

LT: I can describe how macronutrients and other substances get into and out of cells by drawing and labeling visual models.

LE Standards: 4.1.2

Materials Move in and out of cells

Diffusion is the process where molecules spread out from an area of high concentration to an area of low concentration. For example, if someone uncorks a bottle of perfume in a classroom, before long people on the other side of the classroom can smell the perfume because the perfume molecules have diffused, or spread out.

Osmosis is the diffusion of water molecules. In a cell, the cell membrane prevents many large molecules and ions from moving into and out of the cell. Since water is small, it is able to pass directly through the cell membrane. If there is an uneven concentration of something inside and outside of a cell, water molecules will move through the cell membrane to make the concentration equal.

Some substances that cells need are in short supply. This means that in order to get them, the cells must use energy because they will not diffuse on their own. Anytime a cell has to use energy to move molecules or substances it is known as **active transport**.

*****Copy and complete the following chart by defining the terms. You may want to use the following links:**

<https://www.abpishools.org.uk/topic/homeostasis-kidneys/3>

<https://www.bbc.com/bitesize/guides/zs63tv4/revision/4>

Materials Move In and Out of Cells (Movement of Molecules)	
Active Transport:	Passive Transport
requires energy	Diffusion
does not require energy	Osmosis
move from low to high concentration	
move from high to low concentration	
water molecule movement	
any molecule	
along concentration gradient	
against concentration gradient	

Materials Move In and Out of Cells

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Copy the following statements. Draw a diagram of the scenario and answer the questions. (I started scenario 1 for you. =)

Scenario 1: The air you breathe in has more oxygen than there is inside your lung cells. Since oxygen is a small molecule, it can easily pass through cell membranes.

Describe the movement of oxygen: Active or Passive? Diffusion or Osmosis?

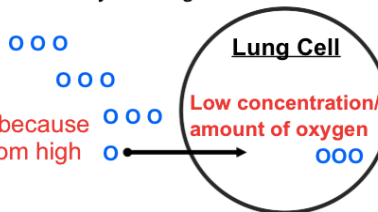
I am using the letter "O" to represent oxygen.

I drew more "O's" outside the cell than inside the cell because it says

"The air you breathe in has more oxygen than there is inside your lung cells."

High concentration/amount of oxygen
(more oxygen outside of the cell)

I drew my arrow in this direction because
molecules automatically move from high
to low concentration



Because "O" (oxygen) is moving from an area of where there is more to an area where there is less, this explains passive transport. Osmosis is the movement of water... not oxygen. Diffusion is the movement of any molecule from an area of high concentration to an area of low concentration.

Scenario 2: A red blood cell is placed in salt water, it will shrivel up because water will leave the cell to try and even out the salt concentration inside and outside of the cell.

Describe the movement of water: Active or Passive? Diffusion or Osmosis?

Scenario 3: A red blood cell is placed in pure water. *Remember our cells/cytoplasm are mostly water but not pure water.

Describe the movement of water: Active or Passive? Diffusion or Osmosis?

Scenario 4: A cell requires sodium molecules. There is a higher concentration inside the cell. A protein will use energy to move the molecule into the cell.

Describe the movement of sodium: Active or Passive? Diffusion or Osmosis?

Scenario 5: The roads were salted to help melt snow and ice. As a result, plant cells are exposed to a high concentration of salt water.

Describe the movement of water: Active or Passive? Diffusion or Osmosis?