

## 5E Lesson Plan

**Center:** The River Center

**Program Name:** Water Cycle

**Date Offered:** Year-Round

**Subject / Grade Level:** Science / 3-5 grade

### **NGSSS Benchmarks:**

#### **3<sup>rd</sup> Grade Standards**

SC.3.L.15.1, SC.3.P.8.3, SC.3.P.9.1, SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.5, SC.3.N.1.6, LAFS.3.SL.1.1, LAFS.3.SL.1.3, LAFS.3.RI.1.3, MAFS.3.MD.2.4

#### **4<sup>th</sup> Grade Standards**

SC.4.L.17.2, SC.4.L.17.3, SC.4.L.17.4, SC.4.P.8.1, SC.4.P.8.2, SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.2.1, LAFS.4.RI.1.3, LAFS.4.RI.3.7, LAFS.4.SL.1.1, LAFS.4.SL.1.3, LAFS.4.SL.2.4, MAFS.4.MD.1.1, MAFS.4.MD.2.4

#### **5<sup>th</sup> Grade Standards**

SC.5.L.17.1, SC.5.P.8.1, SC.5.P.8.2, SC.5.P.7.2, SC.5.P.7.4, SC.5.N.1.1, SC.5.N.1.6, LAFS.5.RL.2.6, LAFS.5.RI.2.6, LAFS.5.W.3.8, LAFS.5.SL.1.1, MAFS.5.MD.1.1, MAFS.5.MD.2.2

### **Vocabulary:**

Water cycle, precipitation, condensation, evaporation, percolation, transpiration, respiration, brackish water, freshwater, saltwater, watershed, groundwater, aquifer, vapor, cloud, glacier, ocean, river, stream, animal, plant, runoff, erosion, solid, liquid, gas, surface water, water supply, pollution, stormwater

### **Lesson targets:**

- I can describe the various components of the water cycle and the path a water molecule might take on its way through this cycle.
- I can explain how the water cycle is important to all living things.
- I can describe how plants, wildlife, and humans affect the movement of water in the water cycle.
- I can explain that the water cycle is the system by which Earth's fixed amount of water is collected, purified, and distributed from the environment to living things and back to the environment.
- I understand how stormwater, runoff, and surface water effect local water supply.
- I can identify how pollutants can enter the water cycle and water supply.

### **Differentiation strategies to meet diverse learner needs:**

- Hands-on instruction
- Tutor/Peer buddy activities
- Use of visuals
- Questioning techniques
- Modification of text or curriculum

### **Background**

Water covers 71% of Earth. It constitutes 50-70% of the weight of all plants and animals, including humans. It can exist in liquid, gas, and solid (water, vapor/steam, ice) in its natural state. Its unique physical properties enable life to exist on Earth.

Water is constantly moving. In general, water evaporates from oceans into the atmosphere (air), condenses into clouds, falls as rain or snow, and eventually returns to the ocean through a drainage system of streams and rivers. This movement is called the water cycle. Energy from the sun and the Earth's gravitational pull are the driving forces that power the cycle.

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A watershed is the area of land that guides water through small streams towards a major stream or river. In addition to clouds, oceans, rivers, and land, living organisms are part of the water cycle too. All living things need water to live because it is essential to their bodily functions. Plants and animals take in water and return it to the atmosphere as vapor (breathing, transpiring) or to the soil as liquid (excreting).

Trees, other plants, and layers of plant litter absorb rainwater, reducing erosion and runoff. Tree roots also help to hold soil in place so that it does not wash away. Forests also help improve water quality by filtering out impurities that could be potentially harmful in streams of groundwater.

### **ENGAGEMENT** (to be completed prior to the field trip)

1. Ask students what they know about water. What are some words that pop into their heads when they say the word water? The teacher or students can write the words on the board.
  - a. Why should we care about water?
  - b. If every living thing needs so much water, why isn't it used up?
  - c. Where does the water go when a puddle dries up?
  - d. Why does the water in the ocean not dry up like puddles do?
  - e. Where does rain come from?
  - f. Do you think water always follows the same path?

### **EXPLORATION** (to be completed during the field trip with River Center staff)

1. Welcome, introduction to the River Center, overview of today's field trip, and safety/rules talk
2. Divide the students into 2 groups to rotate through 3 different activities
  - a. Lovin' the Loxahatchee River Tour—focusing on water, habitats, and the water cycle.
  - b. The Water Cycle hands-on activity (See below).
  - c. Water resources and conservation discussion
    - i. Where does our water comes from?
    - ii. How do we use water?
    - iii. Where it goes once it is down the drain?
3. Touch tank demonstration

### **EXPLANATION** (to be completed during the field trip with River Center staff)

#### **Water Cycle Lesson**

1. Review the different steps of the water cycle: evaporation, condensation, precipitation, percolation. Using student volunteers as water molecules, demonstrate each step remembering that temperature and gravity control the water movement.
2. The water cycle is really a simplified model for looking at the "journey" of a water molecule. Students learn about the different paths water might take because it is not just a circle. Invite them to play a game in which they each will be a water molecule (or drop for younger students). Have them use the student worksheet to record their journey. Younger students can circle the picture and collect a bead.
3. Divide students into groups with 2-3 members and spread the groups evenly between the stations.
4. Have students roll the die and read the statement at their station corresponding to the number on the die. On their worksheet, they should write or circle their current station, what happened to them, and their next destination. When you call out "cycle," students should go to the next station as directed on the paper.
5. Repeat Step 4 about 10 times or until most students have cycled through the cloud station a couple of times.

#### **Water Cycle Lesson Conclusion Explanation**

- Even though individual molecules took different paths, was anything similar about the journeys they took?
- In the game, which stations seemed to be visited by the most, regardless of their particular journey? What can we infer from this?
- Can you think of other parts of the water cycle that were not included in the game? (lakes, rivers, aquifers)
- What makes water move through the cycle? (sun, gravity, physical properties of water)

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### **ELABORATION** (to be completed after the field trip)

Give students the following scenario to write about. Imagine that two pieces of land are exactly alike, except one area is bare and the other is covered by a forest. Now imagine a stream running through each piece of land.

- What are the differences in the way the stream might move through each area?
- How would the water quality of the stream differ in each area?
- What physical changes might take place in each area?

### **EVALUATION**

- Participation in all activities.
- Have the students write or act out their experiences in the water cycle journey. They should include all the stops of their water molecule journey, in chronological order and include details explaining accurately how and why the water molecule went where it did.
- Student should convey the importance and cyclical nature of the water cycle.
  - For example, a student whose journey was glacier-stream-ocean-cloud-stream-animal-cloud-glacier-ocean might start a story like... "I was a lonely water molecule frozen in a glacier on top of a mountain. When the spring came and the ice thawed, I melted into a stream. Down the mountain the stream roared going over large boulders. After the long journey I reached the ocean..."

### **Making Loxahatchee River District Connections:**

- Water supply
- Stormwater
- Sewage

### **Making River Center Exhibit Connections:**

Students will connect their water cycle journey as a water molecule/drop with their "trip down the Loxahatchee River." They will be visiting different parts of the Loxahatchee journey that directly correlate with the water cycle lesson.

- Wild and Science exhibit – river, stream, plant, and animal
- Floodplains – Flood and drought conditions, stream, river, animal
- Estuary (oyster reef and mangroves) – river, animal, plant
- Dock Piling – river, animal (including humans), ocean
- Coral Reef/Deep Marine – ocean, river, animal
- LRD water board – water cycle exhibit, cloud, river, plant, animal (humans)
  - human use
  - human influences
  - human conservation efforts
  - water resources for the environment, human use, agriculture, commercial, as a community
  - wastewater resources, reclamation, reuse, irrigation quality water

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### Making STEM Connections

#### Science

See standards above.

#### Technology

Use, track, and research different local weather stations, and radar technology. Track different storms throughout the school year. Research different kinds of rain gauges. Design one of your own or purchase one for the class and record your findings each morning to see what the rain levels were the day before.

River Center's Virtual Education Videos – Science with Sam Volume 2: All About Clouds!

<https://www.youtube.com/watch?v=Mo4LNsCmsxw&list=PLA39R2PcEo32OY-s6Wp9bJE3ysTXj-Dqq&index=1>

#### Engineering

Cut a 2-liter bottle in half. Put warm water in the bottom and added blue food coloring to pretend it is the ocean. Using the top of the bottle as a cup, add ice, then put the top of the bottle into the bottom of the bottle. After a little while condensation will start to build up and later on in the day you might have enough condensation that it can “rain” from the top of the bottle which represents the atmosphere.

#### Mathematics

See standards above.