

Dissolving shells

Overview:

See the effect of ocean acidification of marine life.

The Earth's oceans are becoming more acidic as more CO₂ in the atmosphere dissolves into our ocean. This experiment highlights the effect of a weak acid on marine life especially molluscs and corals. For this demonstration shells are placed in two small containers; one containing water and the other containing vinegar. The vinegar will cause the shell to start to fizz and dissolve. After 2 hours holes will have appeared in the shell.



Equipment needed:

- Shells (whelks work best).
- Distilled Vinegar (acetic acid).
- Light box.
- Stop clock.
- Water.
- 2 small screw top containers.
- pH paper.

How it works:

1. Add water to one of the containers and add distilled vinegar to the other.
2. Place a similar sized and shaped shell into each container.
3. Place both containers on the light box and turn the light on.
4. Start the stop clock.
5. Ask visitors to see if they can see anything happening. They should be

able to see the shell in the vinegar fizzing and dissolving.

6. The calcium carbonate in the shell is reacting with the vinegar (acetic acid) to produce water, carbon dioxide and calcium acetate. This reaction neutralised the acid but also breaks down structures made of calcium carbonate such as shells and corals.

How does this relate to NERC science?

Environmental scientists understand that carbon dioxide in the atmosphere is absorbed by the oceans; this is a natural process which helps maintain a stable level of CO₂ in the atmosphere. However, they also understand that increase in CO₂ emissions through the burning of fossil fuels has led to greater levels of CO₂ that dissolve into the oceans. This increase level of CO₂ in the water is causing the oceans to become less alkaline (more acidic). Although the oceans are still alkaline (8.06 on pH scale), this reduction in pH is already having adverse consequences to marine life. By 2100 it is estimate that the pH could reduce to 7.76–7.86.



Key take home messages:

- Our oceans play an important role as a 'Carbon sink' – they absorb CO₂ from our atmosphere.
- When CO₂ in the atmosphere dissolves into our oceans it makes the water more acidic.
- This can affect a range of marine organisms.

// **This experiment highlights the effect of a weak acid on marine life especially molluscs and corals** //

Health and safety ⚠

Activity - Electrical Equipment.

Hazard | Precaution

Electric Shock - Take care not to spill liquid on lightbox, annual PAT test, adult supervision.

Risk - Low.

