

Ocean Acidification

Lesson content summaries

Key questions for the unit of work:

1. What is ocean acidification, how is it linked to climate change and why is it so significant in the Arctic region?
2. How can ocean acidification data be analysed and presented?
3. How can the process of ocean acidification be replicated in the laboratory, enabling us to consider its potential impact on global ecosystems?

Lesson 1: Case study

Starter	<p><i>(link to 'The Science' video clip)</i></p> <p>Watch and answer questions relating to video clip, read blog entry from Catlin Arctic Survey 2010 website</p>
Main	<p>Write three-part blog on ocean acidification:</p> <ol style="list-style-type: none">1. What is ocean acidification (definition, facts and figures, diagram)2. What was the project in the Arctic Ocean all about? (location map, aims, techniques)3. What does the future hold for the Arctic Ocean? (threats, key findings, prevention)
Plenary	<p>Summary of learning to date in the form of three fact sharing.</p>

Lesson 2: Data analysis

Starter	<p><i>(link to 'In the Field' video clip)</i></p> <p>Watch and answer questions relating to the challenges faced by researchers collecting data in Arctic regions</p>
Main	<p>Spearman's Rank Correlation Coefficient calculation using data from the research structured as an AQA Geographical Skills paper question but also relevant to other exam specifications.</p>
Plenary	<p>Opportunity for students to mark each other's work using the mark scheme provided.</p>

Lesson 3: Fieldwork investigation

Starter	<p><i>(link to 'Back at the lab' video clip)</i></p> <p>Watch and draw a flow diagram relating to the video clip and the process of data analysis in the lab.</p>
Main	<p>Groupwork task based around two experiments to investigate ocean acidification. Students are given a list of equipment and have to design two experiments using the equipment provided:</p> <ol style="list-style-type: none">1. To investigate how CO₂ alters the pH of sea water2. To investigate the impact of increased acidity of sea water on sea creatures. <p>Equipment provided: sea water or water and salt, litmus paper or pH meter, sea shells or eggs (soaked and unsoaked), beakers, straws, white vinegar, stopwatch, measuring jug, tablespoon, heavy books.</p> <p>Once they've designed their experiments, students video each other conducting experiments with commentary and record their findings / observations. If no video recording equipment is available, they can record some audio or write down their findings.</p>

Plenary Familiarisation with some of the organisms that might be affected by ocean acidification:
photo analysis using Internet research and consideration of wider effects on the food chain.

Homework / follow-up task

Edit everything that you have learnt over the last three lessons to create an online revision page or a revision booklet that could be used by students like yourselves to revise the topic of ocean acidification.

Include a section on the bigger picture – fitting ocean acidification into the wider framework of global warming – how are the two processes linked? The following video clip is a good source of information on this: www.youtube.com/user/PMLAdministrator?feature=mhee

Additional resources

Ocean acidification – the facts (student information sheet)

Ocean acidification – sources of information (student and teacher reference list)

‘Ask the expert’: www.geographyinthenews.rgs.org/interviews/article/default.aspx?id=1234