Name _____

Date _____

PROJECT IDEAS

- What materials besides soap can change the surface tension of water?
- How much water can a sponge absorb? A washcloth?
- How fast does a drop of water travel down a slope? On a steeper slope? Different-sized drops? What units should you use to describe the speed?
- What happens when you freeze different kinds of liquids, like milk or juices? Do they expand, contract, or stay the same volume when they freeze?
- Can you find a way to make ice sink in water?
- What happens when you float different objects in salt water? In other liquids? What do your observations tell you about the density of the objects compared to the liquid?
- How do different types of thermometers work?
- Look at the *FOSS Science Stories* or other books in the library for ideas about projects you might like to present to the class.
- Find out about irrigation and where it is used around the world.
- Can you use different materials to design a waterwheel that can pick up a 500-gram weight?
- Can you design another type of machine that uses water to do work?
- Where does the water in the drinking fountain at school come from?
- What types of chemicals can be added to aquarium water to make it the right quality for fish?
- What types of soil do you have in your community? Find out what happens when you add water to a sample.
- Can you figure out a way to cut down on the amount of condensation that occurs on your bathroom mirror when someone takes a shower?
- How do perspiration and evaporation help your body keep cool?

Name _____

Date _____

RAINDROP STORIES

Write at least ten words that describe water and its properties.

Write a story about a raindrop that fell into a river flowing from the top of a mountain. Use another sheet of paper to draw a picture to illustrate your story.

Name ______________________________

Date ______________________________

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 1: WATER OBSERVATIONS

Students in Mr. Li's class were trying to find out how big raindrops could get. On a rainy day, they placed a cookie sheet covered with flour outside for 15 seconds. Where raindrops hit the flour, little balls of flour formed. After an hour they separated the dry flour balls from the flour with a sieve.

The circles below are the diameters of the flour balls the students measured. Use a metric ruler to measure the diameters. Record your answers on the chart.

Drop	Diameter (mm)
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	
○	

Get a sheet of graph paper from your teacher. Use the data on the chart to make a graph to show the results. Then answer the questions.

How many drops did you measure?

____

What was the diameter of the largest drop?

____

What was the diameter of the smallest drop?

____

Which size raindrop fell most often?

____

Which size raindrop fell least often?

____

Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 2: HOT WATER, COLD WATER

When Madeline's family goes camping, they freeze water in plastic jars with lids to put in their coolers to keep the food cool. Madeline's mother asked her to fill and freeze three jars of water. Madeline filled the jars all the way to the top and screwed on the lids. She put the jars in the freezer.

Two days later she went to the freezer to get the jars and found that all three jars had burst open. She wasn't going to be able to use them. Her mom asked her to try again. She gave her three new jars and suggested that Madeline put in just enough water, so that when it froze, ice would fill the jar just to the brim.

One jar held 500 ml, one held 1000 ml, and the third was a 2-liter bottle. Madeline remembered from science class that when they froze 45 ml of water, the ice expanded to fill 50 ml of space.

How can you use this information to figure out how much water Madeline should add to each jar so that, when it freezes, ice fills the jar just to the brim. Show your math in the space below.

How much water should Madeline put in each jar?

500-ml jar	1000-ml jar	2-liter jar
_____	_____	_____

Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 3: WATER VAPOR

Some students set up an investigation to find out what effect surface area has on the rate of evaporation. They used four different containers: a round cake pan, a water glass, a cottage-cheese container, and an olive jar. They put 100 ml of water in each container.

Container	Diameter
Cake pan	23 cm
Water glass	7 cm
Cottage-cheese container	11 cm
Olive jar	5 cm

The students observed the containers for 6 days. They measured the water on days 2, 4, and 6. The results of their measurements are on the chart below.

Container	Water remaining on		
	Day 2	Day 4	Day 6
Cake pan	75 ml	50 ml	25 ml
Water glass	90 ml	80 ml	70 ml
Cottage-cheese container	80 ml	60 ml	40 ml
Olive jar	95 ml	90 ml	85 ml

In which container will all of the water evaporate first? _____

If conditions stay the same, on which day will all of the water evaporate from this container? Show your math on the back of this page. _____

In which container will all of the water evaporate last? _____

If conditions stay the same, on which day will all of the water evaporate from this container? Show your math on the back of this page. _____

Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 4: WATERWORKS

In the chart below, column 1 lists nine different things people do that need water. Column 2 shows how much water each activity typically consumes, and column 3 shows how much each activity consumes when people conserve. Figure out the amount of water your family uses in a week and write those totals in column 4. If your family is not conserving at this time, figure out how much you could conserve. Write those numbers in column 5.

Column 1	Column 2	Column 3	Column 4	Column 5
Activity	**Normal use**	**Conservation use**	**Weekly family use**	**Amount we could save**
Shower	Water running 110 liters	Wet down, soap, rinse off 18 liters		
Brushing teeth	Tap running 44 liters	Wet brush, rinse briefly 2 liters		
Tub bath	Full 264 liters	Low level 110 liters		
Toilet flushing	Large tank 26 liters	Displacement in tank 22 liters		
Washing dishes	Tap running 198 liters	Wash and rinse in basin 22 liters		
Electric dishwasher	Full cycle 62 liters	Short cycle 48 liters		
Shaving	Tap running 88 liters	Fill basin 4 liters		
Washing hands	Tap running 9 liters	Fill basin 4 liters		
Washing machine	Full cycle, top water level 154 liters	Short cycle, low water level 110 liters		
Totals				

Figure out the total amount of water your family uses each week and the total amount your family could conserve. Write your answers in the bottom of the last two columns.

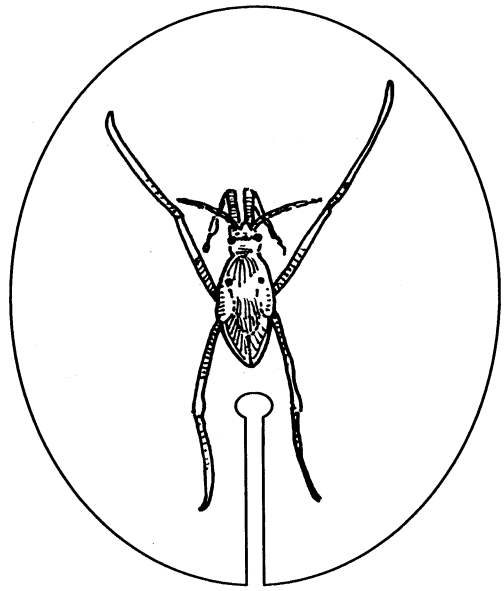
Name _____

Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 1: WATER OBSERVATIONS

Try these activities at home. Make sure you work in a place where it's OK to spill a little water. Record your observations on another sheet of paper.



WATER STRIDER

1. Cut out the water strider along the line. Also cut out the notch at the bottom.
2. Float the paper water strider in 6–10 cm of water in a sink or plastic basin.
3. Use a toothpick to place a tiny amount of dishwashing liquid in the top of the notch near the strider's abdomen. How can you explain what happened?

PAPER CLIPS IN FULL GLASS OF WATER

1. Fill a small drinking glass with water clear to the brim.
2. Carefully add paper clips, one at a time, to the glass of water.
3. Observe the glass from the side. What shape is the water's surface?
4. How many paper clips can you add before the water spills over the edge of the glass?
5. Why do you think you could add paper clips to the glass when it was already filled to the brim?

BERRY BASKET

1. Next time your family has strawberries, save the plastic basket they came in.
2. Float the berry basket, like a boat, in 10–15 cm of water in a sink or plastic basin. Observe the shape of the water in the squares at the bottom of the berry basket.
3. Add one drop of dishwashing liquid to the water in the middle of the berry basket. What do you observe? Why did it happen?

Name _____

Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 2: HOT WATER, COLD WATER

Water is essential for life. You take in water every day. Some of the water you drink when you are thirsty, but a lot of the water you need comes from food.

Water is used in the preparation of a lot of foods. Work with family and friends to find out where water is used in food preparation. For instance, preparing rice takes water. How much? Some kinds of instant cocoa and soups say on the package, "Just add water!"

Look around your kitchen or take a field trip to the market and look for products that use water as part of the preparation. Write the food or product in the "Food" column below, the size or number of servings in the "Servings" column, and the amount of water in the "Water" column. The first two are filled in as starters.

Food	Servings	Water
Instant cocoa	1	1 cup
Rice	4	3 cups

Is the water used in food preparation all eaten, or is some thrown away? Put a check by the foods in the list above if all the water is eaten.

Name _____

Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 3: WATER VAPOR

INVISIBLE WATER

1. Moisten your forearm with a damp washcloth.
2. Either blow gently on the wet spot or fan your arm with a stiff sheet of paper.
   - How does the wet spot on your arm feel? What happens to the water on your arm?
   - How does sweating help to keep your body cool?

NOTE: It takes heat to evaporate water and turn it into water vapor.

INTO THIN AIR

How fast does water evaporate in your home?

Set up an evaporation gizmo and find out.

You will need

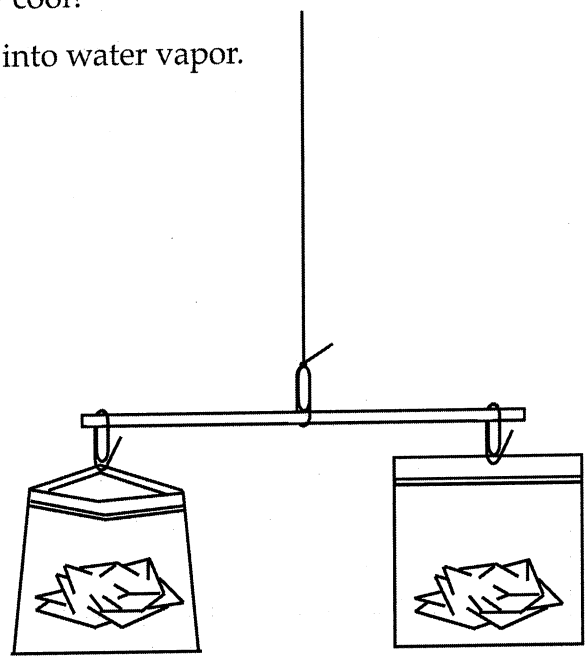
1 Plastic soda straw

3 Paper clips, regular size

1 Piece of string about a meter long

2 Plastic bags, identical (zip-type is nice)

2 Paper towels



1. Slide a paper clip on each end of the straw and open them up a bit to make hooks.
2. A third paper clip is the pivot point. Tie the string here.
3. Moisten the paper towels. Put one in each bag. Seal one bag and leave the other open.
4. Hang the bags on the two hooks. Slide things around until balance is achieved.
5. Hang the whole rig where it can be monitored closely. Observe.

THINK ABOUT HUMIDITY

Where did the water go? The amount of water vapor in the air is called **humidity.** When air contains as much water vapor as it can possibly hold, the humidity is 100%. Warm air can usually hold more water vapor than cool air.

- Watch a weather report or read one in the newspaper. What is the local humidity?
- How could the humidity of the air change the rate of evaporation?