◄ *Benozzo Gozzoli painted* The Procession of the Magi *(1459) for the Medici family. This close-up of Lorenzo the Magnificent (Medici) is part of the larger painting.*

1400–1750

New Ideas

CHAPTER 9

GO DIGITAL
It's All! Online!

ASKING ESSENTIAL QUESTIONS

Why do people make economic choices? • How do new ideas change the way people live? • How do governments change?

What Will I Learn? I will learn about the intellectual and cultural developments of the Renaissance, the Scientific Revolution, and the Enlightenment.

Why Does This Matter to Me? Developments during these major periods influenced events, art, and science throughout history. Artistic styles and scientific methods that emerged during these years are still used today. Ideas of the Enlightenment have shaped societies and governments around the world.

How Will I Know That I Learned It? I will be able to identify the key intellectual and cultural developments of the Renaissance, the Scientific Revolution, and the Enlightenment and be able to explain their significance.

Using Your Inquiry Journal As you read this chapter and examine the primary sources, use your Inquiry Journal to help you make notes and expand your list of questions. As you gather information, think about how you will answer the Essential Questions above.

FOLDABLES
Study Organizer

Go to the Foldables® library in the back of your book to make a Foldable® that will help you take notes while reading this chapter.

RENAISSANCE EUROPE 1500

During the Renaissance, wealthy Italian states developed new ideas about art and learning that spread throughout Europe. The Scientific Revolution and the Enlightenment also began in Europe. Thinkers from various countries developed ideas about the world based on reason. These new ideas gradually spread throughout Europe and beyond.

STEP INTO THE PLACE

GEOGRAPHIC REASONING

The states of the Italian peninsula became the center of the Renaissance.

1. **EXPLORING REGION** Look at the map. What territories are found on the Italian peninsula?

2. **EXPLORING REGION** What physical features would make the cities of Venice and Naples important trade centers?

STEP INTO THE TIME

SEQUENCING Which scientist made a discovery first, Nicolaus Copernicus or Isaac Newton?

400 miles
400 km
Lambert Azimuthal Equal-Area projection

50°N
40°N
30°N
10°W
0°

ATLANTIC OCEAN

SCOTLAND
Edinburgh
IRELAND
North Sea
York
ENGLAND
London
NETHERLAND
Ghent
Antwerp
Rouen
Paris
FRANCE
Toulouse
Avignon
Marseille
NAVARRE
PORTUGAL
Lisbon
Madrid
Toledo
SPAIN
Granada
Mediterranean Sea
AFRICA

KEY
— Holy Roman Empire

EUROPE

1440	1508	1543
Gutenberg prints with movable type	Michelangelo begins painting Sistine Chapel	Copernicus presents view of universe

1400 — 1500 — 1600

THE WORLD

c. 1400	1532	1603
Aztec Empire reaches its height	Spanish forces defeat the Inca	Tokugawa Ieyasu rules Japan

NORWAY

SWEDEN

DENMARK

Baltic Sea

TEUTONIC
ORDER

MUSCOVY

Wittenberg

HOLY ROMAN
EMPIRE

POLAND

LITHUANIA

BOHEMIA

Salzburg
Vienna

AUSTRIA

HUNGARY

MOLDAVIA

ASIA

Milan
Venice

Bologna

Florence

PAPAL
STATES

Adriatic Sea

Black Sea

Rome

OTTOMAN

EMPIRE

NAPLES AND
SICILY

Palermo

20°E

30°E

40°E

1632	1687	1690	1785	1792
Galileo writes book supporting Copernicus's theory	Newton publishes theory of gravity	Locke writes that people have natural rights	Lavoisier proves that materials need oxygen to burn	Wollstonecraft writes about equal rights for women

1700

1800

1620	1644	1754	1776
Pilgrims establish colonies in Massachusetts	Manchus invade China and establish Qing Dynasty	French and Indian War begins	American colonies declare independence

THE STORY BEGINS...

Florence, Italy, played an important role in the Italian Renaissance. [Photograph c. 1890–1900]

LESSON 1
The Renaissance Begins

Niccolò Machiavelli leaned back in his chair. Lorenzo de' Medici was a great ruler. He had done much to improve life in the city of Florence. How could Niccolò explain this to people who had not lived during de' Medici's time? Niccolò picked up his pen and began to write:

> ❝ He aimed to maintain abundance in the city, to keep the people united and the nobility honoured. He had the greatest love and admiration for all who excelled in any art, and was a great patron [supporter] of learning and of literary men, of which his conduct towards Cristofano Landini and Messer Demetrius the Greek furnishes the strongest proof. For this reason the Count Giovanni della Mirandola, a man of almost supernatural genius, was attracted by the magnificence of Lorenzo, and preferred to establish his home in Florence rather than in any other part of Europe, all of which he had visited in his travels. Lorenzo took the greatest delight in architecture, music and poetry; and many of his own poetic compositions, enriched with commentaries, appeared in print. And for the purpose of enabling the Florentine youths to devote themselves to the study of letters, he established a university in the city of Pisa, where he employed the most eminent [outstanding] men of all Italy as professors. ❞

—Niccolò Machiavelli, *History of Florence,* 1521–1525

Wealth Grows in Italian States
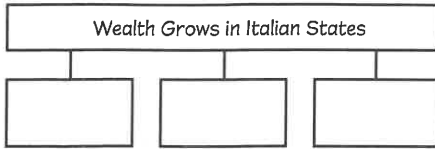
ANALYZING KEY IDEAS AND DETAILS

Read closely to identify the reasons Italian states grew wealthy. Use a chart like this one to record the details. Summarize how the wealth of the Italian states affected their leadership.

THE RENAISSANCE IN ITALY

GUIDING QUESTION *Why did the states of Italy become leading centers of culture during the Renaissance?*

Between 1350 and 1650, ways of thinking changed greatly in Europe. As the Black Death eased, people became more confident about the future. Their interest in learning and the arts was renewed. This new interest in culture is called the **Renaissance** (reh•nuh•SAHNTZ), from the French word for "rebirth."

REBIRTH OF THE CLASSICS

The Renaissance sparked a renewed interest in ancient Greeks and Romans. European scholars improved their understanding of Greek and Latin languages, which they used to study ancient Greek and Roman writings. Europeans also adopted many Greek and Roman ideas. They began to see that individual people could make a difference. They began to believe that people could change the world for the better.

During the Renaissance, most Europeans were still religious. However, they also began to value human efforts outside religion. As a result, people became more **secular** (SEH•kyuh•luhr). That is, they became more interested in worldly ideas and events, not just religious ones.

THE RENAISSANCE IS BORN

The birthplace of the Renaissance was Italy, the heart of the old Roman Empire. The ruins and statues were familiar to Italians. Because of this, Italians readily turned to ancient examples to inspire them in their own artistic efforts.

Art also flourished because by the 1300s, Italian cities had become very wealthy. Their leading citizens, including nobles, popes, and the rich, could allow artists to live in their homes in exchange for artwork. These citizens, known as patrons, could also pay an artist for a single work. These two systems of patronage highlighted the social status and power of a family as well as promoted the reputation of an artist.

ANALYZING KEY IDEAS AND DETAILS

1. **DETERMINING CENTRAL IDEAS** What is the central idea of the section "Rebirth of the Classics"?

2. **CITING TEXT EVIDENCE** What parts of the text support the main idea that the Renaissance was born in Italy?

DETERMINING MEANING

Identify context clues that help you to define the word **secular.**

GEOGRAPHIC REASONING

Many Italian states prospered during the Renaissance.

1. **EXPLORING PLACE** In which territory was Rome located?

2. **HUMAN-ENVIRONMENT INTERACTION** By what mode of transportation would you probably travel from Naples to Venice?

KEY
- Ferrara
- Florence
- Genoa
- Lucca
- Mantua
- Milan
- Modena
- Naples
- Papal States
- Siena
- Venice

ALPS

Milan • Po R. • Mantua • Venice

Genoa •

Pisa • • Florence

Siena •

APENNINES

Adriatic Sea

Corsica

Rome •

Naples •

Sardinia

Tyrrhenian Sea

Mediterranean Sea

Sicily

N W E S

0   200 miles
0   200 km

The powerful states of Italy encouraged the Renaissance. The population of Italy was becoming more **urban** (UHR·buhn). That is, more people were living in cities than in the country. In other parts of Europe, most people still lived in rural areas, including the nobles who owned estates.

As a result of its city life, Italy began to develop a different society. Large city populations meant more discussion among people. Strong economies developed. It also meant more customers for artists and more money for a new kind of art. Like the city-states of ancient Greece, Renaissance Italy's urban society and scholars produced many great works of art and literature.

✓ CHECKING FOR UNDERSTANDING

1. **EXPLAINING CAUSES** Why did wealthy Italians support artists during the Renaissance?

2. **DETERMINING CONTEXT** How was Italy different from other areas of Europe in the 1300s?

THE STATES OF ITALY

GUIDING QUESTION *How did Italy's states become wealthy and powerful?*

During the Middle Ages, Italy remained a collection of states, many of which were independent city-states. There were several reasons for this. The states of Italy did not want emperors and

kings to rule them. In addition, the Catholic Church did not want a united Italy. It did not want a powerful emperor or king to control the pope.

The independent states in Italy were equally strong. They fought many wars and often took land from each other. However, no state was able to rule the others. Florence (FLAWR·uhntz), Venice (VEH·nuhs), Genoa (JEH·nuh·wuh), Milan (mih·LAN), and Rome were some of the most important cities of the Italian Renaissance. The Renaissance began in Italy because city life was stronger there than in other parts of Europe.

Above all, Italy's states were independent because of their riches. They used their wealth to build large fleets of ships. They also hired mercenaries to fight in their armies. A **mercenary** (MUHR·suh·nehr·ee) is a full-time soldier who fights in an army for money. Wealthy merchants and bankers in Italy's states also loaned money to the kings of Europe. The kings left the states alone so they could borrow more money in the future.

RICHES FROM TRADE

The Italian states gained their wealth through trade. The long stretch of the Italian peninsula meant that many of the cities were port cities located on the coast.

The Italian peninsula was in the center of the Mediterranean world. The Byzantine and Ottoman Empires lay to the east, and Spain and France lay to the west. North Africa was only a short distance to the south. Italy's location made trade with these regions easier.

In eastern ports such as Constantinople, Italian merchants bought Chinese silk and Indian spices from Byzantine, Turkish, and Arab merchants. The Italians sold these goods in Italy and Western Europe for very high prices. Italian merchants bought wool, wine, and glass in Europe and sold them in the Middle East. Italian artisans bought raw materials and made goods to sell abroad for high prices.

· In addition to geography, two important events helped the Italians succeed in trade. One event was the Crusades. These conflicts brought Italian merchants into contact with Arab merchants in the Middle East. The second event was the Mongol conquests, which united much of Asia into one large trading network.

DETERMINING MEANING
The word mercenary contains the Latin root *merces*, which means "wages." What context clue in the text lets you know that a mercenary receives wages?

The Gonzaga family ruled the Italian city-state of Mantua during the 1400s. [Painting c. 1474]

INTEGRATING VISUAL INFORMATION Why was it possible for one family to become so powerful in Italy at this time?

An illustrated book written by a Venetian merchant named Marco Polo made many Europeans excited about Asia and its wealth. He wrote about the riches he found there. [Illustration c. 1410–1412]

INTEGRATING KNOWLEDGE AND IDEAS

1. **CONTRASTING** How do the section on Marco Polo and the illustration from his book offer different information about Marco Polo's travels?

2. **INTEGRATING VISUAL INFORMATION** How does the diagram of the Florence cathedral support the statement that "It is considered the greatest engineering achievement of the time"?

The Mongols protected trade along the Silk Road. This made it easier and cheaper for caravans to carry goods between China and the Middle East. As more silk and spices were sent from Asia, the price of these goods fell. More Europeans could pay for the luxuries, and demand for the goods increased.

WHO WAS MARCO POLO?

In the 1270s, the merchant Marco Polo, his father, and his uncle left Venice and traveled to China. Their goal was to meet Kublai Khan (KUH•bluh KAHN), the Mongol emperor of China.

When the Polo family reached the Khan's court, the emperor was amazed by the stories that Marco Polo told of his travels. Kublai sent Marco Polo on fact-finding trips all over China. Polo learned more about Asia than any other European. After returning to Europe, Polo wrote a book about his adventures. His stories about life in China amazed Europeans, who then wanted to buy Chinese goods.

FLORENCE: A RENAISSANCE CITY

The city of Florence was the first major center of the Renaissance. Its wealth and central location attracted many artists, sculptors, writers, and architects. Florence lay on the banks of the Arno River in central Italy. The city was surrounded by walls with tall towers for defense. Soaring above the city was the dome of its cathedral. A local architect, Filippo Brunelleschi (fih•LEEP•oh broon•ehl•EHS•kee), completed the dome in 1436. It is considered to be the greatest engineering achievement of the time.

Florence gained its wealth from making and trading cloth made from English wool. Citizens of Florence also made money from banking, which included lending money and charging interest. As goods poured into Italy from abroad, merchants had to determine the value of **currency,** or money, from different countries. Florentine bankers used the florin, the gold coin of Florence, to measure the value of other money. The city's wealthiest family, the Medici (MEH•duh•chee), owned the largest bank in Europe during the 1400s. The Medici had branch banks, or other offices, as far away as Flanders.
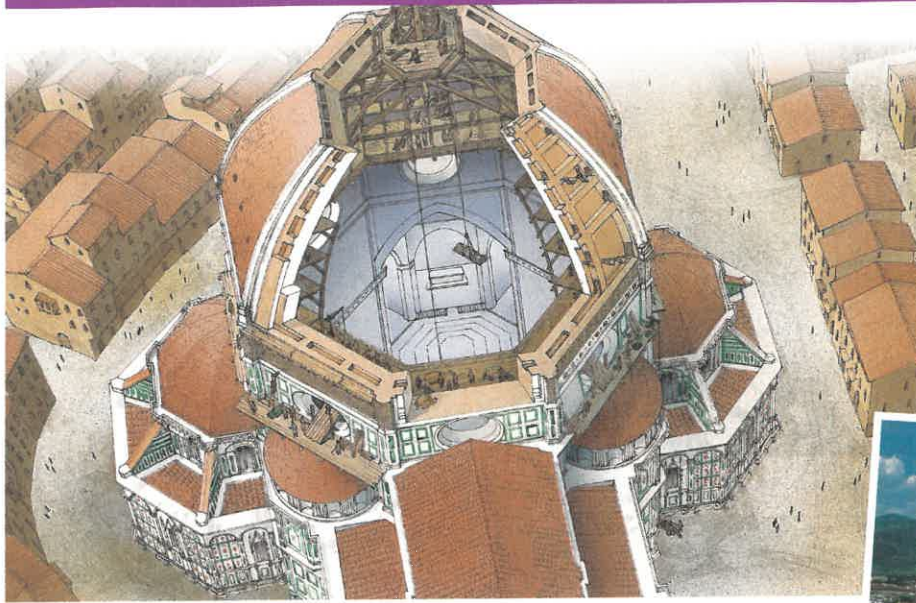
The dome of the Cathedral of Florence became a symbol of the Italian city when it was completed in 1436. It was considered a great architectural design of its time. [Modern diagram]

INTEGRATING VISUAL INFORMATION What earlier civilization was known for building domes?

[Modern photo]

VENICE: A CITY OF CANALS

Another leading Renaissance city was Venice. Located on the northern coast of the Adriatic Sea in eastern Italy, Venice was built on many small islands. Venetians drove long wooden poles into mud to support their buildings. Instead of paving roads, the Venetians built canals and used boats for transportation around the city. Even today, Venice's canals and waterways serve as streets.

During the Renaissance, Venice became an important link between Europe and Asia. Venetian merchants, such as Marco Polo, traveled abroad and made contacts with eastern civilizations. The city also was known as a major shipbuilding center. In a part of the city called the Arsenal, teams of workers built wooden ships and also made sails and oars.

☑ CHECKING FOR UNDERSTANDING

1. **IDENTIFYING CAUSES** What was the source of Italian states' wealth?

2. **EXPLAINING EFFECTS** How did the travels of Marco Polo affect Europeans?

A NEW RULING CLASS

GUIDING QUESTION *Who controlled the states of Italy?*

Wealthy merchants and bankers in the Italian city-states formed a new kind of leadership. Before the Renaissance, nobles in Europe gained their wealth from land, not trade.

In Italy, old noble families moved from the country to the cities. They became urban nobles. They formed ties of business and friendship with wealthy merchants. Meanwhile, merchants

UNDERSTANDING CRAFT AND STRUCTURE

1. **DESCRIBING** How does the author present the information in the first section under "A New Ruling Class?"

2. **ANALYZING STRUCTURE** What is the structure of the section "Keeping the Peace"? How do the paragraphs work within this structure?

began to adopt the customs of the nobles. Soon, the sons and daughters of nobles and rich merchants were marrying each other. These new families became the upper class of the city-states.

WHO RULED ITALIAN CITY-STATES?

Many Italian city-states began as republics. A republic is a government in which power comes from its citizens. However, not all people in an Italian city-state were citizens. Citizenship belonged only to merchants and artisans.

In ancient Rome, power was often given to a dictator during a war or revolt. A dictator was a ruler who had absolute power. In many cases, the Italian city-states relied on a single powerful individual to run the government. Some of these leaders ruled harshly, using force to keep control. Others used a more gentle approach. To win support, these rulers improved city services.

In Venice, the ruler was the duke, or doge (DOHJ). He officially ran the city, but a council of wealthy merchants held the real power. This council passed laws and elected the doge.

In Florence, the powerful Medici family controlled the government for many years. Lorenzo de' Medici governed Florence from 1469 to 1492. He used his wealth to support artists, architects, and writers. As a result of Florence's prosperity and fame, Lorenzo was known as "the Magnificent." Two branches of the Medici family ruled Florence from the 1400s to the mid-1700s. The family dominated the cultural and political life of the city by commissioning works of art and buildings to promote Florence. Their support transformed Florence into the cultural center of the Italian Renaissance.

The Venetians cut canals through the swampy land around the city's original islands c. 600s C.E. Today, gondolas—long, narrow boats—still carry people along these canals.

KEEPING THE PEACE

Political affairs in Italy were **complex,** or complicated. Within each state, rulers had to put down revolts by the poor. They also had to prevent other wealthy people and city leaders from seizing control. At the same time, the rulers had to keep good relations with bordering states.

To deal with the neighboring states, the Italians developed **diplomacy** (duh•PLOH•muh•see). Diplomacy is the art of making agreements with other countries. Italians worked to be sure that no single state had enough power to threaten the others.

How could a ruler keep his hold on power in the Italian states? Niccolò Machiavelli (nee•koh•LOH mah•kee•uh•VEH•lee), a diplomat

in Florence, tried to answer this question. In 1513, he wrote *The Prince*, a book that took a critical look at politics in Renaissance Italy. In this work, Machiavelli stated that rulers should do whatever was necessary to keep power and protect their city, even if they had to lie and kill. Machiavelli gave leaders this advice:

> ❝ Therefore it is unnecessary for a prince to have all the good qualities I have enumerated [listed], but it is very necessary to appear to have them. And I shall dare to say this also, that to have them and always to observe them is injurious [harmful], and that to appear to have them is useful; to appear merciful, faithful, humane, religious, upright, and to be so, but with a mind so framed that should you require not to be so, you may be able and know how to change to the opposite.
>
> And you have to understand this, that a prince, especially a new one, cannot observe all those things for which men are esteemed [respected], being often forced, in order to maintain the state, to act contrary to fidelity [faithfulness], friendship, humanity, and religion. Therefore it is necessary for him to have a mind ready to turn itself accordingly as the winds and variations of fortune force it, yet, as I have said above, not to diverge [move away] from the good if he can avoid doing so, but, if compelled [obligated], then to know how to set about it. ❞

—Niccolò Machiavelli, *The Prince*, 1513

✔ CHECKING FOR UNDERSTANDING

1. **RELATING EVENTS** Machiavelli was able to study Lorenzo de' Medici as he governed Florence. How do you think this may have affected his writing of *The Prince*?

2. **DESCRIBING** How did wealth change during the Renaissance?

Lorenzo de' Medici had enough power to rule Florence by himself, but he chose to govern with the help of assemblies that represented the people of his city-state. [Painting c. 1500s]

INTEGRATING VISUAL INFORMATION How do you think de' Medici would settle a dispute between nobles?

LESSON 1 REVIEW AND ACTIVITIES

Time and Place

1. **DESCRIBING** How did Italy's location contribute to its label as the birthplace of the Renaissance?

Building History-Social Science Analysis Skills

2. **ASKING QUESTIONS** What questions do you need to ask to determine if Lorenzo de' Medici was a good ruler of Florence?

3. **IDENTIFYING CAUSES** What was one reason Italian trade grew during the Renaissance?

4. **IDENTIFYING PATTERNS** How did life in Italy change as it grew more urban?

Writing About History

5. **INFORMATIVE WRITING** Why did Renaissance ideas arise in the 1300s? Explain your answer in the form of a short essay.

Collaborating

6. **COLLABORATING** With your classmates, arrange objects from your classroom on a table as if you intended to create a painting of the arrangement. Then discuss how an artist might make the objects appear realistic when painting them. Discuss ideas such as perspective and the use of light and shadows.

FOLDABLES **Study Organizer** Include this lesson's information in your Foldable®.

THE STORY BEGINS...

Petrarch's discovery of Cicero's work in 1345 helped spark the Renaissance. [Sculpture 1845]
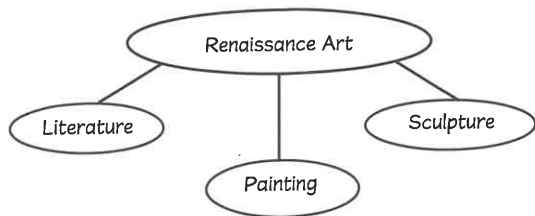
LESSON 2

New Ideas and Art

Francesco Petrarch was overjoyed. For years, the Italian scholar and poet had searched for the writings of the ancient Roman statesman, Cicero, who had been dead for more than one thousand years. Now Francesco held some of the texts in his hands. He had studied ancient times and had begun to view them in a new way. Petrarch read the texts and then wrote a letter to the ancient scholar, expressing his thoughts and feelings.

> **66** Your letters I sought for long and diligently; and finally, where I least expected it, I found them. At once I read them, over and over, with the utmost eagerness. And as I read I seemed to hear your bodily voice, O Marcus Tullius, saying many things, uttering many lamentations, ranging through many phases of thought and feeling. I long had known how excellent a guide you have proved for others; at last I was to learn what sort of guidance you gave yourself. **99**

—Francesco Petrarch, *To Marcus Tullius Cicero,* 1345

PHOTO: boggy22/iStock/Getty Images Plus. TEXT: Robinson, James Harvey, ed. and tr. 1909. Petrarch: The First Modern Scholar and Man of Letters. New York and London. G.P. Putnam's Sons.

ANALYZING KEY IDEAS AND DETAILS

Read closely to identify the different types of Renaissance art. Use a word web like this one to organize the information. Describe how each type of art reflects Renaissance ideas.

RENAISSANCE HUMANISM

GUIDING QUESTION *How did Renaissance writers rely on the past to develop new ideas?*

In the 1300s and 1400s, European scholars developed a new way of understanding the world called **humanism.** It was based on ancient Greek and Roman ideas. Humanists, as these scholars were called, gave importance to the individual and to human society. They wanted to gain knowledge through reason, not just through religious faith. Humanism encouraged people to be active in their cities and to develop their talents.

The humanists made important advances. New forms and styles of literature and art, technological inventions in cartography, engineering, and printing, and new theories in science, mathematics, human anatomy, and astronomy changed the world. Scientific Revolution scholars and Enlightenment thinkers built on these advances with their own achievements in the centuries that followed.

DISCOVERING ANCIENT WORKS

In the 1300s, Italian scholars began to study ancient Roman and Greek works. For most of the Middle Ages, Western Europeans knew little about these writings. During the Crusades, however, they came into contact with the Middle East. Arab Muslim scholars there and in Spain knew the classic Greek and Roman writings. They passed on their knowledge to the Western Europeans. Byzantine scholars also brought classical works to Italy.

One famous humanist scholar was Petrarch (PEE•trahrk). Francesco Petrarch lived in Italy during the 1300s. He studied Roman writers such as Cicero (SIH•suh•roh) and wrote biographies of famous Romans.

Petrarch traveled to different monasteries to find old Latin manuscripts. Scholars throughout Europe followed Petrarch's example. In time, new libraries were built to hold the newly found manuscripts. The largest of these libraries was at the Vatican, the home of the pope in Rome.

DETERMINING MEANING

What part of the word **humanism** helps you understand the focus of its study?

MAKING CONNECTIONS

ST. THOMAS AQUINAS AND HUMANISM

While St. Thomas Aquinas is recognized as a great scholastic thinker of the 1200s, his writings also contained elements of what became known as humanism. In his *Summa theologiae,* Aquinas accepted some of Aristotle's teachings, including that knowledge is gained from logic and reason. Aquinas himself placed faith above reason, but attempted to show how both could exist together. The Church, however, was critical of Aquinas and refused to accept any recognition of reason. Over time, the Church and society began to acknowledge his views. Renaissance thinkers again looked at the teachings of Aristotle and other ancient philosophers, and further emphasized the place of human reason alongside faith.

UNDERSTANDING CRAFT
AND STRUCTURE

1. **ANALYZING TEXT
   PRESENTATION** How does the
   author present the information in
   the section "A New Literature"?

2. **ANALYZING STRUCTURE** Why
   did the historian include the
   section about Gutenberg's
   printing press?

*Although Geoffrey Chaucer is best
remembered as a poet, he also
served as a courtier (a member of
the royal court), a diplomat, and
a civil servant. [Portrait published
c. 1833]*

ANALYZING POINT OF VIEW
How was Chaucer able to write
about different types of people in
society?

Italians also began to value the ancient buildings and
statues all around them. Throughout Rome, workers removed
dirt and rubble from damaged columns and statues. Artists
then eagerly studied the proportion of ancient works. For
example, artists compared the length of a statue's arms to its
height. They believed this comparison could tell them why the
statue looked perfect.

A NEW LITERATURE

In addition to studying the classics, humanists in Italy and other
parts of Europe made important achievements of their own. One
of their contributions was new forms of literature.

During the Renaissance, educated Europeans wrote in the
classical Latin used in ancient Rome. However, they also began
writing in the vernacular, the everyday language people spoke
in a region. Vernacular languages included Italian, French, and
German. For example, Petrarch used Italian to write sonnets, or
short poems, which expressed his love for a woman who died
from the Black Death. Many more people could read works
written in the vernacular instead of in Latin. Publication of the
Christian Bible in vernacular languages allowed people to read it
themselves, without depending on church officials. This was an
important basis for the Reformation.

In the early 1300s, a poet from Florence named Dante
Alighieri (DAHN•tay ah•lee•GYEHR•ee) wrote *The Divine
Comedy*. It is known as one of the world's greatest poems.
Written in the vernacular, it tells of a person's journey from hell
to heaven. The poem describes the horrible punishments for
different sins.

The English writer Geoffrey Chaucer (CHAW•suhr) also wrote
popular vernacular literature. Chaucer wrote his famous work *The
Canterbury* (KAN•tuhr•behr•ree) *Tales* in English. *The Canterbury
Tales* is a collection of stories told by pilgrims on a religious
journey to the town of Canterbury, England. In this work, Chaucer
portrayed the entire <mark>range</mark> of English society. His work shows
both nobles at the top of society and the poor at the bottom.
The English we speak today comes from the form of English that
Chaucer used in his writing.

GUTENBERG'S PRINTING PRESS

The printing press helped spread humanist ideas throughout
Europe. In the early 1450s, a German printer named Johannes
Gutenberg (yoh•HAHN•uhs GOO•tuhn•buhrg) developed a
printing press that used movable metal type. This new press
held individual carved letters that could be arranged to form

Georgios Kollidas/Hemera/Getty Images Plus

words and then could be used again. As a result, books could be quickly printed by machine rather than slowly written by hand.

The Chinese had already invented movable type. However, their written language had so many characters that the movable type system did not work well. For Europeans, the printing press was a great advance. It was easy to use with linen paper, another invention from China.

Gutenberg's printing press made many more books available to people. Its invention came at a time when many townspeople were learning to read and think for themselves. Scholars could read each other's works and discuss their ideas, often in letters. Ideas developed and spread more quickly than ever before in Europe.

In 1455, Gutenberg produced the first European printed book, the Christian Bible, on the new press. Soon, many books became available in Europe. In fact, more books were printed in the first 50 years of printing than were written by hand in the entire history of the world up to 1450. Half of the 40,000 books published by the year 1500 were religious works such as the Christian Bible or prayer books.

Gutenberg produced Christian Bibles on this printing press. Today, there are five complete, original Gutenberg Bibles in the United States. [Date of illustration unknown]

WHAT EFFECT DID HUMANISM HAVE ON SOCIETY?

Humanist scholars were curious about subjects such as biology, medicine, and astronomy. Scholars' study of mathematics helped them in many areas of knowledge.

One of the leading Renaissance scientists was also a great artist, Leonardo da Vinci (lee•uh•NAHR•doh duh VIHN•chee). Da Vinci cut open dead bodies to learn more about the human body. He studied fossils to understand Earth's early history. Da Vinci was also an inventor and an engineer.

Most of what we know about da Vinci comes from his notebooks. Da Vinci filled the pages of his notebooks with notes and sketches of his scientific and artistic projects. These drawings often pictured parachutes, flying machines, and other mechanical inventions far ahead of his time.

✅ CHECKING FOR UNDERSTANDING

1. **IDENTIFYING CAUSES** How were Italian scholars able to rediscover ancient Roman and Greek works?

2. **DETERMINING CONTEXT** Why was the printing press more successful in Europe than it was in China?

MAKING CONNECTIONS: MUSIC

PRINTING MUSIC BOOKS

Before 1501, all music had to be copied by hand or learned by listening to someone play it. Only religious institutions or very wealthy people owned music books. Beginning in 1501, the printing press changed that. It made musical scores, religious as well as nonspiritual, available to a larger number of people.

ITALY'S RENAISSANCE ARTISTS

GUIDING QUESTION *How did Renaissance artists learn to make their art look natural and real?*

In Renaissance Italy, wealthy families and church leaders appreciated beautiful buildings and works of art. They hired talented people to construct beautiful buildings and to fill them with artwork. The pope funded works of art to decorate the Vatican, his headquarters in Rome.

Renaissance builders and artists carefully studied ancient Greek and Roman art, science, and mathematics. They also expressed the new humanist ideas. As one artist declared, human beings were "the center and measure of all things."

WHAT NEW STYLES DID ARTISTS DEVELOP?

Renaissance art was very different from medieval art. Artistic works of the Renaissance tried to show what people really looked like. They also tried to reveal people's feelings. An artist from Florence named Giotto (JAH•toh) was the first to show this change in the early 1300s. His series of wall paintings showed the life of Francis of Assisi. The paintings used gestures and facial expressions to reveal people's emotions.

Renaissance painters also used new methods that brought life, color, and action to their works. The most important was **perspective** (puhr•SPEHK•tihv), a way of showing people and things as they appear at different distances. Artists in the past had tried to use perspective, but Renaissance artists such as Leonardo da Vinci perfected it. Perspective, as used by these artists, gave paintings a realistic, three-dimensional look.

Renaissance artists studied the human body to learn how to draw it accurately. They began to experiment with light, color, and shade. To make their paintings more realistic, artists used a technique called chiaroscuro (kee•ahr•uh•SKYUR•oh). Chiaroscuro used light and shadows instead of stiff outlines to separate objects. In Italian, *chiaro* means "clear or light," and *oscuro* means "dark." Chiaroscuro created drama and emotion in paintings.

Many Renaissance artists painted on fresh wet plaster with watercolor paint. A painting done this way is called a fresco (FREHS•koh), which means "fresh" in Italian. Frescoes were painted in churches all over Italy.

WHO WERE LEADING RENAISSANCE ARTISTS?

The period between 1490 and 1520 was the golden age of Italian Renaissance painting. Three of the most famous artists of the

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ANALYZING KEY IDEAS AND DETAILS

1. **DETERMINING CENTRAL IDEAS** In the section, "What New Styles Did Artists Develop?," what is the central idea?

2. **CITING TEXT EVIDENCE** Which Renaissance artist is highlighted as a sculptor and a painter?

The Mona Lisa *by Leonardo da Vinci is one of the most famous paintings from the Renaissance. It hangs today in the* **Louvre,** *a museum in Paris. [Painting c. 1503–1519]*

ANALYZING SOURCES How does Leonardo da Vinci's *Mona Lisa* reflect the characteristics of Renaissance art?

Musee du Louvre, Paris/Giraudon, Paris/SuperStock

Renaissance were Leonardo da Vinci, Michelangelo Buonarroti (MY•kuh•LAN•juh•loh bwah•nah•RAH•tee), and Raphael Sanzio (rah•feye•EHL SAHN•zee•oh).

Leonardo da Vinci was born in Florence. He is known for the *Mona Lisa*, a portrait of a young noblewoman. He gave her a smile that makes the viewer wonder what she is thinking. Da Vinci also painted *The Last Supper*, a wall painting of Jesus and his disciples. In this work, da Vinci showed emotion through the way the apostles hold their heads or sit in relation to Jesus.
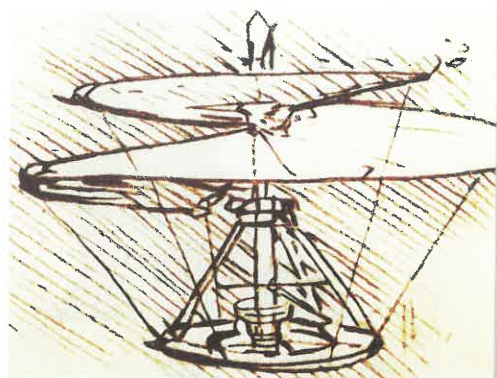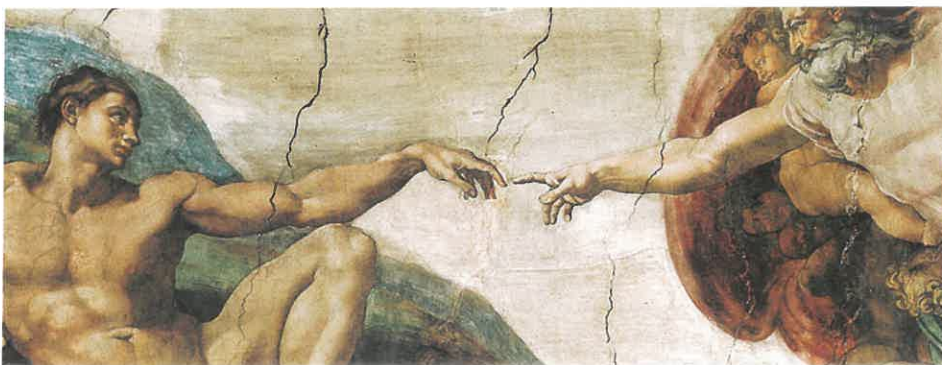

Da Vinci, a great innovator, is credited with having the first idea for a vehicle that could fly vertically. [Drawing c. late 1400s]

❝Lionardo [Leonardo] undertook to paint for Francesco del Giocondo a portrait of Mona Lisa his wife, but having spent four years upon it, left it unfinished. This work now belongs to King Francis of France, and whoever wishes to see how art can imitate nature may learn from this head. Mona Lisa being most beautiful, he used, while he was painting her, to have men to sing and play to her and buffoons [clowns] to amuse her, to take away that look of melancholy [sadness] which is so often seen in portraits; and in this of Lionardo's there is a peaceful smile more divine than human. ❞

—From *Stories of the Italian Artists from Vasari,* by Giorgio Vasari, c. 1550

Another great Renaissance artist was Michelangelo. Michelangelo was an influential architect and poet as well as a sculptor and painter. He began his career as a sculptor in Florence. In 1508, Pope Julius II hired Michelangelo to work at the Vatican. There, Michelangelo painted the ceiling of the Sistine Chapel with scenes from the Bible. These paintings are still famous today. A noted Renaissance biographer praised Michelangelo:

❝The work [Sistine Chapel ceiling] has been, indeed, a light of our art, illuminating the world which had been so many centuries in darkness. Oh, truly happy age, and oh, blessed artists, who at such a fountain can purge [remove] away the dark films from your eyes. Give thanks to Heaven, and imitate Michael Angelo [Michelangelo] in all things. ❞

—From *Stories of the Italian Artists from Vasari,* by Giorgio Vasari, c. 1550

ANALYZING SECONDARY SOURCES

1. **DISTINGUISHING FACT FROM OPINION** Identify one fact in the selection by Giorgio Vasari and explain why it is a fact.

2. **ASSESSING CREDIBILITY** What more would you need to know to assess whether *Stories of the Italian Artists from Vasari* is a credible source on the Renaissance?

ANALYZING SECONDARY SOURCES

1. **ANALYZING SOURCES** How does Michelangelo's biographer emphasize the great respect he has for the painter's work?

2. **DETERMINING CONTEXT** Which words of the biographer indicate that Michelangelo is one of many Renaissance artists who have achieved greatness?

All of Michelangelo's painted figures were like sculptures. They had muscular bodies that showed life and power. This scene of the creation of Adam appears on the ceiling of the Sistine Chapel in Rome. [Ceiling painting c. 1508–1512]
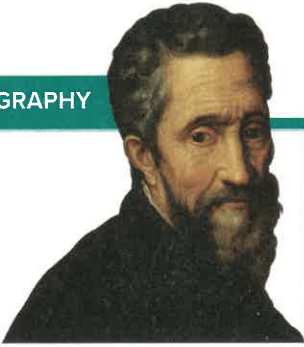
MICHELANGELO BUONARROTI
(1475–1564)

As a young artist, Michelangelo received support from Lorenzo de' Medici, the ruler of Florence. When he saw the young man's talent, de' Medici let Michelangelo study his art collection of ancient Roman statues. One of Michelangelo's first large sculptures was inspired by these statues. Michelangelo's most famous works, however, were based on Bible stories such as "David and Goliath." He made his 13-foot-tall marble statue of David seem calm, yet ready for action. Most of Michelangelo's sculptures suggested strong but controlled emotions. [Engraving c. 1846–1888]

DETERMINING CONTEXT How important was the de' Medici family to Michelangelo?

INTEGRATING KNOWLEDGE AND IDEAS

1. **INTEGRATING VISUAL INFORMATION** How does van Eyck's painting in this section support the paragraph about his painting techniques?

2. **DETERMINING CENTRAL IDEAS** How did the methods of Northern artists differ from Italian artists in their desire to achieve realism in their works?

Like Michelangelo, the artist Raphael worked at the Vatican. He painted many frescoes for the palace of the pope. Perhaps his best-known fresco, the *School of Athens,* shows Greek philosophers. People also admired his paintings of Mary, the mother of Jesus. These works were done in bright colors and showed the Renaissance ideals of grace and beauty.

Renaissance women had few roles independent of men. Some women, though, contributed to the arts. These women were either the daughters of artists or the children of nobles. The most celebrated female artist was Artemisia Gentileschi (ahr•teh•MIHZ•ee•uh jehn•tih•LEHS•kee). She was one of the first women to paint major historical and religious scenes.

✓ CHECKING FOR UNDERSTANDING

1. **DESCRIBING** How did the technique of chiaroscuro change art during the Renaissance?

2. **EXPLAINING CAUSES** How were many Renaissance artists able to afford to produce beautiful artwork?

THE NORTHERN RENAISSANCE

GUIDING QUESTION *How did the Renaissance change as it moved from Italy into Northern Europe?*

During the late 1400s, the Renaissance spread from Italy to Northern Europe. War, trade, travel, and the printing press all spread humanist ideas. The people of Northern Europe eagerly accepted Italian Renaissance style but changed it to suit their own tastes and needs.

NORTHERN EUROPEAN PAINTERS

The term "Northern Renaissance" refers to the cultural changes in what is today Belgium, the Netherlands, Luxembourg, and Germany. Like Italian artists, Northern artists wanted more realism in their works. However, they used different methods to achieve it.

Northern artists began painting in oils rather than using water-based paints. Oils provided richer colors and allowed changes to be made on the painted canvas. Artists also used oils to show small surface details, such as the gold trim on a robe.

The Flemish painter Jan van Eyck (YAHN van EYEK) was skilled in using oils. One of his best-known paintings is *The Arnolfini* (ahr•nuhl•FEE•nee) *Portrait.* It shows a newly married couple standing together in a formal room. Van Eyck showed every fold in their richly colored clothes and every detail of the ceiling lamp above them.

Albrecht Dürer (AHL•brehkt DYUR•uhr) of Germany was another important artist of the Northern Renaissance. His work blended Italian Renaissance methods and medieval German traditions. Dürer was skilled in showing perspective and fine detail. He is best known

for his engravings. An engraving is produced from an image carved on metal, wood, or stone. Ink is placed on the surface, and then the image is printed on paper.

Dürer's *Four Horsemen of the Apocalypse* (uh • PAH • kuh • lihpz) is an outstanding example of a woodcut, a print made from carved wood. His work shows four fierce riders who announce the end of the world.

ENGLAND'S THEATERS

The Renaissance reached its height in England during the rule of Elizabeth I in the late 1500s. The people of Renaissance England were especially fond of plays. About 1580, the first theaters in England were built. Their stages stood in the open air. Some wealthy people sat under a roof or covering. Admission was only one or two cents, so even the poor could attend. The poor stood in a large open area.

English playwrights, or authors of plays, wrote about people's strengths, weaknesses, and emotions. The greatest English playwright of that time was William Shakespeare (SHAYK•spihr). Shakespeare wrote all kinds of plays: histories, comedies, and tragedies. He drew ideas for his plays from the histories of England and ancient Rome. His plays often included Italian scenes, characters, and plots. Many of his plays were about loyalty, family, friendship, or justice. Some of Shakespeare's most famous works are *Hamlet, Macbeth, Romeo and Juliet,* and *Henry V.*

The richly detailed objects in this van Eyck painting reflect the lives of the people portrayed, a merchant and his wife. [Painting c. 1434]

ANALYZING SOURCES What does this painting tell you about the lives of the people in it?

☑ CHECKING FOR UNDERSTANDING

1. **DESCRIBING** How did Shakespeare's plays reflect the ideals of the Renaissance?

2. **EXPLAINING EFFECTS** How did the printing press help expand the Northern Renaissance?

LESSON 2 REVIEW AND ACTIVITIES

Time and Place

1. **DESCRIBING** How were Renaissance artists influenced by humanism?

Building History-Social Science Analysis Skills

2. **EXPLAINING EFFECTS** How did Gutenberg's printing press contribute to the spread of the ideas of Renaissance scholars?

3. **ANALYZING POINTS OF VIEW** Reread the excerpt from *The Lives of the Artists.* What is the author's point of view on Leonardo da Vinci?

4. **SEQUENCING** Was Dante's *The Divine Comedy* printed on a printing press when it was first written? Explain.

Writing About History

5. **EXPLANATORY WRITING** How do you think ancient Greek and Roman ideas have affected the way people learn, relate to, or think about their place in the world? Explain your answer in a short paragraph.

Collaborating

6. **COLLABORATING** Work with a partner to select one invention or idea from the Renaissance. Then discuss how that invention or idea has evolved to the present time by taking turns adding one sentence at a time to the discussion. Build upon what your partner said in the previous sentence by adding relevant facts and details for a total of six sentences.

FOLDABLES Include this lesson's information
Study Organizer in your Foldable®.

THE STORY BEGINS...

Polish astronomer Nicolaus Copernicus proposed many groundbreaking theories during the Scientific Revolution. This bronze statue of Copernicus was completed in 1830 and is located in Warsaw, Poland.

LESSON 3

The Scientific Revolution

Nicolaus Copernicus scratched his head. His research went against centuries of Church teaching. How could he explain that? He was sure that the sun was the center of the universe, but the Church taught that Earth was the universe's center. He would have to write very carefully to convince others he was right.

66 As it has been already shown that the earth has the form of a sphere, we must consider whether a movement also coincides [occurs at the same time] with this form, and what place the earth holds in the universe. Without this there will be no secure results to be obtained in regard to the heavenly phenomena [events]. The great majority of authors of course agree that the earth stands still in the center of the universe, and consider it inconceivable [unbelievable] and ridiculous to suppose the opposite. But if the matter is carefully weighed it will be seen that the question is not yet settled and therefore by no means to be regarded lightly. 99

—Nicolaus Copernicus, *On the Revolutions of the Heavenly Bodies,* 1543

Universe	Human Body

ANALYZING KEY IDEAS AND DETAILS

Read closely to identify the main advances of the Scientific Revolution concerning the universe or the human body. Use a chart like this one to organize the details. Cite examples from the text to describe the importance of these advances.

EARLY SCIENCE

GUIDING QUESTION *How were the scientific ideas of early thinkers passed on to later generations?*

During the Renaissance and the Age of Exploration, people developed new ways to learn about nature. However, humans have always shown an interest in the world around them. Thousands of years ago, people began watching plants and animals grow. Activities such as these represented the beginnings of science. Science is any organized study of the physical world. Scientists study the physical world to determine how things work.

THE FIRST SCIENTISTS

The people of ancient civilizations developed science to solve problems. They used mathematics to keep records. People who studied the movement of the stars developed astronomy. This science helped people keep time and decide when to plant crops.

The ancient Greeks developed a large amount of scientific information. They believed that reason was a way to analyze nature. Their studies helped them develop theories. A **theory** is an explanation for how or why something happens. Theories are based on what people can observe about a thing or event.

The ancient Greeks and Romans made many scientific advances. The Greek philosopher Aristotle (A•ruh•STAH•tuhl), for example, gathered facts about plants and animals. He then classified living things by arranging them into groups based on their similarities and differences. However, classical thinkers did not conduct scientific experiments. That means they did not test new ideas to find out whether they were true. Instead, they based their conclusions on "common sense," which led to many false beliefs. For instance, during Roman times, the Egyptian-born astronomer Ptolemy (TAH•luh•mee) stated that the sun and the planets moved around the Earth. His **geocentric** (JEE•oh•SEHN•trihk), or Earth-centered, theory was accepted in Europe for more than 1,400 years.

UNDERSTANDING CRAFT AND STRUCTURE

1. **ANALYZING STRUCTURE** Why does the author decide to organize the section "Early Science" into two smaller sections?

2. **ANALYZING TEXT PRESENTATION** Why do you think the author put the section "The First Scientists" before "Medieval Science"?

DETERMINING MEANING

Geocentric uses the prefix "geo." If *centric* means "concentrated around a center," what does the prefix *geo* mean?

In today's world, we use Indian-Arabic numbers. However, during the Middle Ages in Europe, Roman numerals were more common. The chart at the bottom of this page compares the two number systems. [Modern photo]

EXPLAINING ISSUES What are the advantages of using the Indian-Arabic numbers over Roman numerals?

Indian-Arabic Numbers	Roman Numerals
1	I
2	II
3	III
4	IV
5	V
6	VI
7	VII
8	VIII
9	IX
10	X
50	L
100	C
1,000	M

MEDIEVAL SCIENCE

During the Middle Ages, most Europeans were interested in religious ideas. Few people were interested in studying nature. Their ideas about science were based mostly on ancient classical writings. They did not think it was necessary to research the facts and draw their own conclusions. Many of the classical writings were poorly preserved. As people wrote out copies of the old texts, they sometimes made errors that changed the information.

At the same time, Arabs and Jews in the Islamic empire preserved Greek and Roman science. They copied many Greek and Roman works into Arabic. They also came into contact with the Indian system of numbers that is used today. This system of numbers is now called Indian-Arabic.

Arab and Jewish scientists made their own advances in mathematics, astronomy, and medicine. Even with these achievements, scientists in the Islamic world did not conduct experiments.

During the 1100s, European thinkers began to have more contact with Islamic peoples. As a result, they gained a renewed interest in science. Europeans began to read copies of Islamic works in Latin. After the Indian-Arabic system of numbers reached Europe, people adopted it in place of Roman numerals. Thomas Aquinas (uh•KWY•nuhs) and other Christian thinkers showed that Christianity and reason could work together. Also, Europeans began building new universities. In these schools, teachers and students helped the growth of science.

Beginning in the 1400s, voyages of exploration added to scientific knowledge in Europe. Europeans began to create better charts and maps. These tools helped explorers reach different parts of the world. As more of the world was explored, people learned new information about the size of oceans and continents. Scientists gathered data about diseases, animals, and plants and organized the new information.

Gradually, scientific knowledge **expanded** in Europe. As this happened, a new understanding of the natural world developed.

✓ CHECKING FOR UNDERSTANDING

1. **DESCRIBING** How was science practiced in ancient and medieval times?

2. **IDENTIFYING CAUSES** What allowed explorers to reach different parts of the world?

Jupiterimages/Stockbyte/Getty Images

NEW IDEAS ABOUT THE UNIVERSE

In the 1500s, Europeans began to think differently about science. They began to realize that scientists had to use mathematics and experiments to make advances. This new way of thinking led to the **Scientific Revolution**. This revolution changed how Europeans understood science and how they searched for knowledge.

Universities offered some legal protection to scholars that allowed them to study subjects and challenge traditional beliefs. Scientific inquiry became so associated with universities that as they spread to Mexico, Peru, and North America in the 1700s, so too did scientific study.

The Scientific Revolution first affected astronomy, the science that studies the planets and stars of the universe. New discoveries in this field began to change European thinking about the universe. They challenged the traditional idea that God had made the Earth as the center of the universe.

COPERNICUS AND PTOLEMY

Nicolaus Copernicus (koh•PUHR•nih•kuhs) was a Polish astronomer. In 1491, he began his career at a university in Poland. A year later, Columbus reached the Americas. Like Columbus, Copernicus challenged old beliefs held by Europeans.

In 1543, Copernicus wrote a book called *On the Revolutions of the Heavenly Spheres*. He disagreed with Ptolemy's theory that the Earth was the center of the universe. Copernicus developed a **heliocentric** (HEE•lee•oh•SEHN•trihk), or sun-centered, theory of the universe. Copernicus believed that the sun was the center of the universe. Earth and the other planets followed a circular path around the sun.

Copernicus's theory disagreed with church teachings. As a result, publication of his book was delayed. He reportedly did not receive the first copy until he was dying.

KEPLER'S IDEAS ABOUT PLANETS

A German astronomer named Johannes Kepler (KEH•pluhr) made more advances. He used mathematics to support Copernicus's theory that the planets revolve around the sun. His findings also made corrections to the theory. Kepler added the idea that the planets move in oval paths called **ellipses** (ih•LIHP•seez) instead of the circular paths in Copernicus's theory.

Also, Kepler stated that planets do not always travel at the same speed. Instead, they move faster as they approach the sun

Ptolemaic Universe

Fixed Stars

Prime Mover

Saturn

Jupiter

Mars

Sun

Venus

Mercury

Earth

Moon

The theory of Copernicus gave a new perspective on the universe. He believ that the Earth and other planets orbit t sun. He also stated that Earth rotates daily on its axis. This new theory prove accurate in many ways.

Copernican Universe

Fixed Stars

Saturn

Jupiter

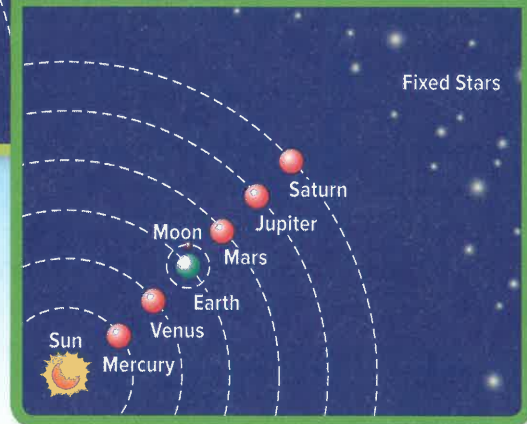Moon

Mars

Earth

Venus

Sun

Mercury

Ptolemy, a Greek astronomer who lived in Roman Egypt, claimed that the planets and the sun revolved around Earth. His theory was accepted for more than a thousand years. [Painting c. 1476]

and slower as they move away from it. Kepler's theory provided a simpler explanation for the movements of the planets. In addition, it marked the beginning of modern astronomy.

INTEGRATING VISUAL INFORMATION Study the diagrams. How did the theory of Copernicus differ from the theory of Ptolemy?

[Colored miniature painting c. 1942]

GALILEO'S ACHIEVEMENTS

An Italian scientist named Galileo Galilei (GA•luh•LEE•oh GA•luh•lay•ee) made the next great discovery in the Scientific Revolution. He believed that conducting experiments was the correct way to achieve new scientific knowledge. His support for the heliocentric theory of the universe placed him in conflict with the Catholic Church, which charged him with heresy. Some of Galileo's studies that challenged long-held ideas were less controversial. For example, Aristotle had thought that heavy objects fall to the ground faster than objects that weigh less. Galileo's experiments proved that was not correct. Objects fall at the same speed no matter what they weigh.

Galileo also believed that scientific instruments could help people better explore the natural world. He heard about an early telescope and designed one of his own. With the telescope, Galileo found evidence that supported Copernicus's theory that Earth revolves around the sun.

Galileo also improved the making of clocks. One day, Galileo was watching an overhead lamp swing back and forth from a cathedral ceiling. He timed each swing and discovered that all of

(t)Joos van Cent/Getty Images; (b) Bettmann/Getty Images

the swings took the same length of time. Galileo used this idea to make a clock that had a swinging pendulum. The pendulum made the clock more accurate.

Galileo also developed new scientific instruments. In 1593, he invented a water thermometer. People could now measure changes in temperature. An assistant of Galileo then built the first barometer, an instrument that measures air pressure.

☑ CHECKING FOR UNDERSTANDING

1. **DETERMINING CONTEXT** Why did Copernicus wait many years before publishing his findings?

2. **IDENTIFYING CAUSES** What events of medieval times contributed to the beginning of the Scientific Revolution?

NEW SCIENTIFIC ADVANCES

GUIDING QUESTION *Which discoveries did scientists make during the 1600s and 1700s?*

During the 1600s and 1700s, scientists built on the advances of Copernicus, Kepler, and Galileo. These scientists made advances in medicine, astronomy, and physics. This scientific knowledge gradually influenced military, agriculture, and metalworking technologies.

NEWTON'S UNIVERSE

Isaac Newton was an English mathematician. According to legend, Newton was sitting in his garden one day when he saw an apple fall to the ground. The apple's fall led him to the idea of **gravity**. Gravity is the pull of the Earth (or other bodies in space) on objects that are on or near the planet.

In 1687, Newton published one of the most important books in the history of modern science, *Principia*. In *Principia,* Newton gave three laws, or well-tested theories, about the motion of objects on Earth and in space. These are called the three Laws of Motion. The most important is the law of gravitation. It states that the force of gravity holds the solar system together. It does this by keeping the sun and the planets in their orbits. Newton's ideas greatly influenced the thinking of other scientists.

STUDYING THE HUMAN BODY

Many changes were made in medicine during the 1500s and 1600s. Since ancient times, the teachings of the Greek physician Galen had influenced European doctors. Galen wanted to study the human body, but he was not allowed to dissect, or cut open, dead human bodies. So, he dissected animals instead.

In the 1500s, the Flemish doctor Andreas Vesalius (vuh•SAY•lee•uhs) advanced medical research. He began

BIOGRAPHY

GALILEO (1564–1642)

In 1632, Galileo, an Italian, published his ideas. Soon afterward, Catholic Church officials banned his book. They believed that the Christian Bible taught that the Earth was the center of the universe. Galileo's theory disagreed and stated the Earth revolved around the sun. Because of this, Galileo was ordered to stand trial for heresy. He was also forced to withdraw many of his statements. [Engraving published in 1863]

EXPLAINING Why did the Catholic Church want to stop the spread of Galileo's ideas?

ANALYZING KEY IDEAS AND DETAILS

1. **CITING TEXT EVIDENCE** Which sentence tells you Newton's nationality?

2. **DETERMINING CENTRAL IDEAS** Name two inventions that advanced human knowledge during the 1600s and 1700s and identify a major finding as a result of each invention.

DETERMINING MEANING

Which word in the text best helps you understand the term **gravity**?

Isaac Newton analyzed rays of light. His experiments showed that light is made up of a wide band of colors called a spectrum. [Date of image unknown]

INFERRING Do you think Aristotle's method could have been used to discover the spectrum? Explain your answer.

dissecting dead human bodies. In 1543, he published *On the Structure of the Human Body.* In it, Vesalius described the internal structure of the human body. His account challenged many of Galen's ideas.

Other advances in medicine took place. In 1609 Galileo perfected his first microscope to magnify small objects. Soon after, an English scientist named Robert Hooke used the microscope to discover cells, which are the smallest units of living matter. Then the Dutch merchant Antonie van Leeuwenhoek (LAY•vuhn•huk) improved the microscope by using more powerful lenses. He used this microscope to discover tiny organisms later called bacteria (bak•TIHR•ee•uh).

In the mid-1600s, the Irish scientist Robert Boyle proved that all matter is made up of <mark>elements</mark>. Elements are basic materials that cannot be broken down into simpler parts.

During the 1700s, European scientists discovered gases such as hydrogen, carbon dioxide, and oxygen. By 1783, Antoine Lavoisier (AN•twahn luhv•WAH•zee•AY) of France proved that materials need oxygen in order to burn. Marie Lavoisier, also a scientist, made contributions to her husband's work.

✔ CHECKING FOR UNDERSTANDING

1. **IDENTIFYING CAUSES** Which invention enabled the discovery of bacteria?

2. **UNDERSTANDING CHRONOLOGY** Examine the table "The Scientific Revolution" in this section. Create a time line and place the life spans of these major scientists at the correct time periods. The time line should run from 1450 to 1800.

THE SCIENTIFIC REVOLUTION

Scientist	Nation	Discoveries
Nicolaus Copernicus (1473–1543)	Poland	Earth orbits the sun; Earth rotates on its axis
Galileo Galilei (1564–1642)	Italy	other planets have moons
Johannes Kepler (1571–1630)	Germany	planets have elliptical orbits
William Harvey (1578–1657)	England	heart pumps blood
Robert Hooke (1635–1703)	England	cells
Robert Boyle (1627–1691)	Ireland	matter is made up of elements
Isaac Newton (1642–1727)	England	gravity; laws of motion; calculus
Antoine Lavoisier (1743–1794)	France	how materials burn

During the Scientific Revolution, scientists made discoveries in many fields, such as astronomy and medicine. For example, William Harvey discovered that the heart pumps blood.

DETERMINING CONTEXT Based on this chart, where did the Scientific Revolution appear to be based? How was that different from where the Renaissance was based?

©North Wind Picture Archives

THE TRIUMPH OF REASON

European thinkers believed science revealed the natural laws of the universe. By using reason, people could study these laws and use them to solve many human problems.

DESCARTES AND PASCAL

France became a major center of scientific thought. In 1637, the French thinker René Descartes (reh•NAY day•KAHRT) wrote a book called *Discourse on Method*. In this book, Descartes studied the problem of knowing what is true. To find truth, he decided to ignore everything he had learned and start over. However, one fact seemed to be beyond doubt. This fact was his own existence. To summarize this idea, Descartes wrote the phrase, "I think, therefore I am."

In his work, Descartes claimed that mathematics is the source of scientific truth. In mathematics, he said, the answers are always true. His reasoning was that mathematics begins with simple principles. It then uses logic, or reason, to move to more complex truths. Descartes is viewed as the founder of modern **rationalism** (RASH•uh•nuh•LIH•zuhm). This is the belief that reason is the main source of knowledge.

During the 1600s, another French thinker, Blaise Pascal (blehz pa•SKAL), studied science. At the age of 19, he invented a calculating machine. Pascal believed that reason and scientific ideas based on experiments could solve many practical problems. However, Pascal was also a religious man. He believed that the solutions to moral problems and spiritual truth could come only from faith in Christian teachings.

WHAT IS THE SCIENTIFIC METHOD?

In the 1600s, the English thinker Francis Bacon influenced scientific thought. He believed that unproven ideas from earlier **generations** should be put aside. Bacon believed that to find the truth, you had to first find and examine the facts.

ANALYZING KEY IDEAS AND DETAILS

1. **CITING TEXT EVIDENCE** How were the studies of Descartes related to the Scientific Revolution?

2. **IDENTIFYING STEPS** What is the second step of the scientific process?

Early microscopes (above top, c. 1725) were used to discover information about items too small to see, like bacteria and cells. Early telescopes (above, c. 1795–1835) were used to learn about larger things in space, like planets and stars.

1. **DETERMINING CENTRAL IDEAS** According to Bacon, what is the danger of closing one's mind to alternate conclusions in the sciences and philosophy?

2. **CITING TEXT EVIDENCE** According to Bacon, how should a person view affirmatives and negatives to arrive at truth?

He believed that it was natural human behavior to dismiss information that did not agree with a person's opinion, including scientists from the past.

> But with far more subtlety [delicacy] does this mischief insinuate [suggest] itself into philosophy and the sciences; in which the first conclusion colours [influences] and brings into conformity [agreement] with itself all that come after, though far sounder and better. . . . [I]t is the peculiar and perpetual [long lasting] error of human intellect to be more moved and excited by affirmatives than by negatives; whereas it ought properly to hold itself indifferently disposed [neutral] towards both alike. Indeed in the establishment of any true axiom [principle], the negative instance is the more forcible of the two.

—Francis Bacon, *The New Organon,* 1620

The Scientific Method

Observe some aspect of the universe.

Hypothesize about what you observed.

Predict something based on your hypothesis.

Test your predictions through experiments and observations.

Modify hypothesis in light of results.

The scientific method involves five steps. These steps build on each other.

IDENTIFYING PATTERNS How is the scientific method different from the way ancient scientists worked?

He developed the scientific method. This method is an orderly way of collecting and analyzing evidence. Its basic principles are still used in scientific research today.

The **scientific method** consists of several steps. First, scientists observe facts. Then, they try to find a hypothesis (hy•PAH•thuh•suhs), or an explanation of the facts. Scientists conduct experiments to test the hypothesis. These tests are done under all types of conditions. Repeated experiments may show that the hypothesis is true. Then it is considered a scientific law.

✔ CHECKING FOR UNDERSTANDING

1. **EXPLAINING EFFECTS** How does Francis Bacon's scientific method influence our lives today?

2. **DETERMINING CONTEXT** How was Blaise Pascal influenced by the time in which he lived?

LESSON 3 REVIEW AND ACTIVITIES

Time and Place

1. **DESCRIBING** How did the scientists of the Scientific Revolution differ from those who came before?

Building History-Social Science Analysis Skills

2. **EXPLAINING IDEAS** How did the development of the heliocentric theory differ from previous theories?

3. **ASKING QUESTIONS** If you wanted to learn more about Marie Lavoisier's work, what questions could you ask?

4. **EXPLAINING CAUSES** Why was Andreas Vesalius able to describe the human body accurately?

Writing About History

5. **ARGUMENTATIVE WRITING** During the Scientific Revolution, advances were made in many scientific fields. Which advance do you think was the most significant? Write a paragraph explaining your answer.

Collaborating

6. **ASSESSING CREDIBILITY** Work in a small group to conduct further research on one of the scientists of the Scientific Revolution. Find three accurate and credible sources on your group's scientist. Create an annotated bibliography and share it with the class.

FOLDABLES Study Organizer Include this lesson's information in your Foldable®.

LESSON 4

The Enlightenment

THE STORY BEGINS...

Mary was frustrated. Enlightenment writers spoke of the rights of man. Of course, they were all men. They said that men should rule over women because women were not as wise as men. Women had rights, too, however, and Mary was determined to prove it. She began to write.
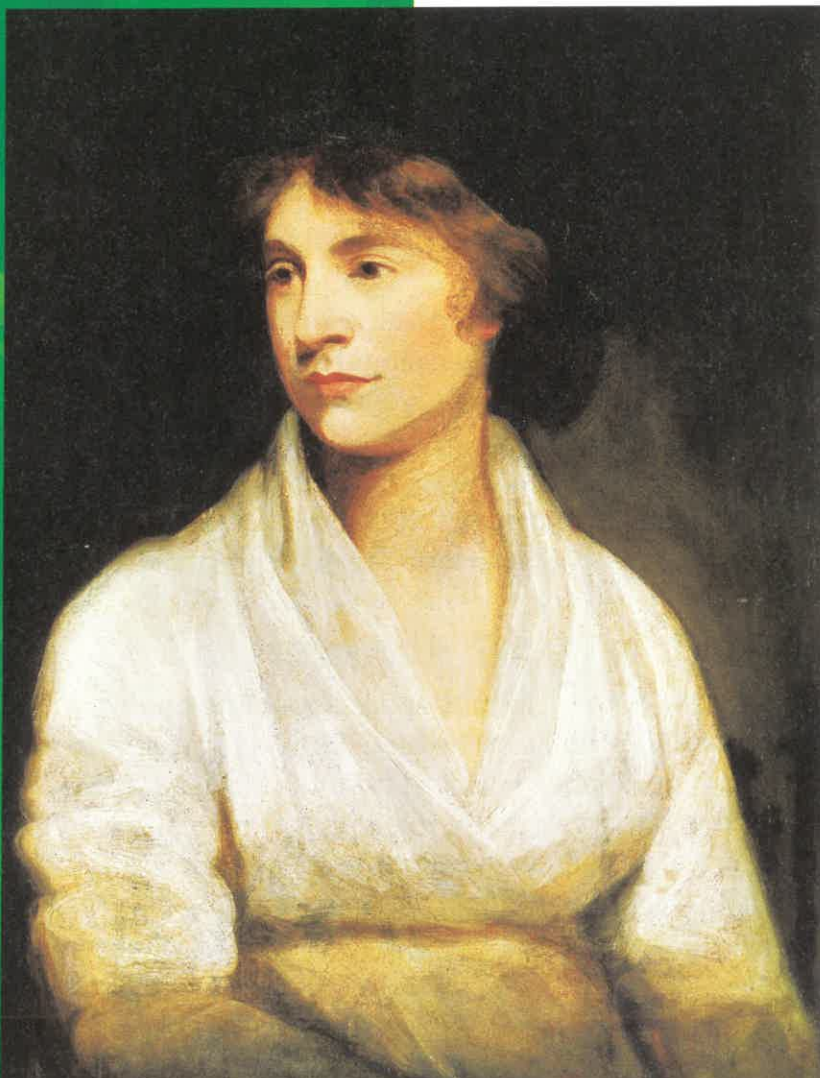
> ❝ In this style, argue tyrants [cruel rulers] of every denomination [kind] from the weak king to the weak father of a family; they are all eager to crush reason; yet always assert [state strongly] that they usurp [take over] its throne only to be useful. Do you not act a similar part, when you FORCE all women, by denying them civil and political rights, to remain immured [confined] in their families groping in the dark?. . . They may be convenient slaves, but slavery will have its constant effect, degrading the master and the abject [hopeless] dependent. But, if women are to be excluded, without having a voice, from a participation of the natural rights of mankind, prove first, to ward off the charge of injustice and inconsistency, that they want [lack] reason, else this flaw in your NEW CONSTITUTION, the first constitution founded on reason, will ever show that man must, in some shape, act like a tyrant, and tyranny [cruelty], in whatever part of society it rears its brazen [shameless] front, will ever undermine [weaken] morality. ❞

> — Mary Wollstonecraft, *A Vindication of the Rights of Woman,* 1792

During the Enlightenment, the idea that men had rights became popular. Mary Wollstonecraft (1759–1797) fought to have women included in this idea, too. [Painting c. 1797]

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Thinker	Idea

REASON AND POLITICS

GUIDING QUESTION *How did European thinkers apply scientific ideas to government?*

During the 1700s, European thinkers were impressed by advances in science. They believed that reason could discover the scientific laws that shaped human behavior. Once these laws were understood, thinkers believed, people could use the laws to improve society.

The Scientific Revolution stressed the use of reason to solve problems. Before this period, people often relied on faith or tradition as guides. However, in the 1700s, many educated Europeans began to break away from tradition. They viewed reason as a "light" that uncovered error and showed the path to truth. As a result, the 1700s became known as the **Age of Enlightenment**. Like the Scientific Revolution, the Enlightenment owed much to the Greeks, the Romans, the Reformation, and the Renaissance. The search for knowledge and order, which transformed throughout the ages and put the Scientific Revolution at odds with traditions, also influenced the Enlightenment.

During the Enlightenment, political thinkers tried to use reason to improve government. They claimed that there was a natural law, or a law that applied to everyone and could be understood by reason. This natural law was the key to making government work properly. As early as the 1600s, two English thinkers used natural law to develop very different ideas about government. The two men were Thomas Hobbes and John Locke.

WHO WAS THOMAS HOBBES?

English writer Thomas Hobbes wrote about England's government and society. At the time, England was torn apart by conflict. King Charles I wanted absolute power. Parliament, however, demanded a greater role in governing. The king's supporters fought those who supported Parliament.

Parliament already had some control over the king. In the 1620s, Parliament had forced Charles to sign the Petition of Right.

INTEGRATING KNOWLEDGE AND IDEAS

1. **ANALYZING SOURCES** How does the image of a serpent help make Hobbes's point about government?

2. **DISTINGUISHING FACT AND OPINION** Identify a statement of John Locke's that was an opinion. Why was it an opinion and not fact?

It said the king could not tax the people without Parliament's approval. Also, he could not imprison anyone without a just reason. The Petition also stated that the king could not declare a state of emergency unless the country was at war.

Charles, however, ignored the Petition. His differences with Parliament led to civil war. The fighting finally forced Parliament's supporters to execute Charles. This event shocked Thomas Hobbes, who supported the monarchy.

HOBBES'S BELIEFS

In 1651, Hobbes wrote a book called *Leviathan*. In this work, Hobbes argued that natural law made absolute monarchy the best form of government. According to Hobbes, humans were naturally violent and selfish. They could not be trusted to make wise decisions on their own. Left to themselves, people would make life "nasty, brutish, and short."

Therefore, Hobbes said, people needed to obey a government that had the power of a leviathan (luh·VY·uh·thuhn), or sea monster. To Hobbes, this meant the rule of a powerful king, because only a strong ruler could give people direction. Under this ruler, people had to remain loyal. This political theory of Hobbes became known as **absolutism** (AB·suh·LOO·tih·zuhm), because it supported a ruler with absolute, or total, power.

LOCKE AND THE GLORIOUS REVOLUTION

Another English thinker, John Locke, believed differently. He used natural law to support citizens' rights. He said the government had to answer to the people. During Locke's life, another English king, James II, wanted to be a strong ruler. Parliament again was opposed to the king's wishes. When civil war threatened in 1688, James fled the country. Parliament then asked Mary, the king's daughter, and her husband, William, to take the throne. This event became known as the "**Glorious Revolution**."

The Glorious Revolution eventually turned England into a **constitutional monarchy**. This is a form of government in which written laws limit the powers of the monarch. In return for the English throne,

DETERMINING MEANING
What word is at the root of the word **absolutism**? What does it mean?

In Hobbes's Leviathan, *a sea serpent like the one below represents the powerful ruler necessary to running the most effective type of government— an absolute monarchy.* [Illustration published 1908]

IDENTIFYING CAUSES What events in England made Hobbes believe that it was best to have a strong ruler?
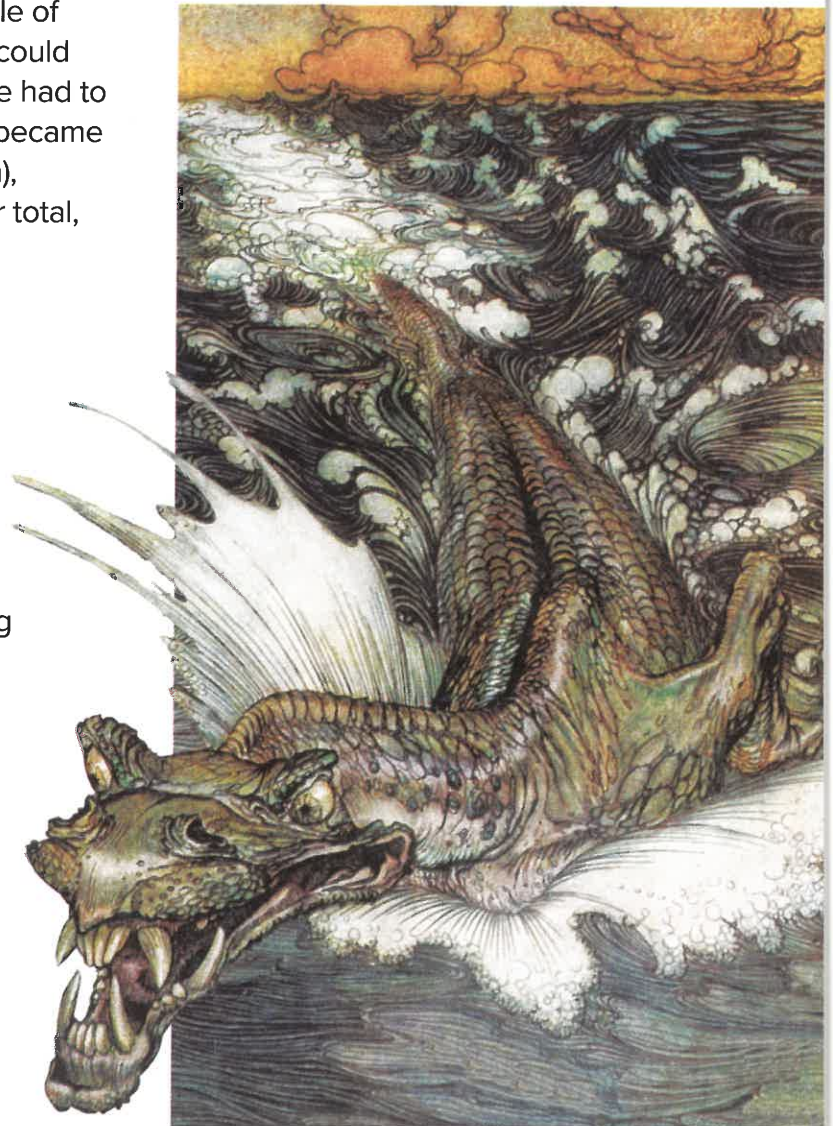
John Locke wrote about many subjects, including education and religion. His ideas contributed to the U.S. Declaration of Independence. [Portrait c. 1704]

INFERRING Would Locke have supported freedom of religion? Explain.

DETERMINING MEANING

Look at the two parts of social contract individually to better understand the term. A contract usually happens between two separate people or groups. What societal groups are involved in this contract?

William and Mary agreed to a Bill of Rights. This document required William and Mary to obey Parliament's laws. The Bill of Rights went further than the Magna Carta to **guarantee** all English people basic rights. For example, people had the right to a fair trial by jury and the right to freedom from cruel punishment. The ideas in the Magna Carta and the English Bill of Rights would later be an important part of the founding documents of the United States of America, including the Declaration of Independence and the Constitution.

In 1690, John Locke wrote a book called *Two Treatises of Government.* His book explained many of the ideas of the Glorious Revolution. Locke stated that government should be based on natural law and natural rights. These rights included the right to life, the right to liberty, and the right to own property.

Locke believed that the purpose of government was to protect people's rights. He said that all governments were based on a **social contract.** This is an agreement between the people and their leaders. If rulers took away people's natural rights, the people had a right to rebel and set up a new government. The Declaration of Independence stated that "all men are created equal" and have certain God-given rights. King George had violated colonists' rights. For this reason, the colonists had the right to rebel.

MONTESQUIEU AND GOVERNMENT

After the Glorious Revolution, many thinkers in France admired the government of England. They liked it better than the absolute monarchy that ruled France. In 1748, a French thinker, Baron Montesquieu (mahn•tuhs•KYOO), published a book called *The Spirit of the Laws,* which stated that England had the best government. He liked English government because it had a **separation of powers**. This means power should be equally divided among the branches of government: legislative, executive, and judicial. The legislative branch makes the laws. The executive branch enforces the laws. The judicial branch interprets the laws and makes judgments when the laws are broken. By separating these powers, government could not become too powerful and threaten people's rights. As Montesquieu explained in the case of judges:

> ❝When the legislative and executive powers are united in the same person, or in the same body of magistrates [judges], there can be no liberty; because apprehensions [worries] may arise, lest the same monarch or senate should enact tyrannical [unjust] laws, to execute them in a tyrannical manner.

Again, there is no liberty, if the power of judging be not separated from the legislative and executive powers. Were it joined with the legislative, the life and liberty of the subject would be exposed to arbitrary [absolute] control, for the judge would then be the legislator. Were it joined to the executive power, the judge might behave with all the violence of an oppressor. There would be an end of every thing were the same man, or the same body, whether of the nobles or of the people to exercise those three powers that of enacting laws, that of executing the public resolutions, and that of judging the crimes or differences of individuals. 99

— Charles-Louis de Secondat, Baron de Montesquieu,
The Spirit of the Laws, 1750

Montesquieu believed in the rights of individuals. His work influenced the writing of the constitutions of many countries, including the United States Constitution.

✅ CHECKING FOR UNDERSTANDING

1. **CONTRASTING** How did Hobbes and Locke differ in their ideas about government and the people?

2. **IDENTIFYING PATTERNS** How was the Scientific Revolution connected to the Enlightenment?

THE PHILOSOPHES OF FRANCE

GUIDING QUESTION *How did French thinkers influence Europe during the Enlightenment?*

During the 1700s, France became the most active center of the Enlightenment. Thinkers in France and elsewhere became known by the French name *philosophe* (FEE•luh•ZAWF), which means "philosopher." Most philosophes were writers, teachers, and journalists who often discussed and debated new ideas at gatherings. These gatherings were held in the homes of wealthy citizens.

Philosophes wanted to use reason to improve society. They attacked superstition, or unreasoned beliefs, and disagreed with religious leaders who opposed new scientific discoveries. Philosophes believed in freedom of speech and claimed that each person had the right to liberty. Their ideas spread across Europe.

WHO WAS VOLTAIRE?

In 1694, François-Marie Arouet (ahr•WEH) was born to a middle-class family in France. He became one of the greatest thinkers of the Enlightenment. Called just Voltaire (vohl•TAR), he wrote novels, plays, and essays that brought him wealth and fame.

Baron Montesquieu traveled through Europe and compared governments. He wrote his conclusions in The Spirit of the Laws. *[Date of image unknown]*

ANALYZING Why did so many scholars respect Montesquieu's ideas?

ANALYZING KEY IDEAS AND DETAILS

1. **CITING TEXT EVIDENCE** Why do many call Mary Wollstonecraft the founder of the women's movement?

2. **SUMMARIZING** Summarize Voltaire's ideas on religion.

Stefano Bianchetti/Corbis Historical/Getty Images

Voltaire had opinions that caused a large amount of controversy. He was jailed for his viewpoints in France's Bastille prison. [Portrait c. early 1700s]

Voltaire opposed the government's favoring one religion and forbidding others. He thought people should be free to choose their own beliefs. He often criticized the Roman Catholic Church for keeping knowledge from people in order to maintain the Church's power.

Voltaire was a supporter of deism (DEE•ih•zuhm), a religious belief based on reason. Followers of deism believed that God created the universe and set it in motion. God then allowed the universe to run itself by natural law.

DIDEROT'S ENCYCLOPEDIA

The French thinker Denis Diderot (duh•NEE dee•DROH) was also committed to spreading Enlightenment ideas. In the late 1700s, he produced a large, 28-volume encyclopedia that took him about 20 years to complete. The *Encyclopedia* covered a wide range of topics including religion, government, the sciences, history, and the arts. The philosophes used it as a weapon in their fight against traditional ways. Many articles supported freedom of religion and called for changes to society.

WOMEN AND THE ENLIGHTENMENT

Prior to the Enlightenment, women did not have equal rights with men. By the 1700s, a small number of women began to call for such rights. In 1792, the English writer Mary Wollstonecraft (WUL•stuhn•KRAFT) wrote a book called *A Vindication of the Rights of Woman*. In it, she states that women should have the same rights as men. Many consider Wollstonecraft to be the founder of the women's movement.

During the Enlightenment, wealthy people held gatherings to discuss the ideas of the day. Here a group reads and discusses the works of Voltaire. [Painting c. 1812]

(t)Bridgeman-Giraudon/Art Resource, NY; (b)Leemage/Corbis Historical/Getty Images

WHO WAS ROUSSEAU?

A Swiss thinker named Jean-Jacques Rousseau (roo • SOH) questioned Enlightenment ideas. In 1762 he published a book of political ideas called *The Social Contract*. This book states that government rests on the will of the people and is based on a social contract. This is an agreement in which what society, as a whole, wants should be law.

✓ CHECKING FOR UNDERSTANDING

1. **EXPLAINING IDEAS** How did Diderot's *Encyclopedia* advance the work of Enlightenment thinkers?

2. **SEQUENCING** Which of the philosophes was the first to write about Enlightenment ideas?

ABSOLUTE MONARCHS

GUIDING QUESTION *How did European monarchs model their countries on Enlightenment ideas?*

During the Enlightenment, thinkers called for controls on government. However, most of Europe was ruled by kings and queens who claimed to rule by divine right, or the will of God. Some absolute rulers used Enlightenment ideas to improve their societies—but they refused to give up any of their powers.

WHO WAS FRANCE'S SUN KING?

During the 1600s and 1700s, France was one of Europe's most powerful nations. In 1643, Louis XIV, called the Sun King, came to the throne. He built the grand Versailles (vuhr•SY) palace. There, he staged large ceremonies to celebrate his power.

Mary Wollstonecraft thought that women should have equal rights in education, the workplace, and political life. [Painting c. 1791]

ANALYZING POINTS OF VIEW How did Mary Wollstonecraft support her argument for women's equality?

UNDERSTANDING CRAFT AND STRUCTURE

1. **ANALYZING POINT OF VIEW** Why did the author decide to include the section "Absolute Monarchs"?

2. **DESCRIBING** How did the author present the information in "Absolute Monarchs"?
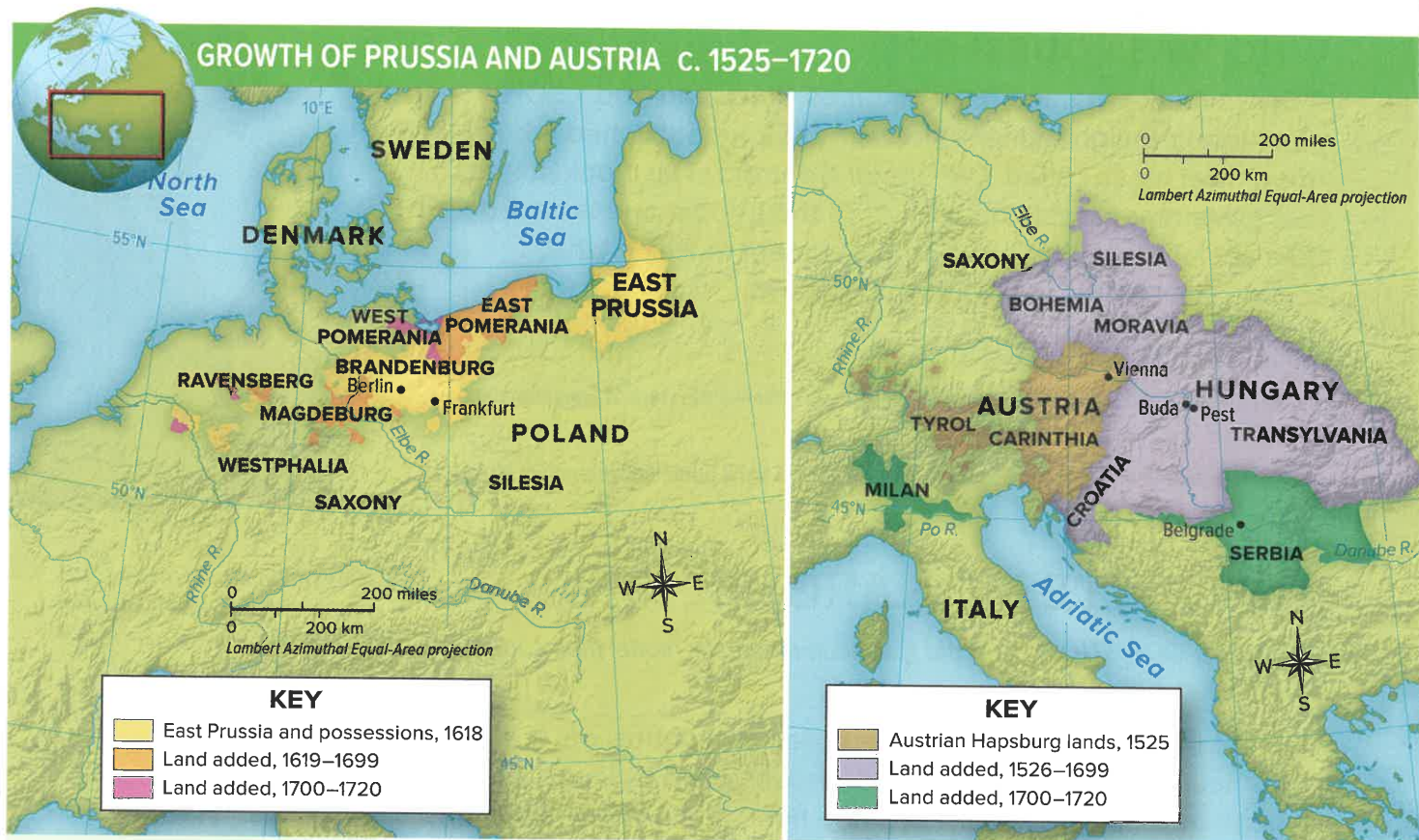

BIOGRAPHY

THOMAS JEFFERSON (1743–1826)

The Enlightenment inspired thinkers outside of Europe as well. In 1776 Thomas Jefferson represented the colony of Virginia at the Continental Congress, which was deliberating American independence. When the Congress asked Jefferson to help write a statement in favor of independence, Jefferson turned to the ideas of the Enlightenment for inspiration. Jefferson wrote in the Declaration of Independence, "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness." Jefferson's words echoed John Locke's ideas on natural rights including life, liberty, and property.

CITING TEXT EVIDENCE How did Jefferson's unalienable rights differ from Locke's natural rights?

SWEDEN

North Sea

DENMARK

Baltic Sea

55°N

10°E

EAST PRUSSIA

WEST POMERANIA
EAST POMERANIA

RAVENSBERG

BRANDENBURG
Berlin

MAGDEBURG
Frankfurt

POLAND

WESTPHALIA

Elbe R.

SILESIA

SAXONY

Rhine R.

Danube R.

50°N

45°N

KEY
☐ East Prussia and possessions, 1618
☐ Land added, 1619–1699
☐ Land added, 1700–1720

200 miles
200 km
Lambert Azimuthal Equal-Area projection

200 miles
200 km
Lambert Azimuthal Equal-Area projection

Elbe R.

SAXONY
SILESIA

BOHEMIA
MORAVIA

50°N

Rhine R.

Vienna

AUSTRIA
TYROL
CARINTHIA

Buda Pest
HUNGARY

TRANSYLVANIA

MILAN

45°N

Po R.

CROATIA

Belgrade

SERBIA
Danube R.

ITALY

Adriatic Sea

KEY
☐ Austrian Hapsburg lands, 1525
☐ Land added, 1526–1699
☐ Land added, 1700–1720

GEOGRAPHIC REASONING

The areas of Prussia and Austria gradually increased from the early 1500s to the early 1700s.

1. **EXPLORING REGIONS** During which time period did Austria add the most territory?

2. **SPATIAL THINKING** Which state had better access to the sea—Prussia or Austria? Explain.

Louis held all political authority in France. He is said to have boasted, "I am the State." Louis's army won wars that expanded the area of France. These conflicts, though, cost the country a large amount of money and soldiers. The king's constant wars and spending weakened France and the monarchy.

GERMAN RULERS

Germany consisted of many territories during the 1600s and 1700s. The two most powerful German states were Prussia and Austria. The most famous Prussian ruler was Frederick II, also called Frederick the Great. He ruled Prussia from 1740 to 1786. Frederick strengthened the army and fought wars to gain new lands for Prussia.

Although Frederick was an absolute monarch, he saw himself as "first servant of the state." He therefore dedicated himself to the good of his people. Frederick permitted more freedom of speech and religious tolerance.

The other German state, Austria, was ruled by the Hapsburg family. In 1740, a Hapsburg princess named Maria Theresa became the ruler of Austria. She introduced reforms. She set up schools and tried to improve the living conditions of the serfs, people who worked under the harsh rule of landowners.

After Maria Theresa died in 1780, her son, Joseph II, became ruler. He carried her reforms even further. He freed the serfs and made land taxes equal for nobles and farmers. The nobles

opposed his reforms. As a result, Joseph was forced to back down.

RUSSIA'S REFORMING CZARS

East of Austria, the vast empire of Russia was ruled by czars. Like the Ottomans, Safavids, and Mughals, Russian rulers began using gunpowder weapons in the 1400s and 1500s, first to unify their people, and then to build a vast empire in Asia. One of the most powerful czars was Peter I, also known as Peter the Great. Peter tried to make Russia a strong European power. He began reforms to help the government run more smoothly. Peter also improved Russia's **military** and created a navy.

Peter wanted Russia to have access to the Baltic Sea, but Sweden controlled the land. Peter went to war with Sweden in a conflict lasting 21 years. Russia won in 1721. Just three years after the war started, Peter founded the city of St. Petersburg (PEE•tuhrz•BUHRG). By 1712, this city was the Russian capital.

After Peter died, a series of weak monarchs governed Russia. Then, in 1762, a German princess named Catherine came to the throne. Catherine II expanded Russia's territory and became known as Catherine the Great. She supported the ideas of the Enlightenment and wanted to free the serfs. However, a serf revolt changed her mind. In the end, Catherine allowed the nobles to treat the serfs as they pleased.

In 1787, Catherine the Great and Joseph II traveled together through Southern Russia. An artist commemorated their trip with this oil painting, c. late 1700s.

SUMMARIZING What social reforms did both Joseph II and Catherine II seek for their countries?

✓ CHECKING FOR UNDERSTANDING

1. **EXPLAINING EFFECTS** How was Frederick the Great influenced by the Enlightenment?

2. **EXPLAINING ISSUES** What two philosophies did monarchs balance during the Age of Enlightenment?

LESSON 4 REVIEW AND ACTIVITIES

Time and Place

1. **DESCRIBING** With which Enlightenment thinkers did Frederick the Great appear to agree?

Building History-Social Science Analysis Skills

2. **EXPLAINING CAUSES** Why did Voltaire criticize the Roman Catholic Church?

3. **ANALYZING** Why was a biography of Thomas Jefferson included in this lesson?

4. **IDENTIFYING PATTERNS** How did Voltaire and Wollstonecraft build on the ideas of John Locke?

Writing About History

5. **ARGUMENTATIVE WRITING** You are an Enlightenment thinker who opposes the views of Thomas Hobbes. Write a short letter to Hobbes that explains to him why you agree or disagree with his ideas about government.

Collaborating

6. **COLLABORATING** As a class, discuss John Locke's belief in the social contract between the people and their leaders. Then collaborate in creating your own social contract, outlining the responsibilities and rights of teachers and administrators and those of the students. Include the consequences if one of the parties to the contract does not fulfill the requirements of the contract.

FOLDABLES **Study Organizer** Include this lesson's information in your Foldable®.

Heritage Images/Corbis/Getty Images

NEW IDEAS 1400–1750

The United States Declaration of Independence took its inspiration from a number of sources. Many of its ideas came from Enlightenment thinkers such as John Locke. However, it was also inspired by documents such as the Magna Carta and the English Bill of Rights. How did earlier legal texts influence the U.S. Declaration of Independence? What concerns did each document hope to address?

VOCABULARY

enjoin: to direct
vindication: justification
regal: related to a king or queen
ecclesiastical: related to the church
excessive: more than what is normal
freeholder: someone who owns land
endowed: given freely
institute: to establish
derive: to take from

PRIMARY SOURCE: CHARTER

MAGNA CARTA

In 1215, King John of England signed the Magna Carta to end a rebellion by his nobles. It gave the nobles certain rights and declared that the king was not above the law.

> ❝Wherefore it is our will, and we firmly **enjoin** [order], that the English Church be free, and that the men in our kingdom have and hold all the aforesaid liberties, rights, and concessions [compromises], well and peaceably, freely and quietly, fully and wholly, for themselves and their heirs, of us and our heirs, in all respects and in all places for ever, as is . aforesaid. An oath, moreover, has been taken, as well on our part as on the part of the barons, that all these conditions aforesaid shall be kept in good faith and without evil intent. Given under our hand—the above-named and many others being witnesses—in the meadow which is called Runnymede, between Windsor and Staines, on the fifteenth day of June, in the seventeenth year of our reign. ❞

ANALYZE THE TEXT

1. **CITING TEXT EVIDENCE** Where can you find evidence of the contents of the oath taken by the king?

2. **SUMMARIZING** Summarize the central idea of this excerpt.

PRIMARY SOURCE: LAW

THE ENGLISH BILL OF RIGHTS

After the Glorious Revolution, which overthrew King James II of England, the English Parliament passed a Bill of Rights in 1689. The law limited the power of the monarch and laid out the rights of Parliament and individuals.

> ❝And thereupon the said lords spiritual and temporal [secular] and Commons, pursuant [in accordance] to their respective [own] letters and elections, being new assembled in a full and free representation of this nation, taking into their most serious consideration the best means for attaining [achieving] the ends aforesaid, do in the first place (as their ancestors in like case have usually done), for the **vindication** [justification] and assertion of their ancient rights and liberties, declare:
>
> - 1. That the pretended power of suspending laws, or the execution of laws, by **regal** authority, without consent of parliament is illegal. . . .
>
> - 3. That the commission for erecting [establishing] the late court of commissioners for **ecclesiastical** [churchly] causes, and all other commissions and courts of like nature, are illegal and pernicious [harmful].
>
> - 4. That levying [taxing] money for or to the use of the crown by pretense of prerogative [false

claim of right], without grant of parliament, for longer time or in other manner than the same is or shall be granted, is illegal.

- 5. That it is the right of the subjects to petition the king, and all commitments and prosecutions for such petitioning are illegal. . . .
- 7. That the subjects which are Protestants may have arms for their defense suitable to their conditions, and as allowed by law.
- 8. That election of members of parliament ought to be free.
- 9. That the freedom of speech, and debates or proceedings in parliament, ought not to be impeached [challenged] or questioned in any court or place out of parliament.
- 10. That **excessive** bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.
- 11. That jurors ought to be duly impaneled and returned, and jurors which pass upon men in trials for high treason [betrayal of country] ought to be **freeholders**. . . . **99**

ANALYZE THE TEXT
1. **SUMMARIZING** Why did the lords write the Bill of Rights?
2. **ANALYZING STRUCTURE** What is the purpose of the numbered list in the English Bill of Rights?

UNITED STATES DECLARATION OF INDEPENDENCE

The United States Declaration of Independence declared the independence of the 13 colonies in America from Great Britain in 1776.

66We hold these truths to be self-evident, that all men are created equal, that they are **endowed** by their Creator with certain unalienable [impossible to take away] Rights, that among these are Life, Liberty and the pursuit of Happiness.—That to secure these rights, Governments are **instituted** among Men, **deriving** their just powers from the consent of the governed, —That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. **99**

ANALYZE THE TEXT
1. **IDENTIFYING CAUSES** According to the writer, why are governments instituted?
2. **EVALUATING ARGUMENTS** What argument is the writer making to justify declaring independence from Great Britain?

MULTIPLE PERSPECTIVES

What principles of the Magna Carta are also found in the English Bill of Rights and the United States Declaration of Independence? How are those receiving rights defined differently in the Magna Carta, the English Bill of Rights, and the U.S. Declaration of Independence? How are they defined similarly?

CHAPTER 9 Analysis Skills Activities

Write your answers on a separate piece of paper.

Thinking Like a Historian

1. **ANALYZING POINTS OF VIEW** Write an essay comparing and contrasting the lives and ideas of Thomas Hobbes and John Locke. What events led them to develop different points of view about government?

Understanding Time

2. **RELATING EVENTS** How did the events of the Scientific Revolution and the Enlightenment flow from ideas developed during the Renaissance?

Building Citizenship

3. **IDENTIFYING PATTERNS** What ideas of the Enlightenment influence our lives today? Create a short presentation that identifies three ideas of the Enlightenment that shape our lives in the twenty-first century.

Geographic Reasoning

Use the map to answer the following question.

4. **SPATIAL THINKING** Match the scientists and thinkers listed below with their countries.

   1. Voltaire   **3.** Locke   **5.** Leeuwenhoek

   2. Copernicus   **4.** Kepler   **6.** Boyle

EUROPE
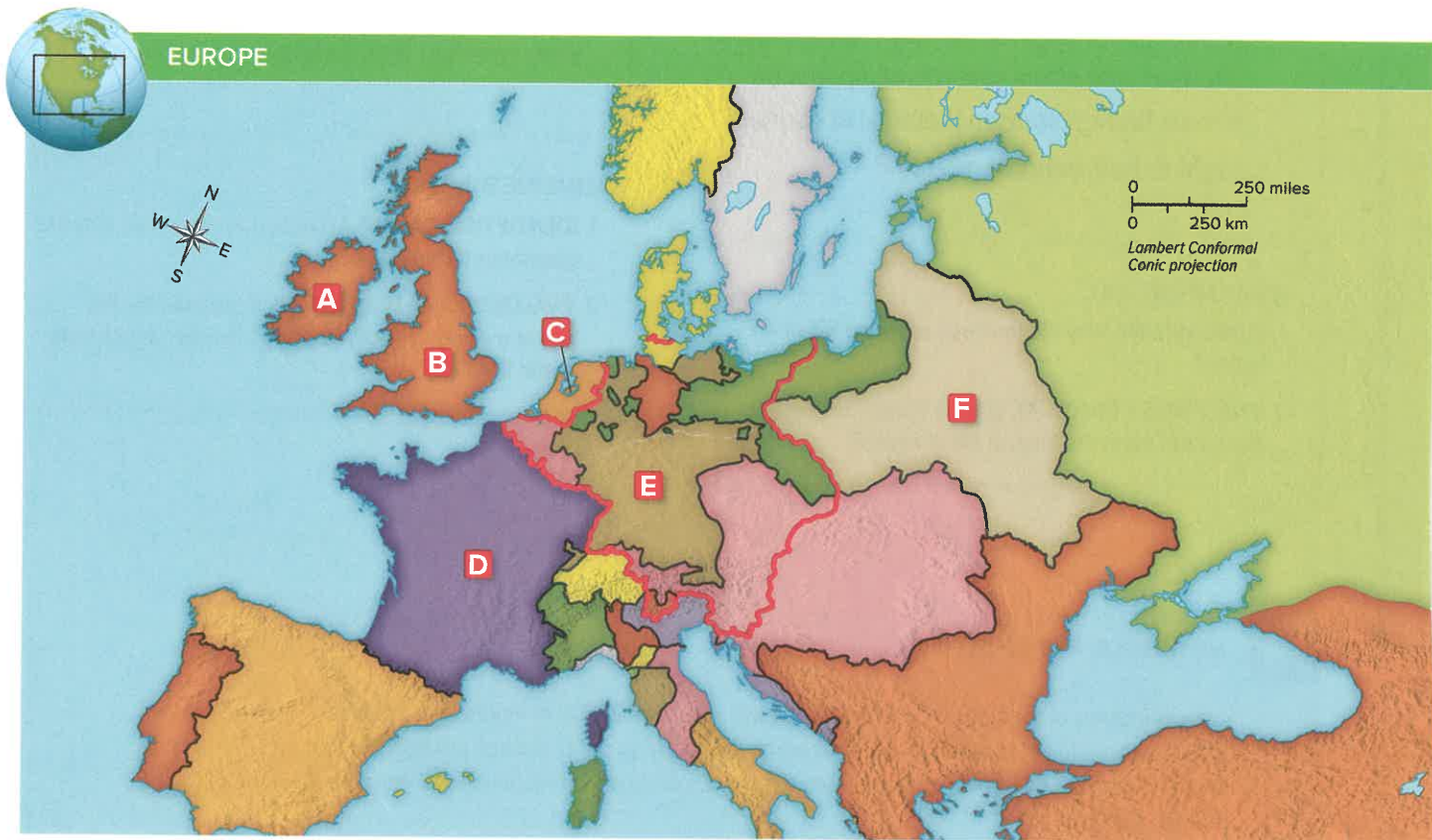
Assessment

Write your answers on a separate piece of paper.

Vocabulary Practice

1. Use each of the following terms in its own sentence.
   - A. secular
   - B. mercenary
   - C. humanism
   - D. diplomacy
   - E. urban
   - F. heliocentric
   - G. scientific method
   - H. absolutism
   - I. social contact
   - J. gravity

Short Answer

2. **CITING TEXT EVIDENCE** Why did Italy's states become important cultural centers during the Renaissance?

3. **DETERMINING CENTRAL IDEAS** How were Renaissance artists able to support themselves and their work?

4. **DESCRIBING** How did the methods of artists change as the Renaissance spread to northern Europe?

5. **IDENTIFYING PATTERNS** How did the ruling class change in Italy at the beginning of the Renaissance?

6. **DESCRIBING** What methods did Renaissance artists learn to use to make their art look natural?

7. **EXPLAINING ISSUES** Why did Renaissance writers choose to write in the vernacular rather than in Latin?

8. **DETERMINING CONTEXT** How did the ancient Greeks try to learn about the world? How was this different from the way that scientists such as Newton tried to learn about the world?

9. **RELATING EVENTS** Explain how one scientist built on the discoveries of a previous scientist to make new advances.

10. **ANALYZING POINTS OF VIEW** Why did the Catholic Church respond negatively to Copernicus and Galileo's discoveries?

11. **SUMMARIZING** What was the impact of Bacon's scientific method on the future of science?

12. **RELATING EVENTS** How is the age of Enlightenment related to the Scientific Revolution?

13. **EXPLAINING ISSUES** Why did Montesquieu believe that a government should separate its legislative, judicial, and executive powers?

14. **EXPLAINING EFFECTS** What effects did the Enlightenment have on women?

15. **IDENTIFYING EFFECTS** How did the Enlightenment influence European monarchs?

16. **IDENTIFYING CAUSES** Why did people become more secular during the Renaissance?

17. **EXPLAINING ISSUES** How did the Italians prevent threats from neighboring states?

18. **ASKING QUESTIONS** What questions might you ask to determine whether an individual was a humanist?

19. **CONTRASTING** How was movable type in Europe different from that in China?

20. **SUMMARIZING** How did Galen solve the problem of not being permitted to dissect dead human bodies?

Need Extra Help?

If You've Missed Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Review Lesson	1-4	1	1	2	1	2	2	3	3	3	3	4	4	4	4	1	1	2	2	3

Write your answers on a separate piece of paper.

Analyzing Primary Sources

Joseph Priestley, in *Experiments and Observations on Different Kinds of Air* 1776, writes about the discovery of oxygen.

66 [A]fter the above mentioned mixture of nitrous air and the air from mercurius calcinatus [a chemical reaction], had stood all night,. . .a candle burned in it, and even better than in common air.. . .If, however, I had not happened, for some other purpose, to have had a lighted candle before me, I should probably never have made the trial;. . .Still, however, having no conception of the real cause of this phenomenon, I considered it as something very extraordinary; but as a property that was peculiar to air that was extracted from these substances, and adventitious [unplanned]; and I always spoke of the air to my acquaintance as being substantially the same with common air.. . .I wanted a mouse to make the proof quite complete. . . .

I procured [obtained] a mouse, and put it into a glass vessel, containing two ounce-measures of the air from mercurius calcinatus. Had it been common air, a full-grown mouse, as this was, would have lived in it about a quarter of an hour. In this air, however, my mouse lived a full hour; and though it was taken out seemingly dead, it appeared to have been only exceedingly chilled; for, upon being held to the fire, it presently revived, and appeared not to have received any harm from the experiment. 99

21 DETERMINING MEANING Read the phrase from the excerpt:

66 Still, however, having no <u>conception</u> of the real cause of this phenomenon, I considered it as something very extraordinary; but as a property that was <u>peculiar</u> to air that was extracted from these substances, and adventitious [unplanned]; 99

Which of the following words could replace the underlined words in the phrase?
A. beginning, strange
B. understanding, unique
C. faith, common
D. expectation, normal

22 SUMMARIZING What is the purpose of the first paragraph?
A. to explain proper scientific methodology
B. to explain the steps of the mouse experiment
C. to explain why the author's theory was correct
D. to explain why the author conducted the mouse experiment

23 CITING TEXT EVIDENCE Which detail suggests that Priestley's first experiment produced something other than common air?
A. "mixture of nitrous air and the air from mercurius calcinatus"
B. "a candle burned in it, and even better than in common air"
C. "as being substantially the same with common air"
D. "two ounce-measures of the air from mercurius calcinatus"

24 DISTINGUISHING FACT AND OPINION Which of the following phrases from the excerpt is an opinion?
A. "having no conception of the real cause of this phenomenon"
B. "I considered it as something very extraordinary;"
C. "... upon being held to the fire, it presently revived"
D. "a full-grown mouse, as this was, would have lived in it about a quarter of an hour"

25 ANALYZING Read the following sentence from the excerpt.

66 Had it been common air, a full-grown mouse, as this was, would have lived in it about a quarter of an hour. In this air, however, my mouse lived a full hour. 99

Write a brief explanation of what this sentence means and how it relates to the writer's main point.

Extended Response Essay

26 NARRATIVE WRITING Write a description of a meeting in which Voltaire, Locke, and Wollstonecraft discuss and argue their viewpoints.

Need Extra Help?

If You've Missed Question	21	22	23	24	25	26
Review Lesson	3	3	3	3	3	4