



Activity Workbook



TEACHER'S

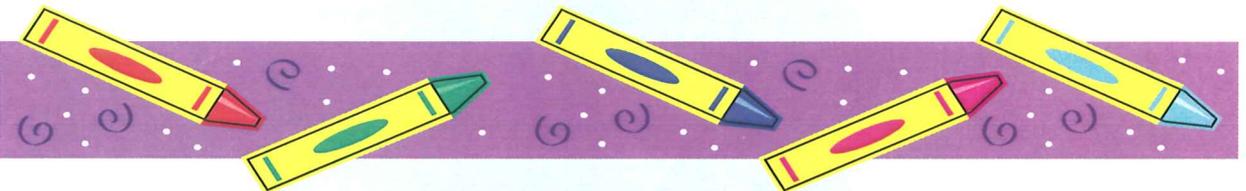


FAIR OAKS
WATER DISTRICT

CLASS BOOK

Special Information Inside

- Activities designed for 4th, 5th, and 6th grade students
- Fun projects that teach water awareness
- Pages that are easy to release from this workbook for copying



Water Awareness Information on the web
www.watershare.usbr.gov, H2ouse.org

Distributed by: Fair Oaks Water District

WATER MATH

SHOW YOUR WORK.

1. If each person flushes the toilet about 3 times a day and each time 5 gallons of water are used, how many gallons of water would be used by one person in a day?

_____ gallons.

How many gallons of water would be used by one person in a week? _____ gallons.

How many gallons would be used by 1,000 persons in a week?

_____ GALLONS.



2. If a person takes 5 tub baths and 1 shower a week, and each tub bath takes 25 gallons of water and the shower takes 36 gallons, about how many gallons of water are used by that person in a week? _____ gallons.

Using these figures for a person's weekly use, how many gallons would be used for showers and baths for 1,000 people for one week?

_____ GALLONS.

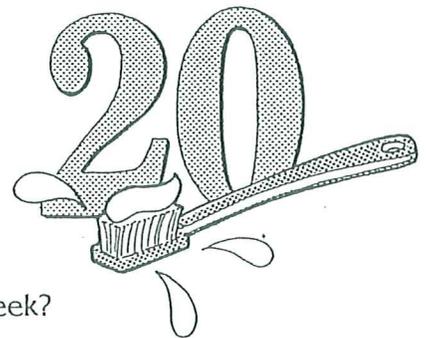


3. If each person leaves the water on while they brush their teeth, and they brush them twice a day, that's about 20 gallons of water used per day per person. How many gallons is that for one person for a week?

_____ gallons.

How many gallons would be used by 1,000 persons for a week?

_____ GALLONS. (round off to nearest whole number)



WATER MATH (cont'd)



4. If an average family uses 315 gallons of water a week to wash dishes, 312 gallons to wash clothes, and 346 gallons to wash hands and shave, how much does that all add up to in a week? _____ gallons.

If there are about 2.6 people in a family, about how many families are there in 1,000 people? _____ families.

Find the water use for 1,000 people by multiplying weekly water use for one family by the number of families in 1,000. How much water would be used by 1,000 people in one week? _____ GALLONS. (round off to nearest whole number)

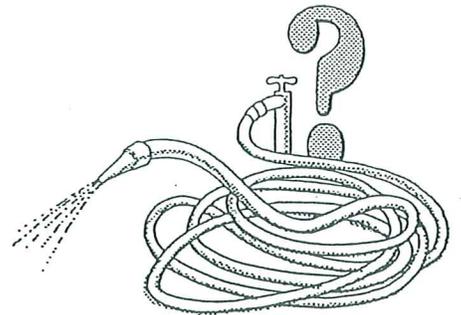
5. If a family waters 4 times a week during the summer for 39 minutes each time, how many minutes will they water all together during the week?

_____ minutes.

If outdoor watering uses about 10 gallons of water per minute, how many gallons will be used per week?

_____ gallons.

Multiply a family's weekly outdoor water use by the number of average families in 1,000 people. How many gallons will 1,000 people use for outdoor watering in a week? _____ GALLONS.



6. Add up the total number of gallons that 1,000 people use in flushing the toilet, bathing, brushing teeth, washing dishes/clothes/hands/shaving, and in outdoor watering for one week. (Just add up your answers to 1,2,3,4, and 5.)

_____ GALLONS.

7. Before you did this lesson, did you realize how much water people use?

Yes

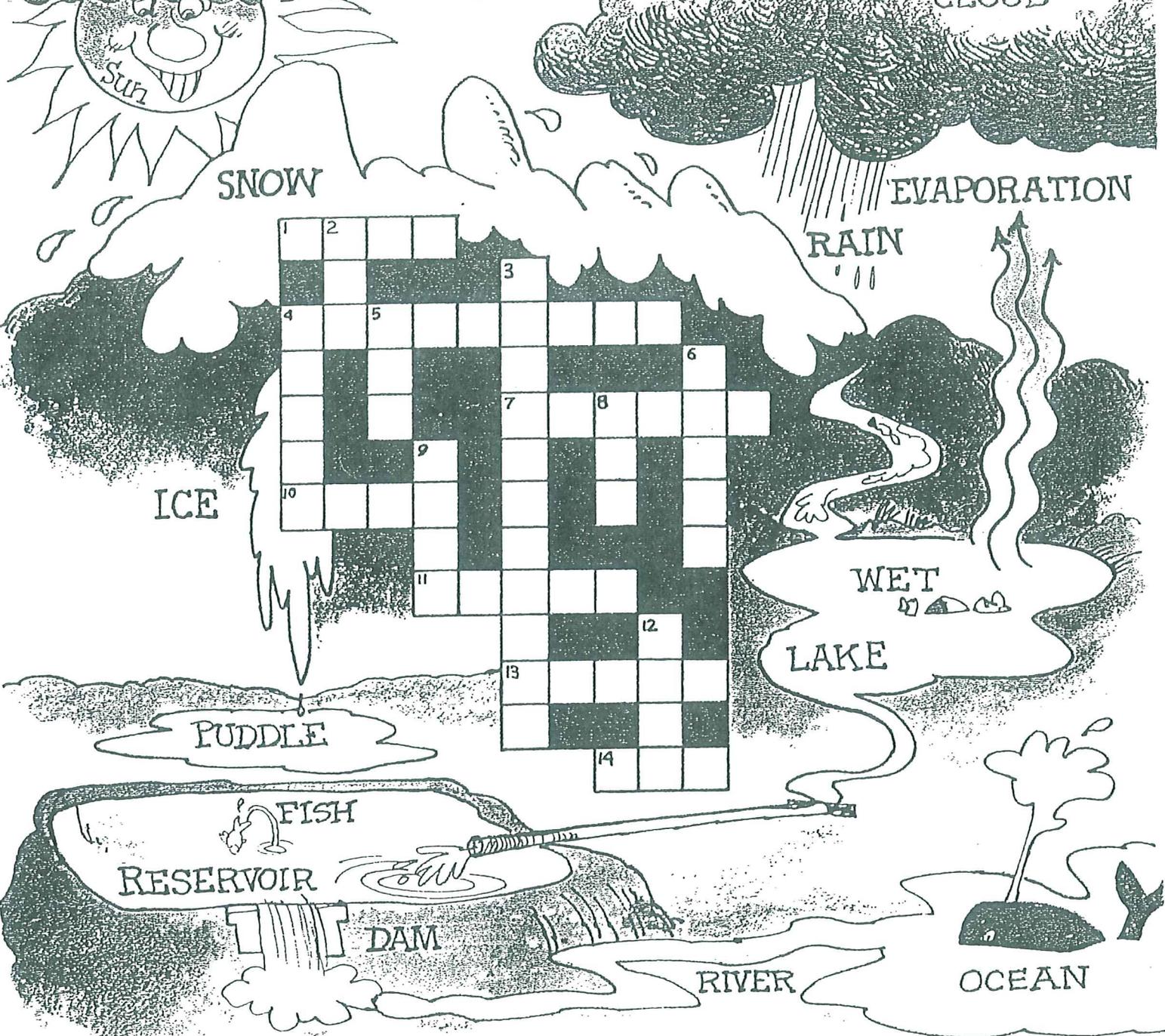
Not Really

ANSWER SHEET

WATER MATH

1. 15
105
105,000
2. 161
161,000
3. 140
140,000
4. 973
384.6
374,216
5. 156
1560
599,976
6. 1,380,192
7. Answers will vary.

Water Crossword



ACROSS

1. Fun to catch and good to eat.
4. Body of water behind a dam.
7. Found on ground after rain.
10. Water which falls from the sky.
11. H₂O
13. Large body of salt water.
14. Soaked or covered with water.

DOWN

2. Frozen Water
3. Water rising into the air.
4. Flows from mountain to the sea.
5. Melts icicles.
6. Holds water in the sky.
8. Barrier across a river.
9. Falls in mountains.
12. Body of fresh water.

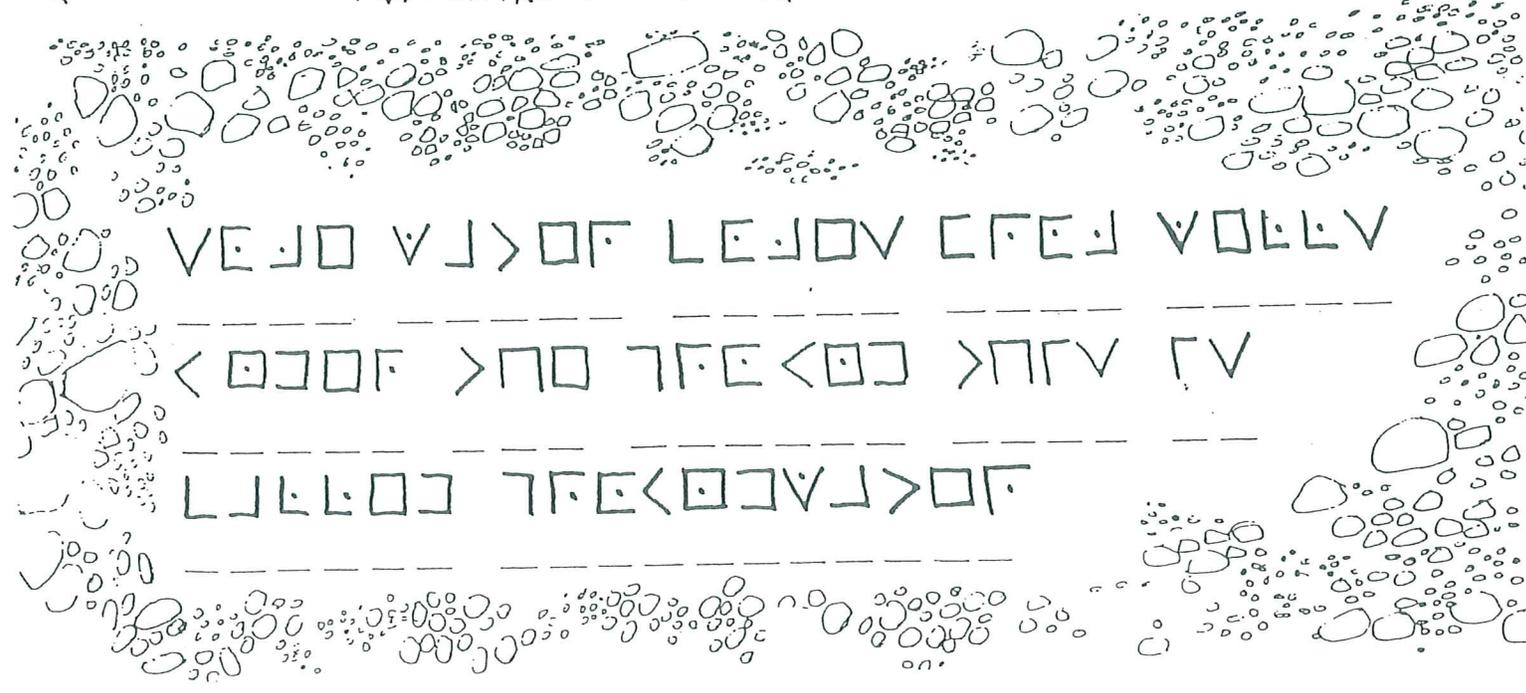
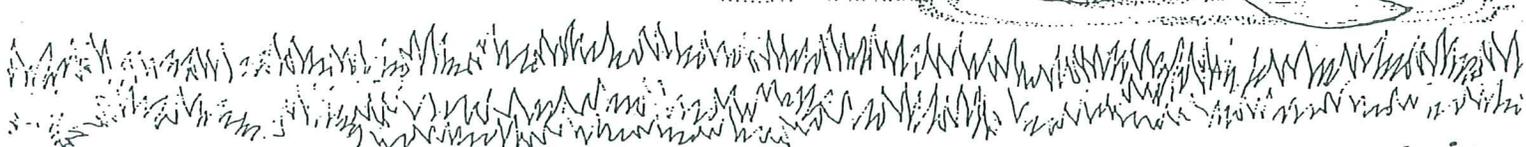
People use lots of water. Use the code to find where the water we use comes from.



v o < v o v j > o f c f e j l j o v j o s

f f a o f v > n r v r l j l l o s v < f c j l o

v j > o f



v e j o v j > o f l e j o v c f e j v o l l v

< o s o s > n r f e c s > n r r

l j l l o s r f e c s v j > o f

Water secrets

Can you decode these messages?



+D 2 SWIM



CLEAN

wash

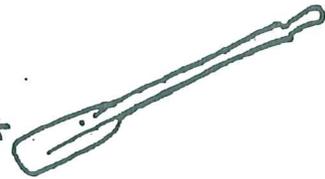


2

"C"

THAT

Y+



DOES

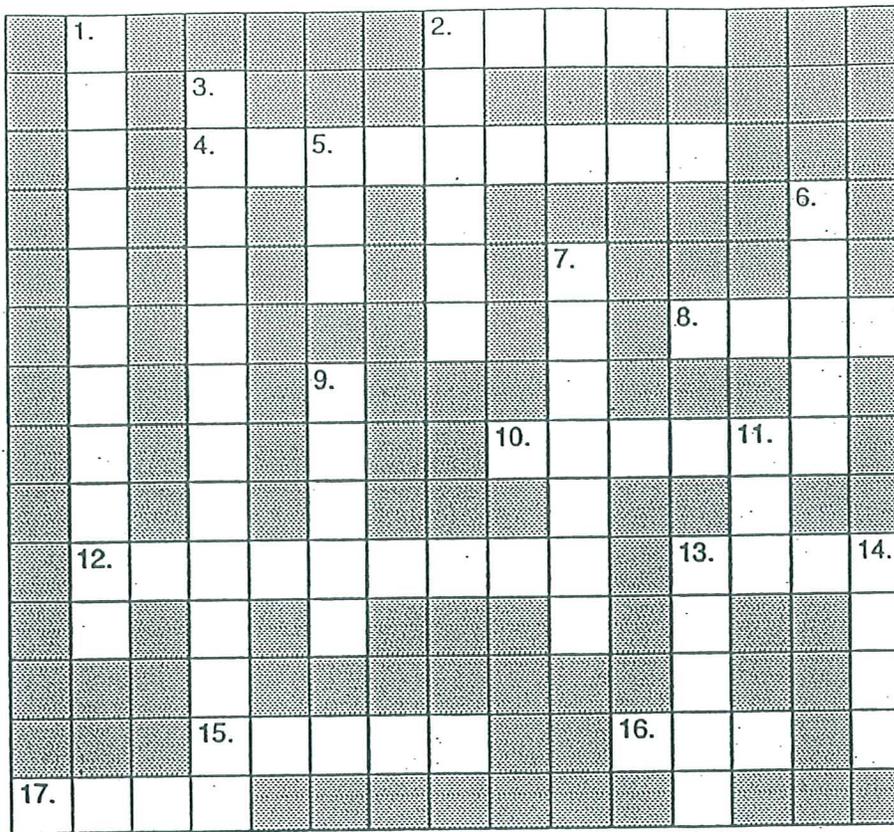


DRIP.

Many words can be written to show their meaning. Look at the examples and then try some of your own using water words.

drip  cup

Water Cycle Crossword Puzzle



Words

sun
 ice
 well
 sea
 lake
 snow
 rain
 water
 flood
 cloud
 solid
 ocean
 liquid
 spring
 aquifer
 evaporate
 reservoir
 groundwater
 precipitation

DOWN:

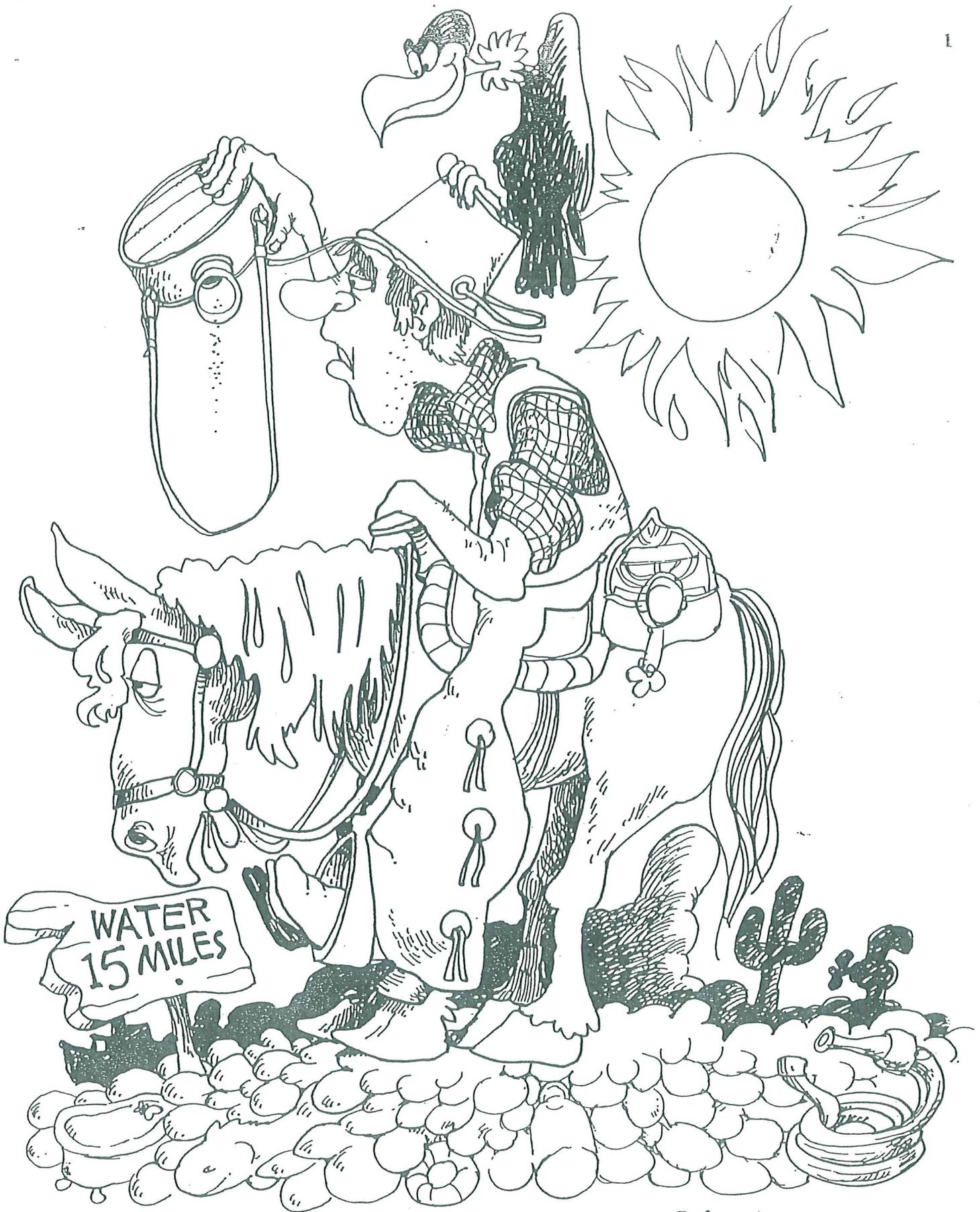
1. Water found below the earth's surface
2. Ground water flowing to the surface
3. Rain, snow, sleet and hail
5. Energy source for the water cycle
6. Condensed water vapor, produces precipitation
7. A water-carrying layer of the earth
9. Rising and overflowing of a body of water onto a normally dry land
11. Solid water, a cold substance
13. Most abundant and important substance on earth
14. A natural standing body of water; fed by a river or stream

ACROSS:

2. Physical state of ice
4. A man-made body of water, used for recreation, power generation, flood control, water supply
8. Frozen precipitation
10. Water is in this physical state between 0 °C and 100 °C
12. When water changes from a liquid to a gas, it is said to _____.
13. Source of water, produced by digging
15. Largest body of water, very salty
16. Natural body of water, smaller than an ocean, larger than a lake
17. Liquid precipitation

EXTRA! EXTRA!

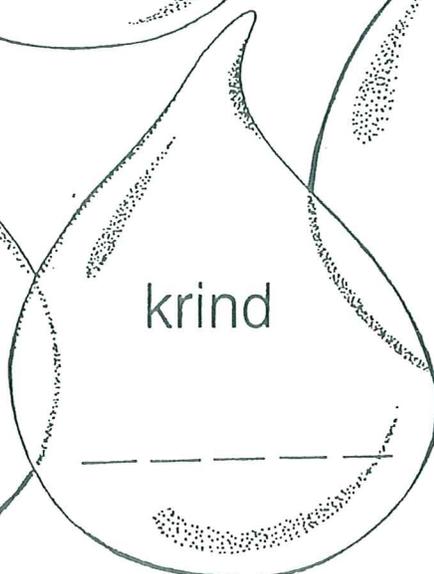
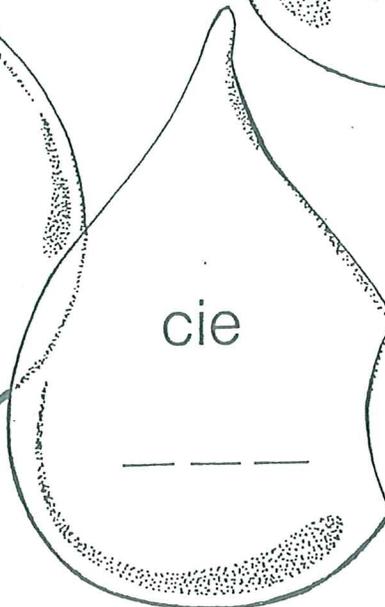
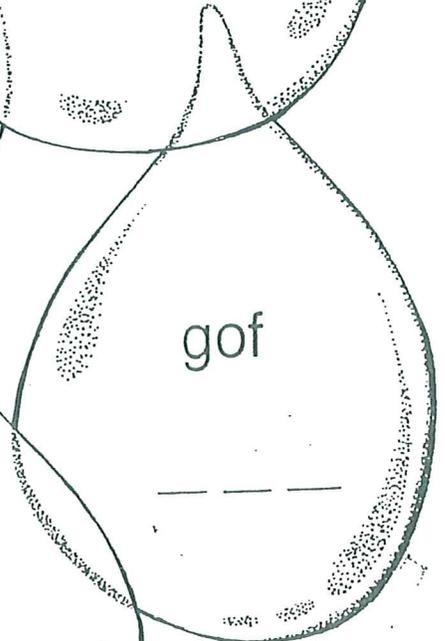
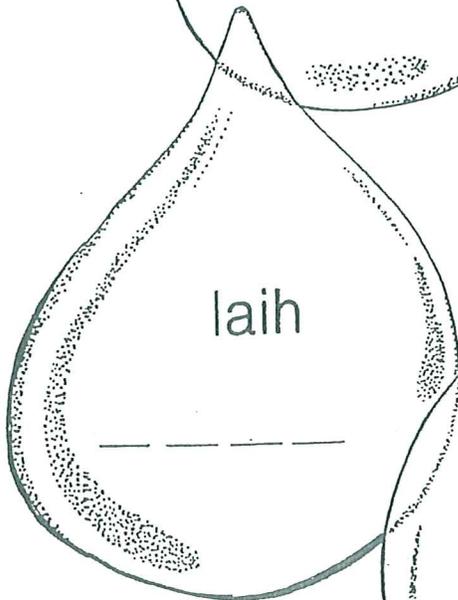
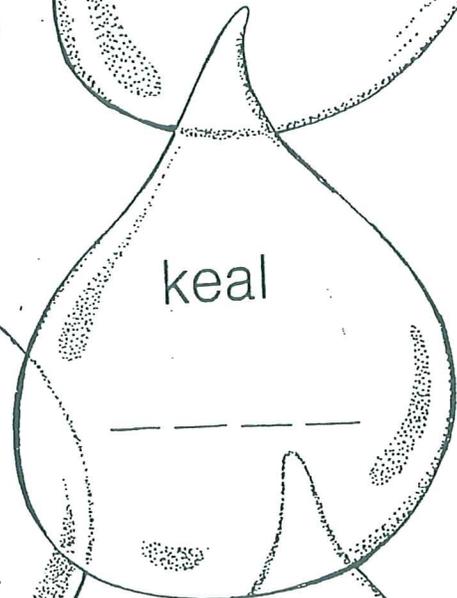
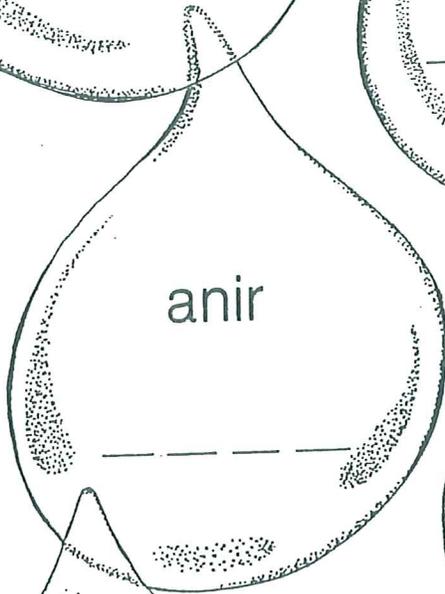
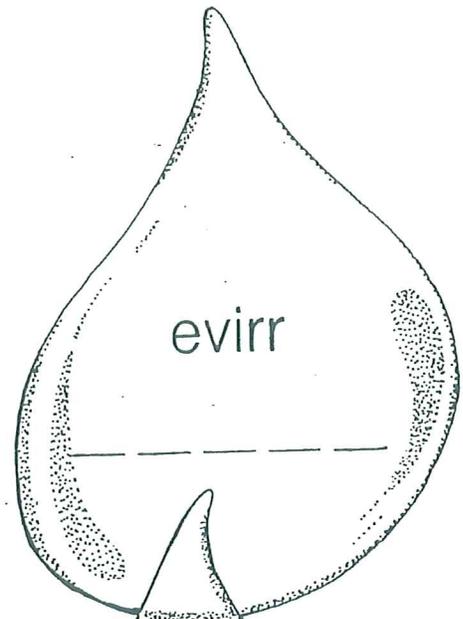
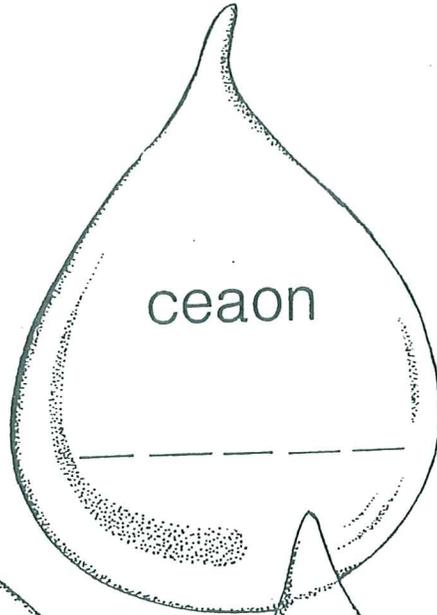
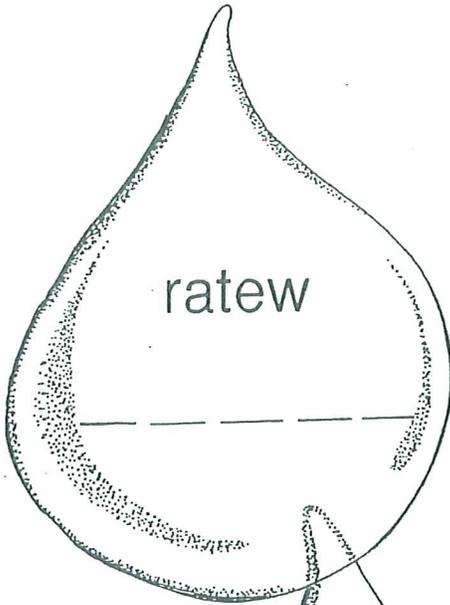
After working the crossword puzzle, alphabetize all of the words.
Write one complete sentence using each word in the cross word puzzle.



There are eleven hidden water objects, can you find them?

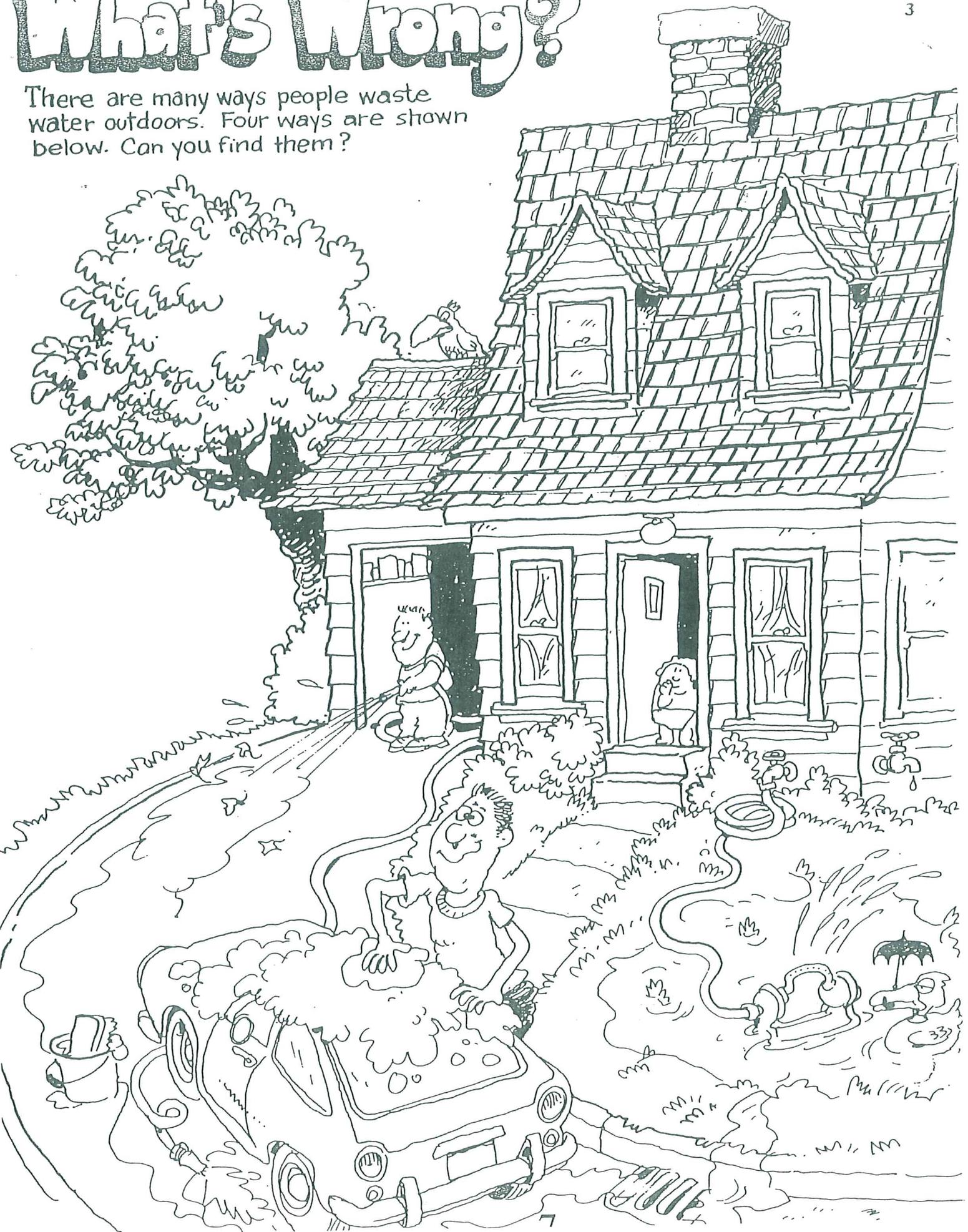
Water Words

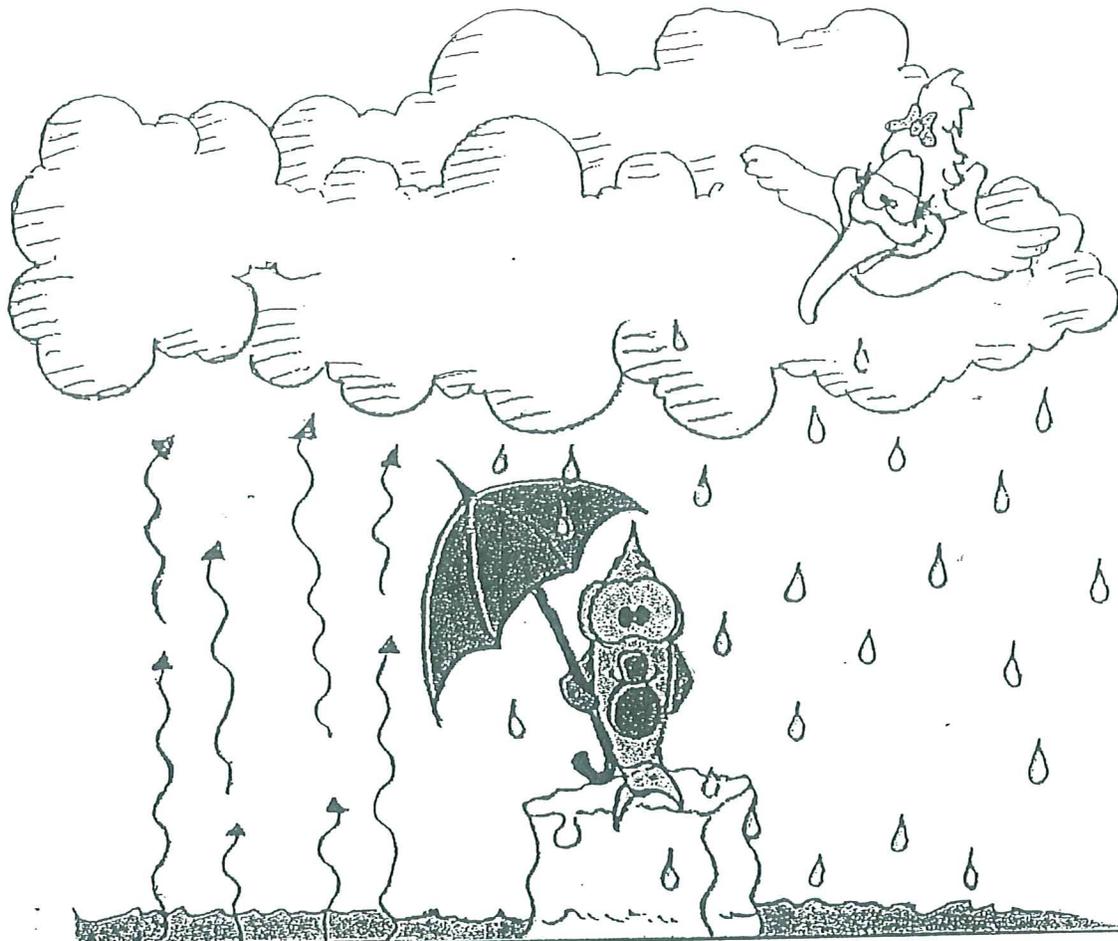
Put the letters in the right order to spell some water words.



What's Wrong?

There are many ways people waste water outdoors. Four ways are shown below. Can you find them?





Here is the secret code.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

Can you find the secret message?

$\overline{4}$ $\overline{18}$ $\overline{15}$ $\overline{16}$ $\overline{19}$ $\overline{13}$ $\overline{1}$ $\overline{11}$ $\overline{5}$

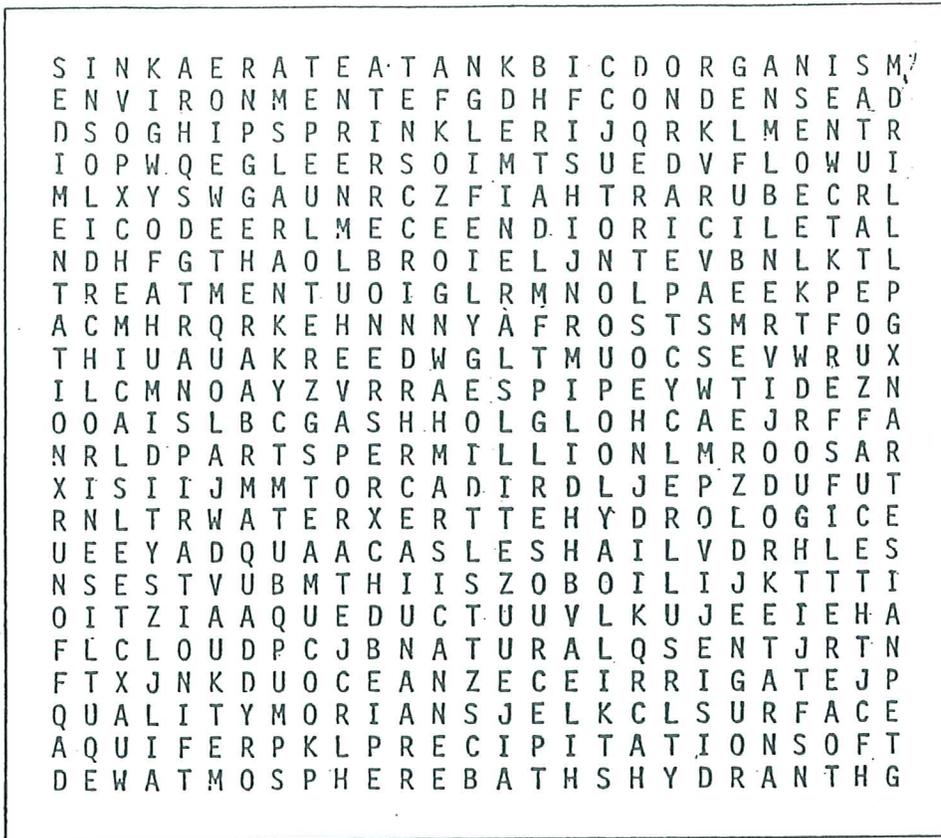
$\overline{3}$ $\overline{12}$ $\overline{15}$ $\overline{21}$ $\overline{4}$ $\overline{19}$

DATE _____

NAME _____

Water Words

5



aerate
aqua
aqueduct
aquifer
artesian
atmosphere
bath
boil
built
chemicals
chlorine
cloud
cook
cold
condense
creek
cycle
dam
dew
distill

drill
drink
drop
drought
energy
environment
evaporate
faucet
filter
fish
flow
fog
frost
fun
gallon
gas
ground
hail
hard
hose

hot
humidity
hydrant
hydrologic
ice
irrigate
lake
life
liquid
liter
main
melt
meter
minerals
molecule
natural
ocean
odor
organism
parts per million

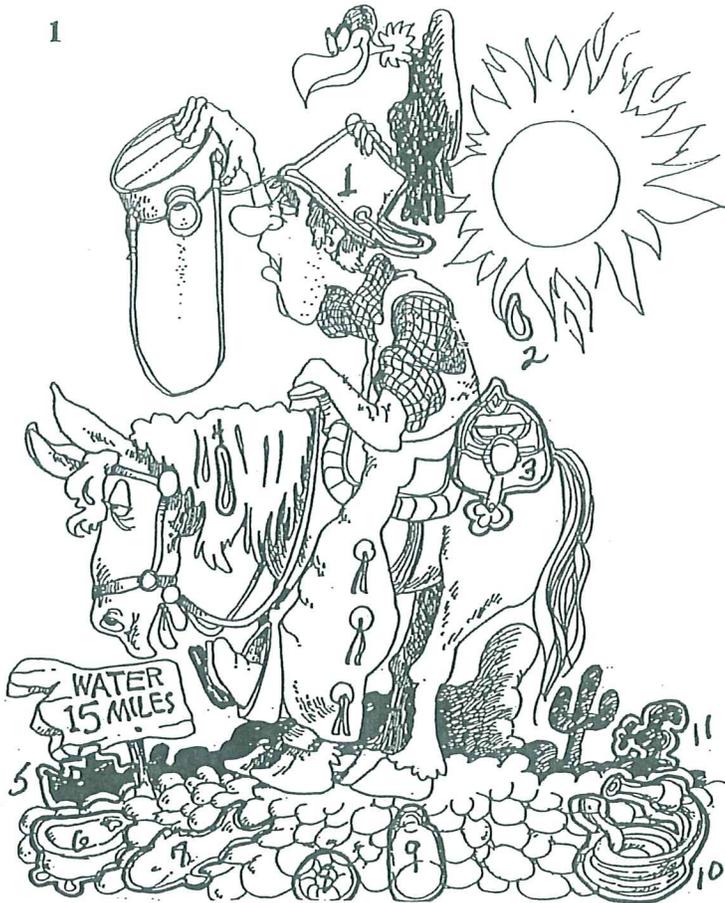
percolation
pipe
plumbing
pool
potable
precipitation
pressure
pump
quality
rain
rate
reservoir
resource
river
runoff
saline
saturate
sedimentation
silt
sink

sleet
snow
soak
soft
solid
sprinkler
steam
stream
surface
swamp
tank
tide
transpiration
treatment
tub
vapor
water
well
weather
wet

In the puzzle, find and circle all the water words listed. There are no words written backwards.

Puzzle Answers

1



Pail, water drop, boat, water drop, boat, bathtub
Fish, lifesaver, bottle, hose, and faucet

2

Water Words

water ocean river
rain snow lake
hail ice drink fog

3

What's Wrong?

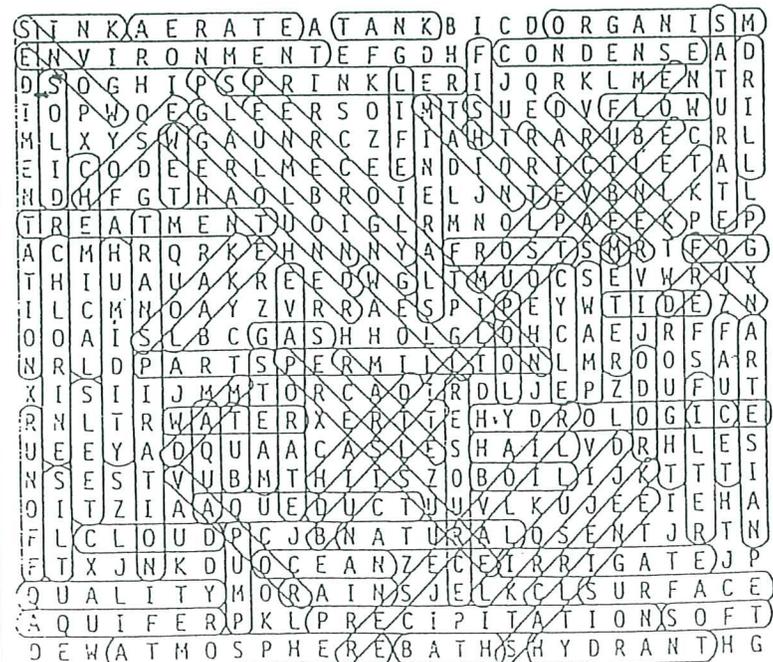
1. Driveway should be swept, not hosed off.
2. Always use an automatic shut-off nozzle on hoses.
3. Set a timer when watering lawns to prevent water run-off.
4. Fix leaking faucets to prevent water waste.

4

Secret Message

Drops make clouds

5



WATER WASTER

A leaky faucet causing a slow drip wastes the following amounts of water:

- $1/32$ " leak wastes 25 gallons in 24 hours, or 95 liters.
- $1/16$ " leak wastes 100 gallons in 24 hours, or 380 liters.
- $1/8$ " leak wastes 400 gallons in 24 hours, or 1,520 liters.



That very small leak of $1/32$ " will not only waste 25 gallons a day, but 9,000 gallons a year!!! Plus you also waste the energy it took to treat and deliver that water to your home.



EXPERIMENT #1

Place a bucket under the faucet in your classroom sink. Have someone wash their hands for a normal length of time, leaving the water running while they are washing and rinsing. Then turn off the water and measure how much water is in the bucket in gallons or liters. (Don't forget to save the wasted water. It can be used to water the school lawn.)

Now do the same experiment, but turn off the water while soaping up, and only turn it back on to rinse off. How many gallons or liters were used this way? _____

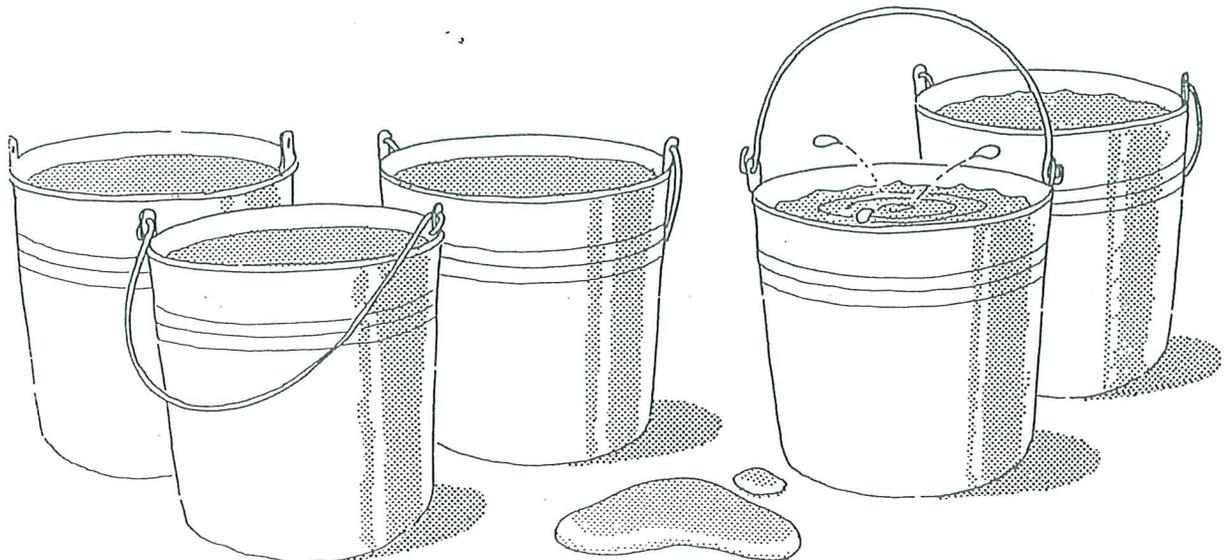
What is the saving? _____



EXPERIMENT #2

Do the same experiment with someone brushing their teeth. Leave the water on while you are brushing and rinsing.

How much water is used? _____



WATER WASTER (cont'd)

Repeat the toothbrush experiment, but this time, turn off the water when you aren't really using it.

How much water did you use this time? _____

What is the saving? _____

EXPERIMENT #3

Pretend your classroom faucet has a leak. (If it does, use it.) Put a bucket under the faucet while it drips very, very slightly.

Measure how much water is wasted in 1 hour. _____

In 2 hours. _____

In 3 hours. _____

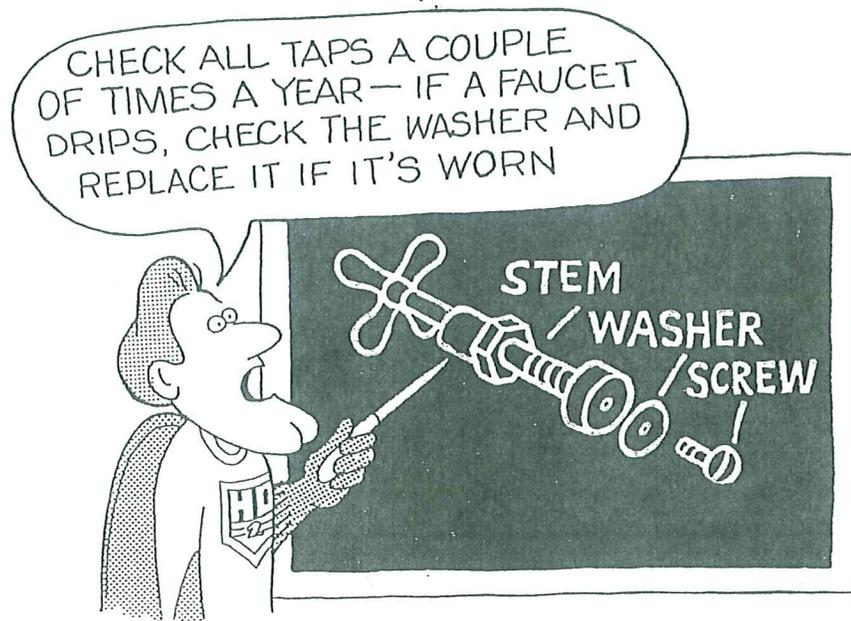
From this information, figure out how much water would be wasted by this same size drip in 1 day. _____

In 5 days. _____

In 2 weeks. _____

BONUS EXPERIENCE

You will need some tools and your teacher's or parent's help on this one. Learn how to replace a washer on a faucet so that you can fix a simple leak.



Water Has Three Forms

OBJECTIVE: To introduce the concept of the three forms of water-- liquid, solid and gas.

CURRICULAR AREA: Science.

TEACHER NOTES: Water is all around us. It is in the air, in and on the ground, in everything we eat or drink, in animals, in man, in plants, just everywhere! Eighty percent of the earth's surface is water in some form. The three forms of water are:

- LIQUID--Saltwater oceans (97 percent of all the water on earth).
Freshwater--lakes, streams, rivers, ponds, wells, groundwater (1 percent of all the water on earth).
- SOLID--Glaciers, icebergs, ice snow (2 percent of all water on earth).
- GAS--Vapor in the air, clouds

WATER AS PRECIPITATION EXISTS IN THE SAME THREE FORMS:

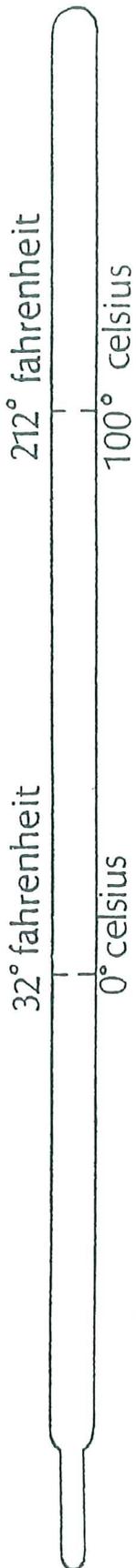
- LIQUID--rain, sleet, drizzle
- SOLID--snow
- GAS--fog

Liquid (water) becomes solid (ice) when the temperature of the water is below 32° Fahrenheit (0° Celsius). Frozen water becomes strong enough to walk or skate on because the molecules of water are now holding very tightly to one another. Water expands when it freezes. It can break bottles and pipes and cause cracks in rocks and sidewalks. As ice melts, molecular bonds loosen and it becomes a fluid. When water is heated to boiling or beyond, the molecular bonds break and the water becomes a gas (steam). Water boils at 212° Fahrenheit (100° Celsius). Steam exerts a powerful force when constricted and can be used to drive machinery.

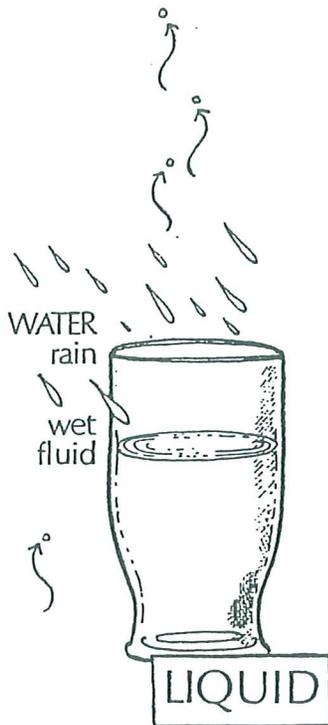
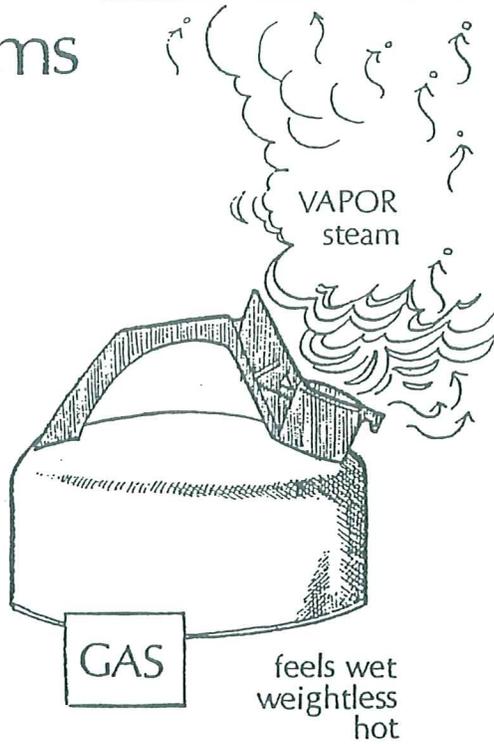
DIRECTIONS: Duplicate copies of Student Page
As a group, orally or individually, complete the questions.

Answers 1. Water is made up of two hydrogen atoms and one oxygen atom. Scientists write it H₂O. 2. The three forms of water are: solid, liquid and gas. 3. Solid water is called ice. 4. The liquid form is called water. 5. Water as a gas is called vapor. 6. Ice is hard, cold, and strong. 7. Liquid water is wet and fluid. 8. Water is always present in air as water vapor. 9. Rain is liquid precipitation. 10. Snow is solid precipitation.

Water Has Three Forms



WATER VAPOR is present in the air at all temperatures



WATER = 2 hydrogen atoms plus 1 oxygen atom
 scientists write it $\text{H} \quad \text{H} \quad \text{O}$ or H_2O



1. Water is made up of _____ hydrogen atoms and _____ oxygen atom.
 Scientists write it _____.

2. The three forms of water are _____, _____, and gas.
3. Solid water is called _____.
4. The liquid form is called _____.
5. Water as a _____ is called vapor.
6. Ice is hard, _____ and _____.
7. Liquid water is _____ and _____.
8. Water is always present in the air as water _____.
9. Rain is _____ precipitation.
10. Snow is _____ precipitation.

Water Trivia

1. How much water does it take to process a single quarter pound of hamburger?
2. How much water does it take to make four new tires?
3. The total amount of water used to manufacture a new car, including tires is ?
4. How many households in the US use private wells for their water supply?
5. How much water does California obtain from the Colorado River yearly?
6. How much water does the federal Central Valley Project deliver?
7. How long can a person live without water; without food?
8. How much water must a person consume per day to maintain health?
9. How much water on average does a birch tree give off per day in evaporation?
10. How much water does an acre of corn loose through evaporation on average?
11. State experts estimate we could be short by how much water in the year 2010?
12. What is the total capacity of California's reservoirs?
13. What range of water may be used when flushing a toilet just one time?
14. In an average five-minute shower, how much water goes down the drain?
15. In brushing one's teeth, what amount of water is used from start to finish?
16. An automatic dishwasher uses how much water per each cycle on average.?
17. On the average, what amount of water is used to hand wash dishes?
18. The Delta flows into the Pacific Ocean at how many gallons per year.?
19. How much water does it take to produce one serving of French fries?
20. How much water is delivered by the California State Water Project?

All Living Things Need Water

OBJECTIVE: To show that all living things need water to survive, but people use water in many other ways as well.

CURRICULAR AREA: Science.

TEACHER NOTES: No living thing can survive without water. Humans can exist for long periods of time without food, but just a few days without water can be fatal. Every system in our body needs water. Water makes up about 83 percent of our blood. Water transports food and body wastes. It helps our bodies digest food. It lubricates our joints and keeps our bodies cool. On an ordinary day, the human body gives off about two and one-half quarts (two litres) of water through breathing, perspiration and excretion. This is replaced through the food we eat and the liquids we drink.

Plants and animals adapt to their environment. Koala bears take all of their liquid needs from the leaves of the plants they eat. (Koala means "no water.") Kangaroo rats metabolize about two ounces of water every five weeks from the dry seeds they eat. Desert plants have root systems that utilize their meager water supply very efficiently. Saltwater creatures are capable of using water that humans cannot, because they have special filtration systems in their bodies that eliminate the salt. Humans use water to survive. It is second to air in importance to us. But we also use water for fun, industry and energy.

DIRECTIONS: Duplicate Student Page

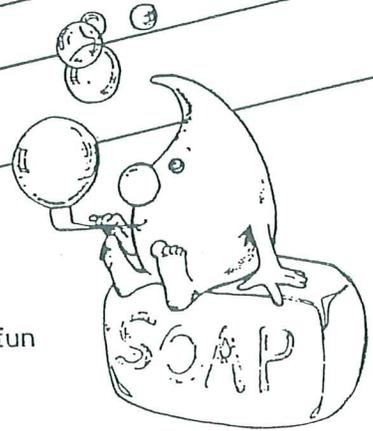
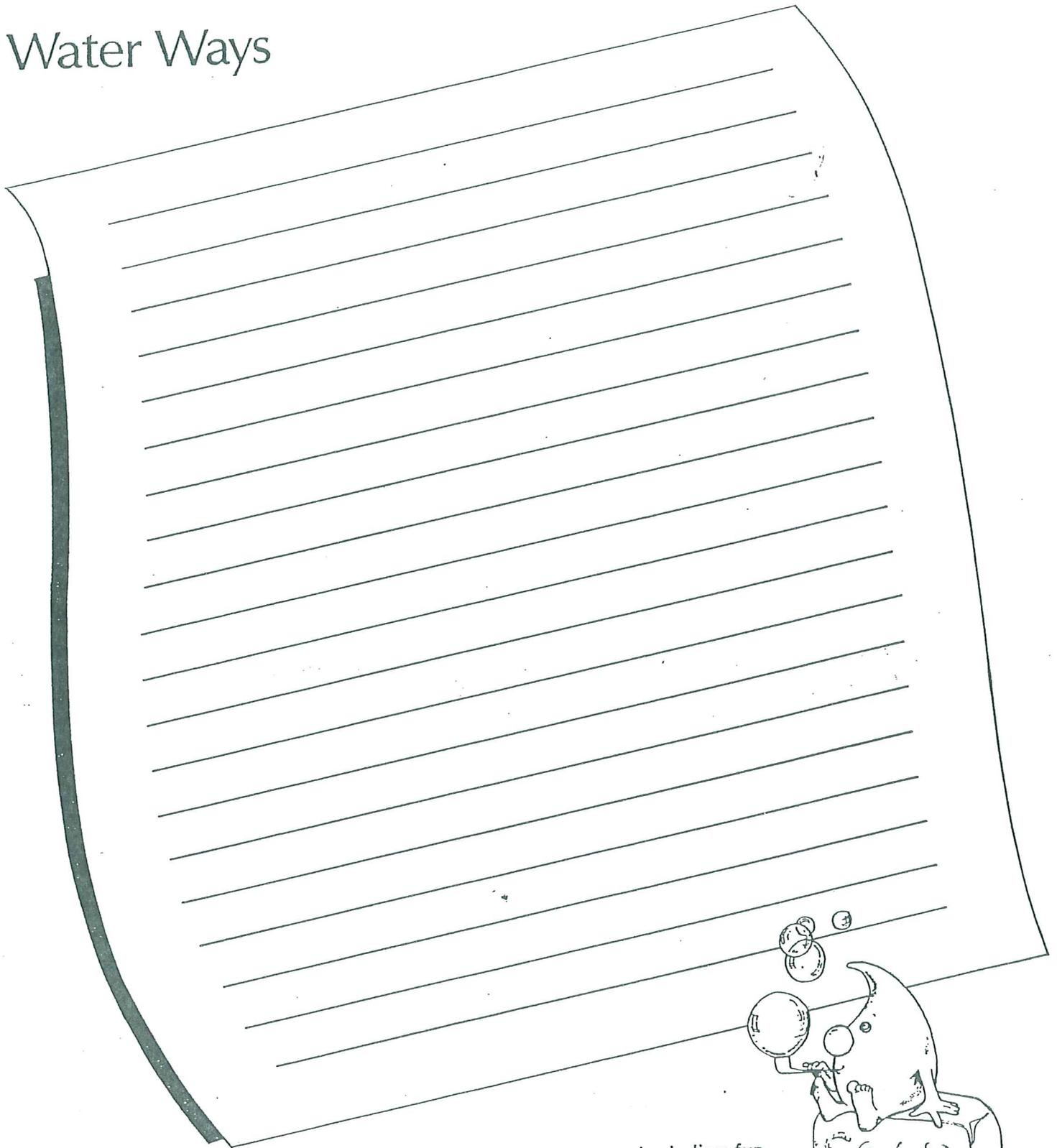
Students are to list all of the ways they can think of that people use water, including recreational activities. Then they are to rank the ten most important uses and explain why the use they chose as number one is truly the most important.

Answers: There will be a variety of answers, but the most important use of water for all living beings is to keep us alive. That is, drinking water. Discuss this page, pointing out that we use water in so many different ways and still take it for granted. But water is a very important resource and we must learn to appreciate its value.

DATE _____

NAME _____

Water Ways



1. List all of the ways you can think of that people use water, including fun activities.
2. Choose the 10 most important uses.
3. Which use is the most important? Why?

The Day the Water Stopped

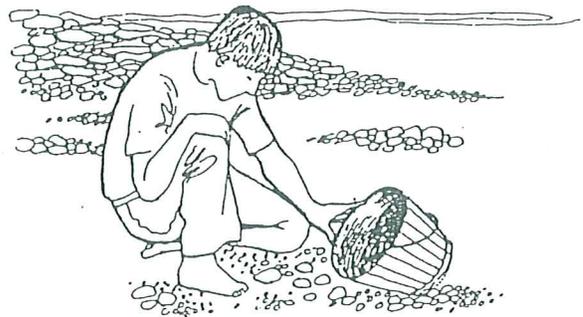
OBJECTIVE: A creative activity designed to develop lateral thinking and problem solving.

CURRICULAR AREA: Language Arts.

TEACHER NOTES: We all tend to take the conveniences around us for granted. The last time the electricity went out or the phone went dead we realized how important those utilities are in our daily lives. Now let's examine what would happen if the water stopped running. This may be a real experience to some people and strictly imagination for the rest.

DIRECTIONS: Duplicate Student Page

Discuss our dependency upon our very reliable utilities. Many of us have experienced power outages. Now let's give some thought to what might happen if the water stopped flowing. It could be funny, sad, exciting, horrible. Direct the students to use their imaginations. They could be a doctor or an industrialist whose work is completely stopped. The possibilities are endless! The first line is the same for everyone, but the results should be highly individualized. (Remember to share good answers with us at the American Water Works Association.)



Here is a diary to help you see how water is used in your household. Write down each time that you use water today, then discuss your list in class tomorrow.



Diary

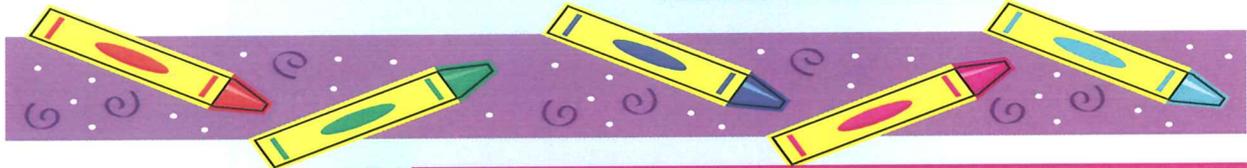
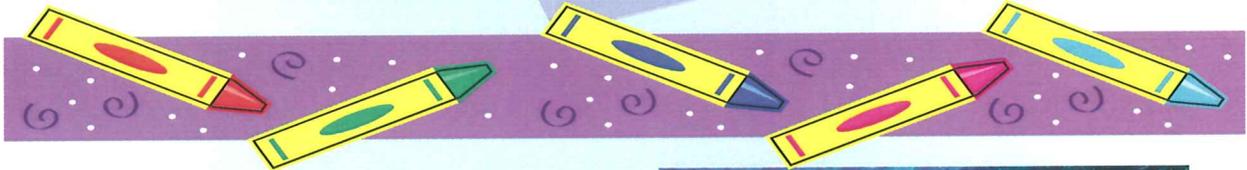
Morning _____

Afternoon _____

Evening _____



**Thank you for
Participating in the
Water Awareness
Program**



**Fair Oaks Water District
967-5723
Orange Vale Water Company
988-1693
Citrus Heights Water District
725-6873
San Juan Water District
791-2663**