the person carrying bucket in his hands, therefore no motion is observed.

**Q.6** *A rocket has been fired upwards to launch a satellite in its orbit. Name the two forces acting on the rocket immediately after leaving the launching pad.*

**Ans.** The two forces that act on rocket immediately after leaving the pad are:

- (i) The force of gravity acting down wards.
- (ii) The frictional force forwarded by air particles.

# Lesson No. 16

## The Cell

### Test Book Questions

**Q1) Define a cell.**

**Ans:** The cell is the basic structural and functional unit of all known living organisms. It is the smallest unit of life that is classified as a living thing (except virus), and is often called the building block of life.

**Q2) Who discovered the cell?**

**Ans:** The cell was discovered by Robert Hooke in 1665.

**Q3) Give three examples of unicellular organisms.**

**Ans:** Three examples of unicellular organisms are:-

i) Amoeba ii) Euglena iii) Paramecium.

**Q4). (i) Why cells could not be observed before 17<sup>th</sup> century?**

**Ans.** Cells could not be observed before 17<sup>th</sup> century because of the non-availability of the microscope. Cells are microscopic in nature. A. V Leeuwen Hock (1674) first studied the living cell.

**(ii) Why cork could not be observed as such by Hook?**

**Ans.** Robert Hooke could not observe the cork as such because it is a solid structure.

**(iii) Where did Hook demonstrate his observations on cork slice?**

**Ans.** Robert Hook demonstrated his observations on cork slice to scientist at Royal Society of London.

**(iv) Name the outermost layer of an animal cell?**

**Ans.** The outermost layer of an animal cell is the plasma membrane.

**(v) Name the layer which is present outside the plasma membrane in plant cell?**

**Ans.** Cell wall is present outside the plasma membrane in the plant cell.

**(vi) Where are chromosomes present in a cell?**

**Ans.** Chromosomes are present in the nucleus of a cell.

**(vii) Name the cell part that has tiny holes?**

**Ans.** Cell membrane (plasma membrane) is the part of a cell that has tiny holes.

**(viii) Name the cell having organelles which are found in the plant cell?**

**Ans.** The cell organelles found in a plant cell are:-

- |                     |                   |                             |
|---------------------|-------------------|-----------------------------|
| (i) Mitochondria    | (ii) Plastids     | (iii) Endoplasmic reticulum |
| (iv) Golgi complex. | (v) Vacuoles      | (vi) Lysosomes              |
| (vii) Ribosomes     | (viii) Cell wall. |                             |

**(ix) Name the cells having branched structure?**

**Ans.** Nerve cells (neurons) & osteocytes (bone cells) have branched structure.

**(x) Which cell can be observed with unaided eye?**

**Ans.** Ostrich egg (170mm x 135 mm) can be observed with the unaided eye.

**Q5) Mention the functions of the following:**

**(a) Cell membrane (b) Chromosomes**

**(a) Cell membrane**

- Ans.**
- (i) It provides shape to the cell
  - (ii) It protects the cell from injury.
  - (iii) It regulates the flow of material into and out of cell.
  - (iv) It keeps the cell contents in place.

**(b) Chromosomes**

- (i) They govern the morphology of the cell.
- (ii) They are responsible for passing genetic characters from parents to the off springs as chromosomes are composed of DNA which contains genes.

**Q6) Why are the following important to a plant cell?**

**(i) Cell wall (ii) Chloroplast (iii) Mitochondria (iv) Nucleus**

**(i) Cell Wall**

- (a) It provides shape and rigidity to the cell
- (b) It protects the protoplast
- (c) It increases the size of cell by continuous absorption.

(d) It prevents over expansion when water enters into the cell, acting as pressure vessel of the cell.

(ii) **Chloroplast.**

- (a) Chloroplasts are the site of photosynthesis, so called as kitchen of the cell.
- (b) Chloroplasts provide colour to the leaf due to a green pigment called chlorophyll.

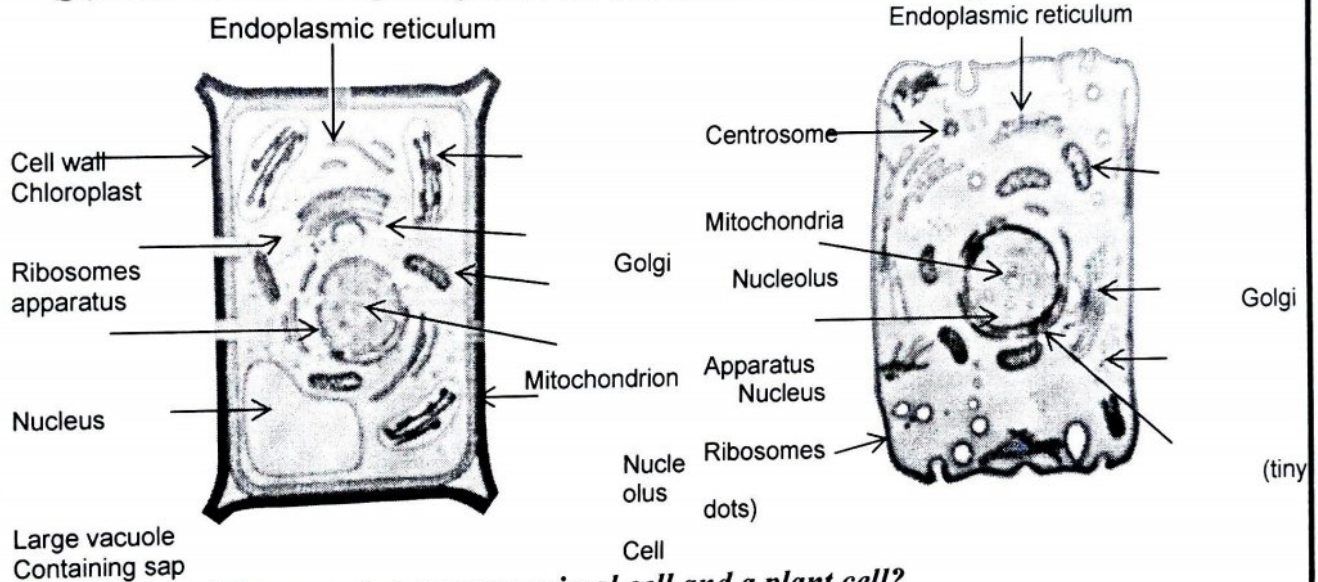
(iii) **Mitochondria**

- (a) These are sites of aerobic oxidization (cellular respiration) of glucose to produce ATP molecules, there by providing the cell with energy.
- (b) They provide biological intermediates for synthesis of various biomolecular substances like amino acids etc.

(iv) **Nucleus**

- (a) It controls all metabolic activities of the cells hence called “the director of cell”
- (b) It is responsible for passing genetic characters from parents to off springs because chromosomes lie within nucleus.
- (c) Nucleus governs the morphology of the cell.
- (d) Cell division initiation and regulation is done by the nucleus.

**Q7) Draw an outline diagram of Plant cell and animal cell. Label the different parts?**



**Q8) Give the differences between an animal cell and a plant cell?**

**Animal Cell**

1. Animal cells are generally small in size.
2. Only cell membrane is present around the cell.
3. Plastids are absent.
4. Vacuoles are many but small sized.
5. Nucleus is generally near the centre of the cell.
6. Reserve food material is in the form of glycogen.
7. Centrosome is present.

**Plant Cell**

1. Plant cells are generally larger than animal cells.
2. It is enclosed by a thick dead cell wall in addition to cell membrane.
3. Plastids are present.
4. Vacuoles are fewer but large sized.
5. Nucleus is often pushed to the outside of peripheral cytoplasm by central vacuole containing cell sap.
6. Reserve food material is in the form of starch.
7. Centrosome is absent.

**Q9) What features are possessed by both plant cells and animal cells?**

- (i) Both Plant cell and Animal cell possess nucleus, Cytoplasm, Cell membrane, Chromosomes, Mitochondria, endoplasmic reticulum, golgi complex, lysosomes & ribosomes.
- (ii) Cell division is shown both by Plant and Animal Cell.
- (iii) Cell differentiation is the feature of both Plant cell and Animal Cell.

**Q10) Why are nerve cells long? Why do these cells have projections?**

Ans. The shape of the cell is related to its function. A nerve cell clearly exhibits this relationship.



Nerve cell is long, branched and has thread like projections as it receives and transfers messages thereby helping to control and coordinate the working of different parts of the body.

**Q11) Why are mitochondria known as the power house of the cell?**

Ans. Mitochondria are the main site of cell respiration. During the cellular respiration, oxygen brings about the oxidation of food & energy gets released & this energy is then used to perform different life processes. For this reason, mitochondria are called as 'the Power house' of the cell. Some of this energy is stored in the form of ATP molecules. So, Mitochondria are also known as "ATP Mills", or "ATP plants" or "Storage batteries".

**Q12) Which four basic elements constitute more than 90% of protoplasm?**

Ans. Ninety nine percent of protoplasm by weight is made up of four elements namely carbon, hydrogen, nitrogen and oxygen.

**Q13) Write in brief about the variation in shape and size of cells?**

Ans. **Cell shape** : Following are the different shapes of the cells in different organisms.

- \* Spherical (eggs of many animals).
- \* Spindle shaped (smooth muscle fibre).
- \* Elongated and branched (nerve cell).
- \* Oval shaped ( R.B.C's).

However, some cells may not have definite shape e.g. Amoeba, W.B.C's etc.

**Cell Size:** Most of the cells are microscopic in nature. The size of the cell varies from the very small cells of bacteria (0.1 – 0.5 micrometer) to the very large eggs of ostrich (170mm x 130mm). In humans, R.B.C (7mm) is the smallest and nerve cell (about 100cm) is the largest cell.

**Q14) Name the different cell organelles and the functions of these organelles?**

Ans. A number of organelles occur in the cytoplasm these are:

- (i) Mitochondria (ii) Chloroplast (iii) Endoplasmic reticulum (iv) Golgi complex  
(v) Lysosomes (vi) Ribosomes

The functions of the cell organelles are as:

**(i) Mitochondria:**

- (a) These are sites of aerobic oxidation (cellular respiration) of glucose to produce ATP molecules.  
(b) They provide biological intermediates for synthesis of various biomolecular substances like amino acids etc.

**(ii) Chloroplast.**

- (c) Chloroplasts are the site of photosynthesis, so called as kitchen of the cell.  
(d) Chloroplasts provide colour to the leaf due to a green pigment called chlorophyll.

**(iii) Endoplasmic Reticulum:**

- (a) It provides surface area for various enzymatic reactions.  
(b) It forms new muscular membrane after each cell division.  
(c) S-ER is concerned with the metabolism of phospholipids and steroids.  
(d) R-ER is concerned with synthesis of proteins which are used outside the cell.

**(iv) Golgi complex:**

- (a) They help in condensation, package and storage of material.  
(b) They form the acrosome of the sperm.  
(c) In plants they are called dictyosomes where they help in formation of cell wall.

**(v) Lysosomes:**

- (a) They bring about intercellular digestion in unicellular organisms.  
(b) They help in cell division.

**(vi) Ribosomes:**

- (a) Ribosomes are responsible for protein synthesis as translation takes place in it.  
(b) Many ribosomes remain attached to a single m-RNA molecule during protein synthesis to form polysomes.

### **Some Additional Questions**

**Q15) Who discovered cell and how?**

Ans. Robert Hook (1665), an English scientist discovered the cell for the first time. He examined a thin slice of cork under his self designed crude microscope. He observed that cork resembled the structure of a

honey comb consisting of many hexagonal compartments. He coined the term "Cell" for each box which in Latin means little room.

**Q16) What is staining? Give example of stains.**

Ans. The process of colouring (dyeing) of the cell organelles to observe the fine structure of the cell is called as staining. Safranin; eosin, methylene blue and crystal violet are some common stains.

**Q17) What is a micron?**

Ans. The cells and their organelles are measured by fraction of a millimeter (mm). One thousandth (1/1000) of a millimeter is called a micron or micrometer. 1 micron = 10<sup>-3</sup> millimeters.

**Q18) Point out the difference between the prokaryotes and eukaryotes.**

**Prokaryotic cell**

1. These are generally small in size (1-10um).
2. Genetic material is not surrounded by a nuclear membrane and is in direct contact with cytoplasm
3. Single chromosome present.
4. Membrane bounded cell organelles are absent.
5. Cell division occurs by binary fission or budding

**Eukaryotic cell**

1. These are generally larger in size (5-100um)
2. Distinct nucleus is present and is surrounded by a nuclear Membrane and is not in direct contact with cytoplasm.
3. Contains more than one chromosomes.
4. Membrane bound cell organelles are present.
5. Cell division occurs by mitosis or meiosis

**Q19) Why lysosomes are known as 'suicidal bags'?**

Ans. Lysosomes contain hydrolytic enzymes and these enzymes may even digest their own contents if burst. They carry out autolysis (auto –self; lysis; breakdown) hence called suicidal bags.

**Q20) Explain the process of ingestion in the unicellular organisms?**

Ans. The process by which the food is taken inside the body of an organism is called ingestion. Some unicellular organisms ingest the food in the following ways:

**Amoeba:** Uses its false feet called pseudopodia to engulf tiny food particles

**Paramecium:** Has fine hair-like structures called cilia all over its body. The cilia pushes the food particles along with the water current into its mouth.

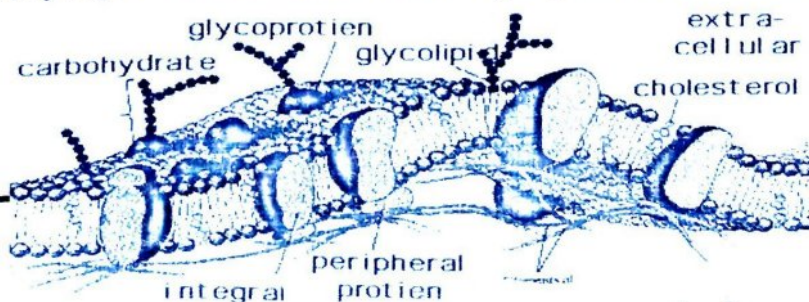
**Hydra:** In hydra there are a large number of tentacles around its mouth which catch small aquatic animals and kill them with their sting cells. Then the food is pushed inside the mouth.

**Define Plasma membrane? Give the detailed structure of Plasma membrane with the help of fluid Mosaic Model:-**

Ans:-Plasma membrane:- Plasma membrane is a thin lining selectively permeable membrane that surrounds all the prokaryotic as well as eukaryotic cells. It is also present around the most cell organelles in eukaryotic cells. It has the same structure every where, hence it is also called as unit membrane.

**Molecular structure of plasma membrane**

Fluid Mosaic Model given by Nicolson and Singer in 1972 fully explains the molecular structure of plasma membrane, According to this model, the plasma membrane is a bilamellar structure i.e. it is made of two layers of Phospholipids in which are embedded the proteins molecules. The protein molecules in the plasma membrane have been compared as 'the protein ice bergs floating in the sea of lipids'. The proteins present inside the membrane between the Phospholipids molecules are known as intrinsic proteins and those on the outer surface of the membrane are known as extrinsic proteins. There are some intrinsic proteins seen through out the both lipid layers these are known as channel proteins. On the outer surface of membrane there are present Glycogen molecules, if these molecules are attached with lipid molecules they form Glycolipid complex and if to the proteins they form Glycoprotein complex, each lipid molecule has a hydrophobic tail directed inwards and hydrophilic head directed out wards.



# Lesson No. 11

## Materials-Metals and Non-Metals

### Terminology

- 1. Metals** :- Elements which are hard ,lustrous ,malleable ,ductile ,sonorous and good conductors of electricity are known as metals e.g. iron ,Aluminum ,Gold ,Copper, Silver etc.
- 2. Non-Metals** :-Elements which are dull in appearance ,break down into powdery substance, non sonorous and poor conductors of heat and electricity are known as non-metals .e.g. sulphur ,oxygen, phosphorous etc
- 3 Metalloids** :-Elements which possess properties of both metals and non-metals are called metalloids .e.g Bi, Ge, As.
- 4. Malleability**:-The property by virtue of which metals can be drawn into thin sheets or foils is called malleability such as Copper and Aluminium Sheets.
- 5. Ductility**:-The property by virtue of which metals can be drawn into thin wires is known as ductility e.g Copper and Iron.
- 6. Lusture**:-The property of metals by virtue of which they possess shiny appearance is known as lusture.
- 7. Sonority**:-The property of producing a sound by metals when struck with a hard material is called sonority.

### Text Book Questions

**Q. Can you store lemon pickle in an aluminium utensil? Explain.**

Ans. Pickles are sour in taste due to the presence of acids. Metals react with acids to produce their respective salts with the liberation of  $H_2$  gas. Aluminum is also a metal. That is why acidic materials like lemon pickle should not be stored in 'Aluminium' utensils.

**Q. Give reasons for the following:**

Ans. a) Aluminum foils are used to wrap food items. It is one of the least reactive metals, so it does not react with food items and does not alter the taste. Moreover, being a metal, Al is highly malleable and can be made into very thin foils, which are convenient for wrapping food items.

**(b) Immersion rods for heating liquids are made up of metallic substances?**

Ans. Metals are good conductors of electricity. Due to this property of metals, they are used for making immersion rods.

**(c) Copper can not displace zinc from its salt solution.**

Ans. It is because copper is less reactive than zinc.

**(d) Sodium and potassium are stored in kerosene.**

Ans. Sodium and potassium are very reactive metals. They react vigorously with oxygen even at room temp. To keep them away from the atmospheric attack, they are stored in kerosene.

**Q. What happens when:**

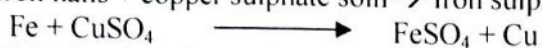
**(a) Dilute sulphuric acid is poured on a copper plate.**

Ans. When sulphuric acid is poured on copper plate, no reaction will take place as hydrogen is more reactive than copper.

(b) **Iron nail are placed in copper sulphate solution. write word equation of the reaction taking place.**

Ans. When Iron nails are placed in copper sulphate solution, displacement reaction occurs. In this reaction copper is displaced by iron nails and form iron sulphate.

Iron nails + copper sulphate soln → Iron sulphate + copper



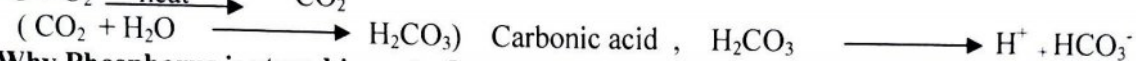
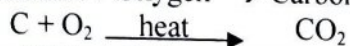
**Q. Saloni took a piece of burning charcoal and collected the gas in a test tube.**

(a) **How will we find the nature of gas.**

(b) **Write down word equations of all the reactions taking place in this process.**

Ans. Charcoal is rich form of carbon. Therefore when charcoal is burnt in air carbon dioxide is formed. This gas when dissolved in water forms carbonic acid. This CO<sub>2</sub> solution turns, blue litmus into red. Hence is acidic is nature.

(b) Carbon + Oxygen → Carbon dioxide gas



**Q Why Phosphorus is stored in water?**

Ans. Phosphorus is stored in water, so as to prevent it from reacting with oxygen to prevent combustion.

**Q. One day Ritta went to a Jewelers shop with her mother. Her mother gave old gold jewelry for polishing. Next day when they brought the jewelry back, they found that there was slight loss in weight. Can you suggest a reason for losing weight?**

Ans. There was a slight decrease in the weight of gold jewellery because of polishing. The goldsmith uses acid in polishing the gold & some part of the gold reacts with the acid as a result of which some weight is lost due to its reaction with acid.

### Additional Questions

**QNo1:- Give general physical properties of metals?**

The general physical properties of metals are stated as follows:-

1. Metals in the pure state possess lustre i.e. shining surface.
2. Metals are generally hard. The hardness varies from metal to metal e.g. Iron, Copper, Aluminium, Lead are hard metals. They can't be cut with a knife. However, Lithium, Sodium and Potassium are soft metals. They can be cut even with a knife.
3. Metals are malleable i.e. they can be beaten into thin sheets .e.g. Iron, Copper, Aluminium etc.
4. Metals are ductile in nature i.e. they can be drawn into wires. e.g. 1gram of gold can be drawn into a wire of about 2km length.
5. Metals are good conductors of heat and possess high melting point. Silver is the best conductor of heat and copper is the second best followed by aluminium. Whereas, lead is the poorest conductor of heat.
6. Metals are good conductors of electricity. Silver is the best conductor of electricity where as mercury is very poor conductor of electricity.
7. Metals are sonorous i.e. they produce ringing sound on striking with hard surfaces.
8. Metals generally have high density. Exception is Lithium, Sodium, and Potassium which have low densities.
9. Metals have high tensile strength i.e. they possess load bearing capacity

**QNo2:- General physical properties of non-metals?**

Some of the general physical properties of non-metals are as follow:

- (1) Non-metals do not possess any lustre except iodine which is non-metallic solid but has lustre.
- (2) They are soft and brittle i.e. they break into pieces when hammered. The only exception is diamond, an allotropic form of carbon which is a non-metal but is the hardest substance known.
- (3) They are neither malleable nor ductile.
- (4) They are generally bad conductors of heat and electricity, except graphite which is an allotropic form of carbon and is a good conductor of electricity.

- (5) They are non-sonorous i.e. they do not produce any sound when hit with any hard object.
- (6) They have generally low melting and boiling point except boron, diamond and graphite which are non-metals but have high melting point.
- (7) They have low densities i.e. they are light elements.
- (8) They have low tensile strength i.e. they are easily broken.
- (9) They may be solids, liquids or gases at room temperature. e.g. Carbon, Sulphur, phosphorus are solids and iodine is a liquid, while as hydrogen, oxygen, nitrogen and chlorine are gaseous non-metals.

**QNo3:- Differentiate between the physical properties of metals and non-metals?**

**Ans.** The main features that distinguish metals from non-metals are given below:

| Metals  | Non –metals  |
|---|--|
| 1. Metals are generally solid in nature at room temp. (except Hg which is a liquid)   | 1. Non- metals exist in all the three states i.e. solid, liquid and gaseous state.               |
| 2. Metals possess bright lustre.  | 2. Non-metals have dull appearance.  |
| 3. Metals have high density (except Na and K which are lighter than H <sub>2</sub> O) | 3. Non –metals have low densities (except diamond which has a high density.)                     |
| 4. Metals are usually malleable (except zinc and Hg)                                  | 4. Non-metals are non-malleable.   |
| 5. Metals are usually ductile (except Zn and Hg)                                      | 5. Non-metals are not ductile.   |
| 6. Metals are hard and have high tensile strength                                     | 6. Non-metals are soft in nature (except diamond which is hardest substance known)               |
| 7. Metals are hard but not brittle  | 7. Non-metals are brittle in nature  |
| 8. Metals are good conductors of heat and electricity except Bismuth & Tungsten.      | 8. Non metals are non-conductors of heat and electricity except carbon (graphite).               |
| 9. Generally metals have high melting and boiling points                              | 9. Non-metals have low melting and boiling points (except carbon, boron, graphite and silicon) . |

**QNo4:- What are the important chemical properties of metals?**

(Ans):-Following are the important chemical properties of metals.

**1. Reactions of Metals with oxygen:-**Metals react with oxygen to form metallic oxides. However, the vigor of reactivity varies from metal to metal.

Some metals react at rooms temperature, some upon heating and some even do not show any reactivity e.g.

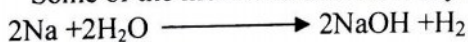


Metal oxides are generally basic in nature.

**2. Reaction of Metals with water :-** Metals react with water to form metallic oxides or metal Hydroxides However, vigor of reactivity varies from metal to metal .

Some metals react with cold water ,some with hot water and some with steam.

Some of the metals do not show any reactivity even with steam.e.g.



Copper , Silver and Gold do not show any reaction with water .

**3. Reaction with acids :-** Metals react with acids to form their corresponding salts with the liberation of hydrogen gas .e.g.



How ever ,Ag , and Pt do not react with acids.

**4. Reaction with bases :-** Metals react with bases to form their salts with the liberation of H<sub>2</sub> gas .

# Lesson No. 10

## Reaching the Age of Adolescence

### Terminology

**Adolescence:-** The period of life , when the body undergoes some physical & biological changes leading to reproductive maturity, is called adolescence.

**Puberty:-** It is the age during adolescence when boys & girls become capable of reproduction.

**Adam's apple:-** It is the protruding voice box usually seen in boys at puberty.

**Sebaceous glands:-** These are the oil glands present on the skin due to which many young people get acne & pimples on their faces.

**Secondary sexual characters:-** These are certain external features developed at puberty which help to distinguish the males from females e.g. development of breasts in females & appearance of facial hair i.e. moustaches & beard in males.

**Harmones:-** These are the chemical substances released by the glands that bring about certain changes in the body.

**Endocrine glands:-** These are the glands which pour their secretions/harmones directly into the blood stream .They have no ducts, hence called as ductless glands. e.g. pituitary gland , thyroid gland, adrenal gland , testes , ovaries , etc.

**Testosterone:-** It is the male sex hormone which is produced by the testes at puberty.

**Estrogen:-** It is the female sex hormone which is produced by the ovaries at puberty.

**Pituitary gland:-** It is an endocrine gland which is situated in head region & influence the activity of other endocrine glands.

**Menstruation:-** It is the bleeding from female reproductive tract due to degeneration of uterus wall when fertilization of egg does not take place .It occurs once in about 28 to 30 days.

**Menarche:-** The first menstrual flow which begins at puberty is known as menarche.

**Menopause:-** Stoppage of menstruation is termed as menopause .It usually stops at the age of 45 to 50 years.

**Chromosomes:-** These are the thread like structures , present inside the nucleus & are responsible for the determination of sex of an individual & other characters due to presence of genes on them.

**Thyroxine:-** It is as a hormone which is secreted by the thyroid gland & is essential for the normal growth & development of an organism.

**Goitre:-** It is an outgrowth of thyroid gland which is produced due to deficiency of Iodine in the body.

**Insulin:-** It is a hormone which is secreted by the pancreas & is responsible for the control of blood sugar level.

**Diabetes:-** It is a metabolic disorder which results due to increased sugar level in the blood because of less or no production of insulin in the body.

**Adrenalin:-** It is an emergency hormone which is released by the adrenal gland at the time of emergency.

**Metamorphosis:-** The transformation of the larva into an adult through drastic changes is called metamorphosis.

### Textual Questions

**Q1) What is the term used for secretions of endocrine glands responsible for changes taking place in the body?**

**Ans:** Hormones.

**Q2) Define adolescence?**

**Ans:** Adolescence is the period of life, when the body undergoes some physical & biological changes leading to reproductive maturity.

**Q3) What is Menstruation? Explain.**

**Ans:** Menstruation is a discharging of blood, secretions & tissue debris from the uterus that occurs in non-pregnant females every month.

In females, the reproductive phase of life begins at puberty (10 to 12 years of age) & generally lasts till the age of approximately 45 to 50 years. The ova begin to mature with the onset of puberty. One ovum matures & is released by one of the ovaries once in about 28 to 30 days. During this period, the wall of the uterus becomes thick so as to receive the egg, in case it is fertilised & begins to develop. This results in pregnancy. If fertilization does not occur, the released egg, and the thickened lining of the uterus along with blood vessels are shed off. This causes bleeding in women which is called menstruation.

**Q4) List changes in the body that take place at puberty?**

**Ans:-** Various changes occurring at puberty are:-

- Change in body shape:-** Males/Boys develop broader shoulder, muscles & wider chest while as in girls the region below the waist becomes wider.
- Voice change:** The voice of boys become deeper due to better development of voice box that can be easily seen as a protruding part, called Adams apple as compared to girls due to which they produce a sound of lower pitch than girls.
- Increased activity of sweat & sebaceous glands:-** These glands secrete sweat & oil respectively which results in a very common problem of acne & pimples.
- Development of sex organs:-** With puberty development of testes & penis takes place in males & enlargement of ovaries occurs in females. Both testes & ovaries are capable of producing sperms & eggs respectively.
- Maturity:** Reaching mental, intellectual & emotional maturity.
- Increase in the height of an individual.

**Q5) Prepare a table having two columns depicting names of endocrine glands & hormones secreted by them.**

**Ans:**

| Endocrine glands | Hormones Secreted   |
|------------------|---|
| 1. Thyroid gland | 1. Thyroxine, Calcitonin, T3 (Tri-iodothyroxine)            |
| 2. Adrenal gland | 2. Cortisol, aldosterone, adrenaline, nor adrenaline        |
| 3. Pancreas      | 3. Glucagon, insulin, somatostatin, Pancreatic Polypeptide. |

**Q6) What are sex hormones? why are they named so? State their function.**

**Ans:** Sex hormones are the hormones which affect the sexual development & maturation of an organism / individual.

They are named so because they are produced by the sex organs like testes & ovaries. Testes produce testosterone while as ovaries produce estrogen.

### Functions:

#### Testosterone:

- It helps in development of facial hair, hair on body, pubic hair, etc.

- b) It helps in enlargement of penis & Scrotum
- c) It helps in development of shoulder bones & muscles.

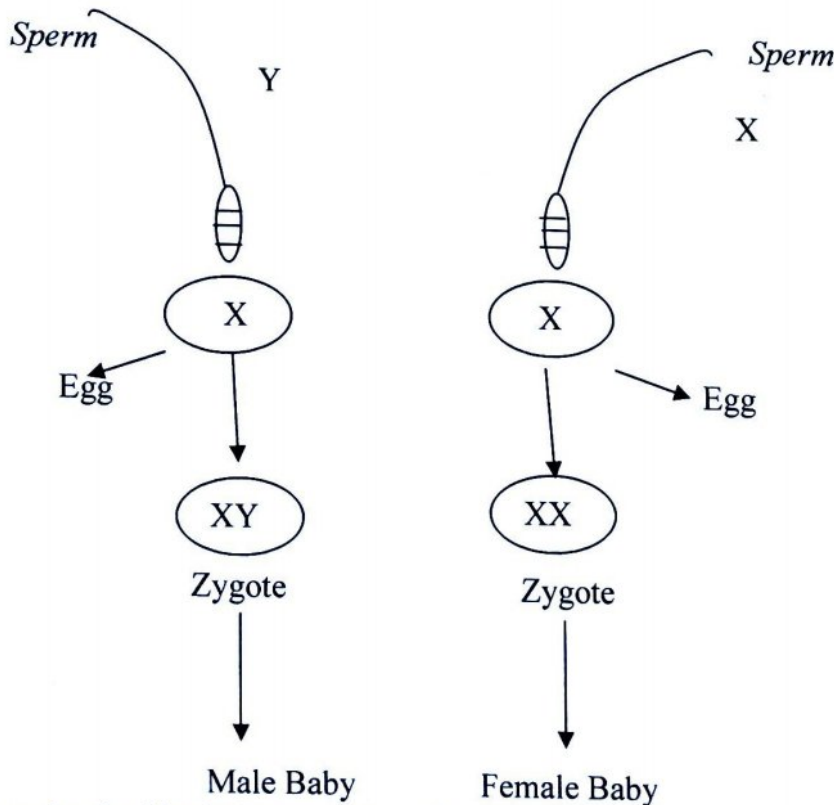
**Estrogen:**

- a) It helps in development of breasts & milk secreting glands or mammary glands.
- b) It helps in development of bones in the pubic region.

**Q8) Write notes on:**

- a) **Adam's apple:** At puberty, the voice box or the larynx begins to grow. Boys develop larger voice boxes than girls which can be easily seen as a protruding part of the throat called Adam's apple.
- b) **Secondary sexual characters:-** These are the characters which are developed as a result of sex hormones, testosterone in boys & estrogen in girls & helps us to distinguish between boys & girls e.g. appearance of facial hair i.e. moustaches & beard in boys & development of breasts in girls.
- c) **Sex determination in the unborn baby:-** All human beings have 23 pairs of chromosomes in the nuclei of their cells. Two chromosomes out of these are the sex chromosomes, named X & Y. A female has two X chromosomes, while a male has one X & one Y chromosome. The unfertilized egg always has one X chromosome. But sperms are of two kinds. One kind has an X chromosome, and the other kind has Y chromosome.

When the sperm containing X chromosome fertilizes the egg, the zygote will be having two X chromosomes & develop into a female child. If the sperm contributes a Y chromosome to the egg (ovum) at fertilization, the zygote would develop into a male child in this way the sex of an unborn baby can be determined.



**Q9) Show by the block diagram the role of hormones in initiating reproduction function ?**

**Ans:**

Hormones from pituitary stimulate testes & ovaries to release testosterone (in males) & estrogen (in females)





Released in the blood stream & reach parts of the body i.e. target site.



They stimulate changes in the body at the onset of puberty.

**Q10) What is balanced diet?**

**Ans:** Diet which contains all the essential nutrients such as Carbohydrates, proteins, fats & vitamins in requisite proportions.