

Water Travels

Grade 5

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Science Content Standards: Grade 5, 3c — *Students know* that water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.

Lesson Concept: Water travels through the water cycle through processes of evaporation, condensation, and precipitation.

Conceptual Flow:

- ▶ There is a limited amount of water on the Earth and it can be reused/recycled.
- ▶ The amount of water on the Earth does not change. Water moves through Earth's system.
- ▶ Water can exist in different states: solid, liquid, or gas.
- ▶ Water travels through the water cycle through a process of evaporation, condensation and precipitation.
 - The water cycle “cleans” the water.
 - The water cycle is happening all the time all over the world.
 - Water cycles through living and non-living things; it does not cycle in a circle.
 - Water is constantly moving in the water cycle, but it does not move in a predictable circle.
 - Heat or absence of heat energy moves water through the water cycle.

Research shows that in order for students to understand the water cycle they need to understand: evaporation and condensation; water vapor/drops of water have weight and undergo freefall.
- ▶ Water flows to the ocean (eventually).
 - Water shapes landforms through erosion, transportation, and deposition as it flows to the ocean.
 - Clear Lake is a part of the water cycle.

Teacher Background:

Atmospheric circulation moves water vapor, clouds, and fog from one place to another. The tiny droplets or crystals of water that form fog and clouds are so small that they remain suspended in the air. Further cooling of the air can cause these droplets or crystals to grow sufficiently until they fall to the earth as rain, hail, sleet, or snow.

Water is constantly moving in the water cycle, but it does not move in a predictable circle. The different paths that water molecules take in the water cycle are variable. There are numerous processes that move water around Earth making the water molecule's "journey" one that is not predictable. These processes include: melting snow moves through watersheds to oceans; water moves in rivers and streams; water seeps underground; water evaporates and travels as water vapor; water vapor condenses on solid objects (on the outside of a cold glass or as dew on a plant, etc.) including on airborne dust particles forming rain drops; living things move water by taking it from the soil and by animals' consuming and excreting it.

(Adapted from and excerpted from the *Science Framework for California Public Schools: Kindergarten Through Grade Twelve*.)

Materials Needed for the Lesson:

Teacher Materials

- Bell to ring to signify next round of activity
- Transparency of the "Water Cycle Map"
- Instructions on making the dice: Go to www.montana.edu/wwwwet/journey.html and download the "Water Cycle Table" then follow instructions on making the dice. An alternative to making the dice is to provide regular dice at each station next to each poster (see below) prepared on chart paper describing what each number represents for each station. Student will roll the die, look up where they are to go next, and write this on their cards before moving to that station.
- Make and label a poster to represent each of the following (make one poster for each): Soil, Plant, River, Clouds, Ocean, Lake, Animal, Ground Water, Glacier and place these around the classroom.

Student Materials

For each student

- One index card (any size or use paper on a clipboard) or use the "Incredible Journey Log"
- "Water Cycle Map"
- Textbook or other book which shows the water cycle

For each group of 2 or 3 students

- Large white drawing paper and felt tipped pens or a white board with markers

Teacher Does	Student Does	Concept
<p>“Incredible Journey Log”. For example: 1) Lake; 2) Lake 3) Cloud. Point out that where you begin is your #1.</p> <p>Distribute 1 index card (or the “Incredible Journey Log”) to each student. If using cards, have students number their card from 1 – 20 in a column.</p> <ul style="list-style-type: none"> ▶ <i>Take your index card (or the “Incredible Journey Log”) and pencil with you on your journey. You will record each stop you make.</i> <p>Evenly distribute students to all nine stations.</p> <ul style="list-style-type: none"> ▶ <i>Your number 1 stop is where you are starting your journey.</i> ▶ <i>You have 30 seconds for each of you to roll the die at the station you are at. Do not move to the next station until I ring the bell.</i> <p>Watch to see when all groups have finished rolling the die and writing the location of where they are to go next</p> <p>Ring bell.</p> <p>Remind students to check that they have marked their index card (or on the “Incredible Journey Log”) as to where they are now.</p> <ul style="list-style-type: none"> ▶ <i>Check your index card (or the “Incredible Journey Log”) to make sure that you are in the correct place, roll the die, and record on your card where you will go next.</i> <p>Ring bell, students move (a total of 20 times), roll die and record where they will go next. Make sure students record their movements on their index card or the “Incredible Journey Log”.</p> <p>Students return to their seats.</p>	<p>Go to assigned beginning location. Record beginning location on index card (or on the “Incredible Journey Log”).</p> <p>Move to next station. Roll the die; record on index card (or on the “Incredible Journey Log”) where they will go next.</p> <p>Move to next station. Students record on their card (or on the “Incredible Journey Log”) where they will be going next, and move to that next station and roll the die at that station. This is done a total of 20 times.</p> <p>Return to seat.</p>	
<p>EXPLAIN:</p> <p>Distribute the “Water Cycle Map” to each student.</p> <ul style="list-style-type: none"> ▶ <i>You will now document your journey on this map.</i> <p>Display transparency of the map; model on the transparency how students will record their data from the index cards (or from the</p>	<p>Look at index card (or at the “Incredible Journey Log”) and make arrows on the “Water Cycle</p>	<p>Water is constantly moving in the water cycle, but it does not move in a predictable circle.</p>

Teacher Does	Student Does	Concept
<p>“Incredible Journey Log”), drawing arrows from one station to the next, to the next, etc. Explain that if they stayed at a station, they are to draw a star. Model to students how to complete the map.</p> <ul style="list-style-type: none"> ▶ <i>Put a circle where you began your journey.</i> ▶ <i>At your tables, do a tally for the number of times each of you was at each station.</i> ▶ <i>Reviewing your data with your table, which stations had the most people (droplets of water)?</i> ▶ <i>Which stations did you visit more than others?</i> ▶ <i>Did you move in a circle in your journey? How did you move?</i> ▶ <i>On the back of your map, describe the difference between your original drawing of the water cycle and your map of your incredible journey as a drop of water. (Does water move in a circle in the water cycle?)</i> <p>Collect papers.</p> <p>Have students look at how the water cycle is shown in textbooks. <i>How is it different from what you experienced in the activity? Many books have greatly simplified the water cycle by showing it moving in a circle. We now know that the water doesn't always move in a circle. But this is a simplified way to show that some water evaporates into clouds and some comes down as precipitation (rain). Are all the parts of the water cycle shown in the water cycle? What parts are not shown?</i></p>	<p>Map” showing your movement as a water droplet. Put a circle at the beginning of journey then make arrows going from destination to destination in order as shown on the index card (or on the “Incredible Journey Log”).</p> <p>ESR: Ocean.</p> <p>ESR: Clouds; Ocean.</p> <p>ESR: No; I zigzagged; I stayed at one station for a long time.</p> <p>ESR: It is not a circle. Water moves in lots of different directions but not necessarily in a circle.</p>	
<p><u>EXTEND:</u></p> <p>Have students look at their “Water Cycle Map” and work with a partner to determine which processes (evaporation, condensation, or precipitation) bring water to or take the water away from the various areas (lake, plant, cloud, soil, etc.). Then have students write this on the outside of each item on their map (e.g., lake: evaporation takes away; precipitation bring water to.; or “E” takes away; “P” brings water to)</p> <p>Using the “Water Cycle Map” have students</p>	<p>ESR: For Plant: E takes away; P brings to plant; For Cloud P takes away; E and C bring to cloud.</p>	

Teacher Does	Student Does	Concept
identify other ways (other than evaporation, condensation, or precipitation) that water can get in and out of some of the “stations” (e.g., to Lake runoff from streams; from Lake runoff through a stream). Students may need to do some research on this.		

Input Question: Reviewing your data with your table, which stations had the most people (droplets of water)? (in Explain section)

Process Question: How are the pictures the same and how are they different? (in Engage section)

Output Question: Does water move in a circle in the water cycle? (in Explain section)

STUDENT HANDOUT

Water Cycle Map



Lake



Plant



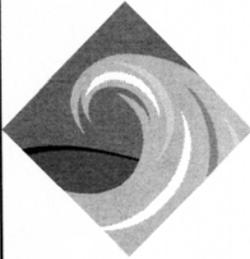
Cloud



Soil



Animal



Ocean



Glacier



Ground water



Stream

STUDENT HANDOUT

Incredible Journey Log

Record where you went and where you stayed during your journey.

	 Ocean	 Clouds	 Glaciers	 Animals	 Ground Water	 Rivers	 Plants	 Soil	 Lakes
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