
CHAPTER 1 — Decimals, Fractions, and Ratios

A. The Snake River is a tributary of the Columbia River. The Snake is one of the longest tributary rivers in North America. Look in an atlas for or on a roadmap of Wyoming, Montana, Idaho, Washington, and Oregon. Find the Snake and the Columbia rivers. Research the lengths of the Snake and the Columbia.

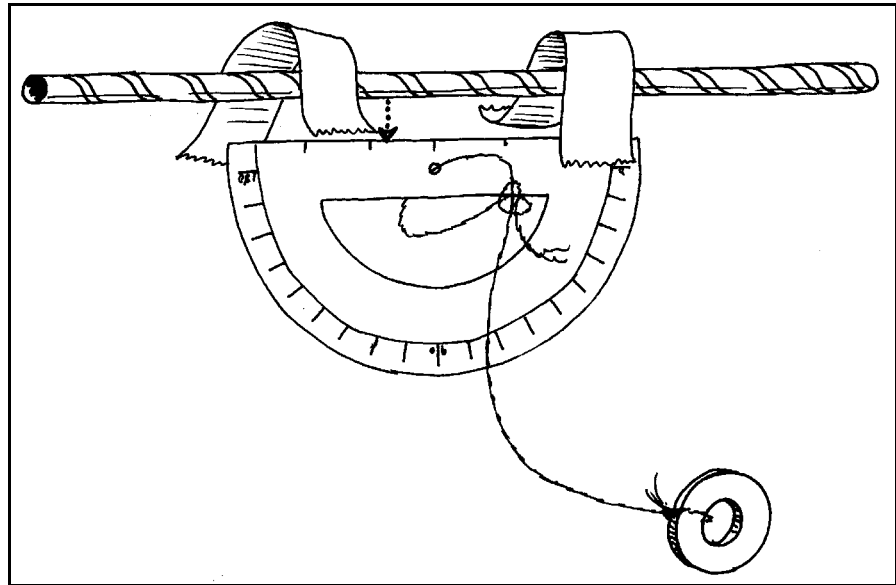
1. Draw your own map showing where the Snake rises near the southeastern corner of Yellowstone National Park and continues across southern Idaho on its journey to meet the Columbia.
2. The Snake carries runoff water from six states. What are they?
3. What fraction of the length of the Columbia is the length of the Snake? Express this fraction as a decimal.
4. Another tributary that rivals the length of the river it feeds into is the Missouri River. What fraction of the length of the Mississippi is the length of the Missouri?

B. In 1811, when David Thompson descended the length of the Columbia River, he had to know where he was. Explorers such as Meriwether Lewis and William Clark, James Cook, and others had to know where they were on their journeys. To reckon their locations, these explorers calculated the latitude and longitude of their position to the best of their ability.

Once they knew the longitude and latitude of a given place, they had established coordinates in space to fix the location. The coordinates of some points are easy to remember; for example, Cairo, Egypt, is 30 degrees north latitude and 30 degrees east longitude.

Here is a way to determine the latitude of where you live. With simple instruments, calculating latitude, which is distance from the equator, is easier than calculating longitude.

1. Study the illustration of the latitude-finder shown here.



2. Make a drawing of this instrument twice as large as the illustration.
3. Now build the instrument. You will need the following materials:

- soda straw
- string
- protractor
- washer
- tape

Assemble the instrument as follows:

1. Attach soda straw to straight edge of protractor
2. Attach washer to end of string
3. Feed string through hole in top of protractor and secure

When you have built the instrument, take it outside on a clear night and find the constellation Big Dipper (Ursa Major). When you find the Big Dipper, look up and to the right of the edge of the cup (the edge away from the handle). There you will find the North Star (Polaris). The North Star is directly above the North Pole or 90 degrees north latitude.

1. Site the North Star through the latitude-finder.
2. Through what point on the protractor does the weighted string pass?



3. What is the result when you subtract the number of the point on the protractor from 180 degrees? The result is the latitude of where you live.

The following is an example for Seattle. The string crosses the protractor arc at 133 degrees, so subtract 133 degrees from 180 degrees, and you have 47 degrees, the latitude of Seattle.

- C. Compare the second around-the-world expedition of Captain Robert Gray in *The Columbia* to Lewis and Clark's overland expedition.
1. What is the simple difference in miles each covered? Lewis and Clark covered what fraction of the distance Gray covered? Express the ratio as a decimal.
 2. Show the two expeditions on a map.
 3. Write a paragraph explaining how an overland expedition (Lewis and Clark) is different from a sea-going expedition (Gray).
- B. Study the illustration of the U.S. \$1 coin honoring Sacagawea, a member of the Lewis and Clark Expedition. After you have studied the illustration, draw the coin.
1. Can you write in words the meaning of “.999 fine silver,” which appears on the coin?
 2. How much larger than an actual Sacagawea dollar is the area of the coin shown in the illustration?
 3. What do the 17 stars on the coin signify?



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- E. The United States of America was founded in 1776. Oregon became a state in 1859, Washington in 1889, and Idaho in 1890.
1. How old is the United States?
 2. How old is each of these three states?
 3. Calculate the fraction of time that each of these states has belonged to the Union. Now convert each fraction to a decimal. (The answer varies depending on the current year. For example, in 2002 the United States was 226 years old, and Idaho was 112; therefore, the answer was $56/113$ or 0.49.)
- F. A commercial passenger plane can typically fly from Spokane to Seattle in about 40 minutes. To travel by automobile from Spokane to Seattle typically takes about 5 hours.
1. What is the ratio in time between the two means of transportation expressed as a fraction? (answer $2/15$)
 2. How much faster than a car does the plane travel? (answer 7.5 times faster)
- G. In 1803, President Thomas Jefferson presided over the Louisiana Purchase. The Louisiana Territory encompassed 828,000 square miles or 2,145,000 square kilometers.
1. What is the ratio (expressed as a fraction) of a square kilometer to a square mile?
 2. What is the ratio expressed as a decimal?
 3. Based on your findings, make a scale drawing in which you compare a square kilometer to a square mile. Write a statement that expresses the ratio of the size of a square kilometer to a square mile.
- D. Three famous pioneer trails to the West were the Oregon Trail, the Mormon Trail, and the Santa Fe Trail.
1. Find out how long each trail was.
 2. Draw a map that shows all three trails.
 3. Express the lengths of the two shorter trails as fractions and as decimals of the longer.