Climate Activity 4

Raise the Waters

Objectives and Standards
- To learn that ocean levels have risen and fallen historically, and what can cause this to happen.

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

4-H SET Abilities Addressed
Measure
Use tools
Predict
Test
Oserve
Interpret/Analyze/Reason
Compare/Contrast

Supplies Needed

-large container for water (a coffee pot works well)
-cold water
-ice cubes
-salt
-masking tape
-source to heat water

Background

What happens when a grain of rice is cooked? It absorbs some water, becomes cooked, and expands. What we do in our own communities can impact entire oceans. If the global temperature rises, the oceans could expand, just like a grain of rice, and take up more space. This activity explores what happens to water as it is heated and cooled.

CoCoRaHS Extension Ideas

Find a nearby river. Are the banks of the river steep, or are they very flat? Ask for a topographic map of the area with the river at your local library, and map out on it what would happen if the water levels rose by 1 foot; by 5 feet. What would happen to the community surrounding the river? Historically, river beds do flood, on average every 10 years, 50 years, or 100 years. Are there any historical records of flooding on your river? How high did the river rise? What would happen if the flood happened again this year?

Activity

1. Make an 'ocean' by filling a glass container with water and adding a pinch of salt.
2. Mark the water level with a small piece of masking tape.
3. Explain to youth that the water is 'sea level,' and you are going to look at what makes sea level rise.
4. At at least 8 ice cubes to the container and allow them to melt naturally. As they are melting, explain that these reflect the glaciers that have slid off land and into the ocean. When this happens, the ice melts and raises the ocean water level. If the ice had stayed on land, there would be no water level rise.
5. Mark the water level after the ice cubes have melted. Is it higher or lower than the old water level, and why?
6. Explain that as the climate heats up, so does the water on the globe, both in our experiment and in real life.
7. Warm the water slowly, taking care not to boil it (which will create steam and reduce the water level).
8. Mark the new sea level.

Discussion

Earth's oceans play a crucial role in the heating and cooling of the places in which we live. They're also a great tourist attraction, and many people have built their homes along the shorelines. However, just like on land, the oceans are affected by the climate, and when climate shifts, it creates a change in the ocean landscape. If the climate gets dramatically cooler than it is now, much of the Earth's oceans freeze near the poles and eventually create glaciers that can travel over land, covering places like Canada and the northern United States almost entirely. We call this an icehouse climate. The ocean recedes from the shoreline during these times, because the water is trapped in ice, and more beach becomes exposed. This leaves residents who built their houses on ocean shores, no matter how close or far away from glaciers they are, much further away from the coastline than they were.

If the climate gets dramatically warmer than today, the water that is stored in glaciers at our poles can melt. In our activity, when we melted our ice cube glaciers, the sea level rose slightly. In the Earth's oceans, if the glaciers melt, the sea level rises globally. Further, when the oceans' temperatures rise, thermal expansion occurs. This is when the water heats and takes up a little more room than it did when it was cool. For a few water molecules, this would go unnoticed, but in the activity there was enough water to cause a small shift in the sea level of your 'ocean.' On a global scale, you can imagine how much thermal expansion could raise the water level. When the water level has risen, all of the people who have built their homes on the sea shore will have lost their beach and would be wading in their house!

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 ☐ Make It Rain ☐ Where Does the Rain Come From? ☐ Stormy Weather	
Snowfall Activities ☐ Confetti Snow Maps ☐ How Much Water? ☐ Edible Education ☐ The Snowflake Game ☐ Snow Journaling	
Temperature Activities ☐ Energetic Weather ☐ Shade of the Old Oak Tree ☐ Temperature Through Time	
Wind Activities ☐ Why Does the Wind Blow? ☐ Make Your Own Wind Dial	
Hydrologic Cycle Activities ☐ The Incredible Journey ☐ Understanding Evapotranspiration ☐ Pinecones: Mother Nature's Weather Forecasters ☐ What is a Watershed?	
Climate Activities ☐ Where is My Backyard? ☐ Soak up the CO_2 ☐ Buckets O' CO_2 : How Your Backyard Can Change the Ocean ☐ Raise the Waters	
CoCoRaHS Participation ☐ 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** _____