



Character Education



Cooperation

High School - September, 2005

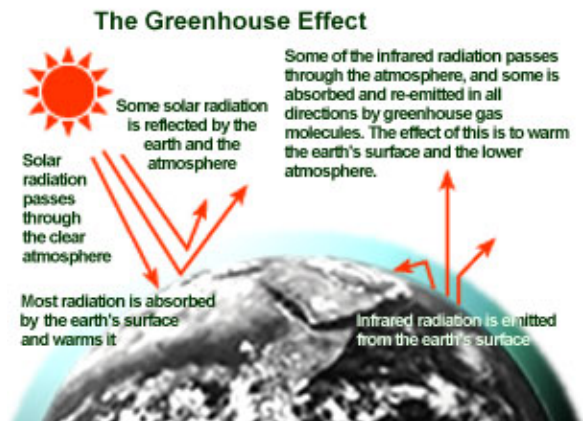
“Working with others to accomplish a common purpose.”

Dear Teacher:

On behalf of the Broward County Environmental Protection Department, welcome back to school! **Cooperation** is essential for almost every aspect of our lives. Students will learn how to work together to accomplish the goals of this activity just as we all need to **cooperate** in order to decrease the greenhouse gases in our environment. Only by working together will we be able to ensure the health of our planet.

Global Warming

Global warming is a subject that has received a lot of attention over the last decade, both in the media and the scientific world. While it is a subject of much debate, one thing not debated is that the temperature of the earth's surface has increased by 1°F over the last century. Global warming is the increase in temperature of the earth by greenhouse gases emitted into the atmosphere by natural or man made causes. Greenhouse gases include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The greenhouse effect is a naturally occurring process where the sun's rays strike the surface of the earth and warms it. After striking the earth's surface, the rays are reflected back into space, but a portion of them remain trapped in the earth's atmosphere by water vapor, carbon dioxide and methane. Without the natural greenhouse effect, the earth's temperature would be significantly colder (by about 59°F). While greenhouse gases do occur naturally in the environment, manmade sources include industry, deforestation and the burning of fossil fuels, such as coal, oil and natural gas. The increases of these sources, and consequently these gases being emitted into the environment, has caused more and more heat to be trapped near the earth's surface, causing the rise in temperature we have been experiencing.



Activity: The Greenhouse Effect Debate

This activity focuses on the international debate over the “Greenhouse Effect,” possible causes for it, whether we should be concerned and take action to reduce the greenhouse effect, or whether there is no problem to be worried about. Have students work in groups collecting information on the greenhouse effect, and evidence for and against the possibility this phenomena exists. While doing the research, students should be identifying what effect global warming might have on the earth and what possible solutions exist. This will be followed by a group debate about the greenhouse effect. As they offer their views they should support their position with evidence from their research. Positions and evidence should be scrutinized by the group according to scientific merits, verifiability, weight of evidence and influences by outside parties.

Questions to Consider:

- What impact might CO₂ emissions have on overall global warming?
- Is there evidence of a strong connection between CO₂ emissions and global warming?
- What impact have chlorofluorocarbons (CFC) emissions had on global warming?
- How is the ozone layer related to global warming?
- Would the earth be warming as quickly if we had not invented and used internal combustion engines for our transportation?
- What future changes in the global climate can we expect based on the recent trends and what can this tell us about life on earth for future generations?
- How much scientific weight should we place on the results of these investigations about global warming?

Resources:


commtechlab.msu.edu/sites/letsnet/noframes/subjects/science/b5u112.html
 yosemite.epa.gov/oar/globalwarming.nsf/content/index.html
 www.npr.org/templates/story/story.php?storyId=1893089&sourceCode=gaw
 www.dep.state.fl.us/air/pollutants/greenhouse.htm
 www.ucar.edu/learn/1_3_1.htm

Extension: Calculate your contribution of CO₂ vehicle use

- Using a city map (if necessary) have each student estimate the distance from their home to school.
- Have each student identify their type of family vehicle based on the types listed on the table below. Calculate the amount of gas used weekly if they rode to and from school everyday in a private car. To do this:
 - Add up the total number of miles for 10 round trips to school (remember, each time you're dropped off, the driver has to drive home, so there are two round trips a day.)
 - Divide the total by the miles per gallon to determine the gallons of gas burned.
 - Multiply the CO₂ released per gallon.
- Calculate the class total as if everyone rode to school in a private vehicle.
- Have students who ride the bus do the same calculations again, using the figures for the bus and dividing the total CO₂ released by the approximate number of students that ride the bus.
- Determine how many students walk or bike to school. They do not contribute additional CO₂ to get to and from school
- Now re-calculate the class total based on the type of transportation actually used by students. Compare the results. How much of a difference is there?

Vehicle	Compact Car	Full-size Car	Truck / Van	Bus
Miles Per Gallon	24	16	13	8
Pounds CO ₂ per gallon	20	20	21	22*

*Buses add more CO₂ per gallon, but they carry more passengers, so be sure to consider contribution by passenger, not just by vehicle.



Autumn Equinox
Is
September 22nd

The autumn equinox is when there is exactly 12 hours of daylight and 12 hours of darkness at the earth's equator. This is because the equator is in the direct path of the sun, so day and night are of equal length. After this day, in the northern hemisphere, the night will be longer than the daytime. Also on this day, the sun will rise for the first time in 6 months at the south pole!

Remind your students never to look directly into the sun. Permanent eye damage can occur.

