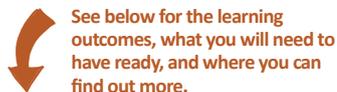


# It's hotting up

## – looking at the evidence



See below for the learning outcomes, what you will need to have ready, and where you can find out more.

### Learners will have/be able to:

- Select and construct both point and line graphs, develop a best fit line, and interpret the data
- Interpret the graph, by using numeracy and literacy skills to explain that there is evidence that temperatures are rising; average temperatures do not rise smoothly; the change in temperature over 100 years is not huge, but it is significant
- Demonstrate geographical and historical understanding, by setting the data, in a time and place frame
- Contributed to a team effort, and expressed their own ideas and feelings

### Outdoor/indoor space

Tarmac or grass (can be done in an indoor hall, but better outdoors!)

### 1.1A Climate data – the evidence

1 per student/group

### Chunky chalk, or 2 white/yellow washing lines/rope

One marked every metre for 10 years, second with ties or laminated card flags representing temperatures. You may wish to start at 0 °C, but suggest 6 °C and explain/demonstrate why (flags are then 6.0, 6.5, 7.0, 7.5, 8.0°C) every 2 metres along line

### Another length of washing line/rope (different colour) at least 15–20 m long

Laminated cards each with a decade  
In large numbers e.g. 1900, 1910, 1920 etc. (11 total)

### Laminated cards with the decade on one side and the temperature on the reverse

With a large class you may like to add an additional set with the Scottish temperatures, using a different colour pen (11 total)

British Geological Society and other partners have produced a poster: *Climate through Time – our rocks reveal the story of change* (ISBN 978-0-7518-3589-2). Have a look at [www.bgs.ac.uk](http://www.bgs.ac.uk)

Scottish Natural Heritage  
*SNH Advances Series 7 – The heat is up and it's raining* poster and activities (Curriculum for Excellence Third Level). Available from <http://www.snh.org.uk/pubs/>

The Meteorological Office  
Get average temperature and rainfall data for near your location and across the UK [www.metoffice.gov.uk](http://www.metoffice.gov.uk)

Woodland Trust Nature Detectives  
Explore the study of phenology and record the first and last sightings of species – see how they are affected by global warming [www.naturedetectives.org.uk](http://www.naturedetectives.org.uk)

**This is a setting the scene activity, providing a concrete example of the evidence for climate change, in a more local context.**

It should also reinforce the fact that the Earth's climate has changed over billions of years, revealed in Britain's geology and rocks. There is concern about the most recent rise in temperature because of its speed, and it could have serious consequences for all living species on the planet, including humans.

### 1.1A

### Climate data - the evidence

#### Changing average temperatures 1900-2000 for the northern hemisphere

These figures are extrapolated from graphs, and are not accurate, but indicate the trend sufficiently for this time period. The figures in brackets (x) are representative of east Scotland (source: Met Office 2006). Have a look at: [www.climate-trends-handbook.sccip.org.uk](http://www.climate-trends-handbook.sccip.org.uk)

year	temperature (°C)
1900	6.8 (6.5)
1910	6.6 (6.6)
1920	6.8 (7.1)
1930	6.9 (6.6)
1940	7.2 (6.6)
1950	7.0 (6.7)
1960	7.1 (7.6)
1970	7.0 (6.6)
1980	7.2 (6.7)
1990	7.3 (7.7)
2000	7.5 (8.0)

## Preparatory activity

Look at different rocks and fossils illustrating how climate has changed naturally over millions of years. Look at the geological table over time and a map of the UK's geology. Explain that the concern about climate-change today is that it is much faster and man – induced. We are going to have a look at the evidence for this global warming.

Following this, or for a period before, learners should be given the opportunity to make regular air temperature observations and records, using a maximum/minimum or digital thermometer; also, have plotted co-ordinates on a matrix, or used 4 figure grid references with a map.



## Activity 1

01 Looking at a globe/atlas, explain that the Meteorological (Met) Office collects information from weather stations across the UK. They can calculate the average annual temperature for the UK, or its individual countries. Scientists working together and sharing their knowledge have also calculated the average annual temperature for the northern hemisphere, for the period starting in 1880 to the present.

02 Explain that from such measurements, because they have been going on for so long now (over 100 years in some countries), there is evidence that the global climate is getting significantly warmer. You have figures for the northern hemisphere – look at the chart of figures (1.1A).

03 Ask/tell how this can be made easier to understand visually – a graph – a line graph, or point graph. Go outside and construct this graph. Take the chalk/lines and cards with you. During the construction try to involve everyone actively matching tasks to their ability.

04 Talk about constructing graphs and construct the x and y axes, on the tarmac/ grass – draw/ lay out the axes. Stand a learner at each decade point (identified by those who have decade cards) once the x axis is established, and those remaining learners without cards at each temperature once the y axis is established.

05 Depending on the number of learners you have – give out the decade cards, one each; the decade/ temperature cards, one each; the x axis line, and the y axis line – one between two, or a piece of chalk each;

06 Now plot the data – each person with a northern hemisphere temperature/decade card works out where they should stand by lining up with the decade first (x axis), and then the temperature second (y axis).

07 Ask a couple of able pupils on the y axis to take the spare line and join the northern hemisphere points up – what does it show? Now take a best line – what does it show? What can they interpret/conclude from this?

08 For more able students, and if you have the Scottish temperatures on cards, ask the learners to stand where their data suggests. What can they interpret/conclude from this? Ask for any questions. Dissolve the graph, and collect the resources.

09 Form a sharing circle – ask the children what they have learnt about line/point graphs, and what they have learnt about the northern hemisphere's and Scotland's temperatures over the last century? Ask what helped them learn? Summarise the key points after feedback.

10 What does this mean for the planet – does anyone know? They will be finding out more....

1.1A

# Climate data

## – the evidence

year	temperature (°C)
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Changing average temperatures  
1900-2000 for the  
northern hemisphere

These figures are extrapolated from graphs, and are not accurate, but indicate the trend sufficiently for this time period. The figures in brackets (x) are representative of east Scotland (source: Met Office 2006).

Have a look at :

[www.climatehandbook.sccip.org.uk](http://www.climatehandbook.sccip.org.uk)

