



► **6-12 SAMPLE PAGES**

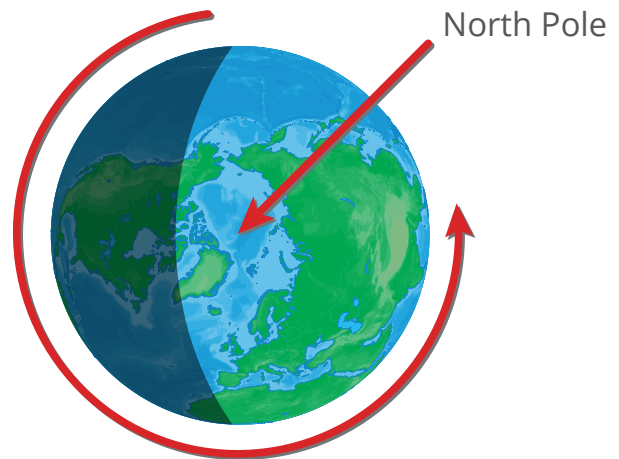
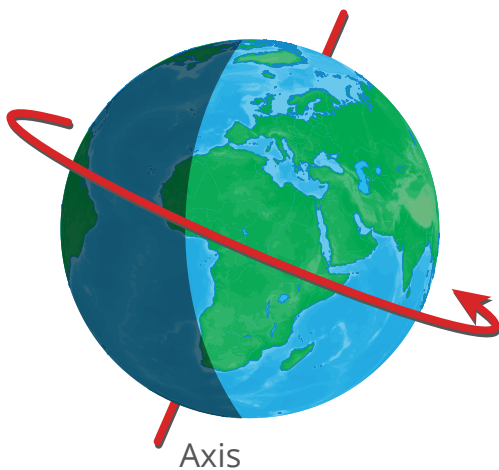
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EARTH'S ROTATION

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.



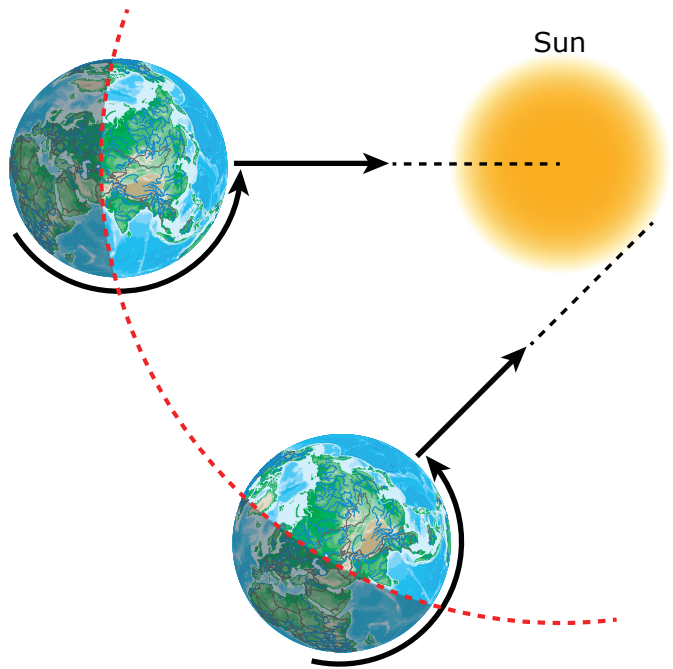
| The Earth is tilted on its axis, and rotates in a counterclockwise direction.

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

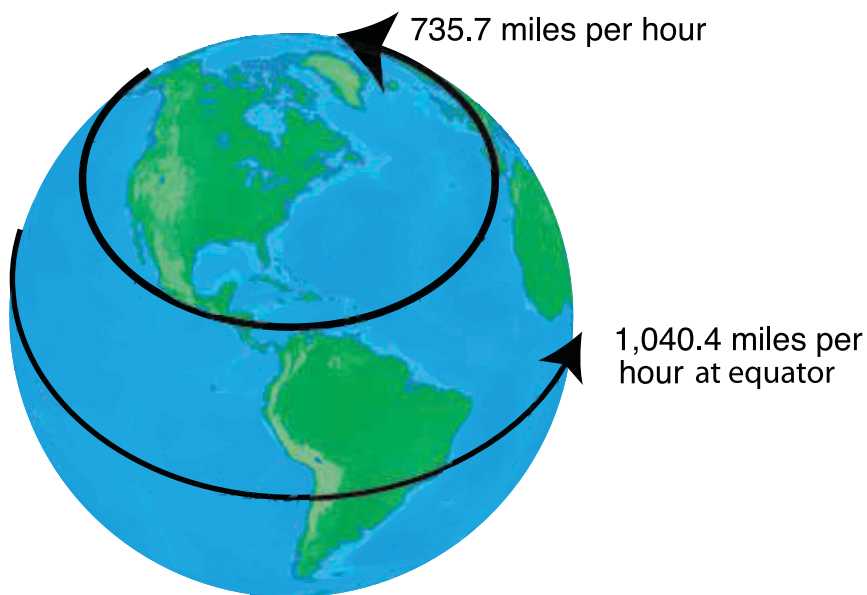
that the earth is also slowly orbiting around the sun as it rotates each day. Therefore, in relation to the sun, a point on the earth has to travel a small amount more each day for the same point on earth to be in a direct line with the sun. This accounts for the 3 minutes 55.909 seconds difference between 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?

SOLVING PROPORTIONS

In Donna's class, there are 12 girls and 9 boys. In Aaron's class, there are 12 boys and 16 girls. Is the ratio of girls to boys in the two classes proportional? Remember that a proportion is a statement showing that two ratios are equal, or equivalent. So, in this problem, we want to find out whether the ratio of girls to boys is the same in both classes.

In this lesson, we'll answer questions like the one above. We'll also set up and use proportions to solve word problems.

PROPORTIONS

One way to check if the ratios of girls to boys in the two classes are equivalent is to set up a proportion and cross multiply. If two ratios are proportional, then their cross products will be the same. Setting up a proportion correctly is a very important step in solving ratio and proportion problems. To set up a proportion correctly, always set up the two ratios in the same way. For example, to compare the ratios of girls to boys, we would want the first part of each ratio to represent the girls, and the second part of each ratio to represent the boys. Also, one of the ratios should represent Donna's class, and the other ratio should represent Aaron's class.



Key point!

To set up a proportion, each ratio should be written in the same way. In this example, one ratio represents Donna's class and the other represents Aaron's class. In each ratio, the girls are represented by the first part of the ratio, and the boys are represented by the second part of the ratio.

$$\frac{12 \text{ girls}}{9 \text{ boys}} = \frac{16 \text{ girls}}{12 \text{ boys}}$$

Cross multiply to check if the two ratios are proportional.

$$12 \times 12 = 144$$

$$9 \times 16 = 144$$

Since the two products are the same, the two ratios are proportional.

Example:

Are the following rates proportional? _____
\$4 for 3 pounds and \$7 for 5 pounds

Solution:

Begin by setting up a proportion.

$$\frac{\$4}{3 \text{ lb's}} = \frac{\$7}{5 \text{ lb's}}$$

Then, cross multiply to see if the products are the same.

$$4 \times 5 = 20$$

$$3 \times 7 = 21$$

Since the cross products are not equal to each other, the rates are not proportional.

USING PROPORTIONS IN PROBLEM SOLVING

Remember that if two ratios are proportional, we can find a missing value using multiplication or division. Each part of one ratio is multiplied or divided by the same number in order to get the equivalent ratio. Many word problems can be solved by first setting up a proportion and then solving for the missing number.

A variable, or letter, is used to represent the unknown value. Any letter can be used to represent the unknown value. Often, a variable is used that goes with the story problem. As you solve these problems, remember to set up each ratio in the same way.

Example:

Kim's basketball team had a win-loss ratio of 3 to 2 this season. If they lost 6 games, how many games did they win?

Solution:

Set up a proportion. The first ratio will represent the team's win-loss ratio of 3 to 2, or $\frac{3 \text{ wins}}{2 \text{ losses}}$. The second ratio will represent the team's actual number of wins and losses. Let's use w to represent the unknown number of wins. The team had 6 losses, so the second ratio will be $\frac{w \text{ wins}}{6 \text{ losses}}$.

$$\frac{3 \text{ wins}}{2 \text{ losses}} = \frac{w \text{ wins}}{6 \text{ losses}}$$

2 losses *multiplied* by 3 is equal to 6 losses.

So, multiply 3 wins by 3 to find the value of w .

$$3 \text{ wins} \times 3 = 9 \text{ wins}$$

The team had 9 wins this season.

Keep in mind...

Each ratio in the proportion was set up the same way. The first part of each ratio represented the wins, and the second part of each ratio represented the losses.

Example:

Charlotte's car gets about 18 miles per gallon of gas. How many miles would you expect her to be able to travel on 9 gallons of gas?

Solution:

Set up a proportion. The first ratio will represent the rate of 18 miles per gallon, or $\frac{18 \text{ mi}}{1 \text{ gal}}$. The second ratio will represent the number of miles Charlotte can travel on 9 gallons of gas. Let's use m to represent the unknown number of miles. So, the second ratio is $\frac{m \text{ mi}}{1 \text{ gal}}$.

$$\frac{18 \text{ mi}}{1 \text{ gal}} = \frac{m \text{ mi}}{1 \text{ gal}}$$

1 gallon multiplied by 9 is equal to 9 gallons. So, multiply 18 miles by 9 to find the value of m .

$$18 \text{ miles} \times 9 = 162 \text{ miles}$$

Charlotte should be able to travel about 162 miles on 9 gallons of gas.

USING PROPORTIONS IN CONVERSIONS

Proportions can also be used to make conversions between metric and customary units of measure. To convert measurements, one of the ratios will represent the conversion factor between the units. For example, if you're converting centimeters to meters, one of the ratios will show that there are 100 centimeters in 1 meter. The other ratio will represent the values that are being converted. Take a look.

Example:

Use a proportion to convert 48 inches to feet.

Solution:

One ratio in the proportion will represent the number of inches in a foot. Since there are 12 inches in 1 foot, we can use the ratio $\frac{12 \text{ in}}{1 \text{ ft}}$. The other ratio in the proportion will represent the value we're trying to convert. In the first ratio, we represented inches in the top of the ratio, so we have to do the same in the second ratio. Let's use f to represent the unknown number of feet. The second ratio will be $\frac{48 \text{ in}}{f \text{ ft}}$.

$$\frac{12 \text{ in}}{1 \text{ ft}} = \frac{48 \text{ in}}{f \text{ ft}}$$

12 inches multiplied by 4 is equal to 48 inches. So, multiply 1 foot by 4 to find the value of f .

$$1 \text{ foot} \times 4 = 4 \text{ feet}$$

48 inches is equivalent to 4 feet.

Let's review!

Before going on to the practice problems, make sure you understand the main points of this lesson.

- ✓ In a proportion, the two products that result from cross multiplying are equal to each other.
- ✓ Proportions can be used to solve word problems and convert units of measurement.
- ✓ The ratios in a proportion should always be set up in the same way.

The Reason for Man's Fall

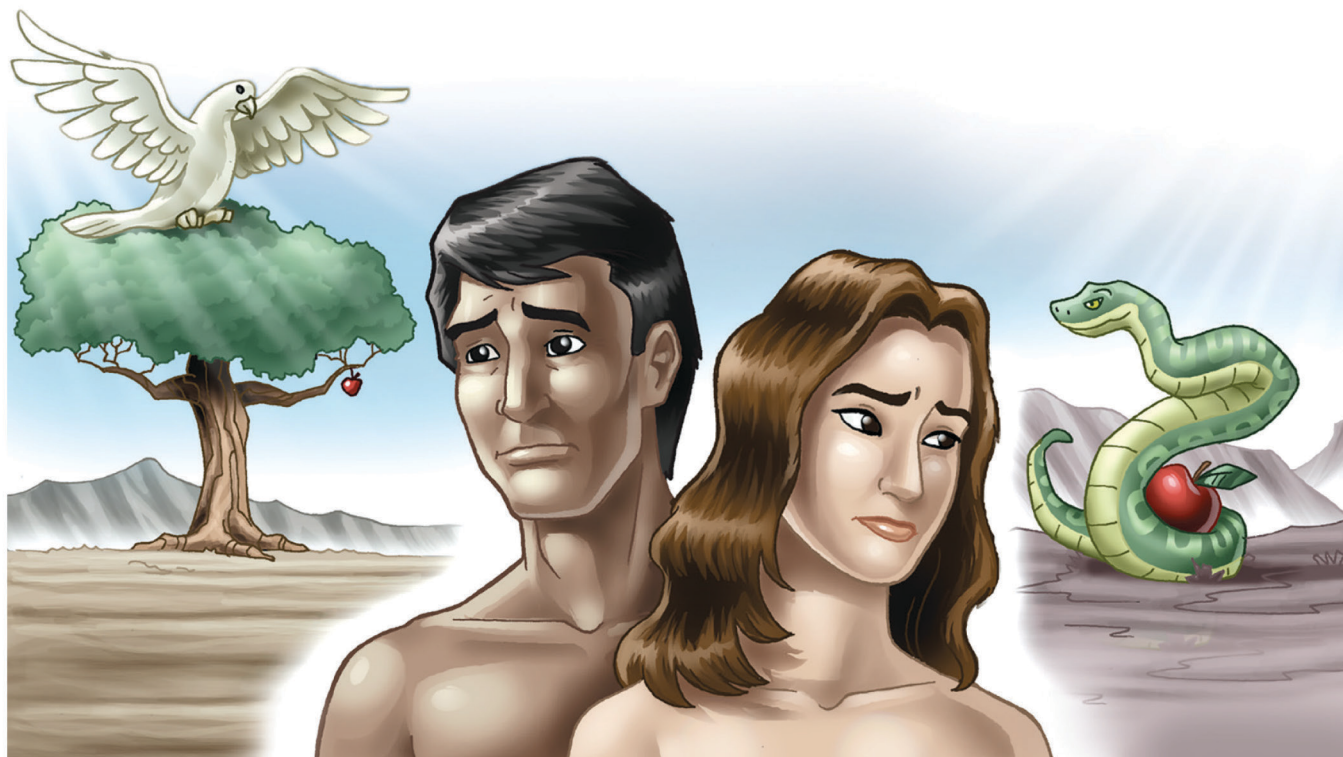
Because of jealousy, the devil **tempted** Adam and Eve, causing them to sin. We each have a personal choice to serve God or to serve the devil.

The Tempter. God created the first man and woman. They were created in the image of God to have daily fellowship with Him. When God created man and woman, He desired that they serve Him because they wanted to; so He gave them a free will to choose to obey or disobey His law. Genesis 3 introduces to us the enemy of man—the devil. The Bible tells us that the devil was once a beautiful angel who served God, but who desired to **dethrone** God and set up his own rule (Isaiah 14:12-15). A great battle took place, and God cast the devil and his wicked angels out of heaven onto the earth (Revelation 12:3-9). Now the devil roams the earth seeking to destroy any person he can (1 Peter 5:8).

Personal Choice. We find in Genesis 3 that Eve was faced with this wicked **tempter**, the devil, also known as the serpent. Remember we

learned that God created Adam and Eve with a free will to choose to obey or to disobey God. The devil wanted to cause Adam to disobey and sin. The plan of the devil was to place doubt in the minds of Adam and Eve as to whether God was really a good God. In Genesis 3:1 we read the leading question of the tempter, "...hath God said, Ye shall not eat of every tree of the garden?"

At this point in history, the most important question of all time was asked of God's first created woman. Eve's answer would **vitaly** affect the entire human race. She was the mother of all mankind, and her decision would affect you and me for all of our lives. The question was simple—will you trust and believe God, or will you make yourself as a god and disobey His law? The law had been given, "But of the tree of knowledge of good and evil, thou shalt not eat of it: for in that day thou eatest thereof thou shalt surely die" (Genesis 2:17). Adam and Eve had to decide whether to obey or to disobey their Creator.



THE MAN

The apostle Paul was also known by the name Saul. The **inference** of Scripture is that he was short of stature and could be easily lowered over a wall in a basket to escape persecution (Acts 9:25 and 2 Corinthians 11:33). He was probably of medium build and displayed boundless energy and zeal in any task he undertook. You will study Paul's birthplace, his trade, and his temperament in the first part of this section.

Origin. Saul was born in the city of Tarsus, the capital of Cilicia. He was proud of his birthplace, not just as a resident, but as a Roman citizen of that great **cosmopolitan** city. The capital city was located on the river Cydnus in a wide plain area with the snow-covered Taurus Mountains as a scenic backdrop. Its earliest residents were possibly Greeks and **Asians**, and it became a Roman city containing also a Jewish colony.

Tarsus, during the reign of Augustus, was noted as a city whose life and citizens were greatly influenced by the Tarsian University there. The atmosphere of enthusiasm and thirst for knowledge among the students must have had a profound effect upon Saul as he grew up. The university climate of Tarsus would give him a natural education in the social, political,

intellectual, moral, and religious life of the Greek and Roman world.

Saul was not only a resident of Tarsus, but also was a Roman citizen by birth. This carried with it privileges not afforded others who merely came under Roman rule. He would be guaranteed protection by Rome from the injustices of local magistrates and would be assured of a speedy passport to any distant land under Roman rule (Acts 16:36-39; 22:29). Paul used his privilege as a Roman citizen to escape from his Jewish persecutors. He also makes allusions to privileges associated with Roman citizenship in his Epistles.



| Tarsus



Write true or false.

- 1.1 _____ Paul was also known as Saul.
- 1.2 _____ Paul was probably very tall and easily noticed in a crowd.
- 1.3 _____ Paul displayed energy and zeal in any task he undertook.
- 1.4 _____ The Tarsian University had a great influence in the city of Tarsus.
- 1.5 _____ Paul did not have the privileges of Roman citizenship.

Section Objectives

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

1. Describe several aspects of God's essence.
2. Describe three key attributes of God toward man.
3. Explain the eternal plan of God, especially for man.

Vocabulary

Study these words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAK.

alteration (ôl' tã rã' shən). A change in something or someone.

attribute (at' rã byüt). Trait, characteristic, or quality that is basic to a person or thing.

compensation (kom pãn sã' shən). A payment or making up of something owed or lacking.

consequences (kon' sã kwen' sãz). Something produced by a cause or necessarily following from a set of conditions.

essence (es' ns). The real or ultimate nature of a thing.

immutable (im myüt' ə bəl). Not capable of change.

omnipresence (om' ni prez' ns). Being present everywhere at the same time.

pinnacle (pin' əkəl). The highest point of achievement or development.

redeem (ri dēm'). To free from captivity by payment of ransom.

restitution (res tã tü' shən). An act of restoring or a condition of being restored.

unmerited (un mer' i ted). Without merit; or something that is not earned.

Note: All vocabulary words in this LIFEPAK appear in **boldface** print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

Pronunciation Key: hat, āge, cāre, fār; let, ēqual, tēm; it, īce; hot, ōpen, ōrder; oil; out; cup, pūt, rüle; child; long; thin; /th/ for then; /zh/ for measure; /ə/ represents /a/ in about, /e/ in taken, /i/ in pencil, /o/ in lemon, and /u/ in circus.



| God has a loving plan for man.



| Fatalistic Attitude



| Deterministic Attitude



| Humanistic Attitude

meditation and physical discipline necessary to achieve unity with the divine mind or god.

Deterministic. Determinism is the teaching that all events, both in the physical universe and within the soul of man, are caused by some previous spiritual or physical conditions. To state this philosophy simply, some force or some thing controls or determines everything that happens. This particular attitude may be seen in those who are involved in astrology, witchcraft, mysticism, or occult practices. Astrology is the study of the heavenly bodies such as stars, moons, and planets, and their supposed influence or control over the affairs of human life. Witchcraft involves the use of magic, sorcery, or spells, and follows careful formulas to attempt to control people or events.

Mysticism is involvement with spiritual practices by which people seek to gain immediate spiritual knowledge apart from the normal process of learning. The occult may include mysticism, astrology, or other practices that claim to go beyond the bounds of ordinary knowledge; it may also involve the worship of Satan or demons. Those involved in such practices may believe in a god who is a supreme

being, mind, or force; but their belief is really in satanic power. The meaning of life or suffering is interpreted according to the practice in which they are involved, and depends on the force or being they acknowledge as supreme in power. Suffering, according to these cults, is the result of predetermined forces or transgressions against supernatural laws or beings.

Humanistic. Humanism is basically the concept that man himself is capable of solving all his problems given enough time, wisdom, and scientific ability. Humanism is an attitude of thought or action in which the human point of view **predominates**. Such a view of life leaves no place for God in the scheme of things since man is viewed as being capable of controlling his own future and destiny. Those humanists who regard favorably most events in life, including suffering, are called *optimists*. The optimists tend to look on the bright side of life and hope for the best believing that good will ultimately defeat bad in the world. Those who have a negative attitude and who believe that bad will triumph are referred to as *pessimists*. To the pessimists all things tend toward evil, and suffering in the world is not outweighed by all the good and happiness in life.



Complete this activity.

2.19 List the kinds of informal (personal) letters.

a. _____

b. _____

c. _____

d. _____

A business letter generally performs one or more functions. It conveys a message about a specific matter of importance that is related to the sender and to the receiver. The business letter serves as a record of a proposal or transaction. It builds good will for the person or the agency that sends the letter.

A business letter is a formal letter that must be *accurate*, *brief*, and *clear*. You are conveying specific information for a specific purpose. A business letter is often written in *block style*, usually typed on standard 8½ x 11 inch white paper. The six parts of the business letter are the heading, the inside address, the **salutation**, the body, the closing, and the signature.

The diagram shows a business letter with the following parts labeled on the left:

- Heading** (indicated by a bracket): Patrick Murphy
111 W. 32nd St.
Midtown, Iowa 52289
- Inside Address** (indicated by a bracket): Flash Photo Corporation
P.O. Box 945
Portland, Oregon 97452
- Salutation** (indicated by an arrow): Dear Sirs:
- Body** (indicated by a bracket): Please send me three rolls of your high-speed color slide film for 35 mm cameras (ASA 400). Enclosed is a check for \$5.25, including the shipping and handling fees.
- Closing** (indicated by an arrow): Very truly yours,
- Signature** (indicated by a bracket): Patrick Murphy

VERBS

You should remember from the study of Language Arts 702 and 705 that a verb is a word or a group of words which usually express action or state of being. The **tense** of a verb tells the time the action or being occurred. A verb is the backbone of every sentence; without it, a group of words is only a fragment of a sentence.

Verbs may be classified **regular verbs** or **irregular verbs**. The principal parts of regular verbs are formed by adding *-ed*, *-d*, or *-t* to the present tense. Irregular verbs must be learned (see Chart 1 in Language Arts LIFEPAK 702 to review the principal parts of some of these verbs).

The three principal parts of a verb are:

	Regular	Irregular
Present tense	stop	see
Past tense	stopped	saw
Past participle	stopped	seen

From these three principal parts of a verb, the six verb tenses are formed.

Present tense:

- I see him.
- She sees me.

Past tense:

- I saw him.

Future tense:

- She will see me tomorrow after class.



| First Person Tense Tree

Present perfect tense:

- I have read the assignment.

Past perfect tense:

- I had read the book before the teacher assigned it.

Future perfect tense:

- By next week he will have read all the assignments.



Complete this activity.

2.45 Read Matthew 6:28–30.

- a. Do these verses fulfill the requirements of an inductive paragraph? _____
- b. Notice that the first sentence asks a question. Do the other sentences lead up to the summation or conclusion presented in the last verse? _____

Perhaps you can find other Biblical examples of inductive paragraphs to share with your class.

Remember, even though the topic sentence concludes the paragraph instead of introducing it, the inductive paragraph calls for the same unity and sequence required of all paragraphs.

Read the following paragraph and complete the activities.

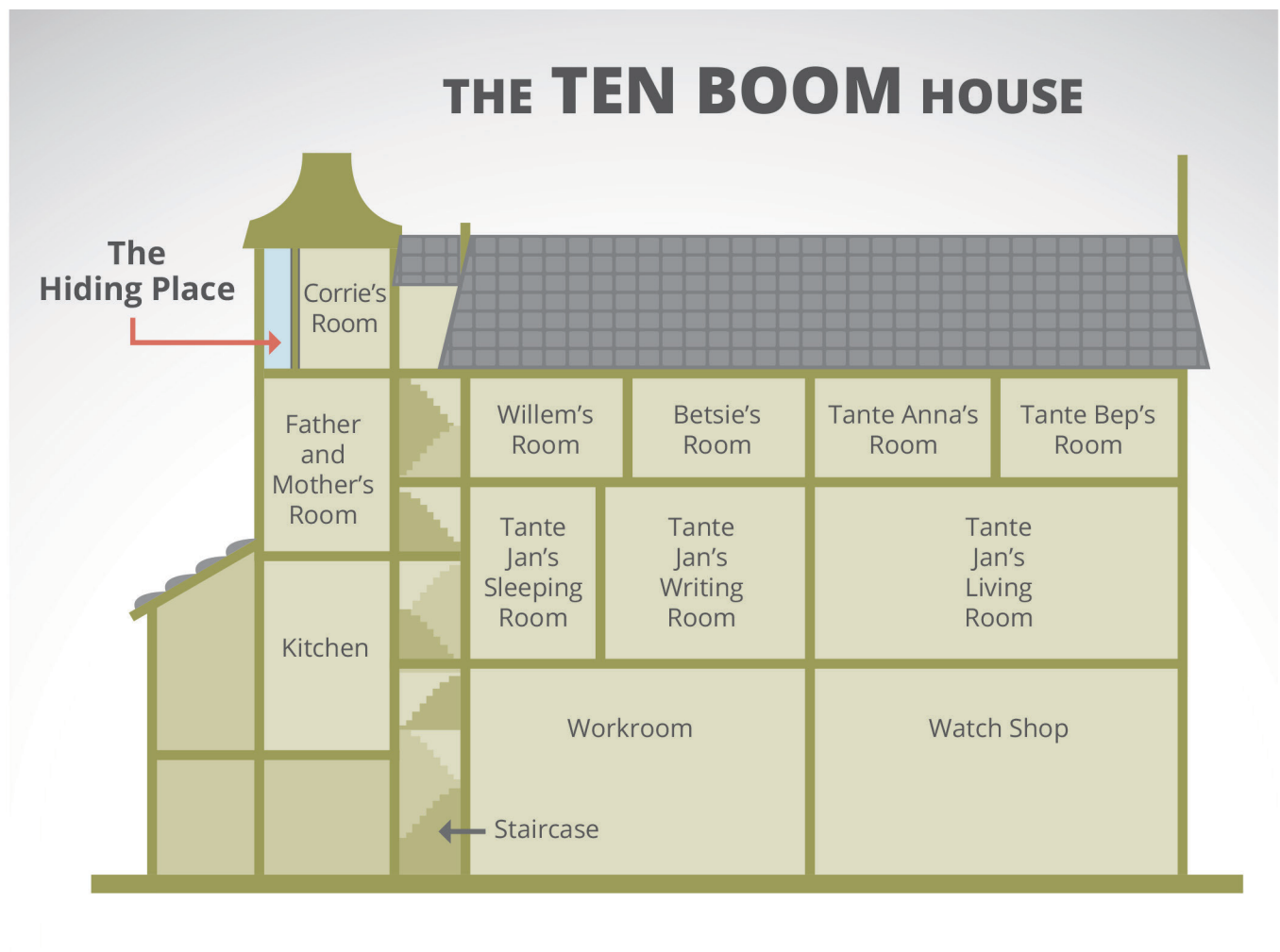
When my brother Mark brought home a baby raccoon he found in the woods, we thought at first it would be a perfect family pet. We named him Tubby because he was so round and plump. Dad helped us build a box for him to sleep in. Mother found some soft, clean rags for his bed. We laughed and laughed as we watched Tubby eat and play. As Tubby grew bigger and stronger, our laughter stopped. Tubby scattered Dad's neckties all over the house. He broke Mom's favorite cookie jar. He knocked over Mark's bike. He treed our cat. He even chewed up all the rolled newspapers I had ready for my paper route. Finally Dad had to call the Game Warden to come get Tubby and to return him to the woods where he belonged. We were sad to see him go, but we had learned a valuable lesson. Wild animals do not always make good pets.

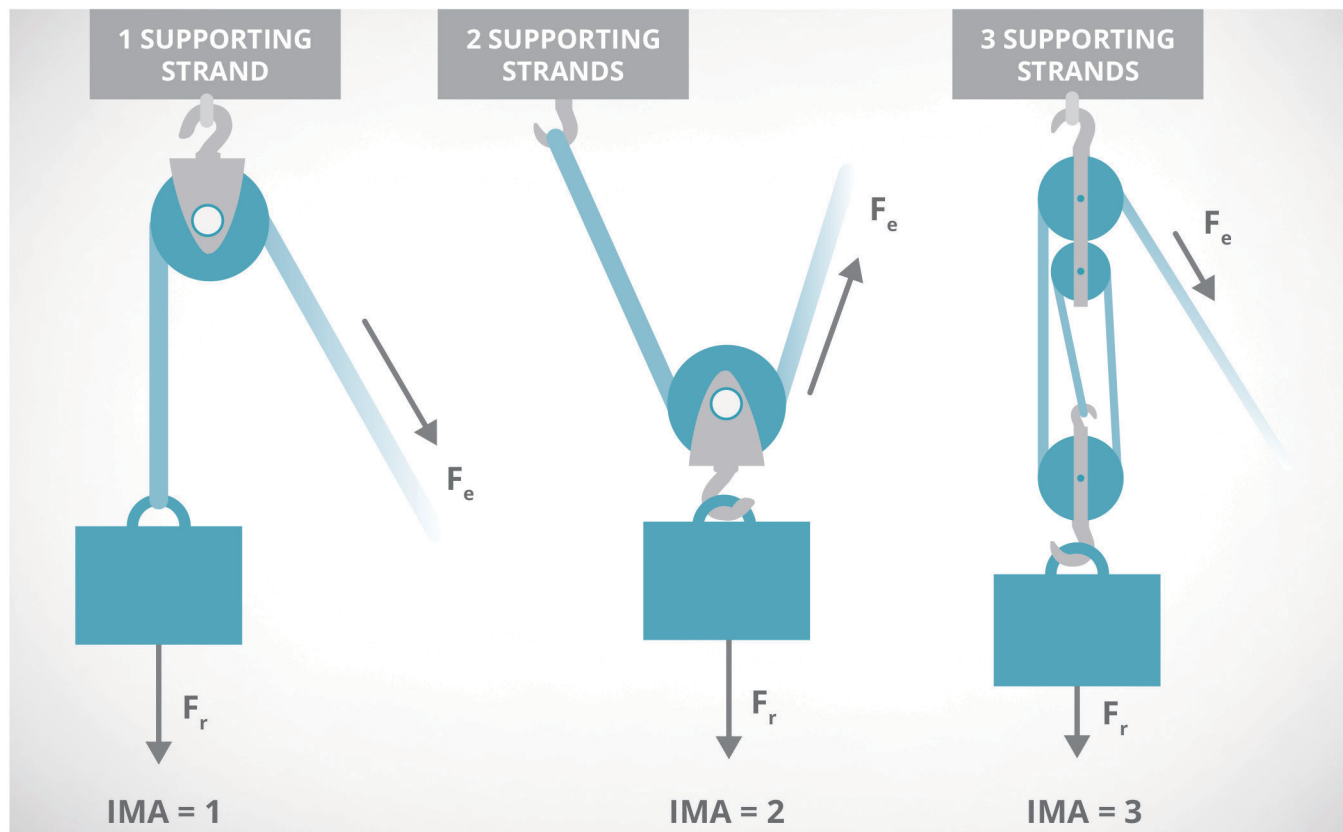


- 2.3 The ten Booms began _____.
 a. efforts to overthrow the government b. to plot against the Jews
 c. taking Jews into their home d. hiding all their jewelry
- 2.4 The hiding place would be located behind a false wall _____.
 a. under the staircase b. in Corrie's bedroom
 c. in the cellar d. in the watch shop
- 2.5 Corrie reached her thirty-one associates by using a _____.
 a. bicycle b. boat c. taxi d. horse and buggy

Soon, fleeing Jews began arriving at the Beje. Corrie goes to Willem for help. He tells her that she will have to get the needed ration cards. She finds a friend who obtains one hundred cards for her. Corrie realizes that she has many friends in Haarlem who can help her when special needs arise. She relies on God to lead her to the right person.

Corrie has a chance to meet members of the **underground**. She meets a man who helps her build a secret hiding place in her house. She also learns that Peter will soon be released. The secret hiding place soon is built. Such an excellent job is done that even Corrie has a difficult time believing it is actually there.





Uses. Pulleys transfer power from electric motors to machines. A v-belt passes around the drive pulley and the driven pulley. The speed of the driven pulley can be changed by changing the size of the pulley.

Generally, pulleys change the direction of the force or increase the effort force. The single pulley mounted over a well has been used since ancient times to haul water to the surface. The bucket and water is the resistance and the effort is provided by the person pulling on the rope. The single pulley is so common in daily life that we seldom think about it. Everything from raising the flag, to pulling your bike or canoe up to the ceiling in the garage to store it out of the way are ways that single pulleys are used.



| Single Pulley and Bucket over a Water well

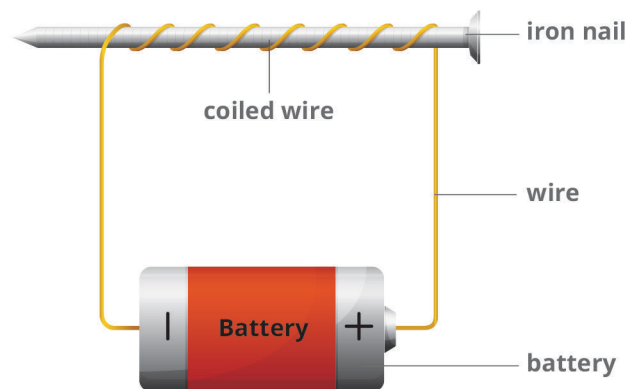
INDUCED MAGNETISM

Magnetism can be induced in an iron bar by stroking the bar with a magnet. This method produces a magnet that is weak and temporary. However, a magnet can be made that is very strong. An iron bar called the *core* is wrapped in a coil wire and the two ends of the wire are connected to a battery. This wire-wrapped core is an electromagnet. The iron bar will be magnetized as long as the wire carries an electric current. When the battery is disconnected, the magnetism vanishes.

Field strength. The strength of an electromagnet depends on the strength of the current, the number of turns of wire around the core, and the material in the core. The strength of the magnet can be changed by changing any one of these. The more turns in the core, the stronger the field; the stronger the current, the stronger the field.

Electromagnets are used to lift and move large loads of iron. Control is easy. The operator has only to turn the switch on or off. One use of electromagnets is the loading of freight cars with scrap iron.

Supermagnets. Scientists and engineers who study supercold believe that all motion in atoms and molecules would stop at the



| Electromagnet

temperature of -460° Fahrenheit or -273° Celsius. So far this very low temperature has not been reached. The experiments have produced some interesting results, however.

Many materials that are not good conductors of electricity at normal temperature are excellent conductors at extremely cold temperatures. In some conductors the current even continues after the energy source is shut off.

Since *superconductors* do not resist the flow of electricity, they produce very strong magnetic fields. Some of these very strong magnets are used in atomic research. Research is being continued toward developing supermagnets and superconductors.



Write true or false.

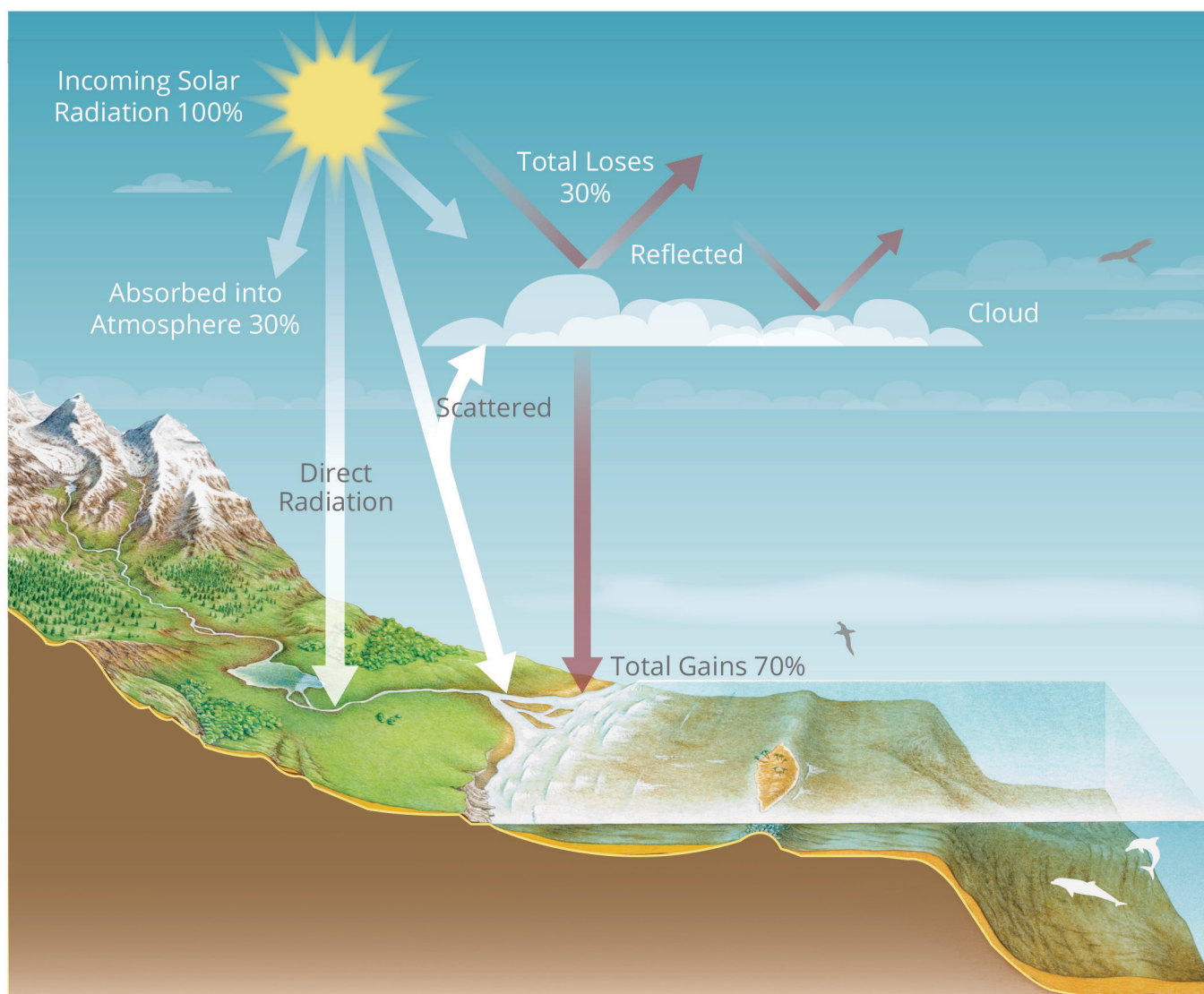
- 1.42 _____ The strength of an electromagnet is easy to control.
- 1.43 _____ Magnetism can be maintained in a bar by hammering.

Incoming radiation. Our atmosphere and clouds reflect about 30 percent of the incoming solar radiation. The remaining 70 percent is responsible for warming the earth and atmosphere. About 30 percent of the total incoming radiation is absorbed directly by the atmosphere. The ozonosphere and ionosphere are responsible for most of this absorption of radiation. The remaining 40 percent of the total solar radiation reaches the surface of the earth. As the solar radiation penetrates the lower layers where air is more dense, some **scattering** occurs. Scattering is the bending of light rays in all directions by gas molecules. Some

light rays are lost back to space. Since blue light is most affected by scattering, the sky appears blue.

Energy released by a very hot object like the sun is in the form of *short-wave* radiation. Land and water can absorb this form of radiation far better than can the atmosphere. As a result the earth's surface is warmed. Since the earth is a warm object it, too, re-releases energy. Ground radiation is of the *long-wave* form because the earth is cooler than the sun.

Greenhouse effect. Long-wave radiation given off by the warm earth is absorbed by water

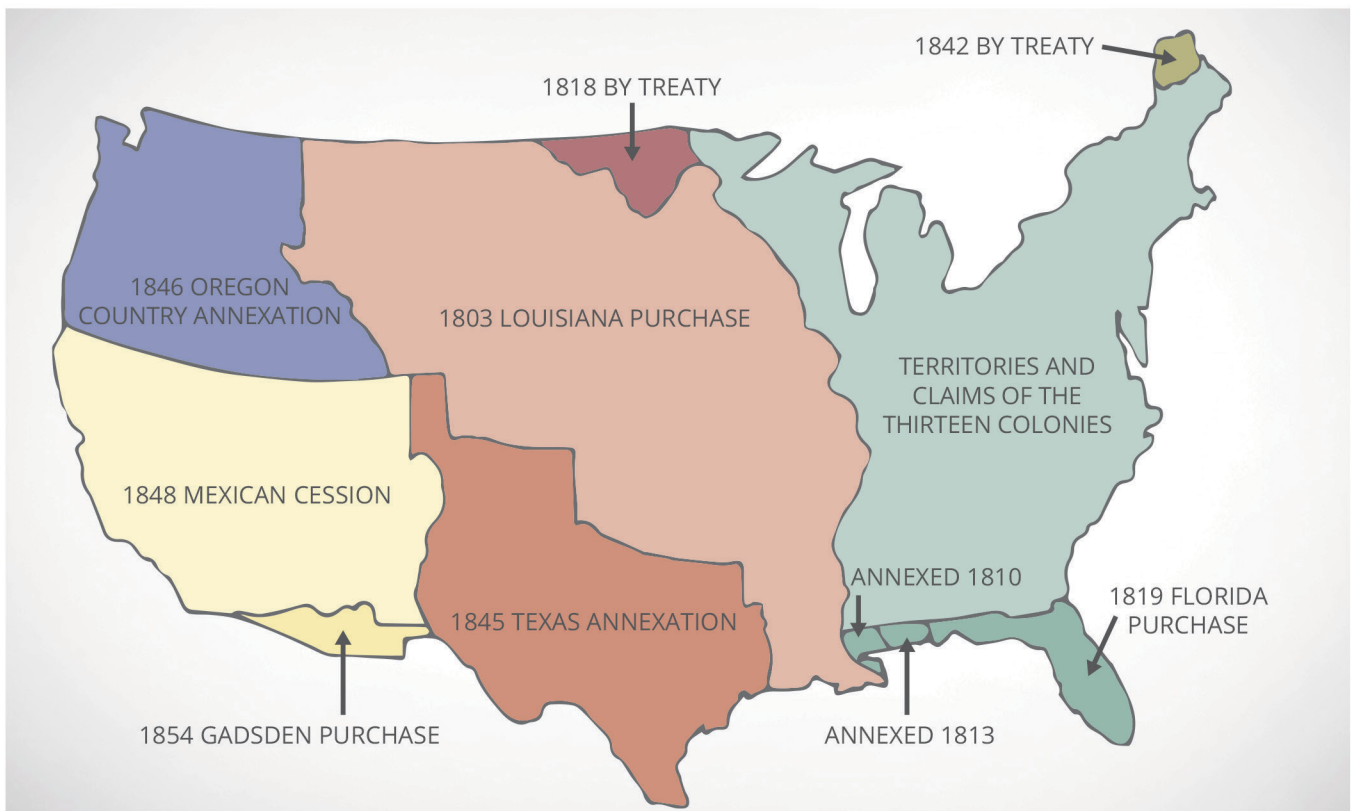


| Figure 6

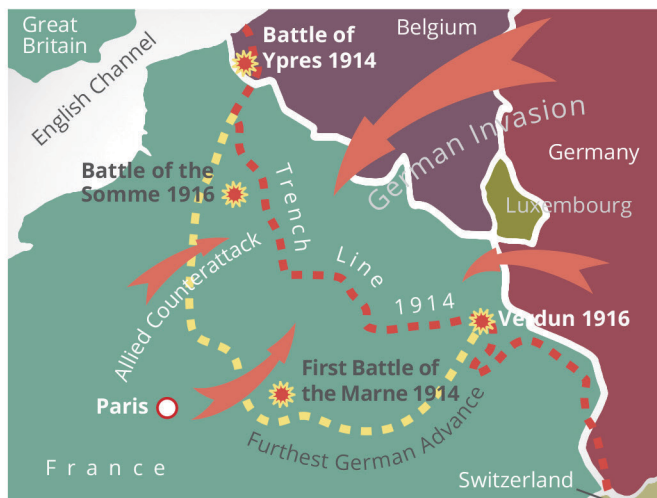
A new **era** began under President John Tyler. The **annexation** of Texas, the Mexican War, and the acquisition of the whole Southwest had their roots in Tyler's administration. Most of the settlers moving into Texas were southerners. They had pushed into Texas for many years and wanted their independence from Mexico. They fought many Mexican armies, seceded from Mexico, and created the Republic of Texas. Their desire to join the United States became an issue during the campaign of 1844. After the election, Texas was admitted to the Union. However, the new state boundaries

were badly defined. The United States and Mexico both claimed large areas on the Rio Grande. War broke out between Mexico and the United States. As a result of the Mexican War, Texas, California, and the great Southwest became part of the United States.

While all this conflict with Mexico was transpiring, President Polk peacefully settled the question of the Northwest with Great Britain. The United States gained present-day Idaho, Oregon, Washington, and parts of Montana and Wyoming; but British Columbia went to Great Britain.



| Growth of the U. S. to 1860



| The Western Front (1914-1916)

National pride, alliances, and an arms race drew Europe into a horrific war. Very few people had the slightest idea how awful the war would be. Sir Edward Grey, the Foreign Secretary of Britain, was one exception. "The lamps are going out all over Europe," he said when Britain declared war. "We shall not see them lit again in our lifetime."

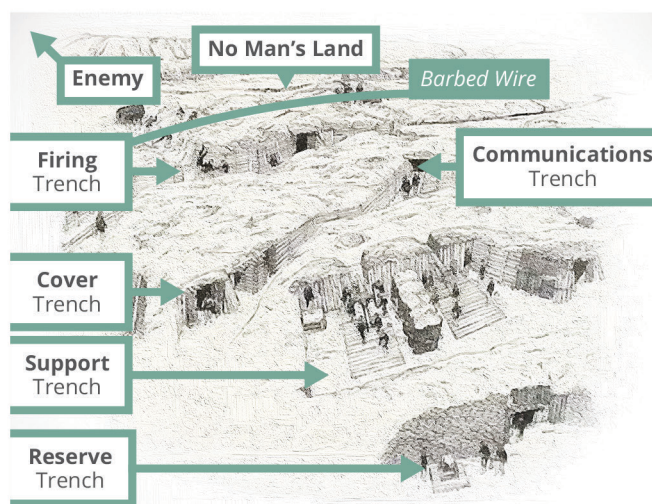
Stalemate. Germany was faced with a two-front war. Its battle plan called for the swift invasion and conquest of France before the huge, but slow, Russian army could be brought into battle. To insure speed on the western front, Germany attacked, not along the protected French-German border, but through neutral Belgium. This was a major mistake. It cast Germany as the aggressor and was a major factor in turning the U.S. toward the Allies.

The well-disciplined, well-equipped Germans made rapid progress, and by September 1914 they were threatening the French capital of Paris. The French and a small British army succeeded in throwing them back at the first Battle of the Marne (September 6-9). Then both sides "raced to the sea" in an effort to go around the enemy army. By November of 1914, a battle line had been established that ran from Switzerland to the North Sea. Both sides dug in and set up defensive positions. Thus began the horrific "trench warfare" of World War I.

Trench warfare was brutal. Each side set up several parallel rows of trenches facing the enemy. These would be 6-8 feet deep and wide enough for two men to pass each other. In between the two armies was "no man's land," bombed-out, open land protected on each side by barbed wire, machine guns, and artillery fire.

Attacks were wholesale slaughters. They began with artillery barrages followed by men "going over the top," out of the trenches into the open across no man's land. They ran unprotected into the machine gun and artillery fire of the enemy who was firing from fortified trenches. Losses were huge and gains were small. For example, close to a million men were wounded, killed, or captured in the battles of Verdun and the Somme in 1916, neither of which accomplished much. Moreover, the generals never learned from the failures. They continued to order attacks in spite of the losses, even when the western front barely moved for three and a half years! The suffering of the men intensified when both sides began to use poison gas that killed and blinded many.

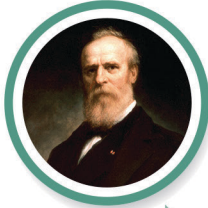
On the eastern front, Germany pushed back the Russian armies that had attacked at the beginning of the war, but Austria-Hungary was less successful. Russia occupied part of their territory until 1915, when a combined German-Austrian army recovered it. Russia



| The Trench Warfare System



AMERICA from 1880 to 1915



Rutherford B. Hayes
1877–1881
Republican



James A. Garfield*
1881
Republican



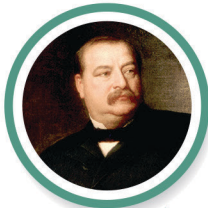
Chester A. Arthur
1881–1885
Republican



Grover Cleveland
1885–1889
Democratic



Benjamin Harrison
1889–1893
Republican



Grover Cleveland
1893–1897
Democratic



William McKinley*
1897–1901
Republican



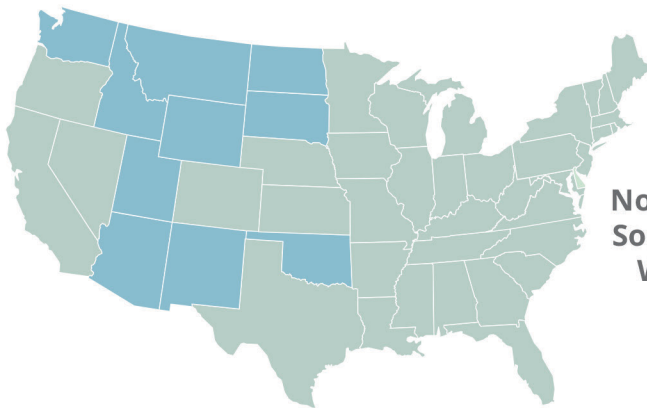
Theodore Roosevelt
1901–1909
Republican



William H. Taft
1909–1913
Republican



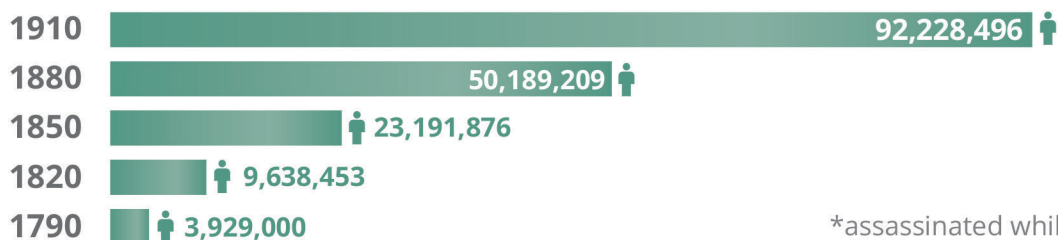
Woodrow Wilson
1913–1921
Democratic



STATES ADMITTED TO THE UNION

North Dakota	1889	Wyoming	1890
South Dakota	1889	Utah	1896
Washington	1889	Oklahoma	1907
Montana	1889	New Mexico	1912
Idaho	1890	Arizona	1912

POPULATION of the United States of America



*assassinated while in office

THE INSTRUCTION OF THE GLOBE

The study of the globe is a lifelong process; you will never finish learning about the globe. You can be instructed about certain aspects of the globe and then begin to build upon these fundamental concepts. One important skill to learn is the use of latitude and longitude to locate a certain position on the globe. The two lines are the only means available to communicate an exact position on the earth's surface. To more fully understand the world in which we live, we must become aware of time belts that span the globe and of the International Date Line.

The world is rapidly becoming a smaller place in which to live. Jet travel allows us to step from one continent to another in the afternoon. Space travelers orbiting the earth can see every country in the world in about the same amount of time that most of us take to eat lunch. Unless we are aware of what is involved in becoming a world traveler, we shall never be at home on our own planet. Did you know, for instance, that in the course of world travels you could live the same day twice? Did you know that you could skip an entire day while traveling, never living one moment of it?

The globe is a unit of instruction all by itself. You can become skillful in the use of the globe by learning to read and use the symbols printed on it. One such helpful tool is the anamlema, found on every physical-political classroom globe. Let the globe become your guide to learning more about the wonderful world in which we live.

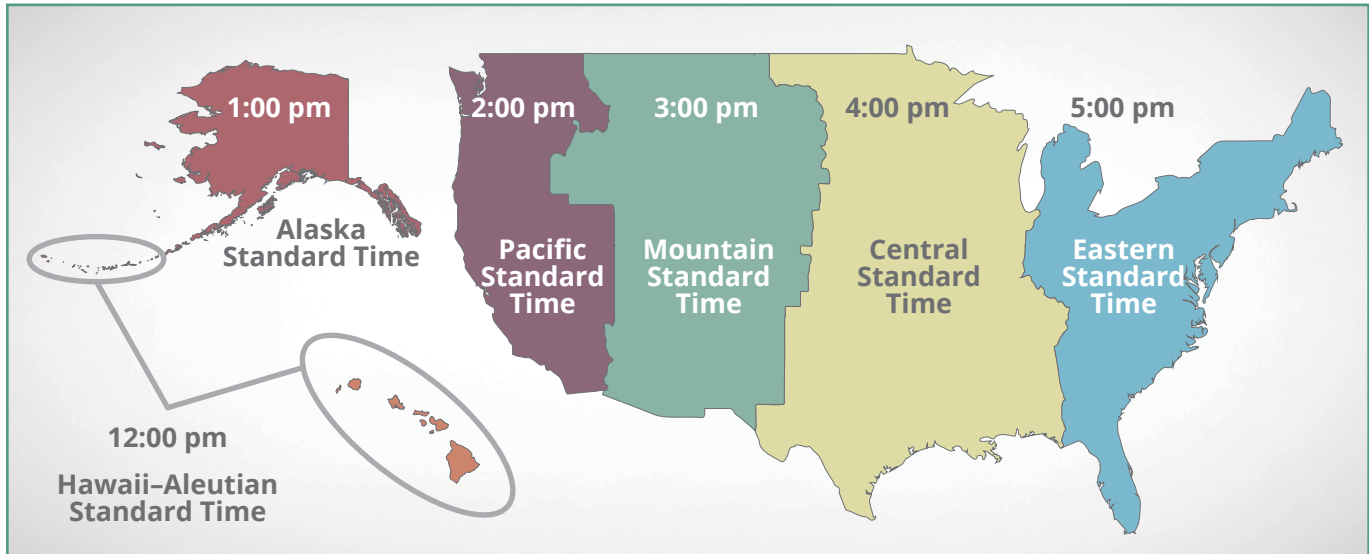
Latitude and longitude. You can locate any point on the earth's surface by the use of lines of latitude and longitude. The earth was **arbitrarily** divided by man with these lines just as a city is divided by streets and avenues.

Latitude lines are sometimes called parallels because they are parallel to the equator and to each other. Longitude lines are often referred



to as meridians. Lines of longitude extend from the North Pole to the South Pole, and they meet as they approach the poles. Because lines of latitude run the same way as the equator, they are measured in degrees north or south of the equator. The equator is 0 (zero) degrees latitude, and both poles are 90 degrees. Longitude lines are measured in degrees in terms of being east or west of the prime meridian. The prime meridian is the first meridian that was arbitrarily established by man. Scientists determined that the first, or prime, meridian would pass through Greenwich, England. Greenwich is, therefore, listed as 0 degrees longitude.

Any feature or location on the earth's surface can easily be described in terms of latitude and longitude. Lines of latitude allow the location to be described as being either north or south of the equator, and lines of longitude reveal how far east or west the location is from the prime meridian.



| Time Belts in the United States

Time belts. Before 1883, the United States and Canada used fifty-three different time systems. With the invention of more rapid means of travel, such as the train, something had to be done to make time systems more uniform. The United States was divided into four time zones, and Canada was divided into five zones. The entire earth is divided into twenty-four time belts, or zones. Each zone is 15 degrees of longitude wide. (A circle contains 360 degrees; 360 degrees divided by twenty-four time belts equals 15 degrees for each belt.)

The time changes by one hour each 15 degrees of longitude you travel to the east or to the west. To avoid splitting cities or states into two

time belts, the boundaries of the time zones were made slightly irregular. Therefore, the time in the time belt just west of where you are now, is always an hour earlier, and the time in the time belt to the east is an hour later. The United States used to have only four time zones; but, with the admission of Alaska and Hawaii, the United States now extends through six time zones. Those six zones include *Eastern, Central, Mountain, Pacific, Alaska, and Hawaii-Aleutian*. A five-hour difference exists between the easternmost city in the United States (Eastern Standard Time) and the westernmost city in the United States (Hawaii-Aleutian Standard Time).



Complete these statements.

- 1.56 Before 1883 the United States and Canada had _____ time belts.
- 1.57 Each time zone around the world is _____ degrees of longitude wide.
- 1.58 The United States extends through _____ time belts.
- 1.59 You can locate any point on the earth's surface by the use of lines of
a. _____ and b. _____.
- 1.60 Before the admission of Alaska and Hawaii, the United States extended through _____ time zones.

International Date Line. The earth is divided into twenty-four time zones, each zone one hour different from the zone on either side of it. As the time zones spread to the east and the west away from the Prime Meridian, they meet exactly halfway around the world at the 180th meridian (180 degrees east or west longitude). This line where the time belts meet is the International Date Line. By crossing the International Date Line to the west you gain, or add, one day (all twenty-four time zones). By crossing the International Date Line to the east you lose, or subtract, one day (all twenty-four time zones). When the time is noon on Saturday of June 1 on the east side of the International Date Line, the time is noon on Sunday of June 2 on the west side of the line. Suppose you were on a ship that left the West Coast of the United States, heading for the Orient. You are traveling straight west and the date is Friday, May 31. You can hardly wait until tomorrow because your birthday is June 1. During the night while you are sleeping, the ship crosses the International Date Line. When you awaken in the morning, you discover that the date is now Sunday, June 2! The day Saturday, your birthday, was skipped, or lost. On your return trip to the United States, you will gain back the day you lost. The International Date Line does



| International Date Line

not follow exactly the 180th meridian. By agreement the line has been made somewhat irregular to help cities and countries through which the 180th meridian passes. Much confusion would result from having two separate dates existing at the same time on one island! For this reason the International Date Line has been moved to the east or west of places to avoid dividing communities into two different days.



Answer true or false.

- 1.61** _____ The earth is divided into twenty-four time zones.
- 1.62** _____ Each time zone is two hours wide.
- 1.63** _____ You lose a day when you cross the International Date Line traveling west.
- 1.64** _____ The International Date Line follows exactly the 180th meridian.

2. DRAMA

One way the library can help us is to provide a way to find books for leisure reading. You are probably quite familiar with the pleasure and instruction to be derived from books, but an entire area of reading you may not have yet explored is drama.

In this section, you will learn about the history of drama. You will become familiar with the elements of drama and the use and meaning of several important dramatic terms. You will also study the proper way to read a play.

SECTION OBJECTIVES

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

7. Trace the historical development of drama.
8. Identify and explain the elements of drama.
9. Define or explain certain dramatic terms.
10. Explain the proper way to read a play.

VOCABULARY

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

cast (kast). To select actors for a play; the actors appearing in a play.

climax (klī' maks). The point of highest interest; the "turning point" of the action in a story or drama.

complication (kom plu kā' shun). The part of the play or story where additional problems occur.

cue (kyū). A word or action that tells an actor to begin his speech; to give an actor his cue.

denouement (dā nü män). The final outcome or resolution of a story or drama.

dialogue (di' u lôg). The lines spoken by two or more characters in a drama.

exposition (eks pu zish' un). The part of a play that introduces or explains the theme and the chief characters of the situation.

flat character (flat kar' ik tur). A one-dimensional character of a story, or play, who does not change, or learn anything.

genre (zhän' ru). A distinctive classification or category of literature.

house (hous). A theater; also the audience of a theater.

miracle play (mir' u kul plā'). A type or religious drama in the Middle Ages about the lives of saints and martyrs.

morality play (mu ral' u tē plā'). A fifteenth- and sixteenth-century form of drama using popular legends to teach morals through allegory. Vices and virtues were personified as characters in these plays.

mystery play (mis' tir ē plā'). A form of drama developing in the Middle Ages from church liturgy and based on events from the life of Christ.

prompter (promp' tur). One who gives clues to actors.

properties (prop' ur tēz). Also props; any article, except costumes or scenery, that is used in a play.

round character (round kar' ik tur). A fully developed character who experiences some change resulting in a greater understanding of himself and others in the course of a play or story.

script (skript). The text of a play.

set (set). The stage and scenery for a play.

setting (set' ing). The mood, time, and place in which a play or story occurs.

stage (stāj). The raised platform where plays are performed; to perform a play.

stage directions (stāj du rek' shunz). The written instructions by the author suggesting movements, actions, and gestures to the actors.

theme (thēm). An idea, point of view, or perception the author expresses in his work.

THE HISTORY OF DRAMA

Drama is usually defined as (1) a story, (2) told in action, (3) by actors who impersonate the characters of the story. To explore the background of drama, its origin and its development, may help a drama student understand drama. Drama developed from religious ceremony in Greece about the fifth century BC and

was further developed later in Rome. However, the decline of Rome resulted in the disappearance of classical drama. Some forms of dramatic ceremonies and rituals helped keep the tradition barely alive, and wandering entertainers no doubt helped preserve the tradition of acting. From the ninth century rituals of the



ANCIENT



ELIZABETHAN



MODERN

Christian church grew **mystery plays**, **miracle plays**, and **morality plays**, forms of drama that lived on into the Renaissance of the sixteenth and seventeenth centuries. During the Renaissance, brilliant and complex plays were written by such dramatists as Ben Jonson, Christopher Marlowe, and William Shakespeare, firmly establishing drama as a literary **genre**.

In the twentieth century, playwrights have drawn upon old traditions as well as upon experimental ideas of theater. Sometimes a play has no **script**—the actors improvise their dialogue. At times, the audience becomes the cast of characters. Even in the midst of this experimentation, however, traditional plays are still being written and produced and enjoyed.

**Complete these statements.**

- 2.1 Drama is usually defined as a. _____ b. _____
c. _____
- 2.2 Drama developed from religious ceremonies in _____.
- 2.3 Three types of plays growing from the Christian church were a. _____,
b. _____, and c. _____ plays.
- 2.4 Drama became established as a literary form, or _____, during the Renaissance.
- 2.5 Two outstanding Renaissance playwrights were a. _____ and
b. _____.

Complete these activities.

- 2.6 List modern variations or experimental ideas used in twentieth-century plays.
a. _____ b. _____
- 2.7 Look at the entertainment section of your city newspaper.
a. Are any plays performed live in your area? _____
Sometimes classical Greek plays are presented, and very often Shakespeare's plays are produced.
b. List any of these productions in your area. _____

THE ELEMENTS OF DRAMA

Drama involves a story that is acted out, usually before an audience. Drama is a very old form of literature, dating back to the ancient Greeks. To understand drama clearly requires a closer examination of the elements of a play. These elements include plot, characters, theme, style, setting, structure, and stage directions.

The plot of a play usually centers around a problem. This problem may be either a moral or a physical problem (man against man, man against himself, man against society, man against environment); it constitutes the *conflict*, or struggle, of the story. Characters in the story may be described, as E.M. Forster in *Aspects of the Novel* suggested, as either **flat characters**, those who remain static or unchanged during the action of the play, or **round characters**, those who learn something during the play that causes them to undergo change of some sort. These characters are involved in the plot, or the working out of the conflict, the characters use **dialogue** or conversation.

The theme of a play is really what the play is about. It is the message the author wants the audience to understand. This theme is revealed through the story and the characters.

The style of a play is the way an author uses language. Style makes one play different from another even if the message is the same.

The **setting** is when and where the play takes place. This information is usually given in the opening **stage directions** along with an introduction to the **cast** of characters, a list of the people within the play.

Structure is the pattern of action in the plot. The plot itself, which is sometimes called the story line, may be viewed in stages: the **exposition** (what the problem is), the **complication** (the plot thickens), the **climax** (the point of no return—a decision is made and the rest of the action depends on this decision), and the **denouement** (or the conclusion of the story—this conclusion is very often quite short, sometimes it is even omitted by experimental authors).

The stage directions are used by the playwright to instruct the actors how to say certain lines or where to move on **stage**. These directions are quite helpful to the reader of a play as well. The stage directions may also tell how the **set**, or stage complete with its **properties**, or props, should look.

Once the cast have learned their lines, the director is satisfied with the complete effect, the audience is in the **house**, the **prompter** is backstage to **cue** the actors, and the technical director has dimmed the house lights, then the curtain may be raised and “the play must go on.” At this point the traditional, superstitious greeting for opening night, “Break a leg,” may be heard.



Write the letter for the correct answer on the line.

- 2.8** The thickening of the plot in a play constitutes the _____ of the story.
a. dialogue b. characters c. complication d. exposition
- 2.9** The point of no return in the play is called the _____.
a. climax b. denouement c. complication d. exposition
- 2.10** The conclusion of the story is the _____.
a. climax b. denouement c. complication d. exposition
- 2.11** The stage complete with its props is called the _____.
a. house b. prompter c. cue d. set

2. CIRCLES

One of the most common geometric shapes we use is the circle. We shall now derive formulas for the area and circumference of circles and special parts of circles.

Section Objectives

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

4. Calculate the circumference of a circle.
5. Calculate the area of a circle.
6. Calculate the area of a sector of a circle.
7. Calculate the area of a segment of a circle.

CIRCUMFERENCE AND π

In this section we shall define the circumference of a circle and then show that the circumference of a circle is found by using the formula $C = 2\pi r$. We also must give a definition for π . To do these things, we must have some understanding of the idea of limits. We shall approach the idea of a limit by inductive reasoning.

Consider several congruent circles. Inscribe regular polygons with increasing numbers of sides in these circles.

Notice several facts:

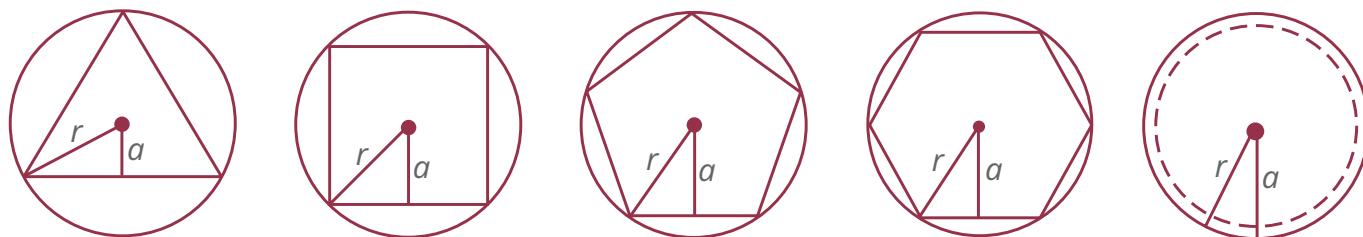
1. The apothem, a , of the polygon increases, with its limit the radius of the circle: $a \rightarrow r$ (read, a approaches r as its limit).

2. The perimeter, p , of the polygon increases, with its limit the circumference of the circle: $p \rightarrow C$.
3. The area, A_p , of the polygon increases with its limit the area of the circle: $A_p \rightarrow A_o$. With these basic ideas of limits, we now define the circumference and area of a circle in terms of limit.

DEFINITIONS

Circumference of a circle (C) is the limit of the perimeters of the inscribed regular polygons. It is a positive number.

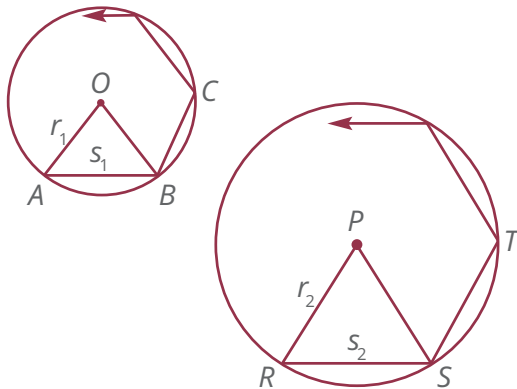
Area of a circle (A_o) is the limit of the areas of the inscribed regular polygons. It is a positive number.



On the basis of these definitions an important relationship can be proved between the circumference and the diameter of any circle.

THEOREM 8-7

The ratio of the circumference to the diameter is the same for all circles.



Given: Circle O with radius r_1 , diameter d_1 , and circumference C_1 .

Circle P with radius r_2 , diameter d_2 , and circumference C_2 .

To Prove: $\frac{C_1}{d_1} = \frac{C_2}{d_2}$

Outline of Proof:

Inscribe in each circle a regular n -gon with n the same for both circles. Let s_1 and s_2 be sides of polygons. $\angle O = \angle P$, for both have a measure of $\frac{360^\circ}{n}$. $\angle A = \angle R$, for both have a measure of $\frac{1}{2}(180^\circ - \frac{360^\circ}{n})$.

Since $\triangle AOB$ and $\triangle RPS$ are isosceles triangles, then

$\triangle AOB \sim \triangle RPS$ and $\frac{s_1}{r_1} = \frac{s_2}{r_2}$ and $\frac{ns_1}{r_1} = \frac{ns_2}{r_2}$. Now ns_1 and ns_2 are the

perimeters p_1 and p_2 of the

inscribed polygons, so $\frac{p_1}{r_1} = \frac{p_2}{r_2}$.

Now as n increases, $p_1 \rightarrow C_1$ and $p_2 \rightarrow C_2$. Therefore, $\frac{p_1}{r_1} \rightarrow \frac{C_1}{r_1}$ and $\frac{p_2}{r_2} \rightarrow \frac{C_2}{r_2}$. Since we have shown $\frac{p_1}{r_1} = \frac{p_2}{r_2}$, we can reasonably assume that their limits are equal.

Therefore, $\frac{C_1}{r_1} = \frac{C_2}{r_2}$ or $\frac{C_1}{2r_1} = \frac{C_2}{2r_2}$
or $\frac{C_1}{d_1} = \frac{C_2}{d_2}$.

Since the number $\frac{C}{d}$ is the same for all circles whatever size the circles may be, we give this number a special name, π . This symbol, called *pi* and pronounced *pie*, is a letter from the Greek alphabet. In other words, π is defined to be the ratio of the circumference of a circle to the diameter of the circle. π is an irrational number. The relationship between C and d of any circle is such that when d is rational, C is not rational, and vice versa.

For practical problems we can approximate π as 3.14, $\frac{22}{7}$, or 3.1416. Two useful forms of our definition are $C = \pi d$ or $C = 2\pi r$. These equations are formulas for finding the circumference of a circle.

Notice some interesting facts about π :

- In the Old Testament (I Kings 7:23) the value of the circumference/diameter ratio, or π , is given as 3.
- Archimedes (287–212 BC) showed the value of the circumference/diameter ratio to lie between $3\frac{1}{7}$ and $3\frac{10}{71}$.
- The symbol, π , for the circumference/diameter ratio was not used until the eighteenth century.
- The value of π correct to 14 decimal places is 3.14159265358979.
- Electronic computers have computed π correct to over ten trillion places.

- f. π is used by biologists investigating laws of bacterial growth. Insurance actuaries use π in computing probabilities.

When finding the exact circumference of a circle, we do not replace π by an approximation but rather leave π in the answer.



Find the exact circumference of a circle with the given radius.

- 2.1 5 inches $C =$ _____
- 2.2 7 feet $C =$ _____
- 2.3 $3\frac{1}{2}$ cm $C =$ _____
- 2.4 $3\frac{1}{4}$ inches $C =$ _____
- 2.5 $\frac{x}{2}$ miles $C =$ _____
- 2.6 36 inches $C =$ _____

Find the approximate value of the circumference of a circle with the given radius.

Use $\pi = 3.14$. Round your results to one more digit than in the given radius.

- 2.7 4 inches $C =$ _____
- 2.8 6 ft. $C =$ _____
- 2.9 5.1 cm $C =$ _____
- 2.10 4.6 inches $C =$ _____
- 2.11 3.21 ft. $C =$ _____
- 2.12 6.53 cm $C =$ _____

2. DIVISION OF THE LAND



| The distribution of Canaan

Joshua records the consummation of Israel's redemptive experience: out of Egypt into Canaan. Having gained control of Canaan generally by conquest, Joshua then turned to the next important assignment: division of the land. Although the land was theirs from God (1:3-5) and they had officially occupied the land as a nation (11:23), each individual

Read Joshua 13-22



tribe still must receive their inheritance and possess their land (13:1-7). Before recording the distribution of the land among the nine and one-half tribes (13:7), Joshua reviewed the division of the land east of the Jordan among the two and one-half tribes (13:8-32).

Section Objectives

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

1. Outline the book of Joshua and identify its purpose.
2. Explain the division of the land.
3. Trace the revelation of God's redemptive plan.

Vocabulary

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

lot

trans-Jordanic tribes

EAST OF THE JORDAN

The division of the land east of the Jordan to the two and one-half tribes (Reubenites, Gadites, and the one-half tribe of Manasseh) had been made by Moses (Numbers 32). The boundaries of the territory (of the two and one half tribes) are delineated in 13:8-13. Then follow the several boundaries of the tribes east of the Jordan (Numbers 32:34-42): Reuben, 13:15-23; Gad, 13:24-28; and the half tribe of Manasseh, 13:29-32.

Notice in 13:33 that the tribe of Levi received no inheritance of land. The Lord God of Israel was their inheritance. Care was taken that the priests neither entangle themselves with the affairs of this life nor enrich themselves with the wealth of the world. They had concerns of greater importance. Although adequate provision was to be made for the Levites, their chief concerns were the spiritual things that pertained to worship of God and service to Him.



| Division of the land



Complete the following statements.

- 2.1 The distribution of the land east of the Jordan had been made by _____.
- 2.2 The tribes whose inheritances lay east of Jordan were a. _____,
b. _____, and c. _____.
- 2.3 The tribe receiving no land as an inheritance was _____.

WEST OF THE JORDAN

An introduction to the division of the land west of the Jordan River among the nine and one-half tribes of Israel is contained in 14:1-5. As commanded by God in Numbers 26:55, the land was to be divided by **lot**. In Old Testament times, choices were customarily made by lot. Not only was this method fair, but also the procedure was chosen and utilized by God Himself in determining what part of the land would be a particular inheritance. According to Numbers 26:56, the size of the inheritance was determined on the basis of the size of the tribe, "...whether many or few." When the tribes had assembled at Gilgal to receive by lot their inheritance, the distribution began with Judah. Significantly located in chapter 14 is the request of Caleb (14:6-15; 15:13-15). Reminding Joshua of what the Lord had said to Moses concerning Joshua and him (14:9), Caleb requested the mountain that the Lord had promised and reflected his continuing faith and faithfulness in the words of 14:12—"...If so be that the LORD will be with me, then I shall be able to drive them out, as the LORD said." Hebron, city where Abraham had lived, worshiped, and was buried, became Caleb's inheritance as the Lord had commanded (15:13).

The territory of the tribe of Judah is defined in Joshua 15. The borders are described and the cities are listed. The inheritance of Joseph (Ephraim and the half tribe of Manasseh) is described in Joshua 16-17.

The Tabernacle was set up at Shiloh in the center of Canaan. In their journeys the Tabernacle, God's dwelling place, was in the center of the formation. Then in the land, God would continue to dwell in the midst of His people, suggesting to them that He should be central in all their lives: nationally, socially, and religiously.

Seven tribes had not yet received their inheritance: Benjamin, Simeon, Zebulun, Issachar, Asher, Naphtali, and Dan. Joshua

18-19 contain the allotments of those remaining seven tribes with a description of the possession given to Joshua (19:49-50). The distribution occurred at Shiloh. Twenty-one men (three from each tribe) were sent out to survey the remaining territory. When the land was surveyed and described, lots were cast; and the land was distributed.

With humility and without selfishness, Joshua received his inheritance last—a somewhat obscure possession (19:49-50).

CITIES OF REFUGE

The Lord had commanded Moses to instruct the children of Israel to establish cities of refuge in the land of Canaan (Numbers 35:9-34): three on the east side of Jordan and three



| Cities of refuge

BIOGRAPHY AND AUTOBIOGRAPHY

The field of biography is a fascinating one because it relates the life story of real people. Biography can resemble fiction because of the interesting and unusual events surrounding people and their lives. Since people are products of their times, biography reveals much of the history of the particular period during which the individuals lived. Much of historical fiction is biographical in nature. The following quotation is from a biography of John Winthrop by Cotton Mather:

Accordingly when the noble design of carrying a colony of chosen people into an American wilderness was by some eminent persons undertaken, *this* eminent person was, by the consent of all chosen for the Moses, who must be the leader of so great an undertaking and indeed nothing but a *Mosaic spirit* could have carried him through the temptations, to which either his farewell to his own land, or his travel in a strange land, must needs expose a gentleman of his education. Wherefore having sold a fair estate of six or seven hundred a year, he transported himself with the effects of it into New England in the year 1630, where he spent it upon the service of a famous plantation, founded and formed for the seat of the most *reformed Christianity*: and continued there, conflicting with temptations of all sorts, as many years as the nodes of the moon take to dispatch a revolution. Those persons were never concerned in a new plantation, who know not that the unavoidable difficulties of such a thing will call for all the prudence and patience of a mortal man to encounter therewithal; and they must be very insensible of the influence, which the

just wrath of Heaven has permitted the *devils* to have upon this world if they do not think that the difficulties of a new plantation, devoted unto the evangelical worship of our Lord Jesus Christ, must be yet more than ordinary. How prudently, how patiently and with how much resignation to our Lord Jesus Christ, our brave Winthrop waded through these difficulties, let posterity consider with admiration. And know, that as the picture of this their govenour was, after his death, hung up with honour in the state-house of his country so the wisdom, courage, and holy zeal of his life, were an example well-worthy to be copied by all that shall succeed him in government.

Were he now to be considered only as a Christian, we might therein propose him as greatly imitable, He was a very religious man; and as he strictly kept his *heart*, so he kept his *house*, under the laws of piety: there he was every day constant in holy duties, both morning and evening, and on the Lord's days, and lectures; though he wrote not after the preacher, yet such was his attention, and such his retention in hearing, that he repeated unto his family the sermons which he had heard in the congregation. But it is chiefly as a govenour that he is now to be considered.



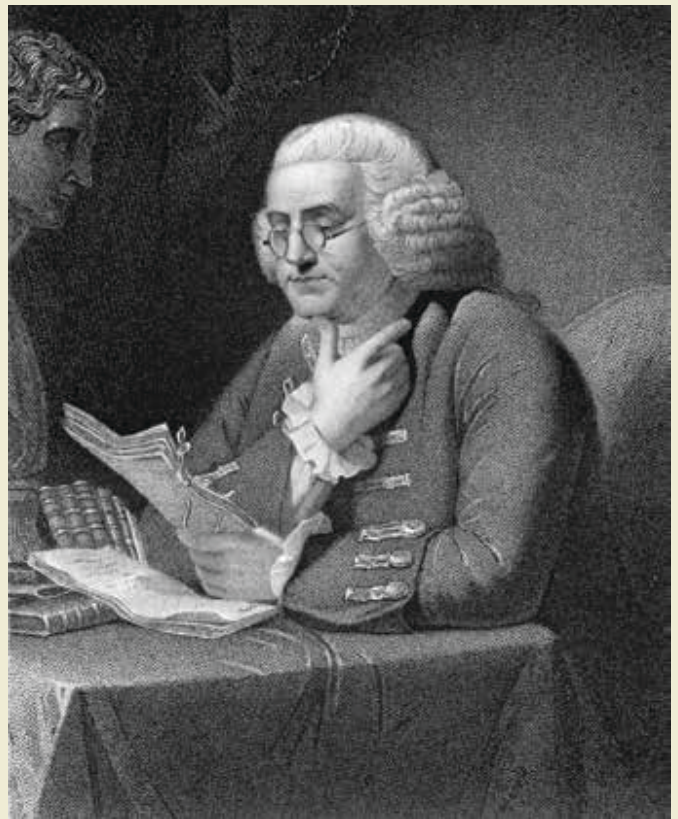
| John Winthrop

Biography usually covers the lifespan of a particular famous personality or a beloved national figure, but it may cover just a small portion of the individual's total life to justify his fame or indicate his achievements. It may also cover an area of history dealing with a special group of people, such as the Quakers or the early patriots, by concentrating on the life of one special representative of that group.

Autobiography is simply an author's story about himself. One of the earliest American writings in this field is the *Autobiography* of Benjamin Franklin—a man of many talents and wide interests. This book is the source of much of our factual knowledge about this famous statesman, writer, inventor, and scientist. His *Autobiography* reveals him as a delightful personality, witty and sociable, adjusting well to all types of people. The following excerpt comes from his *Autobiography*.

My brother had, in 1720 or 1721, begun to print a newspaper. It was the second that appeared in America, and was called the *New England Courant*. The only one before it was the *Boston News-Letter*. I remember his being dissuaded by some of his friends from the undertaking, as not likely to succeed, one newspaper being, in their judgment, enough for America. At this time (1771) there are not less than five-and-twenty. He went on, however, with the undertaking, and after having worked in composing the types and printing off the sheets, I was employed to carry the papers thro' the streets to the customers.

He had some ingenious men among his friends, who amused themselves by writing pieces for this paper, which gained it credit and made it more in demand, and these gentlemen often visited us. Hearing their conversations, and their accounts of the approbation their papers were received with, I was excited to try my hand among them; but, being still a boy, and suspecting that my brother would object to printing anything of mine in his paper if he knew it to be mine, I contrived to disguise my hand, and, writing an anonymous paper, I put it in at night under the door of the printing-house. It was found in the morning and communicated to his writing friends when they called in as usual. They read it, commented on it in my hearing, and I had the exquisite pleasure of finding it met with their approbation, and that, in their different guesses at the author, none were named but men of some character among us for learning and ingenuity. I suppose now that I was rather lucky in my judges, and that perhaps they were not really so very good ones as I then esteem'd them.



| Benjamin Franklin

Complete these statements.

- 2.24 Biography relates events from the lives of real people and also reveals _____ .
- 2.25 Cotton Mather wrote a biography of _____ .
- 2.26 Autobiography may be defined as _____ .
- 2.27 One of the earliest American autobiographies was written by _____ .
-

MAGAZINE AND NEWS ARTICLES

Magazine and news articles are among the most popular forms of nonfiction. Such articles usually contain expository and descriptive prose. Magazines such as *Time*, *Newsweek*, and *U.S. News and World Report* provide national and international news coverage. These magazines also inform the reading public about developments in the arts, science, medicine, industry, economics, and religion. Other publications restrict their content to specialized areas of study. Anthology types of magazines such as *Reader's Digest*, *Children's Digest*, *The Catholic Digest*, *Architectural Digest*, and *Writer's Digest* reprint articles from many sources.

News articles inform the public about daily events. The journalistic style of news writing specifies *who*, *what*, *when*, *where*, and *how* information about the actual event or story. Some publications are known for their objective reporting of the news. Others reflect a certain bias or prejudice. Local news articles that report information about a particular city or county are more personal and familiar in tone and in subject matter.

The following news story about an apartment fire appeared in the October 15, 2016, issue of the *East Valley Tribune*, Tempe, Arizona.

Huge apartment fire lights up Gilbert sky

A large, three-alarm fire broke out just north of downtown Gilbert on Saturday night.

A column of smoke and flames could be seen from miles away as an apartment complex burned at Gilbert and Olive roads.

A dozen units from the Gilbert, Mesa, and Chandler fire departments responded. There were no reports of injuries.

The huge blaze drew spectators to the site, near the popular Gilbert downtown cluster of restaurants.

Witnesses reported flames jumping from building to building of the apartment complex, which was under construction.

Editorials are a kind of essay or article in a magazine, newspaper, or news website stating the opinions of the editor or publisher concerning a specific issue. An editorial may praise a noteworthy citizen or it may discuss some domestic, local, or international problem. An editorial is frequently argumentative, defending a particular, often personal, viewpoint. A good editorial gives evidence that the writer has considered his subject from all sides first before trying to convince the reader. The talk show, the panel discussion, and the roundtable discussion are types of oral editorials.

Choose the correct answer.

- 2.1 Magnetic fields are produced by _____.
 a. atoms b. currents c. voltages d. charges
- 2.2 Magnetic fields are always associated with _____.
 a. charge motion b. bar magnets c. magnetic poles d. static charges
- 2.3 An observer that moves with an electrical charge senses _____.
 a. a magnetic field b. an electric field
 c. electric and magnetic fields d. no field
- 2.4 An electric charge moving past an observer will create _____.
 a. an electric field b. a magnetic field
 c. electric and magnetic fields d. an absence of fields
- 2.5 A time-varying electric field is always accompanied by a _____.
 a. time-varying magnetic field b. static electric field
 c. charge motion d. static magnetic field

CURRENTS AND MAGNETISM

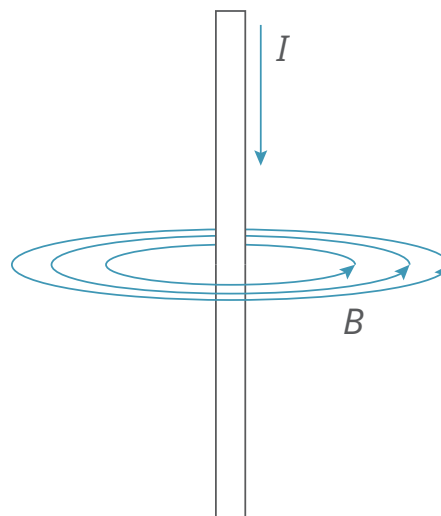
Current-carrying wires are accompanied by magnetic fields that are directly proportional to the current and inversely proportional to the distance from the wire. Field directions around wires can be determined experimentally.

Long wires. Magnetic fields are produced when currents flow in wires, as indicated in Section 1. The early work in this field was performed by Biot, Savart, Oersted, and others. They developed an understanding of the nature of permanent magnets by studying the magnetic fields in wires and solenoids and their interaction with permanent magnets. In the case of a long, straight wire, they found that the magnetic field B at a Point a, produced by a current I , was indicated:

$$B = 2 \cdot 10^{-7} I/d$$

I is the current in amperes, d is the distance from Point a to the wire (in meters), and B is the magnetic field strength. The direction of this magnetic field is shown by Figure 5.

The left-hand rule gives the direction of the magnetic field B around the wire for the electron current direction I . If the fingers of the left hand enclose the wire and the thumb points in the direction of the



| Figure 5: Field around a long, straight wire

current flow, then the fingers will point in the direction of the magnetic field B . The current is the electron current, the direction negative charges move in the wire, as defined in Science LIFEPAK 1207. The current direction referred to as I will always be the *electron* current flow, the one that describes current as flowing out of the negative terminal of a battery, through the external circuit, and returning to the battery's positive terminal.

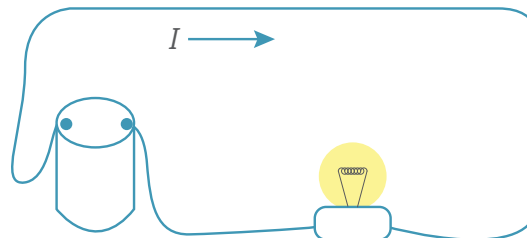
Try this investigation to determine the shape of the magnetic field around a long, straight wire.

These supplies are needed:

- copper wire, about 1 m long
- small lamp socket and bulb
- wire cutter
- battery
- compass

Follow these directions and complete the activities. Put a check in the box when each step is completed. Answer the questions.

- ☐ 1. Connect the wire, lamp, and battery as shown.
- ☐ 2. Place the compass on a table away from ferromagnetic objects.
- ☐ 3. Hold the long, straight wire over the compass and note the orientation of the needle. Try a variety of wire orientations, all of them horizontal.



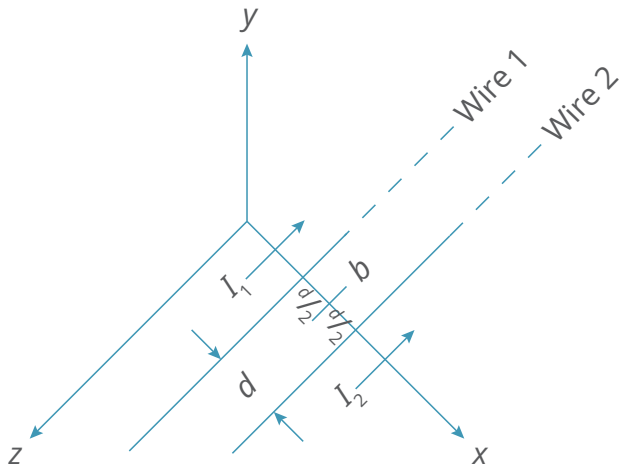
- 2.6 What is the orientation of the needle with respect to the wire? _____
- ☐ 4. Place the wire on the table and hold the compass in a variety of orientations over the wire.
- 2.7 What is the orientation of the needle with respect to the wire? _____
- ☐ 5. Place the compass on the table beside the wire.
- 2.8 What happens to the needle? _____

- 2.9 Does the orientation disagree with your observations in 2.6 and 2.7? _____
- ☐ 6. Ask a classmate to hold the wire vertical as you move the compass around the wire.
- 2.10 What is the orientation of the needle with respect to the wire? _____

- 2.11 From the orientation of the needle, what is the shape of the magnetic field around a long, straight wire?

Magnetic Field Experiment





| Figure 6

The solenoid. If two parallel wires are brought near each other, their fields will interact. In Figure 6, Wire 1 will develop a field B that is felt by Wire 2 a distance d units away:

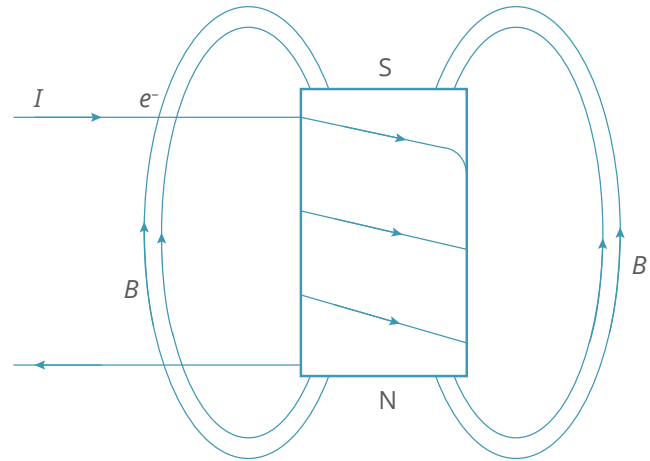
$$B_1 = 2 \cdot 10^{-7} I_1 / d$$

Assume the current I_2 in Wire 2 flows so that it will produce a field at Wire 1 a distance of d units away:

$$B_2 = 2 \cdot 10^{-7} I_2 / d$$

The result at any point will be a summation of the two fields. Assuming I_1 equals I_2 the field at a point midway between the two wires will be

$$B_1 + B_2 = 2 \cdot 10^{-7} \frac{I_1}{d/2} - 2 \cdot 10^{-7} \frac{I_2}{d/2} = 0$$

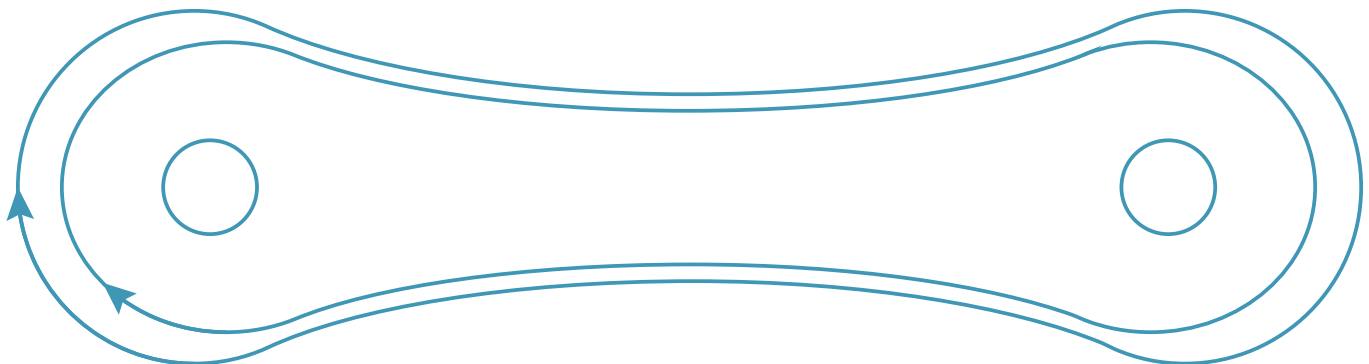


| Field around a solenoid

Fields add as vectors, so that the total field at the point $x = b$ is zero. Everywhere, except between the wires, the fields of Wire 1 and Wire 2 add to form a stronger field.

If a wire is wound around an insulated tube, the currents in each loop on the tube will be equal and in parallel. The total field will then be the sum of the fields around each wire.

The total field will look like that of the bar magnet, with vectorial lines flowing from the north pole to the south pole. A *solenoidal field* will form around the current-carrying coil, called a solenoid.



| Field around parallel wires

THEATER IN ENGLAND

When you attend a play today, whether it be a class play or a professional production of *Hamlet*, you are probably comfortable in the familiar theater environment. You sit in a rectangular auditorium and the actors perform on a picture-frame stage that recedes into the wall and is hidden from view until the play begins. Before the curtain rises, you read the program and become familiar with the characters, the actors, the acts, and the scenes. During the performance you are aware not only of the on-stage actions and words but also of costumes, scenery, and shades and strengths of lighting. At the play's end you applaud in appreciation of the entertainment you have enjoyed.

The theater that you attend today is unlike the earliest English dramatic presentations. Yet, it is the result of a slow, and generally logical, growth of English drama.

Church plays. The origins of English drama are the church plays of the Middle Ages. These plays were a part or an extension of the church service. Their original purpose was to help the uneducated congregation understand the Latin **liturgy**. In their earliest form, the lines of the plays were chanted or sung. Eventually, the plays became so elaborate and so humorous that they were no longer appropriate as means of instruction or worship and were, therefore, transferred outdoors. Once outside, both the plays and the audiences lost more and more of

their dignity and solemnity. Latin gave way to the native language. Rowdy audiences destroyed church property. Finally, in disgust, the clergy forbade the production of any plays on church property.

Mystery plays. The plays found new support in the town authorities who used the trade guilds as dramatic companies. Guildsmen provided money for costumes, stage properties, and actors' wages. The plays came to be called *mystery* plays. Although **secularized** in production, the plays were still based on Scripture. Mystery plays dramatically presented the main scenes of the whole plan of salvation as told in the Old and New Testaments. The plays were performed in a cycle, that is, in a series of short plays that formed one long narrative (usually the story of salvation history from the Creation to Pentecost or even the Last Judgment).

Sometimes the individual plays within the cycle were performed on fixed stages or stations and the crowds moved from station to station to see the entire cycle. Usually, however, individual plays were performed on separate wagons that moved to the spectators who were gathered at various predetermined locations in the city. The first wagon portrayed the Creation; the second wagon, the fall of the angels; and the third wagon, the fall of man. Thus, moving in succession, the wagons brought the entire cycle to the waiting crowds. These wagons were called *pageants*. The design of a pageant usually reflected its purpose and relationship to a specific guild. For example, to present the play of the Great Flood, the pageant of the fishermen would be designed and painted to look like Noah's ark.

Miracle plays. Another dramatic form of medieval England was the miracle play. Although similar to the mystery plays, the miracle plays were based not on Scripture, but on the lives of the saints and the Virgin Mary.



| Church plays

Complete these statements.

- 2.1 The language in which early English drama was performed was _____.
- 2.2 Mystery plays were performed in a _____; that is, a group of short plays formed one long narrative.
- 2.3 Cycle plays were performed a. _____ or b. _____.

Complete this activity.

- 2.4 Look up the word *pageant* in the dictionary and write three separate definitions that you find.

- a. _____

- b. _____

- c. _____



| Innyard

Morality plays. Developed in the Late Middle Ages, the *morality* play was a dramatized **allegory**. In it, abstract virtue and vices like Mercy and Shame were personified and usually competed in a struggle to win souls. The most famous morality play is *Everyman* in which Everyman, who represents all people, receives a summons from Death. In vain, Everyman tries to persuade his friends, Fellowship, Worldly Goods, Beauty, and others, to journey with him. Only Good Deeds remains faithful, but even Good Deeds is so weak from neglect that Knowledge and Confession must renew the strength of Good Deeds so that he can go on toward Death with Everyman. In essence, the morality plays were dramatized sermons.

The morality plays were most often performed in the inner courtyard of inns. The courtyard was surrounded on three sides by the two or three stories of the inn's apartments or rooms. The covered balconies of the upper apartments overlooked the yard and provided shelter against the weather for those who could afford the price of choice seating. The poorer people stood or sat on the cobblestones of the unroofed inn yard. The stage consisted of platforms supported by sawhorses. A curtain at the back of the **scaffold** hid actors until they appeared on stage.

Interludes. The *interlude* is a dramatic form that is considered a transition from medieval morality plays to Elizabethan drama. The exact definition of an interlude is unknown, but it is believed to have originated during the reign of Henry VIII as a brief skit between the courses of a banquet. The word ultimately suggested a play brief enough to be presented in the period of time between events of a dramatic performance, entertainment, or feast.

Court interludes were realistic and humorous and intended primarily to amuse. John Heywood was the best known writer of interludes; his most famous one is *The Four P's*. This interlude presents a debate among a Palmer, a Pardoner, and a Potecary. A Pedlar acts as a judge to determine who can tell the biggest lie. The Palmer wins when he claims that he never saw a woman lose her temper.

Some of the interludes both developed from and resembled morality plays. The purpose of these educational interludes was to teach a moral.

Everyday details and a realistic approach were characteristics of the interlude. Although following the allegorical pattern of the morality plays, the interlude began the move away from personifications of abstracts toward portrayal of individual characters. Most importantly, the court interludes strongly suggested that comic elements that simply amuse and do not instruct have recognizable value.

Write the letter of the correct answer in the space.

- 2.5** A story in which people, things, and happenings have another meaning is _____.
a. a fable b. a drama c. an allegory
- 2.6** The best known morality play is _____.
a. *Everyman* b. *The Four P's* c. *Hamlet*
- 2.7** Miracle plays deal with _____.
a. liturgy b. lives of saints c. Scripture
- 2.8** Mystery plays deal with _____.
a. Scriptural stories b. miracles of saints c. allegory
- 2.9** A play performed as a dramatic entertainment at a feast was called _____.
a. a morality play b. an interlude c. a church play
- 2.10** The type of play that is usually an allegory is _____.
a. a miracle b. an interlude c. a morality