

Scientific Enquiry Materials

KS2

CLIMATE CHANGE



First published in 2007

© The Centre for Research in Primary Science and Technology (CRIPSAT), University of Liverpool

ISBN 978-0-9557200-1-7

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Printed by Zenith Media, Cardiff, CF15 7QR

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Levels 2–5

Resources

- ▶ Enquiry Sheet – Evidence of the Ice Age
 - ▶ Internet access
 - ▶ books about the Ice Age
- This activity links to unit 9 – Forensic Science



Links to skills in the Science PoS

This activity focuses on the evidence to support scientific beliefs about events in the past. Information has to be gleaned from secondary sources, pooled and cross-referenced to check reliability.

Evidence of the Ice Age

Overview

This activity encourages pupils to observe some reproductions of postage stamps illustrating animals that lived on Earth during the Ice Age and to consider the evidence for the Ice Age having occurred.

Activity

The Enquiry Sheet contains pictures of commemorative stamps depicting the Ice Age.

Use these pictures as an introduction to the idea that the climate in Wales has not always been as it is now. Ask the pupils to look at the pictures of the stamps and discuss what they show and what all the animals shown have in common.

In pairs, ask them to discuss what would count as evidence of the Ice Age. They could check their ideas by looking for other evidence of the Ice Age on the Internet and in books. The pupils could record the information that they find on the Enquiry Sheet.

Suggested questions

What do you think is meant by an ice age?

What needed to happen for an ice age to occur?

What counts as evidence of the Ice Age?

What evidence might you expect to find to show that the animals shown on the stamps once lived on Earth?

How was Wales affected by the Ice Age?

Supplementary activities

Pupils could investigate how animals lived on Earth during the Ice Age, focusing on their habitat, food, movement, etc.

Discuss with pupils the difference between primary and secondary evidence. Is there any primary evidence of life during the Ice Age?

Pupils could compare and contrast evidence from the Ice Age with the evidence used by detectives / forensic scientists to solve crime.

** A distinction is made by scientists between an ice age and the Ice Age. Generally, scientists refer to an ice age as a cold period when the entire Earth experiences notably colder climatic conditions. There have been four ice ages, the most recent of which is referred to as the Ice Age.*



These stamps show animals that lived on Earth during the Ice Age.

Discuss with a partner what all the animals shown have in common. List your ideas.

Discuss the evidence that could show that these animals once lived on Earth.

Use the Internet and books to help you find other evidence about the Ice Age.

evidence that these animals lived on Earth	other evidence of the Ice Age

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Melting ice
- ▶ Internet access
- ▶ books about the Ice Age

**Links to skills in the Science PoS**

This activity is predominantly about searching systematically to access secondary sources of relevant information and ideas and then linking cause and effect from past to present.

Melting ice**Overview**

This activity encourages pupils to think about how the Earth has changed as a result of climate changes from the Ice Age to the present.

Activity

Introduce the idea that the climate on Earth has changed since the Ice Age. Ask the pupils to use the Internet and books to explore the features of the surface of the Earth during the Ice Age and find any examples of plants and animals that might have lived on Earth at that time.

Working in pairs, they should draw what they think the area near their home looked like during the Ice Age.

Encourage pupils to compare daily life for adults and children in the Ice Age with life today.

Suggested questions

How did the Earth look during the Ice Age?

How much of the Earth was covered in ice?

What was the air temperature during the Ice Age?

What lived on Earth during the Ice Age?

What observable effects have ice ages left on the landscape?

What do you think daily life would have been like for people during the Ice Age?

Supplementary activities

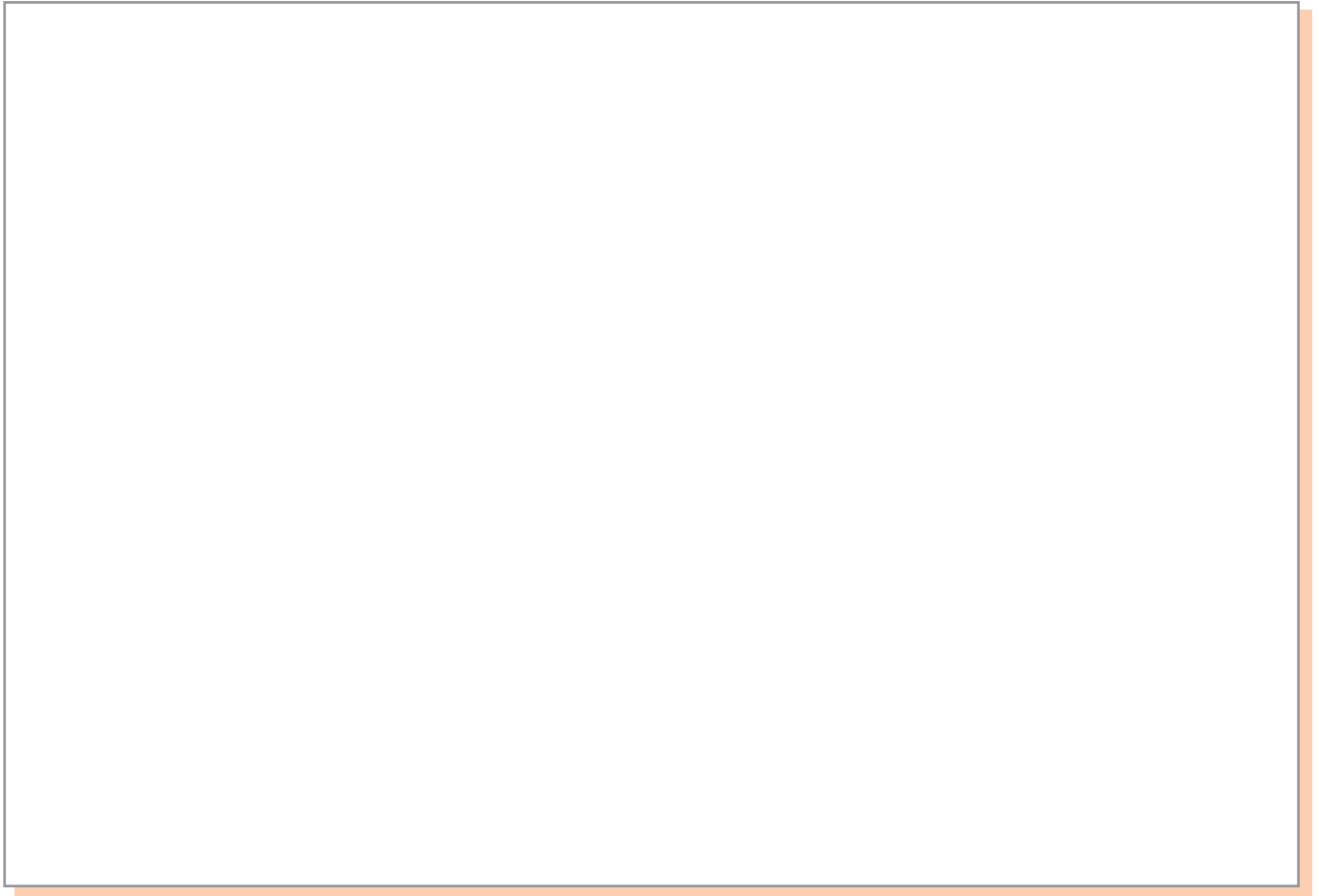
Pupils could find out how and where parts of Wales have been affected by an ice age and show the information on a map.

Pupils could find out what counts as an ice age, how many ice ages have occurred, and what evidence of an ice age is to be found today on the Earth's surface.

Draw pictures to show:

- ▶ how the area near your home might have looked during the Ice Age.

Show some people and other living things and the places where they lived.



Compare daily life for adults and children in the Ice Age with life today.



Levels 2–5

Resources

- ▶ Enquiry Sheet – Measuring climate change
- ▶ Internet access
- ▶ www.bbc.co.uk
This activity links to unit 2 – Weather



Links to skills in the Science PoS

The main emphasis in this activity is the consideration of measurement scales and devices appropriate to the ideas and physical quantities being explored.

Measuring climate change

Overview

This activity encourages pupils to think about the measurements that scientists make to monitor changes in climate. It also helps children to understand the difference between climate and weather.

Activity

Explain to the pupils that in 2006 a project used data collected about the weather to predict climate change. Over 250,000 people downloaded the BBC climate change computer model that used the spare processing power of each person's computer to help predict the future climate. Scientists at Oxford University used the results from each computer to predict the Earth's climate up to 2080.

Ask pairs of pupils to imagine they are scientists investigating climate change and to think about and discuss which aspects of the weather they would measure as part of their investigation. They could record their ideas on the Enquiry Sheet.

Encourage them to share their definitions.

Pupils should use their ideas to think about and discuss how they could monitor and measure changes in the future climate before reporting their discussions to the rest of the class.

Suggested questions

What aspects of the weather would you measure in your investigation?

What measuring equipment would you use?

How often would you take your measurements?

What do you think is the difference between 'weather' and 'climate'?

How would you monitor climate change?

Supplementary activities

Pupils could examine and reflect on the results of the BBC experiment, available at <http://www.bbc.co.uk/sn/climateexperiment/>

Pupils could make a poster or podcast to show the difference between 'climate' and 'weather'.

** 'Weather, of course, is not the same as climate. One happens day by day, the other involves long-term trends over many decades, centuries or even millennia.'*

In pairs, imagine you are scientists investigating climate change.

Which aspects of the weather would you measure as part of your investigation?

what we would measure	how often we would measure	the equipment we would use
		
		
		
		
		
		

Report your ideas to the rest of the class.

Levels 2–5

Resources

- ▶ Enquiry Sheet – Wales under water?
- ▶ map of Wales showing towns and cities (available on CD-ROM)



Links to skills in the Science PoS

In this activity, pupils make comparisons and identify and describe trends in data or information.

Wales under water?

Overview

This activity requires pupils to think about how different places in Wales might be affected by a rise in sea levels as a result of climate change.

Activity

Explain to the pupils that some scientists predict that, due to climate change, sea levels will rise by about 7 metres by 2200. If this happens, parts of the world where people currently live will be under water. Ask the pupils to look at the two maps of Wales on the Enquiry Sheet 'Wales under water?'. The first map shows Wales as it is today and the second map shows a scientist's prediction of how Wales might look by the year 2200. Ask pupils to use the maps to decide which towns, cities and parts of counties are likely to be under water by the year 2200, and why they think these areas are most likely to be affected.

Suggested questions

What parts of Wales may be under water by the year 2200 according to the scientist's prediction?

Why do you think your local area will / will not be under water?

Supplementary activities

Pupils could work out how far inland the impact of changes are estimated to have reached in different areas.

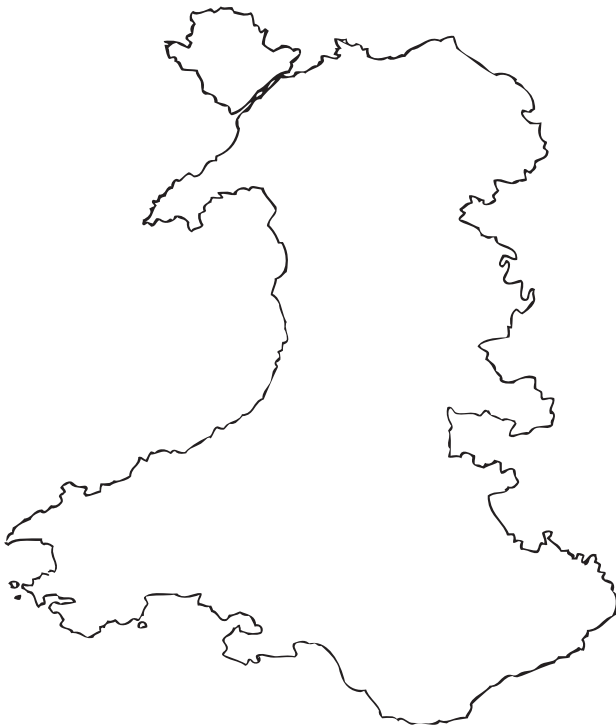
Map 1 shows Wales as it is today.

Map 2 shows a scientist's prediction of how Wales might look by the year 2200.

Look at both maps:

- ▶ which towns, cities and parts of counties are most likely to be under water?
- ▶ why do you think these areas are most likely to be affected?

Map 1: Wales as it is today



not drawn to scale

Map 2: Wales as it might look by 2200



not drawn to scale

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Wales in the year 2200

**Links to skills in the Science PoS**

Pupils make predictions using some previous knowledge, understanding and preliminary work. They also use some previous knowledge to make links between cause and effect and begin to evaluate outcomes against success criteria.

Wales in the year 2200**Overview**

This activity invites pupils to predict likely changes in the climate of Wales by 2200 and the possible effects of these changes in climate.

They are also required to consider whether they agree with other pupils' predicted changes in climate.

Activity

Ask groups of pupils to discuss and predict how the climate in Wales might have changed by 2200.

Ask them to think of some of the possible effects of these changes in climate.

They could record their ideas on the Enquiry Sheet.

Groups of pupils could then exchange Enquiry Sheets and use a colour coding system to show whether they agree, disagree or aren't sure about another group's predictions for changes in climate. Ask the pupils to justify their reasons to the rest of the class.

Suggested questions

How do you think the climate of Wales is likely to change by 2200?

How will any change in climate affect the landscape, buildings and living things?

In what way are other groups' predictions for change different to your group's predictions?

Supplementary activities

Pupils could think of ways that people could help to slow down climate change, discuss the effect of these changes and the length of time before any effect would be noticed.

In groups, predict how the climate in Wales might have changed by 2200.
Think of some possible effects of these changes in climate.

our predicted changes in climate by 2200	possible effects of changes in climate

Exchange your predictions with another group.

Decide whether or not you agree with each prediction offered by a different group.

Colour each rectangle to show if you agree.

- ▶ green – agree
- ▶ red – do not agree
- ▶ orange – not sure

Justify your reasons to the rest of the class.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Plants, animals and climate change

**Links to skills in the Science PoS**

The major skills called upon in this activity are the seeking of patterns of information and making predictions in terms of relevant trends in data. Collaborative development of ideas and reflection are also required.

Plants, animals and climate change**Overview**

The pupils are asked to choose one species of wild plant and one species of wild animal and to consider how climate change might affect these living things and their habitats.

Activity

Begin this activity with a discussion of climate change and its possible effects on Wales.

Ask pupils to think how one type of wild animal and one type of wild plant might be affected by climate change. They could record their ideas on the Enquiry Sheet. Encourage them to explain to other pupils in their group why they think these effects are likely.

Suggested questions

How would their habitat change as a result of climate change?

How might a wild animal change to suit the changes in the climate?

Supplementary activities

Pupils could imagine they are a journalist making an Internet report, a newspaper report or a web log to show the different effects that global warming might have on, for example, people, buildings, sport and leisure.

With a partner, think of one type of wild plant and one type of wild animal that can be found in Wales. Discuss how the plant and the animal and their habitats might be affected by climate change.

Show your ideas to other pupils in your group.

	name of wild plant:	name of wild animal:
		
how its HABITAT might be affected by climate change		
how it might be affected by climate change		

Explain why you think these effects are likely.

Levels 4–5**Resources**

- ▶ Enquiry Sheet – Monitoring plants and animals
- ▶ Internet access

**Links to skills in the Science PoS**

The demand here is for learners to turn their proposal into a form that allows changes to be observed both qualitatively and quantitatively, using relevant equipment and techniques, in order to be able to describe changes and trends over time.

Monitoring plants and animals**Overview**

This activity invites pupils to consider how they would monitor changes over time in a population of their selected wild animal and wild plant.

Activity

Begin this activity with a discussion of what is meant by the scientific term 'population', how and why a population might change and why a population should be monitored. Ask pupils to work in pairs to decide what measurements or observations they could make to monitor any changes within a population of their wild animal and wild plant (selected for the previous activity). They should describe in detail what they would measure or observe and how they would do this. Pupils could record their ideas on the Enquiry Sheet.

Suggested questions

How would you measure the number of wild animals or wild plants?
 How would you decide on a sample of your population to measure or observe?
 What equipment would you use?
 How often would you record measurements or observations?
 For how long would you continue your measurements?

Supplementary activities

Pupils could use the Internet to find out how people observe and measure different wildlife populations in Wales.
 They could find out which populations of living things are being monitored in Wales.

In pairs, decide what measurements or observations you could make to monitor any changes within a population of your wild plant and wild animal.

Describe how you would carry out the monitoring in as much detail as possible.

wild plant:	
what we would measure or observe	how we would measure or observe

wild animal:	
what we would measure or observe	how we would measure or observe

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Saving the Earth

**Links to skills in the Science PoS**

Pupils are asked to reflect on their actions and to generate their own considered views in relation to using the Earth's resources.

Saving the Earth**Overview**

This activity encourages pupils to consider how their own actions might be modified in order to conserve some of the Earth's natural resources.

Activity

Many scientists warn that people should reduce the amount of the Earth's resources they use.

Ask pupils to work in groups to think of ways they and their families might change their actions to help conserve the Earth's resources. They might think of the journeys they make, keeping warm, food and drink, materials in the home, etc. Pupils could use the Enquiry Sheet or make a digital animation to show their ideas.

Suggested questions

What do you do each day that uses the Earth's resources?

What action could you take to reduce the resources you use?

What advice would you give to other people about conserving the Earth's resources?

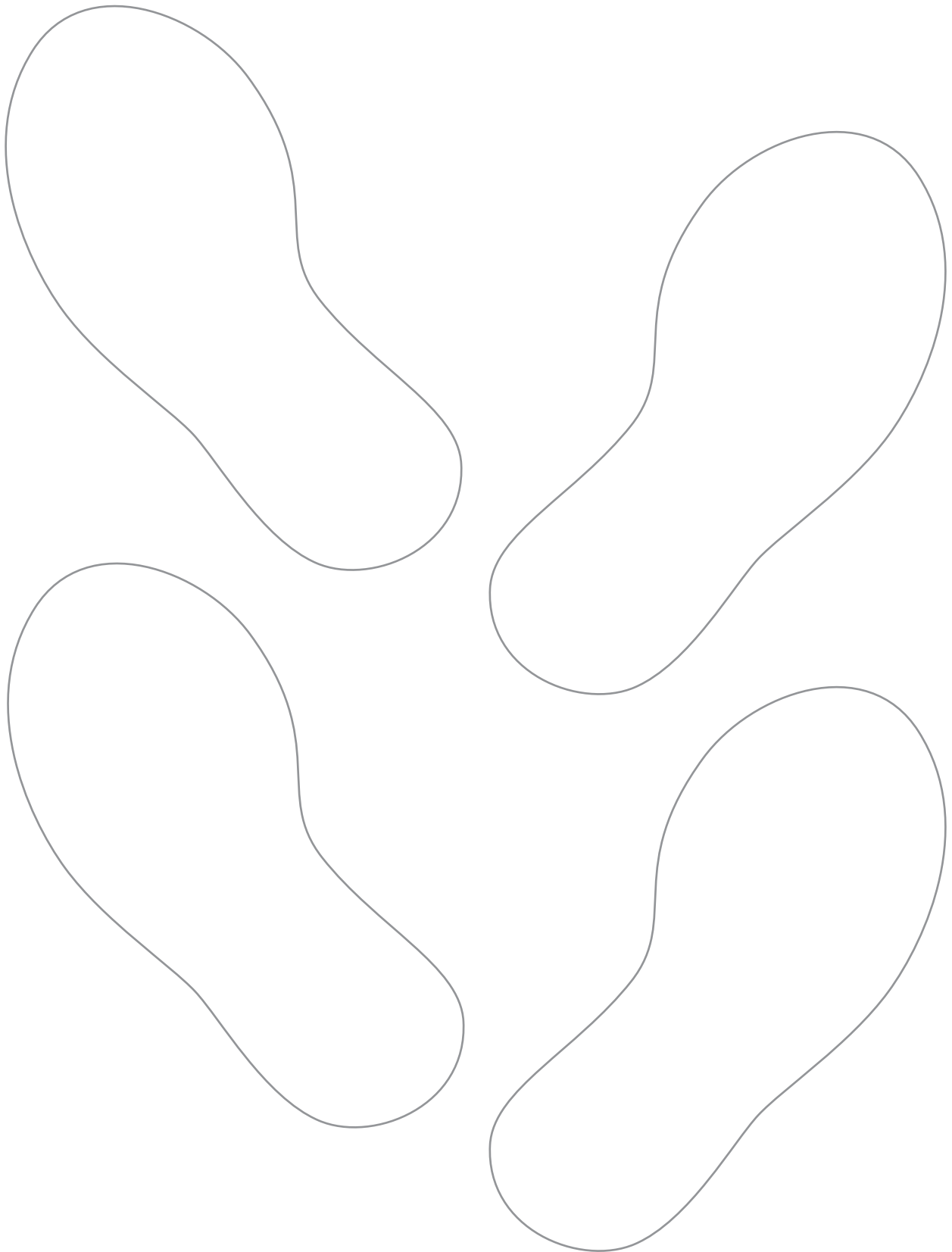
Supplementary activities

Pupils could investigate the distance that particular food and drink travels to reach their homes and the potential saving if local food and drink was used.

They could make a short film showing proposed actions that could be used to persuade other people to help save the Earth's resources.

Pupils could keep diaries to show the distance they travel by car each day for a month.

In groups, think of the steps you and your family could take to help 'save' the Earth's resources. Write one 'step' you could take in each of these 'footprints'.



Levels 3–5

Resources

- ▶ Enquiry Sheet – Claims and evidence
- ▶ articles from newspapers and magazines (that contain claims and evidence about climate change or global warming)

This activity is linked to unit 4 – What's in the news? (2006 KS2 Optional Assessment Materials for Science)

Links to skills in the Science PoS

The main emphasis of this activity is to encourage critical reflection relating to expressions of facts, beliefs and opinions by subjecting claims to scrutiny in terms of supporting evidence.

Claims and evidence

Overview

This activity encourages pupils to locate three newspaper and magazine articles that make claims about climate change or global warming. Having located such articles, pupils are then required to identify the supporting evidence presented within those same articles.

Activity

In advance of this activity, collect suitable articles from newspapers and magazines that refer to climate change and global warming.

Discuss with pupils the meaning of the term 'claim' as it is used in this context. Give groups of pupils a range of articles to read. Ask them to search through the articles for claims about climate change such as global warming. They could list or highlight all the claims that they find. Then, ask pupils to choose three claims from the list they have made and to look for evidence in the articles in support of these claims. They could record their three claims and any evidence that they find for each claim, on the Enquiry Sheet.

Suggested questions

What claim is made in the article you have read?

What evidence is there in the article to support this claim?

Supplementary activities

Pupils could think of a science investigation that they enjoyed doing recently in the classroom. They could write an article or make a podcast that contains a claim and evidence for that claim based on the results of their investigation.

Choose three different claims from the articles you have read.

Look at the articles and other sources of information to see if you can find evidence for any of these three claims.

Write your three claims and any evidence you find in these boxes.

claim 1	evidence for claim 1
claim 2	evidence for claim 2
claim 3	evidence for claim 3

Levels 4–6**Resources**

- ▶ Enquiry Sheet – Scientists' predictions
- ▶ Internet access

**Links to skills in the Science PoS**

This activity has a particular focus on identifying, describing and explaining trends, patterns and relationships. A particular technique called upon is extrapolation of a line graph. Pupils also have to use their prior science knowledge to predict cause and effect.

Scientists' predictions**Overview**

In this activity, the pupils are given two predictions made by scientists about the rise in sea levels and global warming and asked to think about evidence that relates to these predictions.

Activity

Explain to the pupils that some scientists argue that the Earth is gradually becoming warmer. As the temperature of the Earth increases, the ice at the Arctic melts more rapidly. If the Arctic ice melts, scientists predict that sea levels will continue to rise.

Show pupils the graph on the Enquiry Sheet – 'Scientists' predictions'. Ask them to discuss what the graph shows and what the line on the graph might look like if scientists' predictions that sea levels will continue to rise until 2200 are proved correct, and what the line will look like if scientists' predictions are proved wrong. They could sketch some lines on the graph to show their ideas.

The second part of the Enquiry Sheet shows the scientists' predictions that the Earth will become warmer. Working in pairs, ask pupils to discuss what would happen in different parts of the world if the Earth was to become warmer and sea levels continue to rise. They are given a list of five questions to promote discussion and they could record some of their ideas using labels or post-it notes on a large map of the world.

Encourage pupils to search for more information to inform their discussion.

Suggested questions

How do scientists think sea levels will change in the future?

How will the line graph look if there is evidence for the scientists' prediction?

How do you think people could slow down the rise in sea levels?

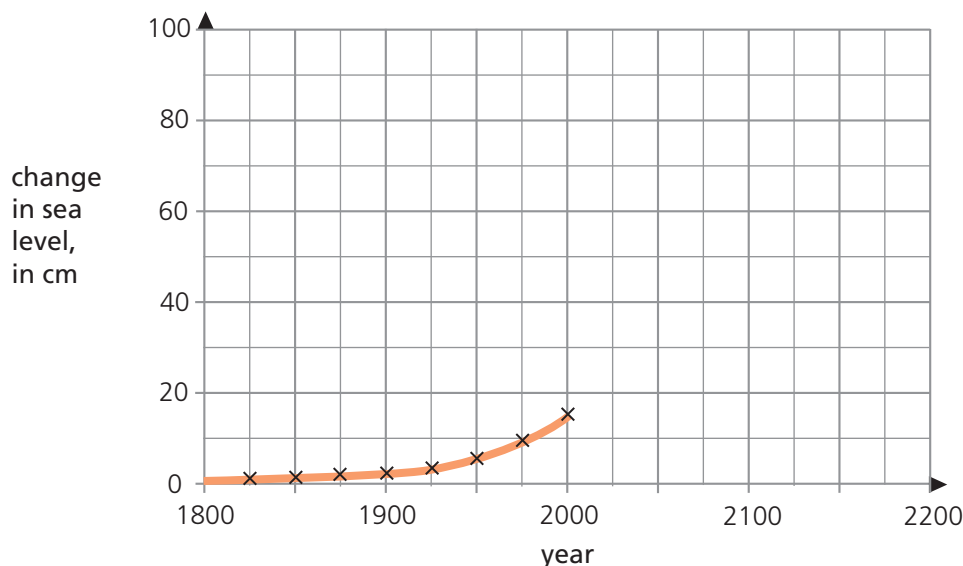
Supplementary activities

Pupils could write a series of 'newspaper' headlines related to climate change, using the computer.

They could sketch graphs to represent changes in climate reported in newspapers.

Scientists predict 'Sea levels will continue to rise until 2200'

Changes in sea level between the years 1800 and 2000.



Discuss what the graph shows.

Discuss what the line on the graph will look like if scientists' predictions are proved correct by 2200.

What will the line on the graph look like if scientists' predictions are proved wrong by 2200? Sketch some lines on the graph to show your ideas.

Scientists predict 'The Earth will become warmer'

Discuss in pairs what you think would happen to some parts of the Earth if the Earth does become warmer and sea levels continue to rise.
Search for more information to help your discussion.

Here are some questions that you could discuss:

- ▶ What might happen to the Sahara Desert?
- ▶ What might happen to rainfall levels in India? How might this affect the people?
- ▶ What might happen to the number of storms, tornadoes, etc?
- ▶ What might happen to polar bears?
- ▶ What might happen to birds' migration and animals' hibernation patterns?

You could write your ideas on post-it notes and stick them on a large map of the world in your classroom.

Produced by
The Centre for Research in Primary
Science & Technology (CRIPSAT),
The University of Liverpool

Sponsored by the Welsh Assembly
Government

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