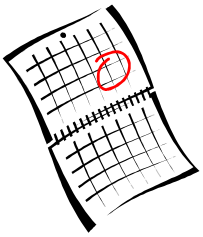
Name_____ Section_____

LAB # _____

# TIME AND DATE AROUND THE WORLD



The purpose of this activity is to see how standard time and date differ around the world at any one moment.

The Earth takes twenty-four hours to rotate on its axis while it completes a solar day. For convenience in changing time during travel, the Earth has been divided into twenty-four standard time zones, each one differing one hour from the adjacent belts. Each zone is approximately 15 degrees wide. The 24 time meridians of the Earth begin with the 0° or prime meridian near Greenwich, England, and continue 15° east or west of the prime meridian to the 180$^{th}$ meridian halfway around the world from 0°. Since the Earth rotates eastward, zones to the east of the prime meridian have later time, while those to the west have earlier time.

A traveler going around the world eastward would advance his watch 24 hours in one circuit of the globe- one hour in each belt- thereby "losing" a day. A westward traveler, however, would set his watch back 24 hours, thereby "gaining" a day. To compensate for these changes, changes of date are made in crossing the International Date Line, near the 180$^{th}$ meridian. The rule requires the date of day to be advanced on a westward crossing, and set back on an eastward crossing.

## Procedure:

In this activity we shall assume that the time is 8 p.m., Monday, at the 0° or prime meridian and we shall proceed to find the time and day at all other time meridians around the world. Remember the two rules:

- For each 15 degrees of longitude (1 zone) the time changes for 1 hour- later eastward; earlier westward.
- In crossing the International Date Line, the date or day is advanced westward, and set back eastward.

1. In the margin above the 0° meridian on the MAP AROUND THE WORLD, label this "8 p.m. Monday," then mark each succeeding time meridian to the east with the proper time and day.
2. Now mark the time meridians to the west in the same way until you reach the 180° meridian. Here, mark the hour in the usual way, but show two different days, one on each side of the line according to the rules above.
3. Continue westward, using the new day, but changing the hour in the usual way. Remember that 1 hour earlier than "1 a.m. Tuesday" is 12 midnight Monday.
4. Shade the area of the map blue in which it is already Tuesday.

**Questions:**

From the information on your map, answer the following questions:

1. What time and day did you find at 150° East? _____
2. What is the time difference between Africa (30°E) and Australia (135°E)?

   _____hrs.
3. Answer the following:
   a. Time and day at 105°E:_____
   b. Time and day at 30°W: _____
   c. Time and day at 90°E: _____
   d. Time and day at 165°W: _____
4. What meridian passes through the center of South America? _____
5. What meridian passes through the center of Alaska? _____
6. What is the time difference between the two meridians in questions 4 and 5?

   _____ hrs.
7. What time and day is it in Spain? _____
8. What time and day is it in Iceland? _____
9. What time and day is it in Japan? _____
10. What time and day is it in Madagascar off the coast of Africa? _____
11. What time and day is it in New Guinea located near Australia? _____
12. What time and day is it in Italy? _____

**Conclusion:**

1. How many degrees are in a circle? _____
2. How many hours are in one day? _____
3. How many hours does it take for one Earth rotation (spin on its axis)? _____

4. How many degrees does the Earth turn in one day? _____
5. How many degrees does the Earth turn in one hour? (HINT: degrees turned in one day/hours in one day) _____
6. In you divide our circle into 24 equal pie sections, how many degrees will each section have? _____
7. The sun does NOT move. The Earth turns _____ degrees every hour. Therefore, we see the sun apparently move across our dome sky _____ degrees every hour.
8. If the sun apparently moves _____ degrees an hour across the Earth's sky, how many degrees does it move from the noon position on Monday to the noon position on Tuesday? _____
9. How many hours does this movement in question 8 take? _____
10. If each hour movement of the sun equals ONE time zone, how many time zones are there on Earth? _____
11. How many degrees in each time zone? _____. One degree of a circle is equal to one degree of longitude. Longitude measures east and west of the prime meridian, the apparent movement of the sun across our sky. Another word for longitude is _____.
12. Since each degree of a circle is the same as a degree of longitude, how many longitude meridians can there be? _____
13. Do longitude lines ever converge (touch)? _____
14. Since 15 degrees longitude equals one hour, what are the units smaller than one degree longitude? _____

## MAP AROUND THE WORLD