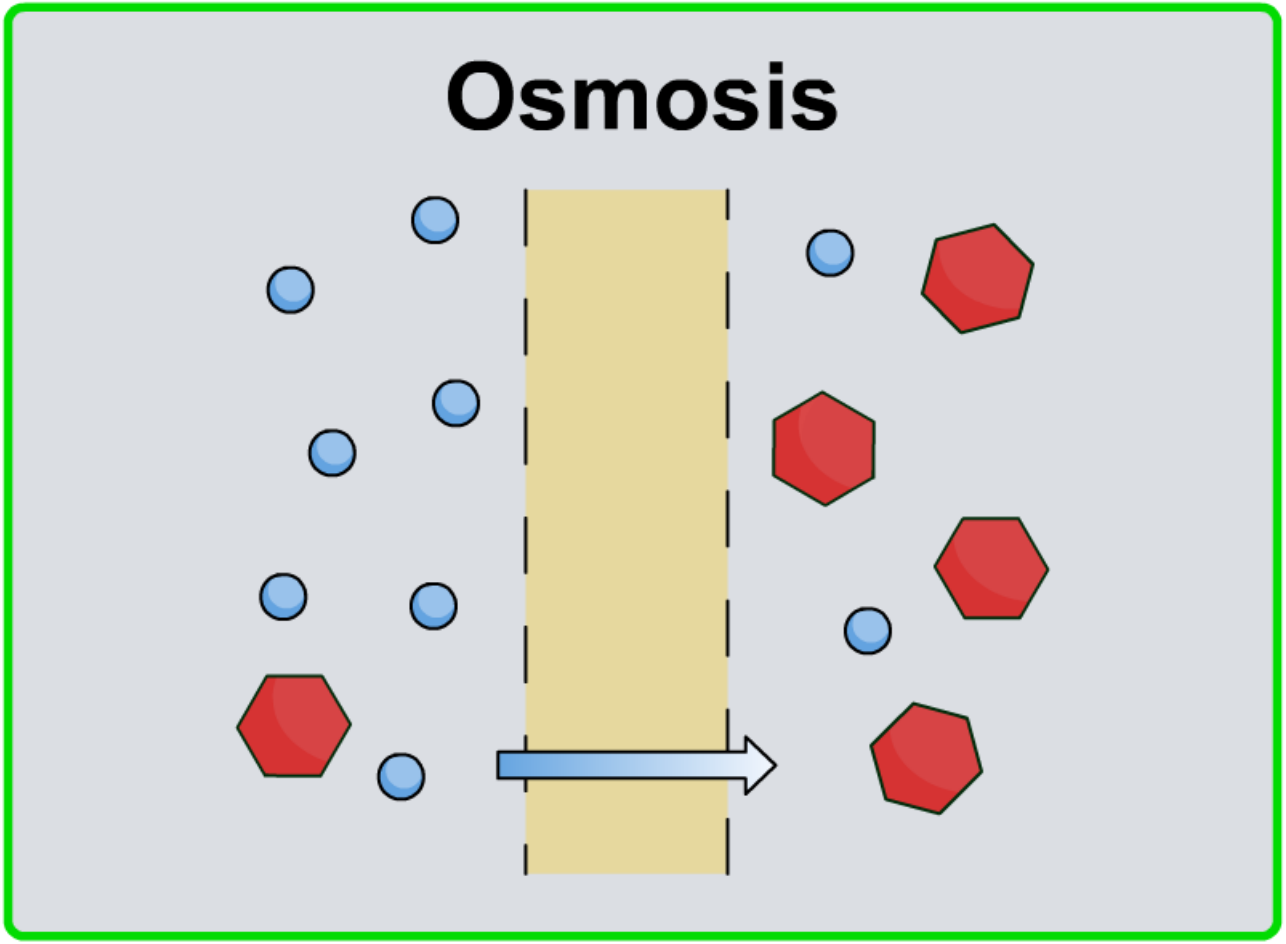
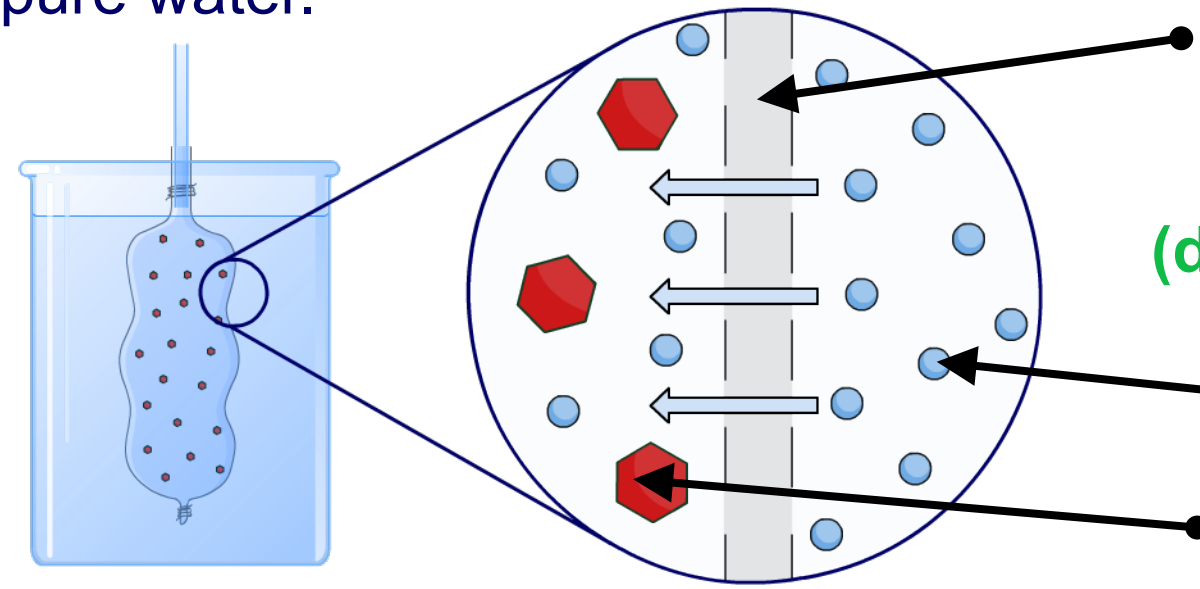


What is osmosis?

Osmosis is the diffusion of **water molecules** from a low concentration solution to high concentration solution, across a partially-permeable membrane.

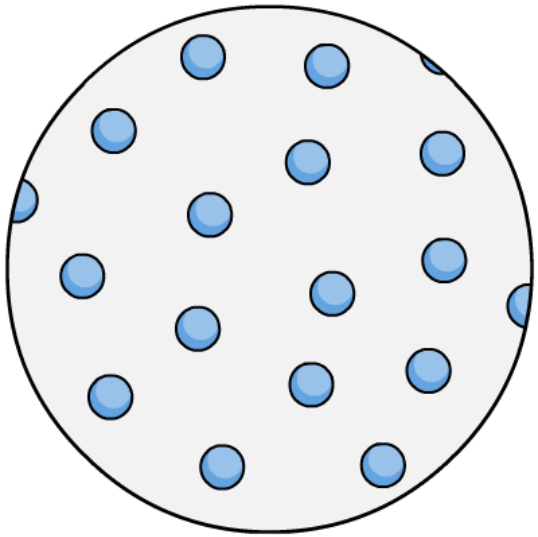
A partially-permeable membrane has holes in it that permit water molecules through but are too small to allow larger molecules through. Osmosis can be demonstrated using dialysis tubing filled with a solution and placed in a beaker of pure water.



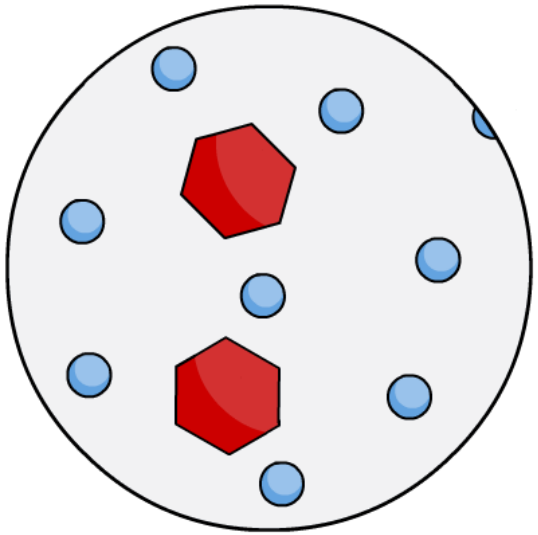
Dilute vs. concentrated

During osmosis, water molecules diffuse from pure water or dilute solution to more concentrated solutions.

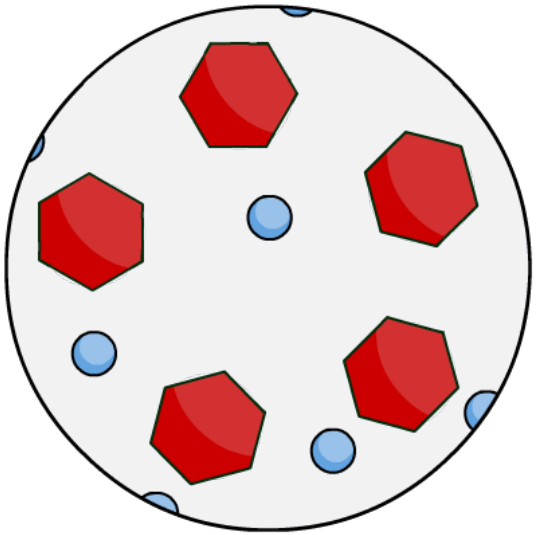
- **Dilute solutions** have a **high** concentration of water molecules.
- **Concentrated solutions** have a **low** concentration of water molecules.



pure water



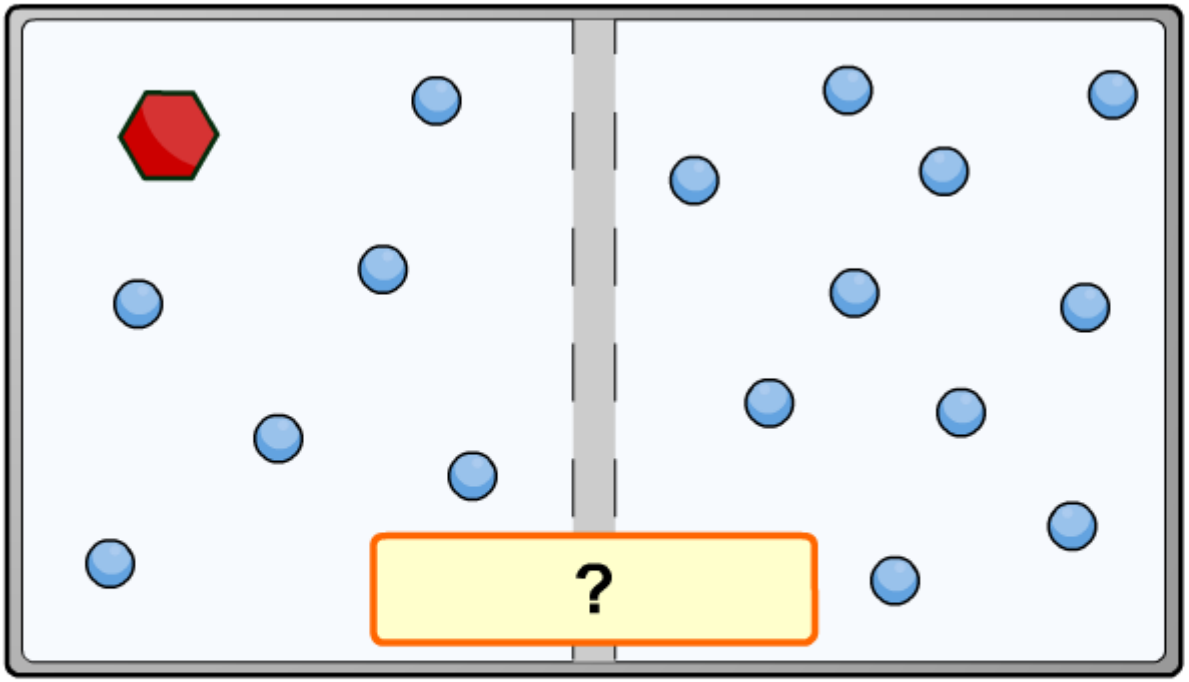
dilute solution



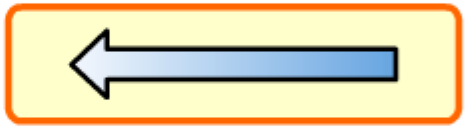
concentrated solution

Predicting osmosis

What direction is the net movement of water?



Solution 1/3



no net movement

partially-permeable membrane

water

glucose

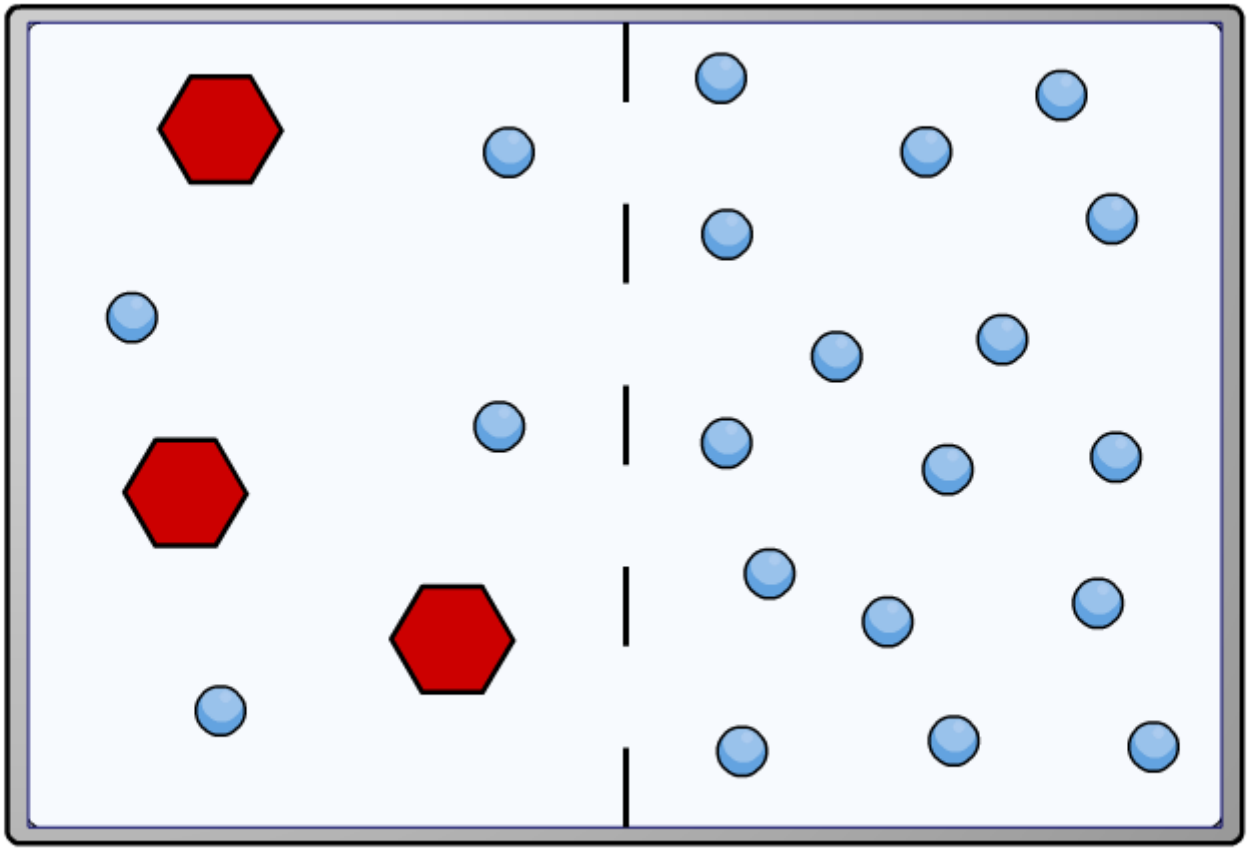
?

C

solve

Osmosis in action

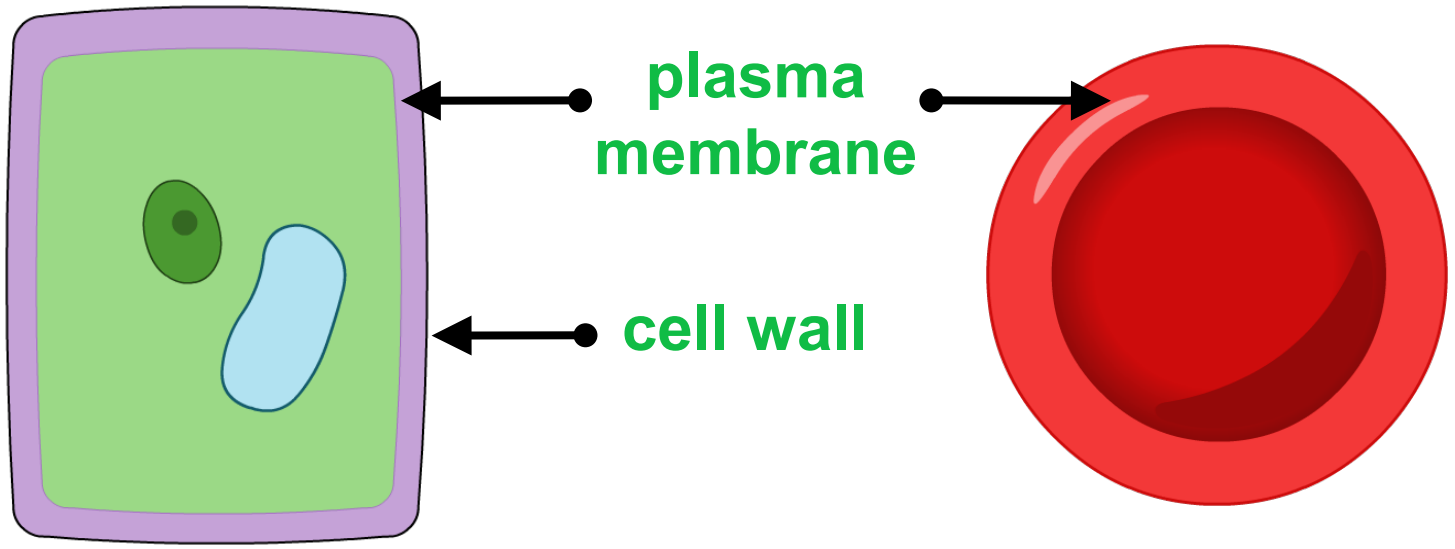
What happens to molecules during osmosis?



Osmosis and cells

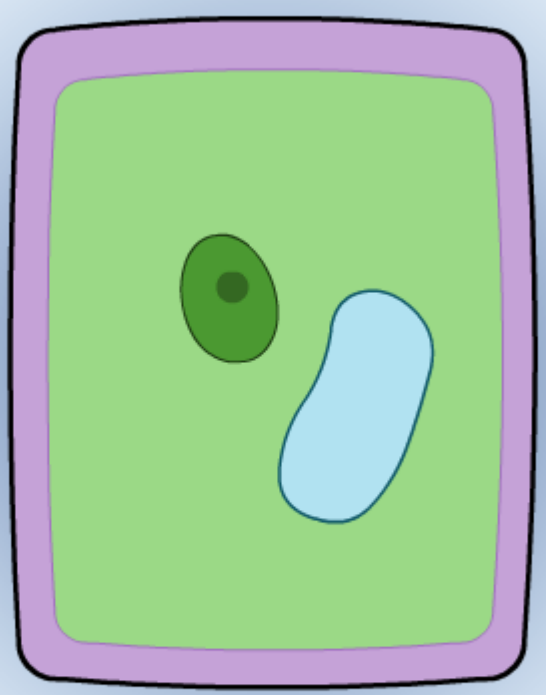
Plant and animal cells are surrounded by a partially-permeable plasma membrane. This allows water and other small molecules to diffuse across.

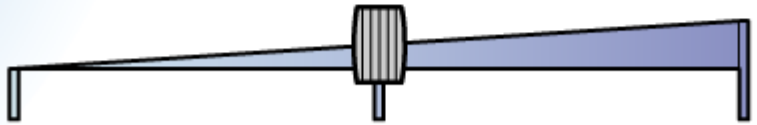
Plant cells additionally have a strong cell wall surrounding the membrane which offers support and protection.



Osmosis and plant cells

How do plant cells react to osmosis?





water concentration outside cell

Osmosis and animal cells

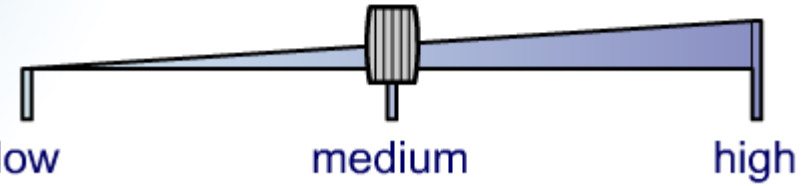
Animal cells do not have a cell wall. This means they respond differently to plant cells to the gain and loss of water.

In dilute solutions, osmosis can cause animals cells, such as red blood cells, to swell up and burst. This is called **lysis**.

In concentrated solutions, water loss causes the cells to shrink. When this happens to red blood cells, it is called **crenation**.

Osmosis and animal cells

How do animal cells react to osmosis?



water concentration outside cell

Osmosis and animal cells

In order to remain healthy, animal cells need to maintain an **isotonic** water balance. This means that the water concentration both inside and outside the cell are equal.

The concentration of water and salt in the blood are controlled by the kidneys.

The kidneys are controlled by the portion of the brain called the hypothalamus.