

CHAPTER
22

Enlightenment and Revolution, 1550–1789

Connect History *and* Geography

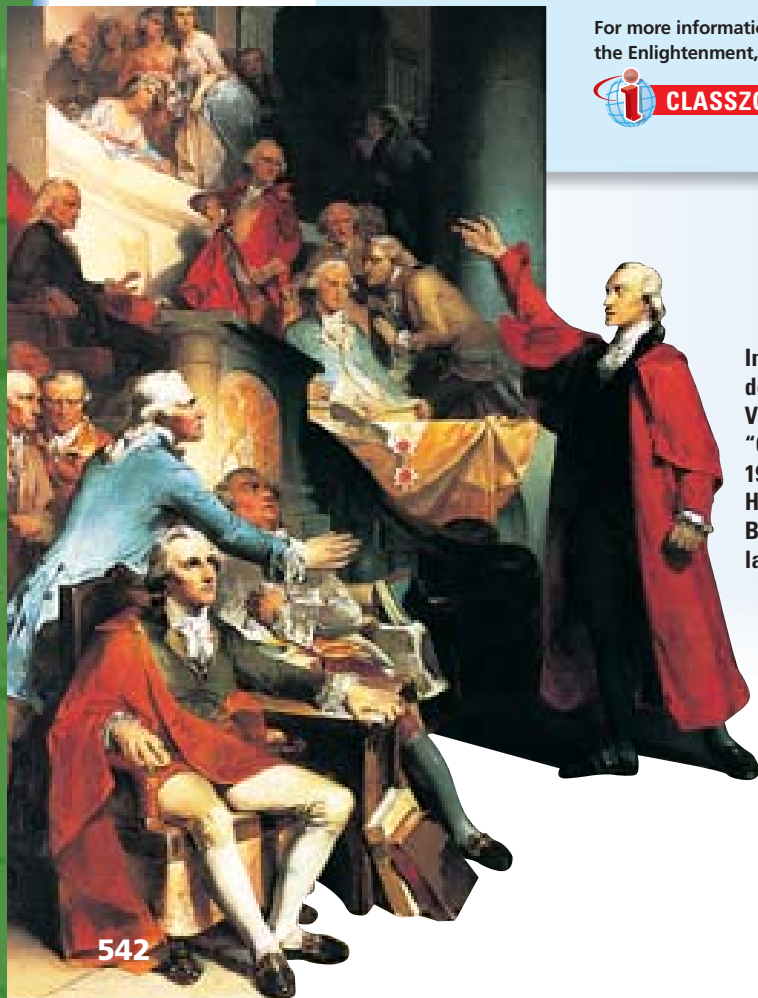
By the mid-18th century, new ideas about human society and government were sweeping across Europe. This intellectual movement, known as the Enlightenment, gave birth to revolutionary ideas like democracy and individual rights. The map at the right shows cities where Enlightenment ideas were flourishing in 1750. Use the map to help you answer the questions below.

1. What city in Brandenburg-Prussia was an Enlightenment center?
2. Where had Enlightenment ideas spread outside Europe?
3. What effect do you think those ideas had on the place you identified in question 2?

For more information about the scientific revolution, the Enlightenment, and the American Revolution . . .



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In 1775, the brilliant orator Patrick Henry delivered his now famous speech to the second Virginia Convention. In this speech he declared, "Give me liberty, or give me death!" In this 19th-century painting by artist Peter Rothenmel, Henry speaks before the Virginia House of Burgesses. He repeatedly spoke against British laws that restricted the colonists' rights.

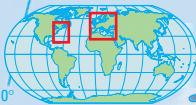
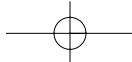
1543

Copernicus publishes heliocentric theory.

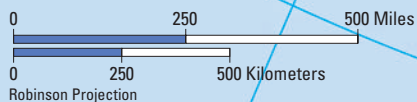
1609 Galileo

observes heavens through telescope.

1550



Centers of Enlightenment, 1750



1628
William Harvey describes heart function.

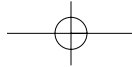
1687 Newton publishes treatise on law of gravity.

1690 John Locke defines natural rights.

1748 Montesquieu describes separation of powers.

1762
Catherine the Great rules Russia.

1789



Interact *with* History

It is the year 1633, and the Italian scientist Galileo Galilei faces a life-or-death dilemma. The Roman Inquisition, a court of the Catholic Church, has condemned him for holding an idea—that the earth revolves around the sun. The court has asked Galileo to publicly deny this idea. If he agrees, the court will show leniency. If he refuses, Galileo will likely face torture or a painful death.

The idea that the earth revolves around the sun had been put forth almost a century before by the Polish astronomer Copernicus. Galileo is firmly convinced that

Copernicus was right. Galileo has been looking through a telescope at the planets and stars. What he has seen with his own eyes is proof enough of Copernicus's theory.

The church has denounced Copernicus's theory as dangerous to the faith. The idea that the earth is the center of the universe is part of church teachings. Church leaders have warned Galileo to stop defending the new theory. But Galileo has written a book that explains why Copernicus's ideas make sense. Now he is on trial.

Put yourself in the place of Galileo as he weighs the choice the Inquisition has given him.



Galileo tries to defend himself before the Inquisition. The court, however, demands that he recant.

Would you deny an idea you know to be true?

EXAMINING *the* ISSUES

- By silencing Galileo, the church wanted to suppress an idea. Do you think this was an effective strategy? Can an idea have a life of its own?
- Are there times when an idea is too dangerous to be openly discussed or taught?
- Galileo faced persecution for teaching new ideas. Could this happen today?

Meet in small groups and discuss these questions. As you share ideas, recall other times in history when people expressed ideas that were different from accepted ones.

As you read this chapter, watch for the effects revolutionary ideas have on others.

1

The Scientific Revolution

TERMS & NAMES

- Scientific Revolution
- Nicolaus Copernicus
- heliocentric theory
- Johannes Kepler
- Galileo Galilei
- scientific method
- Francis Bacon
- René Descartes
- Isaac Newton

MAIN IDEA

In the mid-1500s, scientists began to question accepted beliefs and make new theories based on experimentation.

WHY IT MATTERS NOW

Scientists' questioning led to the development of the scientific method still in use today.

SETTING THE STAGE The Renaissance inspired a spirit of curiosity in many fields. Scholars began to question ideas that had been accepted for hundreds of years. During the Reformation, religious leaders challenged accepted ways of thinking about God and salvation. While the Reformation was taking place, another revolution in European thought was also occurring. It challenged how people viewed their place in the universe.

The Roots of Modern Science

Before 1500, scholars generally decided what was true or false by referring to an ancient Greek or Roman author or to the Bible. Whatever Aristotle said about the material world was true unless the Bible said otherwise. Few European scholars questioned the scientific ideas of the ancient thinkers or the church by carefully observing nature for themselves.

The Medieval View During the Middle Ages, most scholars believed that the earth was an unmoving object located at the center of the universe. According to that belief, the moon, the sun, and the planets all moved in perfectly circular paths around the earth. Beyond the planets lay a sphere of fixed stars, with heaven still farther beyond. Common sense seemed to support this view. After all, the sun appeared to be moving around the earth as it rose in the morning and set in the evening.

This earth-centered view of the universe, called the geocentric theory, was supported by more than just common sense. The idea came from Aristotle, the Greek philosopher of the fourth century B.C. The Greek astronomer Ptolemy expanded the theory in the second century A.D. In addition, Christianity taught that God had deliberately placed earth at the center of the universe. Earth was thus a special place on which the great drama of life took place.

A New Way of Thinking Beginning in the mid-1500s, a few scholars published works that challenged the ideas of the ancient thinkers and the church. As these scholars replaced old assumptions with new theories, they launched a change in European thought that historians call the Scientific Revolution. The **Scientific Revolution** was a new way of thinking about the natural world. That way was based upon careful observation and a willingness to question accepted beliefs.

A combination of discoveries and circumstances led to the Scientific Revolution and helped spread its impact. By the late Middle Ages, European scholars had translated many works by Muslim scholars. These scholars had compiled a storehouse of ancient and current scientific knowledge. Based on this knowledge, medieval universities added scientific courses in astronomy, physics, and mathematics.

During the Renaissance, scholars uncovered many classical manuscripts. They found that the ancient authorities often did not agree with each other. Moreover,



This drawing from an astrology text of 1531 shows the signs of the zodiac moving around the earth. It is based on Ptolemy's system, with the earth at the center.

THINK THROUGH HISTORY

A. Analyzing Issues

Why did most people believe the geocentric theory?

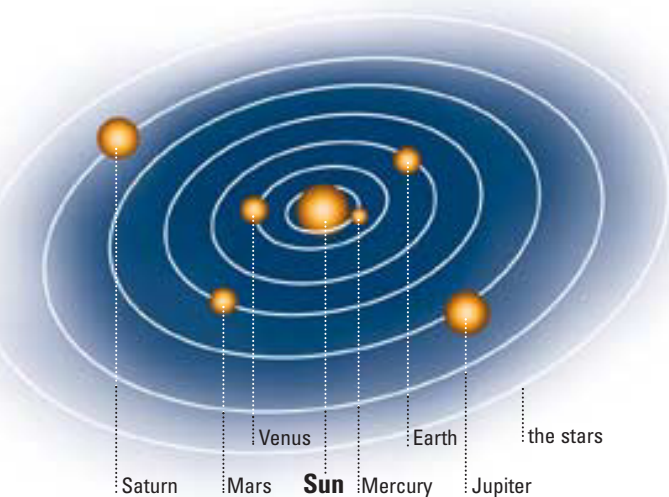
European explorers traveled to Africa, Asia, and the Americas. Such lands were inhabited by peoples and animals previously unknown in Europe. These discoveries opened Europeans to the possibility that there were new truths to be found. The invention of the printing press during this period helped spread challenging ideas—both old and new—more widely among Europe’s thinkers.

The age of European exploration also fueled a great deal of scientific research, especially in astronomy and mathematics. Navigators needed better instruments and geographic measurements, for example, to determine their location in the open sea. As scientists began to look more closely at the world around them, they made observations that did not match the ancient beliefs. They found they had reached the limit of the classical world’s knowledge. Yet, they still needed to know more.

This model shows how Copernicus saw the planets revolving around the sun—in perfect circles.

A Revolutionary Model of the Universe

The first major challenge to accepted scientific thinking came in the field of astronomy. The Scientific Revolution started when a small group of scholars began to question the geocentric theory.



The Heliocentric Theory Although backed by authority and common sense, the geocentric theory did not accurately explain the movements of the sun, moon, and planets. This problem troubled a Polish cleric and astronomer named **Nicolaus Copernicus** (koh-PUR-nuh-kuhs). In the early 1500s, Copernicus became interested in an old Greek idea that the sun stood at the center of the universe. After studying planetary movements for more than 25 years, Copernicus reasoned that indeed, the stars, the earth, and the other planets revolved around the sun.

Copernicus’s **heliocentric**, or sun-centered, **theory** still did not completely explain why the planets orbited the way they did. He also knew

that most scholars and clergy would reject his theory because it contradicted their religious views. Fearing ridicule or persecution, Copernicus did not publish his findings until 1543, the last year of his life. He received a copy of his book, *On the Revolutions of the Heavenly Bodies*, on his deathbed.

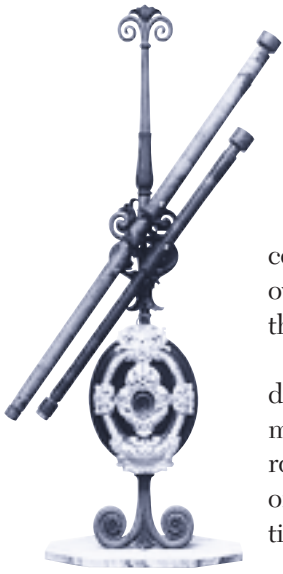
While revolutionary, Copernicus’s book caused little stir at first. Over the next century and a half, other scientists built on the foundations he had laid. A Danish astronomer, Tycho Brahe (TEE-koh brah), carefully recorded the movements of the planets for many years. Brahe produced mountains of accurate data based on his observations. However, it was left to his followers to make mathematical sense of them.

After Brahe’s death in 1601, his assistant, a brilliant mathematician named **Johannes Kepler**, continued his work. After studying Brahe’s data, Kepler concluded that certain mathematical laws govern planetary motion. One of these laws showed that the planets revolve around the sun in elliptical orbits instead of circles, as was previously thought. Kepler’s laws showed that Copernicus’s basic ideas were true. They demonstrated mathematically that the planets revolve around the sun.

Galileo’s Discoveries In 1581, a 17-year-old Italian student named **Galileo Galilei** sat in a cathedral closely watching a chandelier swing on its chain. Aristotle had said that a pendulum swings at a slower rhythm as it approaches its resting place. Using his beating pulse, Galileo carefully timed the chandelier’s swings. Aristotle’s idea was wrong. Instead, each swing of the pendulum took exactly the same amount of time. Galileo had discovered the law of the pendulum.

THINK THROUGH HISTORY
B. Clarifying How did Copernicus arrive at the heliocentric theory?

THINK THROUGH HISTORY
C. Recognizing Effects How did Kepler’s findings support the heliocentric theory?



Galileo used this telescope to observe the moon. He saw that the moon's surface is rough, not smooth as others thought.

In another study, Galileo found that a falling object accelerates at a fixed and predictable rate. Galileo also tested Aristotle's theory that heavy objects fall faster than lighter ones. According to legend, he dropped stones of different weights from the Leaning Tower of Pisa. He then calculated how fast each fell. Contrary to Aristotle's assumption, the objects fell at the same speed.

Later, Galileo learned that a Dutch lens maker had built an instrument that could enlarge far-off objects. Without seeing this device, Galileo successfully built his own telescope. After making some improvements, Galileo used his telescope to study the heavens in 1609.

Then in 1610, he published a series of newsletters called *Starry Messenger*, which described his astonishing observations. Galileo announced that Jupiter had four moons and that the sun had dark spots. He also noted that the earth's moon had a rough, uneven surface. His description of the moon's surface shattered Aristotle's theory that the moon and stars were made of a pure, perfect substance. Galileo's observations, as well as his laws of motion, also clearly supported the theories of Copernicus.

Conflict with the Church Galileo's findings frightened both Catholic and Protestant leaders because they went against church teaching and authority. If people believed the church could be wrong about this, they could question other church teachings as well.

In 1616, the Catholic Church warned Galileo not to defend the ideas of Copernicus. Although Galileo remained publicly silent, he continued his studies. Then, in 1632, he published *Dialogue Concerning the Two Chief World Systems*. This book presented the ideas of both Copernicus and Ptolemy, but it clearly showed that Galileo supported the Copernican theory. The pope angrily summoned Galileo to Rome to stand trial before the Inquisition.

Galileo stood before the court in 1633. Under the threat of torture, he knelt before the cardinals and read aloud a signed confession. In it, he agreed that the ideas of Copernicus were false.

A VOICE FROM THE PAST

With sincere heart and unpretended faith I abjure, curse, and detest the aforesaid errors and heresies [of Copernicus] and also every other error . . . contrary to the Holy Church, and I swear that in the future I will never again say or assert . . . anything that might cause a similar suspicion toward me.

GALILEO GALILEI, quoted in *The Discoverers*

Galileo was never again a free man. He lived under house arrest and died in 1642 at his villa near Florence. However, his books and ideas still spread all over Europe.

The Scientific Method

The revolution in scientific thinking that Copernicus, Kepler, and Galileo began eventually developed into a new approach to science called the scientific method. The **scientific method** is a logical procedure for gathering and testing ideas. It begins with a problem or question arising from an observation. Scientists next form a hypothesis, or unproved assumption. The hypothesis is then tested in an experiment or on the basis of data. In the final step, scientists analyze and interpret their data to reach a new conclusion. That conclusion either confirms or disproves the hypothesis.

The scientific method did not develop overnight. The work of two important thinkers of the 1600s, Francis Bacon and René Descartes, helped to advance the new approach.

Francis Bacon, an English politician and writer, had a passionate interest in science. He believed that by better understanding the world, scientists would generate practical knowledge that would improve people's lives. In his writings, Bacon attacked medieval

CONNECT to TODAY

The Vatican Clears Galileo

In 1992, Pope John Paul II officially acknowledged that Galileo was correct in asserting that the earth revolves around the sun. His pronouncement came after a 13-year study of Galileo's case by a Vatican science panel.

The panel concluded that church leaders were clearly wrong to condemn Galileo but that they had acted in good faith. They were working within the knowledge of their time, the panel said. Therefore, they could not see how Galileo's discoveries could go along with their interpretation of the Bible.



Nicolaus Copernicus began the Scientific Revolution with his heliocentric theory.

Major Steps in the Scientific Revolution

	<p>1572 Brahe discovers nova, or bright new star, which contradicts Aristotle's idea that universe is unchanging.</p>		<p>1609 Kepler publishes first two laws of planetary motion.</p> <p>1610 Galileo publishes <i>Starry Messenger</i>.</p>
<p>1543 Copernicus publishes heliocentric theory. Vesalius publishes human anatomy textbook.</p>		<p>1590 Janssen invents microscope.</p>	<p>1620 Bacon's book <i>Novum Organum (New Instrument)</i> encourages experimental method.</p>



This microscope dates from the 17th century.

scholars for relying too heavily on the conclusions of Aristotle and other ancient thinkers. He also criticized the way in which both Aristotle and medieval scholars arrived at their conclusions. They had reasoned from abstract theories. Instead, he urged scientists to experiment. Scientists, he wrote, should observe the world and gather information about it first. Then they should draw conclusions from that information. This approach is called empiricism, or the experimental method.

In France, **René Descartes** (day-KAHRT) also took a keen interest in science. He developed analytical geometry, which linked algebra and geometry. This provided an important new tool for scientific research.

Like Bacon, Descartes believed that scientists needed to reject old assumptions and teachings. As a mathematician, however, his approach to gaining knowledge differed from Bacon's. Rather than using experimentation, Descartes relied on mathematics and logic. He believed that everything should be doubted until proved by reason. The only thing he knew for certain was that he existed—because, as he wrote, "I think, therefore I am." From this starting point, he followed a train of strict reasoning to arrive at other basic truths.

Modern scientific methods are based on the ideas of Bacon and Descartes. Scientists have shown that observation and experimentation, together with general laws that can be expressed mathematically, can lead people to a better understanding of the natural world.

THINK THROUGH HISTORY
D. Contrasting How did Descartes's approach to science differ from Bacon's?

Changing Idea: Scientific Method

Old Science

Scholars generally relied on ancient authorities, church teachings, common sense and reasoning to explain the physical world.



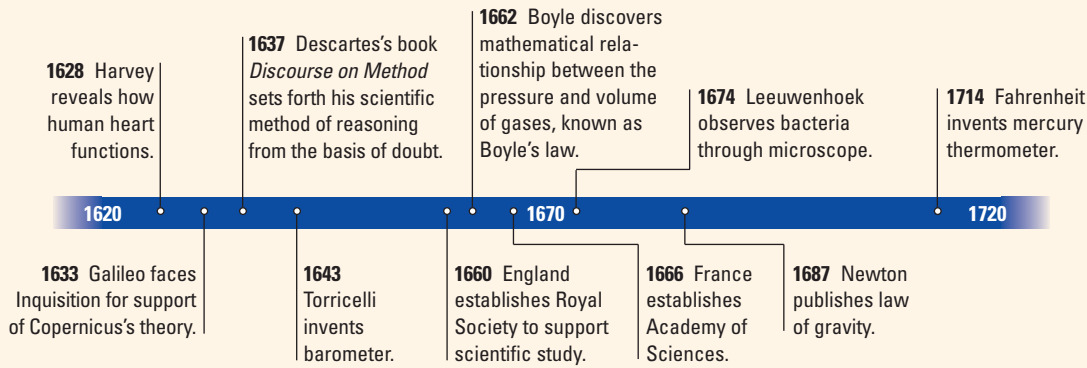
New Science

In time, scholars began to use observation, experimentation, and scientific reasoning to gather knowledge and draw conclusions about the physical world.

Newton Explains the Law of Gravity

By the mid-1600s, the accomplishments of Copernicus, Kepler, and Galileo had shattered the old views of astronomy and physics. Later, the great English scientist **Isaac Newton** helped to bring together their breakthroughs under a single theory of motion.

Newton studied mathematics and physics at Cambridge University. By the time he was 24, Newton was certain that all physical objects were affected equally by the same forces. Kepler had worked out laws for a planet's motion around the sun. Galileo had studied the motion of pendulums. Newton's great discovery was that the same force ruled the motions of the planets, the pendulum, and all matter on earth and in space.



Isaac Newton's law of gravity explained how the same physical laws governed motion both on the earth and in the heavens.

He disproved the idea of Aristotle that one set of physical laws governed earth and another set governed the rest of the universe.

THINK THROUGH HISTORY
E. Clarifying Why was the law of gravitation important?

The key idea that linked motion in the heavens with motion on the earth was the law of universal gravitation. According to this law, every object in the universe attracts every other object. The degree of attraction depends on the mass of the objects and the distance between them.

In 1687, Newton published his ideas in a work called *Mathematical Principles of Natural Philosophy*—one of the most important scientific books ever written. The universe he described was like a giant clock. Its parts all worked together perfectly in ways that could be expressed mathematically. Newton believed that God was the creator of this orderly universe, the clockmaker who had set everything in motion.

The Scientific Revolution Spreads

After astronomers explored the secrets of the universe, other scientists began to study the secrets of nature on earth. Careful observation and the use of the scientific method eventually became important in many different fields.

Scientific Instruments Scientists developed new tools and instruments to make the precise observations that the scientific method demanded. The first microscope was invented by a Dutch maker of eyeglasses, Zacharias Janssen (YAHN-suhn), in 1590. In the 1670s, a Dutch drapery merchant and amateur scientist named Anton van Leeuwenhoek (LAY-vuhn-HUK) used a microscope to observe bacteria swimming in tooth scrapings. He also saw red blood cells for the first time. His examination of grubs, maggots, and other such organisms showed that they did not come to life spontaneously, as was previously thought. Rather, they were immature insects.

In 1643, one of Galileo's students, Evangelista Torricelli (TAWR-uh-CHEHL-ee), developed the first mercury barometer, a tool for measuring atmospheric pressure and predicting weather. In 1714, the Dutch physicist Gabriel Fahrenheit (FAR-uhn-HYT) made the first thermometer to use mercury in glass. Fahrenheit's thermometer showed water freezing at 32°. A Swedish astronomer, Anders Celsius (SEHL-see-uhs), created another scale for the mercury thermometer in 1742. Celsius's scale showed freezing at 0°.

Medicine and the Human Body During the Middle Ages, European doctors had accepted as fact the writings of an ancient Greek physician named Galen. However, Galen had never dissected the body of a human being. Instead, he had studied the anatomy of pigs and other animals. Galen assumed that human anatomy was much the same. Galen's assumptions were proved wrong by Andreas Vesalius, a Flemish physician. Vesalius dissected human corpses (despite disapproval of this practice) and published his observations. His book, *On the Fabric of the Human Body* (1543), was filled with detailed drawings of human organs, bones, and muscle.



Daily Life

Smallpox Inoculations

In the 1600s and 1700s, few words raised as much dread as *smallpox*. This contagious disease killed many infants and young children and left others horribly scarred.

In the early 1700s, an English writer named Lady Mary Wortley Montagu observed women in Turkey deliberately inoculating their young children against smallpox. They did this by breaking the skin and applying some liquid taken from the sore of a victim.

Children who were inoculated caught smallpox, but they had a good chance of getting only a mild case. This protected them from ever having the disease again.

Lady Montagu bravely had her son inoculated. She brought the procedure back to Britain, and from there it spread all over Europe.

An English doctor named William Harvey continued Vesalius's work in anatomy. In 1628, he published *On the Motion of the Heart and Blood in Animals*, which showed that the heart acted as a pump to circulate blood throughout the body. He also described the function of blood vessels.

In the late 1700s, British physician Edward Jenner introduced a vaccine to prevent smallpox. Inoculation using live smallpox germs had been practiced in Asia for centuries. While beneficial, this technique was also dangerous. Jenner discovered that inoculation with germs from a cattle disease called cowpox gave permanent protection from smallpox for humans. Because cowpox was a much milder disease, the risks for this form of inoculation were much lower. Jenner used cowpox to produce the world's first vaccination.

Discoveries in Chemistry Robert Boyle pioneered the use of the scientific method in chemistry. He is considered the founder of modern chemistry. In a book called *The Sceptical Chymist* (1661), Boyle challenged Aristotle's idea that the physical world consisted of four elements—earth, air, fire, and water. Instead, Boyle proposed that matter was made up of smaller primary particles that joined together in different ways. Boyle's most famous contribution to chemistry is Boyle's law. This law explains how the volume, temperature, and pressure of gas affect each other.

Another chemist, Joseph Priestley, separated one pure gas from air in 1774. He noticed how good he felt after breathing this special air and watched how alert two mice were while breathing it. Wrote Priestley, "Who can tell but that, in time, this pure air may become a fashionable article of luxury? Hitherto only two mice and I have had the privilege of breathing it." Meanwhile, in France, Antoine Lavoisier (lah-vwah-ZYAY) was performing similar experiments. In 1779, Lavoisier named the newly discovered gas oxygen.

Other scholars and philosophers applied a scientific approach to other areas of life. Believing themselves to be orderly, rational, and industrious, they thought of themselves as enlightened. They would become the leaders of a new intellectual and social movement called the Enlightenment.

Vocabulary

inoculation: injecting a germ into a person's body so as to create an immunity to the disease.

Section 1 Assessment

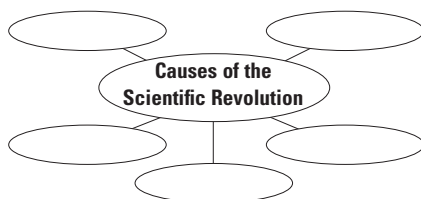
1. TERMS & NAMES

Identify

- Scientific Revolution
- Nicolaus Copernicus
- heliocentric theory
- Johannes Kepler
- Galileo Galilei
- scientific method
- Francis Bacon
- René Descartes
- Isaac Newton

2. TAKING NOTES

Use a web diagram such as the one below to show the events and circumstances that led to the Scientific Revolution.



3. DRAWING CONCLUSIONS

"If I have seen farther than others," said Newton, "it is because I have stood on the shoulders of giants." Who were the giants to whom Newton was referring? Could this be said of any scientific accomplishment? Explain.

4. THEME ACTIVITY

Science & Technology Working in groups of three or four, create a Scientific Revolution Discovery Board. Use these categories: Astronomy, Science, Medicine, Chemistry, Biology. Include important people, ideas, accomplishments.

2

The Enlightenment in Europe

MAIN IDEA

A revolution in intellectual activity changed Europeans' view of government and society.

WHY IT MATTERS NOW

Freedoms and some forms of government in many countries today are a result of Enlightenment thinking.

TERMS & NAMES

- Enlightenment
- social contract
- John Locke
- natural rights
- philosophe
- Voltaire
- Montesquieu
- separation of powers
- Jean Jacques Rousseau
- Mary Wollstonecraft

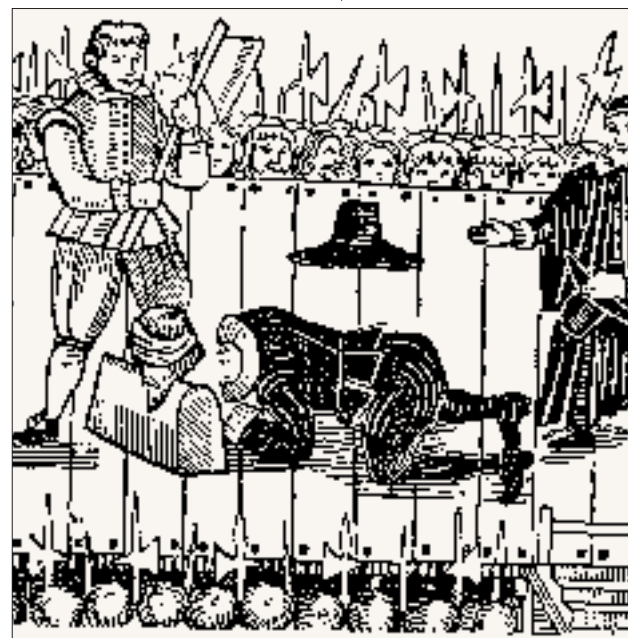
SETTING THE STAGE The influence of the Scientific Revolution soon spread beyond the world of science. Philosophers admired Newton because he had used reason to explain the laws governing nature. People began to look for laws governing human behavior as well. They hoped to apply reason and the scientific method to all aspects of society—government, religion, economics, and education. In this way, the ideas of the Scientific Revolution paved the way for a new movement called the **Enlightenment**, or the Age of Reason. This movement reached its height in the mid-1700s.

Two Views on Government

The Enlightenment started from some key ideas put forth by two English political thinkers of the 1600s, Thomas Hobbes and John Locke. Both men experienced the political turmoil of England early in that century. However, they came to very different conclusions about government and human nature.

Hobbes's Social Contract Thomas Hobbes expressed his views in a work called *Leviathan* (1651). The horrors of the English Civil War convinced him that all humans were naturally selfish and wicked. Without governments to keep order, Hobbes said, there would be “war of every man against every man.” In this state of nature, as Hobbes called it, life would be “solitary, poor, nasty, brutish, and short.”

Hobbes argued that to escape such a bleak life, people gave up their rights to a strong ruler. In exchange, they gained law and order. Hobbes called this agreement, by which people created government, the **social contract**. Because people acted in their own self-interest, Hobbes said, the ruler needed total power to keep citizens under control. The best government was one that had the awesome power of a leviathan (sea monster). In Hobbes's view, such a government was an absolute monarchy, which could impose order and demand obedience.



This engraving depicts the beheading of Charles I. Hobbes developed his political ideas out of the violent events in England in the early 1600s.

THINK THROUGH HISTORY

A. Clarifying

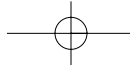
According to Hobbes, why would people want to live under the rule of an absolute monarch?

THINK THROUGH HISTORY

B. Contrasting How does Locke's view of human nature differ from that of Hobbes?

Locke's Natural Rights The philosopher **John Locke** held a different, more positive, view of human nature. He believed that people could learn from experience and improve themselves. As reasonable beings, they had the natural ability to govern their own affairs and to look after the welfare of society. Locke criticized absolute monarchy and favored the idea of self-government.

According to Locke, all people are born free and equal, with three **natural rights**—life, liberty, and property. The purpose of government, said Locke, is to protect these rights. If a government fails to do so, citizens have a right to overthrow it. Locke



Changing Idea: The Right to Govern

Old Idea

A monarch's rule is justified by divine right.



New Idea

A government's power comes from the consent of the governed.

published his ideas in 1690, two years after the Glorious Revolution. His book, *Two Treatises on Government*, served to justify the overthrow of James II.

Locke's theory had a deep influence on modern political thinking. His statement that a government's power comes from the consent of the people is the foundation of modern democracy. The ideas of government by popular consent and the right to rebel against unjust rulers helped inspire struggles for liberty in Europe and the Americas.

HISTORYMAKERS



Voltaire
1694–1778

Voltaire corresponded with several European monarchs and nobles. Among them was the Prussian king Frederick II. At the king's invitation, Voltaire spent three years at Frederick's palace. At first, the two men seemed like ideal companions. Both were witty. Both cared nothing for appearances and dressed in shabby, rumpled clothes. Each friend paid the other elegant compliments.

Before long, however, the king and the philosophe got on each other's nerves. Voltaire disliked editing Frederick's mediocre poetry. Frederick suspected Voltaire of some shady business dealings. Eventually, Voltaire tried to sneak away, but Prussian soldiers captured him and made him spend the night in jail.

After returning to France, Voltaire described the Prussian king as "a nasty monkey, perfidious friend, [and] wretched poet." Frederick returned the abuse, calling Voltaire a "miser, dirty rogue, [and] coward."

The Philosophes Advocate Reason

The Enlightenment reached its height in France in the mid-1700s. Paris became the meeting place for people who wanted to discuss politics and ideas. The social critics of this period in France were known as **philosophes** (FIHL-uh-SAHFS), the French word for philosophers. The philosophes believed that people could apply reason to all aspects of life—just as Isaac Newton had applied reason to science. Five important concepts formed the core of their philosophy:

1. **Reason** Enlightened thinkers believed truth could be discovered through reason or logical thinking. Reason, they said, was the absence of intolerance, bigotry, or prejudice in one's thinking.
2. **Nature** The philosophes referred to nature frequently. To them, what was natural was also good and reasonable. They believed that there were natural laws of economics and politics just as there were natural laws of motion.
3. **Happiness** A person who lived by nature's laws would find happiness, the philosophes said. They were impatient with the medieval notion that people should accept misery in this world to find joy in the hereafter. The philosophes wanted well-being on earth, and they believed it was possible.
4. **Progress** The philosophes were the first Europeans to believe in progress for society. Now that people used a scientific approach, they believed, society and humankind could be perfected.
5. **Liberty** The philosophes envied the liberties that the English people had won in their Glorious Revolution and Bill of Rights. In France, there were many restrictions on speech, religion, trade, and personal travel. Through reason, the philosophes believed, society could be set free.

Voltaire Combats Intolerance Probably the most brilliant and influential of the philosophes was François Marie Arouet. Using the pen name **Voltaire**, he published more than 70 books of political essays, philosophy, history, fiction, and drama.

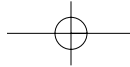
Voltaire often used satire against his opponents. He made frequent targets of the clergy, the aristocracy, and the government. His sharp tongue made him enemies at the French court, and twice he was sent to prison. After his second jail term, Voltaire was exiled to England for two years. There, Voltaire came to admire the English government much more than his own. After he returned to Paris,

THINK THROUGH HISTORY

C. Comparing How were the philosophes' views similar to Locke's?

Vocabulary

satire: irony, sarcasm, or wit used to attack folly, vice, or stupidity.



much of his work mocked the laws and customs of France. He even dared to raise doubts about the Christian religion. The French king and France's Catholic bishops were outraged. In 1734, fearing another unpleasant jail term, Voltaire fled Paris.

Although he made powerful enemies, Voltaire never stopped fighting for tolerance, reason, freedom of religious belief, and freedom of speech. He used his quill pen as if it were a deadly weapon in a thinker's war against humanity's worst enemies—intolerance, prejudice, and superstition. Such attitudes were, he said, *l'infâme*—infamous or evil things. He often ended his letters with a fighting slogan, "*Écrasez l'infâme!*" (ay-crah-ZAY lahn-FAM). The phrase meant "Crush the evil thing!"

Montesquieu and the Separation of Powers Another influential French writer, the Baron de **Montesquieu** (MAHN-tuh-SKYOO), devoted himself to the study of political liberty. An aristocrat and lawyer, Montesquieu studied the history of ancient Rome. He concluded that Rome's collapse was directly related to its loss of political liberties.

Like Voltaire, Montesquieu believed that Britain was the best-governed country of his own day. Here was a government, he thought, in which power was balanced among three groups of officials. The British king and his ministers held executive power. They carried out the laws of the state. The members of Parliament held legislative, or lawmaking, power. The judges of the English courts held judicial power. They interpreted the laws to see how each applied to a specific case. Montesquieu called this division of power among different branches **separation of powers**.

Montesquieu oversimplified the British system (it did not actually separate powers this way). His idea, however, became a part of his most famous book, *On the Spirit of Laws* (1748). In his book, Montesquieu proposed that separation of powers would keep any individual or group from gaining total control of the government. "Power," he wrote, "should be a check to power." Each branch of government would serve as a check on the other two. This idea later would be called "checks and balances."

Montesquieu's book was admired by political leaders in the British colonies of North America. His ideas about separation of powers and checks and balances became the basis for the United States Constitution.



"Power should be a check to power."

Baron de Montesquieu

THINK THROUGH HISTORY

D. Analyzing Issues

What advantages did Montesquieu see in the separation of powers?

Changing Idea: Government Powers

Old Idea

Monarch rules with absolute authority.

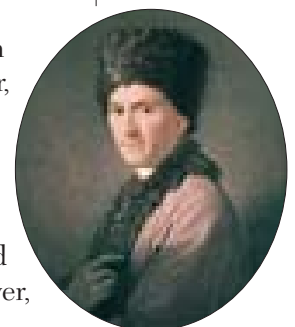


New Idea

Separation of government powers among executive, legislative, and judicial branches.

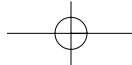
Rousseau: Champion of Freedom A third great philosophe, **Jean Jacques Rousseau** (roo-SOH), was passionately committed to individual freedom. The son of a poor Swiss watchmaker, Rousseau worked as an engraver, music teacher, tutor, and secretary. Eventually, Rousseau made his way to Paris and won recognition as a writer of essays. There he met and befriended other philosophes, although he felt out of place in the circles of Paris high society in which they traveled.

A strange, brilliant, and controversial figure, Rousseau strongly disagreed with other Enlightenment thinkers on many matters. Most philosophes believed that reason, science, and art would improve life for all people. Rousseau, however, argued that civilization corrupted people's natural goodness. "Man is born free, and everywhere he is in chains," he wrote. In the earliest times, according to Rousseau, people had lived as free and equal individuals in a primitive "state of nature." As people became civilized, however, the strongest among them forced everyone else to obey unjust laws. Thus, freedom and equality were destroyed.



"Man is born free, and everywhere he is in chains."

Jean Jacques Rousseau



Rousseau believed that the only good government was one that was freely formed by the people and guided by the “general will” of society—a direct democracy. Under such a government, people agree to give up some of their freedom in favor of the common good. In 1762, he explained his political philosophy in a book called *The Social Contract*.

A VOICE FROM THE PAST

The heart of the idea of the social contract may be stated simply: Each of us places his person and authority under the supreme direction of the general will, and the group receives each individual as an indivisible part of the whole. . . .

In order that the social contract may not be a mere empty formula, everyone must understand that any individual who refuses to obey the general will must be forced by his fellows to do so. This is a way of saying that it may be necessary to force a man to be free; freedom in this case being obedience to the will of all.

JEAN JACQUES ROUSSEAU, *The Social Contract*

Rousseau’s view of the social contract differed greatly from that of Hobbes. For Hobbes, the social contract was an agreement between a society and its government. For Rousseau, it was an agreement among free individuals to create a society and a government.

Like Locke, Rousseau argued that legitimate government came from the consent of the governed. However, Rousseau believed in a much broader democracy than Locke had stood for. He argued that all people were equal and that titles of nobility should be abolished. Rousseau’s ideas inspired many of the leaders of the French Revolution who overthrew the monarchy in 1789.

Beccaria Promotes Criminal Justice An Italian philosophe named Cesare Bonesana Beccaria (BAYK-uh-REE-ah) turned his thoughts to the justice system. He believed that laws existed to preserve social order, not to avenge crimes. In his celebrated book *On Crimes and Punishments* (1764), Beccaria railed against common abuses of justice. They included torturing of witnesses and suspects, irregular proceedings in trials, and punishments that were arbitrary or cruel. He argued that a person accused of a crime should receive a speedy trial, and that torture should never be used. Moreover, he said, the degree of punishment should be based on the seriousness of the crime. He also believed that capital punishment should be abolished.

THINK THROUGH HISTORY

E. Clarifying Where does authority rest, in Rousseau’s view of the social contract?

THINK THROUGH HISTORY

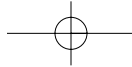
F. Summarizing What reforms did Beccaria recommend?

Major Ideas of the Enlightenment

Idea	Thinker	Impact
Natural rights—life, liberty, property	Locke	Fundamental to U.S. Declaration of Independence
Separation of powers	Montesquieu	France, United States, Latin American nations use separation of powers in new constitutions
Freedom of thought and expression	Voltaire	Guaranteed in U.S. Bill of Rights and French Declaration of the Rights of Man and Citizen; European monarchs reduce or eliminate censorship
Abolishment of torture	Beccaria	Guaranteed in U.S. Bill of Rights; torture outlawed or reduced in nations of Europe and the Americas
Religious freedom	Voltaire	Guaranteed in U.S. Bill of Rights and French Declaration of the Rights of Man and Citizen; European monarchs reduce persecution
Women’s equality	Wollstonecraft	Women’s rights groups form in Europe and North America

SKILLBUILDER: Interpreting Charts

1. What important documents reflect the influence of Enlightenment ideas?
2. In your opinion, which are the two most important Enlightenment ideas? Support your answer with reasons.



Beccaria based his ideas about justice on the principle that governments should seek the greatest good for the greatest number of people. His ideas influenced criminal law reformers in Europe and North America.

Women and the Enlightenment

The philosophes challenged many assumptions about government and society. But they often took a traditional view toward women. Rousseau, for example, developed many progressive ideas about education. However, he believed that a girl's education should mainly teach her how to be a helpful wife and mother. Other male social critics scolded women for reading novels because they thought it encouraged idleness and wickedness. Still, some male writers argued for more education for women and for women's equality in marriage.

Women writers also tried to improve the status of women. In 1694, the English writer Mary Astell published *A Serious Proposal to the Ladies*. Her book addressed the lack of educational opportunities for women. In later writings, she used Enlightenment arguments about government to criticize the unequal relationship between men and women in marriage. She wrote, "If absolute sovereignty be not necessary in a state, how comes it to be so in a family? . . . If all men are born free, how is it that all women are born slaves?"

During the 1700s, other women picked up these themes. Among the most persuasive was **Mary Wollstonecraft**, who published an essay called *A Vindication of the Rights of Woman* in 1792. In the essay, she disagreed with Rousseau that women's education should be secondary to men's. Rather, she argued that women, like men, need education to become virtuous and useful. Even if they are to be mothers, education will make them better mothers. Wollstonecraft also believed that women not only should be able to be nurses but also should be able to become doctors. She also argued for women's right to participate in politics.

Women made important contributions to the Enlightenment in other ways. In Paris and other European cities, wealthy women helped spread Enlightenment ideas through social gatherings called salons. (The importance of salons is discussed later in this chapter.)

One woman fortunate enough to receive education in the sciences was Emilie du Châtelet (shah-tlay). Du Châtelet was an aristocrat trained as a mathematician and physicist. By translating Newton's work from Latin into French, she helped stimulate interest in science in France.

Impact of the Enlightenment

Over a span of a few decades, Enlightenment writers challenged long-held ideas about society. They examined such principles as the divine right of monarchs, the union of church and state, and unequal social classes. They held these beliefs up to the light of reason and found them unreasonable.

The philosophes mainly lived in the world of ideas. They formed and popularized new theories. Although they encouraged European monarchs to make reforms, they were not active revolutionaries. However, their theories eventually inspired the American and French revolutions and other revolutionary movements in the 1800s. Enlightenment thinking produced three other long-term effects that helped shape Western civilization.

HISTORY MAKERS



Mary Wollstonecraft
1759–1797

In *A Vindication of the Rights of Woman*, Mary Wollstonecraft argued that women deserved the same rights as men. "Let women share the rights and she will emulate [imitate] the virtues of men; for she must grow more perfect when emancipated," she wrote. The key to gaining equality and freedom, she argued, was better education.

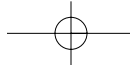
Wollstonecraft herself received little formal education. She and her two sisters taught themselves by studying books at home. With her sisters, she briefly ran a school. These experiences shaped her thoughts about education.

After joining a London publisher, Wollstonecraft met many leading radicals of the day. One of them was her future husband, the writer Richard Godwin. She died at age 38, after giving birth to their daughter, Mary. This child, whose married name was Mary Wollstonecraft Shelley, went on to write the classic novel *Frankenstein*.

THINK THROUGH HISTORY

G. Drawing

Conclusions Why do you think the issue of education was important to both Astell and Wollstonecraft?



Daily Life

Attitudes Toward Children

Before the mid-1700s, people commonly believed that children were naturally sinful. Parents raised their children with a harsh hand and treated them like miniature adults.

During the Enlightenment, such attitudes changed. People believed children should be better educated and could be allowed to mature into adulthood. Parents lessened the use of corporal punishment and increased play time.

By 1780, there was a new market for rocking horses, jigsaw puzzles, and baby clothes. In Britain, the first Mother Goose book of nursery rhymes appeared. Books like *The Newtonian System of the Universe Digested for Young Minds* by Tom Telescope appeared in print. Children even began to get discount tickets to museums and curiosity shows.

Belief in Progress The first effect was a belief in progress. Pioneers such as Galileo and Newton had discovered the key for unlocking the mysteries of nature in the 1500s and 1600s. With the door thus opened, the growth of scientific knowledge seemed to quicken in the 1700s. Scientists made key new discoveries in chemistry, physics, biology, and mechanics. The successes of the Scientific Revolution gave people the confidence that human reason could solve social problems. Philosophes and reformers urged an end to the practice of slavery. They also argued for more social equality and improvements in education. Through reason, a better society was possible.

A More Secular Outlook A second outcome was the rise of a more secular, or worldly, outlook. During the Enlightenment, people began to openly question their religious beliefs and the teachings of the church. Before the Scientific Revolution, people accepted the mysteries of the universe as the mysteries of God. One by one, scientists discovered that these mysteries could be explained mathematically. Newton himself was a deeply religious man, and he sought to reveal God's majesty through his work. However, his findings caused some people to change the way they thought about God.

Voltaire and other critics attacked some of the beliefs and practices of organized Christianity. They wanted to rid religious faith of superstition and fear and promote tolerance of all religions.

Importance of the Individual Faith in science and in progress produced a third outcome—the rise of individualism. As people began to turn away from the church and royalty for guidance, they looked to themselves instead.

The philosophes encouraged people to use their own ability to reason in order to judge what is right or wrong. They also emphasized the importance of the individual in society. Government, they argued, was

formed by individuals to promote their welfare. The British thinker Adam Smith extended the emphasis on the individual to economic thinking. He believed that individuals acting in their own self-interest created economic progress. Smith's theory is discussed in detail in Chapter 25.

During the Enlightenment, reason took center stage. The greatest minds of Europe followed each other's work with interest and often met to discuss their ideas. Some of the kings and queens of Europe were also very interested. As you will learn in Section 3, they sought to apply some of the philosophes' ideas to create progress in their countries.

Section 2 Assessment

1. TERMS & NAMES

Identify

- Enlightenment
- social contract
- John Locke
- natural rights
- philosophe
- Voltaire
- Montesquieu
- separation of powers
- Jean Jacques Rousseau
- Mary Wollstonecraft

2. TAKING NOTES

In a chart like the one below, list the important ideas of Hobbes, Locke, Voltaire, Montesquieu, Rousseau, Beccaria, and Wollstonecraft.

Thinker	Key Idea

Choose one of these thinkers and write a paragraph on how his or her ideas are influential today.

3. SYNTHESIZING

For each of the statements below, identify who said it and explain what it means. Then say how each viewpoint reflects Enlightenment ideas.

- "Power should be a check to power."
- "Man is born free, and everywhere he is in chains."
- "Let women share the rights and she will emulate the virtues of men."

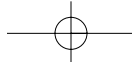
4. ANALYZING THEMES

Power and Authority

Compare the views of Hobbes, Locke, and Rousseau on government. How do their differing ideas reflect their understanding of human behavior?

THINK ABOUT

- how each philosopher viewed the "state of nature"
- what each considered the source of a government's authority



different PERSPECTIVES

European Values

Writers and artists of the Enlightenment often used satire to comment on European values. Using wit and humor, they ridiculed ideas and customs for the purpose of improving society. Satire allowed artists to explore human faults and failings in a way that is powerful but not preachy. In the two literary excerpts and the drawing below, notice how the writer or artist makes his point.

LITERATURE

Voltaire

Voltaire wrote *Candide* (1759) to attack a philosophy called Optimism, which held that all is right with the world. The hero of the story, a young man named Candide, encounters the most awful disasters and human evils as he travels far and wide. In this passage, Candide has met a slave in Surinam, a Dutch colony in South America. The slave explains why he is missing a leg and a hand.

“When we’re working at the sugar mill and catch our finger in the grinding-wheel, they cut off our hand. When we try to run away, they cut off a leg. I have been in both of these situations. This is the price you pay for the sugar you eat in Europe. . . .

“The Dutch fetishes [i.e., missionaries] who converted me [to Christianity] tell me every Sunday that we are all the sons of Adam, Whites and Blacks alike. I’m no genealogist, but if these preachers are right, we are all cousins born of first cousins. Well, you will grant me that you can’t treat a relative much worse than this.”

ENGRAVING

Francisco Goya

The Spanish artist Francisco Goya issued a series of 80 engravings called *Los Caprichos* (*Caprices*) in 1797. In them, he criticized a range of “human errors and evils” and also satirized Spanish politics and society. In the image shown here, titled “Out Hunting for Teeth,” Goya attacks superstition. He wrote this caption for the image:

The teeth of a man who has been hung are indispensable for casting a spell. Without this ingredient, nothing succeeds. A pity that people believe such nonsense.



LITERATURE

Jonathan Swift

The narrator of *Gulliver’s Travels* (1726), an English doctor named Lemuel Gulliver, takes four disastrous voyages that leave him stranded in strange lands. In the following passage, Gulliver tries to win points with the king of Brobdingnag—a land of giants—by offering to show him how to make guns and cannons. The reaction of the king, who is above such things, shows how Swift felt about the inhuman side of the human race.

[I told the king that] a proper quantity of this powder [gunpowder] rammed into a hollow tube of brass or iron . . . would drive a ball of iron or lead with such violence and speed, as nothing was able to sustain its force. That, the largest balls thus discharged, would not only destroy whole ranks of an army at once; but batter the strongest walls to the ground; sink down ships with a thousand men in each, to the bottom of the sea; and when linked together by a chain, would cut through masts and rigging; divide hundreds of bodies in the middle, and lay all waste before them. . . .

The king was struck with horror at the description I had given of those terrible engines. . . . He was amazed how so impotent and grovelling an insect as I (these were his expressions) could entertain such inhuman ideas, and in so familiar a manner as to appear wholly unmoved at all the scenes of blood and desolation, which I had painted as the common effects of those destructive machines; whereof, he said, some evil genius, enemy to mankind, must have been the first contriver [inventor].



Connect to History

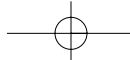
Clarifying Write a statement that summarizes the main point each writer and artist is making. What techniques do they use to reinforce their messages?

 SEE SKILLBUILDER HANDBOOK, PAGE R3

Connect to Today

Writing Imagine you are an alien visitor to your school or community. Write a letter or a narrative that describes how the people you see think and behave. Make sure your letter is free of spelling or grammatical errors.

 **CD-ROM** For another perspective on the Enlightenment, see *World History: Electronic Library of Primary Sources*.



3

The Spread of Enlightenment Ideas

TERMS & NAMES

- salon
- baroque
- neoclassical
- enlightened despot
- Catherine the Great

MAIN IDEA

Enlightenment ideas spread through the Western world and profoundly influenced the arts and government.

WHY IT MATTERS NOW

An “enlightened” problem-solving approach to government and society prevails in modern civilization today.

SETTING THE STAGE The philosophes’ views often got them in trouble. In France it was illegal to criticize either the Catholic Church or the government. Many philosophes landed in jail or were exiled. Voltaire, for example, experienced both punishments. Nevertheless, Enlightenment ideas spread throughout Europe.

A World of Ideas

In the 1700s, Paris was the cultural and intellectual capital of Europe. Young people from around Europe—and also from the Americas—came to study, philosophize, and enjoy fine culture. The brightest minds of the age gathered there. From their circles radiated the ideas of the Enlightenment.

The Paris Salons The buzz of Enlightenment ideas was most intense in the mansions of several wealthy women of Paris. There, in their large drawing rooms, these hostesses held regular social gatherings called **salons**. At these events, philosophers, writers, artists, scientists, and other great intellectuals met to discuss ideas and enjoy artistic performances.

The most influential of the salon hostesses in Voltaire’s time was Marie-Thérèse Geoffrin (zhuh-frehn). Self-educated and from the well-to-do middle class, Madame Geoffrin was friends with both philosophes and heads of state. She corresponded with the king of Sweden and Catherine the Great of Russia.

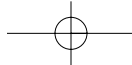
Diderot’s Encyclopedia Madame Geoffrin also helped finance the project of a leading philosophe named Denis Diderot (DEE-duh-ROH). Diderot imagined a large set of books to which all the leading scholars of Europe would contribute articles and essays.

This *Encyclopedia*, as he called it, would bring together all the most current and enlightened thinking about science, technology, art, government, and more.

Diderot began publishing the first volumes in 1751.

This painting by Anicet Charles Lemonnier shows a salon in the home of Madame Geoffrin (inset, and seated third from right). The guests are listening to an actor reading aloud from a new play.





THINK THROUGH HISTORY

A. Making

Inferences In what ways did the *Encyclopedia* project reflect the Age of Enlightenment?

The Enlightenment views expressed in the articles soon angered both the French government and the Catholic Church. Their censors banned the work. They said it undermined royal authority, encouraged a spirit of revolt, and fostered “moral corruption, irreligion, and unbelief.” Fearing arrest, some leading philosophes withdrew from the project and urged Diderot to quit. Diderot pressed on, however, and finally won permission to continue publishing the *Encyclopedia*. New volumes came out regularly under his editorship until 1772.

New Ideas Circulate The salons and the *Encyclopedia* helped spread Enlightenment ideas to educated people all over Europe. The enlightened thinkers of Europe considered themselves part of an intellectual community. They shared their ideas through books, personal letters, visits back and forth, and magazine articles. As one writer of the day described the flurry of communication, “Never have new ideas had such rapid circulation at such long distance.”

Enlightenment ideas also eventually reached middle-class people through newspapers, pamphlets, and even political songs. Enlightenment ideas about government and equality attracted the attention of a growing literate middle class. This group had money but limited status and political power. With their money, middle-class people could afford to buy many books and support the work of artists. Through its purchasing power, this group had growing influence over European culture in the 1700s.



This detail of *Seated Woman with Book*, by French artist Jean-Baptiste Chardin, shows a middle-class woman whose interests include reading. In the 1700s, the middle class had more leisure time for such pursuits.

Art and Literature in the Age of Reason

The Enlightenment ideals of order and reason were reflected in the arts—music, literature, painting, and architecture. European art of the 1600s and early 1700s had been dominated by the style called **baroque**—a grand, ornate style. Monarchs had built elaborate palaces such as Versailles (see page 521). Musicians like the German composer Johann Sebastian Bach and the English composer George Frederick Handel had written dramatic organ and choral music. Artists had created paintings rich in color, detail, and ornate imagery.

Under the influence of the Enlightenment, styles began to change. The arts began to reflect the new emphasis on order and balance. Artists and architects worked in a simple and elegant style that borrowed ideas and themes from classical Greece and Rome. The style of the late 1700s is therefore called **neoclassical** (“new classical”). In music, the style of this period is called classical.

THINK THROUGH HISTORY

B. Contrasting

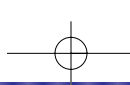
How does the art of the baroque and classical periods differ in style?

Classical Music Three composers in Vienna, Austria, rank among the greatest figures of the classical period in music. They were Franz Joseph Haydn, Wolfgang Amadeus Mozart, and Ludwig van Beethoven.

Haydn was particularly important in developing new musical forms, such as the sonata and symphony. Mozart was a gifted child who began composing music at the age of five and gave concerts throughout Europe as a youth. At 12, he wrote his first opera. Mozart’s great operas—*The Marriage of Figaro*, *Don Giovanni*, and *The Magic Flute*—set a new standard for elegance and originality. Although he lived only to age 35, he wrote more than 600 musical works.

Beethoven showed enormous range in his work. He wrote beautiful piano music, string quartets, and stirring symphonies. Beethoven’s earlier works were in the same classical style as Mozart’s. However, his later compositions began new trends, which carried music into the Age of Romanticism.

Popularity of the Novel Writers in the 18th century also developed new styles and forms of literature. A number of European authors began writing novels—lengthy works of prose fiction. These books were popular with a wide middle-class audience,



HISTORY THROUGH ART: **Fine Art**

Art in the Age of Enlightenment

The Enlightenment influenced many European painters of the middle and late 1700s. Increasingly, artists looked for inspiration in the material world—in nature and human nature. Some artists showed an Enlightenment interest in science and social issues in their work. Others emphasized a new sensitivity toward individuals.

The Individual

The French painter Elisabeth-Louise Vigée-Le Brun was one of the most celebrated portrait artists of the late 1700s. She was the favorite painter of Queen Marie Antoinette of France. Her portraits bring out the personalities of her subjects. Her own energy, success, and independence also reflected the Enlightenment spirit. These qualities shine through this detail of a self-portrait with her daughter.



The Promise of Science

The English artist Joseph Wright of Derby was fascinated by science and its impact on people's lives. The painting below, *Philosopher Giving a Lecture on the Orrery*, shows children and adults gazing into a miniature planetarium. The way Wright uses light in this picture makes a point about how science can educate and enlighten people.



Politics and Society

The English artist William Hogarth often used satire in his paintings. In the painting above, *Canvassing for Votes—The Election*, he comments on political corruption. While the candidate flirts with the ladies on the balcony, his supporters offer a man money for his vote. Hogarth's detailed, realistic style and moralistic topics were meant—like the popular novels of his day—to appeal to a wide middle-class audience.

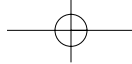
Connect to History

Analyzing Issues Imagine you are a philosophe who moonlights as an art critic. For each of these paintings, write a brief statement about how it reflects Enlightenment ideas.

 SEE SKILLBUILDER HANDBOOK, PAGE R12

Connect to Today

Updating a Picture Choose one of the paintings on this page and think about how you might change it to depict politics, science, or people today. You might describe the modern version in words or using a sketch or other kind of artwork.



who liked the entertaining stories written in everyday language. Writers—including many women—turned out a flood of popular novels in the 1700s.

English novelists such as Samuel Richardson and Henry Fielding developed many of the features of the modern novel. Their works had carefully crafted plots, used suspense and climax, and explored their characters' thoughts and feelings. Richardson's *Pamela* is often considered the first true English novel. It told the story of a young servant girl who refused the advances of her master. In Fielding's comic masterpiece *Tom Jones*, the hero of the book is an orphan who has been kicked out of his adopted home. He travels all over England and overcomes numerous obstacles to win the hand of his lady.

A third popular English novelist was Daniel Defoe, author of the adventure *Robinson Crusoe*. Crusoe is a sailor stranded on a tropical island. Through his wits and the help of a native he calls Friday, Crusoe learns how to survive on the island and is eventually rescued.

Enlightenment and Monarchy

From the salons, artists' studios, and concert halls of Europe, the Enlightenment spirit also swept through Europe's royal courts. Many philosophes, including Voltaire, believed that the best form of government was a monarchy in which the ruler respected the people's rights. The philosophes tried to convince monarchs to rule justly. Some monarchs embraced the new ideas and made reforms that reflected the Enlightenment spirit. They became known as **enlightened despots**. *Despot* means absolute ruler.

THINK THROUGH HISTORY

C. Analyzing

Motives Why did the enlightened despots undertake reforms?

The enlightened despots supported the philosophes' ideas. But they also had no intention of giving up any power. The changes they made were motivated by two desires: they wanted to make their countries stronger and their own rule more effective. The foremost of Europe's enlightened despots were Frederick II of Prussia, Holy Roman Emperor Joseph II of Austria, and Catherine the Great of Russia.

Frederick the Great Frederick II, the king of Prussia from 1740 to 1786, once wrote to Voltaire: "I must enlighten my people, cultivate their manners and morals, and make them as happy as human beings can be, or as happy as the means at my disposal permit." Frederick indeed committed himself to reforming Prussia. He granted many religious freedoms, reduced censorship, and improved education. He also reformed the justice system and abolished the use of torture. However, Frederick's changes only went so far. For example, he believed that serfdom was wrong, but he did nothing to end it. This was because he needed the support of wealthy landowners. As a result, he never challenged the power of the Junkers or tried to change the existing social order.

Perhaps Frederick's most important contribution was his attitude toward being king. He called himself "the first servant of the state." From the beginning of his reign, he made it clear that his goal was to serve and strengthen his country. This attitude was clearly one that appealed to the philosophes.

Changing Idea: Relationship Between Ruler and State

Old Idea

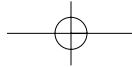
The state and its citizens exist to serve the monarch—as Louis XIV reportedly said, "I am the state."



New Idea

The monarch exists to serve the state and support citizens' welfare—as Frederick the Great said, a ruler is only "the first servant of the state."

Joseph II The most radical royal reformer was Joseph II of Austria. The son and successor of Maria Theresa, Joseph II ruled Austria from 1780 to 1790. He introduced legal reforms and freedom of the press. He also supported freedom of worship—even for Protestants, Orthodox Christians, and Jews. In his most radical reform, Joseph abolished serfdom and ordered that peasants be paid for their labor with cash. Not



HISTORYMAKERS



Catherine the Great
1729–1796

Catherine was the daughter of a minor German prince. At age 15, she was summoned to the distant Russian court at St. Petersburg. She was to marry the Grand Duke Peter, heir to the Russian throne.

The marriage between Catherine and Peter was a disaster. Peter was mentally unstable. His chief pleasure was playing with toy soldiers. More than once he tormented his own dogs.

Catherine soon saw that Peter's weakness gave her a chance to seize power. She made important friends among Russia's army officers, and she became known as the most intelligent and best-informed person at court. In 1762, only months after her husband became czar as Peter III, Catherine had him arrested and confined. Soon afterward, Peter conveniently died, probably by murder.

surprisingly, the nobles firmly resisted this change. Like many of Joseph's reforms, it was undone after his death.

Catherine the Great The ruler most admired by the philosophes was Catherine II, known as **Catherine the Great**. She ruled Russia from 1762 to 1796. The well-educated empress read the works of philosophes, and she exchanged many letters with Voltaire. She ruled with absolute authority, but she also took steps to modernize and reform Russia.

In 1767, Catherine formed a commission to review Russia's laws. She presented it with a brilliant proposal for reforms based on the ideas of Montesquieu and Beccaria. Among other changes, she recommended allowing religious toleration and abolishing torture and capital punishment. Her commission, however, accomplished none of these lofty goals.

Catherine eventually put in place limited reforms, but she did little to improve the life of the Russian peasants. Her thinking about enlightened ideas changed after a massive uprising of serfs in 1773. With great brutality, Catherine's army crushed the rebellion. Catherine had previously favored an end to serfdom. However, the revolt convinced her that she needed the nobles' support to keep her throne. Therefore, she gave the nobles absolute power over the serfs. As a result, Russian serfs lost their last traces of freedom.

Catherine Expands Russia Peter the Great had fought for years to win a port on the Baltic Sea. Likewise, Catherine sought access to the Black Sea. In two wars with the Ottoman Turks, her armies finally won control of the northern shore of the Black Sea. Russia also gained the right to send ships through Ottoman-controlled straits leading from the Black Sea to the Mediterranean Sea.

Catherine also expanded her empire westward into Poland. In Poland, the king was relatively weak, and independent nobles held the most power. The three neighboring powers—Russia, Prussia, and Austria—each tried to assert their influence over the country. In 1772, these land-hungry neighbors each took a piece of Poland in what is called the First Partition of Poland. In further partitions in 1793 and 1795, they grabbed up the rest of Poland's territory. With these partitions, Poland disappeared from the map of Europe. It did not reappear as an independent

country until after World War I.

By the end of her remarkable reign, Catherine had vastly enlarged the Russian empire. Meanwhile, as Russia was becoming an international power, another great power, Britain, faced a challenge in its 13 American colonies. Inspired by Enlightenment ideas, colonial leaders decided to cast off British rule and found an independent republic.

THINK THROUGH HISTORY

D. Synthesizing

How accurately does the term *enlightened despot* describe Catherine the Great? Explain.

Section 3 Assessment

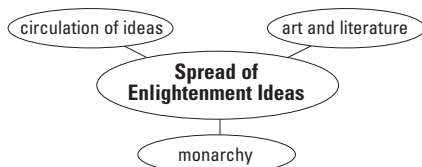
1. TERMS & NAMES

Identify

- salon
- baroque
- neoclassical
- enlightened despot
- Catherine the Great

2. TAKING NOTES

Copy the concept web shown below and add to it examples that illustrate the concepts.



Write two generalizations about the spread of Enlightenment ideas.

3. DRAWING CONCLUSIONS

What advantages do you think salons had over earlier forms of communication in spreading new ideas? Justify your response with specific references to the text.

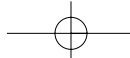
THINK ABOUT

- who hosted the salons and where they were held
- who was invited to the salons
- church and state influence on publishing and education

4. THEME ACTIVITY

Power and Authority

Imagine you are a public relations consultant for Frederick the Great, Joseph II, or Catherine the Great. The monarch you represent wants to be named "Most Enlightened Despot of the 1700s." Write a press release or design a poster or flyer that presents reasons why your client should be given this honor.



4

American Revolution: The Birth of a Republic

TERMS & NAMES

- Declaration of Independence
- Thomas Jefferson
- checks and balances
- federal system
- Bill of Rights

MAIN IDEA

Enlightenment ideas helped spur the American colonies to create a new nation.

WHY IT MATTERS NOW

The revolution created a republic, the United States of America, that became a model for many nations of the world.

SETTING THE STAGE Philosophes such as Voltaire considered England's government the most progressive in Europe. England's ruler was no despot, not even an enlightened one. His power had been limited by law. The Glorious Revolution of 1688 had given England a constitutional monarchy. However, while the English monarch's power was being limited at home, the power of the English nation was spreading overseas.

Britain and Its American Colonies

When George III became king of Great Britain in 1760, his Atlantic coastal colonies were growing by leaps and bounds. Their combined population went from about 250,000 in 1700 to 2,150,000 in 1770, an eightfold increase. Economically, the colonies thrived on trade with the nations of Europe.

Along with increasing population and prosperity, a new sense of identity was growing in the colonists' minds. By the mid-1700s, colonists had been living in America for nearly 150 years. Each of the 13 colonies had its own government, and people were used to a great degree of independence. Colonists saw themselves less as British and more as Virginians or Pennsylvanians. However, they were still British subjects and were expected to obey British law.

In the 1660s, Parliament had passed trade laws called the Navigation Acts. These laws prevented colonists from selling their most valuable products to any country except Britain. In addition, colonists had to pay high taxes on imported French and Dutch goods. However, colonists found ways to get around these laws. Some merchants smuggled in goods to avoid paying British taxes. Smugglers could sneak in and out of the many small harbors all along the lengthy Atlantic coastline. British customs agents found it difficult to enforce the Navigation Acts.

For many years, Britain felt no need to tighten its hold on the colonies. Despite the smuggling, Britain's mercantilist policies had made colonial trade very profitable. Britain bought American raw materials for low prices and sold manufactured goods to the colonists. And despite British trade restrictions, colonial merchants also thrived. However, after the French and Indian War ended in 1763, Britain toughened its trade laws. These changes sparked growing anger in the colonies.

Americans Win Independence

In 1760, when George III took the throne, most Americans had no thoughts of either revolution or independence. They still thought of themselves as loyal subjects of the British king. Yet by 1776, many Americans were willing to risk their lives to break free of Britain.

During the French and Indian War, Great Britain had run up a huge debt in the war against France. Because American colonists benefited from Britain's victory, Britain expected the colonists to help pay the costs of the war. In 1765, Parliament passed the Stamp Act. According



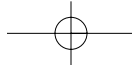
Many educated colonists were influenced by Enlightenment thought. This French snuff box pictures (left to right) Voltaire, Rousseau, and colonial statesman Benjamin Franklin.

THINK THROUGH HISTORY

A. Recognizing Effects How did some colonists respond to the Navigation Acts?

Background

The French and Indian War was the part of the Seven Years' War fought in North America.



to this law, colonists had to pay a tax to have an official stamp put on wills, deeds, newspapers, and other printed material.

American colonists were outraged. They had never paid taxes directly to the British government before. Colonial lawyers argued that the stamp tax violated colonists' natural rights. In Britain, citizens consented to taxes through their representatives in Parliament. Because the colonists had no such representatives, Parliament could not tax them. The colonists demonstrated their defiance of this tax with angry protests and a boycott of British manufactured goods. The boycott proved so effective that Parliament gave up and repealed the Stamp Act in 1766.

Growing Hostility Leads to War Over the next decade, further events steadily led to war. Some colonial leaders, such as Boston's Samuel Adams, favored independence from Britain. They encouraged conflict with British authorities. At the same time, George III and his ministers made enemies of many moderate colonists by their harsh stands. In 1773, to protest an import tax on tea, Adams organized a raid against three British ships in Boston Harbor. The raiders dumped 342 chests of tea into the water. George III, infuriated by the "Boston Tea Party," as it was called, ordered the British navy to close the port of Boston. British troops occupied the city.

In September 1774, representatives from every colony except Georgia gathered in Philadelphia to form the First Continental Congress. This group protested the treatment of Boston. When the king paid little attention to their complaints, all 13 colonies decided to form the Second Continental Congress to debate their next move.

On April 19, 1775, British soldiers and American militiamen exchanged gunfire on the village green in Lexington, Massachusetts. The fighting spread to nearby Concord. When news of the fighting reached the Second Continental Congress, its members voted to raise an army under the command of a Virginian named George Washington. The American Revolution had begun.

Enlightenment Ideas Influence American Colonists Although a war had begun, the American colonists still debated their attachment to Great Britain. Many colonists wanted to remain part of Britain. A growing number, however, favored independence. They heard the persuasive arguments of colonial leaders such as Patrick Henry, John Adams, and Benjamin Franklin. These leaders used Enlightenment ideas to justify independence. The colonists had asked for the same political rights as people in Britain, they said, but the king had stubbornly refused. Therefore, the colonists were justified in rebelling against a tyrant who had broken the social contract.

In July 1776, the Second Continental Congress issued the **Declaration of Independence**. This document, written by **Thomas Jefferson**, was firmly based on the ideas of John Locke and the Enlightenment. The Declaration reflected these ideas in its eloquent argument for natural rights.

A VOICE FROM THE PAST

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; that to secure these Rights, Governments are instituted among Men, deriving their just Powers from the Consent of the Governed.

Declaration of Independence

Since Locke had asserted that people had the right to rebel against an unjust ruler, the Declaration of Independence included a long list

THINK THROUGH HISTORY

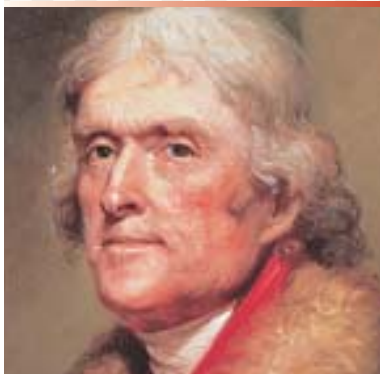
B. Analyzing

Causes How did the French and Indian War lead to the Stamp Act?

Vocabulary

boycott: refusal to buy goods produced in a certain place or by a certain group.

HISTORY MAKERS



Thomas Jefferson
1743–1826

The author of the Declaration of Independence, Thomas Jefferson of Virginia was a true figure of the Enlightenment. As a writer and statesman, he supported free speech, religious freedom, and other civil liberties. At the same time, he was also a slave owner.

Outside of politics, Jefferson was accomplished in many fields, including law, science, agriculture, and languages. He invented many practical devices, including an improved type of plow. One of the great architects of early America, he designed his magnificent home, Monticello. He also designed the Virginia state capitol building in Richmond and many buildings for the University of Virginia.

Of all his many achievements, Jefferson wanted to be most remembered for three: author of the Declaration of Independence, author of the Statute of Virginia for Religious Freedom, and founder of the University of Virginia.

THINK THROUGH HISTORY

C. Comparing

How do Jefferson's "unalienable rights" compare with the natural rights expressed by Locke?



of George III's abuses. The document ended by breaking the ties between the colonies and Britain. The colonies, the Declaration said, "are absolved from all allegiance to the British crown."

Success for the Colonists When war was first declared, the odds seemed heavily weighted against the Americans. Washington's ragtag, poorly trained army faced the well-trained forces of the most powerful country in the world. In the end, however, the Americans won their war for independence.

Several reasons explain their success. First, the Americans' motivation for fighting was much stronger than that of the British, since their army was defending their homeland. Second, the overconfident British generals made several mistakes. Third, time itself was on the side of the Americans. The British could win battle after battle, as they did, and still lose the war. Fighting an overseas war, 3,000 miles from London, was terribly expensive. After a few years, tax-weary British citizens clamored for peace.

Finally, the Americans did not fight alone. Louis XVI of France had little sympathy for the ideals of the American Revolution, but he was eager to weaken France's rival, Britain. French entry into the war in 1778 was decisive. In 1781, combined forces of about 9,500 Americans and 7,800 French trapped a British army commanded by Lord Cornwallis near Yorktown, Virginia. Unable to escape, Cornwallis surrendered. The Americans were victorious.



GEOGRAPHY SKILLBUILDER: Interpreting Maps

- Region** What feature formed the western border of the United States?
- Human-Environment Interaction** What European countries had claims on the North American continent in 1783?

Changing Idea: Colonial Attachment to Britain

Old Idea

American colonists considered themselves as subjects of the British king.



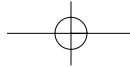
New Idea

After a long train of perceived abuses by the king, the colonists asserted their right to declare independence.

Americans Create a Republic

Shortly after declaring their independence, the 13 individual states recognized the need for a national government. As victory became certain, in 1781 all 13 states ratified a constitution. This plan of government was known as the Articles of Confederation. The Articles established the United States as a republic—a government in which citizens rule through elected representatives.

The Articles Create a Weak National Government To protect their authority, the 13 states created a loose confederation in which they held most of the power. Thus, the Articles of Confederation deliberately created a weak national government.



There were no executive or judicial branches. Instead, the Articles established only one body of government, the Congress. Each state, regardless of size, had one vote in Congress. Congress could declare war, enter into treaties, and coin money. It had no power, however, to collect taxes or regulate trade. Passing new laws was difficult because laws needed the approval of 9 of the 13 states.

These limits on the national government soon produced many problems. Although the new national government needed money in order to operate, it could only request contributions from the states. Angry Revolutionary War veterans bitterly complained that Congress still owed them back pay. Meanwhile, several states issued their own money. Some states even put tariffs on goods from neighboring states.

The nation's growing financial problems sparked a violent protest in Massachusetts. Debt-ridden farmers, led by a war veteran named Daniel Shays, demanded that the state lower taxes and issue paper money so that they could repay their debts. When the state refused, the rebels attacked several courthouses. Massachusetts authorities quickly crushed Shays's Rebellion.

A New Constitution Concerned leaders such as George Washington and James Madison believed that Shays's Rebellion underscored the need for a strong national government. In February 1787, Congress approved a Constitutional Convention to revise the Articles of Confederation. The Constitutional Convention held its first session on May 25, 1787. The 55 delegates were experienced statesmen who were familiar with the political theories of Locke, Montesquieu, and Rousseau.

Although the delegates shared basic ideas on government, they sometimes disagreed on how to put them into practice. For almost four months the delegates argued over important questions. Who should be represented in Congress? How many votes should each state have? The delegates' deliberations produced not only compromises but also new approaches to governing. Using the political ideas of the Enlightenment, the delegates created a new system of government.

The Federal System Like Montesquieu, the delegates distrusted a powerful central government controlled by one person or group. They therefore established three separate branches—legislative, executive, and judicial. This provided a built-in system of **checks**

THINK THROUGH HISTORY

D. Making

Inferences What was the fundamental cause of the nation's problems under the Articles of Confederation?

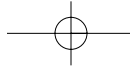
U.S. Constitution: An Enlightenment Document

Enlightenment Idea	U.S. Constitution
Locke A government's power comes from the consent of the people	<ul style="list-style-type: none"> • Preamble begins "We the people of the United States" to establish legitimacy. • Creates representative government • Limits government powers
Montesquieu Separation of powers	<ul style="list-style-type: none"> • Federal system of government • Powers divided among three branches • System of checks and balances
Rousseau Direct democracy	<ul style="list-style-type: none"> • Public election of president and Congress
Voltaire Free speech, religious toleration	<ul style="list-style-type: none"> • Bill of Rights provides for freedom of speech and religion.
Beccaria Accused have rights, no torture	<ul style="list-style-type: none"> • Bill of Rights protects rights of accused and prohibits cruel and unusual punishment.

SKILLBUILDER: Interpreting Charts

1. From whose idea stems the system of checks and balances?
2. Which of the Enlightenment ideas are reflected in the Bill of Rights?





and balances, with each branch checking the actions of the other two. For example, the president received the power to veto legislation passed by Congress. However, the Congress could override a presidential veto with the approval of two-thirds of its members.

Although the Constitution created a strong central government, it did not eliminate local governments. Instead, the Constitution set up a **federal system** in which power was divided between national and state governments.

The delegates agreed with Locke and Rousseau that governments draw their authority from the consent of the governed. The Constitution's preamble sums up this principle:

A VOICE FROM THE PAST

We the People of the United States, in order to form a more perfect Union, establish Justice, insure domestic Tranquillity, provide for the common defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

CONSTITUTION OF THE UNITED STATES OF AMERICA

The Bill of Rights The delegates signed the new Constitution on September 17, 1787. In order to become law, however, the Constitution required approval by conventions in at least 9 of the 13 states. These conventions were marked by sharp debate. Supporters of the Constitution, called the Federalists, argued that the new government would provide a better balance between national and state powers. Their opponents, the Antifederalists, feared that the Constitution gave the central government too much power. They also wanted a bill of rights to protect the rights of individual citizens.

In order to gain support, the Federalists promised to add a bill of rights to the Constitution. This promise cleared the way for approval. Congress formally added to the Constitution the ten amendments known as the **Bill of Rights**. These amendments protected such basic rights as freedom of speech, press, assembly, and religion. Many of these rights had been advocated by Voltaire, Rousseau, and Locke.

The Constitution and Bill of Rights marked a turning point in people's ideas about government. Both documents put Enlightenment ideas into practice. They expressed an optimistic view that reason and reform could prevail and that progress was inevitable. Such optimism swept across the Atlantic. However, the monarchies and the privileged classes didn't give up power and position easily. As Chapter 23 explains, the struggle to attain the principles of the Enlightenment continued in France.

THINK THROUGH HISTORY

E. Analyzing Issues

Explain the controversy over ratifying the Constitution. What did each side believe?

GlobalImpact



The French Revolution

The American Revolution inspired the growing number of French people who were seeking reform in their own country. They saw the new government of the United States as a step toward realizing the ideals of the Enlightenment. They hoped the next step would be reform in France.

The Declaration of Independence was widely circulated and admired in France. French officers like the Marquis de Lafayette, who fought for American independence, returned to France with stories of the war. Such personal accounts intrigued many a reader.

When the French bishop Charles-Maurice de Talleyrand wrote about this time period years later, he would say, "We talked of nothing but America."

Section 4 Assessment

1. TERMS & NAMES

Identify

- Declaration of Independence
- Thomas Jefferson
- checks and balances
- federal system
- Bill of Rights

2. TAKING NOTES

Create a chart like the one below. On the left, list problems faced by the Americans as colonists and in shaping their republic. On the right, record their actions and decisions to solve those problems.

Problem	Solution

Which of the solutions that you recorded represented a compromise?

3. ANALYZING ISSUES

How does the opening statement from the Declaration of Independence (page 564) reflect enlightened thinking?

4. ANALYZING THEMES

Revolution Summarize the ideas from the American Revolution concerning separation of powers, liberty, equality, democracy, popular sovereignty, human rights, constitutionalism, and nationalism.



Chapter 22 Assessment

TERMS & NAMES

Briefly explain the importance of each of the following to the Scientific Revolution, the Enlightenment, or the American Revolution (1550–1789).

1. heliocentric theory
2. Galileo Galilei
3. Isaac Newton
4. social contract
5. natural rights
6. separation of powers
7. salon
8. enlightened despot
9. Declaration of Independence
10. federal system

Interact *with* History

On page 544, you put yourself in the dilemma of Galileo. As you have read, Galileo did recant, but the idea he supported eventually became widely accepted. Think about the decisions of both Galileo and the church. Did the choices they made advance their goals? Discuss your opinions with a small group.

REVIEW QUESTIONS

SECTION 1 (pages 545–550)

The Scientific Revolution

11. According to Ptolemy, what was earth's position in the universe? How did Copernicus's view differ? Which did Kepler's observations support?
12. What are four steps in the scientific method?
13. List four new instruments that came into use during the Scientific Revolution. Identify the purpose of each one.

SECTION 2 (pages 551–556)

The Enlightenment in Europe

14. How did the ideas of Hobbes and Locke differ?
15. What did Montesquieu believe led to the fall of Rome? What did he admire about the government of Britain?
16. How did the Enlightenment lead to a more secular outlook?

SECTION 3 (pages 558–562)

The Spread of Enlightenment Ideas

17. Name three developments in the arts during the Enlightenment.
18. What sorts of reforms did the enlightened despots make? In what respects did their reforms fail?

SECTION 4 (pages 563–567)

American Revolution: The Birth of a Republic

19. Why did the Articles of Confederation result in a weak national government?
20. How did the writers of the U.S. Constitution put into practice the idea of separation of powers? A system of checks and balances?

Visual Summary

Enlightenment and Revolution, 1550–1789

Scientific Revolution

- Heliocentric theory challenges geocentric theory.
- Mathematics and observation support heliocentric theory.
- Scientific method develops.
- Scientists make discoveries in many fields.

A new way of thinking about the world develops—based on observation and a willingness to question assumptions.

Enlightenment

- People try to apply the scientific approach to all aspects of society.
- Political scientists propose new ideas about government.
- Philosophes advocate the use of reason to discover truths.
- Philosophes address social issues through reason.

Enlightenment writers challenge many accepted ideas about government and society.

Spread of Enlightenment Ideas

- Enlightenment ideas appeal to thinkers and artists across Europe.
- Salons help spread Enlightenment thinking.
- Ideas spread to literate middle class.
- Enlightened despots attempt reforms.

Enlightenment ideas sweep through European society and also to colonial America.

American Revolution

- Enlightenment ideas influence colonists.
- Britain taxes colonies after French and Indian War.
- Colonists denounce taxation without representation.
- War begins in Lexington and Concord.

Colonists declare independence, defeat Britain, and establish republic.



CRITICAL THINKING

1. ROLE OF TECHNOLOGY

What role did new technology play in the Scientific Revolution?

2. THE U.S. CONSTITUTION

THEME POWER AND AUTHORITY What was the source of the Constitution's authority? How did this reflect Enlightenment ideas?

3. REVOLUTIONARY IDEAS

Create a two-column table. In the left column, list important new ideas that arose during the Scientific Revolution and Enlightenment. In the right column, briefly explain why the idea was revolutionary.

New Idea	Why Revolutionary

4. ANALYZING PRIMARY SOURCES

The following excerpt comes from Voltaire's *Treatise on Toleration* (1763). Voltaire wrote the essay in response to the case of a French Protestant who was falsely accused of murdering his Catholic son. The man was tortured and executed by French authorities. Read the passage and answer the questions that follow.

A VOICE FROM THE PAST

No great . . . eloquence is needed to prove that Christians should tolerate one another. I go even further and declare that we must look upon all men as our brothers. . . . Are we not all the children of one father and creatures of the same God? . . .

This little globe, nothing more than a point, rolls in space like so many other globes; we are lost in this immensity. Man, some five feet tall, is surely a very small part of the universe. One of these imperceptible [virtually invisible] beings says to some of his neighbors in Arabia or Africa: "Listen to me, for the God of all these worlds has enlightened me: there are nine hundred million little ants like us on earth, but only my anthill is beloved of God; he will hold all others in horror through all eternity; only mine will be blessed, the others will be eternally wretched."

- Summarize the main point conveyed in this passage. How does Voltaire illustrate his point?
- Do you think Voltaire is directing his message to one religion in particular or to all organized religions? Explain your response.

CHAPTER ACTIVITIES

1. LIVING HISTORY: Unit Portfolio Project

THEME REVOLUTION Your unit portfolio project focuses on showing the similarities and differences among revolutions (see page 509). For Chapter 22, you might use one of the following ideas.

- Design the cover for a special magazine issue that spotlights the most revolutionary thinker of the Scientific Revolution or Enlightenment. Create a table of contents to show the focus of the magazine's articles.
- Present a live or taped news report covering a major event of the American Revolution or early republic.
- Write song lyrics for a Revolutionary War ballad or march that explain why the Americans are fighting for independence.

2. CONNECT TO TODAY: Cooperative Learning

THEME SCIENCE AND TECHNOLOGY The Scientific Revolution produced ideas that profoundly changed how people viewed the natural world. In today's world, scientific discoveries have become commonplace. Yet often they are as revolutionary as those of the 16th century.

Work with a team to create a visual presentation highlighting a recent breakthrough in science or medicine. Focus on how the new knowledge changed what scientists previously thought about the topic.



Use the Internet or magazines to research the topic. Look for information that will help you to understand the nature of the discovery and to explain why it is significant.

- Write two brief sentences that summarize the difference in scientific understanding before and after the breakthrough. For an example of such a summary, look at the box on page 548.
- Use text, charts, and other illustrations to explain the discovery's impact.

3. INTERPRETING A TIME LINE

Revisit the unit time line on pages 508–509. What events in Chapters 23 and 24 were probably influenced by the Enlightenment? Why?

FOCUS ON FINE ART

The Spanish artist Francisco Goya produced this engraving, titled *The Sleep of Reason Produces Monsters*, in 1797.

Here is his caption:

"Imagination abandoned by reason produces impossible monsters; united with her, she is the mother of the arts and the source of their wonders."

- What do you think the monsters represent?
- What is the artist saying will happen when a person lets his or her reason go to sleep?

Connect to History How does the engraving reflect the ideas of Enlightenment thinkers?

