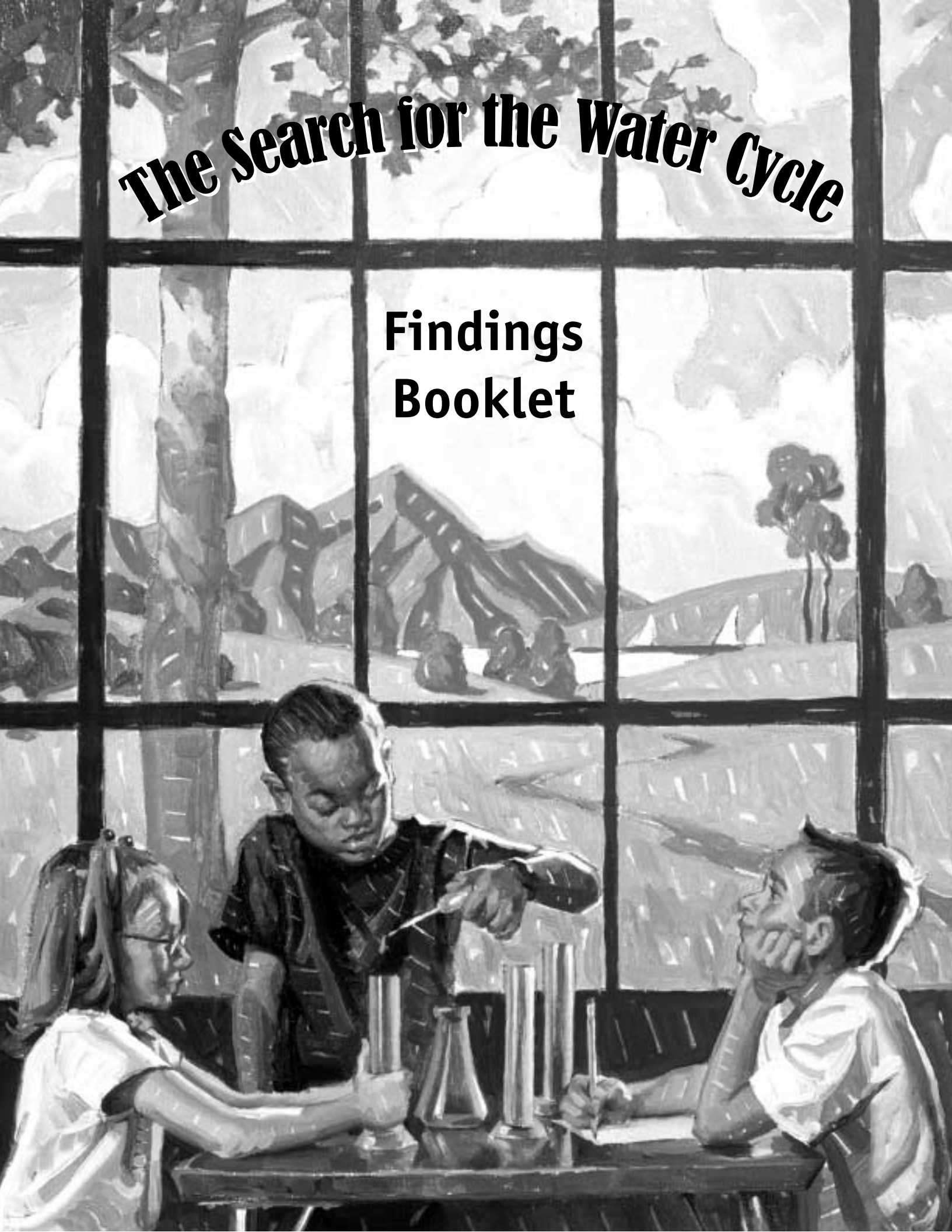
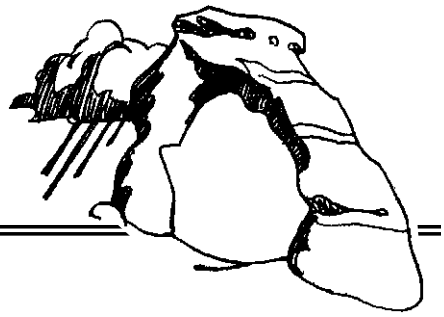
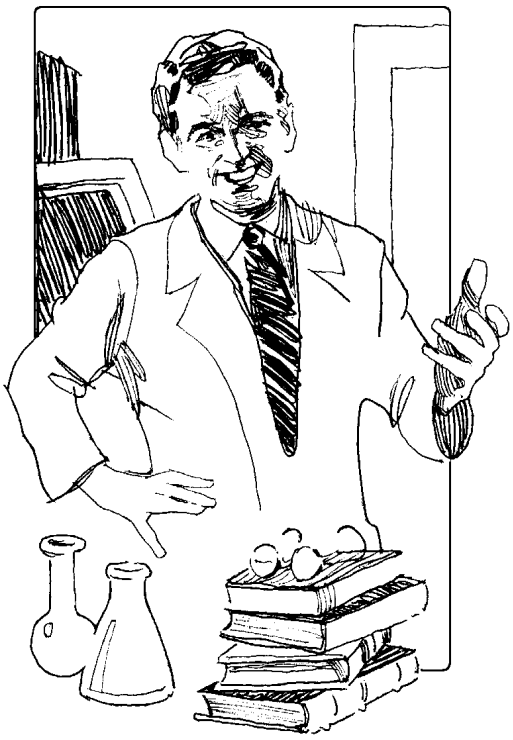

The Search for the Water Cycle
Findings Booklet

Table of Contents





Student Name_____

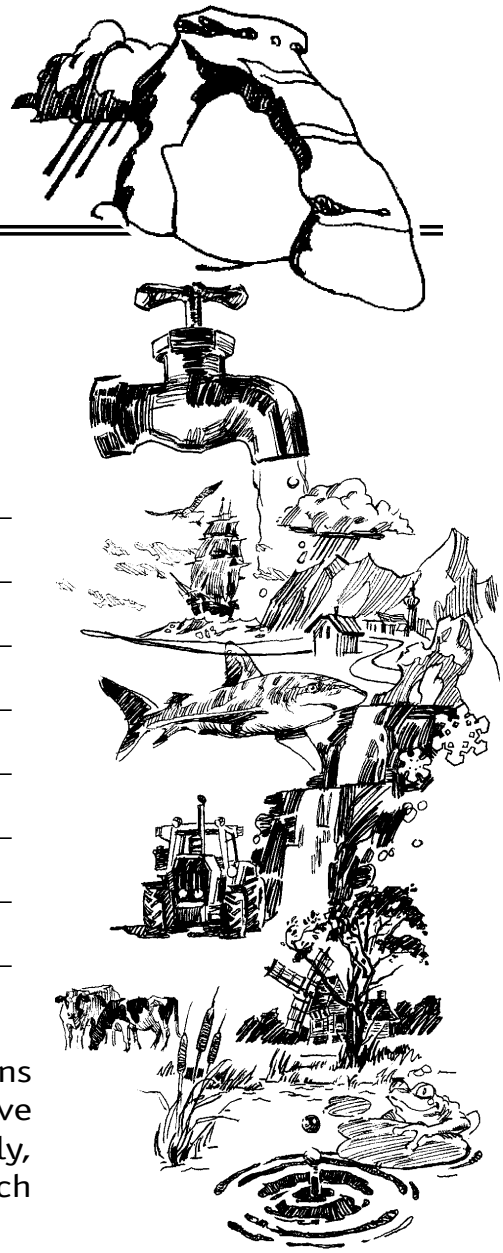
Group _____

Welcome

This *Findings Booklet* will help you organize your learning about the important topic of water. Your teacher will help you understand the water cycle and how it affects you by guiding you through many activities during class and inviting you to complete some activities with your family.

As a scientist, you will investigate the hydrologic cycle commonly known as the water cycle. This booklet will help you to be a good scientist by providing a place to record information and organize your learning. Because it is important to keep records and share information with others, each activity contains a "findings" question. This is where you will record new understanding you gain and questions you might have after completing the experiments or activities. Enjoy your investigations as you *Search for the Water Cycle*.

Where is Water Found?



List the places where you can find water:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Write the 3 main categories of water locations below, then place the items from your list above in the category where they belong. Finally, estimate the percent of water found in each category.

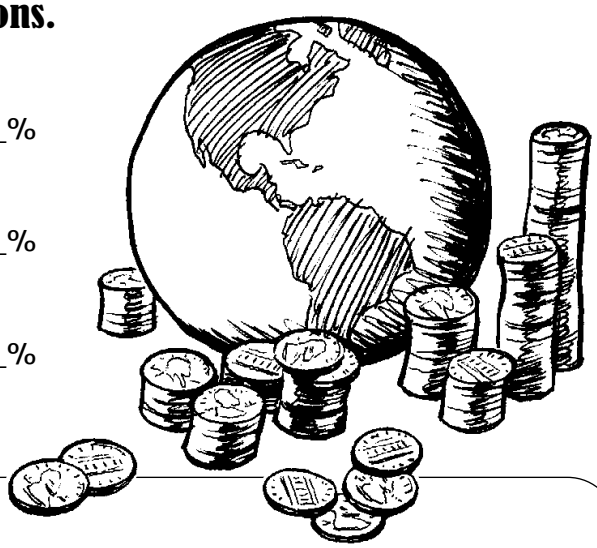
— CATEGORIES —		
_____	_____	_____
_____% estimate	_____% estimate	_____% estimate

Actual percentages of water locations.

_____ _____%

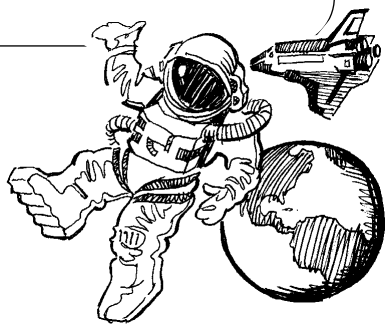
_____ _____%

_____ _____%



Neat facts:

- 70% of Earth's surface is covered by water
- 0.001% of Earth's water is found in the atmosphere



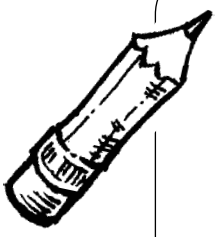
Rename Earth

Assume that you landed anywhere on Earth as a space explorer. Based on what you now know about water, what would you see?

What would you name the planet? Why?

Choose one new thing you learned about water. How will this influence your future water use?

HOME ACTIVITY
Where is All the Water?



Today I learned that:

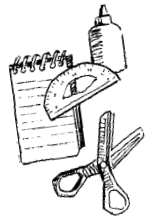
- 97% of Earth's water is found in the ocean
- 2% of Earth's water is found in glaciers
- 1% of Earth's water is freshwater

For Review:

Demonstrate these facts by doing the penny activity from class with your family members. (You will need 100 pennies.)

Fun Focus:

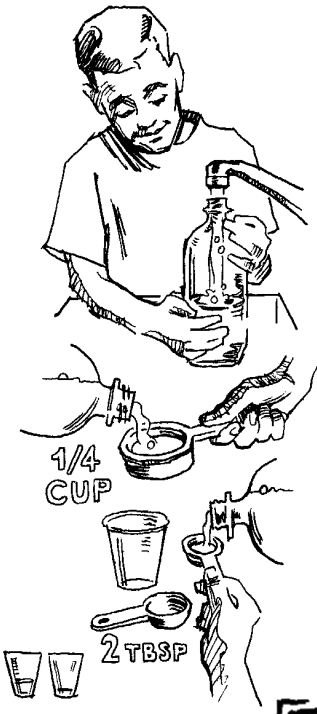
The following home activity will demonstrate the amounts of water we find on Earth.



Materials:

2-liter pop bottle
measuring cup
water
2 clear plastic cups

Procedure:

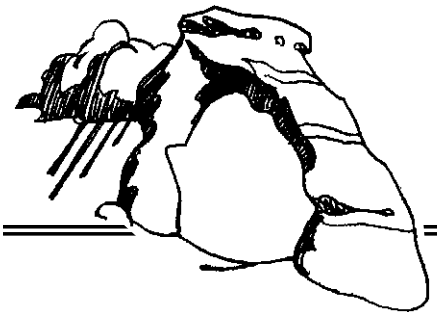


1. Fill a pop bottle with 2000 ml. (2-liters) of water. This represents all the water found on Earth.

2. Pour 40 ml (about 1/4 cup) from the 2-liter bottle into a cup and place it in the freezer. This represents the water on Earth contained in glaciers.

3. Pour 20 ml (about 2 tablespoons) from the 2-liter bottle into a cup to represent the fresh water on Earth.

4. The remaining water in the bottle represents the water in the oceans. Water in the ocean consists of 3.5% salt. To represent saltwater, add 68 ml (about 1/3 cup) to the remaining water in the 2-liter bottle.



Why Does a Puddle Shrink?

KWL Chart:

K	W	L
What do you already ***know*** *about evaporation?*	*What do you* ***want*** *to know about evaporation?*	*What have you* ***learned*** *about evaporation?*

You will be conducting an experiment with 5 small puddles of water. Follow your teacher's instructions to conduct this evaporation activity.

Factors that are the same for all five puddles:

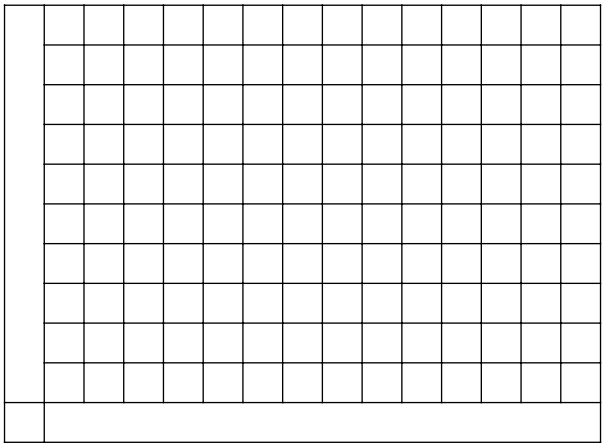
Factor(s) that are different for all five puddles:

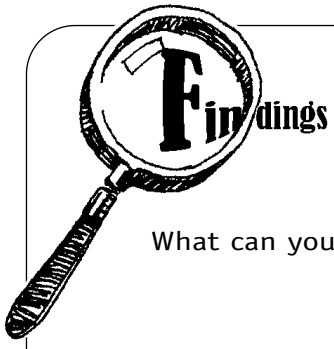
Evaporation Data Chart

Measurements	Puddle A	Puddle B	Puddle C	Puddle D	Puddle E
Starting amount of water (number of drops)					
Starting diameter/ size					
Ending diameter/size					
Ending amount of water (number of drops)					
Amount of water evaporated*					

**HINT: Starting amount of water minus ending amount of water equals amount of water evaporated.*

Convert your data from the evaporation data chart to the graph below.

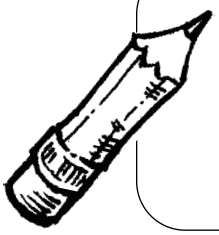




Compare the two charts:

What can you conclude based on the information you collected?

HOME ACTIVITY
Drying Laundry

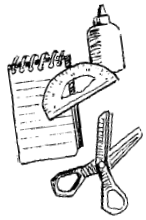


Today I learned that:

Temperature and surface area affect evaporation rates. In class we measured and compared how different-sized water puddles evaporate.

Fun Focus:

This home activity will demonstrate some of the factors that influence evaporation.



Materials:

- 4 Paper towels
- Water
- Teaspoon
- Fan

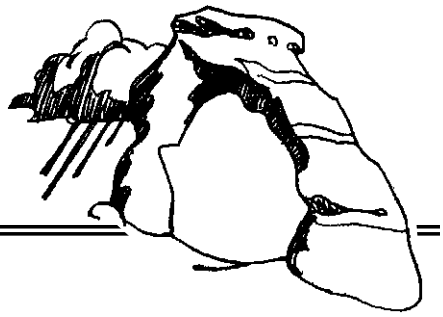
Procedure:

1. Place one teaspoon of water on each of the 4 paper towels.
2. Put one towel in a cold place and one towel in a warm place. Observe both to see which dries first. Record the drying times.
3. Put another towel in a breezy place (fan) and one where there is not a breeze. Record the drying times.

Condition	Cold	Warm	Breezy	No breeze
Location				
Drying time				

4. Discuss what happened with family members.
5. Talk with a grandparent or an older neighbor and ask how they dried clothing when they were young. Write about your discussion.
6. What conclusions can be made from doing this activity?

Condensation Chambers



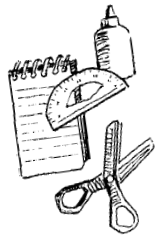
Discussion Question:

Why does water collect on the bathroom mirror when someone takes a hot shower?

Neat Facts:

- **Condensation** of water vapor occurs when a mirror appears to fog up when someone takes a shower.
- **Condensation** also occurs when chilled car windows fog up on the inside.

Create your own condensation chamber by following the steps below.



Materials:

2 clear plastic cups
tape
1 graduated cylinder
water

Assembly Steps:

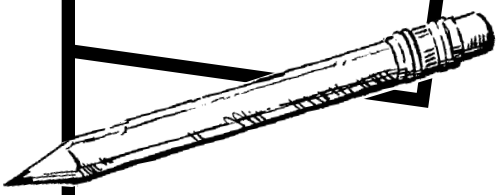
Step 1: Write your name or group number on the cup.
Step 2: Measure 20 ml (2 tbsp.) of water and add it to one cup.
Step 3: Place the second cup upside down over the first cup as illustrated.
Step 4: Use tape to connect the two cups.

Condensation Data Collection

Draw the chamber just after closing with tape:

Draw the chamber after 24 hours:

Draw the chamber after it has been sitting in a sunny location for 1-3 hours:



Explain what you think happened by answering the following questions. Include the following words in your discussion: temperature, evaporation, and condensation.

Is heat a factor in making the condensation chamber work? How?

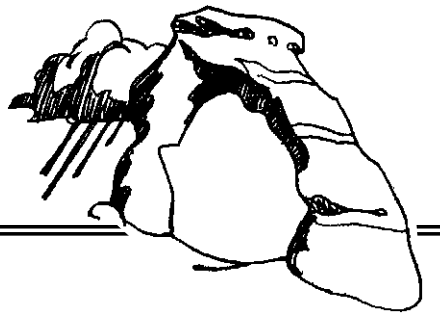
How does the sun affect the chamber?

What do you think happens to the chamber at night?

If the temperature is warmer or colder on one side of the chamber than the other, what happens?

Heat Energy and Water:

What is the Best Way to Melt Ice?

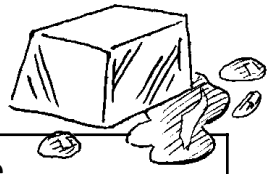


Task:
Melt ice without touching it.

What are your two best ideas for melting the ice?

1

2



Ice Melt Data Chart

Temperature Readings	Temperature	Time
1st: temperature of solid ice		
2nd: ice just beginning to melt		
3rd: melting ice		
4th: ice almost melted		
5th: ice completely melted		

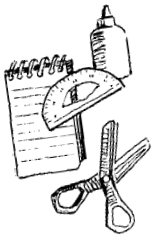
Describe what happened during this experiment.

What did you find interesting as you melted the ice?

The Water Cycle Model:

Making A Cloud

Discussion Question:
What makes a cloud?



Materials:

clear 2-liter pop bottle with lid
flash light (Optional)
warm water
measuring cup

Step 1: Add about 80-100 ml (1/2 cup) of warm water to the pop bottle.
Step 2: Add condensation nuclei:
FOLLOW TEACHERS DIRECTIONS
Step 3: Seal the bottle with the lid.
Step 4: Shine the flashlight through the side of the bottle. (Optional)
Step 5: Describe what you see.

Step 6: Squeeze the bottle for a minute or more. What happens?

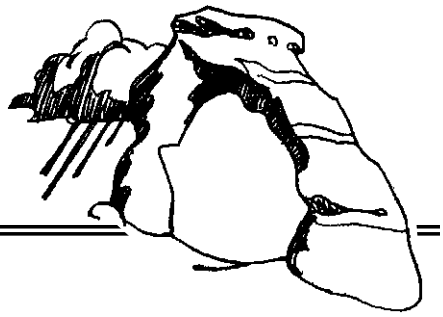
Step 7: Suddenly release the pressure. What do you see?

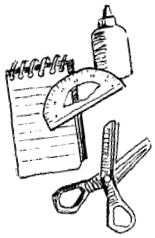
Step 8: Repeat the above steps, but don't add smoke to the bottle. Why do you need dust for clouds to form?

What have you learned about humidity, air pressure, and condensation nuclei?

Temperature plays an important role in the evaporation of water. Describe a situation where water would evaporate rapidly to form clouds?

Water On the Move





Materials:

Two dice per group
Travel Key and Travel Log (pp. 16-17)

Words to Use:

condensation	evaporation
groundwater	precipitation
water cycle	transpiration
vapor	temperature
liquid	

How to Play:

1. Each player rolls the dice to determine his or her starting location using the Travel Key. This location should be written on #1 of your Travel Log.

2. Each player then takes a turn by rolling the dice to determine the new location. Record your new location on the Travel Log and tell a teammate how water can move from the previous location to the new one. You should use at least one of the words from the "Words to Use" box.

3. If you land on the same location, roll again until a new location is determined.

4. The game ends when the Travel Log is completed.

Travel Key:

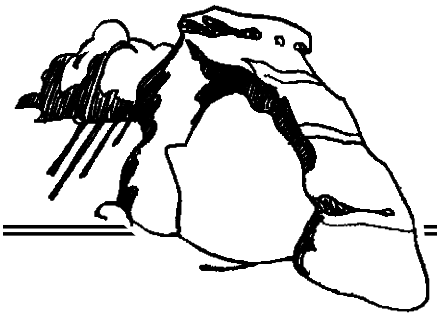
2:	_____	5:	_____	9:	_____
3:	_____	6:	_____	10:	_____
4:	_____	7:	groundwater	11:	air
		8:	cloud	12:	iceberg

Travel Log:

1	Location:
2	Location: Description:
3	Location: Description:
4	Location: Description:
5	Location: Description:
6	Location: Description:

Words to Use:

condensation, evaporation, groundwater, precipitation, water cycle, transpiration, vapor, liquid, temperature



A Water Cycle Chamber

Discussion Question:

When a cup filled with a cold drink is placed in a warm room, what happens to the outside of the cup? Why?

Materials :

- Clear 2-liter pop bottle with lid
- Lamp
- Scissors
- Ice in Ziploc® bag
- Warm water

Step 1: Have an adult help you cut the top off the clear 2-liter pop bottle. Cut just where the side straightens out. (An adult will insert a knife to make a hole, then use scissors to cut the top off the bottle.)

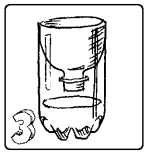
Step 2: Place a cup of very warm water in the bottom part of the bottle.

Step 3: Invert the top of the bottle and place it in the bottom section of the bottle.

Step 4: Fill the inverted top with the bag of ice.

Step 5: Darken the room and observe the chamber using the lamp.

Step 6: Check the bottle over 2 hours time period to observe what is happening inside the bottle.



What does each part of the water cycle chamber represent?

ceiling of the bottle:

ice cubes in the bag:

warm water:

lamp:

Where is water evaporating?

Where and why is water condensing?

Tell what you know about clouds, cold surfaces, and condensation nuclei from this demonstration.

Water Cycle Celebration

Project Proposal

Group member names:

What project would your group like to do for the Water Cycle Celebration?

What steps will your group need to take in order to complete this project?

What materials will you need in order to complete this project, and where will you get them?

What problems might you encounter in doing this project?

Submit for teacher approval.
Teacher Comments:

Student Glossary

clouds when moist, (wet air) rises and becomes cooler it cannot hold as much water vapor as warm air; and the extra water vapor changes into tiny drops of water or crystals of ice to form clouds

condensation the process of water vapor in the air turning into liquid water, as on the outside of a cold glass of water; condensation is the opposite of evaporation

condensation nuclei a tiny particle in the air such as dust or smoke on which water vapor condenses forming water droplets

conservation to conserve and protect resources, e.g. water, from becoming contaminated and less valuable or useful

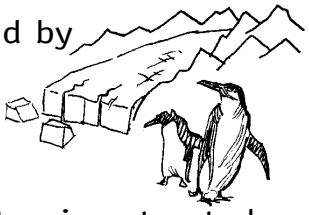
dew condensation of water on cool objects such as grass

energy the ability to do work; most of the energy on Earth comes from the sun, although some forms of energy are stored within the Earth itself, such as heat energy

evaporation change of a liquid, such as water to vapor; how fast water evaporates depends on the amount of water vapor already in the air (humidity), the temperature of water, the surface area exposed to the air, and air movement over the surface

freshwater water that contains less than 1,000 milligrams per liter (mg/L) of dissolved solids; generally, more than 500 mg/L of dissolved solids is undesirable for drinking and many industrial uses

glacier — a huge mass of ice formed on land by compacted snow that moves very slowly downslope or outward due to its own weight



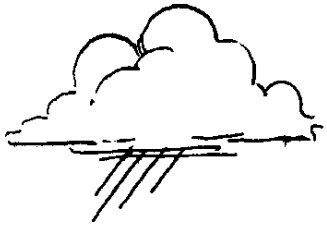
groundwater — water beneath Earth's surface, often in saturated soil and rock that supplies wells and springs

hail — water that falls to Earth in frozen form; each hailstone consists of layers of ice formed as rain is carried high in a cloud, freezes, falls, collects another layer of water and is carried up, and again freezes- this process is repeated until the hail falls to the ground

heat energy — a form of energy that is passed from one object to another because of a difference in temperature

humidity — dampness or moisture in the air or atmosphere

ocean — the body of salt water that covers 70% of the Earth's surface



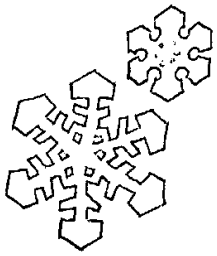
precipitation — water that falls to Earth as rain, snow, hail, or sleet

rain — water that falls to Earth in liquid water form; each raindrop is formed around a core of a dust particle

runoff — precipitation that flows into streams, rivers, and lakes

sleet — water that falls to Earth as frozen rain

snow — water that falls to Earth as frozen flakes; snowflakes are frozen water vapor formed into six-sided crystals



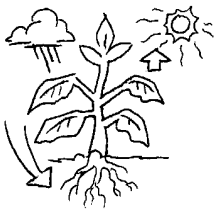
solar energy — energy produced from the sun

sublimation — water that goes from a solid such as snow or ice to water vapor

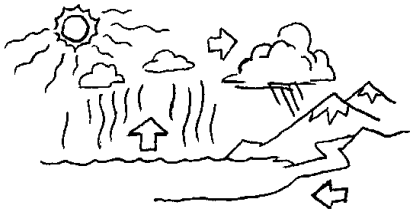
surface area amount of water touching the air

temperature the degree of hotness or coldness of a body or environment

transpiration process by which water is transferred into the atmosphere from the plant surface such as leaf pores



water cycle when water changes back and forth between solid, liquid and vapor as it travels in, on, and around Earth through various stages or processes such as precipitation and evaporation; also called the hydrologic cycle



water vapor water in a gaseous form

— Notes —

The Search for the Water Cycle

Central Utah
Water Conservancy District
355 West University Parkway
Orem, UT 84058
801-226-7100

Utah State Office of Education
250 East 500 South
P.O. Box 144200
Salt Lake City, UT
84114-4200

The Living Planet Aquarium
Utah Water's Van
522 South 400 West
Suite 200
Salt Lake City, UT 84101
801-320-9951

Utah State University
International Office for Water and
Science Education
6516 Old Main Hill
Logan, UT 84322-6516
800-922-4693