LIFEPAC®

SCIENCE

STUDENT BOOK

6th Grade | Unit 8

Alpha Omega
PUBLICATIONS

SCIENCE 608
Spaceship Earth

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Spaceship Earth

Introduction

In His wisdom and love, God created a beautiful home for us – the earth. Our home, the earth, can also be compared to a "spaceship." What is a spaceship? It is a vehicle carrying human beings and other cargo that travels through space. Our earth is like that. Earth is constantly in motion through the vast spaces of the universe. It rotates about its axis. It orbits around the sun. It travels with the rest of our solar system around the center of our **galaxy** – the Milky Way Galaxy. Finally, it travels with the rest of the Milky Way Galaxy through the Universe. Truly, the earth is a huge "spaceship," carrying us and all living things with it as it journeys through space.

In this LIFEPAC®, you will learn more about the earth's size, shape, and motion through space. You will also learn about the relationship of the earth to the moon and the sun, and how these three bodies interact to form **eclipses**. Finally, you will learn more about our solar system which includes the sun and its eight planets.

Objectives

Read these objectives. These objectives tell what you should be able to do when you have completed this LIFEPAC. When you have completed this LIFEPAC, you should be able to do the following:

1. Describe earth's size and shape and its motion through space.
2. Explain how night and day occur on the earth.
3. Define the time zones on earth and be able to locate the prime meridian and the International Dateline.
4. Explain the seasons of the year and how they occur.
5. Describe what happens when the vernal and autumnal equinoxes occur.
6. Describe what happens during a solar eclipse and a lunar eclipse.
7. Name and describe the main parts of our solar system.
8. List the eight major planets of our solar system from the sun outward and describe the relative size and composition of each planet.
9. Define and describe some major characteristics of asteroids, comets, and meteoroids.

Survey the LIFEPAC. Ask yourself some questions about this study and write your questions here.

1. EARTH'S MOTION

When you look at the earth around you each day, it appears to be very fixed and **stable**. Yet, we know that the earth is actually in motion in several ways. The fact that we have day and night shows that the earth rotates about its axis, with half of it **illuminated** by the sun and the other half dark because it is hidden from the sun. In addition, the fact that we have four seasons of the year is explained by the motion of the earth around the sun once a year. The earth also moves through space in other ways, and you will learn more about the various movements of "spaceship Earth" in this section of the LIFEPAC.

Even though the earth is constantly in motion, God has wonderfully designed our earth to support life. He did this by giving the earth a definite size and shape. He also designed the earth to support life by placing the earth in a position from the sun that allows the right life-supporting temperatures to exist on earth. He also placed adequate water, oxygen, and carbon dioxide upon earth to support life. God designed the motions of the earth to occur in regular cycles, such as day, night, and the four seasons of the year. This regular motion of the earth also helps to support and sustain life on earth.

Throughout history, human beings have used the regular motions of the earth to express the passage of time. They have also devised different ways of designating *position* and location on the earth. In this section of the LIFEPAC, you will also learn more about the way humans in most nations of the world today designate time and location upon earth.

Section Objectives

Review these objectives. When you have completed this section, you should be able to:

1. Describe Earth's size and shape and its motion through space.
2. Explain how night and day occur on the earth.
3. Define the time zones on earth and be able to locate the prime meridian and the International Dateline.
4. Explain the seasons of the year and how they occur.
5. Describe what happens when the vernal and autumnal equinoxes occur.

Vocabulary

Study these words to enhance your learning success in this section.

autumnal equinox (ô tum nəl ē kwə noks). Occurs on September 22 or 23, when the days and nights are equal.

ellipse (i lips). An egg-shaped figure similar to a circle which also describes the path or orbit of one body around another.

galaxy (gal ək sē). A system of numerous associated stars traveling together through the universe. Our galaxy is the Milky Way Galaxy, containing hundreds of billions of stars.

illuminated (i lü mə nā t ed). Supplied or brightened with light.

longitude (lon jə tüd). A distance measured in degrees east or west on the earth's surface from the prime meridian.

meridian (mə rid ē ən). An imaginary line running north-south around the earth through the north and south poles.

orbit (ôr bit). Curving path that a moving body takes around another body in space.

rotation (rō tā shən). The action or process of rotating or turning about an axis or center.

sidereal day (sī dir ē əl dā). The time that the earth takes to make exactly one complete rotation to the very same position on earth compared to far distant stars. It is 23 hours 56 minutes 4.091 seconds.

solar day (sō lər dā). The time that the earth takes to make one complete rotation relative to the sun. It is 24 hours.

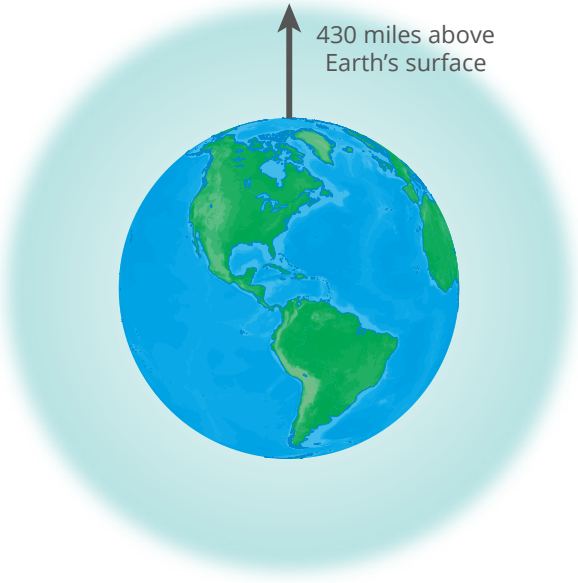
stable (stā bəl). Firmly established; not changing, moving, or fluctuating.

vernal equinox (vė r nəl ē kwə noks). The spring equinox on March 19, 20, or 21 when the days and nights are of equal length.

Note: *All vocabulary words in this LIFEPAC appear in* **boldface** *print the first time they are used. If you are not sure of the meaning when you are reading, study the definitions given.*

Pronunciation Key: h**a**t, **ā**ge, c**ã**re, f**ä**r; l**e**t, **ē**qual, t**ė**rm; **i**t, **ī**ce; h**o**t, **ō**pen, **ô**rder; **oi**l; **ou**t; c**u**p, p**u**t, r**ü**le; **ch**ild; lo**ng**; **th**in; /*ŦH*/ for **th**en; /*zh*/ for mea**s**ure; /*ə*/ represents /*a*/ in **a**bout, /*e*/ in tak**e**n, /*i*/ in penc**i**l, /*o*/ in lem**o**n, and /*u*/ in circ**u**s.

| The size and shape of the Earth vary slightly in relation to one another.



| Atmosphere above Earth

EARTH'S SIZE AND SHAPE

Before discussing the motion of "spaceship Earth," let us consider a few facts about "spaceship Earth" itself. Viewed from space, the earth appears as a large sphere (ball). It has vast swarms of white clouds, blue oceans, and brown and green land areas. At the top of the earth is the North Pole, and the South Pole is near the bottom of the earth. The areas surrounding the poles are large, ice-covered areas that appear white. This view of the earth from space, showing its overall appearance, is truly beautiful. Let's consider some details about the overall size and shape of the earth.

Size and shape. The earth is shaped like a large sphere. However, the earth is not perfectly round. It is slightly flattened at the poles. This means that the diameter of the earth measured from the North Pole to the South Pole is slightly less than the diameter across the middle of the earth at the equator. From pole to pole, the diameter of the earth is about 7,900 miles (12,714 kilometers). At the equator, the diameter of the earth is about 7,926 miles (12,756 kilometers). Therefore, the distance from pole to pole is 26 miles (42 kilometers) less than the diameter of the earth at the equator. This is why the earth is actually slightly flattened at the poles, although it may look perfectly round when viewed from far away in space.

In the same way, the distance around the earth is shorter at the poles than at the equator. At the poles, the earth is 24,860 miles (40,008 kilometers) around. At the equator, it is slightly greater: 24,902 miles (40,075 kilometers) around. However, the equator is not actually the "fattest" part of the earth. The distance around the earth is greatest along a circle slightly south of the equator. Therefore, the earth's shape is a little bit like that of a pear, which has its fattest part just below its middle. But this bulge in the earth's shape is so small that the earth still looks like a perfectly round sphere when viewed from space.

The earth not only has a great size in volume and distance, it also has a very, very large mass. The mass of the earth is:
13,190,000,000,000,000,000,000,000 pounds
or
5,983,000,000,000,000,000,000,000 kilograms!

The atmosphere. So far, we have only considered the solid earth and the waters upon the earth when considering its size and shape. But there is another part of "spaceship Earth" that travels with it as it travels around the sun and through the universe. This is the *atmosphere* above the earth. Air surrounds the entire earth in the atmosphere. It is like a thick, clear, spherical layer surrounding the globe of the earth. The atmosphere extends as far as 430 miles (692 kilometers) above the surface of the earth. The air in the atmosphere gets thinner and thinner the greater the distance from the surface of the earth. Above 300 miles, the atmosphere is so thin that satellites and spacecraft orbiting the earth encounter almost no resistance from the air molecules and atoms.

Complete the following activity.

1.1 In the space below, draw a circle representing "spaceship Earth."

Place a dot at the top of the circle representing the North Pole and a dot at the bottom of the circle representing the South Pole. Draw a line between the North Pole and the South Pole. Just above this line, write the number of miles between the North Pole and South Pole as a diameter of the earth. Also write that number here: a. _____ .

Draw a horizontal line at the middle of the circle representing the equator. Just above that line, write the number of miles across the earth at the equator as a diameter of the earth. Also write that number here: b. _____ .

What is the difference between the two numbers? c. _____ .

Is the earth perfectly round? d. _____ .

Answer true or false.

1.2 _____ Earth can be called a "spaceship" because it is like a vehicle carrying humans and other cargo through space.

1.3 _____ Earth's only motions are to rotate about its axis and to orbit around the sun.

1.4 _____ Earth appears to us to be very fixed and stable, but it is not.

1.5 _____ The regular motions of the earth help support and sustain life.

1.6 _____ Viewed from space, earth appears as a large sphere.

1.7 _____ The earth is perfectly round.

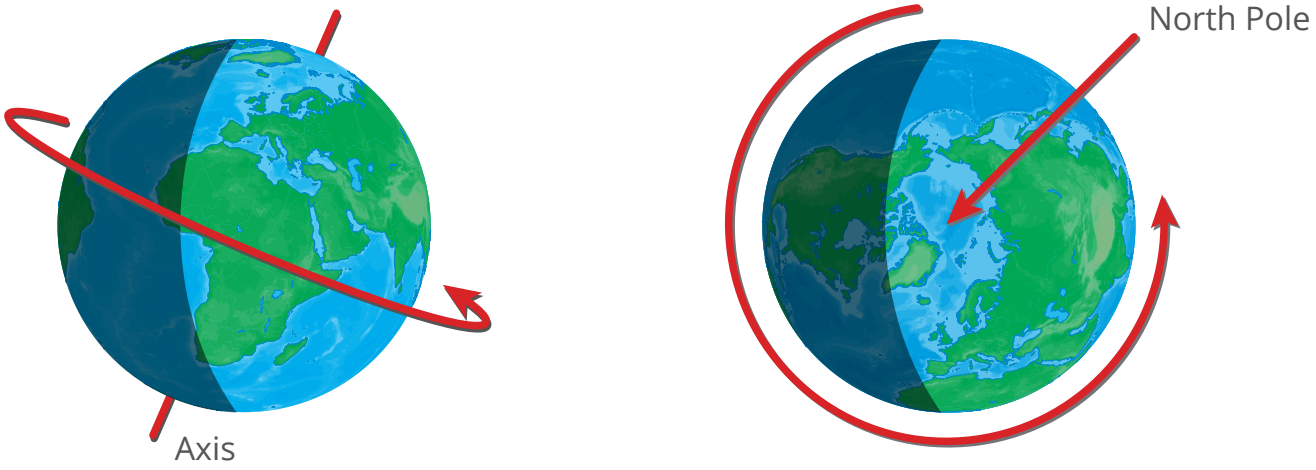
1.8 _____ At the poles, the earth is about 790 miles in diameter.

1.9 _____ The atmosphere of the earth extends to about 430 miles beyond the surface.

EARTH'S ROTATION

The motion of the earth that is most obvious is the one that produces day and night. Of course, ancient peoples thought that the sun traveled around the earth from east to west, producing day and night. Today, we know that it is actually the **rotation** of the earth that causes day and night. The rotation of the earth is the first type of motion that "spaceship Earth" experiences.

The earth rotates about an imaginary axis that extends through the North and South Poles. Rather than being straight up and down, the axis of the earth is tilted at 23.5 degrees from the vertical. The earth spins around this axis. Looking down at the earth from the North Pole, the earth would be spinning in a counterclockwise direction. One half of the earth is always illuminated as it faces the sun. The other half of the earth is always dark with night as it is turned away from the sun. As the earth rotates in a counterclockwise direction, people who have been in night will begin to see the light of the sun coming from the east. As the earth continues to rotate, they will see the sun "come up" in the east. These people will then experience daylight as their side of the earth rotates in the light of the sun. Finally, as night approaches, they will see the sun "set" in the west, and the sun will finally disappear below the horizon as the earth rotates and their location on the earth is hidden from the sun.



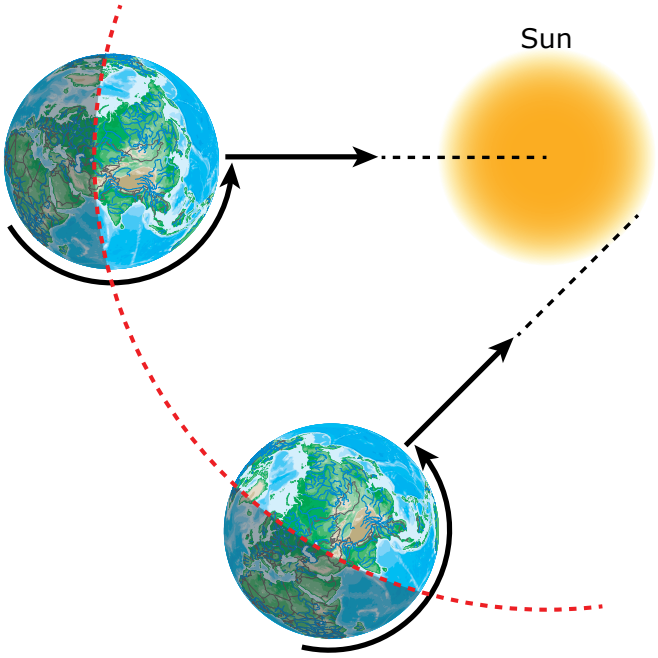
| The Earth is titled on its axis, and rotates in a counterclockwise direction.

In relation to the sun, the earth takes 24 hours to make one complete rotation about its axis. This is called a **solar day**. In relation to the very same position on earth compared to far distant stars, however, the earth takes 23 hours 56 minutes 4.091 seconds to make one complete rotation. This is called a **sidereal day**. Why this difference? The answer has to do with the fact that the earth is also slowly orbiting around the sun as it rotates each day. Therefore, in relation to the sun, a point on the earth has to travel a small amount more each day for the same point on earth to be in a direct line with the sun. This accounts for the 3 minutes 55.909 seconds difference between a *solar day* and a *sidereal day*.

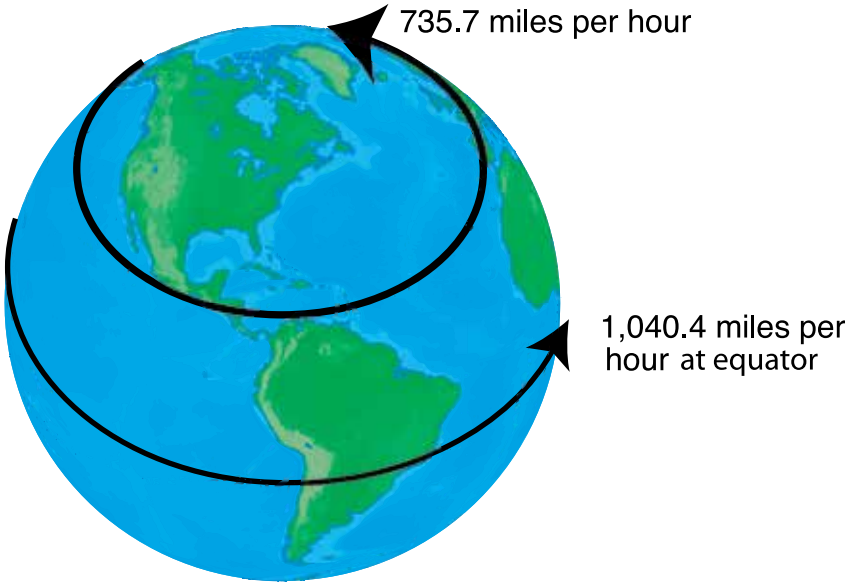
How fast do you travel as the earth rotates around its axis? The answer depends on your location on the surface of the earth. The speed due to rotation at the equator can be calculated by dividing the distance around the earth at the

equator (the distance traveled in one rotation of the earth) by the time in a sidereal day. This would be 24,902 miles divided by 23 hours 56 minutes 4.091 seconds. The answer is 1,040.4 miles per hour. So, even if you were "standing still" at the equator, you would actually be traveling 1,040.4 miles per hour due to the rotation of the earth.

If you were located half way between the equator and the North Pole, your speed would be less than it would be at the equator because the distance around the earth at that point is less: about 17,607 miles. Therefore, dividing that distance by the time in a sidereal day would give you a speed of 735.7 miles per hour due to the rotation of the earth. Earth's motion due to rotation is much faster than it normally seems as you look around you each day!



| Sidereal day



| Speeds on the Earth due to rotation

Answer these questions.

1.10 Why do we have day and night on the earth? _____

_____

_____

1.11 What is the difference between a *solar day* and a *sidereal day* ? _____

_____

_____

1.12 Why does your speed of motion due to rotation of the earth depend on your location?

_____

_____

_____

TIME

From ancient times, people have observed that day and night alternate as the earth rotates about its axis. Therefore, the "day" became a convenient way to measure the passage of *time*. It also became convenient to divide the periods of day and night into smaller periods of time, such as the hour, minute, and second. People also had to agree on the *beginning* of each solar day (24 hours). The Babylonians began their day at sunrise. The ancient Jews began their day at sunset. The Egyptians and Romans began their day at midnight. Today, most places in the world have adopted the practice of beginning the new day at midnight.

Each "day" begins at midnight. A full day lasts 24 hours (*a solar day*). In most countries of the world, the day is divided into two parts of 12 hours each. The hours from midnight to noon are the A.M. (before noon). The hours from noon to midnight are the p.m. (after noon). Therefore, 8:00 A.M. would be 8 hours after midnight, and 8:00 P.M. would be 8 hours after noon. The military often denotes time on a 24-hour basis, such as 0000 for midnight and the start of a new day, 0800 for eight o'clock in the morning (8:00 A.M.), 1200 for noon, and 2000 for eight o'clock at night (8:00 P.M.).

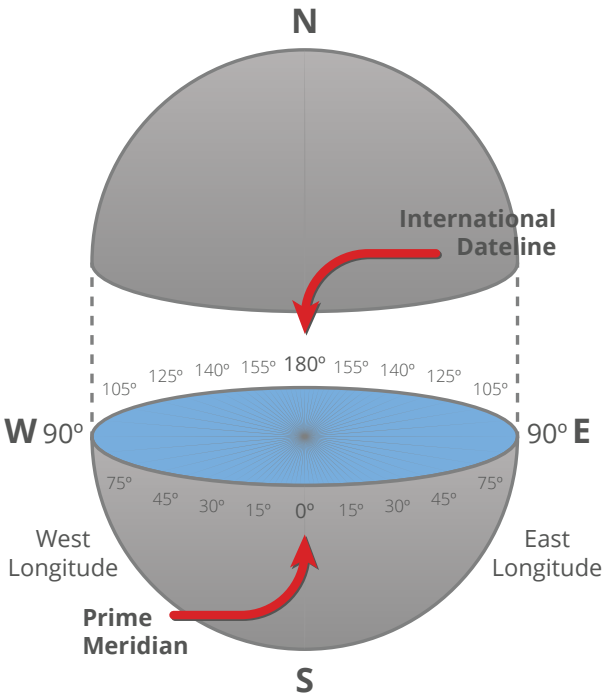
As the earth rotates, where should people say the "day" begins for the whole earth? The solution to this problem has been solved by designating specific "lines" and "zones" about the earth.

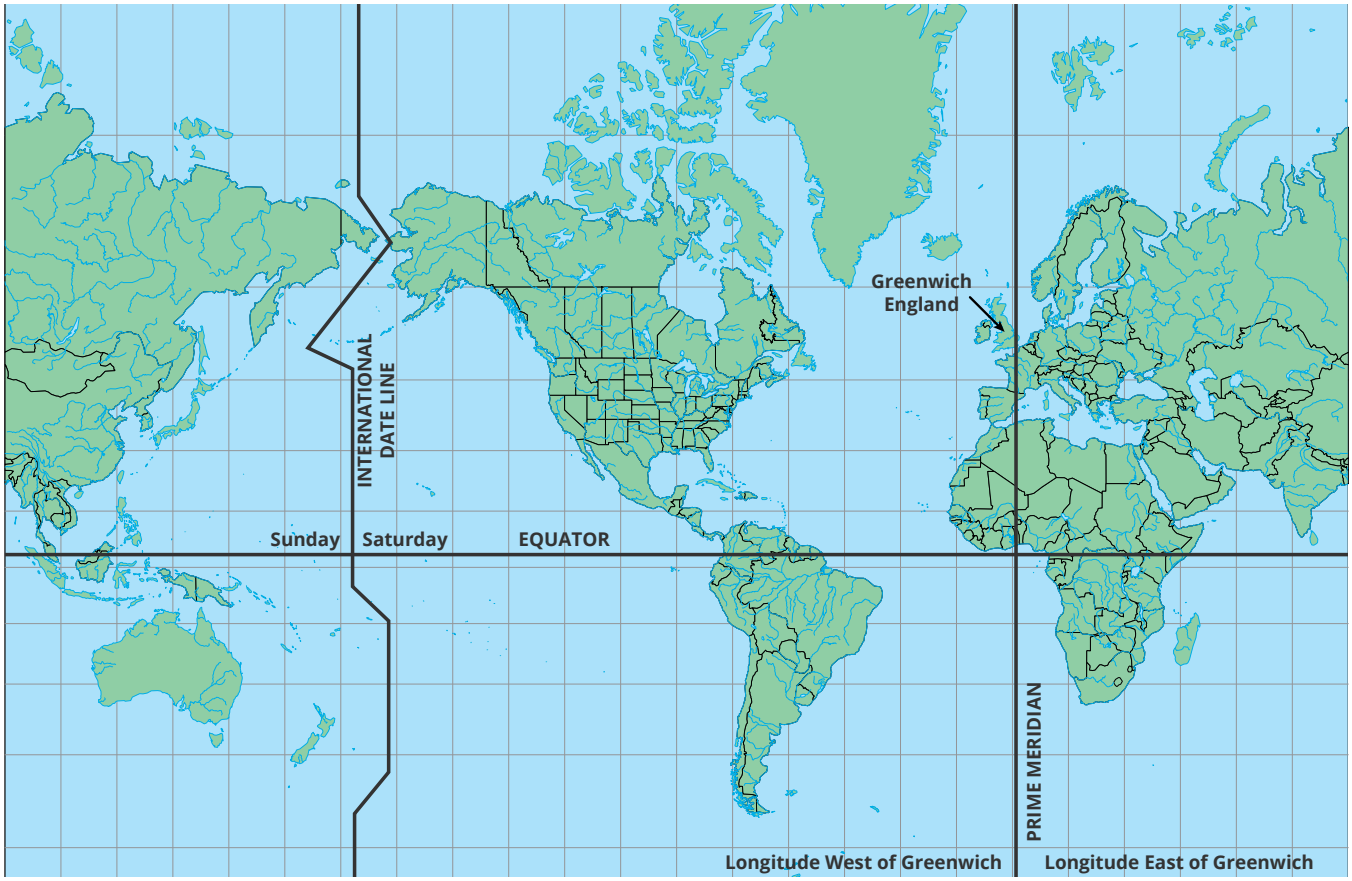
Longitude. To conveniently divide the globe of the earth into parts, imaginary lines are drawn from the North Pole to the South Pole. A circle surrounding the earth at the equator would

| Ancient peoples measured time by day and night.

consist of 360 "degrees" of angular measurement (written as 360°). Therefore, by dividing the entire globe into parts for each hour of a 24-hour day, we would divide 360° by 24 hours, or 15° for each hour of the day on earth. The imaginary lines from the North to the South Pole are then placed 15° apart. These imaginary lines are called **meridians** of **longitude**. By agreement among the nations of the world, the earth's surface is divided into 24 time zones separated by 15° of longitude. The division into these twenty-four time zones is called *Standard Time*.

The *Prime Meridian* is designated as the 0° location on earth. It runs through Greenwich, England, which is a suburb in Southeast London. From that imaginary line, the time zones run east and west. These meridians run 180° east and 180° west. For example, the first time





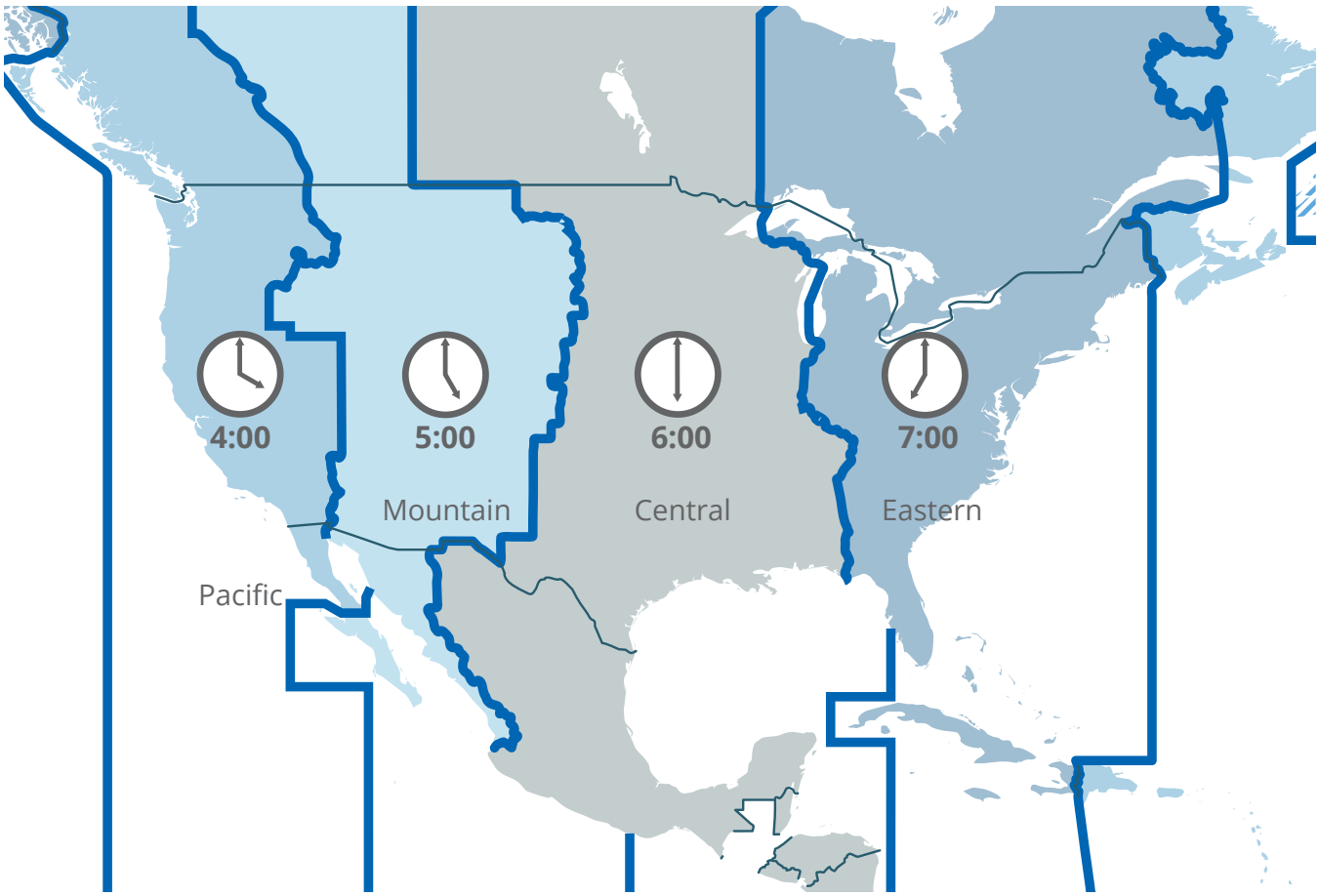
| The International Date Line

zone in the United States is located about 75° west of the Prime Meridian at Greenwich. The 180° meridian is on the other side of the earth exactly opposite the Prime Meridian at Greenwich. This 180° meridian is called the *International Date Line*. By international agreement among the countries of the earth, this 180° meridian – the International Date Line – is where the new calendar day begins.

The International Date Line does not follow the 180° meridian exactly. It zigzags through the Pacific Ocean to avoid dividing an island or land area into two different dates.

Time Zones. The continental United States has four time zones. They are the Eastern, Central, Mountain, and Pacific time zones. Like the International Date Line, these time zones in the United States do not follow specific lines of longitude exactly. They zigzag through the United States to avoid dividing cities into two different time zones. They are approximately located at 75°, 90°, 105°, and 120° west of the Prime Meridian.

There is one hour difference between adjoining time zones in the U.S. For example, when it is 7:00 P.M. in the Eastern time zone, it is 6:00 P.M. in the Central time zone. Notice that there is a three-hour difference between the Eastern time zone and the Western time zone. When it is 7:00 P.M. in New York City, New York, it is 4:00 P.M. in Los Angeles, California.



| Time Zones of the United States

Write the correct letter and answer on the line.

1.13 The ancient Jews began their day at _____ .

a. sunset b. sunrise c. midnight d. noon

1.14 Today, most places in the world have adopted the practice of beginning the new day at _____ .

a. sunset b. sunrise c. midnight d. noon

1.15 In the military services, 6:00 P.M. would be written as _____ .

a. 6:00 b. 0600 c. 1200 d. 1800

1.16 A circle surrounding the earth at the equator would consist of _____ "degrees" of angular measurement.

a. 15 b. 90 c. 180 d. 360

1.17 The division of the earth's surface into twenty-four time zones is called _____ .

a. Greenwich time b. Standard time c. Meridian time d. Clock time

1.18 The 0° meridian is known as the _____ .

a. International Date Line
b. Prime Meridian
c. Longitude Time Zone

1.19 The calendar day starts at the _____ .

a. International Date Line
b. Prime Meridian
c. Eastern Time Zone

1.20 In the continental United States, there are _____ time zones.

a. three b. four c. five

EARTH'S ORBIT

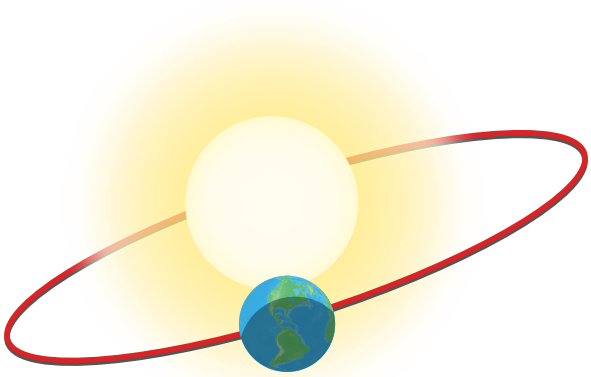
The second major motion of the "spaceship Earth" is its **orbit**, or revolution, around the sun. To make one complete revolution around the sun, the earth takes 365 days, 6 hours, 9 minutes, and 4.091 seconds! We normally define a year as 365 days. Therefore, since it actually takes the earth a little more than 365 days to orbit about the sun, we add an extra day to the year every four years on February 29. This is called a *leap year*. A leap year has 366 days.

During its orbit around the sun in a year, the earth travels 595 million miles (958 million kilometers). During this journey, the earth travels at an average speed of 66,000 miles an hour (107,200 kilometers an hour)! Therefore, not only are you in motion due to the rotation of the earth, you are also traveling very fast on "spaceship Earth" as it speeds around the sun!

An *orbit* is the curving path that a moving body takes around another body in space. Although the earth's orbit around the sun might appear circular on some drawings, it is not. It is actually somewhat elliptical. This orbital path is known as an **ellipse**. All the other planets in our solar system travel in an ellipse around the sun, too. (You will learn more about our solar system in Section III of this LIFEPAC.) Even spacecraft and satellites that circle the earth have orbits that are ellipses.

During the earth's journey around the sun, its distance from the sun varies from 94,500,000 miles in the summer to 91,500,000 miles in the Northern Hemisphere's winter. Therefore, you can see that the orbital path is not a perfect circle, since the distance would always remain the same if it were a circle. The *average* distance of the earth from the sun in its yearly elliptical orbit is 93,000,000 miles.

Newton's Laws. In a previous LIFEPAC, you learned about Sir Isaac Newton's Laws of Motion. Two of these laws help to explain



| The Earth's orbit around the Sun

earth's orbit. They are (1) *the Law of Inertia*, and (2) *the Universal Law of Gravitation*. The *Law of Inertia* states that an object at rest tends to stay at rest, and an object in motion tends to stay in motion in a straight line, unless acted upon by an outside, unbalanced force. The *Universal Law of Gravitation* states that all objects (masses) in the universe pull or attract one another. The larger the object, the greater the pull.

"Spaceship Earth" continues to move around the sun because of inertia. It does not travel in a straight line because of the pull of the sun's gravity. The pull of gravity is an unbalanced force that holds the earth and the other planets in our solar system in orbit around the sun.

Newton's Laws do not explain everything about the orbit of the earth around the sun. For example, who set the earth orbiting around the sun in the first place? These and many other things about our earth, solar system, and universe cannot be satisfactorily or fully explained by scientific laws and theories. By faith, we know that God is the creator and sustainer of the entire universe. It was God who set the planets, including the earth, in orbit about the sun. God has created an orderly universe, and humans can discover laws that God has established that help explain certain things about his creation. But, by faith, we know that God

and Jesus Christ hold ultimate power in the whole universe, and it is by that power that all things continue to exist. As Scripture says: "He (Jesus Christ, the Beloved Son of God) is the image of the invisible God, the first-born of all creation; for in him all things were created, in heaven and on earth, visible and invisible, whether thrones or dominions or principalities or authorities – all things were created through him and for him. He is before all things, and in him all things hold together. (Colossians 1:15-17).

Seasons. The orbit of earth around the sun *and* the earth's tilt on its axis cause the seasons of the year: fall, winter, spring, and summer. Since the earth is tilted at an angle of 23.5°, the Northern Hemisphere is tilted more toward the sun and receives more light energy during the months of the summer. Therefore, the temperatures are higher and the daylight hours are longer. This is true even though the earth in its orbit is actually farther away from the sun in the summer than in the winter. The tilt of the earth in the summer allows the sun's rays to more directly fall on the Northern Hemisphere, and this has more effect on the earth's temperature than its distance from the sun. In the winter, the opposite is true: the Northern Hemisphere is tilted away from the sun; therefore, it receives less solar energy, even though the earth is actually closer to the sun in winter than in summer. Thus, in the winter months, temperatures are colder and the daylight hours are shorter in the Northern Hemisphere. Note that the seasons are reversed in the Southern Hemisphere.

It is also important to note that the North Pole area will be totally illuminated by the sun in summer during an entire rotation of the earth during 24 hours, while the South Pole will be totally in darkness during this time. In summer months for the Northern Hemisphere, the northernmost regions of the earth experience daylight for the entire 24 hours and the sun never fully sets. In the winter, it remains dark during the entire 24 hours, and the sun never fully rises!

Equinoxes. In the spring and fall, the position of the earth's orbit around the sun and the tilt of the earth allow the day and night to be an *equal* amount of time. This happens on March 19, 20, or 21 to start the spring season and is known as the **vernal equinox**. The word *vernal* means *spring*. The word *equinox* means "equal night," referring to the fact that the nighttime and the daylight are equal lengths on that day. Also on that day, the sun is directly overhead at noon on the equator. Following that day, the daylight hours become longer in the Northern Hemisphere. In the fall, on September 22 or 23, the daylight and nighttime become equal again on the **autumnal equinox**. Again on that day, the sun is directly overhead at noon on the equator. Following that day, the daylight hours become shorter in the Northern Hemisphere.

Match the following items.

1.21 _____ orbit

1.22 _____ leap year

1.23 _____ one orbit of earth

1.24 _____ ellipse

1.25 _____ earth from sun

1.26 _____ inertia

1.27 _____ Sir Isaac Newton

1.28 _____ tilt of earth

1.29 _____ International Date Line

1.30 _____ summer

a. shape of earth's orbital path around sun

b. helps earth continue to go around sun

c. 23.5°

d. daylight lasts 24 hours at North Pole

e. gravity

f. curving path that a moving body takes around another body in space

g. 595 million miles

h. 366 days

i. 0° meridian

j. 93 million miles

k. laws of inertia and gravitation

l. 180° meridian

Answer the following questions.

1.31 How are the vernal and autumnal equinoxes the same? _____

_____

1.32 How are the vernal and autumnal equinoxes different? _____

_____

_____

1.33 Can scientific laws and theories explain everything about our universe?

Explain your answer. _____

_____

_____

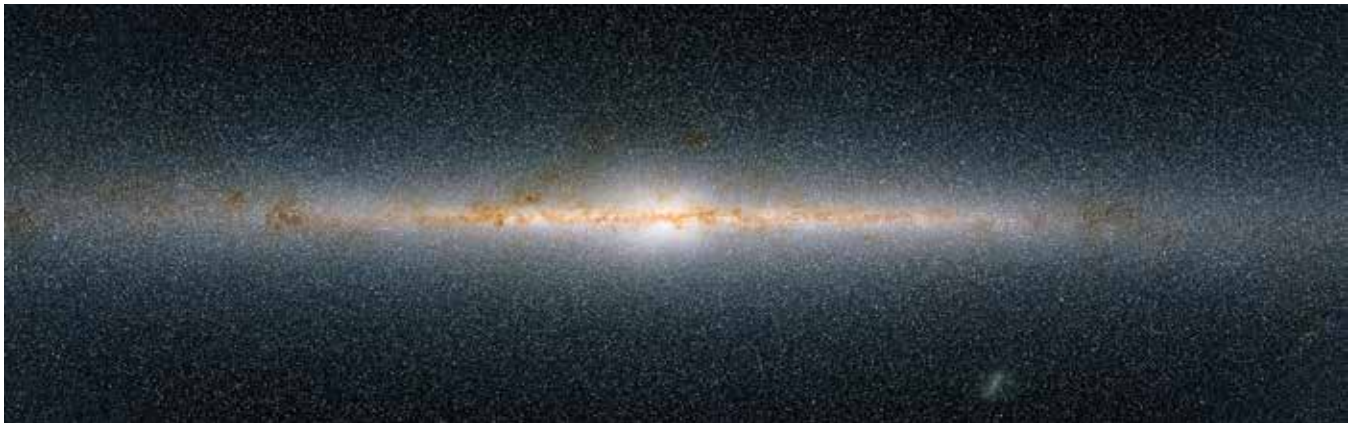
EARTH'S OTHER MOTIONS

You have learned that "spaceship Earth" has motion as it rotates daily and as it orbits around the sun yearly. But "spaceship Earth" also has motion in two additional ways. First, it moves with our solar system around the center of our galaxy – the Milky Way Galaxy. Second, it moves with our entire galaxy as it expands outward from what is thought to be the center of the universe. Let's briefly explore each of these additional motions of "spaceship Earth."

Motion in the Milky Way Galaxy. Earth, our sun, and the other planets in our solar system, are all located in a huge *galaxy* called the Milky Way Galaxy. This galaxy consists of hundreds of billions of stars, one of which is our own sun. The Milky Way Galaxy is a *spiral galaxy*, and has a spiral shape (like a gigantic pinwheel). All of the stars in the various spirals, including our sun and solar system, rotate about the center of the galaxy. Scientists estimate that our sun takes about 250 million years to rotate once around the center of our galaxy! Based upon the approximate location of our sun with the galaxy, the sun – and "spaceship Earth" along with it – would be traveling at a speed of about 101,000 miles per hour as it rotates about the center of the Milky Way Galaxy!

| The Milky Way is a spiral galaxy

Motion with the Galaxy in the Universe. The final motion of "spaceship Earth" that we will consider is on such a large scale that it is almost impossible to imagine it! Our galaxy, along with billions of other galaxies throughout the known universe, is thought by many scientists to be expanding outward, away from other galaxies. If this is so, then our tiny "spaceship Earth" (compared with the size of the galaxies) is also in motion due to this outward expansion of galaxies in the universe. God has created an incredibly large universe; however He is greater than all the universe! What an awesome God we serve here on spaceship Earth!



| Side view of the Milky Way Galaxy

"From the rising of the sun unto the going down of the same the LORD'S name is to be praised." Psalm 113:3

Please study and memorize this verse. It will be on the LIFEPAC Test.

Search the Internet or library.

1.34 Using the Internet, library, or other resources, find out more about our Milky Way Galaxy and the galaxies nearby in our "Local Group" of galaxies. Write a half-page report on what you find, including information about the size, type, and number of stars in these galaxies.

TEACHER CHECK _____ initials _____ date

Review the material in this section in preparation for the Self Test. The Self Test will check your mastery of this particular section. The items missed on this Self Test will indicate specific areas where restudy is needed for mastery.

SELF TEST 1

Match these items (each answer, 3 points).

1.01	_____	orbit
1.02	_____	ellipse
1.03	_____	inertia
1.04	_____	7,900 miles
1.05	_____	24,860 miles
1.06	_____	430 miles
1.07	_____	595 million miles
1.08	_____	vernal
1.09	_____	Milky Way
1.010	_____	24 hours

a. diameter of earth at Poles
b. distance around earth at Poles
c. extent of earth's atmosphere
d. one orbit of earth around sun
e. distance from earth to sun
f. solar day
g. sidereal day
h. spiral galaxy
i. of spring
j. helps earth continue to go around sun
k. shape of the earth's orbital path around sun
l. curving path that a moving body takes around another body in space

Answer true or false (each answer, 2 points).

1.011	_____	Earth can be called "spaceship" because it is like a vehicle carrying humans and cargo through space.
1.012	_____	The regular motions of the earth help support and sustain life.
1.013	_____	Viewed from space, the earth appears as a large sphere.
1.014	_____	The earth is perfectly round.
1.015	_____	Longitude is the distance measured in degrees east or west from the International Date Line.
1.016	_____	At any time, half the earth faces the sun and the other half faces away from the sun.
1.017	_____	Due to the earth's rotation, a person would be traveling faster at the equator than he would at a position halfway from the equator to the North Pole.
1.018	_____	The military denotes 1:00 P.M. as 1300.

1.019 _____ There are three time zones in the continental United States.

1.020 _____ The earth's path around the sun is a perfect circle.

Write the correct letter and answer on the blank line (each answer, 3 points).

1.021 The earth is tilted on its axis at an angle of _____ .
a. 15° b. 23.5° c. 180°

1.022 The ancient Jews began their day at _____ .
a. sunset b. midnight c. sunrise

1.023 Each time zone around the world represents about _____ of longitude.
a. 15° b. 23.5° c. 90°

1.024 The Prime Meridian runs through _____ .
a. Los Angeles, California b. The Pacific Ocean c. Greenwich, England

1.025 When it is 8:00 A.M. in New York, it is _____ in California.
a. 7:00 A.M. b. 6:00 A.M. c. 5:00 A.M.

1.026 A leap year has _____ days.
a. 365 b. 365.5 c. 366

1.027 The earth is closer to the sun during the Northern Hemisphere's _____ .
a. summer b. fall c. winter

1.028 The earth travels around the sun in an orbit shaped like a(n) _____ .
a. ellipse or oval b. straight line c. perfect circle

1.029 The seasons in the Southern Hemisphere are _____ from the ones in the Northern Hemisphere.
a. the same as b. one season behind c. reversed

1.030 The North Pole is dark 24 hours a day in _____ .
a. the summer b. August c. the winter

1.031 "Spaceship Earth" travels about _____ miles per hour in its journey around the center of the Milky Way.
a. 150 b. 7,900 c. 101,000

Complete this list (each item, 2 points).

1.032 List 4 ways that "spaceship Earth" is in motion.

a. _____

b. _____

c. _____

d. _____

Answer these questions (each answer, 3 points).

1.033 How do night and day occur on the earth? _____

_____

_____

1.034 What are the seasons of the year and how do they occur? _____

_____

_____

_____

1.035 What happens when the vernal and autumnal equinoxes occur? _____

_____

_____

_____

_____

80/100 **SCORE** _____ **TEACHER** _____ _____
initials date

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