Ministry for the Environment
Manatū Mō Te Taiao

Our Climate is Changing

New Zealand Climate Change Office
Te Tari Rerekētanga Āhuarangi o Aotearoa

Climate Change and Global Warming
Cross-Curricula Environmental Education Activities








This booklet outlines a wide range of cross-curricula ideas and information to assist you in teaching climate change to Year 5-10 students. It includes class and school cross-curricula activities, a list of useful websites, web-based games and activities, and details on where you can access more information to successfully develop a unit on climate change.

These photographs are available for printing. To download visit www.4million.org.nz/understanding/schoolstuff/pictures and use for display, discussion, writing focus etc.

Our Climate is Changing

Climate change is a very important issue and will remain so until at least the end of this century. All New Zealanders should be aware of climate change and know some actions they can take to reduce greenhouse gas emissions. Teachers should provide opportunities for students to access information that will enable them to debate issues and make informed decisions, and to take responsibility through personal and/or group actions for addressing environmental issues. Refer to *Guidelines for Environmental Education in New Zealand Schools, Ministry of Education, 1999 at www.tki.org.nz/r/environ_ed/guidelines/index_e.php.*

Learning about climate change

- Develop a climate change unit appropriate to the interests and learning needs of your students.
- Address the issue of climate change when a real-life situation provides the starter e.g. a sudden change in weather patterns.
- Include in a broader study on weather, seasons, or caring for the environment.
- Use as a project for a small group or individual studies e.g. gifted and talented children or science fair activities.
- For lesson structure consider using the 'Action Oriented Approach' in the Environmental Education Guidelines at: www.tki.org.nz/r/environ_ed/guidelines/action_ori_e.php.
- Apply 'Bloom's Critical Thinking' questioning strategies. Refer to: www.tki.org.nz/r/health/understanding/word/criticalthink.doc.

Select from the activities below:-

- Print the photographs featured in this booklet. Colour photographs can be found at www.4million.org.nz/understanding/schoolstuff/pictures. Distribute photographs for group discussions on climate change. What does it mean? What is causing it? Ask a representative from each group to report back to the class on their group's understandings.
- Use the 'Greenhouse in a Jar' activity to simulate how greenhouse gases cause global warming and how the increased heat is causing our climate to change. For instructions on how to make a greenhouse effect in a jar please refer to www.4million.org.nz/understanding/schoolstuff/greenhouseinajar.php

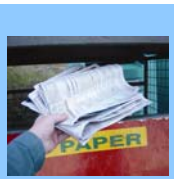
Greenhouse gases in the atmosphere act like the glass in a greenhouse. They allow sunlight to pass through to Earth's surface. When sunlight hits Earth it heats the surface. As heat rises, some of it is trapped by the greenhouse gases. Without the greenhouse gases creating what is called the natural greenhouse effect, the atmosphere and climate on Earth would be too cold to sustain life.

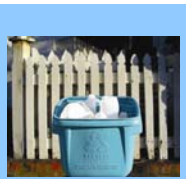
- Find an old tree stump or slice of wood (maybe a hardwood coffee table) with clear growth rings. Ask students to observe the wood and consider the story that can be told by the rings.

Tree rings and coral rings can tell us about climate history. Tree rings show how much a tree has grown each year, with each ring representing one year. In warmer, wetter years the tree will grow more so the ring for that year will be wider than the ring for a colder year. By studying the rings, scientists can learn more about the changes in weather over the tree's lifetime. A similar study can be done with coral rings. In the past 50 years, scientists have noticed that the growth rings in corals have been getting wider. This could be a sign that global warming is really happening.

- Have students plan a debate looking at an issue (related to the use of solar panels, wind farms, packaging, transport) from different perspectives. Students could take on the role of farmers, car manufacturers, local iwi, or debate from a personal perspective.
- Ask students to research and clarify the meaning of **greenhouse gases, emissions, carbon cycle, carbon sinks, Kyoto Protocol**. Information is available in the booklets *Climate Change 1* and *Climate Change 2* found at www.4million.org.nz/understanding/schoolstuff/index.php#booklets.

Booklets: For hard copies of booklets (including this one), please email info@climatechange.govt.nz.



You can download these colour photos from www.4million.org.nz/understanding/schoolstuff/pictures. While you're there – check out the web-based classroom activity 'Play it Cool'.

Our climate is changing. We are creating more greenhouse gases from things like cars, factories, farming and electricity generation. Global warming is causing changes to our climate e.g. icecaps and glaciers may melt, sea levels may rise, and pests and diseases may spread from warmer climates.

See for yourself

- Visit local areas that have been affected by floods, droughts, erosion caused by heavy rain. Interview people who have been affected.
- Interview elderly people in the community. Find out if they have noticed any changes in the climate during their lifetime.
- Interview people who have been affected by extreme weather events and how it made them feel.
- Visit your local city or regional council and ask them what they're doing to help communities adapt to climate change as many have programmes in place to cope with a changing climate.
- Read and dicuss news articles on climate change relating to floods, droughts, and other extreme weather events. Check out the websites www.nzherald.co.nz (search under 'climate change') and www.newscientist.com/channel/earth/climate-change.

Take personal or group action

- Play the web-based interactive activity *'Play it Cool'* at www.4million.org.nz and find out how the Brown family are keeping the planet cool (or not).
- Brainstorm ways the students/class/school are helping to keep the planet cool. Have students develop a list of actions they could take to reduce greenhouse gas emissions. Set some personal/class/school challenges.

Action ideas

Personal

- Conduct an energy audit to calculate how energy efficient you are (see *Climate Change 2* booklet, page 6 at www.4million.org.nz/understanding/schoolstuff/index.php#booklets). Set some personal goals to become more energy wise.
- Check out the Energy Efficiency and Conservation Authority's website for ideas on saving energy (www.eeca.govt.nz).

As a Class/School

- Walk, bike, skate, bus or carpool. Promote a 'Walking School Bus' in your school. It is a fun and social way to keep fit and get to school safely with adult supervision. Each 'bus' walks along a set route with at least one adult 'driver' picking up children at designated stops and walking them to school. The scheme eases traffic congestion around the school grounds as well as providing children with a safe and environmentally friendly journey to and from school. Visit www.eeca.govt.nz for a resource kit.
- Challenge students/staff to bring a school lunch with minimum wrapping.
- Enlist the caretakers support to compost food waste.
- Plant more trees in your school grounds (and/or join with local revegetation groups) to create more carbon sinks. Find out about local groups on www.bush.org.nz.
- Design, construct and test a solar-powered device.
- Design an energy efficient house or community www.converge.org.nz/evcnz.
- Organise a school-wide art/poster/video/power point presentation competition to show an aspect of climate change.
- Write a letter to the New Zealand Climate Change Office or a local newspaper to let them know what you are doing to reduce greenhouse gases in your school.

Curriculum Links

Science

Students can:

- *Justify their personal involvement in a school or class-initiated local environmental project (Planet Earth and Beyond - L3)*
- *Research a national environmental issue and explain the need for responsible and cooperative guardianship of New Zealand's environment (Planet Earth and Beyond - L5)*
- *Investigate the impact of some well-known technological innovation on people and/or the local environment (Nature of Science and its Relationship to Technology - L3)*

Social Studies

Students will understand:

- *How different groups view and use places and the environment (Place and Environment - L3)*
- *How and why people manage resources (Resources and Economic Activities - L3)*
- *How and why people view and use resources differently and the consequences of this (Resources and Economic Activities - L4)*

Technology

Students can:

- *Describe and identify the positive and negative effects of some instances of technologies on people's lives and the environment (Technology and Society - L3)*
- *Explore and discuss the impacts over time on the local and wider environments and society of some specific technology (Technology and Society - L4)*

Mathematics

Students can:

- *Develop the characteristics of logical and systematic thinking and apply these in a range of contexts (Mathematical Processes)*
- *Perform measuring tasks, using a range of units and scales (Measurement - L3)*
- *Interpret and use information about rates presented in a variety of ways (Measurement - L5/6).*

Essential Skills

Students can develop skills in communication (expressing views and ideas, thinking critically and arguing a case), numeracy (collating and organising data, responding to information presented in graphs, tables and percentages), information (retrieval, interpretation and presentation), and problem-solving (when looking at an issue from a variety of perspectives).

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Useful websites for information and activities on climate change

• www.4million.org.nz includes the 'Play it Cool' animated web-based activity, this booklet, pictures to download, a quiz and lots of information on how to reduce greenhouse gas emissions.

• www.climatechange.govt.nz outlines the New Zealand Government's climate change programme. Includes downloadable children's booklets on climate change.

• www.mfe.govt.nz/news/pages/learn.html is the Ministry for the Environment's website which includes an information card on energy.

•www.eeca.govt.nz provides lots of ways to reduce greenhouse gas emissions through energy efficiency.

• www.tki.govt.nz/r/hot_topics/greenhouse_e.php is the Ministry of Education's Online Learning Centre (Te Kete Ipurangi) which includes *The Greenhouse Effect* and *Energy Efficiency* as 'Hot Topics'.

www.theclimategroup.org outlines what organisations around the world are doing to reduce their greenhouse gas emissions.

• www.wwflearning.co.uk is the World Wildlife Fund's educational website for schools.

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This booklet is available at www.4million.org.nz/understanding/schoolstuff