

STUDENT SHEET 2e

Ocean acidification Excel and question sheet

This data activity uses data collected from over 200 research expeditions off the coast of Hawaii. It is one of the most commonly used data sets by scientists and others to demonstrate the process of ocean acidification. The expeditions are known as 'Cruises' because the researchers are based on a ship. They are not at all like cruises you may see advertised in the media!

Step 1: Viewing the data

Open the spreadsheet containing the data. Have a look at all the data. There are three sheets in the workbook listed in the tabs at the bottom of the page:

- **All Cruise data**
all the data collected by the expeditions
- **Cruise data annual mean**
mean of all the data for each year as well as atmospheric carbon dioxide data collected from a research station in Hawaii
- **Graph all Cruise data**
a graph based on the data from the Cruises

Step 2: Interpreting a graph

You will see that a graph has been made from 'All Cruise data' on Sheet 3.

Answer the following questions:

1. What do you notice about the trend (the overall direction of the line of best-fit that has been drawn through all the points) of the data for Ocean pH?
2. What do you notice about the trend (the overall direction of the line of best-fit that has been drawn through all the points) of the data for Ocean CO₂?

Step 3: Creating a graph

You will now create a series of graphs that show Cruise data annual mean figures.

Answer the following questions:

3. What is meant by annual mean?
4. Why might this be a more suitable figure to use compared to the individual data?

Now create three graphs using the figures for:

- Mean Annual Ocean pH
- Mean Annual Ocean Carbon Dioxide (ppm)
- Mean Annual Atmospheric Carbon Dioxide (ppm)

Add a trendline for each graph.

Copy and paste the graphs to a slideshow or word-processing document and print a copy. You will need these to answer the following questions and for creating your report next lesson.

Step 4: Analysing the data

Answer the following questions:

5. Can you suggest a possible reason for any connection between the patterns shown in the three graphs?
6. Look at the data and suggest how it could be improved as a data set e.g. look at the dates, and also think about any further information that would have been useful.
7. What other questions do you have about the data?
8. How could the graphs be used to make the argument that increased atmospheric carbon dioxide is having an impact on the oceans?