Osmosis

Diffusion is the movement of a substance from an area where it is in a high concentration to an area of lower concentration. If you put sugar in a cup of tea, for example, the sugar will diffuse through the liquid until it is evenly distributed and the tea is sweet.

Osmosis is one example of diffusion. Osmosis is the diffusion of a solvent, such as water from an area that has a higher concentration of a solute, such as sugar, to an area that has a lower concentration of the solute. No energy is needed for osmosis to occur, so it is a passive process.

Osmosis takes place across the cell membrane of all living things. Cell membranes are partially permeable, which means they allow some substances to pass through them but no others; the holes in the membrane permit water molecules to pass through them, but are too small to allow many larger molecules through. Cell membranes also allow solids to enter or exit the. Without a cell membrane, cells could not keep vital substances inside and toxic materials outside.

Osmosis maintains an ideal concentration of water in other substances inside the cell because it helps transport nutrients in and move waste materials out. Without osmosis, no cells could continue to function. Osmosis is also vital for plants because it allows them to absorb water from the soil and transport it up to their leaves, where it is used in the production of food via photosynthesis.

Plants would not be able to survive without osmosis and, since they form the base of all food chains, no other life forms would survive, either. Consequently, osmosis is essential for maintaining life on Earth.

LIVEWORKSHEETS

1. Which statement best describes diffusion?

A) The movement of water across a partially permeable membrane
B) The movement of substances from low concentration to high concentration
C) The movement of a substance from an area of high concentration to low concentration
D) The movement of energy through a system

2. Why does sugar eventually become evenly distributed in a cup of tea?

A) The sugar is actively transported by the liquid
B) The sugar dissolves and diffuses through the tea
C) The tea molecules move toward the sugar
D) The sugar changes chemically in the tea

3. Which of the following best defines osmosis?

A) The movement of any substance across a membrane
B) The diffusion of a solute from high to low concentration
C) The diffusion of water from an area of higher solute concentration to lower solute concentration
D) The movement of water across a partially permeable membrane from lower solute concentration to higher solute concentration

4. Why is osmosis considered a passive process?

A) It requires enzymes to occur
B) It only occurs in plant cells
C) It does not require energy
D) It moves substances against their concentration gradient

5. What feature of the cell membrane allows osmosis to occur?

A) It is completely permeable
B) It is impermeable to all substances
C) It is partially permeable to water molecules
D) It actively pumps water molecules

LIVEWORKSHEETS

6. Why are large molecules unable to pass freely through the cell membrane?

A) They are repelled by the membrane
B) The membrane only allows liquids to pass
C) The pores in the membrane are too small
D) Large molecules require energy to move

7. Which of the following is a direct function of osmosis in cells?

A) Producing energy through respiration
B) Maintaining an ideal water concentration inside the cell
C) Breaking down waste materials
D) Synthesizing proteins

8. How does osmosis help plants survive?

A) By allowing plants to release oxygen
B) By transporting sugars through the stem
C) By absorbing water from the soil
D) By producing glucose directly

9. What would most likely happen if osmosis did not occur in cells?

A) Cells would gain unlimited energy
B) Cells would be unable to maintain internal balance
C) Cells would divide more rapidly
D) Cells would only survive in water

10. Why is osmosis considered essential for life on Earth?

A) It allows organisms to move
B) It supports photosynthesis and the base of food chains
C) It prevents diffusion from occurring
D) It replaces the need for cell membranes

LIVEWORKSHEETS