



# Shell Acidification Experiment



If you've heard of ocean acidification before, but you are not sure of what it is and what its effects are, this experiment is just what you need! With this very simple science experiment you will be able to witness the chemical reaction between the shell's material and the acetic acid in the white vinegar!

**Set up time: 2 minutes**

**What do you need?**

1. White vinegar
2. Salt water (approximately 1 ½ teaspoons salt per 1 cup water)
3. Clear glass or plastic jars
4. Seashells
5. A notebook to record the changes in your seashells



## What do you do?

1. First, set up several jars and add a seashell into each one.

*Note: you can have different jars with different types of shells to investigate whether the type of shell affects how fast the shell dissolves*

2. Pour your saltwater into one jar and cover the shell completely. This will act as your control. Make sure to note which jar is saltwater and label accordingly.
3. Pour vinegar into the remaining jars, make sure the seashells are covered completely in each jar.
4. Set the jar aside and observe what happens! You will want to check your seashell periodically to see the changes!
5. After leaving the seashells in vinegar over time (up to 24 hours) try touching them to see how much more fragile they become, some of them might even feel soft or break.
6. Write up in your notebook which seashell reacted the most.

**Note:** You can set up regular intervals to observe your seashells and note the changes. Generally thinner shells will react quicker than the thicker ones, remember to write down which ones were the first and last to react, were they the thinnest and thickest of your seashells?



## The science of seashells with vinegar:

The science behind this seashells experiment is the chemical reaction between the shell's material and the acetic acid in the white vinegar. Seashells are the exoskeletons of molluscs.

A mollusc can be a gastropod like a snail or a bivalve such as a scallop or an oyster.

Their shells are composed primarily of calcium carbonate, which is also what eggshells are made of!

The animals use the shells as a home and to protect their soft bodies. Shells left behind from dead molluscs may wash ashore for you to find or might become a new home for a new sea creature such as a Crab!

## What happens when you put vinegar on seashells?

When you add vinegar to seashells, carbon dioxide bubbles start to form; did you notice that happening during your experiment?

This happens because of the chemical reaction between the calcium carbonate which is a base and the vinegar which is an acid. Together they produce a gas called carbon dioxide.

Over time the shells will become more and more fragile and will start to break apart if you touch them.

## The link with ocean acidification:

This experiment is a great opportunity to talk about the effects of ocean acidification. As the level of carbon dioxide in the air rises so does the acidity of the ocean. The burning of fossil fuels is the biggest cause of this increased air pollution, but it also affects our seawater and contributes to climate change.



**How does it work?** The ocean absorbs carbon dioxide from the atmosphere; carbon dioxide reacts with seawater to form carbonic acid which causes the ocean to decrease in carbonate ions which keeps the seawater in balance. This causes the acidity of seawater to increase and ultimately harm the shells of sea creatures such as molluscs 😞

**What can we do about it?** The good news is that it's not too late to act and change this path, we can help molluscs keep their shells nice and healthy! How? By reducing our fossil fuel use and lowering the amount of CO<sub>2</sub> that goes into the atmosphere.

Can you think of some ways to reduce your carbon footprint?