

Lesson

10

Understanding Time Zones

WHAT YOU WILL LEARN

To understand the relationship between time, the rotation of the earth, and time zones

READING STRATEGY

Draw a diagram like the one below. Label the four time zones of the continental United States in order from east to west.



TERMS TO KNOW

time zone

Would you like to be able to fly through space at over 1,000 miles per hour? Well, you are—right this minute. The earth rotates on its axis at about 1,000 miles per hour at the Equator, carrying you with it. Each hour your spot on the earth travels 15 degrees of longitude toward the east.

You may think you do not notice any sign of your speedy trip, but you do. Every day you see the sun march across the sky. The sun is not actually moving, of course. The earth is turning from west to east. That is why the sun comes up in the east and sets in the west.

It takes the earth 24 hours to rotate on its axis once. Imagine that the sun has just come up. In one hour the sun will be higher in the sky. With each hour that passes, the sun will rise higher, until noon. Then it will become lower, until finally it sinks out of sight.

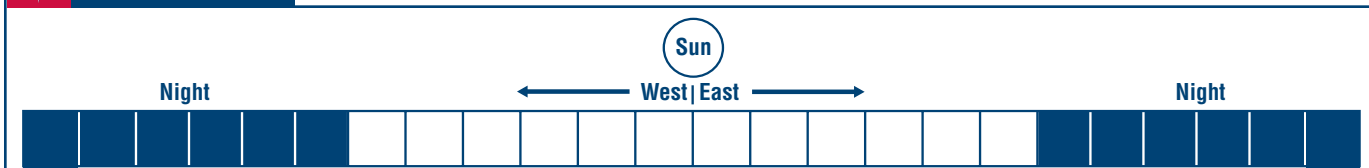
Imagine that you have a friend who lives 1,000 miles west of you. When the sun has been up for one hour where you live, it will just be coming up where your friend lives. You have another friend who lives 1,000 miles east of you. When the sun has been up for one hour where you live, it will have been up for two hours at your friend's house to the east.

Using the Sun to Tell Time

People have used the sun to tell time for many years. How high the sun is in the sky can tell us how long it has been since sunrise, and how long it is until sunset. When the sun is at its highest point in the sky, it is noon. Remember your two friends to the east and the west of you? When it is noon where you are, it is an hour past noon where your friend to the east lives. It is an hour before noon at your friend's house to the west.

Look at **Figure 1-13**. It shows the 24 hours in a day. The sun is at 12 noon. Each division of the bar stands for the distance the earth turns in one hour. As you move east on the bar, times become later in the day. As you move west, times become earlier. For example, one division east of 12 noon, the time is 1:00 P.M. while

 **FIGURE 1-13** Telling Time



one division west of 12 noon, the time is 11:00 A.M. Fill in the blanks on the bar to show the correct times. Cut the bar out and tape it around a tennis ball. This shows you how time changes as you travel around the world. Notice that when it is 12 noon on one side of the world, it is 12 midnight on the other.

Time Zones

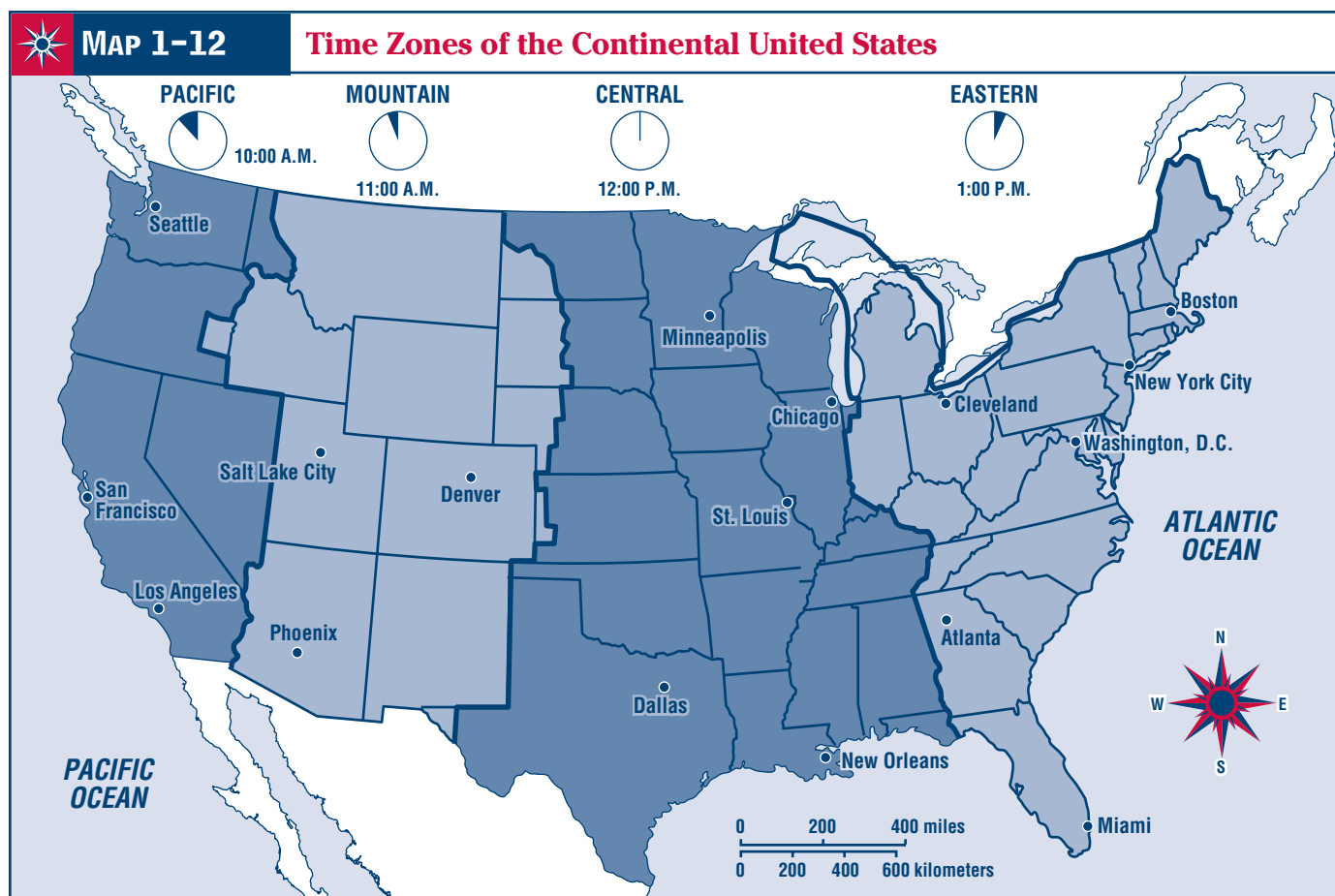
The earth is divided into 24 parts for keeping time, just like the bar in [Figure 1-13](#). We call each division of the earth a **time zone**. Every place on the earth within a time zone has the same time as every other place in that zone.

Before we had time zones, every town kept its own time. Because of the earth's rotation, noon came at different times for towns even 40 or 50 miles east or west of each other. As long as travel was slow, this was not a problem. But with the coming of railroads the differing times became a big problem. Trying to tell people when trains would arrive and leave was almost impossible

when the clocks in every town were set at a different local time.

Time zones were set up to solve this problem. Time zones are about 1,000 miles across from east to west at the Equator. Time zones become narrower as you move toward the Poles. Only four time zones are needed to cover the entire continental United States. (Alaska and Hawaii are in other time zones because they are farther west.) These four time zones are called the Eastern Time Zone, the Central Time Zone, the Mountain Time Zone, and the Pacific Time Zone. In some cases the time zones follow the boundaries of states or countries rather than lines of longitude. Find these zones on [Map 1-12](#) below.

People who travel across time zones must keep track of time. Whenever you cross a time zone going east, the time becomes one hour *later*. You must set your watch ahead one hour. Whenever you cross a time zone going west, the time becomes one hour *earlier*. You must set your watch back one hour.



Using Your Skills

A PRACTICING MAP SKILLS

Use **Map 1-12: Time Zones of the Continental United States** to answer the questions.

1. Which time zone is farthest east? _____
2. Which time zone is farthest west? _____
3. When it is 12 noon in Dallas, what time is it in New York City? _____
4. When it is 4:00 P.M. in Denver, what time is it in San Francisco? _____
5. Suppose that you live in Atlanta. Your grandparents in Seattle want to call you on your birthday. They go to sleep at 10:00 P.M. What is the latest Atlanta time you can expect to hear from them?

6. Suppose you live in St. Louis. You have a computer made by a company near Los Angeles. You want to call people at the company about a problem you are having with your computer. They go to work at 9:00 A.M. What is the earliest St. Louis time you can call them?

7. Imagine that you are flying from Boston to San Francisco. You leave Boston at 8:00 A.M. What time is it in San Francisco?

8. The plane trip from Boston to San Francisco takes six hours. You leave Boston at 8:00 A.M. What time will it be in Boston when you land?

What time will it be in San Francisco when you land? Why?

9. You have to fly from San Francisco to Chicago. You leave San Francisco at 5:30 P.M. What time is it in Chicago?

10. The plane trip from San Francisco to Chicago lasts four hours. You leave San Francisco at 5:30 P.M. What time will it be in Chicago when you land? Why?
