

Camp Fire MINNESOTA

My nature connection

GREENHOUSE EFFECT

GRADES: 4+
TIME: 30 minutes

WHAT IS THE GREENHOUSE EFFECT?

The greenhouse effect is the atmospheric process that allows the Earth to hold or retain heat and stay warm enough for life to exist. Human activity has a significant impact on the greenhouse. This is causing the Earth to retain even more heat and global temperatures to rise.

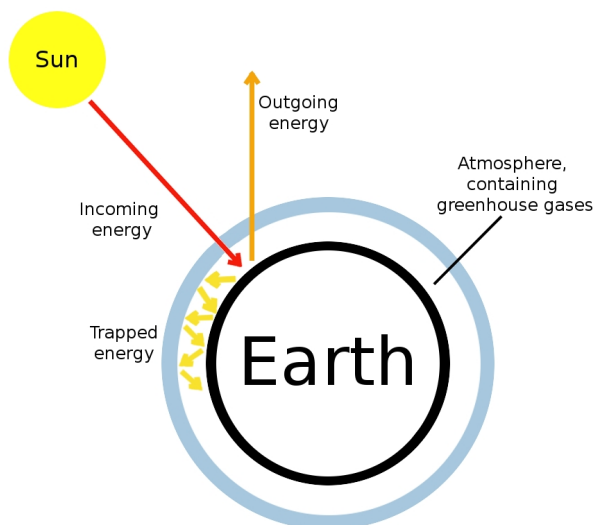
WHAT YOU'LL NEED

A drinking glass

Multiple layers of clothing (shirts, jackets, mittens, snow-pants, etc.)

INTRODUCTION

Even though the Sun is 94 million miles away, the heat that the sun generates is still able to make its way to our planet. So how are we able to retain that heat? The answer is the **greenhouse effect**.



STUDENTS WILL:

1. Understand the important role the greenhouse effect has on our climate
2. Learn about greenhouse gases and feel their impact on the climate

SETTING

At-home activity

Indoor or Outdoor

When the sun's energy hits the earth it warms up everything it touches and then bounces back into space. However, if the sun's energy comes in contact with a greenhouse gas particle in the atmosphere, it bounces back to the Earth's surface and warms it again. The atmosphere acts as a bubble of gas around the Earth and the more greenhouse gas we have in the atmosphere, the warmer the Earth will be.

ACTIVITY 1: CREATE YOUR OWN GREENHOUSE GAS

We know the sun's energy can be retained from bouncing off of greenhouse gases in the atmosphere. Here are the gases that contribute to the greenhouse effect:

- water vapor
- carbon dioxide
- methane
- nitrous oxide
- ozone
- chlorofluorocarbons
- hydrofluorocarbons

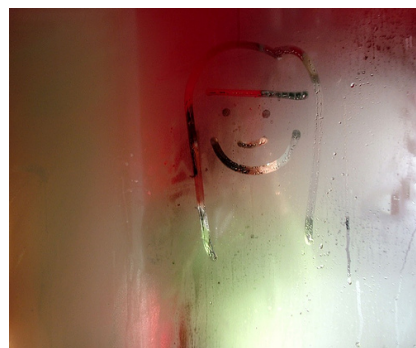


Greenhouse gases can come from many different sources like vehicles, factories, and even humans when we breathe. In this activity, we'll be producing two different greenhouse gases. Through the process of breathing or cellular respiration, we inhale the air around us and exhale two different greenhouse gases. Respiration is also a key factor in how humans generate energy for ourselves.

Carbon Dioxide Production:

1. Hold your hands together about 6 inches from your face.
2. Take a deep breath in. Exhale and pay attention to how your hands feel.

The warm gas you just exhaled was carbon dioxide (CO₂).



Water Vapor Production:

1. Grab a drinking glass and hold it in front of your face so that you are looking down into it.
2. Take a deep breath in.
3. Exhale into the glass; notice how the glass fogs up.

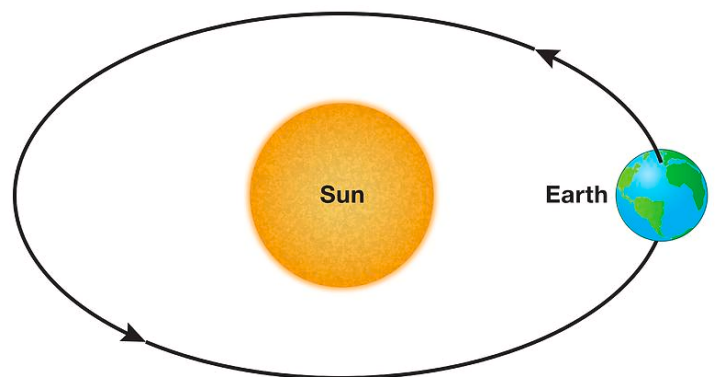
You just produced water vapor. The fog you see on the glass is water vapor that is condensation on the glass. This is the same fog you'll see on a bathroom mirror after a hot bath or shower.

ACTIVITY 2: HOW CAN GREENHOUSE GASES AFFECT OUR CLIMATE?

We now know what greenhouse gases are, and how they help the Earth retain heat through the greenhouse effect. Often times, you will hear the greenhouse effect and greenhouse gases mentioned with the term climate change. Climate is the general pattern of temperature and weather that certain areas experience. So how can greenhouse gases cause the climate to change? Greenhouse gases help the Earth retain the sun's heat energy and keep the planet warm enough for us to live. Each year, large amounts of greenhouse gases are added to our atmosphere from sources like factories and vehicles.

In this activity, we'll learn how the addition of greenhouse gases to the Earth's atmosphere can impact global climate.

1. Imagine that you are planet Earth.
2. Pick two spots to travel back and forth between (ex. your front door and the sidewalk). Each time you travel back and forth represents the Earth completing its orbit—or yearly cycle around the sun.
3. When you return, think about how you feel in terms of temperature. Warmer or cooler than when you started?



TIP: If at any point during this activity you feel tired or lightheaded, remove the additional layers and do not continue.

4. Put on another layer of clothing. This could be another shirt, a sweatshirt, a pair of gloves, snow-pants, etc. Be sure you have room to put another layer on later. This extra layer represents additional greenhouse gases being added to the atmosphere.
5. Now orbit the sun again. How do you feel now? Warmer or colder?
6. Add an additional layer of clothing and orbit the sun again. How do you feel?
7. Repeat the process of adding a layer of clothing and orbiting the sun a few more times.
8. When you are finished take time to reflect on how warm/cold you felt at the beginning of the activity compared to the end.

ACTIVITY 3: CALCULATE YOUR CARBON FOOTPRINT

The amount of CO₂ you as an individual put into the atmosphere is called a carbon footprint. Follow this link to calculate your own carbon footprint and see how much greenhouse gas you contribute to the atmosphere each year. Younger students may need an adult's help.

<https://www.conservation.org/carbon-footprint-calculator#/>

CONNECTING WITH QUESTIONS

- During the activity, how did the additional layers of clothing make you feel? How would additional greenhouse gases make the Earth feel?
- How might the world change if temperatures are warmer everywhere?
- Base on the carbon footprint calculator, how much CO₂ do you put into the atmosphere each year? Did this amount surprise you?
- What are some ways you can reduce the amount of greenhouse gases you put into the atmosphere?

SIMPLE WAYS TO REDUCE YOUR CARBON FOOTPRINT:

- Walk or ride your bike instead of driving when traveling short distances.
- Turn off electronics when you're not using them.
- Buy local produce.

ADDITIONAL RESOURCES

climatekids.nasa.gov/greenhouse-effect/
simpleclimate.wordpress.com/2010/12/22/a-picture-of-climate-change-is-worth-1000-words/