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What Is a Time Zone?

Nature doesn't have a clock; a clock is a human invention. Instead animals, plants and humans respond to the length of the day from sunrise until sunset. This is known as a natural circadian rhythm. For example, sleep patterns and eating habits are part of circadian rhythm. Circadian rhythm is based on a 24-hour day that begins at sunrise. You already know that the earth rotates on its axis so when it is daylight on one side of the earth, it is night on the other side of the world.

Plants and animals simply live their lives responding to the natural cycles of the earth. They don't care about what the time on the clock happens to be. Humans invented clocks in order to organize events. Some of the earliest clocks are sundials which are based on shadows created by the sun. Noon on a sundial occurs when the sun is directly overhead, when there is no shadow.

If noon is supposed to occur when the sun is directly overhead, it should be easy to figure out that noon occurs at a different "time" in each place on the earth because the earth is rotating



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slowly on its axis over a 24-hour period. So when it is noon (sun directly overhead) at New York City, it is already past noon in Maine and nowhere close to noon in Los Angeles. Having a different time for noon was okay when people didn't travel much or very fast but when trains started traveling across the United States there was a problem. How could train officials set up a timetable of departures and arrivals when each community on the route had a different "time" for noon?

In 1883 government officials and many others involved in transportation decided to standardize the time on the clock in different places. Since there are 24 hours in a day, these officials divided the world into 24 time zones that run north to south. Everyone who lives in a time zone keeps their clocks the same, so noon is noon everywhere in the time zone no matter what the position of the sun is. Going to the west, moving from one time zone to the next adjusts the clock by one hour. It is one hour earlier. Traveling westward through 12 time zones, the clock switches from day to night or night to day. Using time zones, everyone is using standard time that keeps up with worldwide communication and travel.



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Multiple Choice Questions

Circle the correct answer.

1. A circadian rhythm is based upon a
 - a. Day
 - b. Week
 - c. Month
 - d. Year
2. When it is noon at one place on earth, what time is it at the exact opposite side of the earth?
 - a. Noon
 - b. Midnight
 - c. 11 A.M.
 - d. 1 P.M.
3. How long does it take the earth to rotate on its axis?
 - a. 4 hours
 - b. 8 hours
 - c. 12 hours
 - d. 24 hours
4. How many time zones are there in total?
 - a. 8
 - b. 12
 - c. 16
 - d. 24
5. How much time on the clock does each time zone represent?
 - a. Half an hour
 - b. One hour
 - c. One and a half hours
 - d. Two hours
6. Why were time zones invented?
 - a. For satellite communications
 - b. For sporting events
 - c. For railroad travel
 - d. For airplane travel



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Short Answer Questions

1. Do some research with a group of your classmates and find out how a sundial works and how to make a sundial.
2. The continental United States is divided into four time zones. Do some research and name these four time zones.
3. What time zone is each of the following cities in? New York City, Chicago, Memphis, Minneapolis, Fargo, Denver, Seattle, Los Angeles.
4. An airline flight departs from New York City at 4 P.M. and arrives in Chicago at 6:04 P.M. Explain why the flight duration is listed as 3 hours and 4 minutes.
5. List some of the advantages of having standardized time throughout the world.
6. Do you think that there are places in the world that do not follow standardized time? Explain your answer.
7. The seasons are opposite in the Northern and Southern Hemispheres. For example, when it is summer in the United States it is winter in Australia. How does this fact affect time zones?



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Answer Key

Multiple Choice

1. a.
2. b.
3. d.
4. d.
5. b.
6. c.

Short Answer

1. Individual response
2. Eastern, Central, Mountain and Pacific
3. New York City – Eastern; Chicago – Central; Memphis – Central; Minneapolis – Central; Fargo – Central; Denver – Mountain; Seattle – Pacific; Los Angeles - Pacific.
4. New York City is in the Eastern time zone but Chicago time is one hour earlier because Chicago is in the Central time zone which is one hour earlier on the clock. People are on the airplane for three hours but the clock time is different where they arrive.
5. Individual response
6. Individual response
7. It doesn't; time zone boundaries run from north to south.

