



HISTORY & GEOGRAPHY

STUDENT BOOK

▶ **9th Grade** | Unit 9

HISTORY & GEOGRAPHY 909

The Tools of the Geographer

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The Tools of the Geographer

Introduction

Geography is the science concerned with the study and description of the ways man adapts to conditions on the earth's surface. As a scientist, the geographer uses special tools to help him in his work. The geographer's tools include the globe, maps, graphs, charts, and a variety of other resource materials. The word *geography* comes from the Greek word *geographia*, which means *earth description*. The tools of the geographer, thus, help him to write about the earth. Geography is neither man-centered nor earth-centered; geography is God-centered. God created the world and has given man the ability to study it. Man's tools are merely "helps" in the exciting discovery of God's wonderful world. In the very beginning of time, God told man to subdue the earth (Genesis 1:28). To subdue or to conquer something, you must learn about it; to learn about something, you must have tools with which to explore it. The Christian studies geography to fulfill his Lord's command given in the garden of Eden. This LIFEPAK® will help you to learn about and to use effectively the geographer's tools..

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAK. When you have finished this LIFEPAK, you should be able to:

1. Explain why the globe is the most accurate representation of the earth's surface.
2. Name the four hemispheres of the earth and the lines that divide them.
3. Explain the two uses of an analemma.
4. Measure distances on a map by using a scale of miles.
5. List the different kinds of maps.
6. Locate a position on a map using latitude and longitude.
7. State a purpose of graphs and charts.
8. List the different kinds of graphs.
9. Describe two qualities of an effective chart.
10. Identify three sources of geographic material found in a library.

1. THE EARTH IN MODEL FORM—THE GLOBE

Many classrooms are equipped with what appears to be a miniature world. Perhaps you have seen this miniature earth flattened into a map or describe statistically on a chart. The most realistic representation of our world is the globe. The globe is a marvelous invention, but it is only an invention. The globe is only a *model* of the real thing, the earth. As you study about the world, as represented by the globe, you will learn of the wisdom and power of a God who loved man enough to create a wonderful world for him. The globe helps to explain what happens in the world simply because the earth is spherical. As you consider the invention of the globe, you should understand the explanation for day and night, the explanation

for the seasons of the year, the explanation for directional guidance, and the explanation for the forces, such as gravity, you feel acting upon you. How does the globe impress you? The appearance of the earth is breathtaking! As the United States astronauts were returning from the moon in 1969, they exclaimed they were overwhelmed with the sky blue sight of the rising earth. The appearance of the globe helps to explain the curvature of the earth, as well as its tilt, or inclination. Man has arbitrarily divided the globe into parts to help him navigate on the earth. Looking at a globe helps you to understand man's divisions of latitude lines, longitude lines, time belts, the International Date Line, and the **analemma**.

SECTION OBJECTIVES

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

1. Explain why the globe is the most accurate representation of the earth's surface.
2. Name the four hemispheres of the earth and the lines that divide them.
3. Explain the two uses of an analemma.

VOCABULARY

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

analemma (an a' lem' má). A scale that is used to equate sun time and the location of the sun at noon on a given day.

arbitrary (är' bu trer ē). Based on one's preference or whim.

axis (ak' sis). A straight line about which an objects rotates.

distort (di stôrt'). To twist out of shape or misrepresent.

hemisphere (hem' u sfir). Half of a sphere or globe; any of the halves (northern, southern, eastern, western) of the earth.

revolve (ri volv'). To move in an orbit.

rotate (rō' tā t). To move or turn around, as a wheel.

sphere (sfir). Any round body; globe; ball.

Note: All vocabulary words in this LIFEPAAC 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: hat, āge, cāre, fā; let, ēqual, tērm; it, Īce; hot, ōpen, ōrder; oil; out; cup, pūt, rüle; child; long; thin; /TH/ for then; /zh/ for measure; /u/ represents /a/ in about, /e/ in taken, /i/ in pencil, /o/ in lemon, and /u/ in circus.

THE INVENTION OF THE GLOBE

The globe is an accurate representation of the world. In fact, the globe is more accurate than any other representation of the earth. The globe helps us to visualize what the world actually looks like. The globe can be used as a valuable guide for travel. The world that the globe represents exerts an influence in the way everyone lives. Certain events occur at certain times in certain ways because man lives on a circular surface. The invention of the globe has been a valuable tool for the geographer.

A picture of the earth today. Pretend to take a trip around the world. If you began walking to the west in a straight line and walked as far as you could go, would you ever arrive back where you started? What would happen if you started walking to the east in a straight line? To make such a trip on foot is impossible, but you can take such a trip on a globe. Put your finger on the globe, spin the globe to the east or west, and see whether your finger arrives where it began. The original location will return under your fingertip because of the circular shape of the earth. The globe represents the circular shape of the earth.

The earth can also be represented on flat maps but not as accurately as on a globe. Flat maps **distort** the true picture of the earth because the earth is a **sphere**; it is not flat. Distances, areas, and directions of round objects are often distorted when they are represented on flat surfaces. An orange can give you a good idea about the difficulties of representing a round object in a flat manner. Suppose that you were able to remove the insides of an orange without disturbing the outer peel. You would then have an object that looked like an orange but with nothing inside. Now suppose you wanted to glue that orange peel to a poster to show your classmates something about oranges. You want to expose every inch of that outer peel on a flat piece of paper. If you flattened the peel, would your end result look like an orange? Perhaps you can understand the difficulty of

representing the spherical earth on a flat map. The globe is the most accurate model of the earth's surface.

Because the globe gives a true picture of the location of land and water, it can be used to explain a variety of events that occur on earth. Many years ago the sun was assumed to have **revolved** around the earth. We know now that the earth revolves around the sun. We also know that the earth is tilted on its **axis**. This tilt causes the seasons on our planet. When the northern part of the world is tilted toward the sun, it receives more hours of sunlight and grows warmer, creating summer. Six months later, the northern hemisphere is pointing away from the sun, receiving fewer hours of sunlight, and causing winter. (The seasons are opposite each other in the northern and southern halves of the globe).

The earth **rotates** on its axis once every twenty-four hours. When your home is on the side of earth away from the sun, your area will be dark. When your home is toward the sun, your home will be in the daylight hours. The earth takes $365\frac{1}{4}$ of these twenty-four hour days to make one trip around the sun.

The Greeks were the first to use the globe. More than sixteen hundred years before the time of Columbus, scientists were certain that the earth was round rather than flat. These Greek scientists reproduced the earth in the form of a globe in approximately 150 BC. Of course, much of their work was guesswork. They assumed the existence of many of the countries around the Mediterranean Sea. They believed that the globe had to be balanced; and this belief, ironically, led to their prediction of the existence of the Americas and of Australia.

Although many different types of globes exist, the most common is the political globe. This globe shows the countries of the earth and uses a color scheme to show the various depths of the oceans and heights of the land.



Answer true or false.

- 1.1 _____ The globe represents the spherical shape of the earth.
- 1.2 _____ The earth's shape is not distorted by a flat map.
- 1.3 _____ The globe is not the most accurate representation of the earth's surface.
- 1.4 _____ The earth takes $365\frac{1}{4}$ days to make one trip around the sun.
- 1.5 _____ The earth rotates once every twenty-four hours.

Complete these statements.

- 1.6 The first people to use the globe to represent the earth were the _____ .
- 1.7 The globe was first produced in the year _____ .
- 1.8 The early globe predicted the existence of two great continents, a. _____ and b. _____ .
- 1.9 The most common type of globe is the _____ globe.
- 1.10 Depths of oceans and heights of land are represented on certain globes by the use of _____ .

A guide in travel. Most people travel only short distances and, thus, use only a flat map to plan their trip. Although all of the earth's surface is curved, it appears to be flat when we travel only a short distance. When we desire to travel great distances, such as halfway around the world, the globe becomes a better guide for travel than a map. When curved surfaces are represented on flat surfaces, distances are distorted. An example of such distortion occurs when traveling from the continental United States to Hawaii, the fiftieth state. Only two methods of travel to Hawaii are available, by air and by water. To get a true picture of how to get there, the globe would give the most accurate information. Although both a flat map and a globe reveal where Hawaii is located, only a globe does not distort the distance involved.

A knowledge of the globe helps us in our day to day travels. If you travel toward the east in

the early morning hours, you will have difficulty seeing because the sun rises in the east. We often talk about the sun rising, but the sun does not really move. The movement of the earth causes differences to exist in the sun's position making it appear to rise.

People who are involved with global travel, such as pilots and navigators, must be well acquainted with the round shape of the earth. A flight from New York to London could become a very long one if routes were planned using a flat map instead of the globe. To plan the shortest trip using a flat map, the plane would leave New York, cross the Atlantic Ocean just south of Newfoundland, and arrive in London. Using the globe to plan the flight, the plane leaves New York, flies directly over Newfoundland, and arrives in London. Which flight is shortest? Although the flat map appears to indicate otherwise, the flight directly over

Newfoundland is really shorter. You can see the route differences by stretching a piece of string from New York to London. The string must be curved to the south to follow this route. You

will find that you need to use more string when following a path that bypasses Newfoundland. The globe is a valuable aid in understanding world travel.



Write the letter for the correct answer.

- 1.11 When traveling a short distance, most people use only a _____ to plan their trip.
 a. globe b. light c. map d. color scheme
- 1.12 When curved surfaces are represented on flat surfaces, distances are _____.
 a. forgotten b. distorted c. estimated d. used
- 1.13 The sun always rises in the _____.
 a. north b. south c. west d. east
- 1.14 Understanding world travel is greatly aided by the _____.
 a. globe b. map c. sun d. plane

A force in everyday life. Simply knowing that we live on a large globe helps us to understand why things happen as they do on earth. We make adjustments almost unconsciously for living on a circular surface. Have you ever wondered why grapes are more often planted in north-south rows than in east-west rows? Have you ever wondered why poultry houses generally face south in the United States? Have you ever wondered why rooms that face north in an apartment house in Buenos Aires, are more desirable to tenants? Have you ever wondered why students wear white arm bands as safety

precautions in Anchorage, Alaska, when going to and from school in the dark? All of these accommodations are made by people living in various places around the world because of the global nature of the earth. Can you find anything that is done in a certain way in your community simply because you live in a special place on the earth's surface? You may have to think carefully and to look diligently because we do so many things without thinking about them. Just ask yourself, "Would we be doing things any differently if we lived on an entirely flat world?"



Answer these questions.

- 1.15 How many sides would a flat world have? _____
- 1.16 What are some changes that a flat world would make? _____

THE IMPRESSION OF THE GLOBE

The globe is a model of the earth. When you examine a globe, you may discover that it was not as round as you thought. You may discover that the model does not stand as erect as you thought, but is, instead, tilted as it revolves and rotates. Rather than studying the model as a whole, you may decide to break the model into halves to learn more about it. Finally, you may want to learn how you could represent the model to someone else who is not able to view the model.

The shape of the earth. The earth is a huge sphere, having more water surface than land surface. At the top of the globe in the

northernmost position is the North Pole; it is on water. At the bottom of the globe in the southernmost position is the South Pole; it is on land. Contrary to appearances, the earth is not perfectly round. Pictures from the orbiting Vanguard satellite showed that the earth is not a round sphere slightly flattened at the poles. Instead, the Vanguard showed that the earth is pear-shaped. The earth bulges almost fifty feet in depth at the South Pole. The earth is, therefore, a slightly pear-shaped sphere. However, these variations are so slight as to be almost unnoticeable. The variations are only fifty feet each over a north-south diameter of the earth of about seven thousand, nine hundred miles!



Write true or false.

- 1.17 _____ The globe is not a model of the earth.
- 1.18 _____ The earth has more land surface than water surface.
- 1.19 _____ The North Pole is on water.
- 1.20 _____ The earth is slightly pear-shaped.
- 1.21 _____ The South Pole is on water.
- 1.22 _____ The Vanguard is an orbiting satellite of the earth.
- 1.23 _____ The earth is flattened at both poles.
- 1.24 _____ The north-south diameter of the earth measures only 7,900 feet.
- 1.25 _____ The earth has never been photographed from outer space.

The position of the earth. Perhaps you have noticed that a globe is never straight up and down, but is always in a tilted, or slanted, position. The **axis** of the earth is also tilted in the same position and always points toward the north. If the earth did not tilt on its axis, the days and nights would be equally long throughout the year everywhere on the earth. This condition would change some of the ways in which we live. Tilting and rotation of the earth (spinning on its axis, always from west to east) determine the different amounts of daylight present in various areas of the world. Tilting and revolution of the earth (orbiting around the sun) determine the seasonal changes that occur in the world.



Follow these directions and answer this question. Put a check in the box when each step is completed.

- Make three columns on a sheet of paper, and head the columns "Date," "Time of Sunrise," and "Time of Sunset."
- Determine how many hours of sunshine your city enjoys each day by finding the difference between the time of sunrise and the time of sunset. The hours of sunrise and sunset should be listed in your daily paper.
- Find a weekly average of the number of sunshine hours by totaling the number of daylight hours in a week and then dividing by the number of days in the week.
- Maintain your record for four weeks.

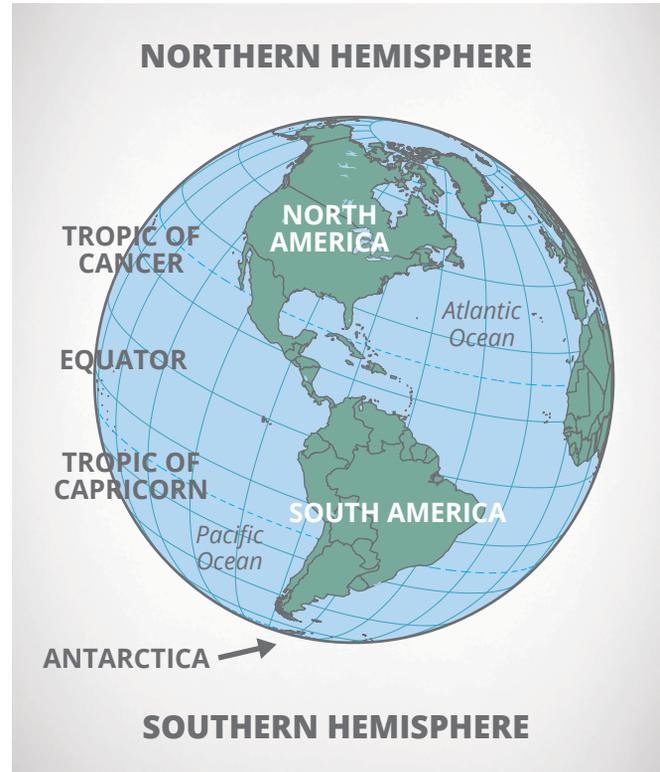
1.26 Did the average number of daylight hours per week increase or decrease over the four-week period? _____

Complete these statements.

- 1.27** The earth always rotates from a. _____ to b. _____ .
- 1.28** When the earth rotates, it spins on its _____ .
- 1.29** The earth revolves by orbiting around the _____ .
- 1.30** Seasonal changes are determined by a. _____ and b. _____ .

The halves of the earth. Man has drawn an imaginary line around the earth that divides it into two equal parts—a northern part and a southern part. This imaginary line is the equator. The equator is midway between the North Pole and the South Pole. Each half of the earth is a **hemisphere**. The earth is divided into four hemispheres—northern, southern, western, and eastern. The equator divides the Northern Hemisphere from the Southern Hemisphere, and another imaginary line runs from pole to pole and divides the Western Hemisphere from the Eastern Hemisphere. Because the earth is one sphere, to divide it equally produces two half-spheres, or hemispheres.

What is life like in the Northern Hemisphere, the Southern Hemisphere, or on the equator? For lands near the equator the sun is almost directly overhead at noon, and days and nights are nearly equal in length. As you move from the equator into the Northern Hemisphere between the Tropic of Cancer and the Arctic Circle, the noontime sun appears in the southern sky. In the Northern Hemisphere a definite difference exists between the winter and the summer seasons. The summer occurs in June, July, and August. As you move from the equator into the Southern Hemisphere, the noontime sun appears in the northern sky. In this area between the Tropic of Capricorn and the Antarctic Circle, a winter and a summer season



also occur. However, summer in the Southern Hemisphere occurs during December, January, and February. Although great differences exist between the Northern Hemisphere and the Southern Hemisphere, some similarities also exist. Because the equator receives the sun's rays most directly, it tends to be extremely warm. When you travel away from the area surrounding the equator, whether north or south, you will find cooler regions.



Write the letter of the correct answer in the blank.

- 1.31** The line that divides the earth into a Northern Hemisphere and a Southern Hemisphere is the _____ .
 a. equator b. circle c. midway d. half-line
- 1.32** The earth has _____ hemispheres.
 a. 2 b. 0 c. 4 d. 3
- 1.33** The line dividing the earth in half is _____ .
 a. real b. imaginary c. thick d. blue
- 1.34** Another term for half-sphere is _____ .
 a. equator b. midway c. pole d. hemisphere
- 1.35** The Northern Hemisphere and the Southern Hemisphere are _____ in size.
 a. unequal b. equal c. gaining d. decreasing

Write true or false.

- 1.36** _____ The sun is nearly directly overhead at noon at the equator.
- 1.37** _____ No similarities exist between the Northern Hemisphere and the Southern Hemisphere.
- 1.38** _____ Summer in the Southern Hemisphere occurs in December, January and February.
- 1.39** _____ The Tropic of Capricorn is in the Southern Hemisphere.
- 1.40** _____ No summer season occurs in the Northern Hemisphere.
- 1.41** _____ Days and nights are of equal length at the equator.
- 1.42** _____ The Tropic of Cancer is in the Northern Hemisphere.
- 1.43** _____ The Antarctic Circle is in the Northern Hemisphere.
- 1.44** _____ The Arctic Circle is in the Southern Hemisphere.

SELF TEST 1

Complete these statements (each answer, 3 points).

- 1.01** The earth rotates once every _____ .
- 1.02** The most accurate representation of the earth's surface is the _____ .
- 1.03** The first people to use the globe were the _____ .
- 1.04** The four hemispheres of earth are the a. _____ , b. _____ , c. _____ , and d. _____ .
- 1.05** The earth always rotates from a. _____ to b. _____ .
- 1.06** Three types of global maps are the a. _____ , b. _____ , and c. _____ .
- 1.07** Two lines that help locate any position on the earth's surface are a. _____ and b. _____ .
- 1.08** The original four time zones of the United States, from east to west are a. _____ , b. _____ , c. _____ , and d. _____ .

Match these items (each answer, 2 points).

- | | |
|-----------------------------------|----------------------------|
| 1.09 _____ axis | a. orbit |
| 1.010 _____ hemisphere | b. distort |
| 1.011 _____ equator | c. great circle |
| 1.012 _____ revolution | d. rotate |
| 1.013 _____ 180th meridian | e. half of earth |
| 1.014 _____ analemma | f. International Date Line |
| 1.015 _____ prime | g. globe |
| 1.016 _____ sphere | h. sun time |
| 1.017 _____ map | i. 0 degrees |
| 1.018 _____ Vanguard | j. distract |
| | k. satellite |

Write true or false (each answer, 1 point).

- 1.019 _____ The earth is not straight but tilted.
- 1.020 _____ The equator is a real, not an imaginary line.
- 1.021 _____ Great-circle routes are no longer used for travel.
- 1.022 _____ A time belt, or zone, is 15 degrees of longitude wide.
- 1.023 _____ The earth is divided into thirty-three time zones.
- 1.024 _____ The International Date Line is not longer used.
- 1.025 _____ The analemma is used to determine how far a country is located from the equator.

Write the letter for the correct answer (each answer, 2 points).

- 1.026 The north-south diameter of the earth is _____ .
 a. 9,700 miles b. 7,900 miles c. 180 miles d. 360 degrees
- 1.027 Tilting and revolution determine the earth's _____ .
 a. meridians b. axis c. shape d. seasons
- 1.028 When curved surfaces are represented on flat surfaces, distances are _____ .
 a. shortened b. lengthened c. distorted d. unchanged
- 1.029 A method that transfers portions of the globe to a flat map is _____ .
 a. impossible b. curving c. a dilemma d. a projection
- 1.030 The earth revolves once every _____ .
 a. 365¼ days b. twenty-four hours c. 180 degrees d. season

Answer this question (each part, 5 points).

1.031 What two things does the analemma show?

- a. _____

- b. _____

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