



Climate Activity 2

Soak Up the CO₂

How Your Backyard Affects the Ocean

Objectives and Standards
 - To learn how human additions of carbon dioxide can influence the chemistry of the atmosphere

NSTA Standards Addressed
 Content Standards
 A, B, D, F, G

4-H SET Abilities Addressed
 Collect Data
 Compare/Contrast
 Interpret/Analyze/Reason
 Observe
 Measure
 Use tools

Background

Climate is affected by processes larger than just weather. The atmosphere forms a protective ‘blanket’ around Earth, helping to trap some of the heat energy from the Sun. The atmosphere has the ability to be a blanket for us because of the greenhouse gases that have existed in the atmosphere for millions of years, but humans are adding more carbon dioxide to the atmosphere very quickly. This is changing the composition of the atmosphere that humans have become accustomed to, and increases the thickness of the ‘blanket,’ which traps more heat energy, which can affect climate in many ways. This activity looks at how humans contribute carbon dioxide to our atmosphere.

CoCoRaHS Extension Ideas

Have youth become familiar with numerous carbon footprint calculators by searching for them online. Test each calculator to see how it measures an individual or group carbon footprint. Decide which calculator uses the best measurements to approximate carbon dioxide emission accurately for your group. Apply this to individuals, the group, and even the entire community and present those results to neighbors and municipal officials.

Supplies Needed

- large clear container, like a punch bowl
- blue food coloring
- carbon footprint worksheet

Activity

1. Explain to youth that carbon dioxide is a greenhouse gas, along with other things like water vapor, methane, and other gases. When humans burn fossil fuels for energy use, like transportation, heating and cooling buildings, and watching t.v., carbon dioxide is released into the atmosphere.
2. Explain that youth will calculate their carbon footprint, which is the amount of carbon dioxide they emit into the atmosphere by filling out the worksheet. Then they will learn how activities in their community can affect climate locally and globally.
3. After youth fill out their worksheet, have them talk about what they learned about themselves. In what part of their lives do they use the most energy, and why?
4. Fill a large bucket with water. Explain that this bucket of water represents Earth’s atmosphere.
5. Hand out vials of food coloring to youth. Explain that the food coloring will represent the addition of carbon dioxide that humans add to our atmosphere. Naturally, Earth regulates the atmosphere pretty well, keeping it in balance, but human activity can rapidly change the atmosphere.
6. One by one, have youth put food coloring into the bucket. The number of food coloring drops each adds to the bucket should equal the number on the bottom of their worksheet. If it is a large group, pick out an average number from the group and use that number for the example to prompt discussion.



7. Discuss what they see. Would it be easy to remove all of the carbon dioxide (food coloring) they just added to the atmosphere? In comparison to the amount of water that is in the bucket, did your group add a lot of food coloring, or is there more water in the bucket than food coloring?

Discussion

There are a lot of naturally occurring greenhouse gases in our atmosphere. We should actually be happy that they are there. It helps Earth stay warm enough to keep animals and plants alive. Mars has almost no greenhouse gases and it is too cold for life to exist on that planet. Venus has a ‘runaway’ greenhouse effect, where it has way too many greenhouse gas particles in the atmosphere, and it is too hot for life to live on the planet. As Venus and Mars show, the composition of an atmosphere can certainly affect on the planet’s climate.

That said, humans only contribute a small amount of greenhouse gases to the atmosphere in addition to what is already there. But in the activity, we learned that even a small amount of food coloring, our ‘carbon dioxide,’ can impact the atmosphere a lot. Once done, its done. In fact, the carbon dioxide we emit today can stay in the atmosphere for up to 1,000 years. That is why it is important for us to try to use a little less energy in our daily lives. Carpool with a friend, or combine multiple trips to the store to burn a little less gasoline. Turn lights, T.V.s, and computers off when not in use. What are some other things you can think of doing to lower the amount of carbon dioxide you put into the atmosphere each day?





Soak Up the CO₂ Worksheet

Measuring Your Carbon Footprint

A Carbon Footprint is the amount of carbon dioxide emitted through the burning of fossil fuels for energy. Answer the following questions to see how much energy you use in your daily life. For each activity below, record how many hours you spend doing that activity in a normal day.

Activity	How many hours spent
Riding in a car, van, or truck	_____
Watching television	_____
Playing video games	_____
Using a computer for fun or schoolwork	_____
Riding in a bus or other form of mass transit	_____
Listening to the stereo	_____
Charging your mp3 player, cell phone, or other electronic device	_____
Use a heating source to cook or reheat food	_____

Total Number of Hours of Energy Use _____

This is an approximation of your Carbon Footprint. Many other carbon footprint activities exist that can give you the total amount of carbon dioxide gas that each activity emits. This carbon footprint approximation is for the purpose of this activity only.





Please send us your feedback!

As a 4-H Educator, you know what has worked well, what has not, and how we can improve the *Tracking Climate in Your Backyard* curriculum. Please share your feedback about the curriculum. We'd love to receive copies of any reports or newspaper coverage about completed *Tracking Climate in Your Backyard* projects.

Fax or mail your completed feedback to Trisha Smrecak, Museum of the Earth, 1259 Trumansburg Rd., Ithaca, NY, 14850 or fax to: 607-273-6620.

Check the activity completed	Suggestions for improving the activity
Rainfall Activities <input type="checkbox"/> Make It Rain <input type="checkbox"/> Where Does the Rain Come From? <input type="checkbox"/> Stormy Weather	
Snowfall Activities <input type="checkbox"/> Confetti Snow Maps <input type="checkbox"/> How Much Water? <input type="checkbox"/> Edible Education <input type="checkbox"/> The Snowflake Game <input type="checkbox"/> Snow Journaling	
Temperature Activities <input type="checkbox"/> Energetic Weather <input type="checkbox"/> Shade of the Old Oak Tree <input type="checkbox"/> Temperature Through Time	
Wind Activities <input type="checkbox"/> Why Does the Wind Blow? <input type="checkbox"/> Make Your Own Wind Dial	
Hydrologic Cycle Activities <input type="checkbox"/> The Incredible Journey <input type="checkbox"/> Understanding Evapotranspiration <input type="checkbox"/> Pinecones: Mother Nature's Weather Forecasters <input type="checkbox"/> What is a Watershed?	
Climate Activities <input type="checkbox"/> Where is My Backyard? <input type="checkbox"/> Soak up the CO ₂ <input type="checkbox"/> Buckets O' CO ₂ : How Your Backyard Can Change the Ocean <input type="checkbox"/> Raise the Waters	
CoCoRaHS Participation <input type="checkbox"/> Precipitation measurements and other activities	

Please share your suggestions for improving the Tracking Climate in Your Backyard curriculum.

How have you used Tracking Climate in Your Backyard in your community?

Thank you for completing the Tracking Climate in Your Backyard curriculum feedback. We appreciate learning about how you are using the curriculum and receiving your suggestions for improving it.

Organization _____ Contact Person _____
 Email _____ Date _____