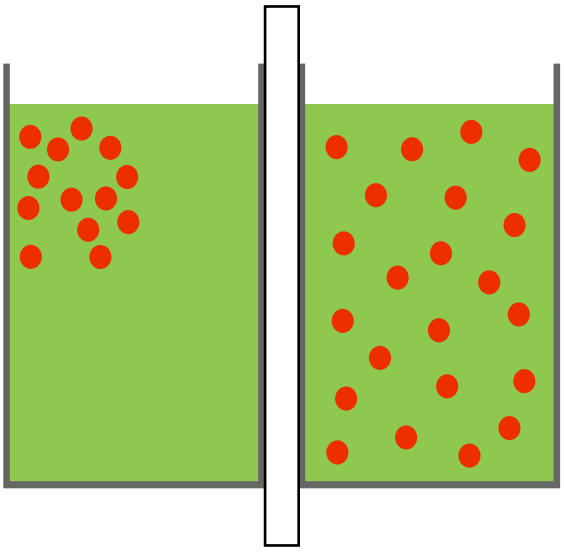
WHAT IS OSMOSIS?

Osmosis is the movement of water molecules across a semi-permeable membrane, from an area of higher molecule concentration to a region of lower molecule concentration.

A semi-permeable membrane is a barrier that allows some substances, like water, to pass through but not others.



Osmosis is important because it helps regulate the balance of water and other substances in living things. For example, in our cells, osmosis helps maintain the right balance of water and other substances like salts and sugars.

Osmosis can also be seen in other everyday examples, such as when a plant absorbs water from the soil. The water moves from the soil, where there is a high concentration of water, to the roots, where there is a low concentration of water.

If the concentration of water is the same on both sides of a semi-permeable membrane, osmosis will not occur. This is called a state of equilibrium.

Click here for a fun osmosis experiment using potatoes!

JR-SCIENTISTS

POTATO OSMOSIS

In this activity you will learn how you can make water move with something called osmosis!

SUPPLIES

Potato
Knife
2 Tall glasses
Distilled water (or regular)
Salt
Tablespoon

INSTRUCTIONS

STEP 1: Cut your potato into four equal pieces about 4 inches long and 1 inch wide.

STEP 2: Fill your glasses half way with distilled water, or regular water if no distilled is available.

STEP 3: Now mix 3 TBSP of salt into one of the glasses and stir.

STEP 4: Place two pieces of potato into each glass and wait. Compare the potatoes after 30 minutes and then again after 12 hours.

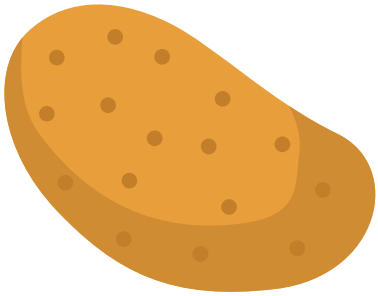
THE SCIENCE

The process of moving water across a membrane is called osmosis. A membrane is a thin sheet of tissue or layer of cells acting as a wall. Plants use osmosis to 'drink' water. The plants create an environment of high salt concentration in their roots that are in the soil. Because the water outside the root cells has less salt than in the roots, water starts moving into the cells. The water then travels up the roots to the rest of the plant.

Osmosis works in both directions. If you put a plant into water with a higher salt concentration than the concentration inside its cells, water will move out of the plant . If this happens then the plant shrinks and will eventually die.

Potato Osmosis Observations

Use this worksheet to process and evaluate your work.



RECORD

What predictions can you make about what might happen?

What do you notice after 30 minutes? After 12 hours?

How did the length and diameter or width of the potato strips change in each cup?

Try this activity work with other vegetables or fruit. Results?

What did you learn?

JR-SCIENTISTS

RUBBER EGG

This rubber egg experiment is a classic science activity!

SUPPLIES

Raw Eggs
Vinegar
Jar/Vase
Food coloring (optional)

INSTRUCTIONS:

STEP 1: Place an egg in the jar and cover with vinegar. You can color the vinegar for rubber eggs too!

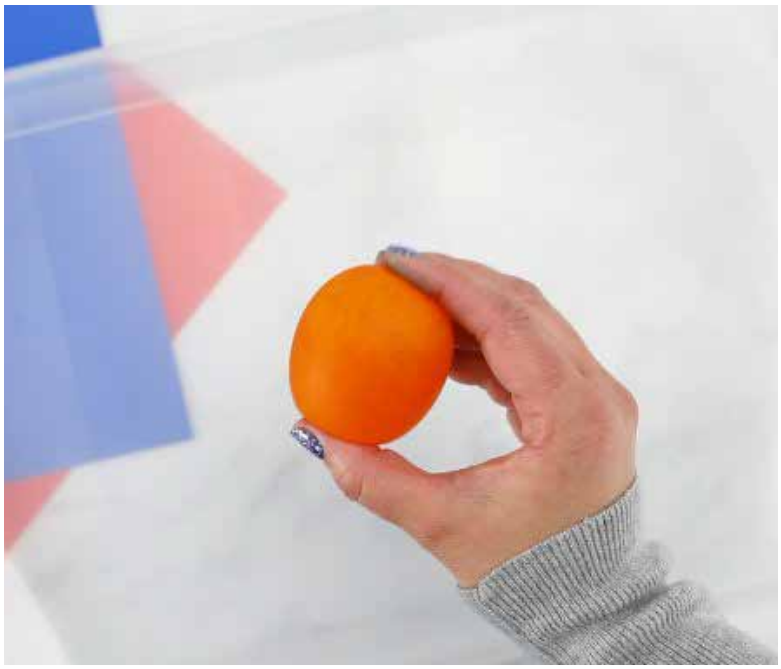
STEP 2: Wait and watch! Notice the bubbles on the eggshell! This is the acid in the vinegar reacting with the calcium carbonate in the shell. This reaction is producing a gas called carbon dioxide!

STEP 3: After 48 hours, remove the egg and rinse it off. Ours had a layer of brown scum that was easily washed away! The hard outer shell is gone and the egg white and yolk are surrounded by a thin membrane.

THE SCIENCE

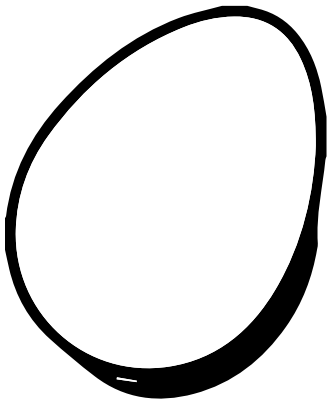
The eggshell gets its hardness from a mineral called calcium carbonate similar to our bones.

When you place the egg into the vinegar, you will start to observe bubbles. These bubbles are a chemical reaction between the acid in the vinegar and the base in the calcium carbonate of the eggshell. When an acid and a base mix they form carbon dioxide which is a gas.

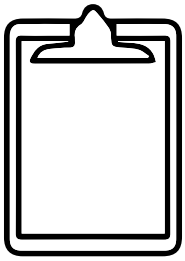


Rubber Egg Observations

Use this worksheet to process and evaluate your work.



Do you think you can make a raw egg bounce?



RECORD

What did you observe day 1? Day 2? What were the differences?

What did your egg look like when you removed it from the vinegar?

Did it bounce? How was that possible?

GROWING GUMMIES

A fun gummy bear experiment all in the name of science and learning!

INSTRUCTIONS:

STEP 1: In four cups you will have one with water, one with vinegar, one mixed water and salt, and one mixed water and baking soda.

STEP 2: Place one gummy bear in each of the cups.

STEP 3: Now watch and record your results for 24 to 48 hours, documenting what you see.

SUPPLIES

Clear cups
Gummy bears
Water
Vinegar
Baking soda
Salt

THE SCIENCE

Start by asking your child what they will happen to a gummy bear in water. Will it dissolve? Will it shrink or grow? Will it fall apart?

"Osmosis" is the motion of water through a barrier. It's why gummy bears grow when other candies (like peppermints) dissolve. Gummy bears contain gelatin (which doesn't dissolve in water) and sugar (which does). When you place a gummy in plain water, you'll see the bear grow as water flows into the bear. Why? The water moves to balance out the stuff dissolved in it. Outside the gummy bear, you have water with nothing in it. Inside the gummy bear pockets of gelatin you have water and sugar. There's more stuff inside the bear, so the water moves into the bear to try and make the proportion of sugar molecules to water the same in both places.

GROWING GUMMY BEARS LAB

	1 MINUTE	6 HOURS	12 HOURS	24 HOURS	48 HOURS
SALT WATER					
TAP WATER					
DISTILLED WATER					
SUGAR WATER					

Will a gummy bear grow? Using different liquids (distilled water, tap water, salt water, juice, vinegar soda, cooking oil etc.) observe how gummy bears **expand**, or don't, in a variety of **solutions**, and determine why that is. Don't forget to measure and record the size of your gummy bears before and after!

Measure after 6 hours, 12 hours, 24 hours, and even 48 hours!

What's Happening?

Osmosis! Gummy bears will expand in size due to osmosis. Osmosis is the ability of water (or another liquid) to be absorbed through a semi-permeable substance which in this case is the **gelatin**. The gelatin in the gummy bears also keeps them from **dissolving** except for when they are placed in an **acidic** liquid such as vinegar.