



NCERT Solutions for 11th Class Biology: Chapter 11- Transport in Plants



IndCareer
Schools



indCareer



indCareer



indCareer

NCERT Solutions for 11th Class Biology: Chapter 11-Transport in Plants

Class 11: Biology Chapter 11 solutions. Complete Class 11 Biology Chapter 11 Notes.

NCERT Solutions for 11th Class Biology: Chapter 11-Transport in Plants

NCERT 11th Biology Chapter 11, class 11 Biology chapter 11 solutions

Exercises

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

Page No: 193

1. What are the factors affecting the rate of diffusion?

Answer

Factors affecting the rate of diffusion are:

- Gradient of concentration
- Permeability of the membrane separating them
- Temperature and pressure

2. What are porins? What role do they play in diffusion?

Answer

Porins are proteins that form huge pores in the outer membranes of the plastids, mitochondria and some bacteria allowing molecules up to the size of small proteins to pass through. They help in facilitating the passive transport of small-sized protein molecules.

3. Describe the role played by protein pumps during active transport in plants.

Answer

Protein pumps are made up of specific proteins called trans-membrane proteins which use energy to carry substances across the cell membrane. These pumps can transport substances from a low concentration to a high concentration. The rate of transport reaches the maximum when all the protein transporters are being used or are saturated.

NCERT 11th Biology Chapter 11, class 11 Biology chapter 11 solutions

4. Explain why pure water has the maximum water potential.

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

Answer

Water molecules possess kinetic energy. In liquid and gaseous form, they are in random motion that is both rapid and constant. The greater the concentration of water in a system, the greater is its kinetic energy or water potential. Pure water has the highest concentration of water molecules. Therefore, it has the highest water potential. When some solute is dissolved in water, the water potential of pure water decreases.

5. Differentiate between the following:

(a) Diffusion and Osmosis

(b) Transpiration and Evaporation

(c) Osmotic Pressure and Osmotic Potential

(d) Imbibition and Diffusion

(e) Apoplast and Symplast pathways of movement of water in plants.

(f) Guttation and Transpiration.

Answer

(a) Diffusion and Osmosis

Diffusion	Osmosis
It is a movement of molecules from high concentration to low concentration.	It is a movement of molecules from high concentration to low concentration through semi permeable membrane.

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

It can occur in solids, liquids, and gases.

It occurs in the liquid medium.

It does not require any driving Force.

It occurs in response to a driving force.

(b) Transpiration and Evaporation

Transpiration

It occurs in plants.

It occurs mainly through the stomatal pores on plant leaves.

It is controlled by environmental factors as well as physiological factors of plants

Evaporation

It occurs from any free surface and involves living and non-living surfaces.

It occurs through any free surface.

It is entirely driven by environmental factors.

(c) Osmotic Pressure and Osmotic Potential

Osmotic Pressure

It is expressed in bars with a positive sign.

It is a positive pressure.

Its value increases with an

It is expressed in bars with a negative sign.

It is a negative pressure.

Its value decreases with an

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

increase in the concentration of solute particles.

increase in the concentration of solute particles.

(d) Imbibition and Diffusion

Imbibition

Imbibition is a special type of diffusion when water is absorbed by solids and colloids causing them to enormously increase in volume.

It usually involves water.

Diffusion is the passive movement of particles, ions, and molecules along the concentration gradient.

It involves solids, liquids, and gases.

(e) Apoplast and Symplast pathways of movement of water in plants.

Apoplast pathways

It is the system of adjacent cell walls that is continuous throughout the plant, except at the casparian strips of the endodermis in the roots

Water moves through the intercellular spaces and the walls of cells

It is the system of interconnected protoplasts.

Water travels through the cytoplasm of cells and intercellular movement is through plasmodesmata.

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

It is a faster process of water movement and water moves through mass flow.

It is a slower process of water movement.

(f) Guttation and Transpiration.

Guttation

It occurs through the vein endings of leaves.

It occurs through the stomata.

Water is lost from the leaves in the form of liquid droplets.

Water is lost from the leaves in the form of water vapour.

It occurs usually at night.

It occurs usually during the day.

It is regulated by humidity, temperature and presence of water in soil.

It is regulated by a number of external and internal factors such as relative humidity, temperature opening and closing of stomata, etc.

NCERT 11th Biology Chapter 11, class 11 Biology chapter 11 solutions

6. Briefly describe water potential. What are the factors affecting it?

Answer

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

Water potential is the potential energy of water to move from one part to the other during various cellular processes such as diffusion, osmosis, etc. It is denoted by the Greek letter Psi or Ψ and is expressed in Pascals (Pa). A system with higher concentration of water has a higher kinetic energy or water potential. Pure water has the highest water potential while Solutions have lower water potential than it.

Solute potential and pressure potential are the two factors which affect water potential.

7. What happens when a pressure greater than the atmospheric pressure is applied to pure water or a solution?

Answer

If a pressure greater than atmospheric pressure is applied to pure water or a solution than its water potential increases because of pressure potential which develops due to increased pressure. It is equivalent to pumping water from one place to another.

NCERT 11th Biology Chapter 11, class 11 Biology chapter 11 solutions

8. (a) With the help of well-labelled diagrams, describe the process of plasmolysis in plants, giving appropriate examples.

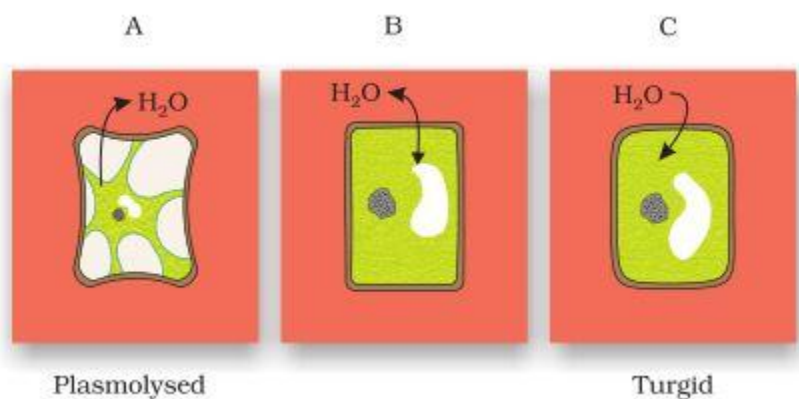
(b) Explain what will happen to a plant cell if it is kept in a solution having higher water potential.

Answer

(a) Plasmolysis occurs when water moves out of the cell and the cell membrane of a plant cell shrinks away from its cell wall. This happens when the plant cell is placed in a hypertonic solution (a solution having more solute concentration than the cell cytoplasm). This causes the water to move out of the cell and toward the solution. The cytoplasm of the cell

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

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.



(b) A hypotonic solution has higher water potential. When a plant cell is placed in a hypotonic solution or a solution having higher water potential, water diffuses into the cell causing the cytoplasm to build up a pressure against the wall, called turgor pressure. This leads to the cell getting swollen. But the rigidity of the cell wall, prevents the cell from bursting.

NCERT 11th Biology Chapter 11, class 11 Biology chapter 11 solutions

9. How is the mycorrhizal association helpful in absorption of water and minerals in plants?

Answer

Mycorrhiza is a symbiotic association of a fungus with a root system. This fungal hyphae either form a dense network around the young roots or they penetrate the cells of the roots. The large surface area of the fungal hyphae is helpful in increasing the absorption of water and minerals from the soil. In return, they get sugar and nitrogenous compounds from the host plants.

10. What role does root pressure play in water movement in plants?

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

Answer

Root pressure is the positive pressure which can be responsible for pushing up water to small heights in the stem by the active absorption of nutrients from the soil. However, root pressure does not play a major role in water movement in tall plants. Root pressure contributes towards reestablishment of continuous chains of water molecules in the xylem which often break under enormous tensions created by transpiration pull.

11. Describe transpiration pull model of water transport in plants. What are the factors influencing transpiration? How is it useful to plants?

Answer

Transpiration creates a suction force inside the xylem. This suction force is called transpiration pull. This is powerful enough to pull the water column from beneath. Adhesion, cohesion and surface tension are the important physical properties of water which further help in the upward movement of water through xylem.

Factors that influence transpiration are temperature, light, humidity, wind speed, number and distribution of stomata, number of stomatal aperture with guard cells open, water status of the plant, canopy structure, etc.

It is useful to plants in following ways:

- creates transpiration pull for absorption and transport of plants
- supplies water for photosynthesis
- transports minerals from the soil to all parts of the plant
- cools leaf surfaces, sometimes 10 to 15 degrees, by evaporative cooling
- maintains the shape and structure of the plants by keeping cells turgid.

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

12. Discuss the factors responsible for ascent of xylem sap in plants.

Answer

Transpirational pull is responsible for the ascent of water in the xylem. This ascent of water is dependent on the following physical factors:

- Cohesion - Mutual attraction between water molecules
- Surface tension - Responsible for the greater attraction between water molecules in liquid phase than in gaseous phase
- Adhesion - Attraction of water molecules to polar surfaces
- Capillarity - Ability of water to rise in thin tubes

These physical properties give water high tensile strength, i.e., an ability to resist a pulling force and high capillarity, i.e., the ability to rise in thin tubes. The thin tubes of xylem work like capillary tubes.

13. What essential role does the root endodermis play during mineral absorption in plants?

Answer

In plants, nutrients are absorbed through the active and passive transports. The endodermis of roots have many transport proteins embedded in their plasma membrane. Transport proteins in endodermis cells enable plant cells to adjust the quantity and types of solutes to be absorbed from the soil. It regulates the quantity and type of minerals and ions that reach the xylem tissue of plants.

14. Explain why xylem transport is unidirectional and phloem transport bi-directional.

Answer

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

Water transported through xylem is utilised in photosynthesis and most of the water is lost through transpiration. Renewed demand for water is once again supplied through the same channel. Hence, transport through xylem is unidirectional.

In phloem, food is transported from source to sink. Leaves are the usual source and storage organs are the usual sink. But the storage organs become source when new buds emerge during early spring. Thus, a reverse flow of food is required. Hence, movement through phloem is bi-directional.

15. Explain pressure flow hypothesis of translocation of sugars in plants.

Answer

According to the pressure flow hypothesis, food is prepared in the plant leaves in the form of glucose. Before moving into the source cells present in the phloem, the prepared food is converted into sucrose. Water moves from the xylem vessels into the adjacent phloem, thereby increasing the hydrostatic pressure in the phloem. Consequently, the sucrose moves through the sieve cells of the phloem. The sucrose already present in the sink region is converted into starch or cellulose, thereby reducing the hydrostatic pressure in the sink cells. Hence, the pressure difference created between the source and the sink cells allows sugars to be translocated from the former to the latter. This starch or cellulose is finally removed from the sink cells through active transport.

16. What causes the opening and closing of guard cells of stomata during transpiration?

Answer

The immediate cause of the opening or closing of the Stomata is a change in the turgidity of the guard cells. The inner walls of the guard cells are thick

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

and elastic, while the outer walls are thin. When turgidity increases within the two guard cells flanking each stomatal aperture or pore, the thin outer walls bulge out and force the inner walls into a crescent shape. The stomatal opening is facilitated by the radial arrangement of the microfibrils. At the time of the closing of the stomata, the guard cells lose their turgidity, the outer and inner walls retain their original shapes, and the microfibrils get arranged longitudinally.



Chapterwise NCERT Solutions for Class 11 Biology:

- Chapter 1: The Living World
- Chapter 2: Biological Classification
- Chapter 3: Plant Kingdom
- Chapter 4: Animal Kingdom
- Chapter 5: Morphology of Flowering Plants
- Chapter 6: Anatomy of Flowering Plants
- Chapter 7: Structural Organisation in Animals
- Chapter 8: Cell-The Unit of Life
- Chapter 9: Biomolecules
- Chapter 10: Cell Cycle and Cell Division
- Chapter 11: Transport in Plants
- Chapter 12: Mineral Nutrition
- Chapter 13: Photosynthesis in Higher Plants
- Chapter 14: Respiration in Plants
- Chapter 15: Plant - Growth and Development
- Chapter 16: Digestion and Absorption
- Chapter 17: Breathing and Exchange of Gases
- Chapter 18: Body Fluids and Circulation
- Chapter 19: Excretory Products and Their Elimination
- Chapter 20: Locomotion and Movement
- Chapter 21: Neural Control and Coordination
- Chapter 22: Chemical Coordination and Integration

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>

About NCERT

The National Council of Educational Research and Training is an autonomous organization of the Government of India which was established in 1961 as a literary, scientific, and charitable Society under the Societies Registration Act. The major objectives of NCERT and its constituent units are to: undertake, promote and coordinate research in areas related to school education; prepare and publish model textbooks, supplementary material, newsletters, journals and develop educational kits, multimedia digital materials, etc.

Organise pre-service and in-service training of teachers; develop and disseminate innovative educational techniques and practices; collaborate and network with state educational departments, universities, NGOs and other educational institutions; act as a clearing house for ideas and information in matters related to school education; and act as a nodal agency for achieving the goals of Universalisation of Elementary Education.

Its headquarters are located at Sri Aurobindo Marg in New Delhi.

[Visit the Official NCERT website](#) to learn more.

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biology-chapter-11-transport-in-plants/>