

Activity: Mapping - Follow the Rivers

Objectives:

- Learn the geography of the Missouri and Colorado River Watersheds and understand their location compared to the Continental Divide
- Understand the geography of the state of Colorado and where the major watersheds are located

1. Print copies of slides #4 and #9, one or more for each student. Print copies of the [outline of student directions](#). All three can be found online as separate documents under the documents and materials section.

2. Slide #1

- Hand out copies of slide #4 and the student directions.
- Project slide #1 on a white board.
- Allow the students to discover the features on this map. Have the students guess where the Canadian and Mexican borders are.
- Ask the students to label the large bodies of water around the United States: the Atlantic Ocean, Pacific Ocean, Gulf of California and Gulf of Mexico.

3. **Slide #2** This map has the lower forty eight states outlined. It also shows the U.S. mainland borders.

- Ask if the students were close on their border guesses. Are there any clues? Tell them the jagged lines are rivers, and ask them what the straight lines could be. [Canada's straight border is along the 49th parallel north. Mexico's border is a series of markers placed with straight lines drawn between them.]

4. **Slide #3** is a map showing a few lakes and dams.

- Point out that blue typically means water to familiarize the students with looking for bodies of water.

5. **Slide #4** is where the student activity starts (this is the slide you will print for each student). The slide has the states outlined, and has a few lakes and dams marked; the Great Lakes, the Great Salt Lake, Lake of the Woods, and three dams on the Missouri River, which are shown but not labeled. The dams on the Missouri will help the students locate the Missouri River. The South Platte River is very distinct in the northeast corner of Colorado, and the North Platte River is distinct through Wyoming. You can also see where the two join in Nebraska, and where the Platte River joins with the Missouri River. The mighty Mississippi River is hard to locate unless the jagged boarder between the many states is pointed out.

Group activity (from the student guide). Suggestion - if there is more than one school of thought, use a different color and add a key.

Students will guess where the Colorado River is located and where major waterways are between the Mississippi and the Continental Divide. Have them draw their guesses using a dry erase marker.

- a. Mississippi River
- b. Missouri River
- c. North and South Forks of the South Platte River
- d. Arkansas River
- e. Rio Grande River
- f. The Colorado River is an important river in our state but does not drain into the Mississippi River. The Colorado ends up in the Pacific Ocean, draining much of the southwestern United States and a small part of Mexico.
- g. North Platte River

6a. **Slide #5** Discussion: Let students talk about how close or far off they were and why. The Ohio River is another river like the Platte; it is very distinct and the students may get it confused with the Mississippi.

6b. Action: Have the students draw the correct river course on their handouts.

Background

Students living in and around Denver live in the Missouri watershed. When looking at the big picture, the Missouri River drains into the Mississippi River. The longest river in the United States is the Missouri, also called the Big Muddy, at 2,540 miles long. The Missouri drains into the Mississippi River near St. Louis, Missouri. The Mississippi River is only 2,340 miles long, but carries a larger volume of water than the Missouri. Please note in the chart below the South Platte is not counted in the miles of Platte River, but rather the Platte River is measured from the headwaters of the North Platte in Wyoming. The South Platte and the North Platte waters become the Platte River in North Platte, Nebraska. The South Platte is the major river running through Denver.

River, Length in miles (flows into)

1. Missouri, 2,540 miles (flows into Mississippi River)
2. Mississippi, 2,340 miles (flows into Gulf of Mexico)
3. Yukon, 1,980 miles (flows into Bering Sea)
4. Rio Grande, 1,900 miles (flows into Gulf of Mexico)
4. St. Lawrence, 1,900 miles (flows into Gulf of St. Lawrence)
6. Arkansas, 1,460 miles (flows into Mississippi River)
7. Colorado, 1,450 miles (flows into Gulf of California)
8. Red, 1,290 miles (flows into Mississippi River)
9. Brazos, 1,280 miles (flows into Gulf of Mexico)
10. Columbia, 1,240 miles (flows into Pacific Ocean)
11. Snake, 1,040 miles (flows into Columbia River)
- 12.* Platte, 990 miles (flows into Missouri River)

From <http://www.enchantedlearning.com/usa/rivers/> The maps are not accessible unless you pay to subscribe.

* The North Platte watershed group has the miles at 1,030

The South Platte River runs 439 miles from South Park to Nebraska.

7. **Slide #5** Students will draw the Continental Divide on the white board.

"The Continental Divide, also called the Great Divide, is a mountain ridge in western North America. This ridge runs north and south and separates the flow of water on the continent. On the eastern side of the divide all streams flow toward the Gulf of Mexico and the Atlantic Ocean. On the western side all water flows toward the Pacific Ocean. "
Continental Divide - Children's Encyclopedia (Ages 8-11)

- a) **Q)** Ask students where the waters on the west side of the divide flow.
A) Pacific Ocean.
- b) **Q)** Ask students if all the rivers on the eastern part of the U.S. flow into the Mississippi River.
A) No, the Rio Grande does not. It flows into the Gulf of Mexico, the same as the Mississippi.
- c) Talk about the rivers east of the Mississippi.
 - The students are going to try and draw in the Continental Divide. No one will get it exactly right. Focus more on the percentage they get correct rather than the entire Divide.
 - How did a group in the 1850s, with no planes, no cars, no satellites etc. draw this correctly?

- Although the divide represents the height of land between watersheds, it does not always follow the highest ranges/peaks within each state or province.
- It runs from Alaska to Argentina.
- The Continental Divide represents the flow of water into the Atlantic or the Pacific Ocean.
- There is another divide along the Appalachian Mountains. You may have some students from the east that may know of the Pocono Mountains and the Adirondack Mountains. This is not a continental divide. The rivers on one side drain into the Atlantic Ocean, and rivers on the other side drain into the Gulf of Mexico. The Gulf flows into the Atlantic. The Continental Divide is unique because it causes the water to drain into different oceans.

8. **Slide #6** Have the students trace the Continental Divide on their maps.

9. **Slide #7** Students will draw the border of Colorado. Colorado is called the headwaters state because so many rivers begin here (the beginning of a river is a headwater). Important: Not all of the major rivers flowing out of the surrounding states are on this map, they are not our objective. Student directions are:

On your map

- a. Outline the borders of Colorado in a bold color .

If you need to break up the lesson, this is a good stopping place.

10. Hand out the relief map of the state of Colorado (copies of slide #9).

11. **Slide #9** Group activity: Students will use the skills gained in the previous exercise to guess and draw on the white board where the major rivers in Colorado are. Students will often confuse the eastern plains hills that divide the South Platte and the Arkansas watersheds for a depression and draw in a river along the hills. Hints for students: Rivers flow down off of high spots and collect along the lower areas. The Colorado River is one of the most distinct rivers on this map, thus a good starting spot.

12. **Slide #10** has added some major highways to help students understand more of the map. Discussion questions:

- Where have the students traveled in the state?
- Do they remember seeing rivers along the highway?

14. **Slide #11** This is the slide where the students start to work. It also has a few of the larger cities added.

15. **Slide #11** Using previously gained skills and the U.S. map, use the white board to draw the Continental Divide.

16. Slide #12

How close was your class's guess? **Q)** Why isn't there a highway along the continental divide? **A)** It would be extremely difficult to build, maintain and travel. **Q)** Can you hike the Continental Divide? **A)** Yes, throughout the United States and part of Canada. Only about 12 hikers per year complete the whole trail—it takes about six months. No horseback riders have yet completed the trail.

17. Slide #13 The GIS specialist has outlined the major watersheds in Colorado on this map.

18. Slide #14 This is a different type of map. The topography layers have been removed. The streams are represented by blue lines.

19. Slide #15 The two types of maps are placed side by side. Students can look at the blue lines (streams) and the topography map and start to make the connection.

Action: students should draw the Continental Divide on their maps.

20. Slide #16 Action: On the white board, have the students find the following river courses leading out of Colorado

- North, Middle, and South Forks of the South Platte River (it has three branches)
- Arkansas River
- Rio Grande River
- Colorado River
- North Platte River
 - The Dolores, San Juan, Gunnison, White and Yampa Rivers require a higher skill level to find. The point is that they all empty into the Colorado River.

21. Slide #17 Have the students determine how close their guesses were using this slide.

Action: The students will now draw and label the rivers on their map. Please note that the Colorado River has many important rivers that drain into it, including the Blue River, the Eagle River, etc.

Slides #18 and #19 reinforce that the rivers flow into different bodies of water. The Gulf of California is the Pacific Ocean just as the Gulf of Mexico is the Atlantic Ocean.

This website - http://en.wikipedia.org/wiki/South_Platte_River - has mixed up the North, Middle and South Forks of the South Platte and where they run. We are working to correct the problem. The South Fork runs into Antero Reservoir. It then meets up with the Middle Fork in Hartsel. The Middle Fork's headwaters are above Alma and run through Fairplay. The Middle and South Forks' headwaters are in the Mosquito Range. After the two meet up, they run into Spinney Reservoir. Then, the river is correctly reported to run through Eleven Mile and Cheesman Reservoirs. The North Fork's headwaters are in Hall Valley on the north side of Kenosha Pass. The North Fork runs through Platte Canyon, east down Jefferson County Road 126, north after Pine, and finally meets the South Fork above Strontia Springs Reservoir. The North Platte description is also incorrect.