# Bouncy ‘sea urchin’ eggs

Find out why Antarctic marine life is under threat from climate change with this easy experiment.

**Curriculum**
KS2 Geography: Human and physical geography
KS3 and KS4 Chemistry: Chemical reactions, Earth and atmosphere

**Resources**

- Uncooked eggs
- Permanent markers
- Vinegar
- Food colouring
- One jar for each egg

**Accompanying video**
https://www.youtube.com/watch?v=uOcmglSGyaM&list=PLJsLOysi1d5GlbnXljAJxbgbl50NciXah

**Learning outcomes**
Understand the damage to marine life from ocean acidification and freshening oceans

**Instructions**

1. Give your eggs a wash
2. Decorate your eggs with permanent markers. Sea urchin shells come in lots of colours and patterns - you could research some photos for inspiration.
3. Pour vinegar into one jar and add some food colouring. Pop in one of your ‘urchin’ eggs.
4. In a different jar add water and another ‘urchin’ egg.
5. Wait 2-3 days

**Observations**
There should be no change to the egg in water, but there should be froth on top of the vinegar.

**What’s happening**
Under the hard shell eggs have two membranes that are permeable to water. The vinegar represents acidic sea water and the hard calcium carbonate shell of the egg is just like a sea urchin shell.

The acid in the vinegar dissolved the calcium carbonate shell, the same thing might happen to the sea urchin in acid sea water.

The water in the vinegar moved through the egg’s membranes by a process called osmosis. Fresh water can move into the sea urchin too. Water moves from a high concentration in the glass to a a low concentration inside the egg membrane. The egg swells as it gains water, that’s why it gets bigger.

Cut your bouncy egg open. We know water diffused through the membranes because water inside is the same colour as the liquid. The egg in water didn’t change because the water is not acidic.

Burning fossil fuels releases large amounts of carbon dioxide (Co2) which causes the Earth to warm. Warmer temperatures are melting Antarctica’s ice sheets releasing fresh water into the ocean. Carbon dioxide also reacts with seawater, making the ocean more acidic. Freshwater and more acidic water in the oceans make life harder for Antarctica’s marine animals. Acidic sea water can dissolve calcium carbonate shells and freshwater puts animals under stress.

This experiment and video were made by Nick Barrett. Nick is a PhD student at the University of Cambridge Earth Science Department and The British Antarctic Survey investigating the resistance of Antarctic marine species to predicted freshening and lower salinity in the Southern Ocean.

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