**Activity 1**

**Global Climate Change Experiment**

**Grade Level:** 5-8

**Time:** 60 minutes

**Learning Intention:** We are learning how the earth’s atmosphere traps heat that contributes to global climate change.

**Objective:** Students will understand the greenhouse effect.

**Overview:** In this activity students gain an understanding of the complexities involved in the global warming phenomenon. The earth's temperature is the result of sunlight penetrating the earth's atmosphere and warming the planet. Some of the light energy is reflected; however, certain gases in the atmosphere "trap" the heat energy after it is reflected off the surface of the earth. This trapping of sunlight energy creates the greenhouse effect. Gases, such as carbon monoxide and chlorofluorocarbons (formerly found in spray products until they were banned), are gases that trap light energy.

**Materials Needed:**

* One large clear glass jar (large enough to hold a plastic or paper cup)
* Two paper cups
* Soil (such as potting or topsoil)
* Outdoor thermometer (small enough for the base to fit in the cup)
* Student Data Sheet

**Success Criteria:** We will know we are successful when we are able complete a the science investigation and compare the results to how Earth’s atmosphere traps heat.

**Activity:**

1. Have students work in cooperative groups of four. Before allowing them to proceed with the experiment, have them read the question, choose roles, and create a hypothesis.
2. Students should work in groups of 4 to complete the activity, collect and record the data, analyze the data, and then answer the wrap-up questions.

**Closure:** As a class, have students share their observations and analysis. Review wrap-up questions and success criteria with students.

Why do you think the temperature changed when the earth (soil) was enclosed by the glass jar?

What was the source of the heat? Why did it affect cup “B” differently than cup “A”?

Can you think of other situations where the heat from sunlight is trapped in a small space and it gets hot?

What happened in this experiment is similar to how the Earth’s atmosphere traps heat. It is known as the greenhouse effect. How could this effect be good or bad for the earth?

Sunlight is the source of the earth's heat. There is a natural balance of sunlight that enters the atmosphere and energy that is reflected and not converted to heat. Anything in the atmosphere that "traps" sunlight energy will add heat to the atmosphere and can result in an increase in temperature.

The students should understand that what we add to our air may not be visible but may have profound effects on human health or the environment. The concept of long-term change is also important. Cumulative effects over decades or centuries can have an irreversible effect on the planet. Most children are familiar with the sun's effect in a closed car. They can discuss what this means if the entire earth is subjected to this type of effect. Will more farmland be converted to desert by droughts? Will sea level rise due to the melting of polar ice and coastal areas and islands disappear? Scientists disagree on the future impacts of global climate change; however, it is important that we consider all the consequences of our actions.