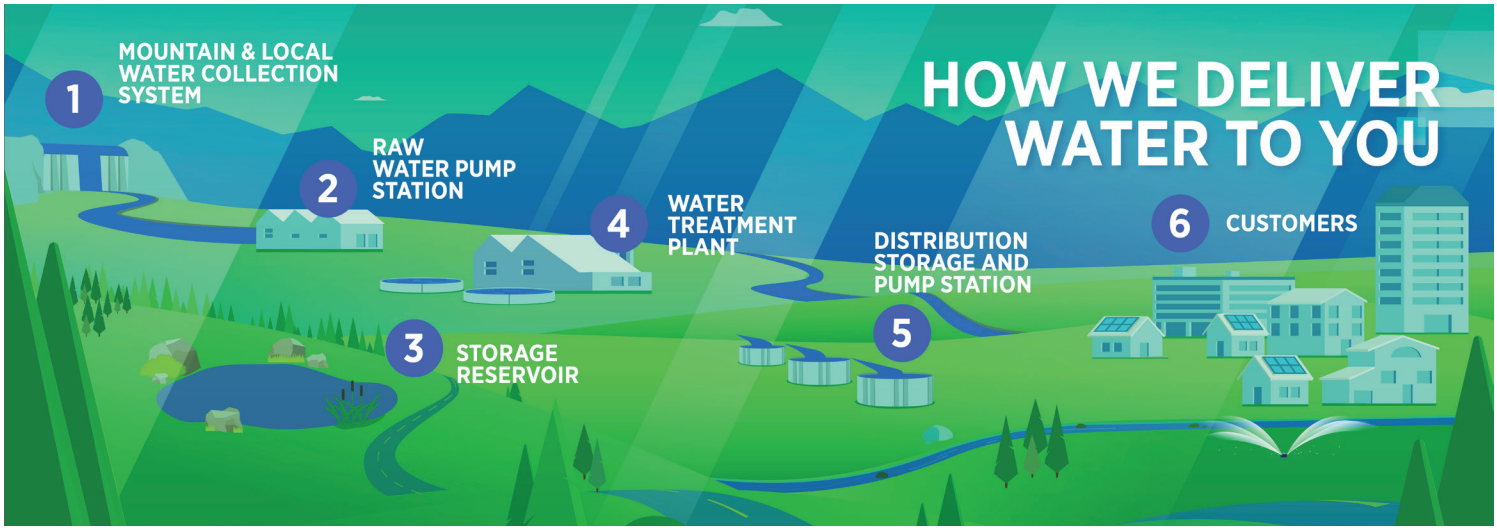
Colorado Springs Utilities
It's how we're all connected

Water Conservation Wizard

Student Workbook

Name: _____

Section 1 – Colorado Springs Water Supply



Colorado Springs gets its water from streams, lakes and reservoirs that are supplied by snowmelt. We live in a semi-arid (dry) climate and receive an average of 16 inches of precipitation a year. That is not enough water for the size of our city, so we must import water from further away. In fact, most of our water comes from snow that fell in the Rocky Mountains. Unlike other cities, we are not located near a river or major waterway, so we have built an extensive water system to bring water to us. 65% of our drinking water comes from the Colorado River Basin 100 miles away.

Colorado Springs diverts water from the western side of the Rocky Mountains through the Continental Divide via four tunnels, nearly 300 miles of raw (untreated) water pipeline and five pump stations. This water is stored in 25 reservoirs before it is treated at one of our six water treatment plants and then delivered to you through more than 2,000 miles of distribution pipe buried under the streets.

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

Colorado Annual Stream Flows

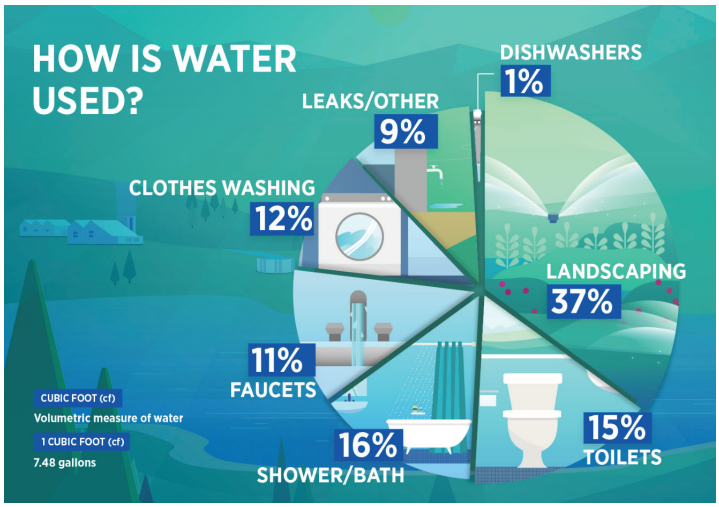
Continental Divide

You are the **"first user"** of most of the water you drink, which means the water has not been used in other homes and businesses. Our water is some of the best in the nation and consistently meets or exceeds state and federal drinking water standards.

Colorado Springs residents use an average of 78 gallons of water a day.

Once you are done using it, the wastewater inside your house travels through sanitary sewer pipes to the Water Resource Recovery Facility where it is cleaned. Ninty percent of this reclaimed water is released down Fountain Creek to other communities downstream, while 10% is reused in town for non-drinking purposes such as watering city parks and golf courses.
Your reclaimed water will flow past more than 200 communities downstream and eventually end up in the Atlantic Ocean via the Gulf of Mexico.

RESIDENTIAL WATER USE



Section 1 Water IQ Quiz

1. How much precipitation does Colorado Springs get in a year? _____ inches

5. Which precipitation type supplies the majority of our water source?
   Circle one: ***Snow*** ***Hail*** ***Rain*** ***Sleet***

3. How many acre feet of water flow off the western slope of the Rocky Mountains and travel to the Pacific Ocean? _____ acre feet
   Bonus question: What side of the Continental Divide do you live on? Circle one: ***East*** ***West***

4. Which river basin supplies the most water for Colorado Springs? _____

5. How far has some of your water traveled to get to town?_____miles

6. Colorado Springs Utilities cleans your water so it's safe to drink at how many water treatment plants? _____

7. How many gallons does a typical Colorado Springs resident use per day? _____gallons

8. What is most residential water used for? _____

9. Which room in the house uses the most water? Circle one: ***Bathroom*** ***Kitchen*** ***Laundry Room***

10. Where does the water go after it's been used inside the home? _____

11. How many other communities downstream does our reclaimed water flow past before it reaches the Gulf of Mexico? _____

12. What percentage of reclaimed water is reused in town for non-drinking purposes? _____%

How well did you do? Ask your teacher for the answer key and see how you rate:

- 10 - 12 correct = High water IQ - Water Wizard!
- 8 - 10 correct = Moderately high water IQ - Water Smart
- 4 - 7 correct = Medium to low water IQ - Water Wonderer
- 0 - 3 correct = Low water IQ – Study this workbook to improve

Your Water IQ:

_____

Section 2 – Calculate the Water Savings

Water is a limited resource. Efficient water use is using water towards the greatest benefit and eliminating waste.

The Smith family has made a commitment to become better water managers. The family studied the Residential Water Use pie chart on page 2 and decided the best place to start saving water was in the bathroom. They tracked their water use for two weeks to see how much water and money they could save. During WEEK 1 they followed their usual habits, which were the same as those listed in the Typical Use column of the Water Use Chart. In WEEK 2, they changed their water use behavior as shown in the Water-wise Use column and installed efficient fixtures in the bathroom including a high-efficiency toilet, showerhead and faucet aerator.

Water Use Chart

Activity	*Typical Inefficient Use – WEEK 1*	*Water-wise Use* - WEEK 2*
Showering	8-minute shower: 20 gallons	5-minute shower with high-efficiency showerhead: 7.5 gallons
Washing Hands and Face	water running: 2.5 gallons	water turned off except to rinse and aerator installed: 1 gallon
Brushing Teeth	water running: 2.5 gallons	water turned off except to rinse and aerator installed: <1 gallon
Flushing Toilet	1 flush: 3.5 gallons	high-efficiency toilet flush: 1.3 gallons

*Water-wise Use includes conservation habits (i.e behaviors such as taking shorter showers and not leaving the faucet running) and using efficient fixtures (high-efficiency toilet, showerhead and faucet aerator).

Water Record – Determine the amount of water used by the four (4) Smith family members if each of them did the following actions ***each day***:

- Took one shower
- Washed face and hands four times
- Brushed teeth two times
- Used the toilet five times

Smith Family Water Record

(use amounts and assumptions above X 4 people X 7 days)

Activity	*Typical Inefficient Use – WEEK 1*	*Water-wise Use - WEEK 2*	*Water Savings: WEEK 1 – WEEK 2 (gallons)*
Showering			
Washing Hands and Face			
Brushing Teeth			
Flushing Toilet			
Total:			

Use the total amount of water the Smith family saved in a week (located in the yellow box) to calculate how much water they could save in a year if they continued their new water management habits.

Smith Family Weekly Water Savings _____ gallons X 52 weeks = _____ gallons saved per year

Section 2 – Calculate the Water Savings

How Much Money Can the Smith Family Save?

It costs money to purchase water, heat water and dispose of wastewater. Determine how much money the Smith family saved in a year using their new water management habits. Colorado Springs Utilities charges by the cubic foot, so you must convert gallons into cubic feet. There are 7.48 gallons of water in a cubic foot.

Convert Yearly Water Savings from Gallons to Cubic Feet (cf) =

Colorado Springs Utilities' Cost Chart

Utility Type	*Cost per cubic foot (cf)*		*Smith Family Yearly Water Savings (cf)*		*Cost Savings per Year ($)*
Water	$0.05	X		=	
Wastewater	$0.02	X		=	
Natural Gas	Only about half the bathroom water is heated. Divide the amount of water saved per year by 2 =				
	$0.05	X	Answer from line above	=	
			Total Cost Savings:	=	$

The Environmental Protection Agency (EPA) recommends using WaterSense® labeled products to save water. ***What do high-efficiency fixtures cost?***

High-efficiency toilet	$100
High-efficiency showerhead	$15
Faucet aerator	$5

Do the math:

Total cost to upgrade bathroom =

RETURN ON INVESTMENT

Within 1 year you'll have recovered the cost of fixture replacement through water and energy savings!

Family Encounter using a Shower Timer

(recreated with permission of Carla Rae Smith, a D20 science teacher)

Save water while you shower! Use the shower timer provided by Colorado Springs Utilities to change your habit to taking a shower that is under five minutes.

1. For the first three days, track your usual time for each shower in the chart below. For the next four days, use the five-minute timer. If you go over, estimate by how much or set your own timer. Extra lines on the chart are for family members to take on the challenge. If you don't take a shower on a day, leave it blank. If you take more than one shower in a day, add the times together.

Name	Shower Time (minutes)						
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7

2. Typical showerheads can flow between 2.5 and 5 gallons per minute (gpm). High-efficiency showerheads are closer to 1.5 gpm. Measure your shower's flow rate by placing a bucket under the showerhead to catch the water for one minute. Use a stopwatch to be exact and measure the amount of water in the bucket after one minute. Your actual flow rate is: _____gpm

3. Calculate the amount of water used in the longest shower on your table: _____ gallons

4. Calculate the amount of water used in the shortest shower on your table: _____ gallons

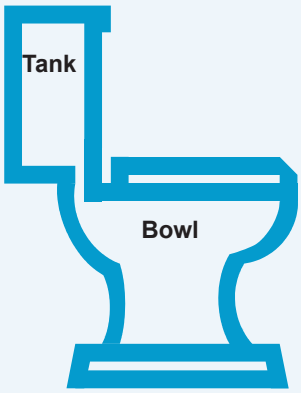
5. Calculate the water use difference between the long and short showers: _____ gallons

6. What was a strategy you used to reduce your shower time?

Is Your Toilet a "Silent" Leaker?

Did you know that toilets are the source of most water leaks? According to the Environmental Protection Agency, one out of every four toilets can be a "silent" leaker, losing about 20 gallons of water a day without you noticing. If you can hear your toilet running, you may be losing up to 200 gallons a day!

Ask your parents' permission to test your toilets at home for silent leaks.



Toilet Leak Testing Instructions:

a. With your parent's permission, add a special dye tablet or 10 drops of food coloring into the water in the tank at the back of the toilet.

b. Do not flush.

c. After 10 minutes, look in the bowl and see if colored water appears.

d. You have a leak if colored water from the tank seeps into the bowl.

Toilet Leak Testing Data Chart	
Number of toilets tested =	
Number of toilets leaking =	
Amount of water lost per day to leaking toilets (estimate 20 gallons of water a day per leaking toilet) =	
Water lost to leaking toilets in one year (gallons) =	

Fix toilet flappers or replace leaking toilets. Watch this YouTube video to see how you can fix the flapper yourself: Go to YouTube.com and search "Stella Fixes a Leaky Flapper."

Congratulations: You now are a Water Conservation Wizard!