

The 5 E's: A Model for Designing Lessons for Inquiry Planner¹

Logistics Information:

- a. Environmental Education Learning Cycle Example
- b. A synthesis of *Project WILD*
- c. Iowa Core Essential Concepts
Earth and Space: Understand and apply knowledge of the structure and processes of the earth system and the processes that change the earth and its surface.
- d. Developed April 16, 2010

Background Information (What do observers need to know about our learners, classroom and school?): Schools will vary

Materials Required:

Water Use Chart (*Project Learning Tree*, p. 166)

Writing materials

Glasses with polluted water

Time Period:

One or two 45 minute sessions.

Name of the Unit: *Where Does Water Run?* (*Project WILD Aquatic*, p. 21-23); *Alice in Waterland* (*Project WILD Aquatic*, p. 154-162)

- I. Plan of the Unit
 - a. Goal of the unit: Students will describe relationships among precipitation, runoff, and aquatic habitats;
 - b. How this unit related to the curriculum:

Previous Grade/Course	Current Grade/Course	Next Grade/Course
3 rd Grade (Life Science)/ Buoyancy	4 th Grade (Life Science)/Water Quality	5 th Grade (Life Science)/Environments, Water Planet

- c. Lesson Plan: Phases in a 5E Learning Cycle (in no particular order) are Engage, Explore, Explain, Elaborate, and Evaluate. There may be multiple experiences in each phase.

¹ Adapted from *Teacher to Teacher: Reshaping Instruction Through Lesson Study* (NCREL, 2002)

Phases of the lesson: learning activities and key questions (and time allocation)	Student activities/ anticipated student reactions or responses	Teacher’s response to student reactions/ Things to remember	Evidence of Student Understanding
<p>ENGAGE: Ask the students to predict how much water they will use in one day. Give each student a piece of paper and a pencil to carry for one full day, to post and tally every time they use water.</p> <p>EXPLORE: Students accurately record their daily use of water.</p> <p>EXPLAIN: Students discuss what they learned about water use from their recordings.</p>	<p>Students will predict how much water they use. Students may be prone to “wild guesses.”</p> <p>Students may have trouble keeping accurate recordings of their water use.</p> <p>Students may have an “a-ha!” moment on how much water they use daily and how this relates to their initial prediction.</p> <p>Students will use their information to generate discussion points:</p> <ul style="list-style-type: none"> • How much water did you use? • Where was most of the water used? • What is the class average of water use? • How does your water use compare to that of others? 	<p>Teachers will attempt to expand students’ awareness of the many uses of water in their daily life, i.e. flushing a toilet, running through a sprinkler, washing hands, etc. Show page 165 <i>Project Learning Tree</i>, Typical Water Use at School.</p> <p>Teacher needs to emphasize the importance of recording every use of water every time.</p> <p>Teacher asks probing questions to encourage further thought:</p> <ul style="list-style-type: none"> • Were the results what you expected? • What was most surprising about your water usage? <p>Teacher can show prepared video clip or other visual resource to increase background knowledge.</p>	<p>Students will return with collected data on notes.</p> <p>Students are actively engaged and recording their use of water.</p> <p>Students are responding to inquiries and asking questions.</p>

Phases of the lesson: learning activities and key questions (and time allocation)	Student activities/ anticipated student reactions or responses	Teacher’s response to student reactions/ Things to remember	Evidence of Student Understanding
<p>ELABORATE: Students have made a connection to their own water use, and now will make a greater leap to understand where this water comes from.</p> <p>Teacher needs to refer back to their experience as a water molecule in the game “Go to the Head of the Cloud,” and other water cycle terms.</p> <p>Ask the students to imagine themselves as a water molecule again, but this time to travel through their home.</p> <p>Present the class with this question: Here are two identical looking glasses of water. Which would you drink and why?</p> <p>EVALUATE: Students work in teams to present ways the water could be tested for contaminants.</p> <p>OPTION: Filtration systems can be created and tested in class. Results can be presented in class. Note: districts may be able to receive credit from Stormwater Management from your local water company.</p> <p>Group inquiry project that investigates water related issues that arose during their unit study such as rain fall collection, conservation campaigns, etc.</p>	<p>Misconceptions about the water cycle may interfere with connecting water use to the water cycle.</p> <p>Students connect the water cycle adventure to the trip through their house.</p> <p>Students need to generate questions about why they should or should not drink the water. Questions should be quantifiable and result-driven:</p> <ul style="list-style-type: none"> • Where did it come from? • How can I test its safety? 	<p>Teacher needs to clarify terms and review concepts of the water cycle.</p> <p>Teacher may need to guide the thinking of the students to keep the focus on the scientific terms.</p> <p>Possible resource: FOSS Water Kit lesson: Water in Earth Materials.</p>	<p>Students are engaged in discussing their water adventure.</p> <p>Students are generating quantifiable questions.</p>

EXTENSIONS

Create a comic strip of the water journey.

Have students research water related diseases.

Contact your local water company or DNR and request materials.

Use computer programs such as KidSpiration to help students create a flow chart of the water through their homes.

Have students create a mural depicting the origins and journey of water through the natural and human systems. (Use Every Child Reads PWIM literacy strategy.)

Students generate math story problems about their daily use of water (*Project WILD* p.154)

Visit local a Water Works site or Sewage Treatment Plant.

GLOBE water protocol or IOWATER materials can be utilized to gather information.

ADDITIONAL ACTIVITIES

Dragonfly Pond (*Project WILD Aquatic*, p.198)

Every Drop Counts (*Project Learning Tree*, p. 163)

ADDITIONAL RESOURCES

A Drop Around the World by Barbara Shaw McKinney and Michael S. Maydak

Incredible Journey (*Project WET*)

http://www.epa.gov/safewater/kids/flash/flash_watercycle.html

Curious George episode

Bill Nye Water Cycle video

Magic School Bus: Wet All Over, Catches a Wave videos