

**TEACHING KATE  
TEACHING KIDS ABOUT THE ENVIRONMENT**

**MINI UNIT ON WATER**

**Grade Level: 2 (special education)**

**Time Required: 2 weeks**

**SC Science Standards**

This lesson plan was correlated with only the grade level specified unless otherwise noted.

- I. A. 1. a
- I. A. 4. a
- I. B. 1. a
- II. A. 1. a
- III. A. 2. g

**Purpose**

Students will be able to describe uses, misuses and ways to conserve water.

**Skills**

Collecting data, communicating, estimating, interpreting data, making a graph, measuring, observing, predicting.

**Concepts**

Students will identify the ways we use water; describe examples of water pollution; learn how polluted water can be filtered; and describe ways to use water wisely.

## Materials Needed

paper	pencils	glue
magazines	large sheets of chart paper	large sheets of drawing paper
books about water	science/writing journal	survey forms
water use log	5 clear jars	gallon milk jugs
water	liter bottle for each student	bread
glass fish bowl	oil	plastic tray
plastic	soil	funnel
liquid dish detergent	coffee filter	paper (confetti)
gravel	powdered detergent	charcoal
red food coloring	chocolate syrup	salt
sand	spoon	jar of dirty water
videos related to using, pollution and conservation of water		
book - <i>The Woman Who Outshone the Sun</i> by Alejandro Cruz		

## Definition of Terms

<u>Conserve</u>	To avoid wasteful or destructive use of natural resources.
<u>Erosion</u>	The removing or wearing away of soil or rock by water, wind or other forces or processes.
<u>Fertilizer</u>	A substance (as manure or a chemical mixture) used to make soil fertile.
<u>Filtration</u>	The process of passing through or as if through a filter.
<u>Pollution</u>	Harmful substances deposited in the air, water or land leading to a state of dirtiness, impurity or unhealthiness.

## Before the Session

Gather magazines, find videos on water and conservation, set up speakers from the water company and the South Carolina Department of Natural Resources, arrange field trips to a water treatment plant and/or body of water and gather books about water from the library. Make dirty water by adding dried leaves and other natural matter to water (for Water Clean-up).

## Background Information

All living things - people, plants and animals - consist mostly of water and must have it to live. Plants need water to dissolve the nutrients in the soil for growth. People and animals must replace water lost through bodily processes such as perspiration, respiration and excretion. People also use water for cooking, cleaning, bathing, transportation and recreation. Farmers use water to irrigate their crops. Industry and hydroelectric-power plants use tremendous amounts of water for cooling, refining, manufacturing and producing power.

As more people use more water, there has been an increase in water pollution. The United States has strict regulations but in some countries, raw sewage is piped into rivers and streams. Fertilizers and pesticides are washed into water systems by rainfall and irrigation. Another growing source is rain runoff from pavement and highly managed yards in urban areas. Pollutants may enter a water system from industrial waste/exhaust, accidental spills or deliberate dumping. Thermal pollution occurs when the water used for cooling machinery is dumped back directly into a river or stream. Plants and animals die because they cannot tolerate the heated water or low oxygen levels (heating water reduces the amount of oxygen it can carry). Leaky sewer pipes and septic tanks, chemical spills, contaminated surface water, old land-fills and buried radioactive wastes also pollute ground water.

Destinations in Science: Unit E - Water

## Suggested Lesson Plan

1. Brainstorm the ways people use water. Record on a chart.
2. Using three large sheets of paper, label one sheet PLANTS, another ANIMALS and the third PEOPLE. Have the students cut out pictures of living things using water and paste them on the appropriate paper. Discuss the pictures and which ones show using water to live.
3. Have each student ask three other teachers and ten students how they use water. Graph the data and interpret.
4. Record on the WATER USE LOG how water is used. Each student records how they use water on a given day at school and one day on the weekend at home. Calculate the amount of water used using the Water Quantity Chart. Then graph everyone's total water usage for that day. Interpret the data - (use gallon milk jugs to show the amount of water used in one category).
5. Take a field trip to find out how our water gets to our home/school from the water source.
6. Read aloud *The Woman Outshone the Sun* by Alejandro Cruz. Discuss how the woman used water and what happened when the water was gone.

7. Make a classroom big book for the following:  
An underground water pipe has broken. The water will be turned off in one hour so repairs can be made. The water will be off for 24 hours. What will you do? How will the way you use water change?
8. Have four clear jars and pour water into each. Add bits of paper to one; pieces of bread to another; oil to another; pieces of plastic to the fourth. Label the jars. Wait several minutes, then discuss what students see and the fact that they polluted the water. Use the jars in #9 and #11.
9. Brainstorm the effect pollution has on people, plants and animals who use or depend on water. Record on a chart.
10. Do “Life in a Fish Bowl” activity (included at end of lesson plan) from *Action for a Cleaner Tomorrow* by South Carolina Department of Health and Environmental Control.
11. Do “Water Clean-up” experiment.
12. Make a pollution big book. Draw pictures and write sentences about polluting water, how it affects living things and how to clean the water.
13. Visit a water treatment plant to see steps water must go through before we can drink it. Also, find out how water can be treated.
14. Create a skit in which animals and people discuss a polluted lake’s condition and how to resolve the problem.
15. Put damp soil and organic matter in the bottom of a jar. Make a little lake by filling the jar  $\frac{2}{3}$  full of water. Put the lid on and shake the bottle. Place the jar in a sunny window. Make and record daily observations. How does it change? How long does it take to clear the water?
16. Use gallon milk jugs to demonstrate how much water is used brushing teeth with (2 gallons) and without (1 gallon) the water running. How much water was used for each? Discuss ways to conserve water. Why do we need to conserve?

### **Application**

In the U.S. we take it for granted that the water coming out of our taps is safe to use due to the treatment and filtration processes it goes through. In many countries this is not the case and water can only be drunk if boiled or if it is bottled water. How long can we rely on our water being potable if we keep adding more and different pollutants to our system? Hopefully, regulation of water pollution can keep our water potable for many years to come.

### **Extension**

Students will be able to create a lake diorama to show how people, plants and/or animals use water. Students can work in teams using a cardboard box. The diorama should show ways of cleaning the water, preventing pollution and conserving water. This diorama could show a housing area or industry area.

Students will write a bumper sticker slogan about pollution based on what they have learned.

### **Resources Available**

Action for a Cleaner Tomorrow. 1994. South Carolina Department of Health and Environmental Control, Columbia, S.C.

Destinations in Science. 1995. Addison-Wesley Publishing Co., Inc. New York, N.Y.

Water Matters: Everyday, Everywhere, Everyway. 1993. National Geographic Society, Reston, VA.

Winslow, Don. 1995. South Carolina Department of Natural Resources, Columbia, S.C.

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**MINI UNIT ON WATER**

**WATER LOG**

Name:

Directions: Draw a drop of water on your paper each time you use water in one of these ways.

Flushing toilet:

Showering:

Taking a bath:

Brushing teeth:

Washing hands:

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**MINI UNIT ON WATER**

**HOW I USE WATER**

Name:

Amount of water used (quantities given are estimates for each use):

Washing hands .....	1/4 gallon
Flushing toilet .....	5 gallons
Showering .....	30 gallons
Taking a bath .....	40 gallons
Brushing teeth .....	1 gallon

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**WATER CLEAN-UP**

Name:

Directions: Put the filter in the funnel. Place the funnel in the mouth of the empty jar.

Put the gravel and charcoal into the filter. Add a layer of sand on top.

Slowly pour the dirty water through the funnel into the empty jar. Record your findings.

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**MINI UNIT ON WATER**

**WATER CLEAN-UP  
RECORD SHEET**

Name:

Look at the jar of dirty water. Draw what you see. Tell how the water looks and smells.

Look at the jar of filtered water. Draw what you see. Tell how it looks and smells.

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**LIFE IN A FISH BOWL**

Preparation Time: Extensive

**Grade:** K-1

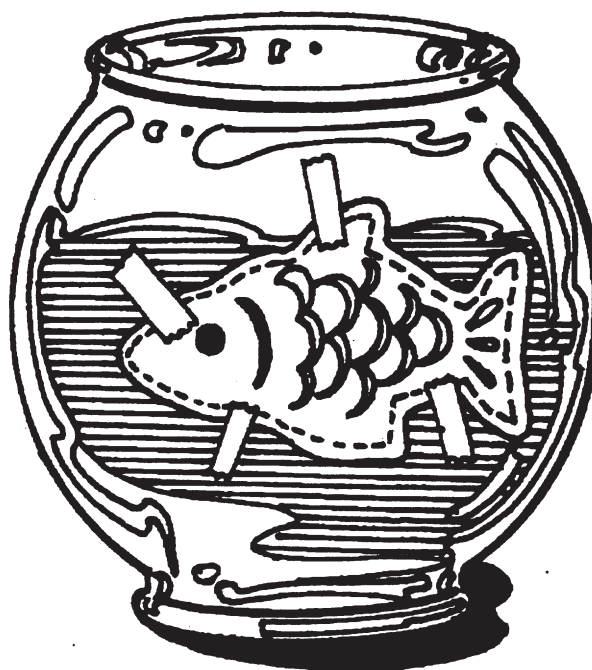
**Focus:** The effect of pollution wildlife

**Subject:** Science, Language Arts

**Materials:** Glass fish bowl or similar container, fish made from plastic meat tray, overhead projector or flashlight (optional but recommended), 8 empty film canisters with tops (or 1/4 cup of each ingredient) one each containing soil, sand, liquid dish detergent, chocolate syrup, salt, paper (confetti), powdered detergent/hot water, red food coloring

**Teaching Time:** One class period

**Vocabulary:** Eroding, fertilizer, decompose, pollution



**Learning Objective**

Students will:

- understand the effect of water quality on living things.

Note: This lesson represents what water quality could be like without the strict monitoring and regulations now in place or the care of concerned citizens. Today, South Carolina has very good water quality. The point of the lesson is that we must continue to protect our water quality.

**Learning Procedure**

1. For this lesson, you will demonstrate what can happen to a fish in a river when people pollute the river. To demonstrate this, you create a friendly fish character and a river to bring the story to life, have your students name your fish and the river.
2. Your fish-bowl river can be made from a glass or plastic fish bowl; pickle jar three-liter, clear soft drink bottle (remove plastic boot from bottom and cut off the tapered top); or any similar container. Your fish can be cut from a reused, clean meat tray or any other water-proof item.

3. Put the fish on a stick or tape it to the front of your bowl. To see the effects of pollution on your “river,” put the bowl on an illuminated overhead projector or use a flashlight behind the your “river.”

4. Read and adapt the narrative. Ask individual students to add the ingredients in the film canisters as indicated to represent pollution.

**Note:** Teachers should review the narrative in advance and adapt the language to the students’ level. Also look for ways to personalize the story by including the name of your fish and the name of the river.

**NARRATIVE:** Imagine a river as it meanders through the countryside, past the farmers’ fields, widening into a lake, but narrowing again as it passes through the city. In this river, named \_\_\_\_\_ lives a fish. Its name is \_\_\_\_\_ (*Point to the fish in the clear water in the fishbowl*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?** (*This question should be asked repeatedly throughout the story and should generate an enthusiastic response from your students. Let students respond aloud.*)

The fish swims down river past an **eroding** bank. An eroding bank is where soil sometimes washes into the river. When it rains, what will happen to the bank? What if it rains a great deal? (*Have student pour soil from the container into the water*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

Suppose part of the soil eroding into the water came from farmland. The farmer has just put fertilizer on the field. Instead of

staying on the field to help the crops grow, some of the fertilizer may ride “piggy-back” on the eroding soil and go into the river. (*Add sand to simulate fertilizer*) What effect will the fertilizer have on the plants in the river? (*It will make plants grow.*) If the plants grow too abundantly and too fast, the river can’t continue to support them. They die, fall to the bottom, and start to decompose.

Decomposing things use oxygen. What else in the river needs oxygen? (*The fish.*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

Farm fields aren’t the only source of fertilizer that can flow into a river. Homes may also be a source. Where the river has widened into a lake, several families have built their homes. Perhaps their septic tanks drain into the water or some of the fertilizers they’ve put on their lawn have washed into the water. (*Add liquid dish detergent to represent pollution from homes.*)

As the lake narrows back into a river. our fish continues downstream past the city. Even though the city people don’t pollute the water directly, what they do at their own homes or subdivisions can affect the quality of the river’s water. Have you ever seen a car leaking oil? Where does the rain wash this oil? (*Put chocolate syrup, representing oil, into the fish bowl.*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

In the winter, when it gets icy and snows, what do we put on our roads to make it easier to drive? (*Salt or sand. Put salt into the water.*) When you eat or drink something salty, what do you do? (*You get something else to drink*) Can this fish get fresh water to

drink? (*No.*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

Suppose the city has a park next to the river. People litter the park and some of it blows into the water. (*Put pieces of paper into the fish bowl.*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

As the river leaves the city, there are several factories that are located along it. Although regulations are strict, if the factory's control equipment is not working properly, some chemicals or heated water may flow into the river. (*Put powdered detergent and hot water into the fish bowl and stir for effect.*)

**ASK: HOW DOES IT FEEL TO BE THIS FISH?**

The waste water treatment plant for the city is also located along this section of the river. The plant does its best to clean out impurities, but some polluted water gets into the river. The river has a large volume of water though, and the plant only puts a small amount of pollution into it. It shouldn't cause too much of a problem. Right? It would be like putting two drops of this food coloring into this jar of water. (*Put in food coloring and stir it.*) **ASK: HOW DOES IT FEEL TO BE THIS FISH?**

### Questions for the Class

1. Have you ever seen a river, lake, or beach closed for swimming?
2. Would you want to swim in a river like the one in our story?

3. Go back through the story, deciding ways that YOU can help solve some of these problems. (*For example, prevent litter in the park, repair car with leaking oil, etc.*)

### Extension Activity

(*Read or improvise as a blues tune.*)

#### THE DIRTY WATER BLUES

Pure water gurgles  
and splashes along  
until pollution  
flows into the song:  
oil,  
tar,  
paint,  
dye,  
mud and muck  
come splashing by.  
Cans,  
jars,  
bottles, cars.  
Old shoes, old news—  
that's the dirty water blues.  
Sweet fresh water  
rolls away from this song,  
while dirt and pollution  
keep flowing along  
and along,  
and along...

*Source: Save The Earth! An Ecology Handbook for Kids*