

**Activity Time:**

30 minutes

Setting:

Any

Materials:

Grab bag - a collection of assorted objects to represent or relate to climate change. Try to have enough for every student or at least one item for every group of four (see activity for suggestions).

Grade Level:

Intermediate, middle school, high school

Subject Areas:

Biology, Chemistry, Ecology, Earth Science, Geography, Physical Science, Resource Science, Science and Technology

Skills:

Analysis, gathering information, inference, interpretation, modeling, questioning, visualization

Group Size:

10+

Key Words:

Carbonite, Climate Change Metaphor



WildBC

Climate Change Metaphors *

What do a car, a rock and a thermometer have in common? Put your hand into the mystery bag to unravel the clues to some unexpected connections.

Summary

A variety of objects provide students with metaphors for why climate change is occurring and the impacts resulting from it.

Objectives

Students will:

- Demonstrate ability to interpret metaphors
- Describe the factors contributing to climate change
- Make connections between human behaviour and environmental changes

Making Connections

Making personal connections with the causes and effects of climate change can be very challenging. It is hard to understand how turning off a light switch in Canada could affect the residents of a small island in the Pacific Ocean. This activity provides students with an easy entry into understanding the science behind climate change and how they can be part of the solution.

Background

The impacts of global climate change are predicted to be varied and wide-ranging. Climate scientists warn that increased temperatures will have significant impacts on global sea levels, temperature and precipitation patterns. Many ecosystems will undergo enormous changes and the human communities that live in and depend upon these ecosystems may be greatly affected.

A rise in sea level is anticipated as one of the most serious results of global warming. Due to melting glaciers and thermal expansion of ocean waters, it is predicted that sea levels could rise between 15cm and 95cm within this century. A one-meter rise would lead to 6% of the Netherlands, 17% of Bangladesh and 80% of the Marshall Islands being under water. These are just a few examples of the many areas that would be affected.

Climate scientists believe the warming of the earth's temperatures is directly related to the reduction of carbon sinks (areas of stored carbon) and the release of carbon, and other greenhouse gases, into the earth's atmosphere. These gases remain in the atmosphere where they trap solar

*(Adapted from Wetland Metaphors, Project WILD)



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radiation that would otherwise be reflected back into outer space. The more we add, the warmer the earth becomes.

In the 250 years since the Industrial Revolution, the amount of carbon in the earth's atmosphere has increased by 31% and is estimated to be increasing at the rate of 0.4% per year. Methane, another important greenhouse gas, has increased by 151%, and nitrous oxide by 17%. The most potent of the greenhouse gases, a group of human-made compounds which includes chlorofluorocarbons (CFC's) did not even exist before the 1930's but now account for 12% of the current enhanced greenhouse effect. All of these greenhouse gases are destroyed over time by atmospheric chemistry but the process can take decades to centuries.

It is human activity that is causing the rise in global temperatures and it must be human activity that changes in order to halt the increase. Raising fuel efficiency standards for cars and trucks, using public transport, riding a bicycle, scooter or skateboard, planting trees, turning off unnecessary lights, recycling, and buying locally produced goods, including food, will all help to slow the rate of climate change. There is much that we can do on

an individual level to minimize our own "carbon contribution". In addition, the observation of our actions can inspire others to make the same changes in their own lifestyles.

Procedure Warm Up

Ask students if they have heard of global warming or of climate change. What effects might this have on us? On the plants and animals around us? What is causing climate change? What can stop it? Tell students that you have many of the causes and many of the solutions to climate change in your grab bag.

The Activity

1. Gather students to stand in a circle.

Explain to them that you will invite certain people to take an item out of the bag. They may not look in the bag before they put their hand in (this adds to the anticipation and excitement). When they have taken their object out they are to look at it, hold it up and state what it is.

2. When all the items are out of the bag, quickly review all of them.

3. Ask the students holding the objects if they have any thoughts on how their particular object might be connected to climate change.

If a student has no idea, ask other members of the group/class to contribute their ideas.

4. When all the metaphors have been identified, group them into causes of climate change and solutions for climate change.

Try to reconstruct the climate change story – fossil fuels and over-consumption causing a rise in temperatures, what's being affected, what can be done to solve the problem.

5. Ask students to contribute any other knowledge they may have about the reasons for climate change.

Invite them to offer more ideas on ways to slow or halt global warming.

Assessment

Have students:

- Select and write about one metaphor from each category – causes, what's being affected and solutions.
- Create a skit or short play about the causes, effects and solutions of climate change.
- Give three examples of actions that could be taken at school



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to reduce their individual carbon contribution.

- Explain why a tree is good symbol of all three sides of climate change – causes, what's affected and solutions.

Extensions

- Have students determine how far they travel to school each day, then determine the 'kilometers per litre' of the family car, city bus or school bus they travel in. Using this information, students calculate how much fuel is used to bring them to and from school every day. Students then combine their individual fuel use to discover how much fuel is used every day in order for them to travel to school.
- If students use a bicycle, they can determine how much they save every day.
- If students come on the city bus, they should divide the fuel used by the passenger capacity of the bus to determine their fuel use
- If students come on a school bus, have them calculate for the bus and for individual cars to determine how much fuel they are saving.

References

Grant and Littlejohn. 2001. Teaching About Climate Change: Cool Schools Tackle Global Warming. Toronto, Ont.: Green Teacher & Gabriola Island, B.C. New Society Publishers.

Mussel, Severson-Baker and Diggins. 1999. Climate Change Awareness and Action: A Multimedia Education Kit. Drayton Valley, A.B.: Pembina Institute for Appropriate Development.

Wetland Metaphors in Project Wild. 1993. Canadian Wildlife Federation. Ont.

Every time people use energy generated from fossil fuels it creates greenhouse gases that contribute to climate change.

It is human activity that is causing the rise in global temperatures and it must be human activity that changes in order to halt the increase.



Climate Change Metaphors

Grab Bag Suggestions

The following is a list of assorted objects and their associated metaphors to represent or relate to climate change. You can have an item for every student or at least one item for every group of four.

Object	Metaphoric Function
Light bulb	Simple actions such as turning off lights when not in use (or leaving them on) can have big impacts on energy use.
Toy car	Overuse of private vehicles leads to unnecessary burning of fossil fuels.
Toy recycling truck	Recycling helps to conserve the world's natural resources so you don't have to use as much energy to create something new
Stuffed polar bear	Polar bears are among the first animals to suffer from climate change as thinning pack ice from warming temperatures makes hunting difficult.
Solar panel	Using non-fossil fuel resources helps cut down on the production of harmful greenhouse gases.
Stuffed/silk or picture of: animal, plant, insect /Endangered species book	Plants and animals all over the world face serious problems as warming global temperatures change climates and ecosystems more rapidly than they are able to adapt. Unlike animals and insects, plants are unable to move.
Thermometer	The average global temperature is rising higher with every passing year.
Sun shaped stamp/card/toy	The sun fuels our planet's comfortable atmosphere but when the sun's rays are trapped in our atmosphere by greenhouse gases, global warming takes place.
Picture of a coastline	Sea levels are predicted to rise as much as 1.5 meters as ocean waters warm and expand. This will flood millions of people & animals from their homes & kill plants and other organisms that are unable to relocate.
Picture of a tropical island	Many small island nations are facing complete inundation from rising sea levels.
Picture of a storm	Increasing global temperatures are predicted to change weather patterns bringing more storms and other extreme weather events.
Carbonite rock	This represents a carbon sink – a place where carbon is safely stored in the earth.

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Object	Metaphoric Function
Plastic pop bottle/packaging	Plastics are made from fossil fuels. The extraction and processing of fossil fuels coupled with the production of plastics represents a huge amount of carbon being released from carbon sinks and into the atmosphere.
Picture of coral	Rising ocean temperatures are predicted to kill off coral – itself an important carbon sink.
Toy tree/ a branch/leaf	Trees are an important carbon sink absorbing atmospheric carbon. Harvesting and burning the world's timber sources releases carbon into the atmosphere. Planting trees helps to replenish the planet's ability to store carbon.
Toy bicycle or bus	Using alternative sustainable forms of transportation cuts down on the burning of fossil fuels and thus greenhouse gases.
Empty spray can	CFC's, often used for propulsion in spray cans, are among the most potent of the greenhouse gases.
Item representing locally grown food	Our eating practices affect the environment. Consuming food grown locally and seasonally uses less fossil fuels for transportation than items that travel long distances.
CD	Plastics are prevalent in our everyday life, made from fossil fuels.
A plastic spoon/fork	Disposable items and packaging are often made from fossil fuels.
Picture of a shoe or doll shoe	Walking is great active transportation – we can all do something one step at a time.
Packet of seeds	Growing your own food, planting greenery. Less travel (fossil fuel use) for food source and adds to sources of carbon sinks
Piece of synthetic material-fleece/nylon	Synthetic materials for clothing are often made from fossil fuels.
Picture of a person/toy doll	People are part of the environment and have impacts on climate change but can also be part of the solution.
Salmon (picture or toy)	In BC, local impacts will affect salmon populations because of both decreases in summer water levels and increases in summer water temperatures.
Plastic bag	Plastics are made from fossil fuels. The extraction and processing of fossil fuels coupled with the production of plastics represents a huge amount of carbon being released from carbon sinks and into the atmosphere. Re-use your plastic bags, then recycle them.