PLANTS NEED TO DRINK TOO!

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Predict, orally or in writing, what will happen to a plant that receives no water; and

2. Demonstrate, orally or in writing, an understanding that plants need water by drawing a picture of a plant that has received adequate water and one that has not.

SUBJECTS:
Science, Math, Creative Dramatics, Language Arts

TIME:
15 minutes (observations last several days)

MATERIALS:
celery
container for celery
balance scale, caloric scale, or postage scale
red food coloring
3 small potted plants
plastic bag that will cover one of the potted plants

BACKGROUND INFORMATION

A plant is a living thing. All living things need water to survive and grow. Plants use water to help make their food. They also use dissolved minerals in water to make new plant parts and to grow.

ADVANCE PREPARATION

A. Gather materials.

PROCEDURE

I. Setting the stage

A. Show the students a stalk of celery. Ask the students if they have ever eaten celery. Ask questions such as "Do you think it has water in it?" "Do you think it needs water to grow and stay alive?" Share the background information with the students. Explain to them that the activity they are going to do will demonstrate that all plants have a tube system that carries water to all their parts and that all plants contain water.

II. Activities

A. Put one stalk of celery in a container of water colored with red food coloring. Place the container with the celery in the science center to observe. Also place an observation and recording booklet in the science center for the students to record their observations.

B. The next day, in a group discussion, show the students the stalk of celery. The students will be able to clearly see the tubes that carry water up the stalk of the celery. Explain to them that plants have a tube system in which water travels carrying dissolved food from the soil to all of the plant's parts.

III. Follow-Up

A. As a group, weigh the celery on a scale. Record the weight and date. Place the celery on a paper towel in the science center for several days for the students to observe. As a group, weigh the celery every other day for 2 weeks and record the difference. Discuss the weight difference with the students. Ask them why there is a weight difference. Tell them that the water is drying up or evaporating. Have the students describe the appearance of the celery. Ask them why it looks the way it does.

B. Dramatize the action play:

THE FARMER PLANTS THE CORN
(Tune: The Farmer in the Dell)
Original words by Cindy Taylor

(Action: Children are in circle on their knees. A child goes around and gently pushes the body down {the seeds}.)
The farmer plants the corn.
The farmer plants the corn.
Hi Ho the dario
The farmer plants the corn.

(Action: A child goes around the circle using hand motions to sprinkle rain on children {the seeds}.)
Down comes the rain.
Down comes the rain.
Hi Ho the dario
Down comes the rain.

(Action: A child goes around the circle making a circular sun motion over the children {the seeds}.)
Out comes the sun.
Out comes the sun.
Hi Ho the dario
Out comes the sun.

(Action: All children slowly stand up.)
The corn begins to grow.
The corn begins to grow.
Hi Ho the dario
The corn begins to grow.

(Action: The children raise hands up and sway.)
The corn grows strong and tall.

The corn grows strong and tall.
Hi Ho the dario
The corn grows strong and tall.

(Action: The children stop swaying and look sad.)
It doesn't rain for days.
It doesn't rain for days.
Hi Ho the dario
It doesn't rain for days.

(Action: The children slowly go down to the ground.)
The corn begins to wilt.
The corn begins to wilt.
Hi Ho the dario
The corn begins to wilt.

(Action: A child goes around the circle using hand motions to sprinkle rain on wilted corn.)
Down comes the rain.
Down comes the rain.
Hi Ho the dario
Down comes the rain.

(Action: The children stand tall with hands raised. Add a great big smile!)
The corn grows strong and tall.
The corn grows strong and tall.
Hi Ho the dario
The corn grows strong and tall.

IV. Extensions

A. Cover a potted plant with a plastic bag. Secure the plastic tightly around the pot with a rubber band or tape. Place the plant in a sunny spot. Observe the plant Water drops will form inside the sealed bag. Ask the children questions such as "Where did the water come from?" (the plant and the soil) "What does this show us?" (plants have water)

B. In a group, discuss the process of condensation. Show the students two healthy potted plants. Tell the students that both plants have had plenty of water. We are going to see what happens when we stop watering one of the plants. Let the students decide which plant will get water and which one will not. Make labels for the plants "Water" and "No Water." Attach them to the appropriate plants. Have students draw pictures of the two plants.

C. Place the plants in the science center to observe. Designate a botanist to care for the plant that gets water. Discuss the appearance of both plants every few days.

RESOURCE

Water is Your Best Friend, California Department of Water Resources, 1,4,5.

HUNG UP ON WATER CONSERVATION

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, at least two ways people waste water;
2. Identify, orally or in writing, at least two ways people conserve water; and
3. Give an oral or written definition of conserve.

SUBJECTS:
Science, Art

TIME:
1 hour 15 minutes total
(3 activities: 40 minutes, 30 minutes, and 5 minutes)

MATERIALS:
2 paper plates per student
green, brown, and blue tempera paint
stapler
student sheet (included)
water drop pattern (included)
chart paper
1 wire clothes hanger per student
1 quart-size (or larger) resealable plastic bag per student
5 gallon jug

BACKGROUND INFORMATION

There is a lot of water in the world, but only a small part of it can be used for drinking, cooking or cleaning. The rest of the world's water is either salt water (oceans), frozen (icecaps), or polluted. Since we have a limited supply of water we must use our water wisely and not waste it.

Water Conservation Facts

1. A household can save up to 20,000 gallons of water each year by fixing leaky faucets.
2. A leaky faucet puts 3-5 gallons of water down the drain every minute.
3. More than five gallons of water is wasted if the tap water is running while brushing teeth.
4. Only 1/2 gallon of water is used if the toothbrush is just wetted and rinsed. Savings: Up to 4 1/2 gallons each time teeth are brushed. Fill five gallon jugs with water to demonstrate how much water is wasted.
5. Washing dishes with the tap running can use an average of 30 gallons of water.
6. Washing dishes (by hand): Fill basin, wash the dishes; empty basin; fill basin; rinse dishes; use about five gallons of water. Savings: 25 gallons each time dishes are washed.

7. Washing a car at home, using a hose, uses up to 150 gallons of water.

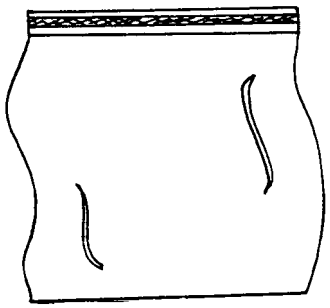
8. Washing a car: Washing it at a self-service car wash, uses 5-10 gallons. Using a sponge and a bucket, uses 15 gallons. Savings in each case: Over 100 gallons of water.

Term

conserve: save, protect, keep; to use a resource wisely and efficiently.

ADVANCE PREPARATION

A. Cut through the zippered corners of each resealable plastic bag.



PROCEDURE

I. Setting the stage

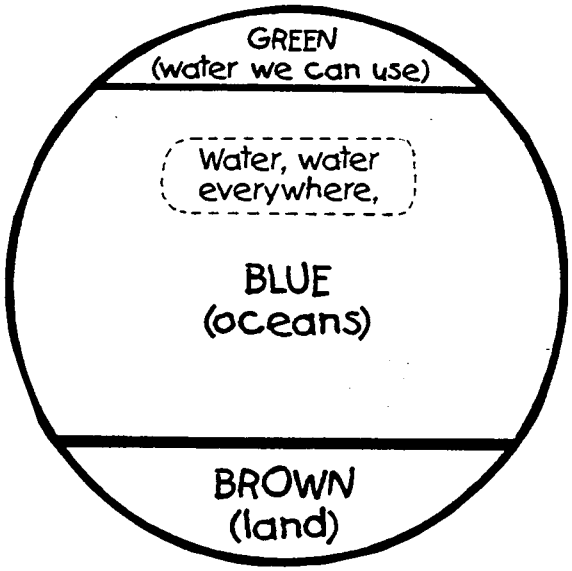
A. Share the background information.

B. Let each student tell one way people waste water and/or one way people conserve water. Write their responses on chart paper:

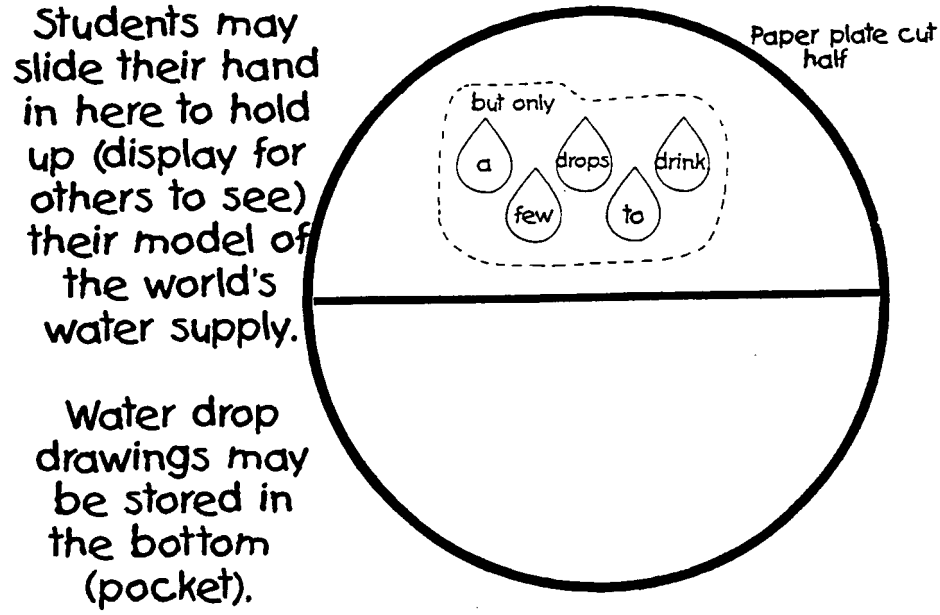
PEOPLE WASTE WATER WHEN THEY:	**PEOPLE CONSERVE WATER WHEN THEY:**
1.	1.
2.	2.
3.	3.
4.	4.

II. Activities

A. The students will make paper plate representations of the world's water supply.
1. Have the students paint a paper plate according to your instructions:



2. When the paint is dry, cut another paper plate in half and staple both halves to the back of the painted plate:



3. Give each student a copy of Student Sheet A. Have him/her cut on the dotted lines and glue:

"WATER, WATER EVERYWHERE"	to the painted part of the paper plate project
"BUT ONLY A FEW DROPS TO DRINK"	to the back (top half) of the paper project

B. Students will draw pictures of examples of water being wasted and conserved.

1. Review the chart lists (see Setting the stage).

2. Give each student two large water drop shapes (Student Sheet B) and these instructions, "On one water drop shape, draw a picture of a way people waste water. On the other water drop, draw a picture of a way people conserve water. When you're finished, cut them out and store them in the pocket on the back of your paper plate project."

III. Follow-Up

A. Copy Student Sheet B for each student. Have each student make an additional water drop drawing and place it in one of the prepared resealable plastic bags. Snap the bag to the bottom of a wire clothes hanger. Display on a bulletin board.

IV. Extension

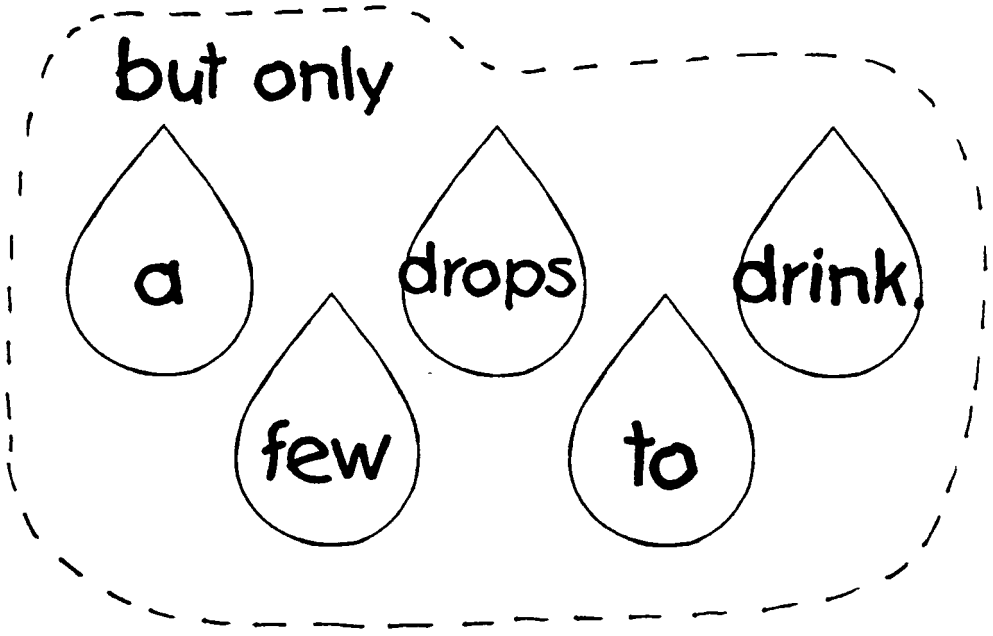
A. Give each student approximately two cups of water in a plastic container, another shallow plastic container, a teaspoon, and some salt. Say, "Let's pretend this water represents all the water in the world. When I say 'Go', dip the water with your spoon quickly but carefully into the other container. 'Go'." Play a waterrelated song for one minute. Say, "Stop." "Sprinkle the salt into the large container. Let's pretend this water represents all the ocean water. Look at the water you dipped out. Let's pretend this represents the water we have to drink and use. Which one is more? Do we have a lot of water to use? Do we need to conserve water? How could we use this fresh water instead of pouring it down the drain?" (Follow one or more of the suggestions). "Could we use the salt water for anything?" Discuss.

RESOURCE

Brownlee, Sharon, "Living With Our Legacy", U.S. News and World Report, April 23, 1990.

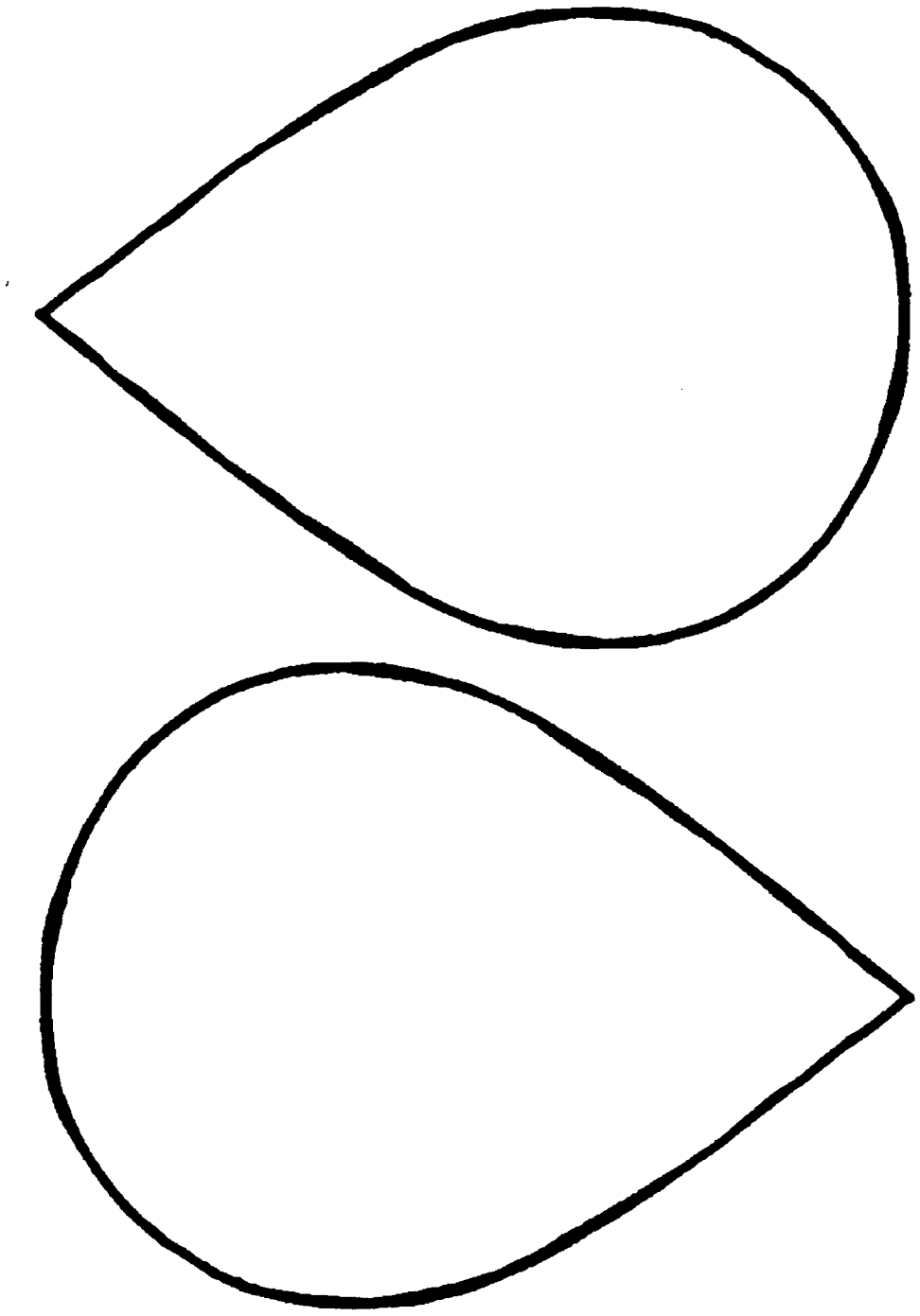
Student Sheet A

Water, water
everywhere,



Student Sheet B

Water drop pattern for activity B-2



CONSERVE EVERY DROP!

K-2

OBJECTIVES

At the end of this lesson, the students shall do the following:

1. Describe, orally or in writing, uses of water in the school;
2. Make a list of water conservation practices; and
3. Give an oral or written definition of conserve.

SUBJECTS:
Science, Language Arts

TIME:
45 minutes

MATERIALS:
2 poster boards or chalkboard
markers
blue construction paper
white paper

BACKGROUND INFORMATION

Water is a liquid we need in order to live. People, plants, and animals cannot live without water. There are three basic ways to conserve water.

1. Economize: Become aware of the amount of water you use and try to find ways to conserve.
2. Repair any leaks that waste water.
3. Reuse water when possible.

Term

conserve: save, protect, keep; to use a resource wisely and efficiently.

ADVANCE PREPARATION

A. Make raindrop-shaped books for each student.

PROCEDURE

I. Setting the stage

A. Chant the attached Water Walk poem.

B. Take your class on a water walk through the school. Find examples of good water conservation and water misuse.

C. Teacher records student's responses.

II. Activities

A. Brainstorm with the class to make two class posters: one with water conservation and the other on water waste. Make a web of each with recorded responses from the water walk.

III. Follow-Up

A. Make Rain Drop Conservation Books. Let students look at the class web and make book shaped like a rain drop (pattern included). Each student should illustrate four ideas to conserve water.

B. Have the students select an address from the following list. These organizations will send booklets about ways students can help to save the environment. Include the student's name, complete address, and two first-class stamps.

Adopt-a-Stream
P. O. Box 5558
Everett, WA 98201

Alliance for Environmental Education
211 Wilson Blvd
Arlington, VA 22201

American Forestry Association
P. O. Box 2000
Washington, D.C. 20036

Center for Marine Conservation
1725 DeSalles St, N.W., Suite 500
Washington D.C. 20036

Environmental Defense Fund
257 Park Avenue, South
New York, NY 10010

Friends of the Earth
218 D Street, S.E.
Washington, D.C. 20003

The International Crane Foundation
E-11376 Shady Lane Road
Baraboo, WI 53913

National Audubon Society
915 Third Avenue
New York, NY 10022

National Geographic Society
Educational Services
17th & M Streets, N.W.
Washington, D.C. 20036

National Recycling Coalition
1101 30th St, N.W., Suite 305
Washington, D.C. 20007

National Wildlife Federation
1412 16th St. N.W.
Washington, D.C. 20036

Renew America
1400 16th St N.W., Suite 710
Washington, D.C. 20036

Sierra Club
730 Polk Street
San Francisco, CA 94109

Whale Adoption Project
P. O. Box 388
North Falmouth, MA 02556-0388

IV. Extension

A. For a homework assignment have each student use the student activity page “Every Drop Counts” (included) and go for a water walk at home. Illustrate good water conservation and water misuse in the home.

RESOURCE

Southwest Florida Water Management District, 2379 Broad St, Brooksville, FL 34609-6899.

WATER WALK ACTIVITY

Look for the following examples of water use or misuse:

We're going on a water walk,
What will we see?
Head out on the sidewalk,
Just follow me!

(drinking fountain, hoses, raindrops, drips, and runoff)

We're going on a water walk,
What will we see?
Head out to the lunchroom
Just follow me!

(sinks and faucets, coffee pot, pitchers, ice machine)

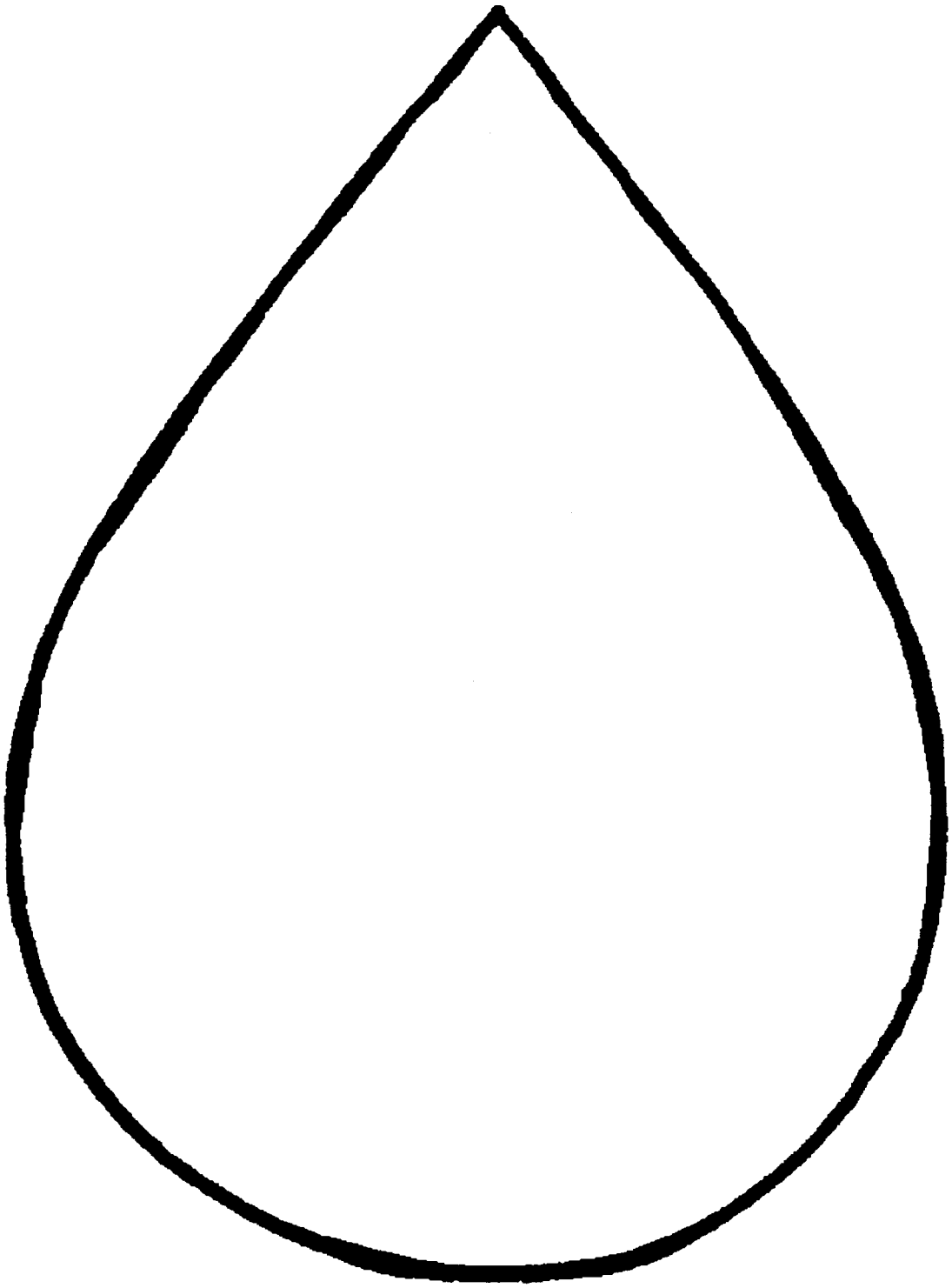
We're going on a water walk,
What will we see?
Head to the playground,
Just follow me!

(puddle, retention pond, dark clouds, hose, spigot, sprinklers, dew)

We're going on a water walk,
What will we see?
Head to the classroom
Just follow me!

(aquarium, toilet & sink, paint trays, sweat, a/c units, and lunch boxes)

Pattern for Raindrop Conservation Books



Every Drop Counts

Take a water walk at home. Record your finding below.

Good use of water in my 	Bad use of water in my 

WATERVILLE, U.S.A.

K-2

OBJECTIVE

At the end of this lesson, the students shall be able to do the following:

1. List, orally or in writing, at least three neighborhood jobs which relate to water.

SUBJECT:
Art

TIME:
1 hour

MATERIALS:
butcher paper
pencils
crayons
empty cardboard toilet tissue rolls (at least one per student)
miscellaneous art materials:
- markers
- tissue paper
- glue
- yarn
- lace
- material scraps

BACKGROUND INFORMATION

Every city and town has lots of jobs which are related to water. There are obvious jobs like waste treatment workers and less obvious jobs like soft drink plant workers or firemen.

ADVANCE PREPARATION

A. Gather materials.

PROCEDURE

I. Setting the stage

A. Brainstorm ideas with the class to come up with a list of places (buildings and businesses) which are found in most towns and cities. Beside each business or building list people that have water-related jobs.

II. Activities

A. Divide your class into four groups. Give each group a long piece of butcher paper. Tell them to draw a street down the middle (lengthwise) of the paper. Side streets may be drawn if so desired. Tell them to draw houses, buildings, and businesses to create a neighborhood.

B. For each corresponding water-related building, make a puppet using toilet tissue rolls and miscellaneous art materials. Examples:

House - plumber
Restaurant - dishwasher
Fire Station - fire fighter
Car Wash - employee
Coca Cola Plant -factory worker
Pool - lifeguard

III. Follow-Up

A. For each puppet a student makes ask, "How is water used in this person's job?" Write the response on an index card or small piece of paper. Place the card inside the toilet tissue roll puppet.

B. Let each student show his/her puppet and tell how the puppet's occupation relates to water.

C. Use an acrostic for each profession that illustrates how they use water.

Example:
D - rinking
O - perations
C - leaning instruments
T - rips by ship
O - cean vacations
R - iver boating

IV. Extensions

A. Laminate the butcher paper play mats. Allow the students to play with the puppets on the mats.

B. Write play skills for the puppets and/or create other puppets.

RESOURCE

DeBruin, Jerry, Young Scientists Explore The World of Water, Good Apple, Inc., Carthage, IL, 1985.

FILL IT UP: WATER STORAGE TANKS

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Discuss the purpose of water storage tank in water systems;

2. Conduct an experiment with water pressure and gravity flow; and

3. Create a water quality logo to be used on water tanks.

SUBJECTS:
Science, Language Arts, Art

TIME:
45 minutes

MATERIALS:
coffee can
3 rulers
nail (large)
hammer
water pitcher
dish pan
crayons or markers
posterboard

BACKGROUND INFORMATION

Almost all public water systems use water tanks for storage. Water is usually supplied by wells or a surface water treatment plant and pumped into the network of pipes carrying water to customers, called the distribution system. Storage tanks are present in the distribution systems of water systems to hold water for use by customers. Water use can be supplied by storage tanks and as these tanks become partially empty, pumps from the water source turn on to provide water. Water not used by the customers is available to refill the storage tanks. Therefore the water changes out in the tanks almost daily and stays fresh. The height of the tanks and, thus, the level of water in the tank provides pressure to move the water through pipes to customers and provides the pressure needed at each household. Ground tanks are more economical to construct than elevated tanks but must be located on a high hill to provide the elevation to provide pressure. For each 2.3 feet of elevation, one pound of pressure is available and thus a tank 120 feet tall when full can provide 52 pounds pressure (120/2.3 = 52 psig) which is sufficient to operate a dishwasher or allow a good shower.

Standpipes are tall tanks capable of holding more water than an elevated tank of the same diameter. When the level of water is low in a standpipe, the pressure is low and thus the water level must remain high. The water in the bottom is available for emergencies such as fire fighting.

Elevated and standpipe water tanks are made of welded steel while ground tanks can be constructed of steel or concrete. Steel tanks can rust and must be protected by special paint systems. In the past, red lead paint was used as a primer paint and, as the coating wore off, the lead paint could contaminate the water inside the tank. Today, no lead paint is allowed and special precautions are taken when the outside paint is sand-blasted off to prevent the lead paint chips from contaminating air or food in the area.

ADVANCE PREPARATION

A. Contact the local water utility manager to find out the location and types of water tanks in your area.

B. Take photographs of these tanks.

PROCEDURE

I. Setting the stage

A. Look at the photographs of the local water tanks. Find their locations on a city map.

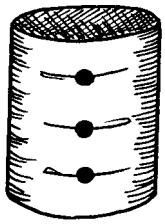
B. Share the background information.

C. Classify the local water tanks as elevated, ground, or standpipe.

II. Activities

A. Experiment to demonstrate water pressure and gravity flow.

1. Make three holes in the coffee can and plug them with paper plugs that can be easily removed. Fill the can with water.



2. Have students hold a ruler out beside each hole. Simultaneously remove the plugs and allow the water to spray into the dish pan. Measure the greatest projection from each hole.

3. Compare the measurements and hypothesize about why this happened.

4. Run a second test to check your results. How is this knowledge important to designers of water tanks?

B. Create a design and a logo for the sides of a water tank. The message should convey an environmental message. Choose any of the water tank designs. These could be made poster board size and used as a hall display.

III. Follow-Up

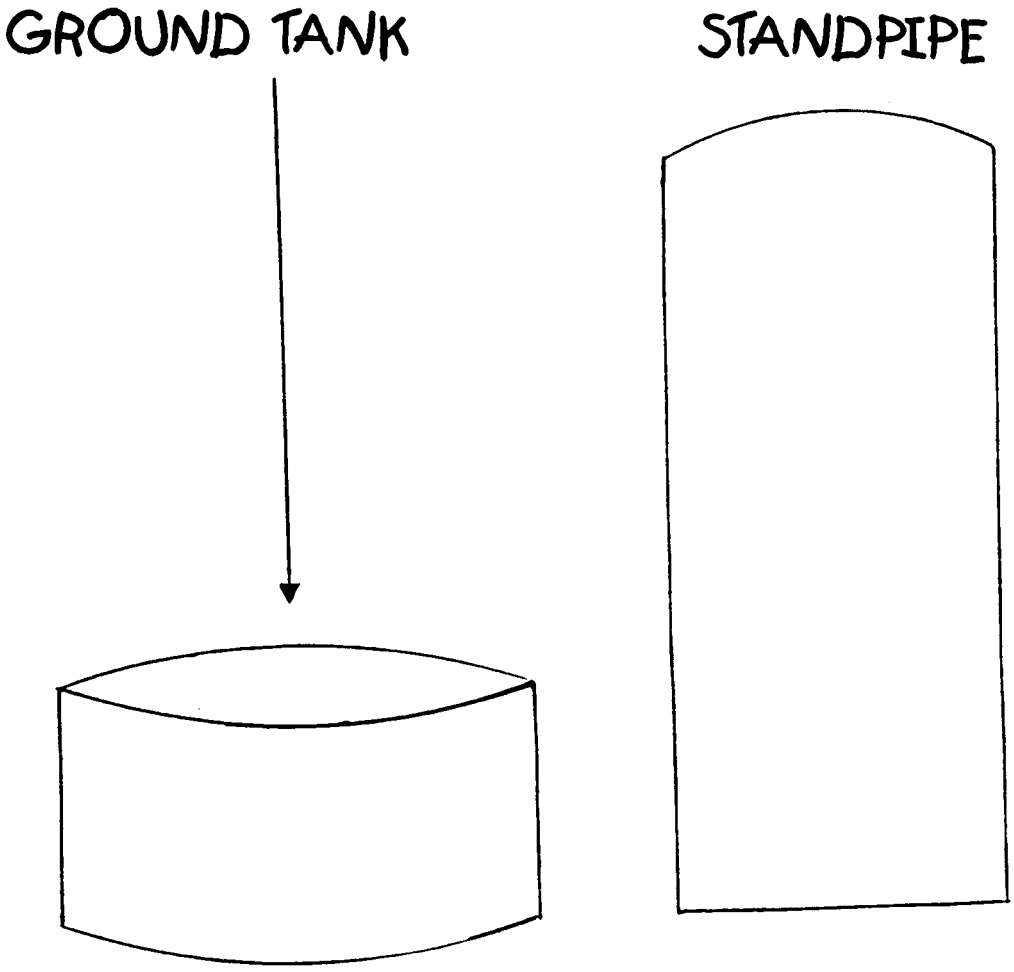
A. Invite the local water utility manager to your classroom to talk about local water tanks. Ask questions about how they are cleaned and how long the water is stored.

IV. Extension

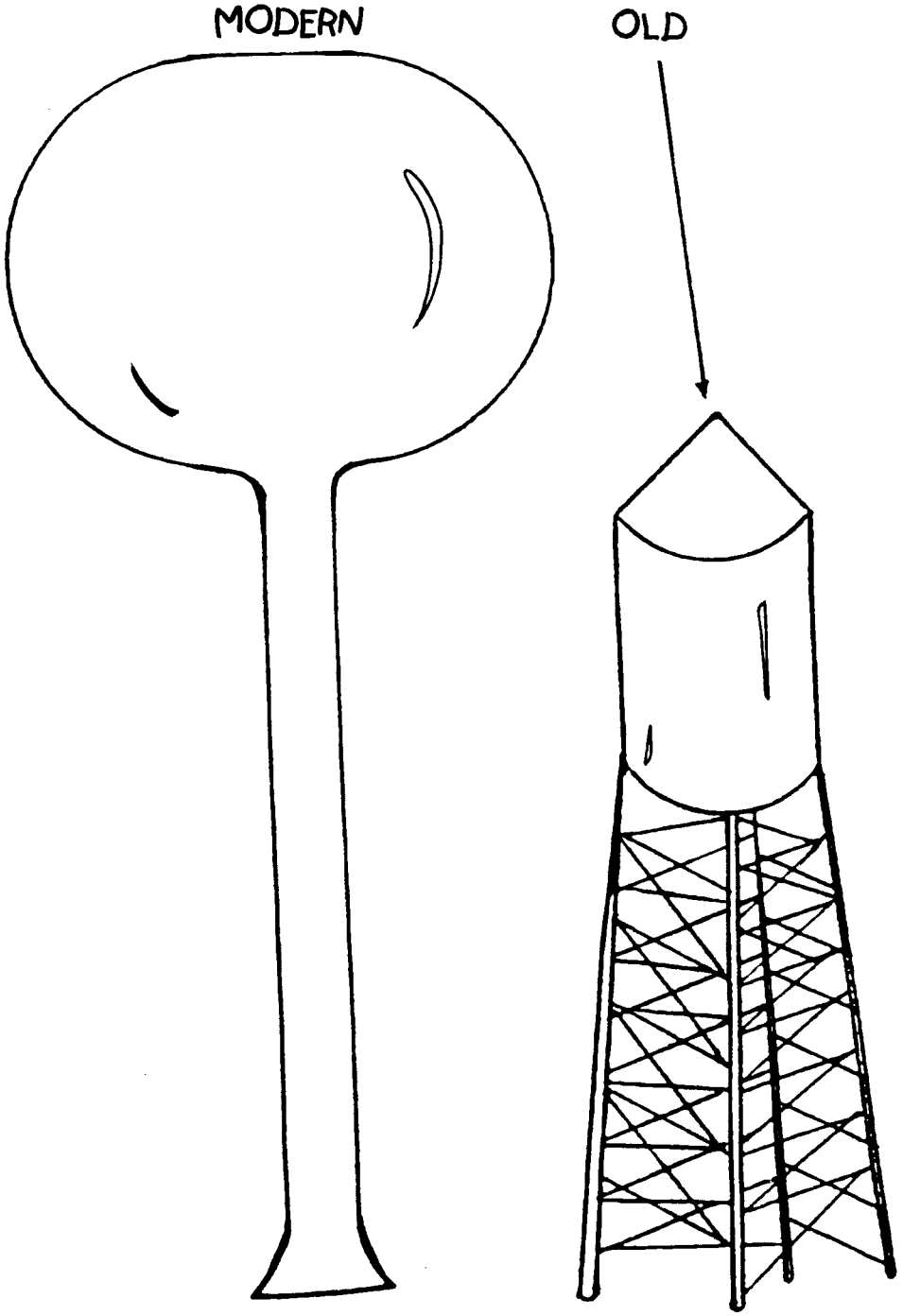
A. Investigate how large water tanks are used to train astronauts for working in weightlessness.

RESOURCE

Waste Not!, Eco Amigos Issue 2,, National Resource Division of International Paper, Palatine, IL, 1995.


GROUND TANK
STANDPIPE

ELEVATED TANKS



WHAT IS A SEPTIC TANK?

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, the septic tank as a method of wastewater treatment;

2. Tell or write how a septic tank works.

3. Name, orally or in writing, the basic parts of a septic tank; and

4. Give an oral or written definition of the new terms: drain field, effluent, sludge, and septic tank.

SUBJECTS:
Science, Math

TIME:
1 hour

MATERIALS:
1 plastic or aluminum container (6-8 inches deep)
potting soil
gravel
1/2 gallon paper milk carton, labeled "House"
1 quart paper milk carton, labeled "Septic Tank"
plastic straws
clay
chart paper
cup or container for water
blackline master for "How a Septic Tank Works"
tack or small nail

BACKGROUND INFORMATION

Septic tanks are used to treat sewage in many rural areas that are not served by public sewers.

A septic tank is a large container usually made of concrete. The tank is buried underground at individual buildings.

Sewage flows through pipes that connect the septic tank to the building. The solids in the sewage sink towards the bottom of the tank where anaerobic bacteria break them down into carbon dioxide, methane, and water. The undigested residue (sludge) stays on the bottom of the tank. The effluent from the septic tank containing the remaining liquid waste, flows through a piping network to a drainfield. Here, perforated pipes surrounded by gravel slowly release the wastewater into the soil where bacteria finish the treatment process.

Soil bacteria continue to destroy the remaining organic material in the effluent.

Solids (sludge) that remain at the bottom of the septic tank must be periodically pumped out and taken to a sewage treatment plant.

Terms

drain field: the part of a septic system where the wastewater is released into the soil for absorption and filtration.

effluent: treated wastewater, flowing from a lagoon, tank, treatment process, or treatment plant released to the environment.

sludge: solid material that isn't broken down by bacterial digestion which settles to the bottom of septic tanks or wastewater treatment plants; it must be pumped out and disposed of in landfills, application to land, or by incineration.

septic tank: a tank, commonly buried, to which all of the wastewaters from the home should flow and in which, primary digestion of the organic matter occurs by anaerobic bacteria; the main part of a septic system where scum and solids accumulate; derived from "sepsis" meaning "putrid decay" or "decay without oxygen."

wastewater: water that has been used for domestic or industrial purposes.

ADVANCE PREPARATION

A. Find a picture of a septic tank.

B. Construct a septic tank model. (See diagram.)

1. Fill an aluminum roasting pan or a large plastic storage container 1/2 full of potting soil.

2. House - Place a 1/2 gallon milk carton cut to a height of approximately six inches at one end of the container. Make a hole 2 inches from the base of the carton and insert a drinking straw. Seal the connection with clay or tape to prevent leakage.

3. Septic Tank - Cut a quart-sized milk carton to a height of three inches. On two opposite sides of the carton make a hole 2 inches from the base of the carton. Connect one hole to the straw that is attached to the house.

4. Make field lines as follows:

   a. Punch a large hole in one straw.

   b. Insert another straw horizontally through the hole and seal each end with clay.

   c. Punch a large hole near the end of this straw. Insert a straw in each hole. Seal the open ends with clay.

   d. Using a tack or small nail, punch holes in each straw to allow drainage.

   e. Connect the field lines to the septic tank by inserting the middle straw into the hole in the quart carton.

   f. Test the system by pouring water into the house and checking for leaks as the water moves through the system. Use clay and or tape to seal any leaks.

g. Put a fine layer of gravel over the soil in the end of the container that represents the drain field.

h. Place the model in the container.

PROCEDURE

I. Setting the stage

A. Ask students to think of places wastewater can be found at school.

1. Make a list on chart paper.

2. Show students some drain pipes in school (under sinks).

3. Explain that wastewater must be treated to make it safe before it is discharged into the environment.

B. Show the students a picture of a septic tank.

1. Ask students:

a. What do you think this is?

b. What is it used for? Explain that it is a septic tank used to treat wastewater.

2. Tell students they are going to learn how a septic tank works.

II. Activities

A. Display the septic tank model and give the students time to examine it.

B. Explain each part of the model.

1. House - Wastewater leaves through a pipe which is connected to the septic tank.

2. Septic Tank - Explain how solids (sludge) sink to the bottom and that liquids will flow into the field lines.

3. Field Lines - Field lines are placed on a bed of gravel. The wastewater seeps out of the holes in the field lines and passes through the gravel into the soil. Bacteria in the septic tank and in the soil destroy harmful organic material.

C. Demonstrate how the septic tank works by pouring water into the house and letting students observe as the water moves through the system.

III. Follow-Up

A. Give the students a copy of the blackline master, "How a Septic Tank Works."

1. Have the students label the parts of the septic tank system.

2. Use a blue crayon to color the path of wastewater movement through the system.

3. Use a brown crayon to illustrate sludge that settles in the septic tank.

B. Divide students into pairs. Ask each student to use the blackline master to tell his/her partner what happens to wastewater in a septic tank system.

IV. Extensions

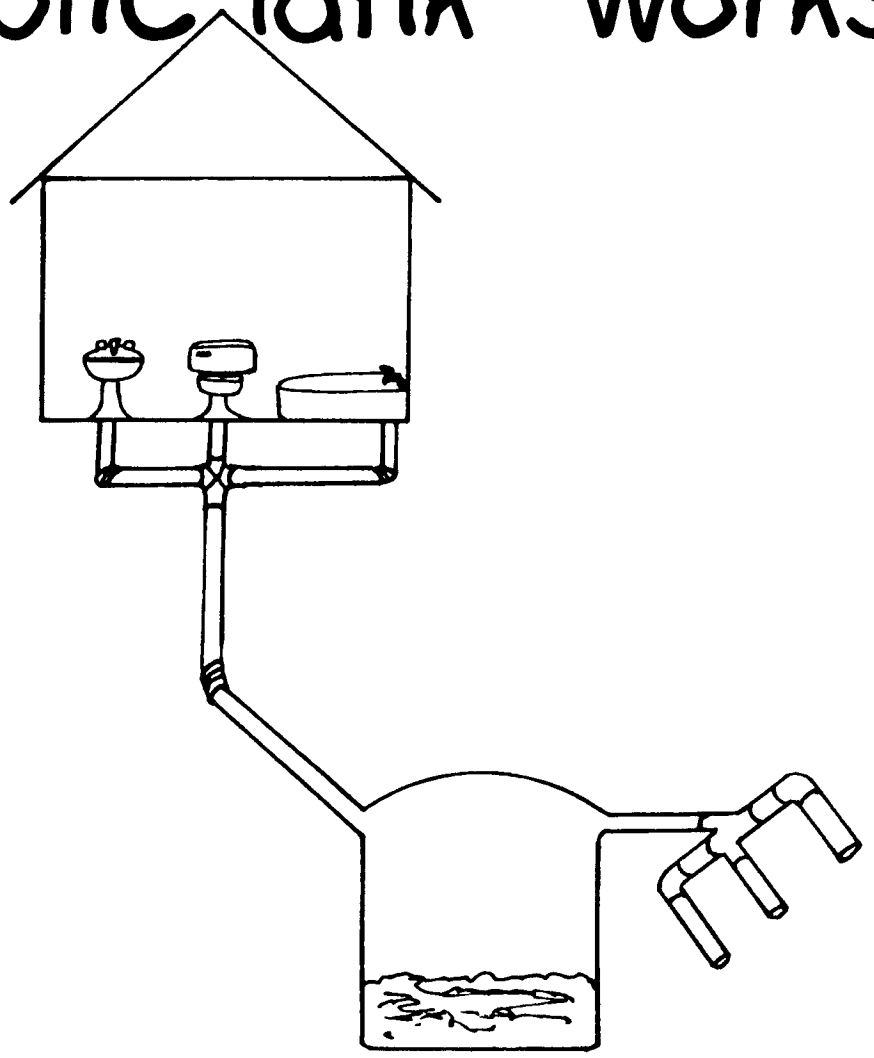
A. If possible, visit a site where a septic tank is being installed.

B. Ask each student to find out if his/her house has a septic tank for treating wastewater. Graph the results of the survey.

RESOURCE

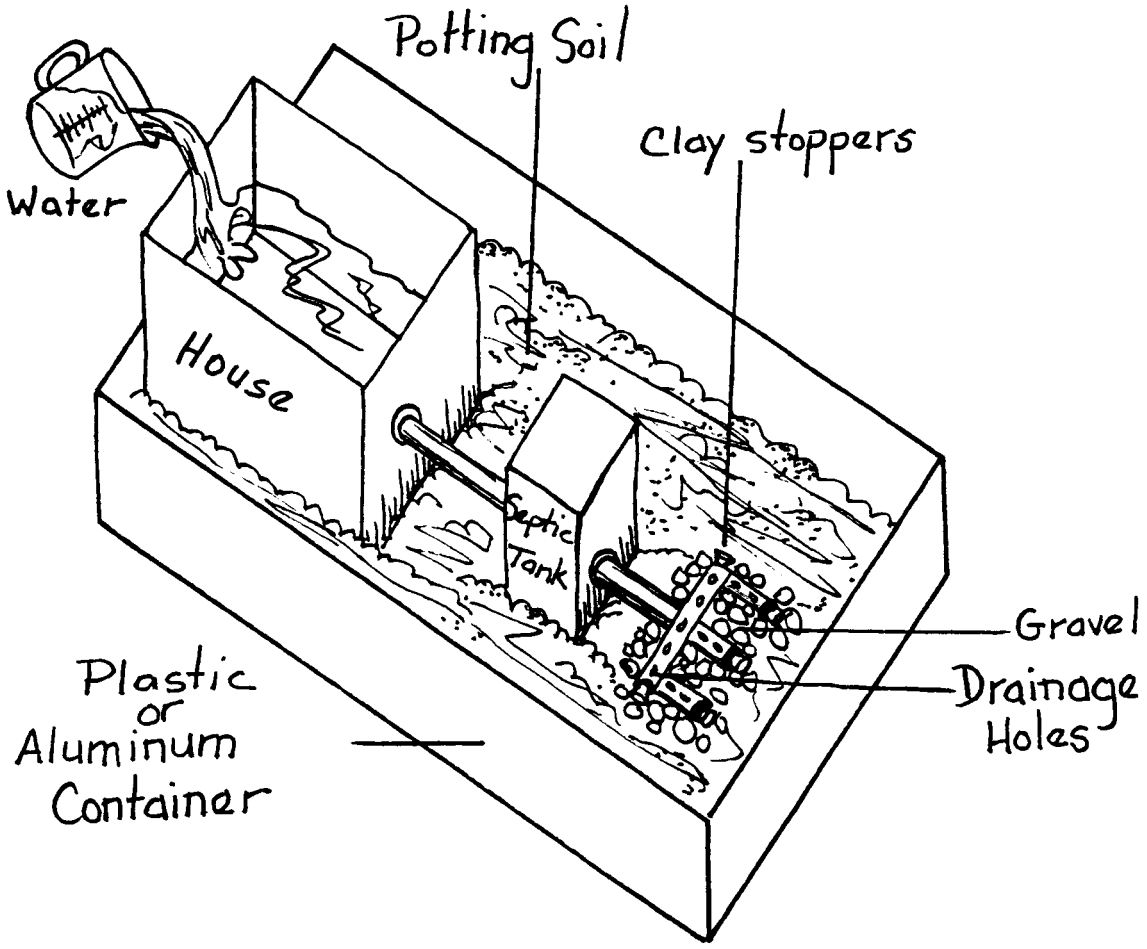
Biddulph, Fred and Biddulph, Jeanne, Getting Rid of Waste Water, Wright Group.

How A Septic Tank Works



1. Label the following;
   drainage pipes
   sludge
   septic tank
   field lines
2. Color the flow of waste water blue. Color the sludge brown.

Diagram


Potting Soil
Clay stoppers
Water
House
Septic Tank
Gravel
Drainage Holes
Plastic or Aluminum Container

SO MUCH WATER, SO LITTLE TO DRINK

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Discuss water concepts;

2. Observe, record, and compare, orally or in writing, the amount of the Earth's surface covered by l and and by water;

3. Observe, record, and compare, orally or in writing, the amount of fresh water vs. salt water;

4. Give an oral or written definition of the new terms: fresh water, salt water, and surface.

BACKGROUND INFORMATION

All living things on this planet are dependent on water for survival. In fact, every living organism is composed of more than 60 % water. Water is necessary for the production of food and maintenance of life. It is also used to produce energy, manufacture goods, transport goods, and provide recreational opportunities.

Because water covers 71% of the Earth's surface, it is often thought of as an endless resource. The fact is that 97% of the Earth's water is the salt water of the oceans. Only 3% of the Earth's water is fresh water and about two-thirds of that is frozen in glaciers, ice caps, and snow. Of the remaining 1%, half is in aquifers beneath the Earth's surface.

Terms

fresh water: inland water that has a low concentration of minerals, salts, and dissolved solids found as surface water or ground water.

SUBJECTS:
Science, Geography, Math, Language Arts

TIME:
3 or 4 30-minute sessions

MATERIALS:
2 pieces of butcher paper
1 egg
1 apple
standard globe
"balloon" or "pillow" globe
2 colored labeling dots
12-3" squares of green construction paper
12-3" squares of blue construction paper
half sheet of copier per child 1 sheet graphing paper per child
1 blue crayon per child
1 green crayon per child
3 sheets 12"x18" green construction paper
7 sheets 12"x18" blue construction paper
1 student booklet per child "So Much Water, So Little to Drink"
United States map
state map
1/2 cup salt water solution
1 Q-tip per child
100 1-inch cubes, all same color
1 or more pkgs. small self-stick removable notes
magazines with pictures of outdoor scenes and/or water usage (optional)
calendars with pictures of outdoor scenes (optional)
2 extra pieces butcher paper

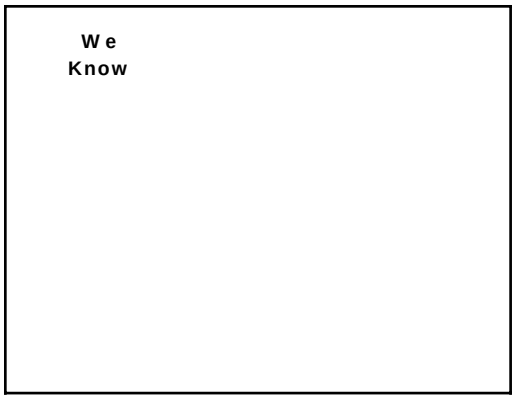
salt water: water that has a high level of dissolved salts (oceans, seas).

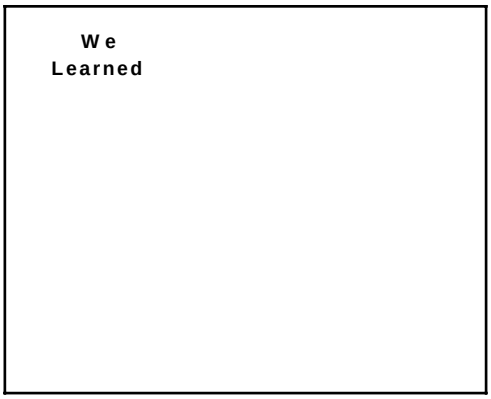
surface: the outside layer of an object or organism.

ADVANCE PREPARATION

A. Gather materials listed above.

B. Prepare charts:





C. Cut twelve 3-inch squares each of blue and green construction paper.

D. For the "Globe Toss" tally activity, cut sheets of copier paper in half (4 1/4" x 5 1/2"); one sheet per student.

E. For the "Globe Toss" graphing activity, copy one graphing sheet per student (included).

F. Copy student books "So Much Water, So Little to Drink" (included).

G. Prepare salt solution by mixing 1/2 teaspoon salt with 1/2 cup water.

H. Prepare classification charts for extension activities "Land/Water" and "Fresh Water/Salt Water" (optional).

PROCEDURE

I. Setting the stage

A. Ask the students to tell what they know about water. Record their responses on prepared butcher paper titled "We Know."

B. Develop an understanding of the term "surface" as being the outside layer of something. Ask, "What is on the surface of:

an egg? (shell)
an apple? (skin or peel)
a person? (skin or hair)"

II. Activities

A. Show the students a globe. Explain they they will examine how much of the Earth's surface is covered by land and by water.

1. Students will identify land masses and water masses on the globe.

2. Rotate the globe slowly and ask students if they see more land or more water.

3. Using an inflated globe or stuffed cloth globe, play "Toss the Globe."

a. Select two students to be "Globe Tossers." Put a colored sticker on each student's right thumbnail.

b. The remainder of the class will record whether the "Tosser's" right thumb is on land or water as he/she catches the globe. The globe will be tossed a total of ten times. Choose the recording technique that best complements the math skill of your class:

1) Divide the class into two teams. One team will record each time a catcher's thumb touches land by placing a 3" green square in their recording area. The other team will record each time the thumb touches water by placing a 3" blue square in their recording area.

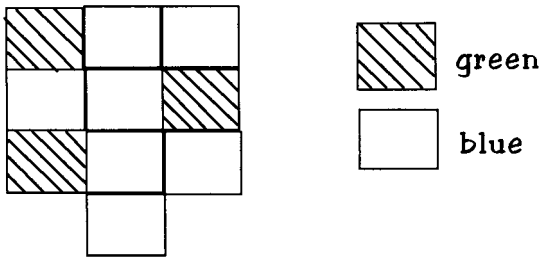
2) Each student will make a tally mark on his/her own paper using a green crayon to represent land and a blue crayon to represent water. At the end of ten throws, each student compares the green and blue tally marks. At the end of ten throws, compare results.

3) Each student will record his/her observations on the attached graph sheet. At the end of ten throws, compare results.

c. Students will discuss the results of their recordings. (The results of this activity could be different than the actual percentages of land and water. This can be discussed after the next section of this lesson. At a later time you may want to repeat the "Globe Toss" and compare results of each trial.)

B. Tell the students that you will use colored paper to better see how the amount of land and water compare.

1. Using 3" squares, place seven blue and three green squares as shown:



   a. Tell students to imagine that these papers represent the whole Earth and that it has been cut into equal pieces. Count the total number of pieces (ten).

   b. Imagine that all the water could be moved to one side and all the land to the other. (Separate the water and the land.) Ask students to describe the comparison.

   c. Count the land pieces, vocalizing the results. "Three of the ten parts are land."

   d. Count the water squares. Vocalize the results. "Seven of the ten parts are water."

   e. Move the 3" squares aside but still in full view of the students.

2. Using 12" x 18" pieces of construction paper, place three green pieces beside each other and seven blue pieces beside each other. Ask students to describe the contrast they see now.

C. Give each student a copy of the student book, "So Much Water, So Little to Drink."

   1. Read the text on page 1. Draw and color the earth.

   2. Read the text on page 2. Using blue and green crayons, color the appropriate number of spaces to represent land and water.

D. Review what was learned about the proportion of land to water on the Earth's surface in the lesson. Locate bodies of water on the globe. Encourage students to look for bodies of water other than the oceans. Is it easy to see these smaller bodies?

E. Using a large map of the United States, locate bodies of water. Identify these bodies as lakes or rivers. Compare bodies of water within your state to those located in other states. How does your state compare?

F. Examine a state map. How do bodies of water on your state map compare in size to those found within your state on the U.S. Map? Locate the body of water closest to where you live. Discuss the size of the body of water in real life compared to its size on the map.

G. Introduce the terms "fresh water" and "salt water."

   1. Ask, "Has anyone gone swimming in an ocean? Did any of the water get in your mouth? How did it taste?"

2. Give each student a Q-tip. (Caution the students to hold one end of the Q-tip but not to touch the other end since everyone is sharing the same solution and will be putting the Q-tip in their mouth). Have students dip their Q-tip into a container of "ocean" (salt) water. Taste it. Would this be good to drink? Explain that ocean water is salt water and cannot be used for drinking unless the salt is removed.

3. Explain that our drinking water comes from lakes, rivers, creeks, or bodies of water under the Earth's surface. It has relatively no salt and is called "fresh water."

H. Show the students a container in which you have placed 100 one inch cubes, all the same color.

1. Tell them to imagine that you have emptied all the water from the entire Earth (oceans, lakes, rivers, ponds, and swimming pools from the surface, and pockets of water under the surface). You have all the water from the whole Earth in this container. You have divided it into equal pieces as we did with the land and water yesterday.

2. Have the class count the cubes. (100)

3. Let individual children estimate how much of the total "water" is fresh vs salt by separating the cubes into two piles.

4. After students have made their guesses, move three cubes away from the other 97. Identify the three cubes as drinkable fresh water and the 97 as undrinkable salt water. Have students verbalize that 97 out of every 100 parts of water is salt water and that three parts of every 100 is fresh water.

I. Point to the three "fresh water" cubes. Explain that these three cubes represent fresh water, but not all of it is drinkable.

I. Set two cubes aside and identify them as fresh water but undrinkable. Ask children what happens to water when it gets very cold. (It freezes). Locate areas on the globe that are very cold. What happens to the water in these areas? (It freezes).

2. Point to the one remaining cube. Out of all the water on the Earth, only this much is fresh water that is drinkable.

3. Verbalize the quantities of total water, salt water, frozen fresh water, and drinkable fresh water.

J. Complete the final pages in the student book, "So Much Water, So Little to Drink." Color the correct number of squares on the graph of each page. Students may also draw a graphic to illustrate undrinkable water, drinkable water, and icebergs.

III. Follow-Up

A. Record student responses on "We Learned" chart.

B. Have students read “So Much Water, So Little to Drink” to classmates, older students, and parents.

C. Have students make a class big book of “So Much Water, So Little to Drink.”

IV. Extensions

A. Place 1 1/2” x 2” self-stick removable notes near the maps. Students can draw a glass with a happy face for drinkable water or glass with an “X” through it for undrinkable water on the sticky notes. These notes can then be placed on appropriate bodies of water on the maps.

B. Prepare a wall display by cutting pictures of a variety of activities and environments out of magazines. Categorize the pictures by placing them under the label “Land” or “Water.”

C. Cut a variety of water scenes, usage, and sources out of magazines and old calendars. Place them on a chart with labels of “Fresh Water” and “Salt Water.”

RESOURCES

Keinath, Thomas M., World Book Encyclopedia, Vol 22.

Tejada, Susan Mondshein, Geo-Whiz!, National Geographic Society, 1988.

Toss the Globe activity was taken from a workshop at Kilby School, University of North Alabama, sponsored by the Alabama Geographic Alliance.

So Much Water, So Little to Drink

by

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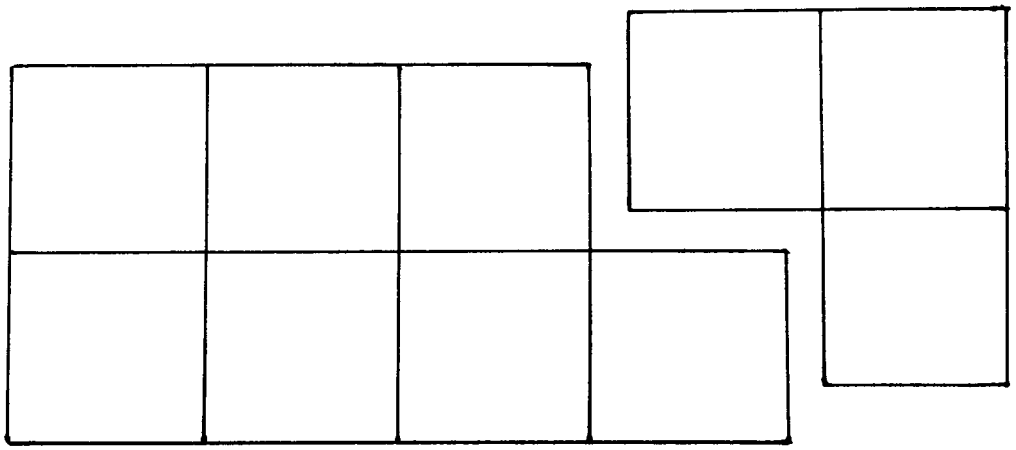

Three out of ten parts of the surface is land. Seven out of ten of the surface is water.

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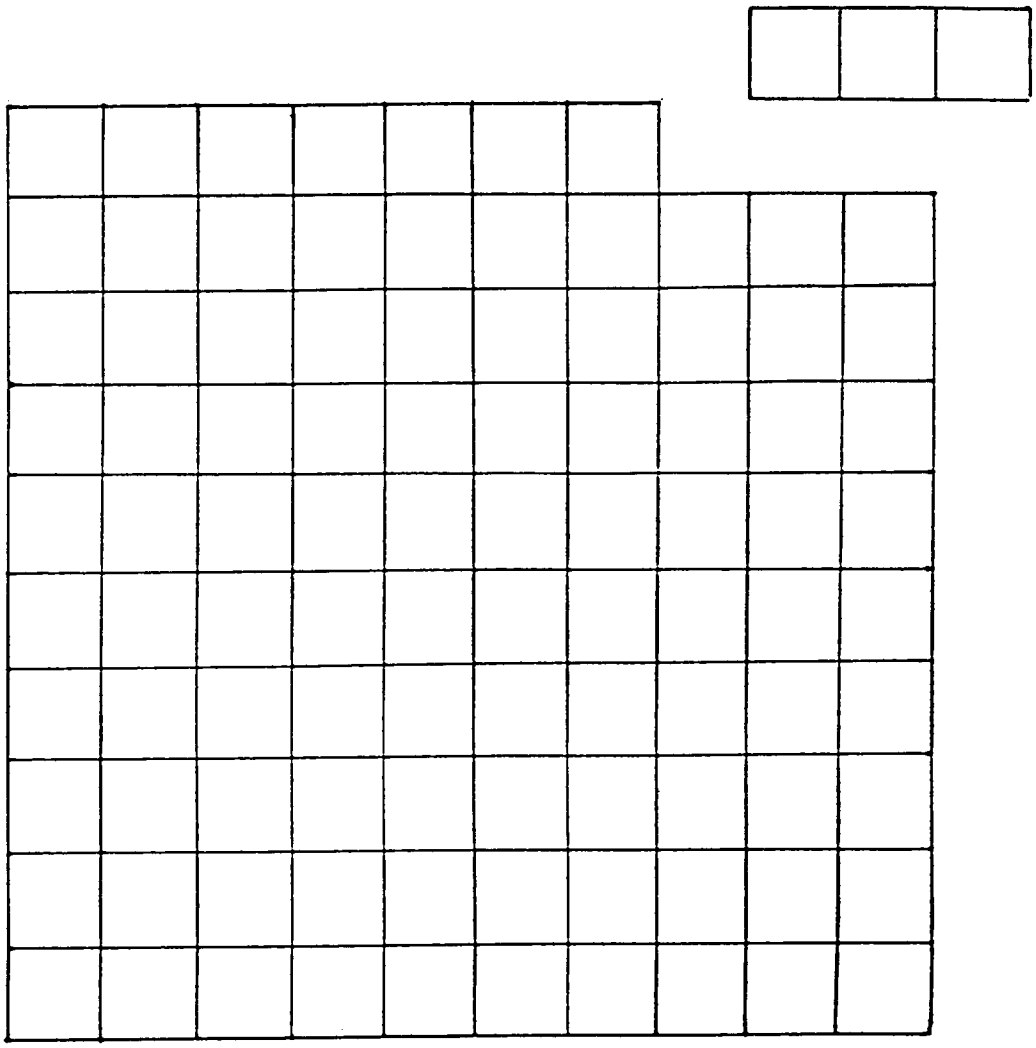
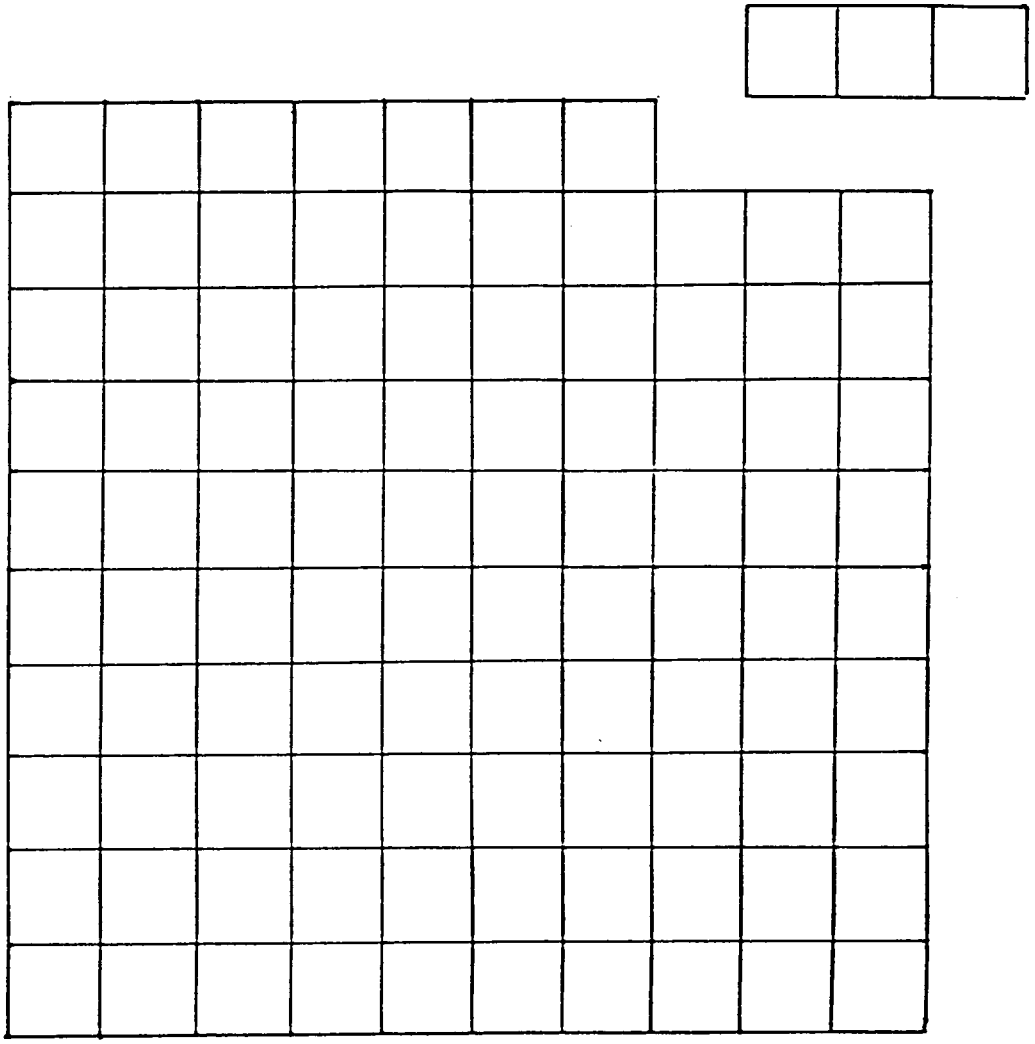


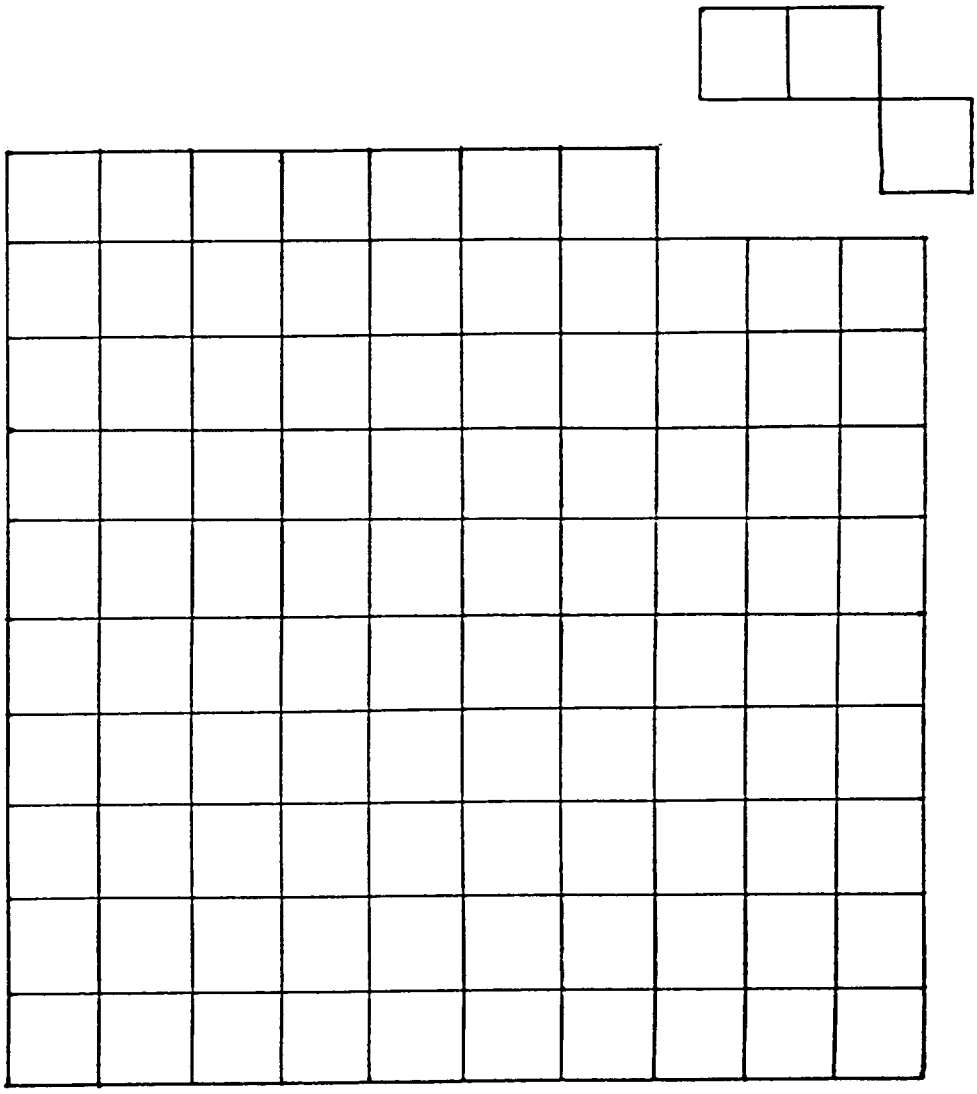
Most of our water is salty water - 97 out of 100 parts. We cannot drink salty water.

4



Very little water is fresh water - 3 out of 100 parts. We can drink fresh water.

5



Most fresh water is frozen in icebergs. We cannot drink ice.

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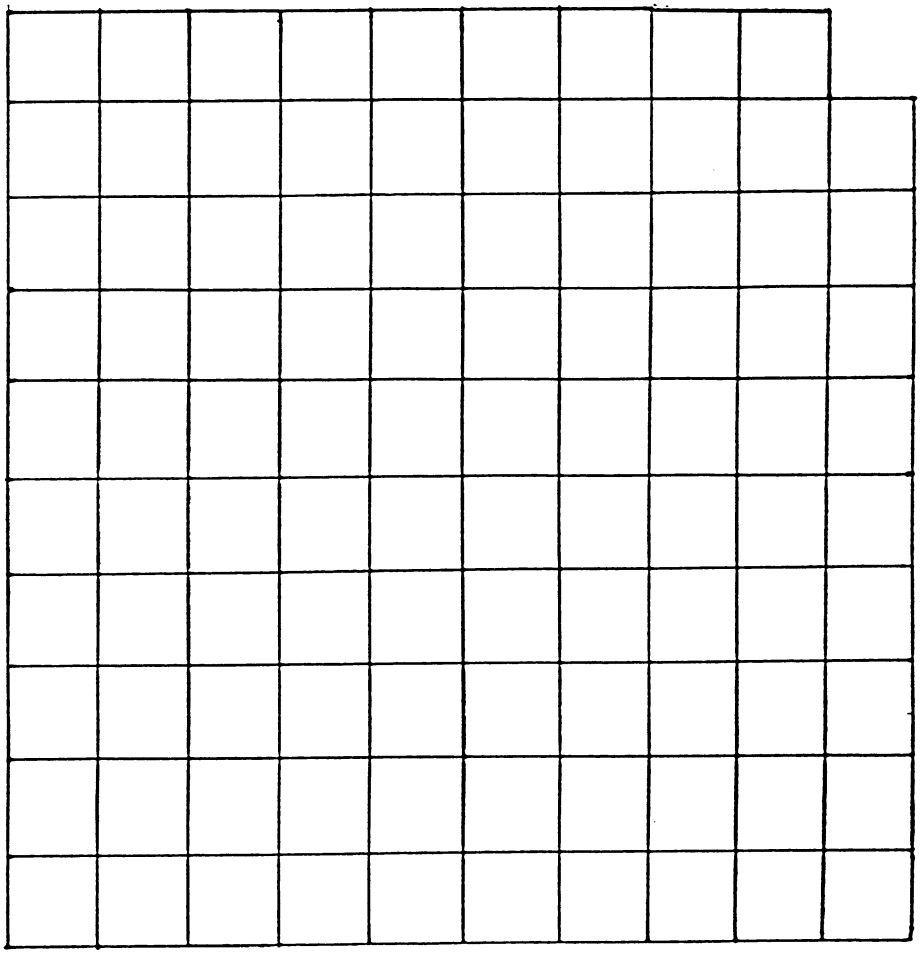

We can drink 1 out of 100 parts of all the Earth's water !