SESSION 1: WHAT IS CLIMATE CHANGE?

Age range: 7 - 11 years

Outline

Learners will first explore their existing ideas about climate change. They will then use the information provided to develop their knowledge and understanding of climate change. Finally, they will carry out a practical activity to reinforce their understanding of what the greenhouse effect is.

Learning objectives

- To recognise the difference between climate and weather.
- To recognise that the Earth's climate is changing and understand that human activities are contributing towards this change.
- To understand how the greenhouse effect works and the role of carbon dioxide as a greenhouse gas.

Learning outcomes

- Learners will develop their knowledge and understanding of climate change.
- Learners will be able to explain the results of an experiment that helps them to understand what the greenhouse effect is.
- Learners will share their knowledge and understanding about climate change with others.

Key questions

- What do I know about climate change?
- What is the difference between climate and weather?
- What is the greenhouse effect?

Resources

- *Climate challenge A* slideshow: slides 2 – 8.
- Activity sheet: *The greenhouse effect in a jar.*

Curriculum links

England

- **Science: Living things and their habitats**
  - Pupils should be taught to recognise that environments can change and that this can sometimes pose dangers to living things.
- **Science: Working scientifically**
  - Pupils should be taught to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
  - Pupils should be taught to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Wales

- **Science: Enquiry**
  - Pupils should be given opportunities to carry out different types of enquiry- planning, developing and reflecting.
- **Developing number**
  - Learners develop their number skills across the curriculum by using mathematical information, calculating, and interpreting and presenting findings.
- **ESDGC: Climate Change**

Scotland

- **Social Studies**
  - By comparing my local area with a contrasting area outwith Britain, I can investigate the main features of weather and climate, discussing the impact on living things.

    SOC 2-12a
- **Sciences : Biodiversity and Interdependence**
  - By exploring interactions between plants and animals (including humans) learners develop their understanding of how species depend on one another and on the environment for survival.

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Activity 1.1: Climate change board race

- Show slide 3 and explain briefly what a board race is. A board race is run like a relay with the person at the front of each team running up to the board or piece of paper and writing something related to the question or topic. As soon as they have written something they run back to their team and hand the pen to the next person in line and then head to the back of the queue. The next person then has a go but they must not repeat anything that is already written on their group's board or piece of paper. The process is repeated until the time is up.
- Tell learners that the topic for this race is 'Climate change' and that you will give them five minutes to get as many ideas on their paper or board as possible. Organise learners into equal groups of four to six and line them up in front of a piece of paper (or a section of whiteboard) for each group with the topic 'Climate change' written at the top. Give the first person in each group a pen or pencil.
- If there is insufficient space to run a board race you could carry out a similar activity with groups staying at their tables and learners passing around a pen or pencil to take turns to write on a piece of paper.
- At the end of the race, ask learners to sit down. Count the number of answers for each team.
- Feedback the range of ideas focusing on any themes which emerge.
- Congratulate learners on how much they already know and emphasise that they will be building on their knowledge and understanding about climate change during the session.

Differentiation

Make it harder: Make the groups smaller.

Make it easier: Buddy up learners, with one person writing and the other giving ideas.

Activity 1.2: The greenhouse effect in a jar

Source: *This activity is based on one in 'Climate Chaos' (WWF 2005), which can be downloaded from http://assets.wwf.org.uk/downloads/climate_chaos_info_pack.pdf*

You will need an outside space and a sunny day for the following activity.

- Use slides 4 to 6 to explain the difference between climate and weather, what the greenhouse effect is and why the climate is getting warmer.
- Explain that learners are going to carry out an experiment to show how a greenhouse works.
- Display slide 7 which shows two thermometers, one in a glass jar and one in the open air. Explain to learners that glass acts like carbon dioxide in the atmosphere by trapping heat emitted by the sun. *Please note that this is a simplified explanation for a younger audience.*
- Ask learners to use their existing knowledge, understanding and experiences to predict what will happen to the temperature on each thermometer shown in slide 7 over time.
    - *Do you think the temperature will always be the same on both thermometers at any given time?*

- *What do you predict will happen to the temperature over time on each thermometer?*
- *Why do you think this?*

- Explain that learners are going to try this experiment (alternatively you could do this as a whole class demonstration). Organise learners into groups of three. Explain that each group will need to place two thermometers side by side on the same kind of surface outdoors. They should then enclose one of the thermometers in a large glass jar. Explain that this is like a greenhouse. They should take and record the readings from each thermometer straight away; again after 30 minutes and again after an hour.

  Safety note: Ensure learners take care when handling glass jars to minimise the risks of breakage and possible injury.

- Ask learners to record their results using a table and line graph.
- Ask learners to compare the temperature change for each thermometer.
  - *What did you find?*
  - *Why do you think this happened?*
  - *Were your predictions correct?*
- Recap on what the learners learned about climate change in slides 4 to 6. Gases such as carbon dioxide have a similar effect on the Earth's temperature as the glass jar had on the thermometer. This is why the global warming caused by the emissions of gases such as carbon dioxide is called the 'greenhouse effect'. The greenhouse effect is important for us as it has made the Earth warm enough to support life. However, human activity is making the layer of 'greenhouse gases' thicker and the Earth is getting hotter. Scientists are predicting many negative effects as a result of these changes in temperature and people are already being affected.

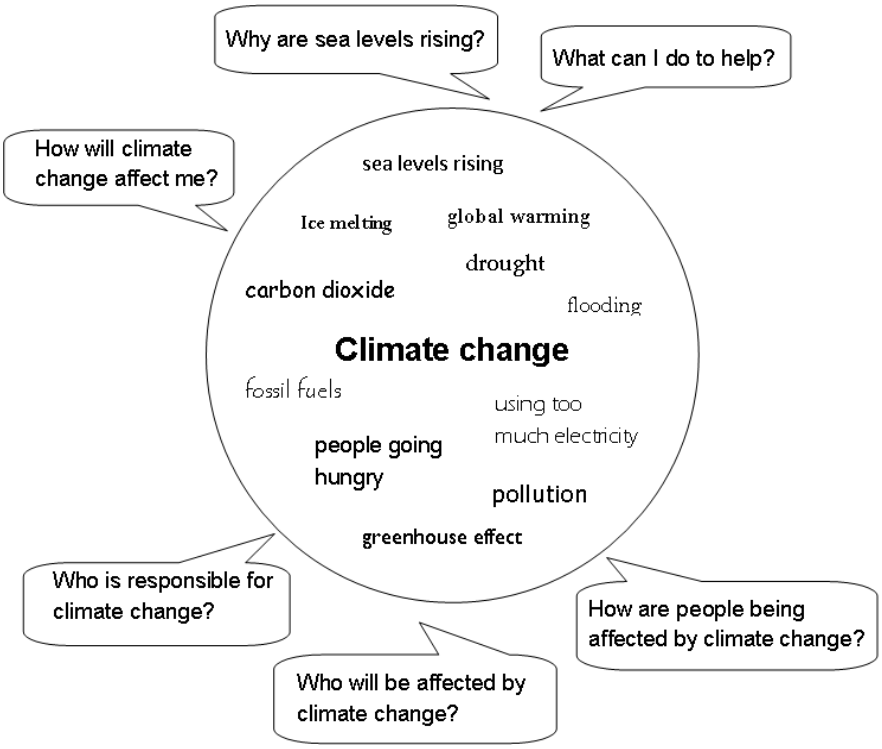
Differentiation

- *Make it easier: Learners could use the templates provided on the activity sheet,* The greenhouse effect in a jar*, to record their results.*

Activity 1.3: What do you understand about climate change?

- Draw an outline of the Earth on a large piece of paper and write 'Climate change' in the middle. Learners could write anything they have found out about climate change or words related to climate change inside the Earth. Display the Earth in a prominent place in the classroom and encourage learners to add to this 'working wall' as they go through their climate change learning journey.
- Any questions that learners have about climate change could be written outside the Earth. Discuss how learners might find out the answers to these questions.
  - *What information sources could you use?*
  - *What support might you need?*

- Show slide 8. Ask learners to use secondary sources of information to find out more about what climate change is. Explain that the learners should focus on the science around climate change. Tell them that they will be finding out more about the causes and impacts of climate change, as well as potential solutions, in subsequent sessions.
- The following web links might be useful:
  - http://www.metoffice.gov.uk/climate-guide
  - http://www.sciencemuseum.org.uk/climatechanging/climatescienceinfozone.aspx
  - http://climatekids.nasa.gov/time-machine/
- Learners could add the findings from their research inside the Earth.



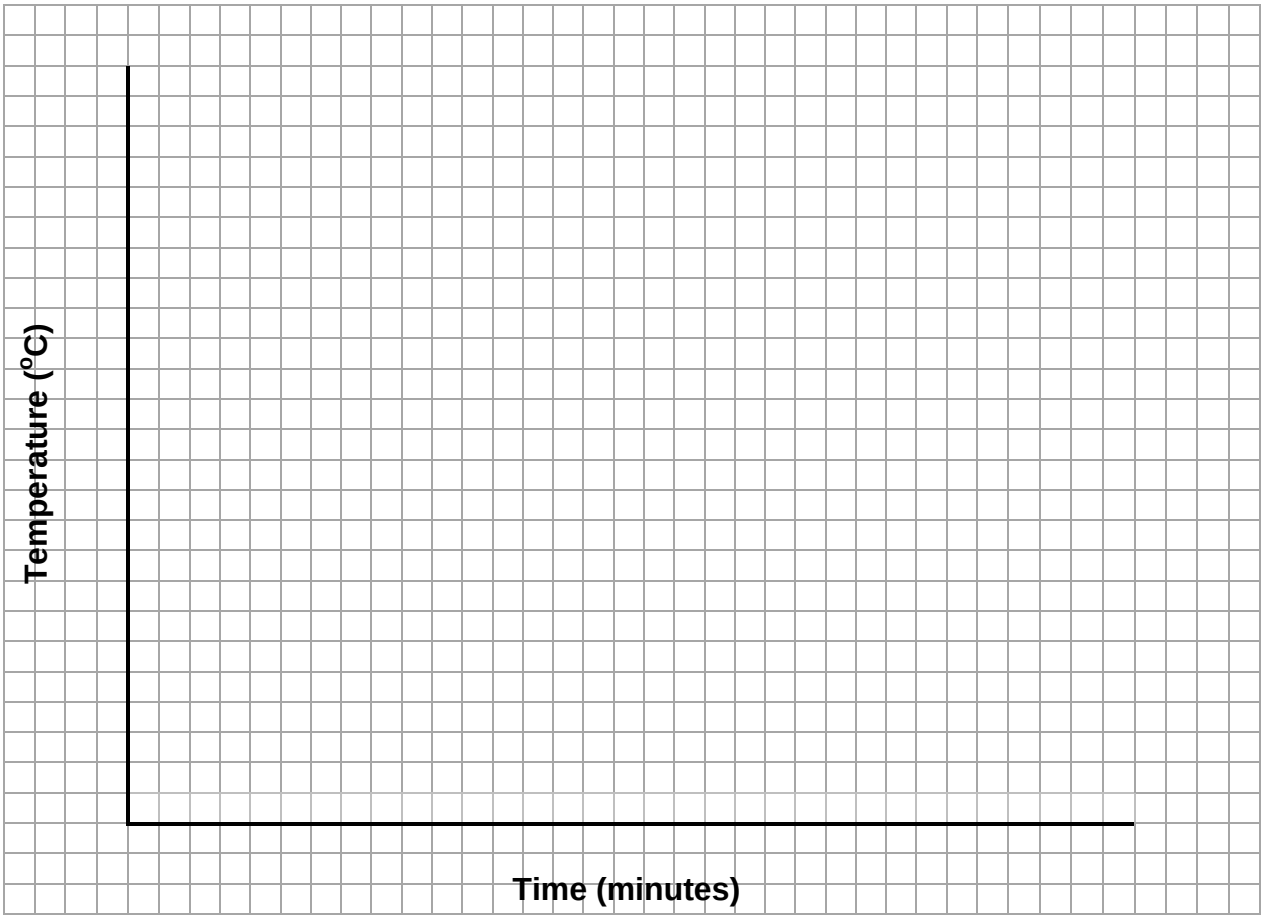
Further idea

- Learners could investigate microclimates within the school grounds. Ask learners to collect and compare weather data over a period of time from different parts of the school, such as close to and far away from a building, or from areas with north and south facing aspects.

The greenhouse effect in a jar

Use the table and graph below to record your results.

Time	Temperature – No jar	Temperature – Glass jar



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