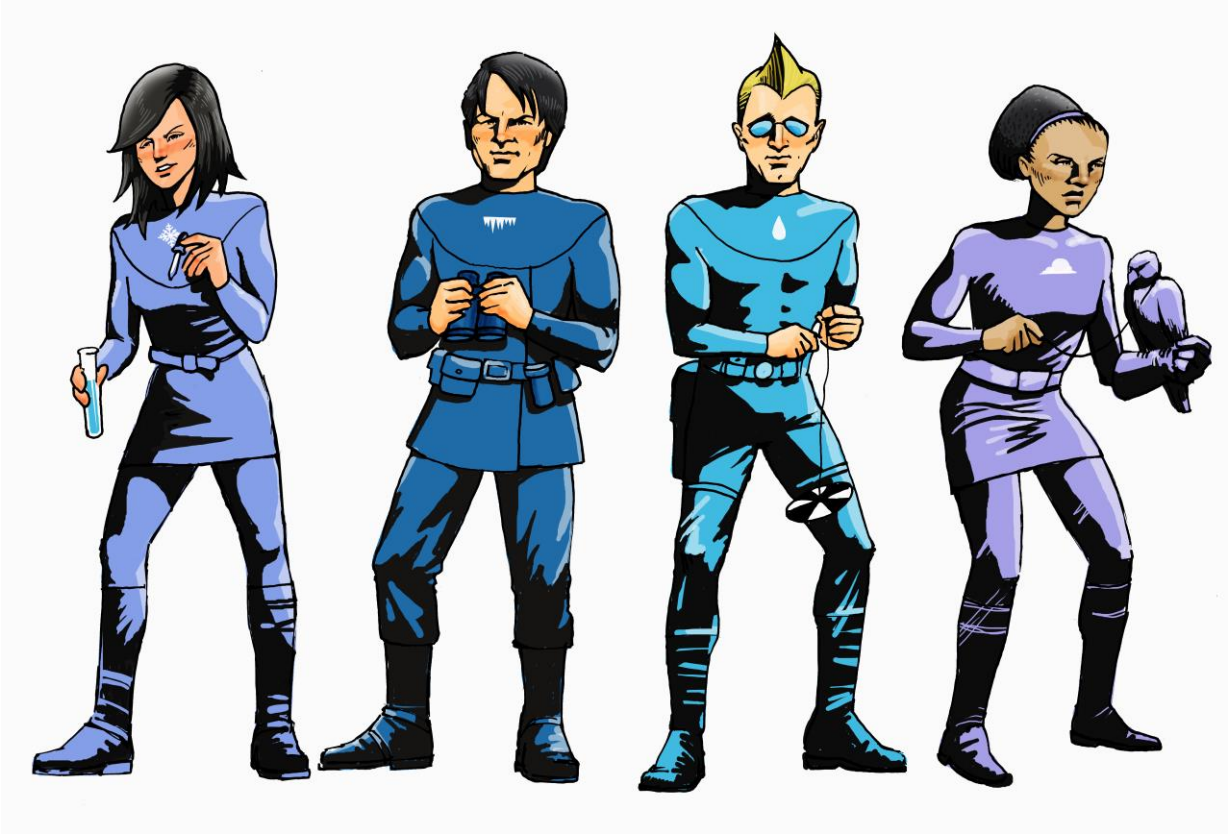
The Ways of Water

Teacher's Guide: Grade 8



AQUA TEAM

the Next Generation

Beaver Water District

Revised November 2015

Lesson 3: H_2O: An Agent of Erosion

Purpose

The West Fork of the White River Watershed includes all the rivers, streams, and runoff from sloping land which flows into Beaver Lake. It is impacted by activities that occur within the surrounding waterways and sloping areas. Activities such as recreation, farming, construction, and industry all affect the quality of the water in Beaver Lake. West Fork of the White River Watershed geologic maps may be found at the Beaver Water District website, www.bwdh2o.org , and the United States Geological Survey website, http://www.usgs.gov/pubprod/.

Objective

Student teams will investigate erosion caused by water flowing over surface areas and the effect on water sources.

Arkansas Framework Correlation

Language Arts

8th Grade

OV.1.8.2 Use standard English in classroom discussion and presentations.

OV.1.8.6 Contribute appropriately to class discussion.

OV.3.8.1 View a variety of visually presented materials for understanding of a specific concept.

OV.4.8.2 Organize ideas by using such graphic organizers as charts/graphs, and formal outlining with main topics, sub-topics, and details.

Science

8th Grade

ESS.8.8.4 Synthesize and model the result of both constructive and destructive forces on land forms: deposition, erosion, weathering, crustal deformation.

ESS.8.8.8 Demonstrate an understanding of the agents of erosion: gravity, water, ice, wind, and animals including humans.

ESS.8.8.9 Using models of rivers, predicts changes when variables, such as load, slope, amount of water, or the composition of a stream bed, are changed through erosion or deposition.

Social Studies

8th Grade

G.3.8.5 Analyze methods and consequences of environmental modification on world *regions* and populations (e.g., acid rain, erosion, clear cutting, desertification, global warming, ozone depletion, strip mining).

Problem Question

What is the role of water as an agent of erosion? How do changes in land use affect stormwater runoff, water quality, stream dynamics, and watershed topography?

BACKGROUND INFORMATION

- Erosion is the natural process by which soil and rocks are moved by wind or water along the earth's surface.

- The eroding of fertile topsoil causes loss of land productivity.
- Eroded particles will eventually settle out of the air or water and change the environment on which they settle.
- As particles in water settle, bottom organisms are covered and channels are filled with sediment. These particles may also absorb chemicals such as fertilizers, pesticides, heavy metals and other toxins and carry them to water sources.
- Most sediments come from non-point sources (bare fields, housing projects, construction sites and cities).
- Crop productivity and landscaping is enhanced by the use of commercial fertilizers and animal manure to supply nutrients. However, some of this fertilizer will dissolve in water and leach into the ground water supply or be carried during erosion as runoff.

Timeline

One to two (1-2) class periods.

Materials

- Bags of potting soil (or do investigation outside using soil in schoolyard)
- 1 metal spoon or hand shovel
- 3 Plastic dishpans or Al foil roasting pans
- paper or foam cups with 10-15 toothpick holes punched in the bottom of one of the cups
- facial tissue

Teacher Preparation

Make materials and supplies available.

Additional Resources

Resources for materials not included:
UA Center for Math & Science Education
http://www.uark.edu/~k12info/
479.575.3875
Northwest Arkansas Education Co-Op
http://starfish.k12.ar.us/web/
479.267.7450
Beaver Water District
www.bwdh2o.org
479.717.3807
Know of other resources? Please let us know!
education@bwdh2o.org or 479.756.3651

7E's H2O: An Agent of Erosion

Elicit

Using the interactive activity at http://www.kineticcity.com/mindgames/warper/ find out what students know about types of erosion.

AND/OR

Agree/Disagree: Give student partners the list of agree/disagree statements at the end of this lesson. They read the statements one at a time and together decide if they agree or disagree and write a rationale for their decision.

Engage

Concentration game to be done whole group in the classroom or as individuals or partners in the computer lab. http://www.quia.com/cc/512.html?AP_rand=1511523442 .

Explore

Procedure:

1. Fill the first pan with soil and smooth it flat to form level land.
2. Fill the cup that does not have holes with water.
3. One student holds the cup with holes 12 inches above the "plain."
4. Another student gently pours the water from the other cup into the cup with holes.
5. Sketch the setup into your journal, watch what happens and record the observations in your journal.
6. Fill another pan with soil and form a hill or mountain near the center.
7. Repeat steps 2-5 in the mountain pan.
8. Fill a third pan with soil and cover the hill or mountain with facial tissue to model a grass covered hillside.
9. Repeat steps 2-5 with the "grass" covered hillside.

Explain

Exit slip the day of the lab: What did you learn from this investigation?

Elaborate

Collaborative posters: Students list places they have seen or know of vegetation being planted to prevent erosion. (In groups of 4-6, each student takes a turn writing one place. Each student uses a different color of marker.)

Evaluate

Student will be evaluated by

- Teacher observations during lab

- Journal entries
- Student partners will revisit their agree/disagree statements and rationales and write a statement explaining any changes in their thinking, citing evidence from their unit experiences

Extensions

Build 2 soil "mountains" beside one another in the schoolyard. Cover one "mountain" with sod and leave the other uncovered. Photograph the mountains twice weekly for several weeks to record changes in the mountains caused by erosion. Post the photos in the classroom for all students to observe. Students write a conclusion in their journal about what they have learned from the observations of the 2 "mountains."