



Climate Activity 3

Buckets of CO₂

Objectives and Standards
- To learn what happens to carbon dioxide when it enters the atmosphere.
NSTA Standards Addressed
Content Standards
A, B, D, F, G
4-H SET Abilities Addressed
Compare/Contrast
Evaluate
Interpret/Analyze/Reason
Observe
Predict
Question
Test
Use tools

Background

Because weather in different areas averaged together for years creates the regional climate, and regional climates averaged together yield the global climate, what happens in our own backyard can influence what happens around the world. So, when you burn carbon dioxide in the form of gasoline for your family car, coal or natural gas for heating or cooling your family's house or apartment, or use energy to watch T.V. or play on the computer, the gas is released into our atmosphere. Some of it gets absorbed by the oceans, which act as carbon 'sinks' and help prevent greenhouse gases from warming the planet too much. This activity explores what happens to oceans who have absorbed much more carbon dioxide than they normally contain as a result of human carbon emissions.

Supplies Needed

- large glass container (a coffee pot or clear vase works well)
- water
- salt
- antacid tablet
- bromophenol blue (acid base indicator liquid available on science education supply stores)
- dry ice

CoCoRaHS Extension Ideas

Learn about other aspects of water quality in lakes, rivers, and oceans that can contribute to the health of the organisms living within those bodies of water. Create a water quality measuring kit (including pH indicators, turbidity indicators, water flow monitors, etc.) and go out to a local water body. Measure the health of the water body and, if it is not as healthy as it could be, discuss ways in which human activity could improve or further degrade the body of water. Would a change in climate affect the health of this water body? Why or why not?

Activity

1. Make an 'ocean' by filling a glass container with water and adding a pinch of salt.
2. Add a few drops of bromophenol blue, which will turn yellow if acidic and blue if not. It should start out blue.
3. Add a small chunk of dry ice (cooled and compressed carbon dioxide) to the 'ocean' and observe what happens (the ocean turns yellow).
4. Explain that as the dry ice sublimates (goes from a solid to a gas), the carbon dioxide bubbles get absorbed by the ocean, which makes it more acidic and changes the color of the pH indicator.
5. Try the experiment again, except instead of placing dry ice in the 'ocean,' use a straw to exhale carbon dioxide into the water. You should see the same color change.
6. Place an antacid tablet in the acidic 'ocean.' Observe what happens.



Discussion

Earth's oceans are a natural carbon sink, meaning that they can store carbon so less is able to escape into the atmosphere and 'thicken' our greenhouse gas blanket. However, humans have emitted a lot of carbon dioxide into the atmosphere, and the oceans are having trouble keeping up. As a result of storing our extra carbon dioxide, the levels of carbon dioxide in the ocean water are changing the overall chemistry of the ocean. The oceans are becoming more acidic, just like the 'ocean' in this activity.

Many organisms that live in the ocean are vulnerable to changes in the ocean chemistry, and can only live in a narrow pH (acid/base) range. Especially at risk are organisms that secrete a shell made of calcium carbonate, like some corals, mollusks (clams, gastropods/snails), and microscopic organisms.

In your 'oceans,' a simple antacid tablet brought the pH level of the ocean back up so it was no longer acidic. It is not as simple to correct the pH balance of our Earth's oceans, so changing the acidity of the oceans can create extinction events in the ocean, too.





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 _____