The Water Cycle

FRAMEWORK
I. Scientific and Engineering Practices
II. Cross-Cutting Concepts
III. Physical Sciences

SKILLS/OBJECTIVES

- Students will learn about the water cycle by playing a water cycle game and by making a "biome in a baggie" to bring home and watch the water cycle in action

MATERIALS

- Water cycle station dice + station signs from NOAA website
- Colored stickers for each station
- Buzzer/bell
- Potting soil
- Seeds (beans, grass, something that grows quickly)
- Gallon-sized ziplock bags
- Cups of water for watering plants
- Masking tape

NOTES

Download the station labels and game cubes used for activity 1 here: http://response.restoration.noaa.gov/training-and-education/education-students-and-teachers/water-cycle-game.html

- How old is water? It's as old as the Earth!
- Where does water come from? It's a cycle!
- Water starts in the ocean as a *liquid*. The hot sun **evaporates** the water, changing it from a *liquid* to a *gas (water vapor)* that floats up in the atmosphere. In the sky, the *water vapor* **condenses** back into *liquid* on dirt particles and forms clouds. When the clouds get too heavy, the water **precipitates**, falling to the ground as rain (*liquid*) or snow (*solid*). Finally, *liquid* water on the ground flows through streams and rivers and eventually **collects** back in the ocean.
    - *Point at the water cycle as you discuss water cycle process

Activity #1	**Water Cycle Game**
Materials	• Water cycle station dice + station signs from NOAA website • Colored stickers for each station • Buzzer/bell
Worksheet	Yes

- Each child will be an individual water molecule traveling through the water cycle, and go through all the places that water can be found in the cycle (their ideas, but include the 9 stations) and what state the droplet is in there (solid—ice, liquid—water, gas—water vapor). Point out that some droplets may not move every time.
- **Spread students evenly across the nine stations and have Wes students monitor the stations**
- **At each station, each student puts a sticker on his/her tracking sheet and then rolls the die.**
- **WHEN THE BUZZER SOUNDS, students move to the next station according to their roll.** When they arrive at the new station, Wes students should ask the kids "what happened to them?" (Where did they come from? How did they get there? What process did it use? What physical state were/are they in? Ice, liquid water or water vapor?)
- Repeat until students have completely filled out their tracking sheets
- After the game come back together as a group and "analyze the data." By a show of hands:
    - Did anyone make it to all the stations? Why or why not?
    - Who spent time as ice? Liquid water? Water Vapor?
    - Which station did you go to most? Least? Why?
    - Did anyone stay at a station twice in a row? Three times? Four times? Why?
    - Did anyone take the same path?
    - Wrap-up: test their understanding of the different processes – what is it called to go from the cloud to the ground? What is an example of evaporation? Etc.

- Have students match the terms to the water cycle diagram on the back of the worksheet

Activity #2	**Biome in a Baggie**
Materials	• Potting soil • Seeds (beans, grass, something that grows quickly) • Gallon-sized ziplock bags • Cups of water for watering plants • Masking tape
Worksheet	No

- **Fill pot ¾ full of soil**
- **Plant the seeds: make a trench down the center of the soil that's as deep as your fingernails + sprinkle a pinch of seeds in the trench. Cover seeds with soil.**
- **Water seeds with some water (but don't overwater!)**
- **Put the biome in a plastic bag and seal it. Use masking tape to tape the plastic bag around the plant pot so the condensation will drip into the plant pot not around it.**
- **Place plant in a sunny spot**
- After a few days, your plant will run out of CO_2, so open the baggie to let in more air + then reseal it
- Explanation: The students have created an ecosystem for their plants. They won't need to water their seeds again because the water will recycle itself. The roots of the plant absorb the water and the water travels up the stem to all the parts of the plant. When the water gets to the leaves, some of it **evaporates**. Some water also evaporates from the soil. The evaporated water forms drops on the bag (**condensation**). The condensation then falls back down to the ground like rain (**precipitation**). This is the water cycle – evaporation, condensation, and precipitation. The cool thing about the biome in a baggie is that everything

your plant needs in there (water, nutrients from the soil, air from the bag, makes food from the sun).