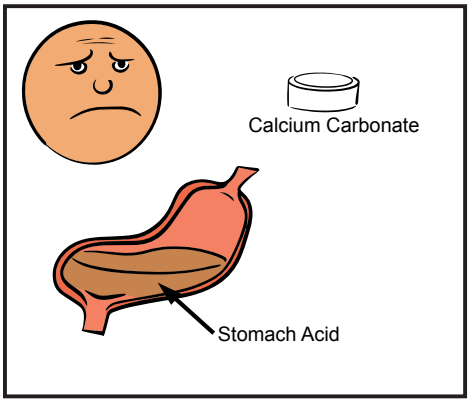
After Dinner Science: The Squishy Eggs

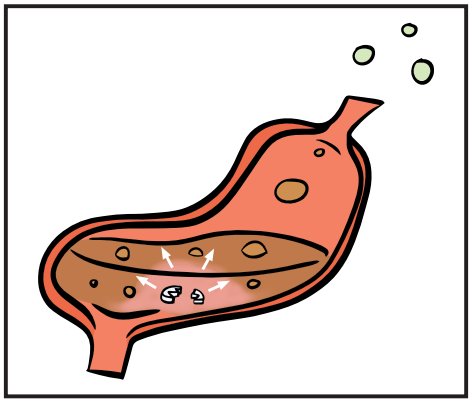
Did you know that eggs were meant to be more than breakfast? Eggs are packages that birds make to hold their babies. A baby chick does not grow inside its mother like human babies do; it grows inside an egg. While chicks are still inside the egg, they are called **embryos** (ehm-bree-ohs). The eggs' hard shells protect the embryos.

Egg shells are hard due to the material that it is made from, calcium **carbonate** (kal-see-um car-bow-nate). People sometimes take calcium carbonate pills if their stomach is upset. That is because something special happens when calcium carbonate is mixed with some kinds of liquids like stomach acid or vinegar. This special kind of change is called a **chemical change** (kem-ih-kle change).

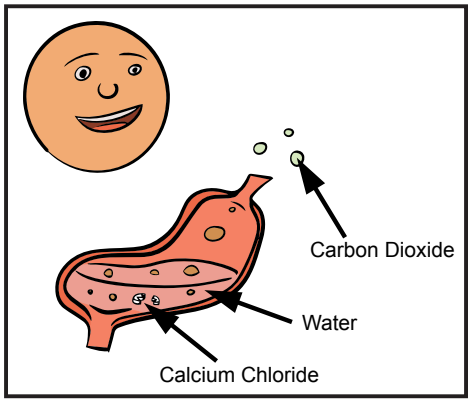
In a chemical change, materials called **reactants** (ree-act-ants) break apart and fit together in new ways to form different materials called **products** (prah-ducts). In our example, we started with calcium carbonate and painful stomach acid. These are our reactants. The chemical change begins when someone swallows a calcium carbonate pill to get rid of their stomach acid. The calcium carbonate and the stomach acid materials break apart and get rearranged to make water, **carbon dioxide** (car-bon die-ox-ide) gas, and an ingredient used in sports drinks called calcium chloride (kal-see-um klor-ide). These are all the products. Thanks to a chemical change, the person now feels better.



Reactants



Break Apart and Rearrange



Products

But what does a chemical change have to do with eggs? In this Grab and Go, you will experiment with eggshells and watch as a chemical change takes place.

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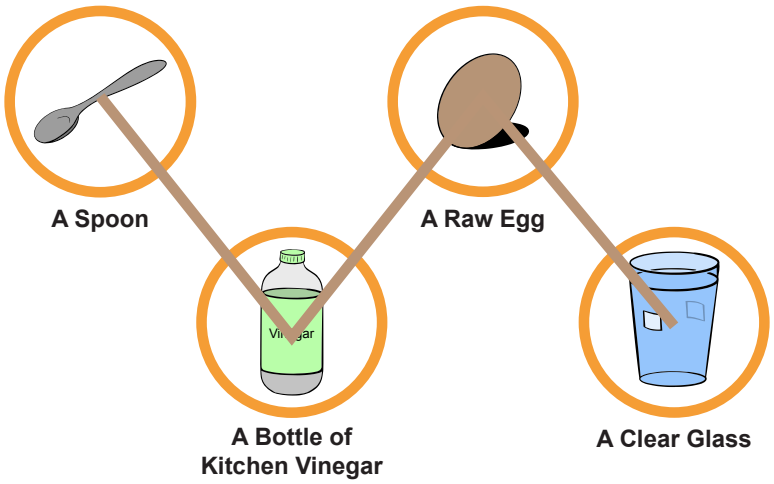
The Materials



The Experiment

1. Fill the glass with vinegar. Leave enough empty space so you can put the egg in without spilling any vinegar.
2. Observe the outside of the egg. Carefully feel it– what does the shell feel like? Can you gently scratch it with your fingernail?
3. Write a prediction down on your recording sheet. What do you think will happen to the egg in the vinegar?
4. Carefully put the egg into the glass of vinegar. You may need to use a spoon to help. The egg may float in the liquid for a minute or two, but it will eventually sink. Record the time you put the egg in the vinegar, then observe the egg for a few minutes. Do you notice anything different yet?
5. Watch for bubbles on outside of the eggshell. What do you think might be causing the bubbles? Write down your prediction.
6. Let your egg stay in the vinegar for at least an hour, before checking again. Record the time and any new changes to the egg. Are there more bubbles?
7. Every few hours, you can check the egg. Be sure to record the time and any new changes, along with any new predictions or questions you have.
8. Eventually, you will see white foam on top of the vinegar. What do you think causes this? (Hint: what happens when you pour a glass of soda?) In about 24 hours, draw a picture of what the egg looks like now.
9. Carefully remove the egg and rinse it. Be careful, the eggshell will be a lot weaker! Gently scrape the eggshell with your fingernail again. What happens?
10. If you leave the egg in the vinegar for about 36 hours, all the calcium carbonate eventually will react with the vinegar and leave just the soft membrane and yolk behind. Would an embryo be able to hatch if its eggshell was a lot weaker and softer? Explain your thinking.

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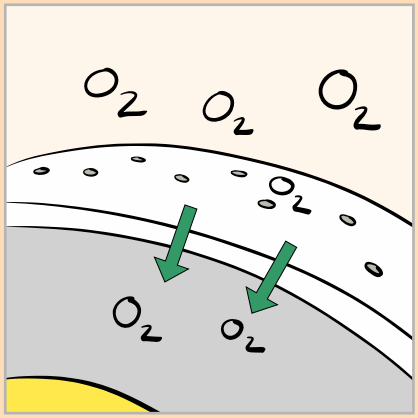
Extra Enrichment

Try taking your **decalcified** (dee-kal-sih-fied) egg and putting it into another liquid. What do you think will happen?

- Carefully remove the decalcified egg from the vinegar, and very gently rinse it off with plain water. Be careful– it will be fragile, and might break!
- Fill a glass with a different liquid. You could try corn syrup, salt water, soda, or plain water, or something else. Make sure that an adult is with you while you experiment.
- Place the decalcified egg in the new liquid, and record the time you put it in. Now, predict what will happen to the egg in the new liquid, and write it down. Leave the egg in the new liquid for at least 1 hour before you check on it. Has anything changed? Record the changes and the time.
- Check on the egg again in 12 hours. Record the time, any changes, and any new questions you have in your science notebook.
- Do you think anything can regrow the calcium eggshell once it's been weakened? Why or why not?

Eggshells are **semi-permeable** (seh-mee-per-mee-uh-bul). This means that the eggshell has small holes called **pores** (poors) that work like a gate. If you look closely, you can actually see them on the egg. The pores let some things, but not everything, pass through the eggshell. The pores let the embryo get the **oxygen** (ox-ih-jin) it needs to stay alive while making sure the yolk, egg white, and other liquids cannot escape.



Adapted from Make & Take Event 2019.

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