

This instructional segment (part 1 of 2) is based on the hydrologic cycle.	
Student Science Performance	
6th Grade Earth Science	Title:
Topic: Water in Earth Processes	Water Water Everywhere!
<p>Performance Expectation for GSE: S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth processes.</p> <ol style="list-style-type: none"> Ask questions to determine where water is located on Earth’s surface (oceans, rivers, lakes, swamps, groundwater, aquifers, and ice) and communicate the relative proportion of water at each location. Plan and carry out an investigation to illustrate the role of the sun’s energy in atmospheric conditions that lead to the cycling of water. <i>(Clarification statement: The water cycle should include evaporation, condensation, precipitation, transpiration, infiltration, groundwater, and runoff.)</i> Ask questions to identify and communicate, using graphs and maps, the composition, location, and subsurface topography of the world’s oceans. 	
<p>Performance Expectations for Instruction:</p> <ul style="list-style-type: none"> Make observations of the hydrologic cycle. Plan and carry out investigations to investigate the hydrologic cycle. Construct arguments based on water shortages across the Earth. <p>Additional notes on student supports</p>	
<p><i>Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.</i></p>	
Engaging Learners	<p>Phenomenon - Water, Water Everywhere!</p> <p>Using the image below, students should brainstorm to focus on questions and concepts of the hydrologic cycle. Have them discuss where they see evidence of condensation, evidence of precipitation, and conjecture why this is happening.</p>



Photo Credit: Gavin Bernstein - used with permission

Teacher Notes: Use this picture at the very beginning of the discussion on the hydrologic cycle. The picture is an amazing example of the hydrologic cycle in action. Help students to formulate questions about the water cycle and why this picture is the water cycle in action.

Obtaining/Evaluating/Communicating: Using table discussion, have the students discuss what they know about the water cycle for 5 minutes. After the discussion, have the students draw the water cycle labeling evaporation, condensation, precipitation, transpiration, infiltration, groundwater and runoff.

Teacher Notes: Once the students have 5 minutes to draw and label, stop the and take up the drawing. Explain to the students that the drawing will be returned periodically during the lesson for revisions.

Exploring

Obtain

Students will obtain additional information on the water cycle from the [Water Water Everywhere](#) (NASA). This information will provide information for the illustration the students are constructing.

Teacher Notes: The information presented in the video provides the necessary vocabulary. Encourage students to listen and jot down the vocabulary, sketch and write three facts they found interesting.

Communicate

Have students work together to develop a clear, concise vocabulary list.

	<p><i>Teacher Notes: Refer to the standard to match terms to the class list. Be aware of the connection to standard S6E4 b, c, d. This video offers preview to these standards.</i></p>								
<p>Explaining Finalizing Model</p>	<p>Evaluate Return the paper from the engagement section. Students should use a different color pen, pencil or crayon to revise their illustration.</p> <p>Obtain Students will explain the movement of water around the world through the design of a water cycle model. The following resource provides further explanation, allowing students to develop the model. Summary of the Hydrologic Cycle.</p> <p>A potential video to use: The Great Aqua Adventure (Crash Course Kids).</p> <p><i>Teacher Notes: Students should correct, add to and finalize their illustration.</i></p> <p>Evaluate Gallery walk – post the student drawings around room. Have students use sticky notes to communicate with classmates about missing elements and understandings. <i>Teacher Notes: Look for innovation – look for differences...why are the pictures drawn as accurate or more accurate than just the textbook style water cycle. Students will look for improvements of what is usually found in the textbook water cycle drawing. (mountains, snow, lake, clouds all in the same place with arrows going in the same direction with labels)</i></p> <p>Students will use this checklist to evaluate the models.</p> <table border="1" data-bbox="513 1125 1458 1457"> <tr> <td>Check the included elements:</td> </tr> <tr> <td><input type="checkbox"/> evaporation</td> </tr> <tr> <td><input type="checkbox"/> condensation</td> </tr> <tr> <td><input type="checkbox"/> precipitation</td> </tr> <tr> <td><input type="checkbox"/> transpiration</td> </tr> <tr> <td><input type="checkbox"/> infiltration</td> </tr> <tr> <td><input type="checkbox"/> groundwater</td> </tr> <tr> <td><input type="checkbox"/> runoff</td> </tr> </table> <p>Have students help each other modify the models so that there is a more comprehensive understanding of what is actually occurring.</p> <p><i>Teacher Notes: This is a 2D model. Help your students understand that nature actually involves water, clouds, etc.</i></p> <p>Obtain: Students will model the water cycle in action. Assign each group of students one element of the cycle from the list above and instruct them to plan and carry out an investigation related to that part. Students will use the information obtained from the earlier model to help design their model.</p>	Check the included elements:	<input type="checkbox"/> evaporation	<input type="checkbox"/> condensation	<input type="checkbox"/> precipitation	<input type="checkbox"/> transpiration	<input type="checkbox"/> infiltration	<input type="checkbox"/> groundwater	<input type="checkbox"/> runoff
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	<p>Evaluate: Students will present their model to the class. As the presentations occur, students should draw the flow of events for the water cycle. After each group has presented, the students will have an updated version of the water cycle and can use the information to make a digital storyboard.</p>
<p>Elaborating Applying Model to Solve a Problems</p>	<p>Communicate: Each group of students will produce a digital storyboard. The storyboard to communicate a clear understanding of the water cycle by using ideas they have seen in the group presentations.</p> <p>Phenomenon Show picture of the Flint River in Georgia to elicit discussion about freshwater locations around the world. Research: Picture of Flint River</p> <p>Obtain Obtain information about freshwater locations around the world. One resource is this video, Hydrologic cycle or a potential video to use: The Great Aqua Adventure (Crash Course Kids) Data can be obtained from The Water Cycle (USGS).</p> <p>Have students use this information to make a chart with the percentages of water found in various forms in different locations on the Earth’s surface and graph their results.</p> <p>Evaluate/Communicate: Compare and describe the relative proportion of water at each location on Earth’s surface. This resource provides lessons and video about the water on the Earth’s surface: Fresh or Salty <i>Teacher Notes: Be sure students understand that The Dead Sea and Salt Lake just look like regular lakes, but they are salt lakes. As well as the water in the Arctic is salty but the ice on top is fresh.</i></p>
<p>Evaluation</p>	<p style="text-align: center;">Assessment of Student Learning</p> <p>Obtain: Students will obtain information about the urban water cycle. Natural and Urban "Stormwater" Water Cycles provides a lesson on runoff and infiltration of stormwater from Teaching Engineering.</p> <p>Evaluate/Communicate: Have students evaluate the urban water cycle. Using the same illustration, students should insert new terminology presented. Allowing students to use the idea of a making small town scenario showing an understanding of urban water cycle terms will provide evidence needed to demonstrate comprehension of the hydrologic cycle. Students will communicate the understanding of additional terminology.</p>

<i>SEP, CCC, DCI</i>	Science Essentials
Science and Engineering Practices	<ul style="list-style-type: none"> ● Asking questions and defining problems ● Planning and carrying out investigations ● Obtaining, evaluating and communicating information
Crosscutting Concepts	<ul style="list-style-type: none"> ● Patterns ● Cause and Effect ● Systems and System Models ● Energy and Matter ● Structure and Function ● Stability and Change
Disciplinary Core Ideas	<p>From <u>A Framework for K-12 Science Education</u>:</p> <ul style="list-style-type: none"> ● ESS2.C: The Roles of Water in Earth’s Surface Processes ● ESS2.D: Weather and Climate ● ESS3.B: Natural Hazards

Additional Supports for struggling learners:

The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student’s Individualized Education Program.

General supports for the following categories:

<u>Reading:</u>	<u>Writing:</u>	<u>Math:</u>
<ol style="list-style-type: none"> 1. Provide reading support by reading aloud or doing partner reads 2. Have the teacher model what they are thinking when reading the text 3. Annotate the text with students so that they may refer to it as they work through the activities. 	<ol style="list-style-type: none"> 1. The teacher can provide a sentence starter for the students. 2. The teacher can give students an audience to write to (i.e. Write a letter to your sibling explaining this topic). 3. The teacher can provide constructive feedback during the writing process to help students understand the expectations. 	<ol style="list-style-type: none"> 1. Provide calculators as needed. 2. Provide graph paper as needed.

Supports for this specific lesson if needed:

Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.

Engage:

1. The teacher should have clear and consistent guidelines for discussions. These guidelines should help students feel more comfortable and be more likely to participate.
2. The teacher should consider guiding questions to assist students in brainstorming information about the water cycle.
3. The teacher can start by asking students to make observations about the image that appears in the lesson plan.
4. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.
5. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or designing a play.
6. Students may need additional time to complete their assignment.

Exploring:

1. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or designing a play.
2. The teacher should consider how students access the material. The teacher should provide multiple points of access to the material such as articles, videos, text-to-speech or read aloud.
3. The teacher should consider showing videos more than once as needed for students to make observations and identify key points.
4. Students may need additional time to complete their assignment.
5. The students should justify any revisions that they made to their model.

Explaining:

1. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or designing a play.
2. The teacher should consider providing sources for students to use in their research.
3. The teacher should consider having multiple ways for students to share their work. These share formats could include using technology, gallery walks or presentations.
4. The teacher should consider providing a rubric for students to use to self-evaluate their work. This increases student ownership of the work.
5. The teacher should have clear and consistent peer feedback guidelines to help students provide respectful, clear, constructive and useful feedback.
6. The teacher can then have students use the feedback that they get from the peer feedback session to revise their models.
7. Students may need additional time to revise their model.
8. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student grouping.
9. The teacher should consider providing groups with multiple options to express their knowledge. These formats could include drawing, writing, making a poster or creating a presentation.

Elaborating:

1. The teacher should have clear and consistent guidelines for student discussions. These guidelines should help students feel more comfortable and be more likely to participate.
2. The teacher should consider providing students with sources to use in their research.
3. The teacher should consider providing students with an organizer and chart for students to record their research.
4. The teacher should consider providing groups with multiple options to express their knowledge. These formats could include drawing, writing, making a poster or creating a presentation.
5. Students may need additional time to complete their assignment.

Evaluating:

1. The teacher should consider giving students multiple options to express their knowledge. These options could include writing, drawing or designing a presentation.
2. The teacher should complete a formative assessment several times throughout the lesson and re-teach, review and enrich as needed.