



WHERE DOES OUR WATER COME FROM?



HOW DO YOU USE WATER?

In the space below, list ways in which you use water.

THE STORY OF WATER

The story of water in Colorado starts in the Rocky Mountains. Colorado is known as a **headwater** state. This means that all the precipitation that falls in our state flows OUT of the state, and no water flows INTO the state. There are only two states in the United States that are headwater states. One is Colorado and the other is Hawaii.

Our state also has many **watersheds**. Watersheds are sometimes called drainage **basins**. A watershed is an area of land where rain or snow drains into a stream or other water body. Ridges of higher ground form boundaries between watersheds. Rain falling on one side of the higher ground flows toward the low point of one watershed, while rain falling on the other side of the boundary flows toward the low point of a different watershed.

Snow that falls high in the mountains can sometimes stay frozen for a long time. Nature provides this good way to store our water. When that snow melts, the water then flows downhill towards the rivers and streams.

Colorado has eight major river basins throughout the state, and a ninth basin in the city of Denver. These basins form areas that provide borders for the rivers geographically and also are used by people to organize and manage our water. There are groups of people who come together to help manage each basin. These groups are called **Roundtables**. These people work together to solve the water challenges we face.



LOCATING YOUR WATERSHED

On the map below, complete these steps:

Step 1: Place a star where you live.

Step 2: Color your watershed yellow.

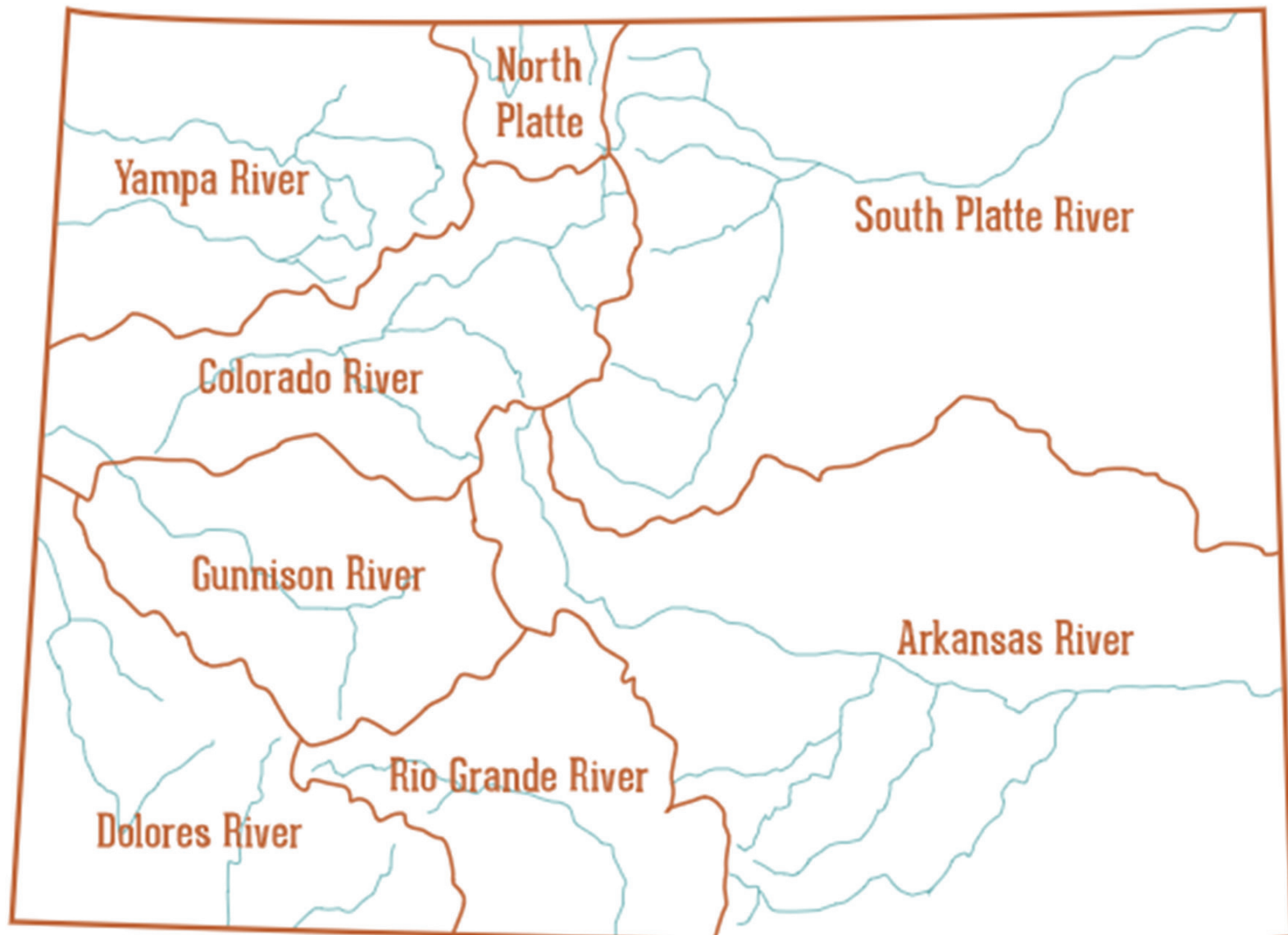
Step 3: Trace the border of the South Platte Watershed in green.

Step 4: Draw diagonal lines on the watersheds with rivers that will carry water toward the Atlantic Ocean.

Step 5: Draw horizontal lines on the watersheds with rivers that carry water to the Pacific Ocean.

Step 6: Draw a compass rose on the map to indicate North, East, South, and West.

Step 7: The ninth water basin, the one around the city of Denver, is missing from this map. Can you draw it in?





Benjamin Eaton

Can you imagine vast open rangeland covered with only cactus and grasses covering the South Platte River Basin? No farms in sight? This is what the Colorado Front Range would have looked like had it not been for someone who did not let unexpected turns in his life make him quit. Through persistence and using what we have learned from the past, people can take those unexpected turns and create something memorable, just like a man named Benjamin Eaton.

Imagine a young man who, in the early 1800s, joined the Ohio Line Railroad's engineering crew to survey lands in the west. He

HISTORICAL PERSPECTIVE: BENJAMIN EATON

spent summers farming and winters teaching school with no idea what his future might hold. Life took a tragic turn in 1857, when his wife passed away, while giving birth to his son, Aaron. After this heartbreak, the 21-year-old left his son with his mother and traveled west to Iowa where he purchased a farm. Two years later, he would join a group from Iowa that would travel west to join the thousands of "59ers" who were going to find gold!

In 1859, Eaton and other farmers from Iowa traveled through the San Juan country of Colorado looking for illusive gold. They were unsuccessful and most headed back to farm in Iowa, but not Eaton. He decided to take a turn south and experiment with irrigation ditches in New Mexico as a part of the Maxwell land grant. Who knew that this detour would later become one of the foundations for his lasting impact on the state of Colorado?

In 1862, during the Civil War, Eaton joined up with Colonel "Kit" Carson in New Mexico. The Civil War campaign ended quickly for

Eaton and he headed back to visit his son in Ohio and marry a woman named Rebecca Hill.

Rebecca, Aaron, Eaton, and two more of their children left Ohio and traveled west to Colorado. Eaton had noticed the land on his previous journeys and thought that with irrigation this Colorado land could produce many crops. He settled near Windsor and purchased 25,000 acres, laying claim to the Cache la Poudre River waters from the Union Pacific Railroad. There he began to create irrigation systems that would forever change the future of Colorado by allowing farmers to have access to water.

In 1870, Nathan Meeker was sent west by Horace Greeley to the confluence of the South Platte and Poudre Rivers to start a colony. (Confluence means the junction of two rivers.) The colony was called Union Colony but is now known as Greeley. The farmers of the colony would need water for crops in this semi-arid location. Nathan Meeker talked to Benjamin Eaton who promised

to help build a ditch that would be critical to the colony's farms.

Eaton would not give up on the ditch, even when things got tough. Gophers digging holes through the canal and even a fight between two neighboring towns would not stop Eaton. Canal No. 1, Larimer Canal No. 2, and even the Windsor Reservoir were completed because of the perseverance of Eaton and others. Because of their efforts, water was flowing to different parts of the Front Range, bringing with it a boost to the area's agriculture and economics.

Eaton continued to try new challenges and became the Justice of the Peace and a Weld County commissioner. He even served in the territorial legislature. In 1884, Benjamin Eaton became the fourth governor of Colorado where he continued to work on improving farming and irrigation systems in the state. He was given the nickname "The Farmer Governor."

Learning from each of the experiences that he had, Eaton made a difference in Colorado that still impacts our state today. He turned the South Platte River valley into a vital agricultural region.

GEOGRAPHIC PRECIPITATION IMBALANCE

Did you know? Nearly 80 percent of the water in Colorado is on the West Slope. More than 80 percent of Colorado's population and irrigation water demands are on the East Slope. This is called a geographic precipitation imbalance.



One-third of an acre-foot of water is delivered to an average home every year. An acre-foot is 326,000 gallons or enough water to cover a football field 12 inches deep. Sixty percent of the water is used inside the home for showers, laundry, cooking, cleaning, and other uses. The remaining 40 percent is used outside. A small fraction of water used outside returns to the water cycle eventually. Of the water used inside the house, 95 percent returns to the water cycle through the treatment system. Rainfall and snowmelt on roofs and pavement flows directly to streams.

"GOOGLE IT" SOUTH PLATTE BASIN CHALLENGE

Here are some towns in the South Platte River Basin and the way they were named. See if you can match the name of the town with the history behind its name. It is fair to "Google It!"

Name of South Platte Basin town:

 K Johnstown

 Dearfield

 Fort Lupton

 Eaton

 Galeton

 Windsor

 Platteville

 Mead

 Lucerne

 LaSalle

 Kersey

 Nunn

 Keenesburg

 Hereford

 Greeley

History behind the name of the town:

A This town was first called Orr, but was confused with Orr, California and Carr, Colorado. This town got its name from the founder's mother's maiden name.

B In about 1892, a railroad built a side station at this location north of Greeley. It was named after the English word for alfalfa.

C In 1859, Horace Greeley took a tour of the West and was impressed with the agricultural possibilities of the area. He told Nathan Meeker to start a Union Colony. Meeker named it after Horace.

D This town was named after a doctor who homesteaded the area in 1886. His son named the town after his dad 21 years later.

E This town borders the South Platte River and was founded in 1871. French explorers who discovered the Platte river described it as "a mile wide and an inch deep." This town is named after this river.

F Oliver T. Jackson started this town in 1910 as the only black colony in the state of Colorado. The name came from the founders who wanted people to know that as farmers their fields were "dear to them."

G This town was first called Zita. The Union Pacific Railroad renamed it "Gale" after a railroad official. The name was later changed to its current form so that it would not be confused with "Gill."

H This town lies just two miles south of the state line in northern Weld County and is named for a cattle breed.

I In 1862, Benjamin Eaton built a farm on this present location. It was originally called New Liberty, but the name was later changed to the name of a former Fort Collins circuit-riding Methodist minister.

J Incorporated in 1892, the town was founded by a prominent builder of irrigation projects in the area. He was later elected governor of Colorado.

K Harvey Parish named this town when he thought his son was dying from appendicitis. His son, John, survived and later became the mayor of the town named after him!

L Should this town be spelled as one word or two? Even town officials debate this question. This town was named after a famous French explorer.

M This town has a tower that encourages people passing through to “watch the town grow.” It was first called Maynard, but had its name changed due to the heroic actions of its current namesake who saw a bridge burning and ran down the railroad tracks flagging down an oncoming train. The railroad company renamed the town in his honor.

N A sign that reads “Home of 500 Happy People and a Few Soreheads” is in front of a town that used to be a telegraph office and was named for a rancher in the area.

O This town was established in 1882. Its namesake was a lieutenant in the army leading an expedition through the Rocky Mountains in 1835. He established a trading post at this site. He first named it Fort Lancaster.

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

CAN YOU FIND ALL THESE WORDS IN THE WORD FIND?

ABIOTIC

EROSION

TRIBUTARY

AQUATIC

FLOODPLAIN

TURBIDITY

BIOTIC

GROUNDWATER

WATERSHED

DEPOSITION

RIPARIAN

WEATHERING

DIVIDE

RUNOFF

WETLAND

ECOSYSTEM

SEDIMENT

MEETING COLORADO'S WATER NEEDS

Colorado's population has grown from 1 million in 1930 to more than 5 million today. The population is projected to grow at even faster rates in the future. How do we ensure population growth doesn't change what we know and love about our state - such as our precious natural resources, and especially, our water resources? When it comes to our water, Colorado's Water Plan has answers.

The Colorado Water Plan provides solutions to Colorado's water challenges. It also identifies ways in which we will continue to find solutions to our water challenges into the future. If Colorado's water is managed strategically, our state has enough water to meet our needs well into the future.

How many of the water conservation tips on the right can you start doing? Check with your city's water department for more ways and helpful resources to conserve water in your home.

1. Turn off the tap while brushing your teeth. Water comes out of the average faucet at 2.5 gallons per minute. Don't let all that water go down the drain while you brush! Turn off the faucet after you wet your brush, and leave it off until it's time to rinse.

2. Cut your showers short. Older shower heads can use as much as five gallons of water per minute. Speed things up in the shower for some serious water savings.

3. Turn off the tap while washing your hands. Do you need the water to run while you're scrubbing your hands? Save a few gallons of water and turn the faucet off after you wet your hands until you need to rinse.

4. Fix your leaks. Fixing leaky faucets can mean big water savings.

5. Re-use your pasta cooking liquid. Instead of dumping that water down the drain, try draining your pasta water into a large pot. Once it cools, you can use it to water your plants. Just make sure you wait, because if you dump boiling water on your plants, you might harm them.

6. Head to the car wash. If the car needs to be washed, ask your parents to take it to a car wash that recycles the water, rather than washing at home with the hose.

7. Choose efficient fixtures. Buying a low-flow toilet, choosing efficient shower heads, and opting for a water efficient dishwasher and washing machine can add up to big water savings.

8. Shrink your lawn. Even better: lose the lawn completely. Instead, opt for a xeriscaped landscape that incorporates low-water ground cover, succulents, and other plants that thrive in drought conditions.



The *Colorado Reader* publication is an Agriculture in the Classroom project of the Colorado Foundation for Agriculture. The Colorado Foundation for Agriculture (CFA) is a 501(c)3 non-profit education corporation and works with industry partners to help meet our shared vision of advancing Colorado agricultural literacy. We provide Agriculture in the Classroom resources and programs to Colorado educators and

students, many of which are FREE or at minimal cost. For more information or to make a donation to support agricultural literacy education programs, visit www.GrowingYourFuture.com, or contact Jennifer Scharpe, Colorado Foundation for Agriculture, 10343 Federal Blvd Unit J Box 224, Westminster, CO 80260, 970-818-3308, Info@GrowingYourFuture.com. Content for this *Reader* has been provided by the South Platte and Metro Basin Roundtables, and the Poudre Learning Center © Copyright 2019 Colorado Foundation for Agriculture. Educational instructors may, for academic purposes, reproduce, download, disseminate, and transfer that material as long as the reproduction credits CFA as its source.

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Colorado Academic Standard Focus

4th & 5th Grade Reading, Writing, and Communicating:

- Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes. (CCSS: RL.5.4)
- Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (CCSS: RL.4.1)
- By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range. (CCSS: RI.4.10)

4th Grade Social Studies (History):

- Analyze primary source historical accounts related to Colorado history to understand cause-and-effect relationships (DOK 2-3)

National Agriculture Literacy Outcomes

Agriculture and the Environment

- Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals) (T1.3-5.e)

Answers

Page 3 - Locating Your Watershed

Step 4: Watersheds that carry water to the Atlantic Ocean are: South Platte River and Arkansas River

Step 5: Watersheds that carry water to the Pacific Ocean are North Platte; Yampa River; Colorado River; Gunnison River; Rio Grande River; and Dolores River

Page 6 - "Google It" South Platte Basin Challenge

K-Johnstown; F-Dearfield; O-Fort Lupton; J-Eaton; G-Galeton; I-Windsor; E-Platteville; D-Mead; B-Lucerne; L-LaSalle; A-Kersey; M-Nunn; N-Keenesburg; H-Herford; C-Greeley

Information for this challenge was taken from Mike Peter's article: From Boozeville to New Windsor: How Weld towns got their Name found at: <https://www.greeleytribune.com/news/local/from-boozeville-to-new-windsor-how-weld-towns-got-their-name/>

Additional Resources

www.GrowingYourFuture.com - The Colorado Foundation for Agriculture is a 501(c)3 non-profit educational corporation and works with industry partners to help meet our shared vision of advancing Colorado agricultural literacy. We provide Agriculture in the Classroom resources and programs to Colorado educators and students, many

of which are FREE or at minimal cost. Visit our website for more information about our programs, browse our online digital library, or search the Curriculum Matrix.

Curriculum Matrix - The Agricultural Literacy Curriculum Matrix is an online, searchable, and standards-based database for K-12 teachers. The Matrix contextualizes national education standards in science, social studies, and nutritional education with relevant instructional resources linked to Common Core Standards. Below are a few lesson plans that could be used in conjunction with this Colorado Reader on Careers in Agriculture. Go to www.GrowingYourFuture.com and click on Curriculum Matrix (on the Home Page or under the Educator's Tab), search each title within the Curriculum Matrix to find these lesson plans.

<https://greeleygov.com/services/ws/home> - The City of Greeley's water conservation program is one of the largest and most successful in Colorado. Visit their Water Conservation Education page for more information on their successful water education programs including classroom presentations, "Caring For Our Watersheds" program, DVDs and videos, and tours.

www.CCWCD.org - The mission of the Central Colorado Water Conservancy District is to develop, promote, and implement water conservation, augmentation, and management strategies to protect water resources for the benefit of the citizens of the District and Subdistrict. CCWCD strongly believes that the key to protecting our water resources while sustaining agriculture production is through education. They offer educational opportunities to their citizens from kindergarten through senior including the Children's Water Festival, Well Watch Program, and the Confluence Institute for educators. The Greeley Children's Water Festival for fourth-grade students is April 24, 2019. Contact CCWCD for more info.

PoudreLearningCenter.org - Their mission is to awaken a sense of wonder and inspire environmental stewardship and citizenship through education of students, families and local residents along the Colorado Northern Front Range. Visit their website to learn about their classroom field trips and other educational opportunities for students.

SouthPlatteBasin.com - South Platte Basin Water Implementation Plan video: <https://vimeo.com/114841419>

DenverWater.org - For Denver Water area schools, check out their Youth Education Programs, including classroom presentations and treatment plant tours. Also available on their website is the Journey of Water video series. These videos describe the story of water from the mountains to the home. The Denver Metro Water Festival for sixth-grade students is May 15, 2019. Contact Denver Water for more info.

Colorado Water Conservation Board - <http://cwcb.state.co.us/Pages/CWCBHome.aspx>

IRRIGATION TUBES – YOUR OWN EXPERIMENT

After canals were dug, farmers needed to be able to get the water from the canal to the crops. Many ditches were dug and the invention of the irrigation tube was a big help.

At first, farmers made “cuts” in the ditch that would allow the water to flow. This was very labor intensive and with erosion would make the watering not even over all of the crops.

The invention of the irrigation tube, helped farmers “set” the water and allows the water to flow evenly through their crops.

All you need to try to “set a tube” is an irrigation ditch with water, a metal pipe, and a bit of “know

how.” Place the tube into the water at an angle to get as much water into

the pipe as you can. Place your hand over the end of the tube that is out of the water and “pump” the tube back and forth in the water. When water starts to squirt out of the tube, lay the end of the tube you were holding over the bank of the ditch so that gravity will help the water flow from the ditch, through the tube, to the crops. If it didn’t work, no worries, just try it again!



If you don’t have a tube or an irrigation ditch handy, you can experiment with the concept by trying the experiment below:

Siphon Experiment

For this experiment you will need:

- 2 gallon buckets
- Water
- Clear tubing approximately 3 feet in length (can be found in a science lab or purchased at a hardware store)

1. Place one bucket on a stool and the other bucket on the ground.
2. Fill the top bucket with water.
3. Place one end of the tube in the top bucket, submerged in the water at the base.

4. Create a vacuum on the opposite end by suctioning the water up the tube like drinking from a straw.

5. Once water gets to the end of the tube immediately place it in the bottom bucket.

6. What happens? In what direction does the water travel?

7. Now reverse making the water flow up into the top bucket.

8. Fill the bottom bucket with water. The top bucket should be empty.

9. Place one end of the tubing in the bottom bucket and create a vacuum.

10. Once the water reaches the other end of the tube immediately place it in the top bucket, near the base.

11. What happens? Does the water travel in the same direction?

Experiment taken from: <https://www.education.com/science-fair/article/uphill-water-flow/>

