

Watershed Watch

Adapted from the Maunaloa Gardens Foundation's *'Ōhi'a Project/Exploring the Islands*

Time

45min

For 24 kids(may be adapted for more)

Key Concepts

- There are many competing demands for fresh water in Hawai'i. Demands have increased over time.
- The health of watersheds depends on the health of the forests.
- Water resources need to be managed through conservation and protection.
- We must educate others and ourselves on the importance of water conservation and protection

Essential Questions

- How has land use affected our fresh water supply over time?
- Why do islands need forested watersheds?

Objectives

Student will be able to:

1. identify the major water users in the state
2. state the relationship between population growth and water demand
3. list strategies for water conservation

Materials

construction paper, 4 different colors

markers or crayons

scissors

radio or tape recorder or CD player and recorded music/ipod

masking tape, safety pins, or yarn

water cycle poster

Preparation

Cut **30** large water drop shapes (about 15 cm, or 6 in.) out of blue construction paper to represent the water supply (or substitute other props). Cut out **8** squares of one color construction paper for identification tags for people. Cut **8** more squares of color construction paper, and label them as follows: 4 native plants, 4 native animals. Cut out **8** squares of another color construction paper and label them: 2 sugarcane, 2 *kalo* (taro), 1 pig, 1 miconia, 1 strawberry guava, and 1 cow. There should be an identification card for each student. If there are more than 24 students in the class, have the additional students represent people. If there are fewer, alter the scenarios to fit the class size and remove a corresponding number of water drops.

Vocabulary

watershed, infiltration, runoff, groundwater, surface water, precipitation, transpiration, evaporation, condensation, native, invasive

Teaching Suggestions

Briefly review the water cycle

Explain native forests in water generation

Explain what each identification tag is

Discussion Questions

- What is a watershed? (*The land area where water drains to a particular body of water.*)
- Do you live in a watershed?
- Why are watersheds important to people who live in a town? (*Healthy watersheds covered with forest vegetation catch and hold water that is drawn from wells and distributed to population centers. Watersheds with bare ground contribute to runoff, flooding and erosion that affect people in lowland areas where towns are usually located.*)

Game

- a) Take the class outside or pull the tables and chairs to one side of the classroom. Arrange the paper water drops in a circle on the ground. Explain that the drops represent surface water resources in Hawai'i. Pass out identification tags for the water activity, and have students tape, pin them on, or wear around their neck.
- b) Review the directions and play the game.

How to Play

- a) Read a scenario from a period of Hawaiian history.
- b) After each statement ask the characters named in the scenario to form a circle around the water drops.
- c) Turn on the music and have the characters circle the water drops.
- d) When the music stops, characters must each take one water drop from the pile.
- e) Characters stay in the circle, which grows larger as more students are added with each scenario. Water drops are returned to the center after each scenario, since water recycles in nature.
- f) If there are not enough drops to go around, people, agriculture and livestock have the power to take water from native plants and animals.
- g) If a character does not get a water drop, it cannot survive and must leave the game. The survivors then return their drops to the center and the teacher goes on to the next scenario.

Scenarios

- a) The year is 200 BC. There are no people in Hawai'i, but there are lots of plants and animals. Ask the 8 native plant and animal characters to circle the water drops.
- b) The year is AD 1000. Polynesians have colonized the Hawaiian Islands, so there are now more uses for fresh water. Ask the 2 kalo, and 2 people to join the other characters in the circle.
- c) The year is AD 1800 and Europeans are in the islands. Send in the 2 sugarcane, cattle, and 3 people.
- d) The year is AD 1930. Pigs escaped their enclosures and are released into the wild. They assist in the spread of strawberry guava which creates dense thickets replacing the native forest. Have the pig and straw. guava join the circle and remove 1 native species holding 2 water droplets.
- e) The year is 1970. Miconia is introduced at a private nursery. Infestation occurs. Add miconia and remove 2 native species holding 2 water droplets each(4 total).
- f) It's now the present time. The population has grown so large that they have dug hundreds of wells to tap groundwater sources. As a result, the water table has dropped, and many surface water sources have gone dry. (Remove 4 drops to represent the loss of surface water resources.) All remaining people approach the circle. This time, there will not be enough water to go around.
- g) Pollutants leak into our groundwater supply contaminating it.(Pesticides, herbicides, fertilizers, paint, oil, gas, cleaning solvents, and other contaminants that can seep into the ground). Remove 2 droplets of water

What can we do about this and what are the causes?

Future Scenarios

- a) Global warming: Data confirming global warming of temperatures in the air and oceans have risen to affect amount and distribution of rainfall. Remove 2 more water drops.
- b) Water demand increases with higher population meanwhile the native forest gets removed and/or replaced by invasive species. Remove 5 drops of water.
- c) We prevent pollutants from reaching our groundwater supply. Add two drops of water.
- d) We replant our native forests and more water comes back to the island. Add native forest and 6 water droplets.

- e) We find ways to reduce water usage and use conservation efforts. Add 3 drops of water.
- c) Summarize the main points of the game.

Discussion Questions

- What effects do cattle and pigs have on the water supply?
- What effects do invasive species have on our groundwater supply?
- When there is not enough water for all the water users, who decides which uses are most important, and how do they decide? (Discuss the State Water Code—circa 1987 (Chapter 174C))
- What can be done to provide more water to meet needs?
- How can pollution affect our groundwater supply?