

Exploring River Profiles

NAME _____

DATE _____

In this activity, you will draw and compare profiles from source to mouth of the Mississippi and Missouri Rivers.

Procedure

1. Use the data in the table below to draw profiles of each river. A profile is a side view that shows how the elevation of the river changes along its course.
2. Set up the graph paper with the long side as the x-axis. Label the x-axis "Distance in miles from Mouth of Mississippi River". Use a scale of one-inch (10 small boxes) equals 500 miles.
3. Label the y-axis "Elevation in feet" and use a scale of one-inch (10 small boxes) equals 1000 feet.
4. Plot the points for the Mississippi River and the Missouri River on the same graph. Use a different color to connect the points for each river. Include a key. Note: The Missouri River is a tributary of the Mississippi River, so the lines for the two rivers will meet at one point – the mouth of the Missouri River.
5. Label the points that represent the source and the mouth of both the Mississippi & Missouri Rivers on the graph.
6. Give the graph a descriptive title.

Mississippi River			Missouri River		
Station	Miles from Mouth	Elevation in feet	Station	Miles from Mouth of Mississippi	Elevation in feet
Mouth	0	0	Mouth	1290	400
Mouth of Red River	350	35	Kansas City, Missouri	1680	715
Mouth of Arkansas River	550	120	Omaha, Nebraska	1950	960
Mouth of Ohio River	1090	275	Yankton, South Dakota	2190	1160
Mouth of Missouri River	1290	400	Mouth of Yellowstone River	2800	1855
Burlington, Iowa	1490	500	Fort Benton, Montana	3365	2565
LaCrosse, Wisconsin	1790	630	Great Falls, Montana	3400	3300
St. Paul, Minnesota	1935	685	Source of Missouri River	3650	4060
Minneapolis, Minnesota	1950	800			
Lake Itasca, Minnesota (source of Mississippi)	2350	1460			

Analysis of Data

Stream gradient is the slope of the stream channel. It is calculated as the **difference in vertical elevation** between two points on the river **divided by** the **distance along the river between** the same two points. In other words: Stream Gradient =
$$\frac{(\text{elevation of point 1} - \text{elevation of point 2})}{(\text{distance between points 1 and 2})}$$

where point 1 is upstream from point 2.

Calculate the stream gradient for two sections along each river. Units for gradient are **feet per mile**. Show your work. Label Units. Give answer in DECIMAL form, rounded to hundredths.

1. Mississippi River from source to St. Paul, MN

2. Mississippi River from mouth of Ohio River to mouth of Mississippi River

3. Missouri River from source to Fort Benton, MT

4. Missouri River from Omaha, Nebraska to mouth of Missouri River

Conclusions – Answer in complete sentences.

1. Describe the general relationship between stream gradient and the location along a river's course (i.e. near source compared to mouth). Does this relationship hold true for both the Mississippi and Missouri Rivers?

2. Compare the gradient of the Missouri River near its headwaters to the gradient of the Mississippi River near its headwaters. Which river appears to have its source in more mountainous terrain? Which river experiences a greater change in altitude over its entire course?

3. Find the Missouri and Mississippi Rivers on a map of the United States. Describe the geographic location of the headwaters of the Missouri River. What is the topography (landscape) of this area? Is it consistent with your answer to the previous question? Contrast that with the topography in the vicinity of the source of the Mississippi River.

4. What is the elevation of the base level (mouth) of the Missouri River? _____
 What is the elevation of the base level of the Mississippi River? _____
 "Ultimate base level" for all rivers is considered to be sea level. Which river reaches ultimate base level? _____

5. A delta is a depositional feature that may form at the mouth of a river if it flows into a relatively quiet body of water and deposits its sediment load.
 (a) Would you expect to find a delta forming near the mouth of the Mississippi River? _____
 Explain your reasoning.

 (b) Would you expect a delta to form at the mouth of the Missouri River? Explain why or why not.