What is a Watershed?  Lesson 2

Objectives
The student will be able to do the following:

- Define a watershed
- Explain that water flows downhill according to the laws of gravity
- Draw a watershed, including mountain ridgelines, valley, river, and ocean

Materials
Two plastic or paper cups and one plastic plate per student
A small amount of water in one of the plastic cups
A map of Hawaii would be useful
Overheads of the pictures or schematic drawings may be helpful
Copies of the schematic drawings, if desired, as activity sheets or homework

Background
This unit introduces students to the term “watershed.” The unit reminds students about the law of gravity and builds upon a previous unit on water.

Advance Preparation
This is an introductory unit and can be done with little advance preparation. Students should have been introduced to water in general, including the locations where water can be found.

Each student should have two cups and a plastic plate. One cup of water should have a small amount of water in it.

Procedure
1. Building on Unit 1, ask students to remember where water is located. Ask them to call out locations of water and have each student who remembers a location of water draw it on the board. The drawing on the board should include, at a minimum, a cloud, river, and the ocean.
2. Point to the cloud and ask students what direction the water will fall when it rains (“Does it fall up, down, sideways?).
3. Demonstrate that water always falls DOWN, and explain that this is because of gravity. Use two cups of water and pour water back and forth between the cups to demonstrate. Have students do the same with the water in their cups.
4. Ask students what they think will happen when it rains on the top of a mountain. Write up the possible answers on the board. Students should identify that water will flow down, and ideally they will describe water as flowing downhill.
5. Tell students that they will get to experiment and see what happens when it rains on a mountain. Have each student turn one cup upside down on the plastic plate. This upside-down cup will be the “mountain.” Have students slowly pour the water onto the top of the cup to simulate rain. They can move the pouring cup around to see what happens when water hits the “mountain” in different places.

6. Students should be able to see that when it “rains,” water will flow down the side of the “mountain.”

7. Have the students look at the plastic plates. The water should be in the plate by now. Ask them, “If this were Hawaii, and the cup is the island, where is the water?” Students should answer that the plate represents the ocean.

8. Point out that in Hawaii, most water that falls as rain eventually ends up in the ocean. Ask students how that water gets to the ocean. They should identify that most water ends up in a river. (Some also falls directly on the ocean and some seeps underground and then seeps into the ocean.)

9. Ask students to think about the Kalihi Stream. A map may be useful but is not necessary. Ask students where water in the Kalihi Stream comes from. You may need to present some leading questions – e.g. “If it rains in the hill behind the school, where does that water go? If it rains in Kaneohe, does that water come into the Kalihi Stream?” Students should be able to understand that the water in the Kalihi Stream comes from rain in the Kalihi area, and not from any other location.

10. Explain that the area around the Kalihi Stream is a watershed.
    - Watershed: An area of land where water drains and collects.
    - Break down the word watershed into “Water” and “Shed”
      - Water – rainfall, streamflow, water under the ground
      - Shed – 2 uses
        - Shed like a storage shed. A watershed stores water in its ponds and rivers.
        - Shed like water shedding off an umbrella. A watershed is like an umbrella, with water draining from the top (mountains) to the bottom (valley) into the ocean.

11. Explain that in Hawaii, watersheds are surrounded by mountain peaks that surround a valley, with a river coming down the middle of the mountain and running through the valley to the ocean. You may want to reproduce some of the pictures and drawings on overheads to illustrate.

12. Explain that every place in Hawaii is a watershed. When it rains somewhere, water must eventually flow down and out to the ocean.

13. Explain that everyone lives in a watershed. Point out that the school is next to the stream. Ask students to think about what happens when it rains (water flows directly to the stream or seeps into the ground and flows to the stream).

14. You may want to introduce the concept of Ahupua’a (might meet social studies standard?). Note that Ahupua’a often followed watershed boundaries, but were not limited to single watersheds.
• An Ahupua’a was a way of dividing land under traditional Hawaiian authority. Ahupua’a are lands that go from the mountains to the oceans, often following natural watershed divisions. The Ahupua’a was the key unit of land management.

Activities
1. Have students draw a watershed. Tell them that the watershed must include mountains with ridgelines (the top of the mountain), a valley, a river, and the ocean. Their watersheds can also include buildings, farms, and other features.
2. Have students color in the watershed schematics in this lesson.
3. Have students write a paragraph explaining what a watershed is.
4. As homework, ask students to go home and think about what happens when it rains on top of their home. Have them draw a picture with arrows explaining where the rain goes after it falls on their home.

Other interesting facts
Watersheds can be any size. Watershed refers to the any drainage basin. For instance, a dip in the road draining into a storm drain can be a watershed. This small road valley can be contained in a smaller watershed the size of a few blocks. This small watershed can be contained within the drainage valley for a small tributary. Small tributary watersheds are contained within the watershed for a larger river. The entire south side of Hawaii and its many rivers are a watershed for the ocean. The entire state of Hawaii can be classified a watershed for the surrounding ocean areas.
Materials have been developed as part of the University of Hawaii-Manoa GK-12 program (NSF grant #0538500) in conjunction with the Kalihi Waena Elementary School, Honolulu, HI. Duplication for educational purposes only.
Materials have been developed as part of the University of Hawaii-Manoa GK-12 program (NSF grant #05385500) in conjunction with the Kalihi Waena Elementary School, Honolulu, HI. Duplication for educational purposes only.
Materials have been developed as part of the University of Hawaii-Manoa GK-12 program (NSF grant #0538500) in conjunction with the Kalihi Waena Elementary School, Honolulu, HI. Duplication for educational purposes only.
Materials have been developed as part of the University of Hawaii-Manoa GK-12 program (NSF grant #5385500) in conjunction with the Kalihi Waena Elementary School, Honolulu, HI.

Duplication for educational purposes only.

Materials have been developed as part of the University of Hawaii-Manoa GK-12 program (NSF grant #0538550) in conjunction with the Kalihi Waiaina Elementary School, Honolulu, HI. Duplication for educational purposes only.