

# Water Cycle Education Activities

## Summary

*Students dive into questions such as*

*Where does our water come from?*

*Where does it go?*

*Students will understand the features of a watershed, the geography that shapes it, and what it takes to keep the watershed healthy.*

## Objectives:

- Students will be able to explain what a watershed is
- Students will be able to explain where the water is coming from and where it is going
- Students will be able to list one action they can do to keep the watershed healthy

## Foil Watersheds

**Time:** 30 min

**Materials:** Spray bottle, foil/paper/ or their hands, markers

**Potential Standards/Themes:** How we define watershed,

NGSS 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

## Directions:

1. Introduce the activity by having students hold their hands together, then open them up, like the gesture for a book. If water were to fall on your hands, where would it go?
2. Explain that their hands are like a watershed, or an area of land where all the water drains/flows down to the same place. (You can also have them break down the word watershed and talk about how a shed is used for storage- natural water storage)
3. Give each student an 8 1/2 x 11 inch piece of paper and ask them to crumple it into a tight ball, and then gently open up the paper, being careful to not flatten it out completely.
4. Have students choose one color marker and draw lines to connect the highest points on the map. These are the mountain ridgelines.
5. Have students choose a second color and mark the low places where different bodies of water might be found: creeks, rivers, lakes, etc.
6. With a third color, have students mark four or five places to represent places of human activity: housing, factories, shopping centers, schools, trash etc.
7. Have students predict the path water might take on their foil (students may use pencils to draw the path on their maps).
8. Lightly spray the maps using spray bottles. Ask students what the water from the spray bottle represents (rain falling onto the landscape).
9. Discuss:
  - What path did the water follow?
  - Were their initial predictions correct?
10. Define a watershed (an area of land that drains surface and groundwater into a common body of water like a stream, creek, reservoir, or bay). Ask students to describe how they created mini watersheds in their hands.
11. Discuss the following in small groups or as a class:
  - How does water flow in the watershed?
  - Where did you place the human activity on your map? Why?

- What types of materials might the water pick up as it moves through the watershed?
  - Where do these materials come from?
  - Where do you think these materials will end up?

### Build your own watershed (Outside)

**Time:** 30 min

**Materials:** None

**Potential Standards/Themes:** How we define watershed

NGSS 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

**Directions:**

1. To reiterate the concept of a watershed and how the landscape is shaped by water, have students build their own watersheds from natural materials.
2. In an area with soft sand, instruct small groups of students to build their own landscape from natural materials such as dirt, rocks, sticks, leaves and whatever else they can find dead on the ground. They can include a town or home if they want.
3. Each group should make a prediction for what will happen to the water and the landscape if it rains.
4. Give groups 10-15 minutes to build and then give each group a chance to share special features of their landscape and predictions.
5. Pour water from a jug or bottle to create a flood on each landscape and watch how the water erodes the sand
6. Encourage students to share their observations.
  - Point out drainage areas, rock features that don't erode, lakes forming and any other interesting features.
  - Key words: erosion, drainage, gully, saturation
  - Point out depositional environments
7. Explain to the students that they made a watershed. Ask them to use their observations and create a definition of a watershed with their group.
8. Have groups share their definitions of watershed, then use everyone's input to create a class definition.

### Upstream Neighbors

**Time Requirement:** 40-60 min

**Materials:** large papers, pencils

**Before the lesson:** On large pieces of paper, draw a river that runs from one end of the paper to the other end. This paper will be referred to as "a plot of land" At the end of the activity the students will connect the plots of land to create one long river.

**Directions:**

1. Introduce the concept of a watershed (an area of land where water falls and drains into a common point). You can do this with the activity mentioned above.
2. Divide the class into groups of three or four and give each group the "plot of land"

3. Instruct them to design and draw a town that is located along a river. They can be as creative and silly as they would like. Suggestions include; farms, ice cream shops, amusement parks, waterwheels, etc.
4. Once the groups are done, have each group present their town.
5. Place the plots of land next to each other as though all the towns are along the same river.
6. Tell a story about how each town could be impacting the one downstream with their farms, factories, grocery stores, roads etc.
7. Give students a chance to decide on mediation efforts that they could do in their town to reduce its impact.
8. How about in their real-life town? What can they do to conserve/protect water in their own town?

### From Source to Sea

**Time:** 30 min

**Materials:** Rope

**Potential Standards/Themes:** Geography

**Directions:**

1. Ask students where the river starts? Where does it end?
2. Have the tallest student be “Rocky Mountain National Park”. They will stand on a stool and hold the rope up high. Ask them to make a noise like an animal (wolf, owl, etc) from the Rocky Mountains.
3. For the rest of the rope you will introduce a place and ask students to discuss who may live in this place and how water is used. Pick one volunteer to stand at the rope to represent this place. If the group is goofy you can have them act out each spot (*indicated by italics in parentheses*).
  - Grand Lake: Rafting and boring (*raft up to the rope*)
  - Rocky Mountains: Ski resorts use the water to make snow (*ski up to the rope*)
  - Glenwood Springs, Colorado : Canyon is formed by erosion with the river (*rub hands to show erosion*)
  - Rifle/West Slope, Colorado: Ranching (*Moo like cows, lasso like a cowboy/girl*)
  - Palisade, Colorado : Fruit farms (*Pick a peach*)
  - Grand Junction, Colorado: Ask them what is a junction- a place where things meet. The Gunison meets the Colorado in GJ (*Cross arms like a junction*)
  - Moab: Canyonlands is formed by erosion (*erosian hands*)
  - Utah Melon Country
  - Green River UT: Tell students about the disagreement between WY and CO over where the headwaters start.
  - Lake Powell, Arizona : Boating
  - Glen Canyon Dam: Hydroelectric dam. (*kids point their fingers in the air and go “zap zap zap”*)
  - Grand Canyon, Arizona: Formed by Erosion

- Hoover Dam: Hydroelectric dam (*Zap Zap Zap*)
- Los Vegas, Nevada: One kid represents Los Vegas. They stand away from the rope but stick their hand out like a straw and make slurping sounds.
- Central Arizona Pipeline, Arizona: One kid represents Phoenix. They stand away from the rope but stick their hand out like a straw and make slurping sounds.
- Yuma, Arizona: Where 90% of America's winter veggies come from (*Pretend to use a watering can*)
- San Luis Border Crossing: The River crosses into Mexico
- Mexico: Lots of canals to divert water to ranches and farms in Mexico. This is the first year that the dams are being released to ensure water gets to Mexico for 5 months straight.
- Colorado River Delta: Good migratory bird habitat. The river empties into the Sea of Cortez (*act like a bird*)

## A Drop in the Bucket

### Background:

- Colorado River starts in Granby, CO (Rocky Mountain National Park on Western Side)
- Colorado River ends in Sea of Cortez in California Peninsula
- 15 dams on the main stem (including Parker Dam- Lake Havasu, Hoover Dam- Lake Mead, and Glen Canyon Dam- Lake Powell) and hundreds more on tributaries
- 1,450 miles long, 7 US states rely on it (Colorado, Utah, Arizona, Nevada, California, Wyoming, New Mexico) and 2 Mexican states (Baja California, Sonora), 30 million people
- Since 1961, only a few drops has actually entered the Sea of Cortez
- Colorado winter determines if it's going to be a low water or high water year for farmers. They then have to decide what crops to plan based on the results in April and how much water is available to them.

### Materials:

1. 1 small bucket of water, one empty bucket to dump water into
2. 1 cup
3. Map of the United States (that shows the CO River) and Colorado Watershed Map
4. Picture cards of river, dams, source, and outlet

### Acre Feet:

- Water is measured in Acre Feet
- One acre foot of water is 1 football field covered with 1 foot of water

### Directions:

1. Spread out a map of the United States
2. Talk about where the Colorado River starts and ends
3. Talk about what an acre foot is in reality

4. Fill a bucket up with water and collect a bucket to empty water into
5. Gather one cup. Explain to the students that 1 cup is equal to 1 million acre feet of water.
6. Take cups away from the water bucket to explain how much water is being taken from the Colorado River. If you want to use all the “cups to take” you will need 14 cups of water in your bucket.
7. At the end, grab the bucket and turn it over. What comes out is how much Mexico gets!
8. Discuss:
  - Is this fair?
  - Who decides who gets how much water?
  - Is anyone’s water usage more important than anyone else's?
  - What can we do as an individual/town/state/country to conserve water?
  - Who can we learn from about water conservation?

**Cups to Take:**

- The Front Range uses 1 million acre feet of water per year (take one cup)
- Denver, holds about ¼ of the population of the state, tunnels water through the continental divide from around the state including Dillon Reservoir, Williams Fork Reservoir (near Kremmling), Lake Granby, uses 2 million acre feet of water (take 2 cups)
- Salt Lake City uses ½ million acre feet of water a year (take ½ cup)
- Central Utah, melon country, uses 2 million acre feet of water (Take 2 cups)
- 1 million acre feet of water evaporates from lakes, reservoirs, and dams each year (take 1 cup)
- Las Vegas uses 3 million acre feet per year (Take 3 cups)
- Phoenix uses 2 million acre feet per year in just swimming pools and golf courses (Take 2 cups)
- Imperial Valley, California, which gets its water from the river by way of All American Canal, an 80 mile long aqueduct that is the only source of water for the farming community and 9 surrounding cities, uses 3 million acre feet of water per year (Take 3 cups)
- What is left is what Mexico gets! (should be maybe a quarter of a cup if you are lucky)

Postcards From Home

**Time:** 20-40 min

**Materials:** Paper(cut into pieces that are about 4” x 6”), colored pencils

**Potential Themes:** Exploring a sense of place

**Ages:** Elementary- Middle school

**Directions:**

1. *This activity is best conducted after ‘drop in the bucket ‘or the rope activity.* Start out with a discussion. Have students do a *Think, Pair, Share* in groups of 2 or 3. Pick one location from the activity and have students reflect on:
  - What is something that surprised you from this activity?
  - Now that you know this, do you think differently about that place/location?

2. After students share out, record their reflections on the board. Are they positive? Negative? Neutral? Pull up pictures of student's postcards from that location (available on our website)
  - Ask students, how does this affect your opinion/reflection?
3. Next engage the class in a discussion
  - What do you think people think about the place where we live?
  - What is special about the place we live in?
  - How do we use our natural resources?
  - How might our action affect people downstream?
  - What do we do to protect our resources?
4. Next, ask the students to write a postcard to another student in the watershed. Pass out paper. Instruct students to draw something on the front that shows the world their favorite place in their town. Write on the back something amazing about where you live and what you can do to protect water for others.
5. Options for sharing postcards
  - Instagram: Photograph your students postcards and tag us @watercycle\_adventure
  - Email: Email pictures to [thewaterbicycle@gmail.com](mailto:thewaterbicycle@gmail.com) and we will post them on our website
  - Snail Mail: Contact us [thewaterbicycle@gmail.com](mailto:thewaterbicycle@gmail.com) and we can share an address of another school participating in the project

## A Watershed of Stories

**Time:** One class period, plus about a week for students to complete assignments.

**Materials:** Computer and projector or smart board, audio recorders for students without smartphones

**Potential Themes:** History and English, Primary sources

**Ages:** Upper middle to High School

### Directions:

1. Introduce the concept of "a single story" with the Ted Talk from Chimamanda Ngozi Adichie. <https://www.youtube.com/watch?v=D9lhs241zeg&t=810s>
  - Check in with the students- what is Adichie's main point? What is "the single story"
2. Introduce the concept of a single story in relation to the Colorado River.
  - What do students think the story is around the Colorado River? How is the river portrayed?
  - If needed, you can show news clips like this one: [www.cbsnews.com/news/mega-drought-colorado-river-system-water-system/](http://www.cbsnews.com/news/mega-drought-colorado-river-system-water-system/)
  - Potential themes we see in the media
    - Conflict
    - Fear
    - Desperation
  - What is the danger of having a single story about the river?
    - Potential answer: If we feel overcome with desperation will we work to protect the river or will we be too overwhelmed?
    - If people think others are rooted in conflict will they be willing to collaborate or fend for themselves?

3. Can we rewrite this narrative? Ask the students to come up with other stories about the river? When they think of the river, what do they think of?
  - What kinds of pleasurable experiences have you had on the river?
  - Do you know anyone who is working to protect the river?
4. Explain to the students that it is their job to expand upon the “single story” of the Colorado River. They will be compiling an oral history about the importance of the Colorado River to their local region, which highlights positive relationships.
5. Options for sharing stories
  - Email: Email recordings to [thewaterbicycle@gmail.com](mailto:thewaterbicycle@gmail.com) and we will post them on our website and add them to our oral history database.

*Assignment: Record an oral history (interview) about the Colorado River.*

Interviewee can be anyone outside of other students

Interview Questions:

- What is your earliest memory of the Colorado River?
- Where is the river in relation to where you live?
- How do you use the river?
- What is a positive memory you have about the river and/or water?
- How can our town work to better protect the river?
- What is one thing you would like other people in the watershed to know about our community?