

## Worksheets

- 1) - (c) The plant will wilt (shrink)
- 2) Phloem helps in carrying the food to different parts.
- 3) The transportation in plants takes place with the help of two different types of tissues, the xylem and the Phloem.
- 4) Transportation in plants is the process in which substances absorbed or synthesized in one part of the plant are moved to other parts of the plant.
- 4) The bulk movement of substances through the conducting or vascular tissues of plants is called translocation.
- 5) - d) All the three
- 6) Permeable means it allows some/all substances to pass through it.
- 7) - c) from higher concentration to lower concentration.
- 8) - Phloem

9) - d) All of these

10) - b) the loss of water vapour from the aerial parts of a plant.

11) - d) A hot, dry, windy day

12) The xylem vessels carry the water and minerals absorbed by the roots to the stem and leaves.

13) The main functions of wood parenchyma are:  
\* Storage of food materials in the form of starch, fats, tannins and crystals.

\* ~~Radial~~ Radial conduction of water takes place by the ray parenchymatous cell.

\* Xylem parenchyma cells are closely connected to vessels or tracheids through outgrowths called tyloses.

The main function of wood fibre is to give mechanical support to the plant.

14) ~~Roots~~ Roots are very important for the plant because:-

\* They suck the water and nutrients up out of the soil into the plant. Like this they are not only good for the plants but they are also good for the soil.

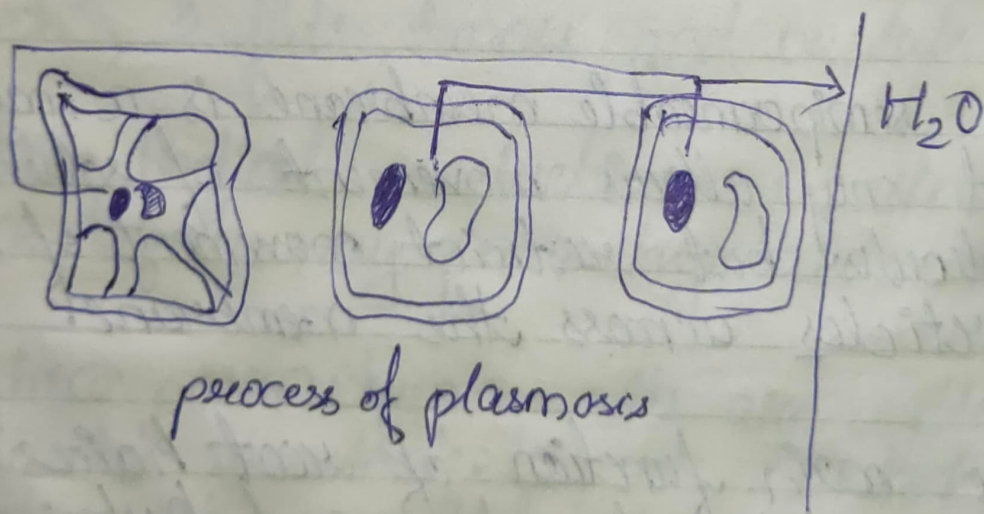
\* When it rains, the roots hold the soil in place so it is not washed away. When soil gets washed away. When soil gets washed away it is called erosion.

15) A semipermeable membrane is a membrane that only allows movement of solvent molecules but restrict movement of solute particles across the membrane?

16) The main function of root hairs is the uptake of water and nutrients from the rhizosphere.

17) Plasmolysis can be defined as the shrinkage of the cytoplasm of a plant cell away from the cell wall and toward the

centre. It occurs because of the movement of water from the intracellular space to the outer cellular space. This happens when the plant cell is placed in a hypertonic solution (i.e., a solution having more solute concentration than the ~~cell~~ cell cytoplasm). This causes the water to move out of the cell and toward the solution. ~~The~~ The cytoplasm of the cell shrinks and the cell is said to be plasmolysed. This process can be observed in an onion peel kept in a highly concentrated salt solution.



- 18) The movement of molecules across a cross a cell membrane from a region of lower concentration to a region of higher concentration — against the concentration gradient. Active transport requires cellular energy to achieve this movement.

- 19) The transport of molecules across the membrane through a concentration gradient without the use of cellular energy by the movement.
- 20) The factors responsible for ascent of xylem sap are :-
  1. Transpiration pull : The transpiration being carried out in the upper regions of the plant causes a continuous loss of water which causes a negative pressure to develop which causes a negative pressure to develop which drives the water upwards. Water has high tensile strength hence the continuous flow of water is not broken.
  2. Root Pressure : It is the positive pressure developed in the roots due to absorption of water and minerals from the soil which forces the water upwards to a certain range as well as prevents the formation of air bubbles.
  3. Capillary action : It is the ability of water to rise up in thin tubes or columns. Water has the property of cohesion that

binds the water molecules together as well as adhesion which helps the water molecules to stay attracted to the xylem walls.

4) Imbibition : It is the phenomenon in which colloidal particles attract a large amount of water. This also adds up in the overall process of ascent of xylem sap.

21) Xylem flow is unidirectional and phloem flow is bidirectional and phloem flow is bidirectional because xylem transport water from soil to leaves and phloem transfers the food synthesized in leaves to all the parts of plants whenever it is necessary.

| 22) <u>Xylem</u>                                                                      | <u>Phloem</u>                                                                              |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 1. Conducts water and minerals salts from the roots to the aerial parts of the plant. | 1. Translocates food from the leaves to the storage organs and growing parts of the plant. |
| 2. Made up of tracheids, vessels, xylem parenchyma and xylem fibres.                  | 2. Made up of sieve tubes, companion cells, phloem parenchyma and phloem fibres.           |

3. Conducting cells (vessels and tracheids) are dead.

4. Conduction is unidirectional.

5. Conduction does not require any expenditure of energy.

3. Conducting cells (sieve tubes) are living.

4. Conduction is bidirectional.

5. Conduction requires expenditure of energy.

23) Path of water through the root hairs to the xylem vessels.

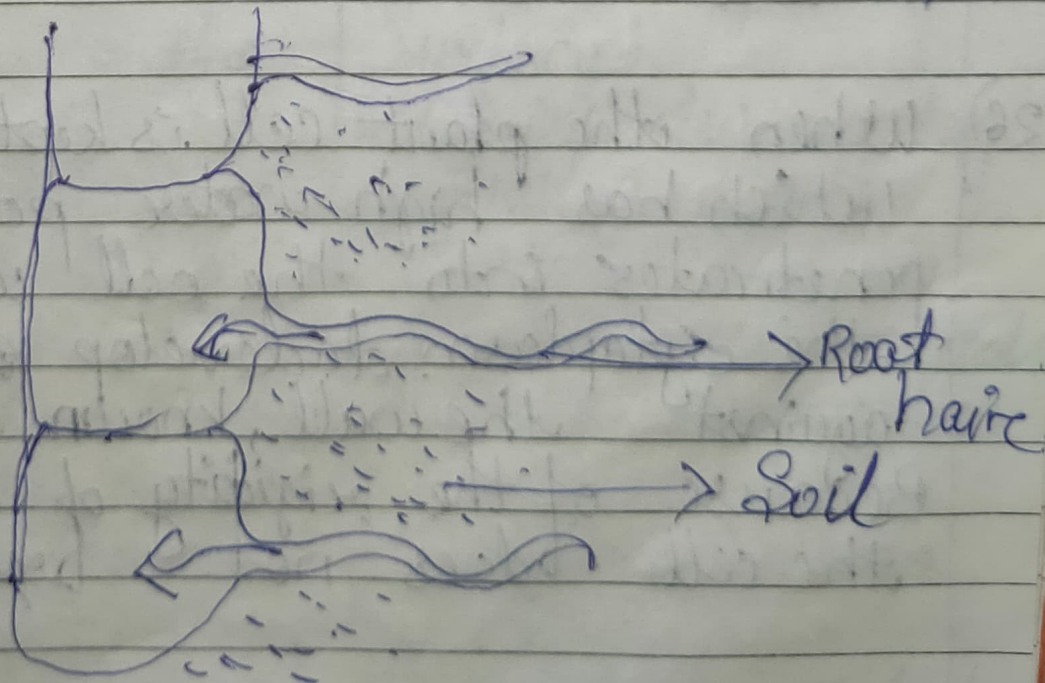


Diagram of Root hairs

24) The plasma membrane is known as a selectively permeable membrane because it has the ability to decide whether to allow substances inside and outside the cell or not. The plasma membrane is able to regulate the movement of substances across the cell because of its phospholipid structure.

25) Factors affecting the rate of diffusion are as follows:-

1. Concentration gradient
2. Permeability of the membrane
3. Temperature
4. Pressure

26) When the plant cell is kept in a solution which has high water potential, water penetrates into the cell which causes the cytoplasm to develop a pressure against the wall, known as turgor pressure. Because of the rigidity of the cell wall, the cell does not burst.

## 21) Transpiration

- \* It is a biological process.
- \* Transpiration is a slow process.
- \* Occurs in living tissues
- \* In the process of transpiration water is lost from plant cells.
- \* Occurs through stomata cuticle or lenticel.
- \* Occurs during the daytime.
- \* It is regulated by temperature, light, concentration, pH, hormones and carbon dioxide.
- \* Surface remains wet
- \* It helps in the uptake of minerals and nutrients

## Evaporation

- \* It is a physical process.
- \* Comparatively a fast process.
- \* Involves non-living matter.
- \* In this process, ~~the~~ water is lost from the surface of plant parts.
- \* It occurs from the entire outer surface.
- \* Occurs during day as well as night.
- \* There is no such regulations or controls over the Evaporation.
- \* Surface becomes dry.
- \* It is not associated with minerals or nutrients uptake.

- \* Transpiration is controlled by osmotic potential and water potential.
- \* Transpiration makes the surface of leaves and young stems wet and protects them from sunburn.

\* Evaporation is independent of these processes.

\* Evaporation provides dryness to the free surface.

28) Wind, speed, light, humidity and temperature are the external factors influencing transpiration. The canopy structure, number and distribution of stomata, water status of plants, and a number of open stomata are the plant variables influencing transpiration.

29) Root pressure, in plants, force that helps to drive fluids upward into the water-conducting vessels (xylem). The root pressure is partially responsible for the rise of water in vascular plants, though it alone is insufficient for the movement of sap against the force of gravity especially within the tallest trees.

30) In tall trees, water rises with the help of the transpirational pull generated by transpiration or loss of water from the stomatal pores of leaves. This is called the cohesion-tension model of water transport. As a result, the water present in the xylem is pulled as a single column from the ~~the~~ stem.

31) During transpiration the movement of potassium ions in and out of the guard cells causes the opening and closing of stomata. Due to this the water potential in the guard cells decreases and water moves inside the guard cells causing them to swell up and become turgid which in turn causes the opening of stomatal pores.

32) The water potential of pure water is always taken as zero at standard temperature and pressure. It can be explained in terms of the kinetic energy possessed by water molecules. When water is in liquid form the movement of its molecules is rapid and

constant. Therefore, it has the highest water potential.

33.

### Osmosis

- \* It is limited only to the liquid medium.
- \* Requires a semipermeable membrane.
- \* Depends on the number of solute particles dissolved in the solvent.
- \* Requires water for the movement of particles.
- \* Only the solvent molecules can diffuse.

### Diffusion

- \* Occurs in all mediums Solid, Liquid and gas.
- \* Do not require a semipermeable membrane.
- \* Depends on the presence of other particles.
- \* Do not require water for the movement of particles.
- \* Both the molecules of solute and solvent can diffuse.

- 34) The root hairs are suited for absorbing water from the soil because : The root hairs present a large surface area. The ~~most~~ more the surface area, the greater is the absorption. It contains a solution (cell sap) of a higher concentration than surrounding soil water.
- 35) a) Plants transpire more quickly on hot summer days as compared to cold winters.  
b) Plants transpire most slowly when the air cannot hold any ~~more~~ water molecules when it is already laden with moisture.
- 36) As water evaporates from the leaves, a suction force is created. This force helps to draw more water up through the stem which causes the roots to absorb more water from the soil.