

# 1 The Sun, Water Cycle, and Climate from the *series Water Smart* Pre-Test

**Directions:** Answer the following ten questions.

1. What is the water cycle?
2. Where does the water cycle get energy to keep going?
3. What is precipitation?
4. What is condensation?
5. What is evaporation?
6. What is transpiration?
7. What is percolation?
8. What is runoff?
9. How many phases can water be in?
10. What is a rain gauge used for?

## The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Answer the following ten questions.

1. What are the three phases of water?
2. What are the different types of precipitation?
3. What role do plants play in the water cycle?
4. When the sun goes down at night, does the water cycle stop?
5. When do we find frost and dew outside?
6. What is evaporation?
7. What is transpiration?
8. What does condensation form?
9. What is percolation?
10. How can thick clouds keep us cooler in the day and warmer at night?

### 3 The Sun, Water Cycle, and Climate from the *series Water Smart*

**Directions:** Answer the following ten questions.

1. Why does the water cycle keep going?
2. In what ways is climate controlled by the sun and the water cycle?
3. How does transpiration play a role in the water cycle?
4. In what ways does the water cycle provide fresh water around Earth?
5. What would happen if the water cycle stopped?
6. Other than rain, what kinds of precipitation are there?
7. Other than clouds, how else do we see condensation?
8. How can clouds help to control climate?
9. In what ways do plants play a role in the water cycle?
10. How do the different parts of the water cycle fit together?

## The Sun, Water Cycle, and Climate from the *series Water Smart*

**Directions:** Answer the following ten questions by circling the word TRUE or FALSE.

True / False 1. The water cycle stops at night.

True / False 2. Hail is a type of precipitation.

True / False 3. Percolation helps to clean water.

True / False 4. Dew is condensation.

True / False 5. There is no water cycle where it is cold.

True / False 6. Evaporation is faster when it is warm.

True / False 7. Snow helps to deliver fresh water.

True / False 8. There is no water anywhere in a desert.

True / False 9. There is more runoff on pavement than on grass.

True / False 10. Plants help out in the water cycle.

# The Sun, Water Cycle, and Climate from the *series Water Smart*

climate  
clouds  
condensation  
cycle  
dew  
dissolve  
ecosystem  
erosion  
evaporation  
frost  
glacier  
groundwater  
hail  
humid  
liquid  
meteorologist  
moisture  
ocean  
particles  
percolate  
phase  
porous  
precipitation

rain  
reflect  
runoff  
sea  
sediment  
sleet  
snow  
solid  
solvent  
sublimation  
sun  
temperature  
transpiration  
vapor  
weather

## ADVANCED WORDS

deposition  
desalinate  
filter  
hydroelectric  
turbid  
virga

# The Sun, Water Cycle, and Climate from the *series Water Smart*

Directions: Find the hidden vocabulary words list below in the puzzle. Some of them are backward, while others go from top to bottom or bottom to top.

N O I T A S N E D N O C P Q E  
 S U B L I M A T I O N M A E S  
 E V A P O R A T E D E W R R A  
 C L I M A T E S L E E T T Q H  
 G L A C I E R A L I Q U I D P  
 R E F L E C T H A I L L C D Z  
 G L Z U V H S S H L Q U L F F  
 R A Y H A G I N I Y F T E C B

climate  
 condensation  
 dew  
 evaporate  
 glacier  
 hail  
 liquid  
 particle  
 phase  
 reflect  
 sleet  
 sublimation

# The Sun, Water Cycle, and Climate from the *series Water Smart*

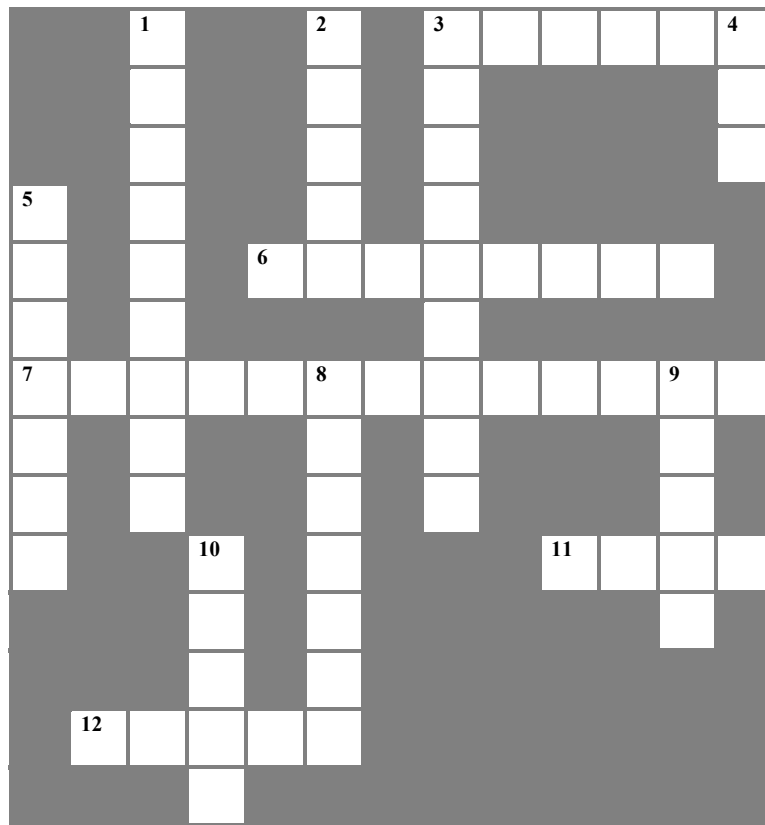
**Directions:** Find the hidden vocabulary words listed below in the puzzle. Some of them are backward while others go from top to bottom or bottom to top.

T R A N S P I R A T I O N P T  
 R E T A W D N U O R G X G E N  
 N O I S O R E C L O U D S R E  
 P F F O N U R E T S O R F C M  
 O H U M I D I L Y U P I U O I  
 R P K P V U Y C Z N B O D L D  
 O G I B S B I Y T Q Q D Z A E  
 U Y S J K K I C H X N O Y T S  
 S X S S U I D R R A G K K E C

clouds  
 cycle  
 erosion  
 frost  
 groundwater  
 humid  
 percolate  
 porous  
 runoff  
 sediment  
 sun  
 transpiration

# The Sun, Water Cycle, and Climate from the series *Water Smart*

Directions: Fill in the puzzle using vocabulary words from *The Sun, Water Cycle, and Climate*.



## Across

3. When water soaks into the ground quickly, it means the soil is very \_\_\_\_\_.
6. Another word for small pieces of soil that are carried in erosion.
7. A scientist who studies and predicts precipitation.
11. A type of precipitation. It rhymes with sail.
12. We find these ice crystals on windows after a clear cold night.

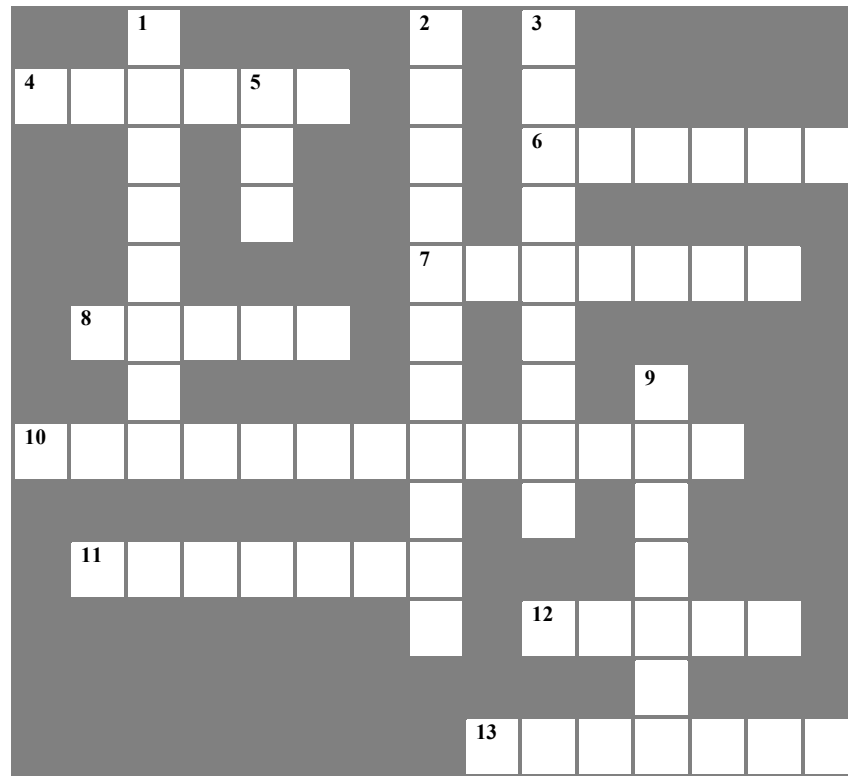
## Down

1. This is another word for ecological system.
2. The water \_\_\_\_\_ helps move water all around the Earth.
3. Sediment is another name for these little things.
4. The source of energy for the water cycle.
5. The average type of weather for a place is called \_\_\_\_\_.
8. Clouds can \_\_\_\_\_ sunlight to send it back into space.
9. Water is a liquid, but ice is a \_\_\_\_\_.
10. Water that evaporates becomes this.



# 9 The Sun, Water Cycle, and Climate from the series *Water Smart*

Directions: Fill in the puzzle using vocabulary words from *The Sun, Water Cycle, and Climate*.



## Across

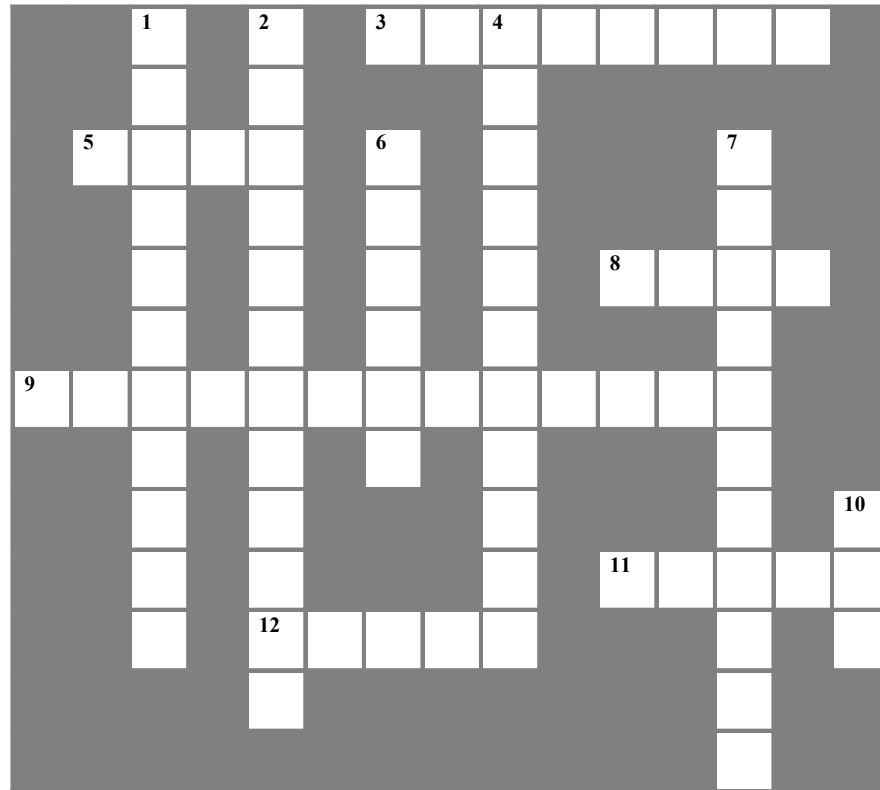
4. Water condenses to form these things that float in the sky.
6. Water that flows downhill after it rains.
7. When water wears down rocks and carries the pieces away.
8. Water droplets that float in the warm summer air make the air feel this way.
10. This is another word for rain, snow, sleet, or hail.
11. Snow that never melts.
12. The name for half frozen rain or half melted snow.
13. The water cycle changes this everyday. It rhymes with “feather.”

## Down

1. Even in the driest places we find this in the air.
2. The water cycle controls the precipitation and \_\_\_\_\_ of a city.
3. This word describes when water soaks into the ground.
5. After a clear, calm night, we might wake up to find this on grass.
9. Water can dissolve anything because it is the universal \_\_\_\_\_.

# The Sun, Water Cycle, and Climate from the series *Water Smart*

Directions: Fill in the puzzle using vocabulary words from *The Sun, Water Cycle, and Climate*.



### Across

3. Anything that sits in water long enough will do this.
5. A type of precipitation. It rhymes with stain.
8. A type of frozen precipitation. It rhymes with “blow.”
9. This word describes how plants give off water from their leaves.
11. Ice can change \_\_\_\_\_ and become water or vapor.
12. Natural storage areas for water that cover most of the Earth.

### Down

1. When water disappears into the air, it goes through this process.
2. This is what happens when we see water vapor turn into clouds.
4. Ice that turns directly to vapor without melting first goes through this.
6. We know water is a \_\_\_\_\_ because it flows and changes shape.
7. A name for water that is found in the ground.
10. Another word for ocean. It rhymes with “tea.”

# 1 The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Answer the questions using choices a through e listed at the bottom of the page. Each choice can be used only once. You'll find the answers at the websites listed beneath the questions.

1. El Azizia, Libya, in northern Africa holds the world record for hottest day ever. How many degrees Fahrenheit is that record?

[http://www.extremescience.com/record\\_index.htm](http://www.extremescience.com/record_index.htm)

2. About how many meteorologists are there in the United States?

<http://www.bls.gov/oco/ocos051.htm>

3. How many gallons of water does an average tree transpire each day?

<http://www.dsisd.k12.mi.us/mff/Environment/Cycles.htm>

4. How far is the sun from Earth in miles?

<http://solarsystem.nasa.gov/features/planets/sun/sun.html>

5. McGrath, Alaska, holds the record for the coldest temperature recorded in the United States. How many degrees below zero in Fahrenheit is that record?

<http://www.weathertoday.net/weatherfacts.htm>

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- a. 75  
b. 100  
c. 136  
d. 6,900  
e. 93,000,000

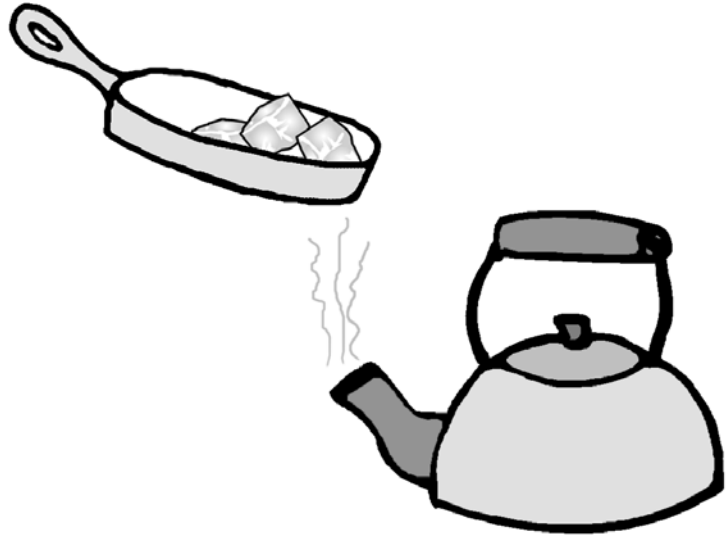
# The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Have an adult help you since this experiment requires you to use a stove.

**You need:**

teapot  
cooking pot  
ice  
water  
stove

- Fill a teapot halfway with water and put it on the stove to boil.
- Put some ice cubes in a pot.
- Hold the edge of the pot over the steam from the teapot when the water starts to boil.
- Observe what happens.
- Be careful when you pour the water out of the hot kettle.



1. What makes the water in the teapot boil?
2. What happens to the water as it boils?
3. What do you observe on the outside bottom of the pot with ice in it?
4. How does this compare to the water cycle?
5. Why did we use ice in the pot above the kettle?

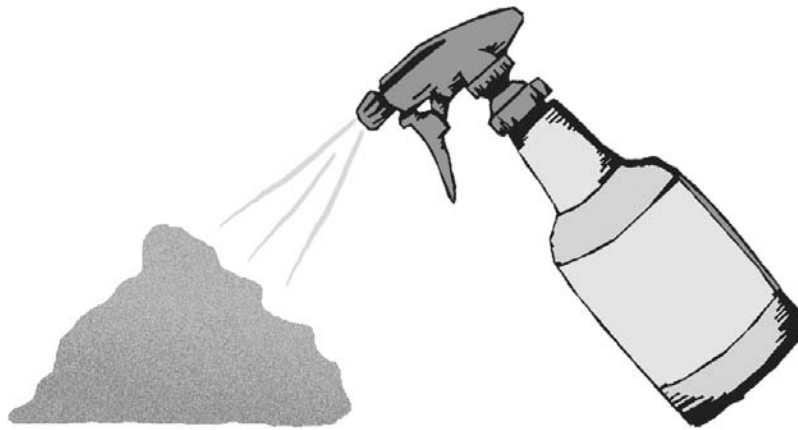
# The Sun, Water Cycle, and Climate from the *series Water Smart*

**Directions:** Create erosion.

**You need:**

spray bottle  
water  
pile of sand

- Put a small mound of sand on the ground and spray it.
- First start from about two feet away and spray gently.
- Then move closer to the sand and spray faster and faster.
- Observe what happens to the sand and the water that you spray onto the sand.



1. What happens to the water and sand when you spray gently from a distance?
2. What happens differently when you spray the sand closer?
3. Where does the water and sand go?
4. What does this tell us about erosion compared to how hard it rains?
5. What ways can you think of to get all of the water into the sand without the sand eroding?

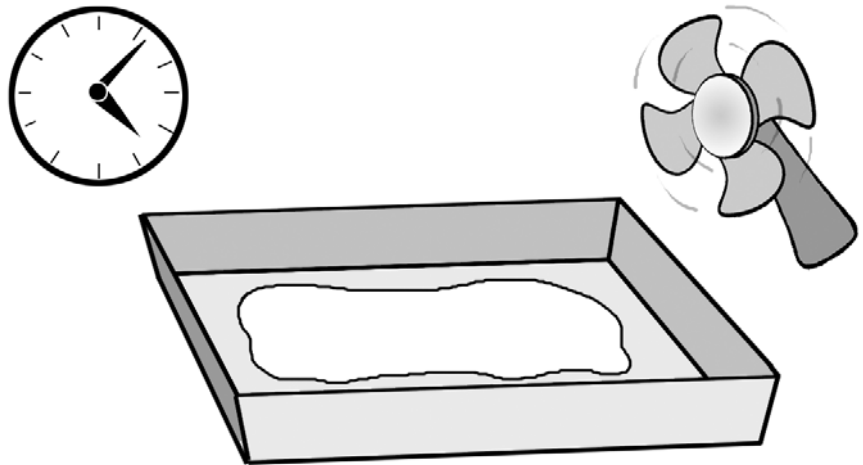
# The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Time how long it takes for water to evaporate.

**You need:**

flat cooking pan  
water  
clock or stopwatch  
battery powered fan or  
sheet of cardboard

- Pour about two ounces of water into the bottom of a flat pan.
- Use a small fan to blow on the water in the pan and see how long it takes for the water to evaporate.
- You can also use a sheet of cardboard instead of a fan to move the air over the pan.
- Experiment with different speeds of the fan or different speeds of fanning.
- When all of the water is gone, pour the same amount into the pan again.
- This time just let it sit by itself to see how long it takes for the water to evaporate.



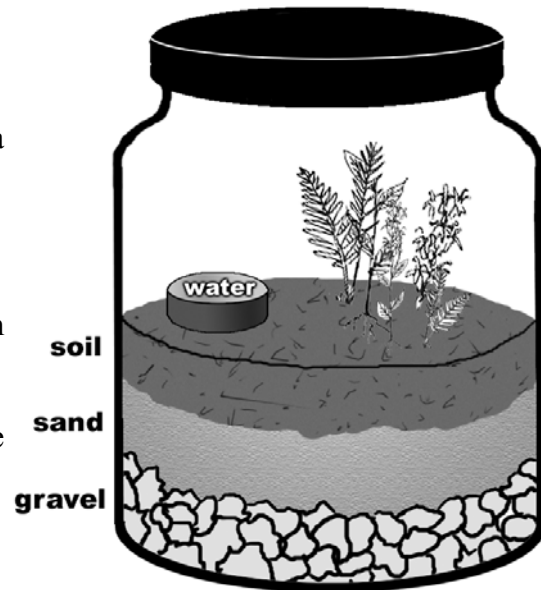
1. How long does it take for the water to evaporate when you fan it?
2. How long does it take for the water to evaporate when it sits by itself?
3. What does the fan do to the water?
4. Does the distance or speed of the fan make a difference?
5. What does this tell us about wind and evaporation?

**Directions:** Make your own ecosystem in a jar.

**You need:**

a clear jar with a lid  
fine aquarium gravel  
sand  
soil  
a bottle cap  
water  
small plants

- Start by putting a layer of gravel in the bottom of a clear jar.
- Then add a layer of sand on top of the gravel.
- On top of the sand add a layer of soil.
- Put a few small plants in the soil.
- Now place a bottle cap with water in it inside the jar on top of the soil.
- Put the lid on the jar but don't tighten it.
- Place the terrarium in a place where it can get sunshine and observe it for several weeks.



1. What do you observe in the terrarium?
2. What happens to the water that was in the bottle cap?
3. Do the plants live and grow?
4. How is this like an ecosystem?
5. What parts of the water cycle do you see?

# The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Prove that plants give off water.

**You need:**

clear plastic bags with ties or zipper lock bags  
bushes or trees  
sunshine

- On a sunny day, put a clear bag over some of the leaves of a bush or tree branch.
- Loosely seal the bag with a tie or zipper lock.
- After an hour, remove the bag and examine it. Record what you find.
- Repeat the same experiment using bags over leaves of different types of trees and bushes, like pine trees with needles instead of trees with leaves.
- Examine what you find and compare the results.
- Leave one bag on a branch for most of the day and examine that.



1. What do you find in the bags after an hour?
2. Where does the water come from and where does it normally go?
3. What difference do you see in plants or trees with needles instead of leaves?
4. Do you think you could get enough water to drink from the leaves?



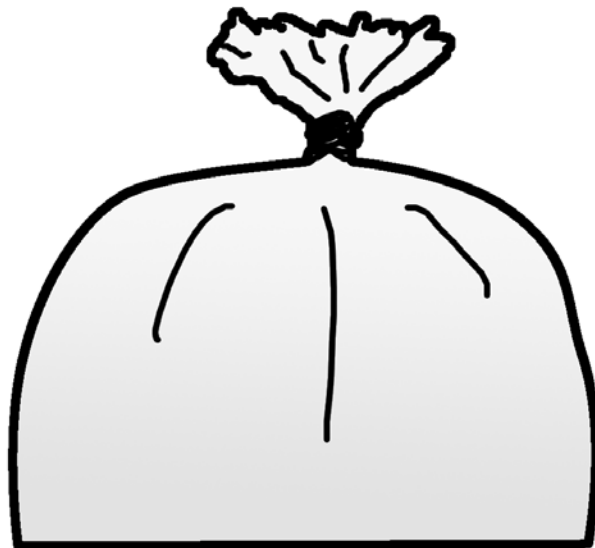
## The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Form your own frost.

**You need:**

clear plastic bag with tie or zipper lock bag  
freezer

- Blow air into a clear plastic bag to fill it up with air.
- Quickly close it and tie it shut or seal it with a zipper lock.
- Put it in a freezer for about an hour.
- Take it out and examine it. Leave it out.
- After another half hour, observe it again.



1. What do you observe in the bag when you take it out of the freezer?
2. Where did the things in the bag come from?
3. How is this like the water cycle?
4. When the bag warms up after a half hour out of the freezer, what do you see inside of it?
5. What does this tell us about what is in our breath when we exhale?

# The Sun, Water Cycle, and Climate from the series *Water Smart*

**Directions:** Take the salt out of water to make it fresh.

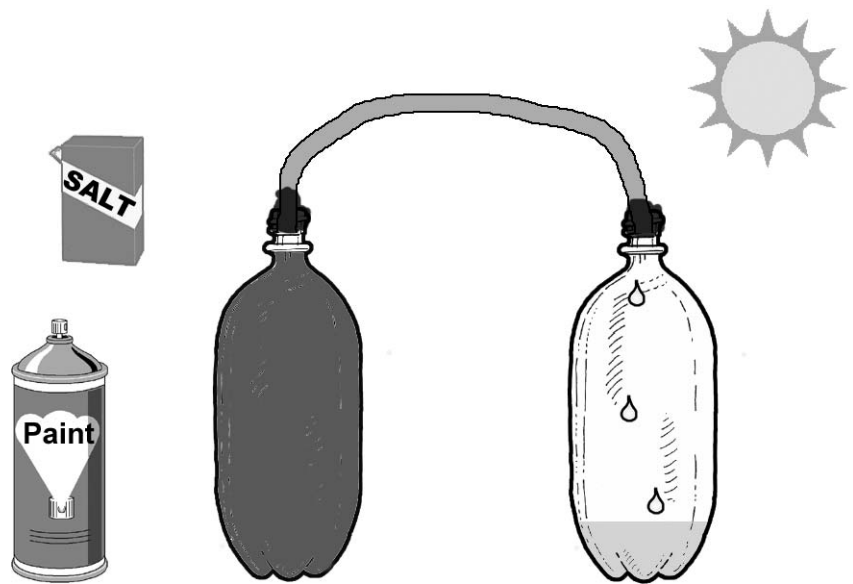
**You need:**

two two-liter bottles  
salt  
water  
black paint  
clear plastic tube  
duct tape  
sunshine

- Paint the outside of a two-liter bottle black.
- After the paint is dry, fill that bottle halfway with water and add two spoonfuls of salt to it.
- Shake it or stir it until the salt dissolves.
- Insert one end of a plastic tube just inside the top of the bottle and seal it in place with duct tape.
- Insert the other end of the plastic tube just inside the top of an empty two-liter bottle.

Also put duct tape around that top to seal the tube in place.

- Place both bottles in the sun and observe them every half-hour.



1. What do you observe happening in the tube?
2. What do you observe happening to the empty bottle?
3. Why do we spray one bottle black and put it in the sun?
4. Taste a little of the water in the clear bottle. Is it salty?
5. What is this process called when we take the salt out of salty water?

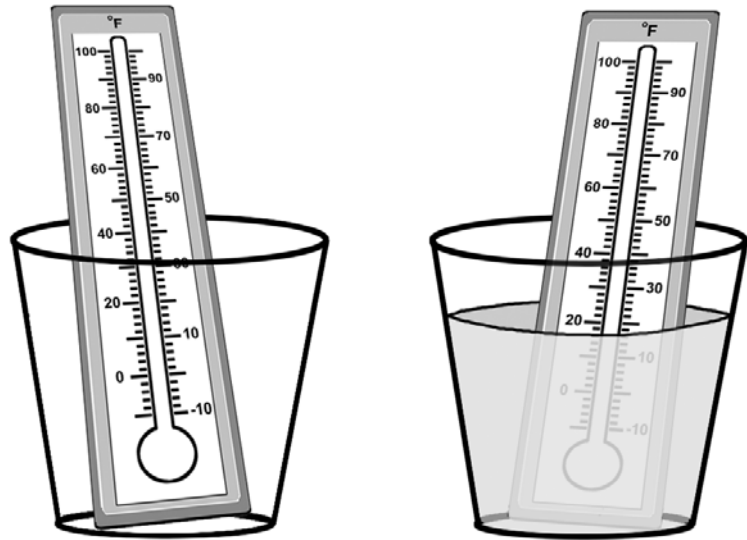
# The Sun, Water Cycle, and Climate from the *series Water Smart*

**Directions:** Determine if water or air heats up and cools down faster.

**You need:**

two thermometers  
two cups  
water  
refrigerator

- Put thermometers into two different cups.
- Fill one of the cups with water that's been sitting out for a while.
- Read both thermometers and write down what they show. The readings should be close to each other.
- Now put both thermometers in a refrigerator.
- Take readings every 10 minutes of both thermometers until both temperatures stop falling.
- Now take both cups out of the refrigerator, set them on a counter.
- Take additional readings every 10 minutes until the temperature stops rising.



1. Which temperature fell fastest in the refrigerator?
2. Why should you not hold the refrigerator door open too long when taking readings?
3. Did both thermometers end up at the same temperature in the refrigerator?
4. When taken out of the refrigerator which thermometer warmed faster?
5. Why was there a difference in how fast or slow the water cooled and warmed?
6. What does this tell us about the climate of cities near large bodies of water?

# The Sun, Water Cycle, and Climate from the *series Water Smart*

**Directions:** Use these for further activities.

## For Teachers

### **United States Regional Climate Centers**

[http://met-www.cit.cornell.edu/other\\_rcc.html](http://met-www.cit.cornell.edu/other_rcc.html)

Find historical rainfall and temperature summaries for thousands of cities around the United States.

### **Clouds and the Earth's Radiant Energy Sytem, (CERES)**

<http://school.larc.nasa.gov>

A fun program to interest kids in skywatching and seeing the role of water in the atmosphere. They collect data and share it via the Internet worldwide with other kids.

### **Santa Barbara California Water Activities Manual**

<http://www.sbwater.org/Curriculum.htm>

An extensive curricula composed of six sections, each of which focuses on a specific water topic.

### **Hydro for Kids, National Hydropower Association**

<http://www.hydro.org/pubs/curriculum.asp>

Curriculum shows how the water cycle makes hydroelectric power possible.

## For Kids and Teachers

### **The Water Cycle at Work, Environmental Protection Agency (EPA)**

<http://www.epa.gov/safewater/kids/cycle.html>

Find water games and excellent experiments and links for all grades.

### **Learning Web, United States Geological Survey (USGS)**

[http://interactive2.usgs.gov/learningweb/explorer/topic\\_water\\_links.asp](http://interactive2.usgs.gov/learningweb/explorer/topic_water_links.asp)

Links on groundwater, hydrology, aquifers, and more.

### **Floods, Federal Emergency Management Agency (FEMA)**

<http://www.fema.gov/hazards/floods/>

A wealth of material to download to learn more about flooding disasters and coping with them.

### **Environment Canada**

[http://www.atl.ec.gc.ca/index\\_e.html](http://www.atl.ec.gc.ca/index_e.html)

Water, pollution, and environment background material along with weather information for Canada.

### **Greek Water Works, Portland State University**

<http://www.historyforkids.org/greekciv/science/water/water8.htm>

Enlightening history of water usage in Greece.