LESSON 3: RESEARCH IN ACTION

All lesson resources can be found at: encounteredu.com/teachers/lessons/frozen-oceans-science-14-16-lesson-3

Summary

The Arctic Ocean is known as a 'sentinel system'. This is because ocean acidification is happening more rapidly in these cold waters. Students will learn about the research that is currently being undertaken in this remote region.

Learning Objectives

- Learn how scientists work in extreme environments and develop knowledge of science careers
- Link the survey techniques used by students to the environmental and biological survey techniques used by the Catlin Arctic Survey scientists
- Understand how to investigate the relationship between the health of organisms within an ecosystem and environmental factors such as pH

Preparation

- Familiarise yourself with relevant multimedia content available online in lesson resources
- Print out enough copies of:

    Subject Update - Ocean acidification
    Subject Update - Copepods
    Subject Update - Ice-free ice holes
    Subject Update - Copepods into the future

- There are a range of options for students to communicate their work, all of which were methods used by the scientists. Print out enough copies of (if using):

    Student Sheet 3a - Scientist tweet sheet
    Student Sheet 3b - Blog post
    Student Sheet 3c - Storyboard template

Notes

LESSON PLAN

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Aims / Objectives	Activities	Resources	Outcomes
STARTER: WHERE IS OCEAN ACIDIFICATION HAPPENING?	Show students the difference in sea-surface pH map Ask students to identify the areas where the change in ocean pH is fastest Why might this be the case? Show students the sea-surface temperature map Ask students whether they can identify any links between pH and temperature	'Sea-surface temperature' diagram 'Changing sea-surface pH' diagram	Know that ocean acidification is happening at different rates in different places and understand some of the reasons for this
THE SENTINEL SYSTEM	Introduce the fact that the Arctic acts as a sentinel system for the rest of the planet's oceans. Changes are happening here fastest and can show what the possible impacts could be for the rest of the oceans Show the Channel 4 News video to introduce students to the work of the Catlin Arctic Survey	'Channel 4 News' video - hosted on YouTube. Link: https://www.youtube.com/watch?v=ElEpFcyijNk	Know why scientists are going to the Arctic to study ocean acidification
HOW IS RESEARCH CONDUCTED IN THE ARCTIC?	Show students the series of images from the Encounter Edu Discovery Zone that shows what a day in the life of an Arctic scientist is like	'Ice Base science' gallery 'Water sampling' gallery 'Trawling for copepods' gallery 'Making an ice hole' gallery Subject Update - Ocean acidification Subject Update - Copepods Subject Update - Ice-free ice holes Subject Update - Copepods into the future	Know what it would be like to be an Arctic scientist
A DAY IN THE LIFE	Students to create a presentation of a day in the life of an Arctic scientist	This can be created using: – A slideshow program – Through Twitter (use Student Sheet 3a) – As a blog post (use Student Sheet 3b) – A storyboard for a short video (use Student Sheet 3c) Students can search for images from the Arctic in the Encounter Edu Discovery Zone encounteredu.com/discover	Demonstrate understanding of the realities of remote field research
PLENARY	Scientists have to make a case to receive funding to enable them to conduct their work from research bodies such as NERC What ocean acidification research would students apply for? Do students think that ocean acidification should be a research priority?	Show the NERC site: www.nerc.ac.uk	Understand that scientists have to make a case when they apply for funding