Activity:
Ocean acidification investigation

Increased carbon dioxide in the atmosphere is causing the ocean to become more acidic. Set up a class experiment to simulate how this affects ocean creatures with shells.

You will need:

- 2 beakers
- Water
- Salt water (you can make your own by adding salt to water)
- White vinegar
- pH meter or pH indicator
- Chalk or shell
- Measuring tape
- Scales
- Magnifying glass or microscope
- Ocean Acidification Investigation

Carbon dioxide in the atmosphere dissolves in the ocean, lowering its pH

What to do

1. Introduce the topic by watching the ocean acidification video. Ask pupils to list some of the creatures mentioned in the video (scallop, crab, sea urchin, coral, plankton) and confirm that all these creatures have shells or skeletons made of calcium carbonate.
2. Set up the experiment. Fill one beaker with a water/vinegar (roughly 2:1) mix and the other with salt water. Ask pupils to record the pH of each liquid on the Ocean Acidification Investigation worksheet.
3. Explain that you are going to leave a calcium carbonate object (shell or chalk) in each beaker for a week. Discuss what pupils think will happen to the objects and create and note down a hypothesis.
4. Before placing the objects in the beakers, pupils should sketch them and record the size and weight. If you have access to a microscope or magnifying glass, pupils could look at their structure.

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What to do (continued)

5. The following week, remove the objects from the beakers. Make a second sketch of the objects.
6. Record the pH in the beakers and the weight and size of the objects. Make notes on their structures if using a microscope or magnifying glass.
7. Compare the results and discuss how this experiment relates to ocean acidification. What has happened to the calcium carbonate object? How does acidification of the ocean affect creatures with shells or skeletons made of calcium carbonate?

Ocean acidification

Carbon dioxide from the earth's atmosphere dissolves in the surface water of the ocean. It then combines with seawater to create a weak carbonic acid.

Currently the ocean's pH is 8.1. It has dropped from 8.2. While this might not seem like much of a change, because of the way the pH scale works, the change represents approximately a 25% increase. And it has mostly happened over the last 200 years, since the start of industrialisation.

Scientists believe that ocean pH has changed naturally in the past but is now occurring at a faster rate than ever before due to human activity, such as burning fossil fuels, which releases carbon dioxide, and deforestation, which also releases carbon dioxide as well as reducing the number of trees absorbing the gas from the atmosphere.

In acidic waters, the shells of some marine creatures have started to dissolve. This means the creatures have to use extra energy in repairing their shells, which affects their overall growth. Other creatures have grown thicker shells, which also takes extra energy and affects overall size.

Cutting carbon dioxide emissions will slow the rate of ocean acidification.

Ocean Acidification Investigation

Name: _____

_____

My hypothesis:

_____

_____

_____

_____

_____

Picture before the experiment:

	Acidic water		Water	
	Before	After	Before	After
pH				
Size				
Weight				

Picture after the experiment:

Our results show: