Hydrologic Cycle
Activity 1

The Incredible Journey

Objectives and Standards
- To understand the water cycle and its components, as well as to learn about water residence times in various storages

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

4-H SET Abilities Addressed
Draw/Design
Observe
Communicate
Organize
Question
Interpret/Analyze/Reason
Compare

Supplies Needed

-9 large pieces of paper
-30-50 beads in each of 9 different colors
- a pipe cleaner for each youth
-9 home-made dice

Background

The hydrologic cycle, or water cycle, is the basis for most of out weather events and climate regimes. It is very important to understand that there is only so much water available to us on Earth, and that only a small percent is freshwater. Also, the same water on the planet today has been cycling for millions of years, so it is possible that the water we drink today may have been the same water that was here 70 million years ago! Since water is a limited resource, the same water here today was here when dinosaurs roamed the Earth. This activity will explore how water cycles through the planet, and give insight to how long water remains in each part of the cycle.

Preparation Needed

On each sheet of paper, draw and label (or have youth draw) one of the nine scenes listed: clouds, animals, lakes, soil, ground water, rivers, oceans, plants, glaciers.

Out of old gift boxes, shoe boxes, etc., create 6 sided dice that can be read from 4 ft away. Each die will be associated with a specific scene (above), and has different labels.

Scene	*Die Side Labels*
Soil	plants, rivers, groundwater, clouds, clouds, stay
Plants	clouds, clouds, clouds, clouds, stay, stay
Rivers	lakes, groundwater, oceans, animals, clouds, stay
Clouds	soil, glaciers, lakes, oceans, oceans, stay
Oceans	clouds, clouds, stay, stay, stay, stay
Lakes	groundwater, animals, rivers, clouds, stay, stay
Animals	soil, soil, clouds, clouds, clouds, stay
Groundwater	rivers, lakes, lakes, stay, stay, stay
Glacier	groundwater, clouds, rivers, stay, stay, stay

Activity

1. Place the 9 sheets of paper with scenes, their respective die, and their coordinating beads (one color per scene) around the room. If outside, you may wish to place things relative to their geographic positions (i.e. plants, animals, rivers, lakes, and soil closer together, ocean, groundwater, glaciers at a distance, etc.).
2. Hand out pipe cleaners and explain that everyone will travel the room as water molecules going through the water cycle. Their pipe cleaner is a map, or timeline, of where they have been. As they travel from place to place, they should collect a bead to represent the time they spend in each place.
3. Fold a hook into the end of the pipe cleaner to prevent beads from falling off the timelines.

4. Tell youth to pick a place to start their journey as a water molecule. Try to evenly space them to begin.
5. Ask youth about water at each station. How would it travel between the different scenes? Tell youth that as they travel, they need to think about how their water molecule would travel from one place to another (melt, evaporate, etc.).
6. Explain that in this game, a roll of the die determines where you will go. At each station, line up in a single file line, collect a bead and place it on your pipe cleaner, then roll the die. If the die tells you to go to a different station, go to that station and repeat. Be sure to collect beads every time a die is rolled, even if you repeatedly roll a 'stay.'
7. Each bead represents 10 years in the cycle of their water molecule. Have them total up how much time they spent in each station. Use the discussion session of this activity to supplement steps 6-9.
8. Choose 1 or 2 timelines to discuss. Write how much time they spent at each station on the board or on a sheet of paper. Discuss where water spends most of its time (oceans, clouds, glaciers, underground) and why (huge storage capacity, less likely to cycle).
9. Draw the hydrologic cycle on the board or on a sheet of paper with all of the stations represented in one picture. Using a red pen for water travel in gas form and a blue pen for water in liquid/solid form, draw the path of one youths water molecule journey. Be sure to put arrows in the direction of travel. Each youth may decide to draw their own path.

Discussion

Ask what they noticed about their molecule travels (they got caught in the glaciers, in groundwater, or in the ocean, there were always long lines at those stations). Help them connect their experience to the fact that most of our water is stored in glaciers, groundwater, and oceans

Ask youth to hold up their pipelines and describe them. Did many people travel to all of the sample places? Do some pipe cleaners have almost all of one or two colors? Who spent the most time at one place (had the largest number of the same beads) and who went to the most places (had the most different colored beads)? Relate this to the amount of time water spends in an animal or plant as compared to in an ocean, glacier, or groundwater.

Water can stay trapped in the ground, in the ocean, or in a glacier for decades and centuries. While it all cycles through eventually, some water travels a lot while other water hardly ever moves. The same water you're drinking today could have been in an ocean filled with dinosaurs and other extinct animals!

A Note on How Water Molecules Travel

Since the activity requires participants to have some understanding of how a water molecule can get from one location to another, this worksheet explains how water can be transferred from each of the scenes in The Incredible Journey.

A Water Molecule from CLOUDS can stay in clouds, or travel to the following places:
Lakes - through precipitation and surface runoff
Oceans - through precipitation
Soil - through precipitation (fog and mist, too)
River - through precipitation and surface runoff
Glaciers - through precipitation (slow accumulation of snow, becomes ice, doesn't melt)

A Water Molecule from SOIl can stay in soil, or travel to the following places:
Plants - through their roots
Groundwater - through percolation through the soil
Rivers - through runoff and filtered through springs
Clouds - through evaporation

A Water Molecule from GROUNDWATER can stay there, or travel to the following places:
Rivers - through filtering through springs
Lakes - through filtering through springs

A Water Molecule from PLANTS can stay in plants, or travel to the following places:
Clouds - through evapo-transpiration (water exits through the leaves)

A Water Molecule from ANIMALS can stay there, or travel to the following places:
Soil - through urination or spitting; or through animal decomposition
Clouds - through sweating or panting

A Water Molecule from a LAKE or an OCEAN can stay there, or travel to the following places:
Clouds - through evaporation
Animals - through drinking the water or absorbing it with their skin
Plants - through the root system of terrestrial plants or absorbtion by marine plants

A Water Molecule from a RIVER can stay there, or travel to the following places:
Plants - through the roots of plants
Animals - through drinking from rivers or absorbtion through the skin
Oceans and Lakes - through the flowing of rivers into them

A Water Molecule from a GLACIER can stay there, or travel to the following places:
Rivers - through melting of the glacial ice, forming or flowing into a river
Soil - through melting of the glacial ice directly onto the soil

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** _____