

4/Telling Time Around the World

Because the earth is always rotating on its axis, people in different parts of the world see the sun directly overhead at different times. At any given moment, clocks around the world show different times.

The measurement of time is very necessary to people's daily activities. Trains, buses, and airplanes must keep time schedules. Radio and television programs must start at a certain time. Can you imagine some of the problems that would occur if every place had a different way of measuring time?

In 1884, to avoid confusion, most of the world's countries agreed upon a system of standard time zones. These are shown on the map.

What Is a Time Zone? *

Time on Earth is measured by meridians. The word "meridian" means midday. Ante-meridian time, or A.M., means before noon. And P.M., post-meridian time, means after noon, when the sun has crossed the meridian for the day.

As you read in Lesson 3, the prime meridian passes through Greenwich, which is a suburb of London, England. Many years ago, a very good observatory was built there. It had very accurate tools by which scientists could tell the exact time of day. Because of this, the prime meridian was chosen as the starting point for the world's time zones.

All the other time zones go east or west of the prime meridian. There are 24 time zones. Twelve time zones extend east of Greenwich, and twelve time zones extend west. Each time zone covers 15° of longitude because the earth rotates 360° in 24 hours. Every 15° the standard time changes by one hour.

All time zones to the east of the prime meridian are ahead of Greenwich time. All zones to the west are behind Greenwich time. In the Pacific Ocean, there is an imaginary line where the east and west zones meet. This is known as the **International Date Line**.

As you can see on the map, the meridians that have been chosen are those with numbers that can be divided by 15. From each of these meridians, the time zone reaches 7½ degrees to the east and west. By international agreement, all places within a time zone have the same time. This means that places at the eastern edge of each time zone have the sun directly overhead 60 minutes before

those on the western edge. How close to the edge of a time zone do you live?

These 15-degree meridians give us our time zones. The clocks in each time zone are set one hour ahead or behind the clocks in the neighboring time zones. If you move east from Greenwich, each time zone is one hour later. When it is noon in Greenwich, it is 1:00 P.M. in Vienna. Vienna is one zone to the east of Greenwich. It is 8:00 P.M. in Shanghai, eight zones to the east. If you go west from Greenwich, each time zone is one hour earlier. When it is noon in Greenwich, it is 7:00 A.M. in Ottawa, five zones to the west.

You can also see on the map that the boundaries between the time zones are not always straight lines. ~~The~~ boundaries jog in places to make it possible for neighboring towns and cities to have the same time. Sometimes, the people in a time zone have not chosen to use the time of their time zone. All of India, for example, uses a time that is 30 minutes ahead of Pakistan. And Australia's central time zone is 90 minutes ahead of its westernmost zone. All these places are shown as having irregular time zones on the map.

Find the United States on the map. Its time zones do not closely follow the meridians. This is because the boundaries between the zones have been shifted to run railroad schedules and business activities in a more orderly fashion. The fifty states are located within six standard time zones: Eastern, Central, Mountain, Pacific, Alaska, and Hawaii-Aleutian.

What Day Is It?

Because of the earth's rotation, it is never the same calendar day all over the world. Therefore, the International Date Line has been set up as the starting point for each new day.

Part of this line is the same line that marks the 180° E or 180° W longitude. However, the date line does not follow the 180° meridian exactly because it was drawn to avoid as many land areas as possible. Find the line on the map on page 37 to see how it zigzags.

Most of the world's countries agree that a day begins at ~~midnight~~ at the International Date Line and moves west around the earth. Twenty-four hours later, the day ends back at the date line. At the instant of midnight in the time zone of the International Date Line, it is the same day throughout the world.

The International Date Line also marks a change from one day to another. Calendar dates change as the date line is crossed. If you are traveling west over the Pacific Ocean, you add a day when you cross the International Date Line. For example, if it is Monday, February 18, to the east of the line, it is Tuesday, February 19, to the west of the line.

If you are traveling east over the Pacific Ocean, the opposite is true. Then you subtract a day when you cross the International Date Line. If it is Tuesday, February 19, to the west of the line, it is Monday, February 18, to the east.



Lesson Review

Vocabulary: International Date Line

Recalling the Main Ideas

1. Why do places around the world have different times at any given moment?
2. Why is the prime meridian important for determining time in different parts of the world?
3. Why aren't all the boundaries between the 24 time zones straight lines?
4. How many time zones cross the United States? In which time zone do you live?
5. What line separates today from tomorrow?

Use the atlas on page 28 to answer the following questions.

1. If it is 4:00 am in Los Angeles, what time is it in New York?
2. If it is noon in Greenwich (London), England, what time is it in Cairo, Egypt?
3. How many time zones does the United States have?
4. At 9:00 pm Maria telephoned from Mexico City to her friend in Quito, Ecuador. What time is it in Quito?
5. If it is 7:00 am in Beijing, China, what time is it in Paris, France?
6. Suppose you are traveling by ship from the United States to Japan. If it is Thursday to the east of the international date line, what day will it be as soon as you cross the line?
7. Suppose you are on a plane going from Australia to Hawaii. If it is Monday as you come to the international date line, what day will it be after you cross it? If it is May 14 west of the line, and you cross it going east, what date will it be?