

### Get to Know Your H<sub>2</sub>O

Grade level: 2<sup>nd</sup> – 5<sup>th</sup>

Standard/ GLE Code: SC.2.3.2, SC.5.3.4

Time commitment: 45 minutes

Materials Needed:

*How Much Water?* – globe, 1 gallon jug or container, teaspoon, 100 macaroni pasta, beans or small items (per student), student page, green, blue, red markers (optional)

*Where Does Your Water Come From?* – Red, blue and green markers

Because water covers three-quarters of the earth's surface, it might appear that there is plenty to go around and that we will never run out of this valuable resource. In reality, however, we have a limited amount of useable fresh water. Here in Colorado Springs, water is a scarce resource that is brought in from the Rocky Mountains 100 miles away.

Suggested format:

Get to Know Your H<sub>2</sub>O has two parts – Part 1 - “**How Much Water?**” and part 2 - “**Where Does Your Water Come From?**”. The first is a discussion and demonstration of the amounts and types of water on earth and the second is a reading assignment to learn about Colorado Springs water supply. After reading the passage, students will answer questions about the reading assignment.

#### Part 1 - How much Water?

- Show an Earth globe and have students guess how much of the Earth's surface is covered in water (70%).
- Explain that there are four general types of water on Earth (salt water, frozen water, groundwater and surface water). Have the students count out 100 macaroni, beans or small items and estimate how many would represent the four types of water. They can enter estimate percentages of each kind on their worksheet in their Student Workbook, then discuss with their neighbor and write in a 2<sup>nd</sup> estimate.
- Discuss the difference between salt and fresh water and that people, plants and animals need fresh water to live. Watch this four-minute video on the percentage of fresh water on Earth: <https://www.youtube.com/watch?v=oaQCiwzjinCM> (see next page)
- Conduct the water amounts demonstration with your students. After the demonstration, have the students write in the actual percentages of each type of water (97% salty, 2% frozen, 0.8% groundwater, 0.2% surface water). They can color the pasta pieces per type of water and arrange them graphically and/or string them into a necklace.
- Initiate a class discussion on the importance of water and why it needs to be protected.

#### Part 2 – Where does your water come from?

- Ask students if they know where the source of their drinking water comes from.
- Have the students read their Get to Know Your H<sub>2</sub>O student page and answer the questions.

#### Educational Messages:

- Students learn water amounts on Earth.
- Students learn about the source of their drinking water and our local water system.
- Students use math skills to count, graph and estimate %.
- Students read and answer comprehension questions.

### Teacher Demonstration – How much water?

- If 100 gallons represented all of the water on earth: 97 gallons would be salt water – almost 39 buckets of water (2.5 gal buckets)
  - 2.5 gallons would be ice (glaciers, ice caps) – one bucket of water
  - 0.4 of a gallon would be groundwater – 6 ½ cups of water
  - 0.02 of a gallon would be surface water (all the rivers, lakes, wetlands and clouds/vapor) on Earth – less than 1/2 cup of water!
1. Fill a gallon jug nearly full (97%) with water and explain that this water represents salt water (oceans and seas).
  2. Add another splash to represent the 2% of water that is in the form of ice (glaciers, ice caps). At this point the jug should be just about full.
  3. Add a smaller splash of water to represent the 0.8% of water that is underground in our aquifers (groundwater).
  4. Finally, take one teaspoon of water and add it to the jug. Explain to students that this represents all the surface water (including rivers, streams, lakes, ponds, wetlands, etc.) in the world (0.2%). Most of the water we use in our everyday lives comes from rivers.
  5. After you demonstrate the correct percentages of water in the world, have students fill in the actual amounts on their worksheet. Facilitate a discussion about their predictions and actual findings.
  6. Discuss with students the fact that less than 1% of all the water in the world is available for human use (although 3% of the Earth's water is fresh, not all groundwater and surface water is available for use by humans).

### A DROP IN THE BUCKET LESSON PLAN

From Project WET

Water can be both abundant and rare at the same time. Use this activity to help students understand that water is a limited resource.

**Warm up:** Have students estimate the proportion of water that they think is potable--not salty and not polluted. Record the students' estimates.

**Step 1.** Fill a 1-liter (1000 ml) cylinder or beaker with water and tell students that it represents all the water on earth.

**Step 2.** Ask students where most of the water on Earth is located. When they answer correctly with "in the oceans", pour out 30 ml of water into a 100 ml graduated cylinder. The 30 ml represents the fresh, un-salty water. The remainder in the large beaker is all salty. You can add a few shakes of salt to represent that.

**Step 3.** Ask if all of the 30 ml is available for consumption. When they guess no, ask why not. You may have to give hints to help them figure out that much of our fresh water is frozen in the polar ice caps. Now pour 6ml out of the 30 ml into a 10 ml graduated cylinder.



The 6 ml represents the fresh, unfrozen water. The remaining 24 ml is all frozen. Place an ice cube in that cylinder.

**Step 4.** Ask again if all of the 6 ml is available for consumption. Help the students to realize that much water is in clouds, soil and even in the bodies of plants and animals that is unavailable for use. Using an eyedropper, remove a single drop of water from the 6 ml and place it in your hand. This represents all the clean fresh water for everyone on Earth to use.

**Step 5.** Now rub your hands together to dry up the drop of water and point out how easy it is to lose our water resources if we do not take care of them.

**Wrap up:** Revisit the estimates they made before the activity. After going through the exercise, point out that the one drop was approximately .003 percent of all water. You can point out that if we multiply it out, we find that there are 7 million liters per person (based on a population of 6 million people). This may sound like a lot, but the problem is distribution. There are water rich and water poor areas. You can extend this activity by researching the amount of water it takes to produce a pair of blue jeans or a hamburger to see that 7 million liters of water per person isn't actually that much. Students could also calculate how much water they use in a day and in a year.

This is just one of the over 90 activities in the Project WET guide. Please visit the **Project WET** webpage: <http://projectwet.org> to find out more about this exciting program.

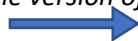
### HOW MUCH WATER? ANSWER KEY

If 100 gallons represented all the water in the world, estimate how many of these gallons would be in each of the four distinct groups of water.

How much water is:	1 <sup>st</sup> Estimation (# of gallons out of 100)	2 <sup>nd</sup> Estimation (# of gallons out of 100)	Actual Answer (# of gallons out of 100)
Salt Water			97 gallons out of 100 (97%)
Frozen – Glaciers, ice caps, icebergs, etc.			2 gallons out of 100 (2%)
Groundwater			Less than 1 gallon out of 100 (0.8%)
Surface Water – Rivers, lakes, wetlands, clouds/vapor, etc.			Only 3.2 cups out of 100 gallons (0.2%)

- 1<sup>st</sup> Estimation – This is your own guess.
- 2<sup>nd</sup> Estimation – Now compare your guesses with a neighbor's guesses. Do you want to change any of your guesses? If you do want to change your guess, please enter your new answer in the 2<sup>nd</sup> column.
- Actual Answer – Now write down the actual answer that your teacher gives you.

Using the Actual Answers, lay out your pasta pieces on a flat surface as a graph or pie chart of the four types of water and draw a smaller-scale version of your results here.



Graph - don't forget to label your X and Y axis



Pie Chart – add a label and percentage to each slice of pie

**Water Amounts Data:**



## Part 2 – WHERE DOES YOUR WATER COME FROM?

Read the passage, then answer the questions below.

Communities in Colorado get their water from streams, lakes and reservoirs that are supplied by snowmelt and rainfall. The amount of water that is available for use varies from year to year and depends on snowpack in the mountains. In fact, about 80% of our water in town comes from snow that fell in the Rocky Mountains.

A **reservoir** is a man-made lake used to store water.

Everyone in the world lives in a watershed. A watershed is an area of land that drains into a stream or lake. Here in Colorado Springs we live in the Fountain Creek watershed which is part of the Arkansas River Basin. We use this water as part of the city water supply.

The Arkansas River Basin water available in town isn't enough for the size of our city so we also bring in water from the Colorado River and South Platte River Basins.

In fact, most of our drinking water comes from 100 miles away from the Western Slope of the Rocky Mountains through a series of tunnels, canals and pipes. The water is stored in reservoirs before it is treated and distributed in our community.

By cleaning and testing the water, Colorado Springs Utilities makes sure that we have safe, delicious water for drinking. Our water utilities do more than clean the water. They also fix leaky pipes and install new ones, monitor water levels in our waterways and much more!

The water used inside your house goes down the sanitary sewer pipe to the Water Resource Recovery Facility where it gets cleaned again

1. What percent of our water comes from snow? 80% %
2. Write the name of the watershed you live in: Fountain Creek Watershed, which is part of the Arkansas River Basin Watershed
3. Name the three river basins that supply your water: Colorado, Arkansas, South Platte
4. How far has some of your water traveled to get to town? 100 miles
5. What is the name of the utility company that supplies your drinking water?  
Colorado Springs Utilities (for students within Colorado Springs area)



