

Water Flow

Strand	Matter
Topic	Investigating natural flow of water
Primary SOL	K.5 The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include b) water flows downhill.
Related SOL	K.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which a) basic characteristics or properties of objects are identified by direct observation; e) nonstandard units are used to measure the length, mass, and volume of common objects; g) a question is developed and predictions are made from one or more observations; h) observations are recorded; j) unusual or unexpected results in an activity are recognized; and k) objects are described both pictorially and verbally.

Background Information

Water flows from a higher elevation to a lower elevation due to the force of gravity. Water flows downhill starting out as small creeks that merge to form larger streams and rivers. Rain will either soak into the soil and become part of the groundwater or will flow into the waterway as runoff. The surface runoff collects in rivers, lakes, and oceans.

Materials

- Water containers (plastic buckets or bottles)
- Small plastic cups
- Yarn or string for nonstandard measurement
- Digging tools or sticks
- Clipboards
- Paper
- Writing utensils
- Containers of water or a hose
- Digital camera

Vocabulary

water, flow, direction, downhill, absorb, stream, path, dam

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Gather students in a group. Ask students to observe what happens to water in a container (e.g., pitcher). Standing beside a bucket, hold the container of water at least three feet above a bucket and pour some water from a container into the bucket.
2. Ask students to describe what happened to the water. Encourage students to talk about the direction the water flows. Ask them if you could make the water flow up.
3. Tell students that they are going to explore what happens when they pour water in different locations on the schoolyard.

Procedure

This activity will need to be done outside.

1. Fill a bucket with clean water. Divide students into groups of two to three students. Give each group a small plastic cup, a clipboard, a piece of paper on which to record experiment observations, and a drawing implement to use during the water flow investigations. Have each team fold their piece of paper in half from top to bottom, and then without opening the original fold, have them fold it a second time from side to side. Now have them open their papers. They should have four fairly equal sections on their papers. Have them number the sections 1–4.
2. Go outside on the school grounds. Find a sloping area of soil or blacktop. If you do not have a sloping area on your school grounds, use a set of steps or set up a ramp where you can pour the water. Have students make predictions about how and where the water will flow. Pour water from a container (or use a hose) to create a stream of water. Notice how the water moves and the path it takes. Does it move at a continuous speed? Does it form pools? Does all the water follow the same path? Try this out in different places. Does the water behave differently?
3. Tell the groups that they are going to test how water behaves in four locations. Preselect four areas where the student groups will test their water. Possible surfaces to use include a blacktop, a sidewalk, soil, sand, grass, a slide, a bush, and a railing. Try to select at least two areas that are sloped where the water will definitely flow. (If you do not have a sloping area on your school grounds, have students pour water on a set of steps or set up a ramp where they can pour the water.)
4. Identify for the student groups the first surface that they will use. Have each student group fill their cup about one half full using the water in the bucket. Have each group pour their water on the selected surface, and have them observe what happens to the water. Ask them the following questions: “What happens? Is the water absorbed? Does it form a puddle, make a hole, or mix with soil to make mud? Does it flow in a certain direction?”
5. Have them record what they see on their team paper by drawing a picture.
6. Select three other locations for teams to pour water. Have them follow the same process at each location. In the last location, tell students that they are going to test even further. Have them pour more water in the same spot and observe and discuss what happens.

Observations and Conclusions

1. When you return to the classroom, discuss as a whole class what happened with the water at each location where they poured it.
2. Ask them which direction the water flowed.

Assessment

- **Questions**
 - Share several pictures of water with students. The pictures could include things such as water in a river flowing into an ocean; water being poured from one container into another; water in a lake, etc. Ask them to describe what will happen to the water in each picture.
- **Journal/Writing Prompts**
 - Select one of the four locations from your team experiment that was conducted outside. Draw and label a picture in your journal of that experiment.
- **Other**
 - Have students bring in family pictures when they visited a water location (e.g., ocean, lake, river, pond), or have them draw a picture of a water location they would like to visit. Have them include their family in their pictures enjoying themselves by the water.

Extensions and Connections (for all students)

- Let students make puddles in the soil or find puddles after it rains. Have students use a stick to dig a path for water to flow out of the puddle. Measure how far the water travels using a piece of yarn or string. Experiment with different techniques to make the water flow farther.
- Brainstorm ways to change the flow of water. Use stones, twigs, and leaves to build dams that block or change the path of the stream. If possible, use a digital camera to take pictures of the different methods used. Have students also draw the water paths they created.

Strategies for Differentiation

- Students may use a sand table or outdoor sandbox to dig pools and waterways. Pour water from a container to experiment to see how far water travels. Change the waterways to see what happens to the flow of water.
- Put drops of water on a smooth, slanted surface (e.g., a mirror). Have “Raindrop Races.” Make the “raindrops” race down the slanted surface. Compare the paths and speed of different “raindrops.”
- After it rains, take a class walk. Look for water flowing down or dripping off surfaces. Take photos with a digital camera for a slide presentation and/or class book.
- Have students verbally share observations during experiments instead of writing or drawing.
- Instead of going outside, use a large plastic box with sand or soil in it to complete experiments.