


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> <p>a. 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.</p> <p>b. 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></p> <p>c. Ask questions to identify and communicate, using graphs and maps, the composition, location, and subsurface topography of the world’s oceans.</p>	
<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><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> 

	<p>Photo Credit: Gavin Bernstein - used with permission</p> <p><i>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.</i></p> <p><i>Obtaining/Evaluating/Communicating:</i> 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.</p> <p><i>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.</i></p>
<p>Exploring</p>	<p>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.</p> <p><i>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.</i></p> <p>Communicate Have students work together to develop a clear, concise vocabulary list.</p> <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>Evaluate Return the paper from the engagement section. Students should use a different color pen, pencil or crayon to revise their illustration.</p>
<p>Explaining Finalizing Model</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</p>

sticky notes to communicate with classmates about missing elements and understandings.
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)

Students will use this checklist to evaluate the models.

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

Have students help each other modify the models so that there is a more comprehensive understanding of what is actually occurring.

Teacher Notes: This is a 2D model. Help your students understand that nature actually involves water, clouds, etc.

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.

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.

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.

Elaborating
 Applying Model to Solve a Problems

Phenomenon
 Show picture of the Flint River in Georgia to elicit discussion about freshwater locations around the world.
 Research: Picture of Flint River

	<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 the water in the Arctic is salty but the ice on top is fresh.</i></p>
Evaluation	<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>
SEP, CCC, DCI	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 A Framework for K-12 Science Education:</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