

Thinking About CO₂ and What Makes the Earth Sick?

Activity Summary:

This lesson will inform students how increases in carbon dioxide (CO₂) emissions influence climate change and increase Earth's temperature.

Background:

The heat-trapping properties of greenhouse gases such as carbon dioxide, allow some of the heat produced by the sun's rays to be kept inside the Earth's atmosphere rather than being reflected back into space. This is called the greenhouse effect. The greenhouse effect keeps the earth warm enough to support life. Carbon dioxide (CO₂) is one of the greenhouse gases that is produced naturally by the Earth and its living organisms. CO₂ emissions are also produced by human activities such as powering factories, driving automobiles, and cutting down trees. These human activities have increased the amount of CO₂ being added to the atmosphere. As humans increase greenhouse gas emissions, the Earth's temperature also increases because the more CO₂ there is in the atmosphere, the more heat-trapping there is. The warming of the planet has contributed to rising sea levels, disruption of habitats, droughts, and severe storms.

Materials Needed per Group:

- Whiteboard, chalkboard, or flipchart and markers
- A hat, scarf, jacket, sweatpants, blanket, and gloves
- CO₂ Emission Cards

Thinking about CO₂

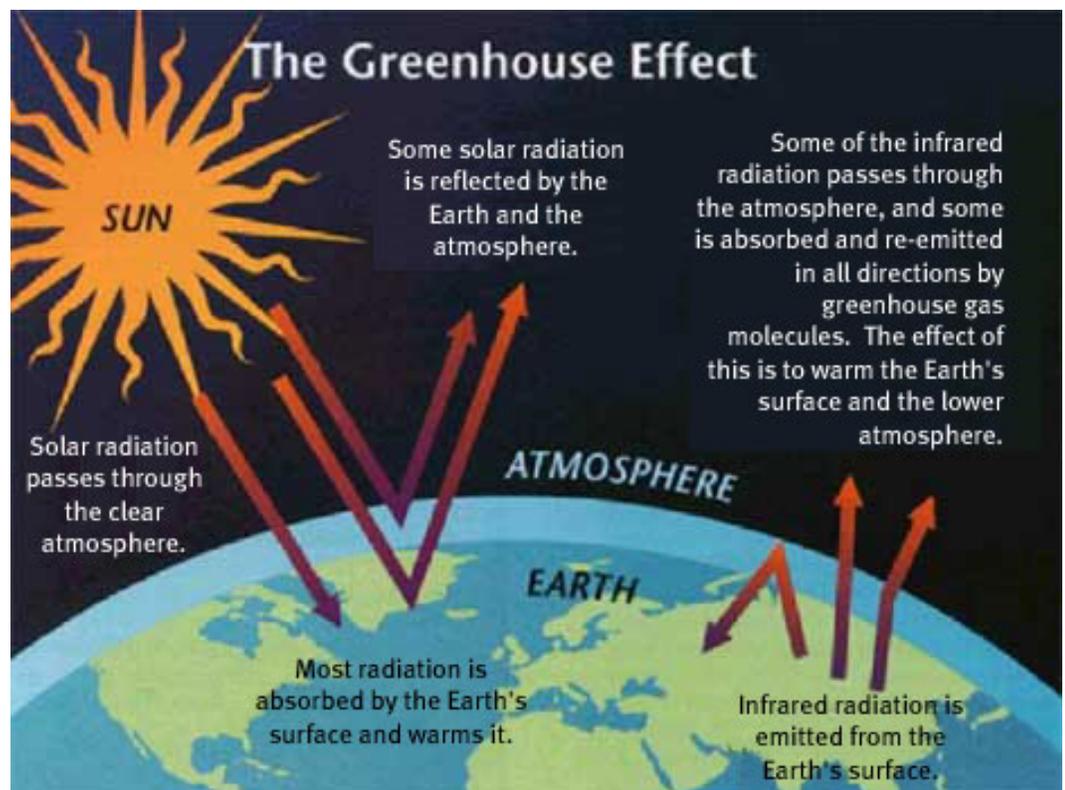
Directions:

1. Start the lesson by dividing a chalkboard, whiteboard, flipchart, etc. into two columns.
2. Label one side of the column with 'what do we know about CO₂?' and ask students to tell you what they already know about the molecule (*for example, it stands for Carbon Dioxide, we exhale CO₂, trees and plants convert CO₂ to Oxygen, it is a greenhouse gas, etc.*)
3. When students are done, label the other side of the chart 'what do we NOT know about CO₂?' and have them ask questions they have about CO₂ (*for example, is CO₂ good or bad? Where does CO₂ come from? What is a greenhouse gas and why is it called that? Etc.*)
4. Tell students to keep the chart in mind as they work through the lesson.



This activity was created by Ashley Schopieray for Earth Day Network.

www.earthday.org/education



What Makes the Earth Sick?

Directions:

1. Talk with students about the greenhouse effect and how it works. Explain that it is Earth's natural process of keeping warm, and that an accumulation of CO₂ in the atmosphere is like putting a blanket around the Earth to keep the planet warm enough to allow living things to survive and be healthy. This effect allows for life to exist on Earth; otherwise, Earth would have no protection from the extreme coldness of outer space. This is similar to how the glass of a greenhouse allows sunlight to enter but holds in its warmth, keeping the inside air warmer than the outside air.
2. Break students into small groups. Have one student from each group volunteer to be "Earth." Let them know that they will have to be dressed up in layers of clothing, so choose a student who is comfortable with this. Ensure that each group has a scarf, hat, jacket, sweatpants, gloves, and a blanket. (*Note- this could be done as a whole class with only one student being the "Earth"*).
3. Using the **CO₂ Emission Cards**, have a student pick a card out of the deck and read what it says. Have groups follow the directions as listed on the card for which layer of clothing to add to "Earth".
4. Continue with the next card until all cards have been chosen and the "Earth" is covered in layers.
5. Discuss with students how adding layers to their classmate was a representation of adding CO₂ to Earth's atmosphere. Explain that the greenhouse effect is natural on Earth and needed to support life, just as we need a couple of layers of clothing to stay warm, but too much warmth can be a bad thing. Mention that the Earth's temperature has historically fluctuated, but it is the rate at which its temperature is currently warming that is an issue. Have students think about what happens when they have too many layers on they feel uncomfortable, maybe even sick. This same process happens with the Earth, but the Earth cannot remove its heat-trapping "layers" without your help in reducing greenhouse gas emissions!

CO₂ Emission Cards

<p>You brought pre-packaged snacks in your lunch</p> <p>Add a scarf to "Earth" The production and packaging of food accounts for 13% of total greenhouse gas emissions in the United States. Since you gotta eat, reduce the packaging!</p>	<p>You left your TV on when you went out to meet your friends</p> <p>Add a jacket/sweater to "Earth" Use of appliances and electronic devices accounts for 8% of total greenhouse gas emissions in the United States. Your TV uses energy even when it's turned off.</p>	<p>You bought a new video game instead of borrowing it from a friend or renting it</p> <p>Add a hat to "Earth" The production of new goods accounts for 28% of the total greenhouse gas emissions in the United States.</p>
<p>A parent drove you to school when you could have taken a bus or carpoled with a friend</p> <p>Add sweat pants to "Earth" Sharing a ride with someone just 2 days a week will reduce your CO₂ emissions by 1,590 lbs/year.</p>	<p>You threw your soda can in the trash rather than recycling it</p> <p>Wrap "Earth" in a warm blanket Recycling half of your potentially recyclable materials (paper, plastics, glass) would reduce your CO₂ by 2,400 lbs/year.</p>	<p>You left your cell phone charger plugged into the wall when you weren't charging your phone</p> <p>Add gloves to "Earth" Leaving a TV or a cell phone plugged-in is called a phantom load and can increase energy costs 2-8%.</p>