WATER FOR LIFE
SNAPSHOT

DRIVING QUESTION: HOW DO WELLS WORK?

Recommended Grades: K – 6; Adaptations for 7 – 12.

Classroom or Center Activities	*Outside or Larger Space Activities*	*Technology-Based Activities*	*Stem-to-Go Take Home*	*Field Work and/or Natural Area Needed*
X	X	X	X	X

Materials: Three clear plastic cups, pea gravel, play sand, food coloring, pourable pitcher or graduated measuring cup of water, (1) 10 or 25 milliliter graduated cylinder (measuring spoons and cups can be substituted if needed), two plastic straws, scissors, dropping pipet or medicine dropper that can fit tightly inside a straw, Water Test Strips for testing aquarium water.

Teacher Prep: <15 Minutes

Participant activity: 30 minutes

Objectives:

1. Predict then observe how water moves (infiltrates) through the earth to become groundwater that is stored in an aquifer.
2. Use metric measurements and calculate how much water an aquifer can hold (porosity).
3. Observe how water and contaminants move thorough aquifers (permeability).
4. Infer which aquifers are more vulnerable to pollution, like pesticides and fertilizer.
5. Measure chemical parameters to determine if water is within safe levels.
6. Apply observations from the aquifer models to connect with water quality issues in North Carolina.

STEM Skills

S: Predict and test hypotheses.

T: Use tools to measure metric units. Interpret data using a key.

E: Apply a model to real world issues.

M: Calculate quantities. Analyze and interpret data through graphs.

Teacher Tips: WATER FOR LIFE

Plan ahead: Inexpensive graduated cylinders and dropping pipets are available through Carolina Biological or craft stores, such as Oriental Trading Company, or Michael's. To make your own graduated cylinder, use a medicine dropper to fill known milliliter levels in an empty film container or glitter tube. Use a fine tipped permanent marker to mark the increments in milliliters on the side.

Total prep: < 15 minutes to make copies, mark cylinders, assemble materials

Safety: Small gravel may be a choking hazard. Participants may need a reminder not to squirt water or dye at one another. Spills may be slippery. Food coloring may dye clothing. Please note: the test strips cannot determine if water is safe to drink.

Sensory Integration Issues: If participants struggle with fine motor skills needed for pipets, pre-pour measured amounts or substitute a teaspoon of 5 milliliters. To prevent spilling the cylinder, tape the base with masking or regular tape.

Cost: Approximately $3 per person. Generally, pea gravel and play sand purchased from home improvement stores are cost-effective for large groups.

What else do I need? Paper towels/rags. Optional: Clementine oranges for each participant. Aquarium test strips can be purchased through pet stores.

Clean Up: Hands, equipment, and surfaces can be washed with soap and water. Do not pour sand/ gravel in the sink.

NC CAP's Unit Planner

Classroom or Center Activities	*Outside or Larger Space Activities*	*Technology-Based Activities*	*Stem To-Go*	*Field Work and/or Natural Area Needed*
Well Lab	Water Cycle Dance	Calculate how much water you use: https://water.usgs/edu/activity-percapita.html	Leak Detectives	Water Cycle Walk
Earth as an Orange		Calculate how much water you lose with a leaky faucet https://water.usgs.go/edu/activity-drip.html	Water Cycle Walk	
Water Taste Test		Water Cycle Interactive with three levels: https://water.usgs.gov/edu/watercycle-kids-beg.html		
		Groundwater True or False Interactive for older students 7 - 12: https://water.usgs.gov/edu/activity-tf-groundwater.html		
		National Survey online about how your drinking water tastes compared to what other people say: https://water.usgs.gov/edu/activity-watertaste.html		

NC Essential Standards Correlations: Water for Life

K.P.2.1: Classify objects by observable physical properties (including size, color, shape, texture, weight and flexibility)
K.P.2.2: Compare the observable physical properties of different kinds of materials (clay, wood, cloth, paper, etc.) from which objects are made and how they are used.
1.P.1.2: Explain how some forces (pushes and pulls) can be used to make things move without touching them, such as magnets.
1.E.2.1: Summarize the physical properties of Earth materials, including rocks, minerals, soils and water that make them useful in different ways.
1.E.2.2 Compare the properties of soil samples from different places relating their capacity to retain water, nourish and support the growth of certain plants.
1.L.1.1: Recognize that plants and animals need air, water, light (plants only) space, food and shelter and that these may be found in their environment.

1.L.1.3: Summarize ways that humans protect their environment and/or improve conditions for the growth of the plants and animals that live there (e.g., reuse or recycle products to avoid littering).
2.P.2.1: Give examples of matter that change from a solid to a liquid and from a liquid to a solid by heating and cooling.
2.P.2.3: Compare what happens to water left in an open container over time as to water left in a closed container.
2.E.1.1: Summarize how energy from the sun serves as a source of light that warms the land, air and water.
3.P.1.2: Compare the relative speeds (faster o slower) of objects that travel the same distance in different amounts of time.
3.P.2.1: Recognized that air is a substance that surrounds us, takes up space and has mass.
3.P.2.2: Compare solids, liquids, and gases based on their basic properties.
3.E.2.1: Compare Earths saltwater and freshwater features (including oceans, seas, rivers, lakes, ponds, streams, and glaciers).
4.L.1.3: Explain how humans can adapt their behavior to live in changing habitats (e.g., recycling wastes, establishing rain gardens, planting trees and shrubs to prevent flooding and erosion).
5.P.2.1: Explain how the sun's energy impacts the processes of the water cycle (including evaporation, transpiration, condensation, precipitation, and runoff).
5.P.2.2: Compare the characteristics of several common ecosystems, including estuaries and salt marshes, oceans, lakes and ponds, forests, and grasslands.
6.L.2.2: Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, tundra) affect the ability of organisms to grow, survive, and/or create their own food through photosynthesis.
7.E.1.2: Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.
8.E.1.1: Explain the structure of the hydrosphere including: Water distribution on earth; Local river basins and water availability.
8.E.1.3: Predict the safety and potability of water supplies in North Carolina based on physical, and biological factors, including: Temperature, Dissolved oxygen, pH, Nitrates and Phosphates, Turbidity, Bio-indicators.
8.E.1.4: Conclude that the good health of humans requires: Monitoring of the hydrosphere, water quality standards, methods of water quality treatment, maintaining safe water quality, stewardship.