Building Community®

Our World of Water
Teacher's Guide

Introduction
Our World of Water gives students information about our water supply and how to conserve and protect it. Each page of the booklet is a self-contained teaching unit and may be taught in sequence with the other pages, or independently. This presentation guide provides discussion tips for each page, plus suggestions for some simple experiments that can be done with commonly found objects.

Standards
The book supports multiple state science standards in earth, physical, and life sciences. Specific standards pertain to the three states of matter, resource conservation, the roles of water in earth's surface processes, and living things and the environment.

Vocabulary
Aquifer - Any geological formation that contains water, especially one that supplies water for wells and springs.
Conserve - To protect or preserve natural resources such as water.
Desalinization - The process of removing salt from seawater.
Glacier - A large body of slowly moving ice.
Groundwater - Water that comes from beneath the surface of the ground.
Ocean - One of the four largest bodies of water on the Earth.
Precipitation - Water received on earth directly from clouds as rain, hail, sleet, and snow.
Reclamation - Restoring polluted water to usable condition.
Reservoir - A lake where water is stored for future use.
Sewage - Waste material carried off by sewers and drains.
Surface water - Lakes, ponds, rivers, oceans, streams, puddles, etc.
Treatment - Conditioning of water to make it usable.

Lesson Development-
Ask students: When you hear the word water, what is the first thing that comes to mind? Make a list on the chalkboard of all the responses students make. Explain that water is used for many purposes and is necessary for life itself.

Cover Page - Discussion Questions:
- What is Kato the Cat balancing on his finger?
- What are the children pictured in each drop doing that relates to water?

Teacher Notes
Ask students what they think would happen if all the water on earth dried up, or if we became unable to use it.

Page 2 - Discussion Questions:
- How much of the earth's surface is land?
- What does H_2O represent? (2 parts hydrogen to 1 part oxygen)

Teacher Notes
Use a globe or colored map of the world to show students that most of the planet is covered by water.

Page 3 - Discussion Questions:
- When have you seen water appear as steam?
- How does water appear as liquid from the body? (*Tears, sweat, saliva, urine, serum.)*
- How cold does it have to be for water to freeze?
- Which of your senses could you use to detect water?
- What forms of water fall from the sky? (*Rain, snow, sleet, hail.)*
- What are some different bodies of water found on the Earth? (*Ocean, lake, river, bay, stream, etc.)*

Teacher Notes
Water freezes at 32° Fahrenheit and 0° Celsius.

Experiment
What happens when water freezes?
Equipment: Plastic container with lid; water; freezer.
Directions: Fill the plastic container completely with water. Put the lid tightly on the container. Place in freezer overnight. Ask the children what happened to the water when it froze. (*It expanded.)*

Page 4 - Discussion Questions:
- How much of a person's body is made up of water? (*60 to 70 percent*)

Teacher Notes
Explain that water is a necessity of life, and that people can live without it for only about seven days. Each of us consumes about one-half gallon of water a day (including cooking water and drinking), and uses about 70 gallons in all each day.

Page 5 - Discussion Questions:
- What is happening in all of the pictures on this page?
- From what sources do we get our water?

Teacher Notes
Divide the class into three groups and have each group do research on one of the three sources of water. Note: Ground water supplies 50% of drinking water, 40% of irrigation water, 80% of all rural water uses, and 25% of all industrial water uses.

Page 6 - Discussion Questions:
- What ways is water being used in this picture?
- Which uses are essential and which are not?

Teacher Notes
Have children create a Water Diary to show their uses of water for a day or a week. They should indicate whether or not each use was necessary.

Page 7 - Discussion Questions:
- What are the buildings in the top pictures? (*Factories*)
- What are the two towers to the left of the factories? (*Water towers*)
- Why is there a *Keep Out* sign at the reservoir?
- Other than the fire department, what public service agencies use water?

Teacher Notes
Have the students create maps of their neighborhoods showing the different types of places that use water. (Public, commercial, industrial, private.)

Page 8 - Discussion Questions:
- Why is it important to become familiar with different water words?
- What other water words can you think of?

Teacher Notes
Invite students to create word games using the Water Vocabulary words. They can make crossword puzzles or word finds. Words can also be used for spelling or vocabulary work.

Page 9 - Discussion Questions:
- Why is it necessary to store water?
- How does water get from storage to the places where it will be used?

Teacher Notes
Have students draw a water storage tank, or let them build a model of a water storage system.

Page 10 - Discussion Questions:
- From what these pictures show, how does water get polluted?
- What wastes go directly into water?
- What wastes are carried in surface runoff or seep into underground aquifers?
- Why should we be concerned about water pollution?

Teacher Notes
Break the class into research groups to report to the class about the different ways water is polluted. Include the following: trash, sewage, petroleum products, industrial wastes, toxic wastes, pesticides, fertilizers, metals, minerals, salts, organic wastes, microbes, and gases.

Page 11 - Discussion Questions:
- Why does water need to be treated in order for us to use it?
- What does the picture show?

Teacher Notes
There are many methods of treating water for drinking, including: carbon filtration, distillation, reverse osmosis, and ultraviolet treatment.

Demonstration
Show how filtration removes dirt from water.
Materials: A large juice can, 3 cups of fine sand, 2 cups of gravel, a drinking glass, a piece of screen, and a nail.
Procedure: Punch 6 small holes in the bottom of the juice can, and pour the gravel into the can. Place about 4 inches of sand on top of the gravel. Arrange the can on top of the glass, with the piece of screen sandwiched between them. Pour some muddy water into the can. You will see cleaner water dripping into the glass.

Page 12 - Discussion Questions:
- How much of the Earth's surface is covered by water? (80%)
- Why is it scary to see the percentage of water that can be used for drinking?
- Where can the fresh water be found? (Freshwater lakes and streams; groundwater.)

Teacher Notes
Discuss the reasons why converting glaciers to drinking water is not feasible. (Costs and logistics of towing glaciers.) Ask the children if it is possible to remove the salt from seawater. Talk about the expense of the desalinization process.

Page 13 - Discussion Questions:
- How is water being wasted in the pictures on this page?
- How is it being used properly?

Teacher Notes
Ask the students if they know how much water could be wasted from a drip from a leaky faucet? (11 gallons a day.) Tell them that if everyone would cooperate, we could save a great deal of water. Develop strategies to get people to start being aware of water conservation and to stop wasting water.

Page 14 - Discussion Questions:
- What three water conservation methods are highlighted on this page?
- How is water being reused? (Rainwater is being used to water plants.)
- List the things Kato is doing to conserve water.

Teacher Notes
Ask students to brainstorm ways to get people to use the water conservation methods on this page.

Page 15 - Discussion Questions:
- How many ways can you get bingo on this card?
- Explain how each picture shows either a conservation approach or a way water is being wasted.

Teacher Notes
Have students review their Water Diaries (see Teacher Notes for Page 6). Ask them to write down some ways they plan to reduce water waste.

Page 16 - Discussion Questions:
- Define each of the words in the Water Word Search.

Teacher Notes
As a culminating activity, have students create posters, signs, songs, videos or other messages that will help others understand the importance of water conservation.