Lesson 2–Some Things You Need to Know to Read a Map

Key teaching points

• Mapmakers use north, south, east, and west to describe direction.

• Mapmakers usually orient their maps to show north at the top.

• It is possible to describe the relationship of one place to another. One place is north, south, east, or west of another place. This kind of orientation is known as **relative location**.

• Using longitude and latitude, a grid of imaginary lines created by geographers, it is possible to identify the **absolute location** of any point on the Earth's surface.

• The relationship between a distance on the map and the corresponding distance on the ground is known as **scale**.

• Using the distance scale, it is possible to determine the actual distance on the ground between two points shown on a map.

• Geographers use the terms "large-scale" and "small-scale" to describe the amount of area on the ground covered by a map. A large-scale map shows a small land area in great detail. A small-scale map shows less detail, but a larger land area.

How this lesson relates to the geographic themes

Location—This lesson focuses on developing skills students need to understand location—where things are. It helps students understand both absolute and relative location. Absolute location refers to the system of latitude and longitude used to designate a point on the Earth's surface.

Relative location includes understanding what direction one point is from another, as well as how to orient yourself from one map to another and from a photograph to a map.

Materials you need for this lesson

1. A globe.

2. A copy of the map packet for each student.

3. A copy of Activity Sheet #2 for each student.

For this lesson, you will be teaching students information derived from the poster and the maps in the map packet. You'll also be asking them questions based on the poster and the maps. Have them follow along with the maps and their activity sheets, filling in the answer to each question as it's answered by the class. This will help students learn from each other. At the end of the class, every student will have a correctly filled-in activity sheet.

Suggestions for teaching this lesson (2, 30-minute sessions)

Pass out Activity Sheet #2. Ask students to take out the map packet. Tell students they'll use all three maps to complete this lesson. You'll be teaching students three basic concepts in this lesson: *Understanding direction*, including orienting a picture to a map; *Understanding latitude and longitude*; and *Understanding scale*.

Understanding direction

1. *Review north, south, east, and west*. Refer to your classroom globe. Say, "Notice that north is at the top of the globe, south at the bottom. When talking about north on a map, geographers mean going toward the North Pole.

When talking about south on a map, they mean going toward the South Pole. When creating maps, mapmakers generally use the same orientation for their maps—with north at the top.

Draw on the board the symbol mapmakers typically use to show north, south, east, and west.

Say, "This is the orientation of almost every map you'll see, including the maps on this poster."

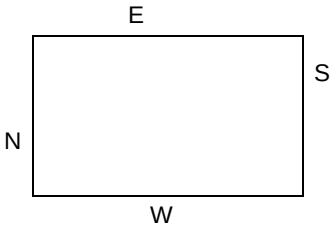
2. *Help students orient a map to the picture of a place*. Students should use their **shaded relief maps**. You have just told your students that maps are usually oriented with north at the top. But when a photograph is taken of a place, it isn't always taken looking north. Students should learn how to orient a picture of a place to the directions on the map.

Have the students look at the picture of Salt Lake City on the poster. Have a student come up to the poster and run a finger along the mountain range in the picture, which goes in this direction: _____ (left to right)

Now have students find and run their fingers along the Wasatch Mountains on the **shaded relief map**. They go in this direction:

(up and down) |

Point out that this is the same mountain range. Then ask the students to look at the picture on the poster, then look at the map, and tell you where north is on the picture.



Have students put an X on the place on the **shaded relief map** that shows where the photographer was standing to take the picture. Ask, "In what direction was the photographer looking when the picture was taken?"
(*Answer: southeast)*

3. *Have students practice finding locations using directions*. It will take students a few minutes to find these locations on their **shaded relief maps**.

You might want to turn it into a game. When one student finds a location, ask him or her to describe the location to the rest of the class.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

• On your **shaded relief map**, which town is farthest north?
(*Answer: Willard*)

• Which town is farthest south?
(*Answer: Orem*)

• Which towns are farthest east?
(*Answers: Woodland, Upton, Wasatch*)

• Which town is farthest west?
(*Answer: Ophir*)

4. *Talk about relative location.* Say, "You can use north, south, east, and west to talk about where one place on a map is in relationship to another." On the poster picture and on the **shaded relief map**, point out Salt Lake City. Then point out the Great Salt Lake on the **shaded relief map.**

Ask students, "Which direction is the Great Salt Lake from Salt Lake City?" (Another way to say this is, "If you were standing in Salt Lake City and looking at the Great Salt Lake, what direction would you be looking?")
(*Answer: west*)

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

• If you were going from Ogden to Sandy, what direction would you travel?
(*Answer: south*)

• If you were going from Farmington Bay to Willard Reservoir, what direction would you travel?
(Answer: north)

Point out that not everything is directly north, south, east, and west of another point. To better describe the location of one place, introduce students to four additional directional markings—northeast, southeast, southwest, and northwest. Add these directions to the symbol you have drawn on the board.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

• Echo Reservoir is _____ of Salt Lake City.
(*Answer: northeast*)

• Great Salt Lake State Park is _____ of Salt Lake City.
(*Answer: northwest or west*)

• Deer Creek Lake State Recreation Area is _____ of Salt Lake City.
(*Answer: southeast*)

• West Valley City is _____ of Salt Lake City.
(*Answer: southwest*)

Point out that direction can also be applied to linear features like rivers or railroads.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

• What direction do the Wasatch Mountains run?
(*Answer: north-south or south-north)*

• What direction does Echo Canyon run?
(*Answer: southwest-northeast or northeast-southwest*)

Features like the canyons and mountain ranges mentioned above can be described with either direction first. When describing rivers, however, the direction is from the source of the river to the mouth.

More map practice. Then ask students to choose other locations on the map, asking each other questions about which direction they would travel to go from one to the other. (They will not write these answers on their activity sheets.) It is important for students to be comfortable looking at a map and understanding directions.

Understanding latitude and longitude

1. *Review latitude and longitude with your students.* Students will be using their **topographic maps.** You might say, "Points of latitude and longitude are imaginary lines created by map-makers to allow them to pinpoint any place on the globe or map." Have the students find the latitude and longitude markings on the **topographic map**.

Notice that *degrees* of latitude and longitude can be further subdivided into minutes and then into seconds. Ask them to guess how many seconds of longitude are in a minute. *(The answer is 60.)* Point out that these subdivisions of a degree allow geographers to be precise in stating a location. The **topographic map** lists Salt Lake City's location in degrees, minutes, and seconds.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

In what direction do latitude lines run?
(*Answer: east-west)*

Longitude lines?
(*Answer: north-south)*

What are the latitude and longitude of Salt Lake City?
(*Answer: 40° 46' N, 111° 53' W*)

2. *More on latitude and longitude*. Have students use a globe. Ask them to follow Salt Lake City's latitude line around the globe. Ask them to find two or three other cities found at roughly the same latitude. (*Possible answers: Beijing, China; Ankara, Turkey; Madrid, Spain)*

Have the students follow the longitude line. Ask the students to find a capital of a Canadian province that is closest to the longitude of Salt Lake City. (*Answer: Edmonton, Alberta*)

Following the longitude line south on the globe, which country does it pass through before reaching the Pacific Ocean? (Answer: Mexico)

Working with scale

1. *Explain scale to students*. Students will be using all three maps. You might say, "In order to see how large a piece of the globe your map pictures, the first thing to do is to look at the scale of the map. The scale of the map describes the relationship between a distance on the map and the corresponding distance on the ground. Maps have different scales. Each map on this poster has a different scale. Let's work with these maps to learn more about scale and what it does.

Have the students place the maps with their legends on their desks in the following order: shaded relief map on the left, road map in the center, and topographic map on the right.

First, have the students look at the legend for the **shaded relief map**. Ask them to locate the distance scale shown in the legend.

Ask students to answer this question and fill in the answer on Activity Sheet #2:

What is the scale of this map? (*Answer: 1:500,000)*

Tell the students that this means that 1 inch on the map equals 500,000 inches on the ground, or that 1 centimeter on the map equals 500,000 centimeters on the ground.

Now find the scale of the **road map**.

Ask students to answer this question and fill in the answer on Activity Sheet #2:

What is the scale of this map? (*Answer: 1:1,000,000)*

Find the scale of the topographic map. Ask students to answer this question and fill in the answer on Activity Sheet #2.

What is the scale of this map? (*Answer: 1:24,000*)

2. *Large- and small-scale maps*. To help students compare one map with another, have them find the State capitol on all three maps and circle it. First, have the students look at the **topographic map**. Ask, "What other buildings can you see on this map?" (*Answers may include a hospital, several schools, the City and County Building, and Temple Square. Draw their attention to the oil refinery storage tanks in the northwest corner of the **topographic map**.)*

Next, have students look at the **road map**. "Can you see any of the buildings that are shown on the **topographic map** on this map?" Again, draw their attention to the refinery storage tanks. This gives them a clear understanding of how much more detail the large-scale **topographic map** includes. Ask students if they can find any of these buildings on the **shaded relief map**. (*Answer: no*)

Now have students find the Great Salt Lake on the **shaded relief map**. A considerable area of the lake is shown in the northwest corner of the map.

Then have them find the lake on the **road map.** They can see the lake in the northwest section of the map. Ask them now to look at the **topographic map**. They cannot see any of the lake on this map.

You might say, "A large-scale map, such as the **topographic map**, shows a small land area in considerable detail. But the small-scale **shaded relief** map shows less detail, but a larger land area."

3. *Using the distance scale to determine distance*. One reason many people use maps is to determine the distance between two places. Each map has its own distance scale printed on it. Using the distance scale, students can determine the distance between two points.

Say, "We're going to measure distances from the State capitol building."

Have the students locate the State capitol on their **road map.** Have them locate the town of Sandy. (*Almost directly south*)

Ask students to answer these questions and fill in the answers on Activity Sheet #2.

- Using your rulers, measure the distance on your **road map** between the State capitol and the town of Sandy. What is the distance? (*Answer: 1 inch)*

Use the distance scale to determine the distance between the capitol and Sandy. What distance does that 1 inch represent? *(Answer: 16 miles*)

Have students repeat this activity on the **shaded relief map**.

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Ask students to answer these questions and fill in the answers on Activity Sheet #2.

• Using your rulers, measure the distance on the **shaded relief map** between the State capitol and Sandy. What is the distance?
(*Answer: 2 inches*)

• Use the distance scale to determine the distance between the capitol and Sandy. What distance does that 2 inches represent?
(Answer: about 16 miles)

Because the scales of the **road map** and the **shaded relief map** are different, they will measure a different distance between the two points. However, even though the distances on the maps from the State capitol to the town of Sandy are of different scales (2 inches versus 1 inch) the distance on the ground that those measurements cover is the same.
(Answer: about 16 miles)

Additional activities for follow-up

1. Have the students use encyclopedias and other reference works to learn more about Utah. See how many other kinds of maps you can find.

Make a display bulletin board of the various maps that are available for the same place.

2. Show students north, south, east, and west by using the school as a reference point. (Perhaps they can see the sun only in the morning or in the afternoon.)

3. Bring in a variety of maps of the United States, your State, and your community. Help the students see that the larger the scale, the more detailed the map can be.

4. Have students create their own maps of your school or classroom. Allow them to choose their own scale for these maps. Afterwards, compare the level of detail that can be shown on a larger-scale map.

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