Lesson 12

What are time zones?

KEY TERMS

time zone: part of the Earth where it is the same time; the Earth has 24 time zones.

prime meridian: imaginary line that runs north and south through Greenwich, England

international date line: imaginary line that runs north and south and separates one day from the next

LESSON 12 | What are time zones?

When it is 12 noon in New York, it is three hours earlier (9 A.M.), in California. At the same moment in Paris, France, it is five hours later (5 P.M.).

Why is the time different around the world?

Time depends upon the Earth's rotation. The Earth rotates from west to east once every 24 hours. As it rotates, the sun seems to move from east to west.

Because of this, places in the east see the sun before places in the west.

- It is later in the day in places that have already seen the sunrise.
- It is earlier in places that are waiting to see the sun.

New York, for example, is east of California. The sun rises in New York three hours before it rises in California. California must still wait three hours for the sun to rise. Therefore, it is three hours earlier in California than it is New York.

How do we know how many hours difference there are between places?

The Earth is divided into 24 standard **time zones.** They are imaginary lines that run north and south. The starting line is called the **prime meridian** [muh-RID-ee-un]. Distance between zones is measured in degrees east or west of the prime meridian.

There is one hour difference between each time zone. For each zone to the east, you add one hour. For each zone to the west, you subtract one hour.

Here's an example. If it is 10 A.M. where you live, then the time in the zone just to the east is 11 A.M. The time zone just to the west is 9 A.M.

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UNDERSTANDING THE PASSING OF TIME

Study Figure A. Then answer the questions or fill in the blanks. A through F stand for different places.

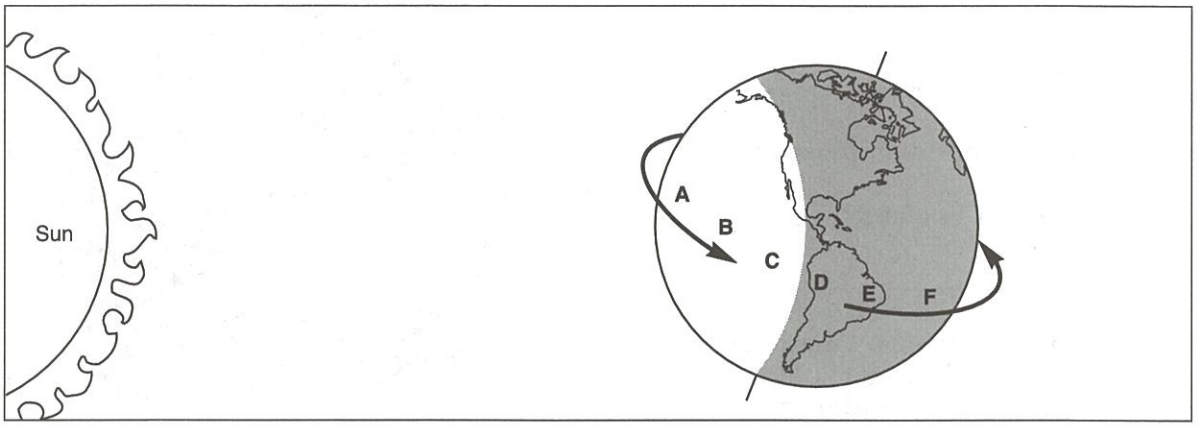

Figure A

1. List the places that are having day: _____
2. Which of these places had day first? _____
3. Which of these places had day last? _____
4. In which direction does the Earth rotate? _____ (west to east, east to west)
5. As you go to the west, the time becomes _____ . (earlier, later)
6. As you go to the east, time becomes _____ . (earlier, later)
7. B is _____ (east, west) of C. The time at B is _____ (earlier, later) than the time at C.
8. B is _____ (east, west) of A. The time at B is _____ (earlier, later) than the time at A.
9. List the places that are having night: _____
10. Which of these places had night first? _____
11. Which of these places had night last? _____
12. E is _____ (east, west) of D. The time at E is _____ (earlier, later) than the time in D.
13. E is _____ (east, west) of F. The time at E is _____ (earlier, later) than the time at F.
14. Of all the places in the diagram, where is it the earliest? _____
15. Of all the places in the diagram, where is it the latest? _____

UNDERSTANDING THE ZONES

Figure B shows the meridians. Study Figure B. Then answer the questions or fill in the blanks.

1. The direction that meridians travel is _____ .
   north and south, parallel with the equator

2. The prime meridian passes through what city in England? _____

   _____

3. Distance between meridians is measured in degrees (°). How many degrees are there between meridians?

   _____

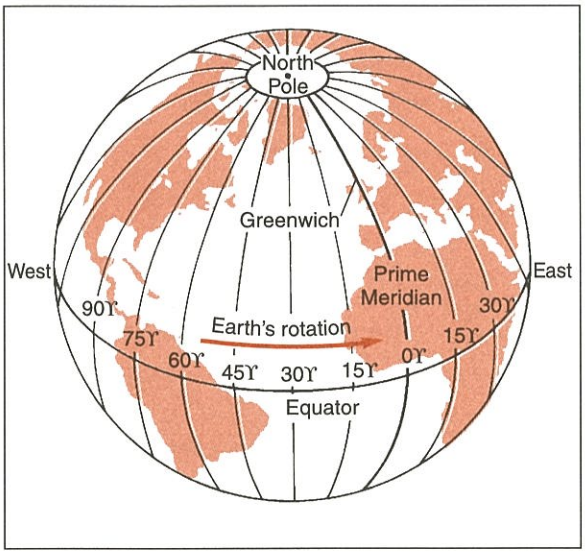

Figure B

The meridians in Figure B are straight lines. The angle between meridians are all the same. But the time zones do not look this way.

Most time zones are not straight lines. They zigzag in order to keep certain related places within the same time zone.

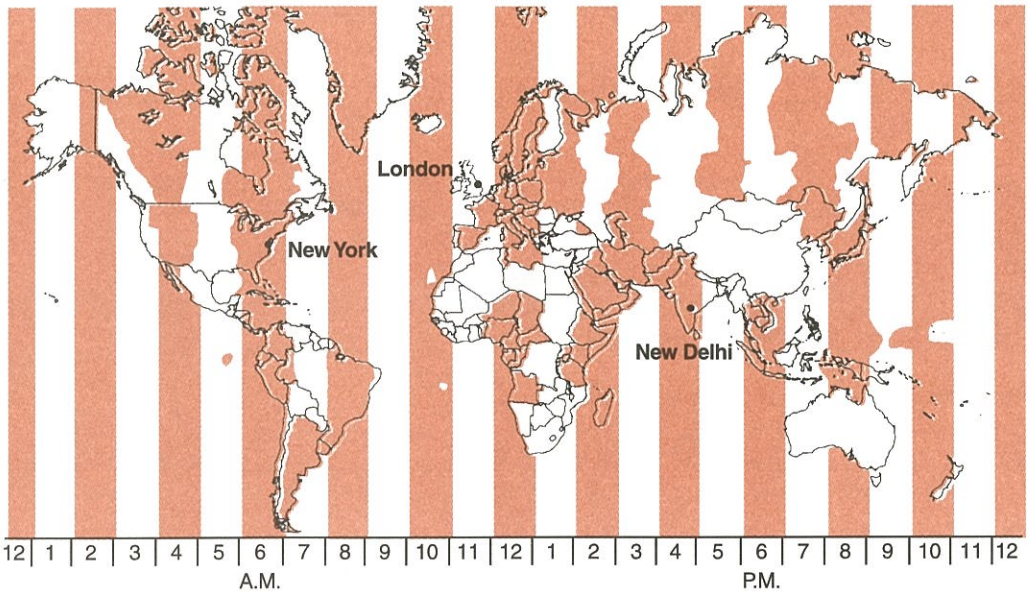

Figure C

4. New York is _____ of the prime meridian.
east, west

5. How many hours difference is there between London and New York? _____

6. The time in London is _____ than the time in New York.
earlier, later

7. When it is 2 P.M. in New York, what time is it in London? _____

8. When it is 6 A.M. in London, what time is it in New York? _____

9. When it is 1 P.M. in London, what time is it in New Delhi? _____

10. When it is 12 noon in New Delhi, what time is it in London? _____

SOME TIME ZONES IN THE UNITED STATES

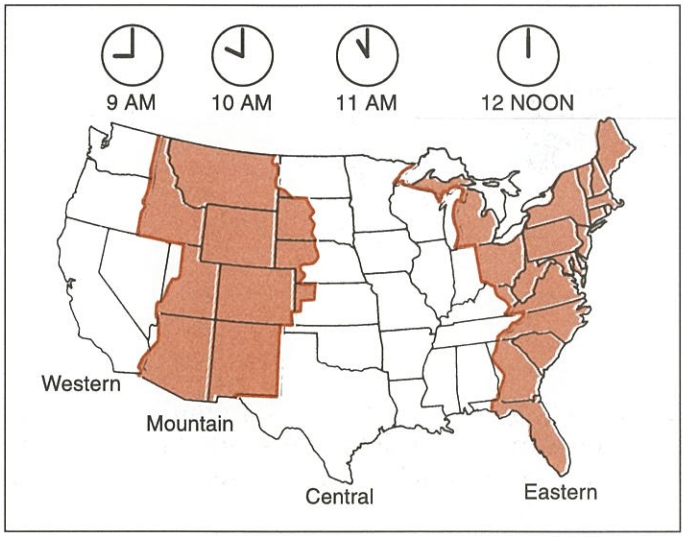

Figure D

Figure D shows the 48 contiguous states in the United States. It is divided into four time zones. Study the figure. Answer the questions.

1. Name the time zones in North America.

_____ _____

_____ _____

2. When it is 2 P.M. in the Eastern zone, it is _____ in the Mountain zone.
12 Noon, 1 P.M., 4 P.M.

3. When it is 4 A.M. in the Pacific zone, it is _____ in the Mountain zone.
3 P.M., 5 A.M., 6 A.M.

4. When it is midnight in the Central zone, it is _____ in the Pacific zone.
10 P.M., 11 P.M., 2 A.M.

5. When it is midnight in the Central zone, it is _____ in the Eastern zone.
11 P.M., 1 A.M., 1 A.M.

THE INTERNATIONAL DATE LINE

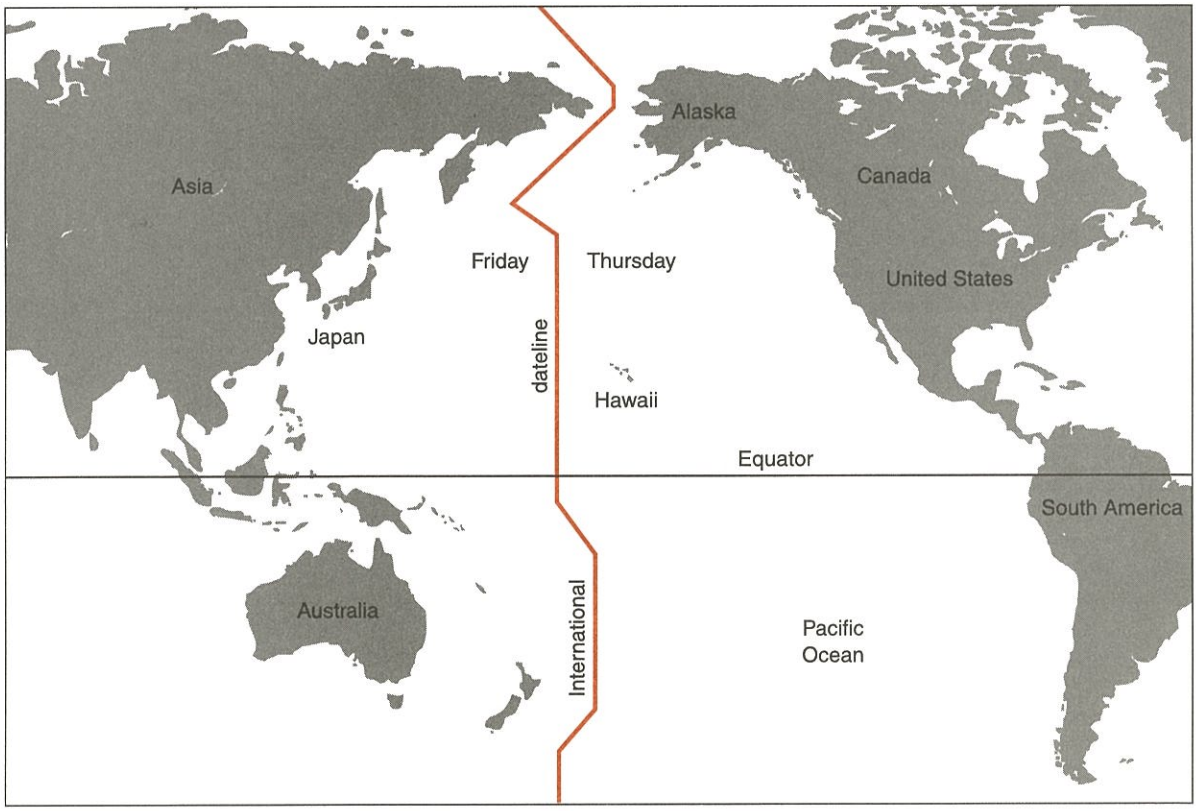

Figure E

Imagine that you are traveling westward. You set your watch back one hour for each meridian you pass. If you travel completely around the world, you will change your watch 24 times. This means your watch would be set one day ahead of everyone else's watches.

To correct this problem, people agreed that when they crossed a certain meridian, they would change the time on their watches by one day, just like they change their watches by one hour when they enter a new time zone. They called this imaginary line the **international date line.** The international date line is set at the 180° meridian, halfway around the world from the prime meridian.

When you cross the international date line from east to west you add one day. Sunday, for example, becomes Monday.

When you cross the international date line from west to east, you subtract one day. Sunday becomes Saturday.

Now answer these questions:

1. When it is Tuesday in the United States, what day is it in Japan? _____
2. When it is Wednesday in Australia, what day is it in Alaska? _____
3. When it is Friday in Hawaii, what day is it in Canada? _____

COMPLETING SENTENCES

Choose the correct word or term for each statement. Write your choices in the spaces provided.

1. Time depends upon the Earth's _____ .
   revolution, rotation
2. The sun seems to move across the sky from _____ .
   west to east, east to west
3. Places in the west see the sun _____ places in the east.
   before, after
4. The time in the west is _____ than the time in the east.
   earlier, later
5. The time in the east is _____ than the time in the west.
   earlier, later
6. The Earth is divided into _____ time zones.
   12, 24, 60
7. Time zones run _____ .
   vertically, horizontally
8. The starting time line is called the _____ .
   prime meridian, international date line
9. The time difference between time zones is one _____ .
   day, hour, year
10. For each time zone to the east, you _____ one hour.
    add, subtract
11. For each time zone to the west, you _____ one hour.
    add, subtract
12. The number of degrees between time zones is _____ .
    90, 15, 180
13. The date changes when you cross the _____ .
    prime meridian, international date line
14. It is a day later when you cross the international date line from

    _____ .
    west to east, east to west
15. It is a day earlier when you cross the international date line from

    _____ .
    west to east, east to west

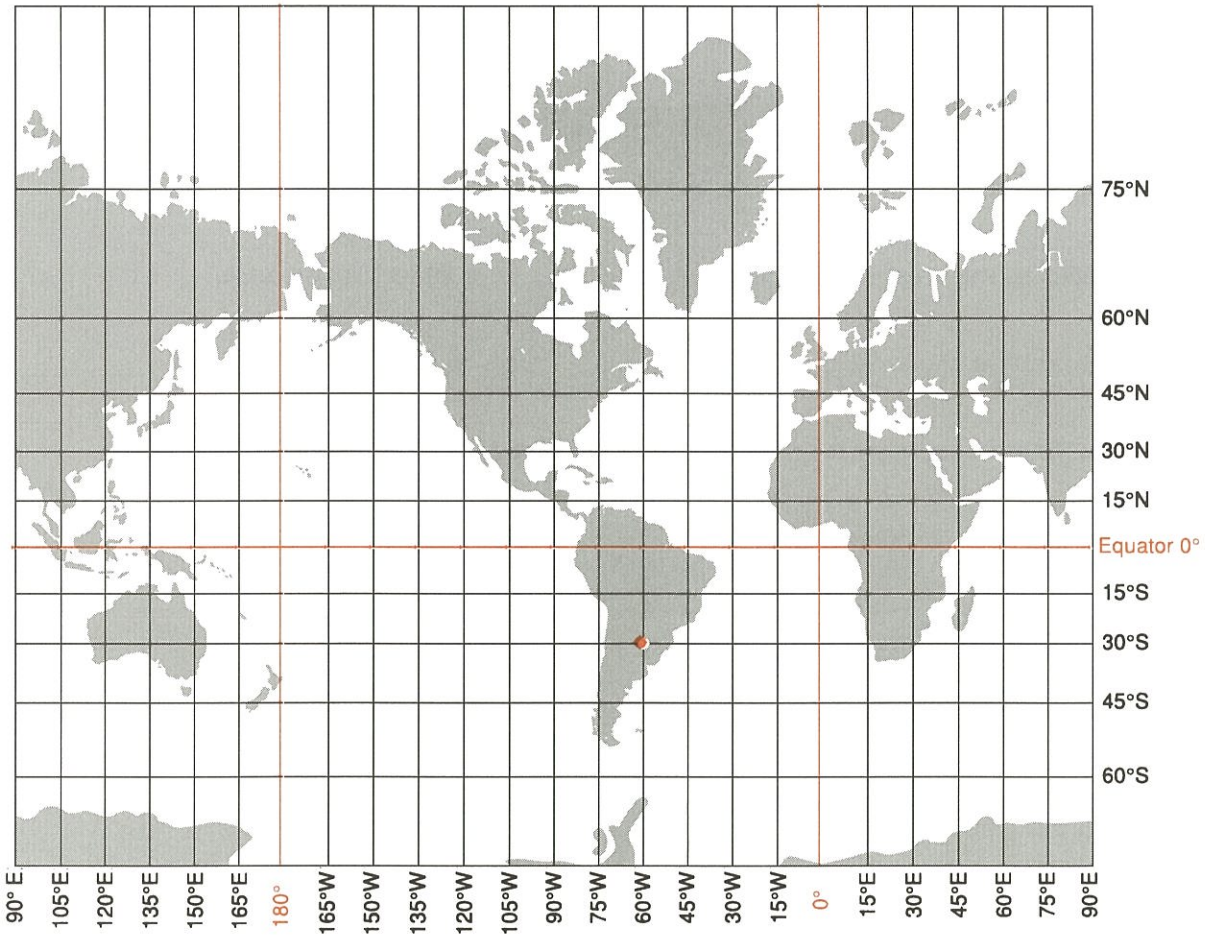

Figure F

The meridians divide the Earth into time zones. But they also tell us how far east or west a place is. Location east or west is measured in degrees of longitude.

There are also imaginary lines that run parallel to the equator. These are lines of latitude. They tell us how far north or south of the equator a place is in degrees of latitude.

Look at Figure F. It shows the lines of latitude and longitude. Find the dot that marks the location of 30° south latitude and 60° west longitude. This may be written as 30° S latitude; 60° W longitude.

Now find each of the following locations. Mark each with a dot and its number.

1. 30° S latitude; 135° E longitude
2. 60° N latitude; 105° W longitude
3. 60° N latitude; 75° E longitude
4. 15° N latitude; 105° E longitude
5. 0° latitude; 15° W longitude
6. 45° N latitude; 90° W longitude