



# EarthCircles

## Water at Work

### LESSON 2: WHERE IS THE FRESH WATER?

#### **OVERVIEW:**

**Concept:** Fresh water is necessary for the survival of life on land. It is available from two sources on Earth, the surface water and the groundwater.

#### **Lesson At A Glance:**

Materials

Preparation

Background

#### **LESSON PLAN:**

Opening circle

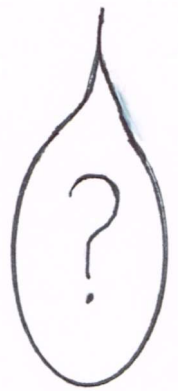
Activity: Kids make models of a watershed. Then they use their models to investigate where water comes from and how it can be polluted.

Discussion

Principles in Practice

Story

Closing Circle



#### **Materials:**

For each watershed model:

- Newspaper
- Sheet of white plastic
- Large plastic tray
- Waterproof markers
- Spray bottle of water

For demonstration:

- Gallon jug of water
- Food coloring
- 2 very small clear containers
- ¼ cup measuring cup
- US map and local map
- Push pins

**Maps & Links:**

US Map that shows Mississippi River watershed

Google maps link: <https://maps.google.com>

Massachusetts Water Resource Authority: [www.mwra.com/04water/html/watsys.htm](http://www.mwra.com/04water/html/watsys.htm)

Local map that shows features such as: hills, valleys, streams, rivers, ponds, water treatment plants, wells, water towers, and streets (to locate Kid's homes).

**Book:** *Letting Swift River Go* by Jane Yolen

**Preparation:**

Arrange a circle of chairs for the Opening Circle.

Set up the water supply demo before class:

- Tint the gallon container of water with blue food coloring.
- Pour  $\frac{1}{4}$  cup of the dyed water into one small container and 1 tablespoon of the dyed water into the other small container.
- Place the demo on a small table in the center of the circle of chairs for all to see.

Have a set of materials for the watershed model for each team of 3-4 Kids.

- You can use white plastic.
- trash bags to drape over the newspaper.
- Place materials for the watershed models on a supply table.
- List materials needed to make the model on the chalkboard.

Mount a local map of your town on the bulletin board. Have pushpins at hand. Also mount the U.S. Map.

- To make sure you understand where your local water supply comes from, you may want to check with your local water department (usually it is part of the Department of Public Works) to learn how your town gets water.
- Many departments such as the Planning Board and the Conservation Commission can also supply you with maps that illustrate local water sources, topography, wetland information, treatment plants and/or wells. Someone from a town department may be able to visit the class to speak with the Kids or give them a guided tour of local facilities.
- <http://www.youtube.com/watch?v=60LLfmOtcRU> to access video clip.

### Background for teachers:

Basically there are just two ways to get a water supply:

- **Collect Surface Water:**

The water cycle regularly delivers fresh water to the surface of Earth in the form of rain or snow. Some of this water becomes **run-off**, traveling over the land surface to form streams and rivers which drain into lakes and eventually into the oceans.

The land area that drains into a given river system is called a **watershed**. We can get a water supply by tapping into the nearest river or lake, by collecting rain water into barrels or cisterns, or by damming a river to create a reservoir.

- **Tap into the Groundwater:** Some of the rainwater and snowmelt seeps down into the ground. When it reaches bedrock or layers of clay that stop its flow, it collects in sandy or gravelly areas called **aquifers**. We can get water from an aquifer with a well or a spring.

Usually watershed boundaries and political boundaries differ and this often leads to injustices in the way water is distributed.

As an example, the Quabbin Reservoir was created in the early 1900's to supply Boston and nearby towns with water. It is situated in central Massachusetts in the Swift River watershed, where four small towns used to be. Residents were forced to leave their homes and find other places to live because their valley was going to be flooded. Bodies as well were moved from the cemetery and reburied elsewhere. Today Quabbin Reservoir supplies water to more than fifty cities and towns, mostly in eastern Massachusetts. Bitter feelings still exist in the central part of the state because of this development. The book, *Letting Swift River Go* by Jane Yolan, is an excellent children's story of the fate of the four towns when Quabbin Reservoir was created.

In some parts of the world people collect rainwater and save it in **cisterns**, a kind of collecting tank for their water supply. They may use big rain barrels, or channel water from the roofs of their houses into cisterns in their basements. For example, people on the island of Bermuda depend on cisterns that hold rainwater from their roofs. The island is basically coral which is too porous to hold water in either ponds or aquifers. UU's who visit Star Island conference center off the coast of New Hampshire are familiar with cisterns that, depending on rainfall, determine whether they get one or two showers per week.

## **LESSON PLAN**

### **Opening circle:**

With everyone seated in a circle, exchange greetings and notice who is present.

**Demonstration:** As Kids gather in the circle, they will be curious about the water demo. Begin by pointing out that water is a most precious and necessary resource. How can we apply our UU Principles to caring for this resource? Does anyone know what the containers of water represent? If someone does know, ask them to explain. If not, you explain.

- Hold up the gallon jug. It represents 98% of the Earth's water, which is salt water in the oceans.
- Next hold up the  $\frac{1}{4}$  cup. It represents the 1.5% of water that is fresh but is frozen in the polar ice caps and the glaciers.
- Last hold up the tablespoon of water that represents the one half of one percent (0.5%) available for all the plants, animals and people on the land.



Ask if Kids know where their local water supply comes from. If their answer is “the faucet”, how do they think the water gets from its source to the faucet? Discuss with them the two sources from which we can get fresh water. On the map can they identify the lake, stream, reservoir, or well field that brings them water? Have the Kids locate their homes on a local map and mark the location with a pushpin. Then locate the pumping station, the well or the reservoir that provides their water supply and mark it as well. In discussion, guide their recognition that all of our water supply comes from either surface water or groundwater.

### **Activity: Making Watershed Models:**

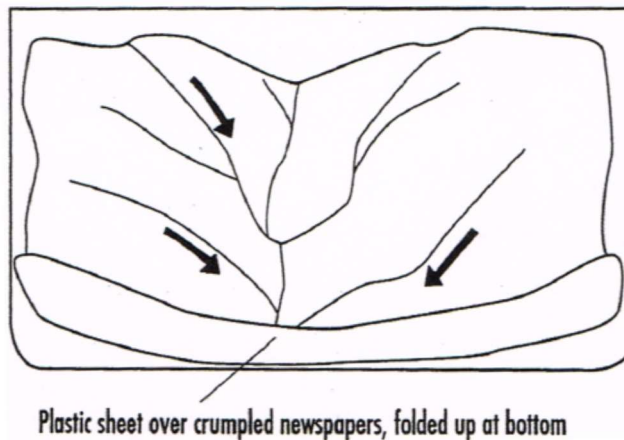
Divide the class into groups of three or four.

Tell the Kids that they will be making a model of hills and a valley to explore what a watershed is and what it does. Each group makes a watershed model, following the directions below. You

may read the directions aloud to guide them, or write them on the chalkboard for Kids to read and follow. Designated Kids in each group gather materials for their groups. Check their progress to be sure that water will flow into the “valley”.

To set up a Watershed Model:

- Loosely crumple two sheets of newspaper and place them in the plastic box. Make space between the newspapers to shape a valley.
- Drape the plastic sheet over the crumpled paper, fitting it between the two pieces to form hills and a valley. Be sure that water generally will flow into the valley and to the front of the box.
- Use a marker to draw streams on the hills joining together in the valley to form a river.



When the models are ready, Kids try the following activities.

### Watershed Exploration

- Spray the water onto the model and observe how the water flows.  
Ask Kids: “How does this model show what happens when it rains?”
- To model a wetland, fold some paper towel and place it in the valley. Spray again.

Ask Kids: “How does this affect the flow of rainwater in the model?”

“What kind of natural land areas work in this way?”

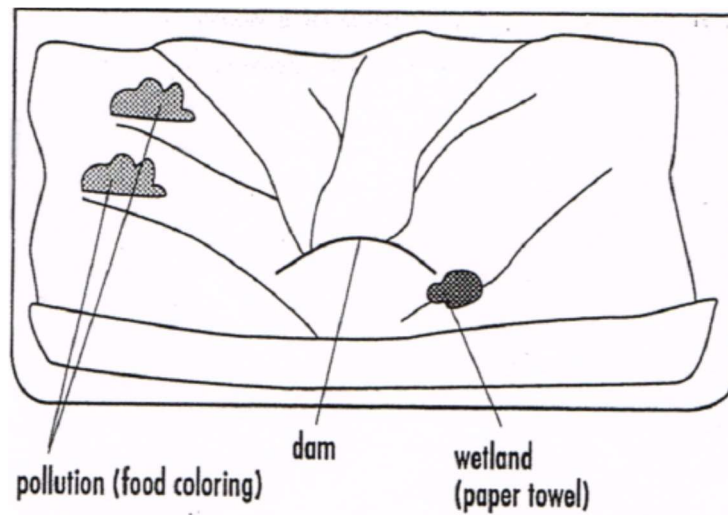
“Where would you find these kinds of areas in nature?”

- To demonstrate a dam and a reservoir, make a barrier in the valley with a fold of the plastic sheet. Spray until water collects behind the barrier.

Ask Kids: “Where is the water supply in this model?”

- To represent pollution, drip a few drops of red food coloring on the hillsides. Spray with a little water to represent rain.

Ask the Kids: “Where does the ‘pollution’ go?”



### Discussion:

Tell the Kids that an area of land that drains rainwater or snowmelt in this way is called a **watershed**. Every inch of land on Earth is in one watershed or another. Water flows down one side or the other of a high ridge line on hills or mountains that separate watersheds. Some watersheds are small, others are immense. Rivers form from the runoff and carry water back to the oceans.

Ask Kids: “What is the largest watershed in the United States?”

Have the Kids look on the US Map to find the largest river and its main tributaries. The Mississippi River watershed is fed by the Missouri River from the West, the Ohio River from the East and many smaller rivers and streams along the way.

Ask Kids: “What watershed do we live in?” Answer will vary with location. Can they find a river that flows through their area on the local map?

### Activity: Map Reading

- On the local map on the bulletin board, ask Kids to find streams, rivers and wetlands near their homes. Depending on your town, point out wells. Discuss how some are active and some are inactive. How many wells had to be shut down because of pollution in the groundwater? Did or does your town get some or all of the water supply from town wells? Do you get water from a city or state water resource authority?

- Show the map of local water resources and the distribution system. How close is the water resource to Kids' homes? Kids may want to locate where they live on the map and mark the location with a push pin.

**Story: *Letting Swift River Go*** by Jane Yolen

This children's book tells what happened to the people in three small towns when the city of Boston bought their land to create Quabbin Reservoir. After reading it aloud, ask Kids to discuss the story with our Seven Principles in mind.

**Principles in Practice:**

- What surprised the Kids most about how Quabbin Reservoir was created and built?
- Were any UU Principle violated by taking people's homes?
- What might we do at home to make more water available to share with other towns and new residents?
- What Principles do we honor when we responsibly share the resources in our region?
- Is it a human right to have safe drinking water? Delivered to everyone's home?
- Is it possible to provide this everywhere?
- Is it right to move water many miles from its source in one watershed to supply people in another watershed where there is not enough water for everyone?

**Closing Circle:** Ask Kids to repeat these words together.

"Water flows from high in the mountains.

Water runs deep in the Earth.

Miraculously, water comes to us and sustains all life."

Thich Nhat Hanh, *Earth Circles*

