

4th-5th Grade SCIENTISTS ON THE GO

How Much Freshwater is on Earth?

It may seem like there's lots of water on Earth. However, 7.6 billion people and all plants and animals share the precious resource. Estimate and calculate the percentage of available fresh water on Earth following the steps below. You may be surprised!

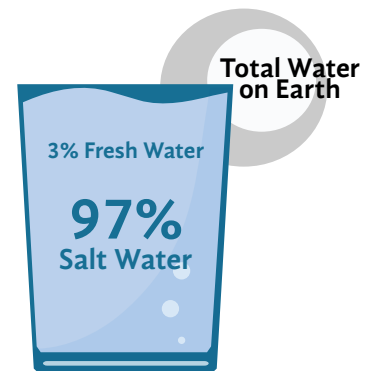


1. Label the sheets of paper - fresh water, total liquid, and clean and available - and place a small bowl on each paper.
2. Fill a medium bowl with one liter (1000 mL or 4.25 cups) of water. Put in a couple drops of blue food coloring. This water represents all of the water on Earth! What are the 2 kinds of water?

Supplies

- 1 medium bowl
- 3 small bowls
- 3 pieces of paper
- Measuring spoons
- Blue food coloring (optional)
- Salt (optional)

3. Transfer 2 tablespoons (30 mL) of water from the medium bowl to the "fresh water" bowl. The remaining water in the medium bowl represents salt water found in oceans. Add a pinch of salt to the salt water. Where are 3 places we can find fresh water?



4. Transfer 2 teaspoons (10 mL) of water from the "fresh water" bowl to the "total liquid" bowl. What kind of water is left in the "fresh water" bowl?
_____ (Hint: it's very, very cold!)
5. Dip your finger into the "total liquid" bowl and let that water drip (1 mL) into the "clean and available" bowl. This represents the small amount of fresh water we have to share.

Let's do some math. What percent of all water is clean and available?

Hint: $1 \text{ ml} \div 1000 \text{ ml} = \underline{\hspace{2cm}} \times 100 = \underline{\hspace{2cm}} \%$

Wow, that's not much fresh water and it moves on Earth through the water cycle!

Sharing Our One Drop

What are ways you can save water at home? Draw or write your ideas.

Let's calculate. How much water do you use?

Use the gallons per minute chart to calculate the amount of water you use during certain activities.

1. Gallons used during a 5 minute shower:

$$5 \text{ minutes} \times 2 \text{ gpm} = \underline{\quad\quad} \text{ gallons}$$

2. Gallons used during a _____ minute shower:

$$\underline{\quad\quad} \text{ minutes} \times 2 \text{ gpm} = \underline{\quad\quad} \text{ gallons}$$

3. Gallons used while brushing your teeth:

$$\underline{\quad\quad} \text{ minutes} \times \underline{\quad\quad} \text{ gpm} = \underline{\quad\quad} \text{ gallons}$$

4. Gallons used while _____

$$\underline{\quad\quad} \text{ minutes} \times \underline{\quad\quad} \text{ gpm} = \underline{\quad\quad} \text{ gallons}$$

How many gallons?

- Bathroom faucet: 1.5 gpm
- Showerhead: 2.5 gpm
- Toilet: 1.6 gallons per flush
- Kitchen faucet: 2.5 gpm
- *gallons per minute (gpm)



We'd love to see your finished activity!

Email a photo to info@wetsciencecenter.org for a prize.

At Home

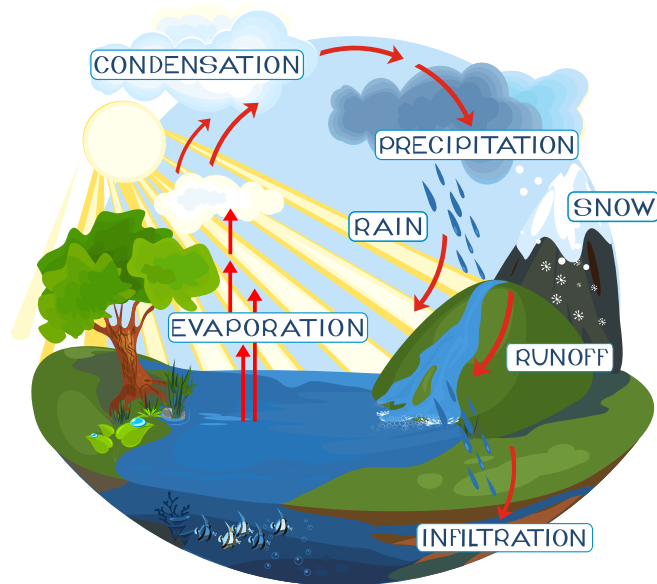
Water Cycle Experiment

How does water move from land to the sky and back to Earth? It moves through the water cycle! Your task is to create your own mini water cycle in a bag.

1. On the bag, draw out the steps of a water cycle. Look at the example for ideas.
2. Pour 1/3 cup of hot tap water into the bag. Add a drop or two of food coloring to the water (optional). Seal the bag.
3. Tape the bag to a window or edge of a table. Observe what happens.
4. If it is sunny, place in the sunlight to watch the cycle continue.

Supplies

- Plastic Ziploc sandwich bag
- Permanent marker
- Tape
- Blue food coloring (optional)



Reflection Questions:

What happens when you close the bag with hot water in it?

Which parts of the water cycle could you see in your bag?

Why is the water cycle important for Earth?

Label the Parts of the Water Cycle

Read the definitions of the words and then label the picture with the correct word.

Precipitation: Water gets too heavy to stay in the cloud and falls to earth as rain, snow, or hail.

Condensation: Water in the air cools and forms clouds.

Evaporation: Water warms up and turns into a gas from a liquid that floats up in the air.

Runoff: Water flows over surfaces instead of being absorbed into the ground.

Transpiration: Plants absorb water through their roots then release the water vapors from their leaves.

Hydrosphere: All of the water on the surface of the planet, underground, and in the air.

Infiltration: Water lands on permeable surfaces like soil and grass. It then soaks into the ground moving through cracks and space between rocks.



6. _____

Experiment

Transpiration in Action

What is transpiration?

It is the process of plants carrying water in their roots from the soil up to its leaves, then releasing the water back into the atmosphere.

Why can't we see the water escaping the leaves?

It escapes through tiny holes, too tiny for our eyes to see, called stomata. The stomata open and close for the plant to take in carbon dioxide and release oxygen. During this process, water evaporates out of the stomata on the underside of the leaves.



See Plant Transpiration in Action

1. Gather your supplies: clear plastic bag and a string.
2. Find a leafy plant or tree outside for the experiment.
3. Put your bag around a good portion of leaves and branch then seal it by tying the string around the branch. What do you think will happen?
4. Leave the bag for 2 hours, overnight, or a few days. The longer you leave it there, the more time the plant will have to transpire.
5. Remove the bag from the plant and observe what happened inside the bag.



Reflection Questions:

How long did the bag stay on the plant?

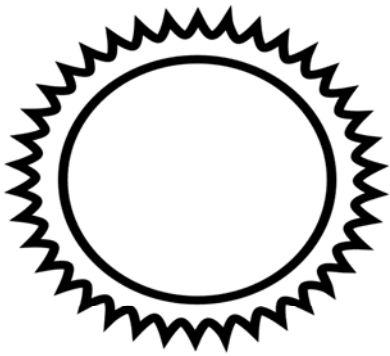
What was it like inside the bag after taking it off?

Where did the water inside the bag come from?

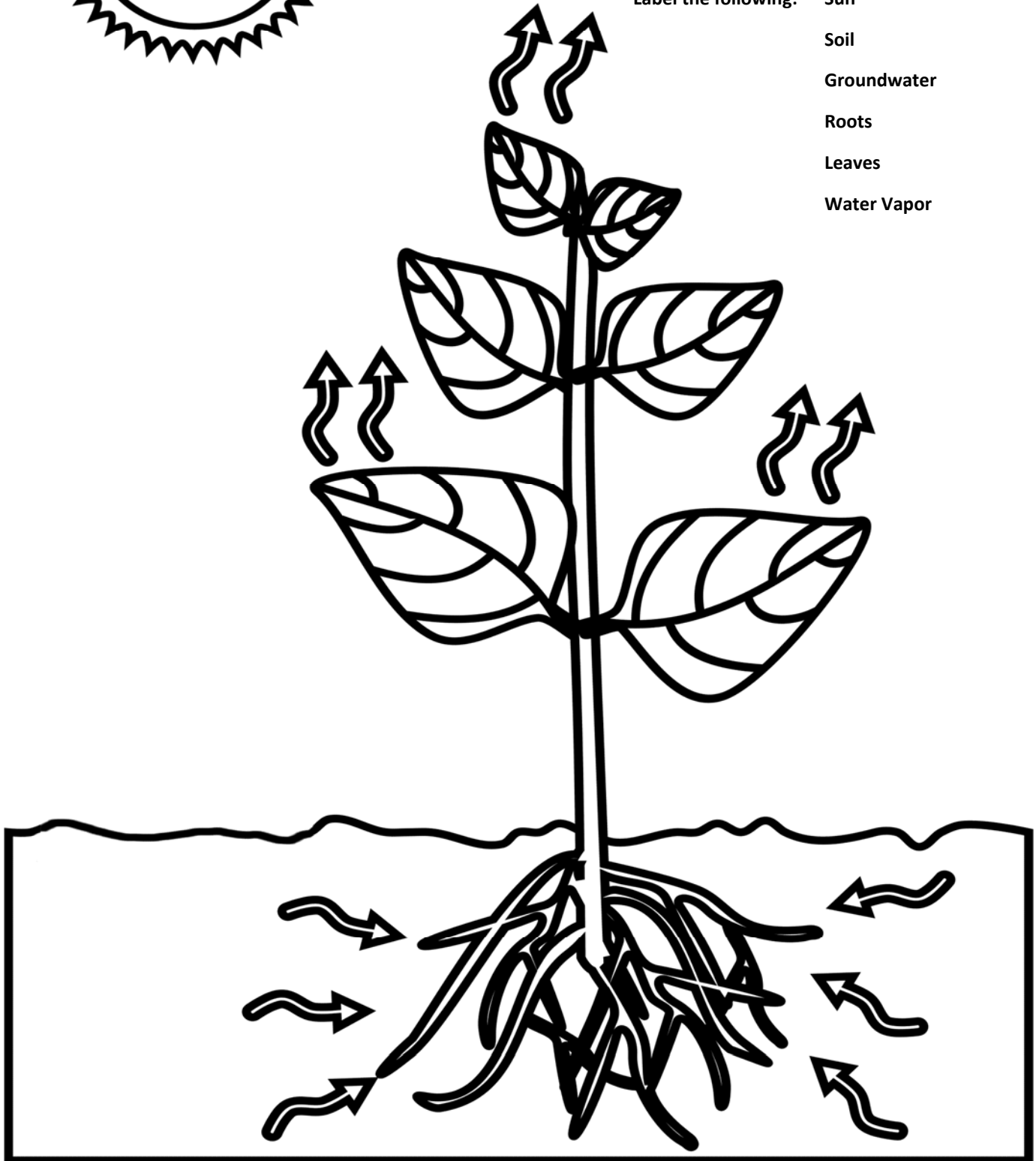
Name _____

Transpiration

Water travels through the ground. Roots of a plant carry water to the plant's leaves. Water vapor escapes from the plant's leaves. The water vapor goes back into the air. This is one way water moves through the water cycle.



- Label the following:
- Sun
 - Soil
 - Groundwater
 - Roots
 - Leaves
 - Water Vapor



The Water Cycle Story

Write a creative story about the character Wally the Water Molecule.

Describe the drop's journey through the water cycle, remembering to include evaporation, condensation, precipitation, infiltration, and runoff.



Title:

Water Cycle Word Search

Can you find all of the words?

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

CLOUDS

INFILTRATION

SALTWATER

WATER CYCLE

CONDENSATION

ONE PERCENT

SNOW

WATER DROP

FRESHWATER

PRECIPITATION

STOMATA

WATER VAPOR

HAIL

RUNOFF

TRANSPIRATION

WEATHER

