

Section 1

Understanding Life Systems

EXPLORATION 1

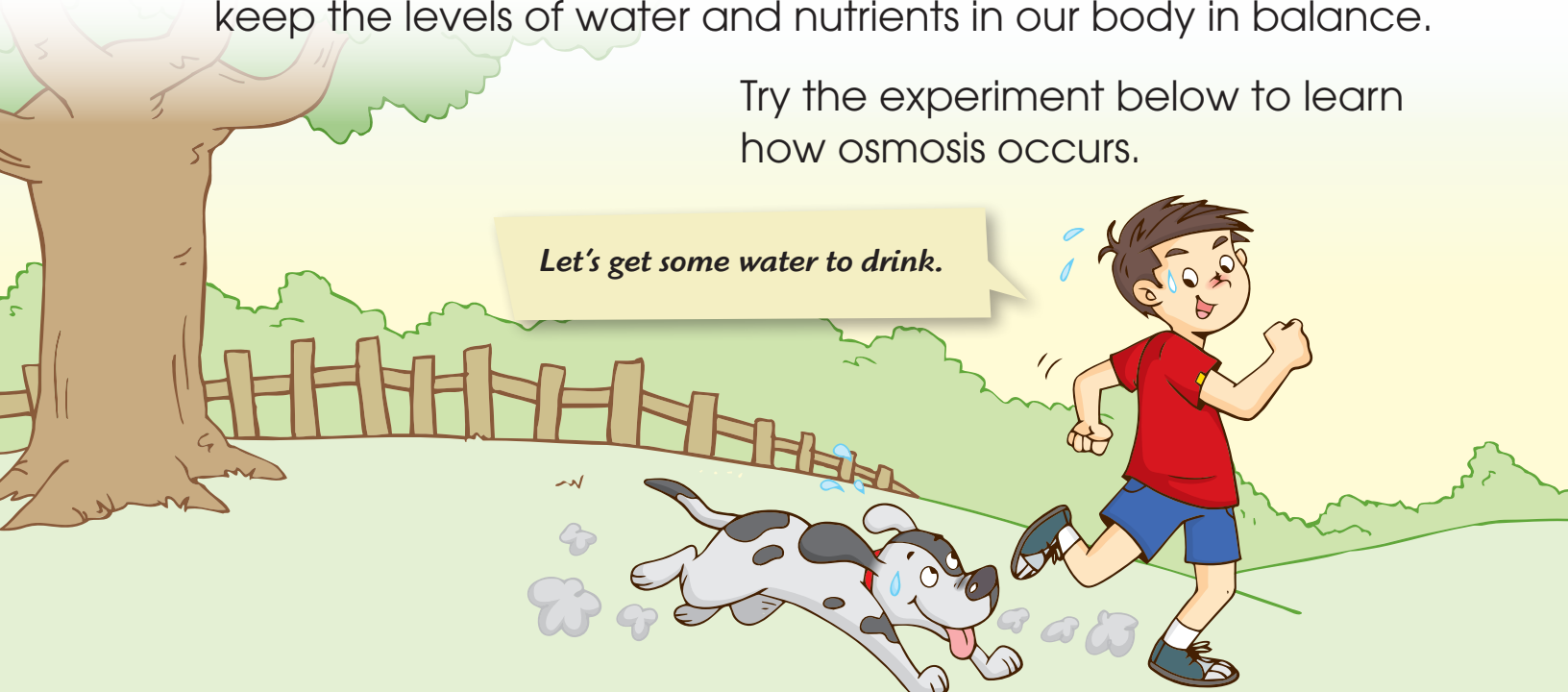
Egg Osmosis

Observe osmosis through eggs.

When we exercise, our body sweats and we feel thirsty. To replace the water we lose when we sweat, we need to drink water. Have you ever wondered how our body absorbs the water that we drink? Our body absorbs it through osmosis. Osmosis helps our body get the water and nutrients from food into our blood. It also transfers waste products out of our blood.

So, what is osmosis? Osmosis is the natural movement of water through a semipermeable membrane (a membrane that has tiny pores, allowing small molecules to move through it). During osmosis, water moves through a semipermeable membrane from the side that has a high concentration of water to the side that has a low concentration of water. The semipermeable membrane surrounding the cells in our body allows water and small molecules to move in and out of the cells. So, moving water from cell to cell is what allows us to keep the levels of water and nutrients in our body in balance.

Try the experiment below to learn how osmosis occurs.



Let's get some water to drink.

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EXPLORATION
1

Egg Osmosis

In this experiment, you will examine the direction of water movement during osmosis.

Level of Difficulty:

advanced

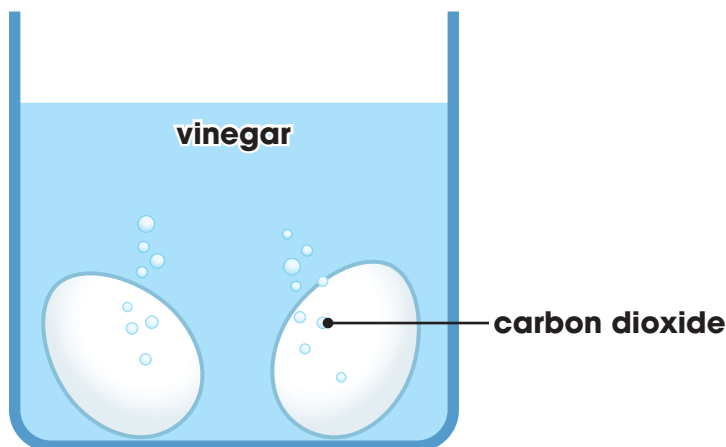
Time Needed:

1 week

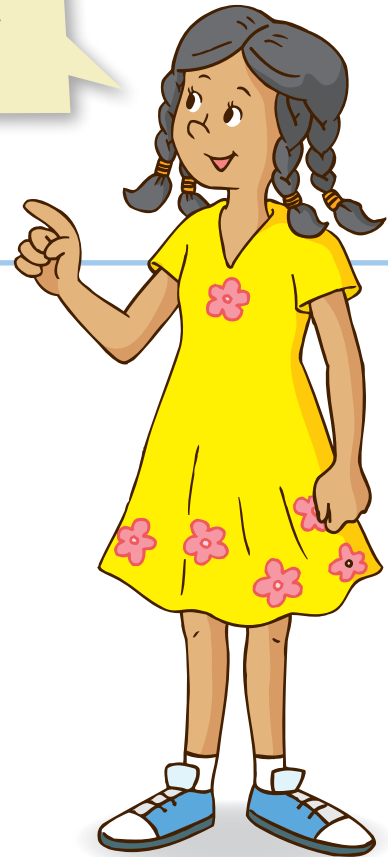
Before doing the experiment, we need to prepare two eggs with no shells in advance. Each shell-less egg represents a cell and its semipermeable membrane.

Eggs with No Shells

Leave the eggs in vinegar for 24 hours. The egg shells will dissolve in the vinegar. During this process, carbon dioxide is released, which can be seen as bubbles on the surface of the shells.



After the shell dissolves, the membrane is semipermeable and rubbery in texture. Pour all the vinegar down the drain and gently rinse the eggs off under running water to get them ready for the experiments.



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Egg Osmosis

Hypothesis:

For each experiment, write the correct word to show your hypothesis.

Materials:

- 2 shell-less eggs
- 2 jars
- a scale
- paper towel
- water
- corn syrup

Experiment 1

If a shell-less egg is added to a jar of water, I predict that the egg will

_____ .
shrink/expand

Steps:

1. Measure and record the weight of the shell-less egg in the chart on the next page.
2. Place the egg in a jar and add enough water to cover the egg.
3. Observe the egg after one week.
4. Measure and record the weight of the egg.
5. Record your observations.

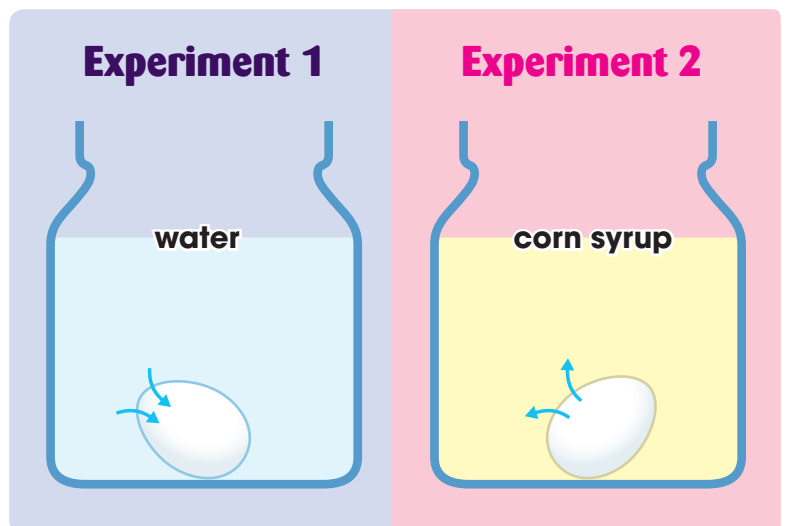
Experiment 2

If a shell-less egg is added to a jar of corn syrup, I predict that the egg will

_____ .
shrink/expand

Steps:

Follow the same procedure as in Experiment 1, but add corn syrup into the jar instead of water.



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Egg Osmosis

	Experiment 1	Experiment 2
Initial Weight		
Final Weight		
Difference in Weight (gain/loss)		
Observation		

Conclusion:

Circle the correct words after conducting the experiments.

The egg in water **shrinks / expands** and the egg in corn syrup **shrinks / expands** .

Experiment 1: My hypothesis was **correct / incorrect** .

Experiment 2: My hypothesis was **correct / incorrect** .

Explanation:

In Experiment 1, the water molecules moved into the egg through the semipermeable membrane until it reached equilibrium (the state in which the concentration of water on both sides is equal). You may have noticed that the egg expanded.

In Experiment 2, the corn syrup is mostly sugar and has a lower concentration of water than the egg. Hence, the water moved out of the egg to the corn syrup until it reached equilibrium. This outward movement of water caused the egg to shrink.

