Round You Go, H_2O!

This activity center is part of the **Water Science** theme.

What's the purpose of this activity?

This activity will introduce students to the Hydrological Cycle in a fun role playing game. Students will be "parts" of the water cycle and will learn the various stages of water that can be found on earth and its atmosphere. Students will become an active water cycle!

Key messages:

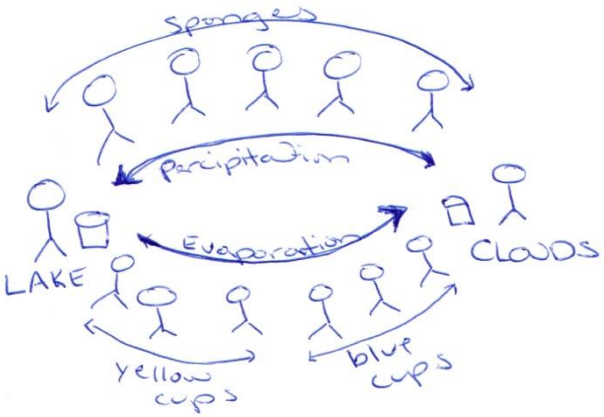
- The water cycle is the journey water takes as it circulates from the land to the sky and back again.
- Water is constantly moving from place to place … this is called a cycle, a process where something moves in a round system.
- Precipitation, evaporation and condensation are key elements to our water cycle, the hydrological cycle.
- The water cycle is a complex process that is essential to life on Earth.
    - Providing water and food to all living creatures: humans, animals and plants.

Materials:

- 3 buckets, each large enough to hold ~ 4 liters of water (if have measuring scale on them better)
- 1 large measuring cup (2-4 liters)
- 2 poncho costumes
    - Lake - blue rain poncho, foam fish necklace and duck crown
    - Clouds - white rain poncho with crinoline sash (if available)
- Plastic cups: may have yellow and blue but not necessarily coloured
- Sponges
- Water cycle poster
- Water: 4 liters of water in one of the blue buckets (on side of Evaporation)
- Stop watch or regular watch for timing

Activity Set Up:

1. Place 2 blue buckets on the ground; this will be the "LAKE".
2. Place 1 white bucket opposite the 2 blue buckets, this will be the" CLOUDS".
    - Distance between buckets will depend on how many students are involved in activity.
    - Place approximately 3-6m apart. Students should be an arm's length apart from each other when in circle formation. Therefore, if there are a lot of students increase the circle and increase the distance between the buckets.



3. Place sponges in white/cloud bucket.
    - Have at least 1 sponge per student in precipitation line

- Make sure sponges are already wet (helps speed up the activity)

4. Measure 4 L of water into one blue bucket (the bucket that will be closest to the "evaporation" side of the circle.
5. Have plastic cups ready to hand out.

What will I be doing?

Helping children understand how the water cycle works in a fun role playing game.

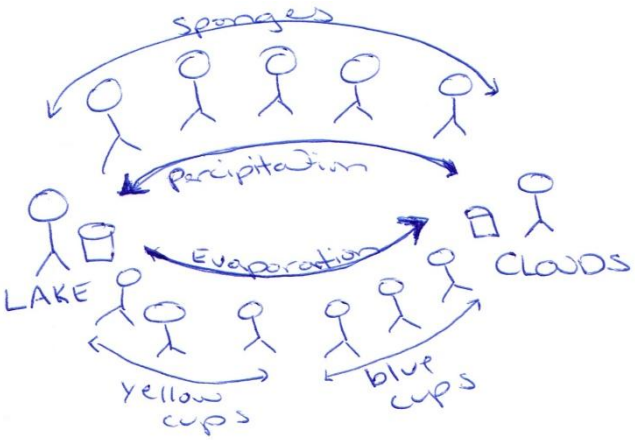
Give a brief introduction to water and the water cycle. Prompt discussion and introduction with bolded questions below.

- **Is water important to us?** … Yes!
- **How long can we live without water?** … about 3 days.
    - All life on Earth needs water … and healthy water.
- **Where can we find water on Earth?**
        - Clouds
        - Glaciers
        - Rivers
        - Lakes
        - Oceans
        - Groundwater
        - Soil
        - Plants
        - Animals (including us)
    - Water constantly moves from place to place … this is called a cycle.
        - Movement in a loop system.
- There needs to be an energy source to make this cycle work … **Any ideas what that may be?** … the SUN! (demonstrate with water cycle poster)
    - The sun heats up the water on earth that is in the oceans, lakes, rivers, puddles, soil, etc. and causes the water to turn to a gas … EVAPORATION (1)
    - This water vapor (gas) rises into the atmosphere where it eventually cools and turns back into liquid … CONDENSATION (2)
        - Clouds are made up of these tiny droplets of water and/or ice crystals
    - When the condensed water droplets become heavy enough for gravity to pull them down to Earth, the water falls from the clouds onto the Earth's surface … PRECIPITATION (3)
    - This water may fall into the oceans, lakes or onto the Earth's surface. Precipitation that falls onto the surface gradually moves through the spaces between the soil particles and enters the groundwater (water held underground in soil and pervious rocks) … INFILTRATION (4)
    - Plants also give off water through "sweating" water vapors (gas) through the pores (stomata) of their leaves. … TRANSPIRATION (or Evapo-transpiration) (5)

Are you ready to be water?
Explain the roles of" Round You Go, H2O!"

1. Have children form a circle.
    - Choose one volunteer and place the two blue buckets at their feet (on the inside of the circle)
        - This volunteer will represent the "LAKE" and will wear the blue poncho with fish necklace & duck crown.
    - Directly opposite/across from the "LAKE", choose another volunteer and place one white bucket at their feet facing the "LAKE" volunteer (with 5-8 sponges inside, dependent on # of students)
        - This is the "CLOUD" and will wear the white poncho and crinoline sash
        - Try to make equal numbers of children between the "LAKE" and the "CLOUD" on both sides of the circle!

2. Now measure out water (4 liters) and put into one of the buckets at the "LAKE", on the side closest to the "evaporation" side.
   - Explain that if this is the "LAKE", then as the sun warms up the surface water it EVAPORATES up into the atmosphere, it turns into a gas.
     - Give the first ½ of children on the right side of the circle/cycle, 1 plastic cup each.
       - Explain that they are the evaporating water!
     - Give the "Lake" volunteer a cup as well.
     - Continue explaining that as the water vapor rises into the atmosphere, it gets cooler …
       - **What happens to the water?** … it condenses, turns back to liquid.
3. The "LAKE" takes their cup and dips it into the first/"full" lake bucket and carefully pours the water from their cup to the first "evaporated water" student's cup … ***without spilling any***!
   - The first "evaporated" student then pours the contents of their cup into the 2nd person's cup, and so on all the way down the evaporation line.
   - As the water cools and condenses (the last student in the evaporation line), it is poured into the "CLOUDS" bucket (over the sponges).
     - Okay, that's ½ of the water cycle!
   - Students continue filling and transferring their water …. As soon as the 1st evaporation student has transferred their cup, the "LAKE" can fill it up again and send it down the line!
4. As the wind blows clouds over the landscape, condensed water falls from the CLOUDS to the EARTH … PRECIPITATION.
   - Sponges … represent the precipitation!
     - The "CLOUD" picks up 1 sponge from the white bucket **(do not squeeze it out!)** and passes it to the 1st "precipitation" student.
     - Once the first person has passed their saturated/full sponge to their neighbor, they can accept another from the "CLOUD".
     - Each "precipitation" student must wait for their neighbor to receive it … you can only have one sponge in your hand at the same time!
     - Keep passing down the line until it reaches the last person (one closest to the LAKE) and then squeeze it into the lake, the second blue bucket (not the initial full bucket).
   - Now the emptied sponge can be sent back down the line to be "filled" again in the



CLOUD bucket.
     - Empty and full sponges can cris-cross up and down the precipitation line!
     - That's the 2nd half of the water cycle!
5. The water cycle is continuous, but right now, the CLOUD doesn't have any water … so give a head start.
   - When the leader says, "it's a hot sunny day" … start evaporating!
     - Start the first half of the cycle … the cups.
   - When the leader says "it's a windy, rainy day … start precipitating!

        - Start the second half of the cycle … the sponges!
6. When all the water is gone from the 1st LAKE bucket give a couple more minutes then stop the activity.
    - Be sure you tell the students that you are timing them … all kids like a race!
    - See how fast they can move all the water!
7. Measure the water that is now in the 2nd LAKE bucket with the measuring cup.
    - Is it the same as you started? …Probably not.
        - Where did the water go? … could be in the cloud still (check)
    - But some may have "dripped" out of the sponges during the "passing off".
    - This represents that it doesn't just rain over lakes and oceans … but on land too!
        - Rain landing on the ground will be absorbed into the ground (groundwater) or will run off into streams, rivers, wetlands and will eventually make it to those bigger bodies of water (lakes and oceans).
8. Water is not lost, it is just constantly moving in the cycle!

Additional Background Information:

Water exists in three states: liquid, solid and vapour.

Water is the most widespread substance found in our natural environment and it is the source of all life on earth. Water covers 70% of the earth's surface but it isn't always easy to understand the total amount of water when we only see a small portion of it. The distribution of water throughout the earth is not uniform. Some places have more rainfall than others. There are many reasons for this, such as where the mountains are and where the prevailing winds blow. This rainfall distribution partly explains the differences in vegetation and why some areas are deserts and some are rainforests.

The Earth's fresh water can be found:

- ~69% is in the form of ice and permanent snow cover in the Antarctic, the Arctic and in the mountainous regions.
- ~30% exists as fresh groundwaters.
- < 1% is found in lakes, reservoirs and river systems, where it is easily accessible.

The Hydrological Cycle:

The total amount of water on Earth and within its atmosphere doesn't change but it is always moving. Water circulates from the land to the sky and back again and is called the 'hydrological cycle' or 'water cycle'.

The sun's heat provides energy to evaporate water from the earth's surface (oceans, lakes, etc.). Plants also lose water to the air - this is called transpiration. The water vapor eventually condenses, forming tiny droplets in clouds. When clouds move over land and meet cool air, precipitation (rain, sleet, or snow) is triggered. This is how water returns to the land (or sea).

Some precipitation soaks into the ground. Some of the underground water is trapped between rock or clay layers, this is groundwater. But most of the water flows downhill as runoff (above ground or underground), entering rivers, lakes and eventually oceans.

Water Cycle Stages:

Evaporation

- The sun's heat provides energy to change the earth's surface water (a liquid) to a gas and transfer it to the atmosphere.
- Approximately 80% of all evaporation is from the oceans, with the remaining 20% coming from inland water and vegetation (transpiration).

Transport

- Movement of water through the atmosphere, specifically from over the oceans to over land, is called transport.
- Some of the earth's moisture transport is visible as clouds, which themselves consist of ice crystals and/or tiny water droplets.
- Clouds are propelled by wind.

Condensation

- Transported water vapour eventually condenses, forming tiny droplets in clouds.

Precipitation

- When clouds meet cool air over land, precipitation (rain, sleet or snow), is triggered and water returns to the land (or sea).

Groundwater

- Some precipitation soaks into the ground and this is the main source of the formation of waters found on land - rivers, lakes, groundwater and glaciers.
- Some of the underground water is trapped between rock or clay layers - this is called groundwater.
- Water will flow downward until it meets impermeable rock, then it travels laterally. These are called aquifers.
- Groundwater returns to the surface (lakes, rivers, oceans) through aquifers.

Run-off

- Most precipitation flows downhill as run-off.
- Some of it penetrates and charges groundwater while the rest reaches rivers, lakes and eventually the ocean where it evaporates.

Clean Up Procedures:

At the end of the day make sure all items are carefully placed back into the bin and sealed. If any items are damaged or require attention, please let supervisors know. Leave the site as you found it for the next day's volunteers.