Lesson Outline for Teaching

Lesson 3: Moving Cellular Material

A. Passive Transport
   1. A cell membrane is semipermeable, which means that it allows only certain substances to enter or leave a cell.
   2. Passive transport is the movement of substances through a cell membrane without using the cell's energy.

B. Diffusion
   1. Diffusion is the movement of substances from an area of higher concentration to an area of lower concentration.
   2. Usually diffusion continues through a membrane until the concentration of a substance is the same on both sides of the membrane.

C. Osmosis—The Diffusion of Water
   1. Osmosis is the diffusion of water molecules only through a membrane.
   2. If the concentration of water in the air surrounding a plant is less than the concentration of water inside the plant’s vacuoles, water will diffuse into the air until the concentrations are equal.
   3. Facilitated diffusion allows molecules to pass through a cell membrane using transport proteins.
      a. Carrier proteins carry molecules through the cell membrane.
      b. Channel proteins allow ions to pass through the cell membrane.

D. Active Transport
   1. Active transport uses the cell's energy to move substances through a cell membrane.
   2. Active transport moves substances from areas of lower concentration to areas of higher concentration.
   3. A cell uses endocytosis to take in a substance by surrounding it with the cell membrane.
   4. A cell's vesicles release their contents outside the cell during exocytosis.

E. Cell Size and Transport
   1. For a cell to survive, its surface area must be large compared to its volume.
   2. As a cell grows, its volume increases faster than its surface area.

Discussion Question
How do substances move into and out of cells?
Substances can move into and out of cells by diffusion, osmosis, facilitated diffusion, endocytosis, and exocytosis.