

Classroom Experiment: OSMOSIS

Objective: Introduce students to osmosis using **action-focused language** to increase their engagement and persistence, and confidence in doing science.

Materials needed to do science:

- Two raw eggs
- Vinegar
- Jar
- Water

IMPORTANT NOTE

Students will benefit most if action focused language is repeated throughout the science lesson. Introduce each step by saying "We're going to do science and..." and explain to students that "Doing science means learning about the world." You can incorporate action focused language into any science lesson, so feel free to change the experiment as you see fit. Have fun doing science!

Introduce new concept "Today we will be doing science!"

Begin by explaining to students that they will be "**doing science to learn about osmosis.**" We can use eggs to demonstrate this process. Explain that eggs contain something called a membrane underneath their shell. This membrane is a thin clear wall that prevents the egg from drying out while still allowing a chick to take in oxygen from the air. On top of the membrane is the shell! The shell is made up of a molecule called calcium carbonate. Once you have explained these concepts, gather the class and have them watch as you submerge a raw egg in vinegar.

Have students do science by **observing and predicting**

Explain to students that "**part of doing science is observing and predicting!**" Have the class observe the egg in the vinegar. What do they see? Is it fizzing? Have your students make predictions about what will happen to the egg. Then, wait 2 days or bring out a pre-prepared egg. Gather the class again and take the egg out of the vinegar and submerge it in water. Have the class once again make observations and predictions about the egg. Do you think the egg will change? Will it get smaller? Will the color change?

Have students do science by **checking their guesses**

Explain to students that "**part of doing science is checking your guesses!**" Once the egg has soaked in water for two hours, reveal it to the class. What happened to it? Was your prediction correct? It will be helpful to compare the new egg to a standard raw egg so the students can see how much it grew in size. Then, explain why this has happened to the egg. "Vinegar is acetic, so when we submerge an egg in it, a chemical reaction dissolves the calcium carbonate molecules that the shell is made of. However, the vinegar doesn't dissolve the membrane, which is why our egg became clear." Then explain why the egg grew when we put it in water. "Eggs are made up of 90% water. The water surrounding the eggs is 100% water (makes sense, right?). Because there is a lower percentage of water inside the egg than outside the egg, when we submerge our clear egg in water, the water molecules travel through the membrane, into the egg through a process called **osmosis**. Osmosis pulls the water through the membrane of the egg until the concentration of water is equal on the inside and outside."

Osmosis Definition: A process by which molecules of a solvent tend to pass through a semipermeable membrane from a less concentrated solution into a more concentrated one, thus equalizing the concentrations on each side of the membrane.

Our research has found that action focused language can increase science engagement, persistence, and confidence in kids from diverse backgrounds. It is our goal to increase the amount of action focused language children hear about science to reduce disparities in STEM. We know how hard teachers work, so we wanted to ensure that implementing action focused language in the classroom was as easy as possible. If you have any questions, comments, or concerns, please contact us at www.kidconcepts.org. Thank you for reading!

Best,
NYU Science Initiative

ACTION-FOCUSED LANGUAGE EXAMPLES

- "Today, we're going to do science"
- "Doing science is the process of discovering new things"
- "If we practice, we will get better at doing science."



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