LESSON 2: DATA ANALYSIS (CHEMISTRY)

All lesson resources can be found at: encounteredu.com/teachers/lessons/frozen-oceans-science-14-16-lesson-2

Summary

One of the most used data sets to show the trend in ocean acidification over the past 20 years is from the Hawaii Ocean Time-series. Students will use the real data from a series of research 'cruises' to analyse the information and identify trends. There are options to use ICT to examine the data set, as well as using print outs of graphs and data tables.

Learning Objectives

–   Present data using appropriate methods and carry out and represent mathematical analysis

–   Interpret data, including identifying patterns and trends and use data to make inferences and draw conclusions

–   Evaluate data critically, showing awareness of potential sources of random variations and systematic errors

Preparation

–   Familiarise yourself with the Ocean Acidification Data in the spreadsheet available online in lesson resources.

–   Print out enough copies of:

> Subject Update - Hawaii Ocean Time-series

Option 1 – offline, with students required to draw their own graphs from a data table

–   Print out enough copies of:

> Student Sheet 2a - Ocean acidification data and question sheet
> Student Sheet 2b - Ocean pH graph
> Student Sheet 2c - Ocean carbon dioxide graph

Option 2 – offline, with students analysing a pre-prepared graph

–   Print out enough copies of:

> Student Sheet 2d - Ocean acidification graph and question sheet

Option 3 – online, with students creating graphs in MS Excel

–   Book computer room or class laptops

–   Download the Ocean Acidification Data for students and save to appropriate work area for students

–   Download the Lesson 2 slideshow 'Using Excel to create graphs'

–   Print out enough copies of:

> Student Sheet 2e - Ocean acidification Excel and question sheet

Notes

LESSON PLAN

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Aims / Objectives	Activities	Resources	Outcomes
STARTER: WHY USE THIS DATA SET?	It has only been in the past few years that ocean acidification has been researched more. There are few data sets that show how carbon dioxide has affected the pH of the oceans over a period of time	Subject Update – Hawaii Ocean Time-series for background Show the location of the cruises using Google Maps by searching for: 22 45N, 158W	Understand that long-term data on ocean acidification is rare
DATA EXERCISE: OPTION 1	Using the annual mean data from the Hawaii Ocean Time-series, students: - answer basic questions about data sets - draw graphs based on the data - interpret the graphs	Student Sheet 2a – Ocean acidification data and question sheet Student Sheet 2b – Ocean pH graph Student Sheet 2c – Ocean carbon dioxide graph	Understand the use of data in science investigation Create a graph from a data set Interpret data and draw conclusions
DATA EXERCISE: OPTION 2	Using the annual mean graph from the Hawaii Ocean Time-series, students: - answer basic questions about data sets - interpret the graphs	Student Sheet 2d – Ocean acidification graph and question sheet	Understand the use of data in science investigation Interpret data and draw conclusions Draw a line of best-fit
DATA EXERCISE: OPTION 3	Using the annual mean data from the Hawaii Ocean Time-series, students: - answer basic questions about data sets - draw graphs based on the data - interpret the graphs	Student Sheet 2a – Ocean acidification Excel and question sheet Spreadsheet – Ocean acidification data (student) Slideshow – Using Excel to create graphs *The use of a computer room or class set of laptops is needed for this option*	Understand the use of data in science investigation Create a graph from a data set Interpret data and draw conclusions Use software to assist in the interpretation and communication of data