# Osmosis

**Osmosis,** *<< oz MOH sihs, >>* is the movement of liquid from one solution through a special membrane into a more concentrated solution. The process is essential for the survival of living things. For example, plants absorb most of their water by osmosis. In animals, osmosis helps regulate the flow of water and nutrients between body fluids and cells. Industries reverse osmosis for such purposes as water purification and food preservation.

A liquid solution consists of a dissolved substance called a *solute,* and a liquid called a *solvent.* During osmosis, some of the solvent from one solution moves through microscopic holes in a membrane into another solution. The membrane is *semipermeable*--that is, it allows solvent molecules to pass through its holes, but it blocks solute molecules. The solute molecules are larger than the holes in the membrane.

In osmosis, more solvent moves into the solution with the greater concentration of solute molecules. This occurs mostly because, in the weaker solution, there are fewer solute molecules blocking the movement of the solvent.

Solvent from the weaker solution continues to dilute the more concentrated solution until the concentrations are equal. At this point, the amount of

solvent entering each solution equals the amount leaving each solution.

However, the flow of solvent will stop before the concentrations become equal if a certain pressure is exerted on the more concentrated solution. This pressure is called the *osmotic pressure.*

**Experiment.** Osmosis can be demonstrated by performing the following experiment. First, fasten a piece of cellophane over the bottom of a glass tube. Next, pour a solution of sugar and water into the tube. Then place the tube into a container of pure water so the levels of the water and the sugar solution are equal. After several hours, the liquid in the tube rises because of osmosis.

In this experiment, the cellophane is the semipermeable membrane. It allows water molecules to pass through but blocks sugar molecules. The sugar molecules are too large. In the tube, the sugar molecules interfere with the water molecules and prevent some water from moving through the membrane. As a result, more water moves into the tube than out of it.

As water moves into the tube, the sugar solution rises, thereby increasing the pressure in the tube. The solution continues to rise until the pressure that it exerts equals that of the pure water.

**Reverse osmosis.** Chemists use a process called *reverse osmosis* to purify water and perform other functions. In normal osmosis, water flows from fresh water into seawater when they are separated by an

appropriate semipermeable membrane. But, by applying pressure to the seawater, chemists can reverse the movement of the water and produce fresh water from seawater. Some shipwreck victims have used survival kits that convert seawater into drinking water by osmosis (see Water [diagram: Reverse osmosis]).

---

**Contributor**

- Robert B. Prigo, Ph.D., Professor Emeritus of Physics, Middlebury College.

**How to cite this article:**

To cite this article, World Book recommends the following format:

**MLA:**

Prigo, Robert B. "Osmosis." *World Book Student*, World Book, 2022, www.worldbookonline.com/student/article?id=ar407260. Accessed 28 Feb. 2022.

**APA:**

Prigo, R.B. (2022). Osmosis. In *World Book Student*. https://www.worldbookonline.com/student/article?id=ar407260

**Harvard:**

Prigo, RB 2022, 'Osmosis' , *World Book Student*, World Book, Chicago, viewed 28 February 2022, <https://www.worldbookonline.com/student/article?id=ar407260>

Administrators

About World Book