The Beginning of the Scientific Revolution

Keywords
- alchemy
- heliocentric view of the universe
- humoral theory of disease
- geocentric view of the universe

Essential Questions
- What were some of the tenets of scientific thought in the early 1500s?
- What events, movements, or discoveries prior to the Scientific Revolution inspired European thinkers to question the medieval view of the natural world?
- What are the differences and similarities between the Ptolemaic and Copernican views of the universe?
**Set the Stage**

The world of the Middle Ages was grounded in faith, bordered by impassable oceans, and imbued with magic and mysticism. Many philosophers and intellectuals looked to the past for answers, rather than to the future with questions. In one respect, this tendency of medieval scholars was a great asset—they made significant strides in preserving the knowledge of the ancients. On the other hand, it did not motivate new discoveries or reward inquisitive minds. Those who did seek to expand their knowledge did so only to discover or reveal God’s perfect design. The knowledge passed down from Aristotle explained what people could observe and calculate, but didn’t necessarily prompt the need for further inquiry. In this age, art and other pursuits flourished, but science did not. Fortunately, changes that took place during the late Middle Ages, however, created the right environment for science and reason to take a new and prominent place in European society.

**Scientific Thought in the Early 1500s**

In the early 1500s, European ideas about the universe were theologically grounded in the physics and astronomy of Aristotle, a fourth-century B.C.E. Greek philosopher who clearly distinguished the earthly from the heavenly realm. Aristotle’s scientific theories were based on direct observation and did not conflict with church doctrine. Scientists in the Middle Ages wanted to better understand God’s designs, and Aristotelian physics fit well with their ideas about the earth and heavens. Like Aristotle, they believed that a motionless, fixed earth was at the center of the universe, and it was surrounded by crystalline spheres. The sphere closest to earth contained the moon, followed by the sun, the five known planets, and the fixed stars. Beyond the last sphere was heaven, where God, angels, and saved souls resided. The spheres and their contents moved around the earth as directed by the angels. Two additional spheres were added to Aristotle’s model during the Middle Ages to account for obvious shifts in the position of the stars.

In the thirteenth century, Thomas Aquinas (1225–1274) made Aristotle’s work consistent with church doctrine. Aristotle’s ideas placed the earth and man at the center of the universe, while God remained beyond the earthly realm in the perfect and unchanging heavens. Aristotle’s thoughts on the movement of heavenly bodies corresponded with his theories of earthly matter and motion as well. The terrestrial realm was made up of four elements—fire, air, water, and earth. A fifth element comprised the celestial sphere of heaven.

Medievalists maintained this belief that the material world was made up of four elements. Studying the balance of these four elements was called **alchemy**, which was popular during the Middle Ages. Alchemists worked to perfect the proportion of these elements in metals and understand the way...
substances could interact, a tradition that went back to the Greeks. The ultimate goal for alchemists was to discover the key to transmuting one element into another. Solving this mystery would not only unlock the secrets of nature, but also lead to limitless wealth from turning common metals into gold. Alchemists worked in secret languages and symbols to protect their work from the uninitiated.

In medicine, the four elements corresponded to four bodily elements or humors: blood, phlegm, yellow bile, and black bile. Humans were considered the amalgamation of these ingredients, and sickness was thought to be caused by their imbalance. The **humoral theory of disease** prompted procedures such as bloodletting to restore the balance of the humors. Yet as Europeans became exposed to new diseases after venturing into the New World, some doctors started to question if an imbalance of the humors could actually account for all the novel illnesses.

During the early 1500s, one well-known figure—someone who personified the commingling of science and art during this period—began investigating the human body to gain a deeper understanding of its structure and function. Leonardo da Vinci (1452–1519) was an artist, an engineer, and a scientific thinker. He dissected bodies to learn more about the four humors and human anatomy. Leonardo also conceived of the idea of blood circulation in the body. He even speculated about a **heliocentric view of the universe**—a universe centered around the sun—which represented an enormous departure from Aristotelian ideas. However, Leonardo never published any of his scientific ideas, and many were not revealed until his private notebooks were discovered in the twentieth century. But when the idea of the heliocentric universe surfaced again, a revolution in scientific thought was in the works.

Although exceptional people like Leonardo da Vinci did pursue natural knowledge, the intellectual landscape of the early 1500s was dominated by skepticism. Prominent thinkers believed that certain knowledge was unattainable and that one should doubt even what seems most obvious. Although this skepticism led society, in general, on a more open-minded and tolerant path, it did not always foster intellectual curiosity or scientific discovery. Paradoxically, many people during this time also had the tendency to over-believe, wholly accepting Aristotelian beliefs without modification or question. The relationship between magic and science blurred: alchemy was as respected as chemistry; astronomy and astrology were equally valid ways to understand the universe. In this intellectual climate, few dared challenge the long-accepted ideas of Aristotle, and even a hundred years after Leonardo da Vinci’s death, many Europeans were still not scientifically minded.

**Influences on the Scientific Revolution**
The Scientific Revolution involved an enormous shift in scientific thought, theory, and practice. Modern science as we know it originated in the mid-sixteenth and seventeenth centuries. This period gave rise to the scientific method, which combines mathematical deduction and experimental observation. The discoveries that
took place during the Scientific Revolution would alter the way Europeans thought about the world. However, this revolution did not happen overnight and it was not for the masses. It was a complex series of events, complete with false starts and numerous ideas—many wrong, some right, but almost all useful—and a diverse set of influences. Ancient texts, the exploration of the New World, technological advances, new political realities, wars, religion, art, and culture all influenced the Scientific Revolution and set the stage for a new way of thinking about the world.

Many of the ideas about science and the natural world at the start of the Scientific Revolution were not new. European thinkers were rediscovering and studying ancient and late Middle Ages texts and theories. Humanist writers, who had a deep interest in ancient and classical writings, studied ancient scientific texts, setting the stage for increased scientific inquiry in the years to come. These ancient texts dealt with astronomy, math, medicine, anatomy, and pharmacology. The study of ancient works about dissection by Galen, a second-century Roman physician whose ideas dominated medicine for over a millennium, revitalized the understanding of human anatomy. Some of these ancient scientific works even challenged the Aristotelian ideas that had persisted through the Middle Ages.

People also studied the work of ancient mathematicians, leading to the widespread notion that mathematics, rather than theology, was the key to understanding the nature of all things. The fourteenth and fifteen centuries witnessed a revival in mathematics, as people reexamined the ideas of Plato and Pythagoras. These ancient thinkers maintained that truth in nature was found in numbers and that simplicity was a more likely indicator of truth than complexity. Such ideas would inspire a new way of thinking about astronomy and the mathematics of the universe.

Europeans were not just looking in texts; they were examining their surroundings more closely than ever before. Many events, discoveries, and challenges inspired European thinkers to question the existing medieval views of the natural world, partly because that natural world was expanding. With the late fifteenth- and early sixteenth-century periods of exploration, new lands meant discoveries of new flora and fauna and a more complex and diverse natural world. It also meant new diseases, crops, spices, and species, many of which crossed the Atlantic Ocean. Great advances were made in botany as several plant species made their way to European botanical gardens and herb collections, and many of these were integral to the development of new medicinal drugs.

The pursuit of natural knowledge before the Scientific Revolution was largely an informal endeavor with few supporting institutions, which changed with the rise of medieval universities. Although most universities initially included only law, medicine, and theology on their curricula, these disciplines were soon joined by others. By 1300, philosophy had taken its place in the universities and established itself as an area of inquiry and debate separate from theology. This framework allowed a scientific branch of philosophy to find its way into academia. During the fourteenth and fifteenth centuries, professorships of mathematics, physics (called natural philosophy), and astronomy were established at universities across Europe. These programs provided an outlet for the intellectual giants of the Scientific Revolution to come, almost all of whom studied or taught at universities.
The quest for knowledge also had a very pragmatic impetus. The period of global exploration preceding the Scientific Revolution necessitated a deeper understanding of astronomy for navigation. The Portuguese began exploring the coast of Africa and then Asia in the early fifteenth century. They were led by Prince Henry, who was called “the Navigator” for his role as an explorer. A Portuguese committee of mathematicians established by the king in 1484 improved navigational tables, resulting in Europe’s first navigational manual. The magnetic compass allowed sailors to obtain accurate directions while at sea, while the nocturnal was used to tell time at night by using the paths of certain stars around the polestar. The astrolabe, an invention of twelfth-century Muslim explorers, used the position of the sun and stars to calculate latitude. Accurately determining longitude proved much more difficult, but it gave astronomers an important purpose and forged close ties between scientists, merchants, and the military. The navigational advances made by Portuguese explorers in the fifteenth century spurred greater interest in studying the heavens and helped make it possible for Christopher Columbus to cross the Atlantic Ocean at the end of that century.

As the physical world accessible to Europeans was expanding, so was their intellectual world. Johann Gutenberg’s invention of a printing press with movable type in mid-fifteenth-century Germany made scientific ideas more accessible and portable. Germany quickly became the printing hub of Europe, establishing printing presses in more than 60 cities within fifty years of Gutenberg’s invention. By 1500, more than 200 European cities had printing presses. Numerous books, pamphlets, and newsletters detailed various scientific endeavors. People had access to scientific ideas from across Europe and beyond. Knowledge could spread faster than ever before.

Advances in technology—such as the telescope and microscope—facilitated new discoveries and allowed scientists to ask new questions. The microscope, developed by three spectacle makers around 1600, would allow scientists in the coming centuries to investigate living things with a level of detail that was impossible the Middle Ages. As people across Europe experimented with convex lenses, Galileo Galilei combined a concave with a convex lens, which eventually allowed him and others to see the heavens as never before. Time and time again, questions and challenges prompted technological advancements, which in turn led to new areas of research.

Political, religious, and cultural conflicts also influenced the Scientific Revolution. During the numerous European wars of the fourteenth and fifteenth centuries, rival nation-states vied for supremacy. One way for a nation-state to best its rivals was to have superior military equipment. The cannon is one example of a weapon that was developed because nation-states focused resources on new technology that could give them a strategic advantage.

The Reformation encouraged scientific inquiry and access to knowledge in the sixteenth and seventeenth centuries, as well. Although Luther, Calvin, and other sixteenth-century reformers were not interested in challenging traditional scientific thought, they nonetheless embodied the challenge to traditional authority that the Scientific Revolution rested upon. The Reformation encouraged the development

2

SELF-CHECK
What country’s early exploration efforts led to advancements in mathematics and navigation?
of a more literate population with its emphasis on individual interpretation of the Bible, which was made more accessible with Gutenberg’s Bible of 1456.

Even the church had a role in fostering scientific research. Leading up to the Scientific Revolution, many people who investigated the natural world were clerics, and Protestant and Catholic authorities often encouraged scientific studies. However, the Catholic Church’s role would change during the Scientific Revolution as the search for more secular and scientific ways of understanding the world placed traditional knowledge and approaches in question. After 1630 and the Counter-Reformation, Protestantism tended to promote science while the Catholic Church discouraged it.

Renaissance art—with its emphasis on realistic depictions of animals, plants, and anatomy—also led to closer observation of the natural world. Anatomists and artists would work together closely during the Scientific Revolution, as accurate illustrations were vital to conveying the complex and intricate workings of the human body. Artists often incorporated mathematical principles in their work and depicted technological innovations. Albrecht Dürer generated designs for city fortifications, while Leonardo da Vinci designed war machines, airplanes, submarines, and parachutes.

Two Views of the Universe: Copernicus and Ptolemy

Before the Scientific Revolution, nearly all Europeans held a view of the universe that was a combination of Aristotelian physics and Ptolemaic astronomy. Ptolemy was a second-century Greek mathematician and astronomer who held an Aristotelian geocentric view of the universe. In a geocentric universe, the earth is at the center of the universe, and the sun revolves around the earth. Ptolemy believed that the fixed stars, the moon, and the planets were all in concentric crystalline spheres above the earth. It was the movement of these spheres that allowed the fixed stars and planets to circle around the earth. Ptolemy believed that the sphere closest to the earth contained the moon, followed by spheres for Mercury and Venus, the sun, and the outer planets. The fixed stars were contained in the furthest sphere. Beyond all the spheres was heaven, where Christians believed that God dwelt with the angels.

Medieval Christians believed that, in this geocentric system, God directed the planets and stars to rotate around the earth; the heavens were perfect and static. In order to account for the perceived motion of the planets by an observer on earth, Ptolemy’s system employed the idea of epicycles and deferents. Planets travelled in a perfectly circular orbit (an epicycle) within a larger orbit around the earth (a deferent). This system was not meant to represent the actual motion of the planets, but to mathematically account for the elliptical paths that could be observed and calculated on earth. Ptolemy’s complex system explained irregular planetary movements and allowed astronomers and stargazers to track the planets with great accuracy. As with Aristotelian physics and astronomy, the Catholic Church endorsed Ptolemy’s work, which was the pervasive theory until the mid-1500s.

Nicolaus Copernicus

Nicolaus Copernicus (1473–1543) was a Polish clergyman, mathematician, and astronomer who studied in Krakow, Poland, and later at Italian universities. While
in Italy, he studied ancient Greek ideas about the universe that contradicted the Ptolemaic geocentric system. These ideas were being revisited in Renaissance Italy by people such as Leonardo da Vinci. After returning to Prussia, Copernicus worked on his own theory about how the universe worked from 1506 to 1530.

Copernicus’s theory was heliocentric—it held that the earth revolves around the sun. Since Copernicus was more of a mathematician than an astronomer, he relied heavily on mathematical principles and the records of his predecessors. He believed the earth was one of many planets orbiting the sun. Contradicting Ptolemy’s stationary earth, Copernicus thought the earth spun on its axis, thereby creating night and day. This motion explained the seeming movement of the sun and fixed stars around the earth. Like Ptolemy, Copernicus employed the idea of spheres, maintaining that eight spheres made up the universe. In the center sphere was the motionless sun. Then came six spheres containing the known planets. The outermost eighth sphere held the fixed stars. Copernicus did not question the Aristotelian idea of divine circular orbits. Copernicus believed that as the planets revolved around the sun, the moon revolved around the earth.

Copernicus did not publish his heliocentric theory for many years. Finally, in 1543, he published *On the Revolutions of the Heavenly Spheres*, which cautiously laid out his claim that the earth and other planets orbit around the sun. He dedicated the work to Pope Paul III and claimed that his work was simply a mathematical hypothesis. Copernicus had not set out to remove the earth as the centerpiece of the universe, but had intended to create a more elegant and intelligible mathematical explanation for the movement of the planets. Copernicus died the same year his work was published.

Regardless of his intentions, Copernicus’s ideas generated uncertainty about humanity’s place in the universe, both literally and figuratively. If Copernicus was correct, the earth was no longer unique and set apart from the heavenly realm as in Aristotle’s universe; it was simply one of the planets. His theory also had profound implications for the size and scale of the universe: If the earth travelled all the way around the sun in one year and the stars were actually fixed, the universe had to be enormous, perhaps even infinite.

The Copernican theory and its implications generated tension between science and the church. John Calvin and Martin Luther immediately condemned Copernicus. Luther referred to him as the “new astrologer who wants to prove that the earth moves and goes round . . . . The fool wants to turn the whole art of astronomy upside down.” The Catholic reaction was, at first, less severe. However, Giordano Bruno, an Italian monk who taught heliocentrism, was arrested by the Catholic Inquisition and burned at the stake in 1600. Although he was condemned for his unorthodox theology, he was also a proponent of the Copernican theory. The Catholic Church officially declared the Copernican hypothesis false in 1616.
Despite the church’s declaration, the Copernican theory gathered momentum and gained popularity in the early 1600s. Astronomers collected evidence using new instruments and made systematic observations to disprove the Ptolemaic view of the universe. Other events also helped create doubt about the Ptolemaic system. A new star appeared in 1572 and was visible for two years, while a new comet was observed in 1577. These observations contradicted the idea of a static, unchanging heavenly sphere. One of the astronomers who made detailed observations about the new star in 1572 was the Dane Tycho Brahe (1546–1601). Brahe became a great authority on the position and movements of the planets following Copernicus’s death. However, he never fully accepted the Copernican theory. Brahe’s theory blended the Copernican and Ptolemaic universes. He believed that the other planets revolved around the sun, and this whole system then revolved around the earth-moon system. It would be left to Brahe’s assistant, Johannes Kepler, to carry Copernicus’s ideas even further.

**Extensions**

- Read John Donne’s poem *The Anatomy of the World*. Identify the changes that Donne reflects upon in his world—changes that resulted from new scientific discoveries.

**SELF-CHECK**

What idea did Copernicus cautiously set forth in *On the Revolutions of the Heavenly Spheres*?
• Read *On the Revolutions of the Heavenly Spheres* by Copernicus. Identify quotes that appear conciliatory to the Catholic Church and Aristotle in his work. Also, locate quotes that describe and defend the heliocentric view of the universe.

• Go online to read a short biography of Copernicus. What information does this biography add to the material learned from the course reading material?

• Read the dedication of *On the Revolutions of the Heavenly Spheres* and excerpts from the work. How does Copernicus defend the idea that the earth moves round the sun?

• Design and create representations of the Ptolemaic and Copernican models of the universe.

**Summary**

Although Copernicus’s *On the Revolutions of the Heavenly Spheres* is largely considered the beginning of the Scientific Revolution, Copernicus was simply searching for knowledge in the ways he knew how. In many regards, he was continuing with the Middle Ages pursuit of knowledge to better understand and glorify God’s design. He retained the crystalline spheres and divine orbits of Aristotle and Ptolemy, whose works had dominated the Middle Ages. However, gradual changes were taking place in the years leading up to when Copernicus took the bold step of removing the earth from the center of the universe in 1543, changes that influenced the scientific mind of Copernicus and the minds of those who followed him.

**Looking Ahead**

With the beginning of the Scientific Revolution, astronomers and natural philosophers began investigating the natural world in new ways. People looked for truth not in the traditional authorities of the church and the ancients—such as Aristotle and Ptolemy—but in rational observation. Although the Copernican theory was slow to catch on, astronomers like Brahe, Kepler, and Galileo, aided by new instruments, advanced the heliocentric universe theory. As astronomers became more and more certain of earth’s place in the universe, they increasingly clashed with the church. The motivation for scientific pursuits shifted from theological to secular.

**SELF-CHECK ANSWERS**

1. Fire, air, earth, and water were believed to make up all earthly matter.

2. Portugal’s exploration efforts in Africa and Asia led to early advancements in mathematics and navigation.

3. Ptolemy developed epicycles and deferents to account for irregular and elliptical planetary motions.

4. Copernicus cautiously set forth the idea of a heliocentric universe in *On the Revolutions of the Heavenly Spheres*. 

Copyright © 2013, 2011 K12 Inc. All rights reserved. This material may not be reproduced in whole or in part, including illustrations, without the express prior written consent of K12 Inc.
The Rise of Modern Science

Essential Questions

- What were the primary accomplishments and discoveries of Brahe, Kepler, and Galileo?
- How did Galileo’s discoveries start to erase the distinction between the earthly and heavenly realms?
- What were Newton’s contributions to science?
- What were the similarities and differences between the ideas of Bacon and Descartes?
- Who wrote the following works: Discourse on Method, Dialogue on the Two Chief Systems of the World, The New Astronomy, Principia, Starry Messenger, and Novum Organum?
- What were some of the consequences of the Scientific Revolution?
**Set the Stage**

As the Middle Ages came to a close, some scholars started to question long-held scientific beliefs, especially those concerning the workings of the universe. After Nicolaus Copernicus set forth his theory of a heliocentric universe in 1543 and offered an alternative to the Ptolemaic system of an earth-centered universe, others began looking to the heavens, as well. As the seventeenth century unfolded, these astronomers and natural philosophers began speaking of the universe not in the language of the ancients, but in the language of mathematics.

**The Heirs of Copernicus**

In the decades that followed the publication of Copernicus’s *On the Revolutions of the Heavenly Spheres* in 1543, other astronomers and scientists made detailed observations of the heavens. Like Copernicus, they hoped to better understand and explain the workings of the universe. The most important and influential of this group included Tycho Brahe, Johannes Kepler, Galileo Galilei, and Isaac Newton. The work of these men, in turn, inspired the efforts of philosophers such as Francis Bacon and René Descartes.

**Tycho Brahe (1546–1601)**

Tycho Brahe was a Danish nobleman who, at a young age, was impressed by a partial solar eclipse. This event influenced his decision to become an astronomer. After completing his studies, Brahe built an observatory on an island near Copenhagen and systematically collected data about the movements of the stars and planets. Brahe also built a library and various instruments to advance his studies. He compiled a detailed record with more than twenty years of observations about the movement of the planets and stars. Brahe’s work represented the most accurate observations to date.

Although Brahe’s observations led him to reject the Ptolemaic view of the universe that was based on Aristotelian physics, he also rejected the Copernican system. Instead, Brahe hypothesized about a universe that had elements of both the Ptolemaic and Copernican systems. He did not believe that the earth moved. Brahe’s strength was the accuracy and volume of his data, which his successors later utilized. However, he did not have the mathematical skills necessary to interpret the data. Brahe spent his last years in Prague as the imperial mathematician to Emperor Rudolph II. During his service to the emperor, Brahe had an assistant named Johannes Kepler.

**Johannes Kepler (1571–1630)**

Johannes Kepler was a German astronomer who began his studies in theology because his parents wanted him to become a Lutheran minister. However, after coming under the influence of Germany’s best-known astronomer, Michael
Maestlin, Kepler began pursuing his real interests in math and astronomy. He eventually became a mathematics and astronomy teacher in Austria. After Brahe’s death in 1601, Kepler took over the post of imperial mathematician in Prague and continued gathering and recording observations about planetary movement. Unlike Brahe, however, Kepler was an ardent supporter of heliocentrism. He was determined to use Brahe’s data to find a mathematical explanation for heliocentrism. Kepler successfully provided mathematical proof for a heliocentric model of the universe and laid out the first such model to account for the actual paths of the planets. Kepler published his work in 1609 in The New Astronomy.

Using Brahe’s detailed data, Kepler formulated three laws of planetary motion that proved the precise relationships among the planets in a heliocentric universe. Kepler’s first law proved that planetary motion was elliptical, not circular, and thus eliminated the need for epicycles. His second law said that planets do not travel at a uniform speed in their orbits. Finally, Kepler’s third law determined that the length of time a planet takes to make a complete revolution around the sun is related to its distance from the sun. Planets closer to the sun revolve with greater speed than those far away. Kepler’s third law destroyed the Aristotelian belief that planetary motion was steady and static.

Taken together, Kepler’s three laws of planetary motion did much to dispel many previously held theories about the planets. In fact, he disproved the basic tenets of the Ptolemaic paradigm. His laws upset the idea of uniform circular motion and crystalline spheres that revolved in circular orbits. Kepler successfully combined the straightforward observations of Brahe with the mathematical elegance of Copernicus and showed that these two ways of looking at the world—observation and mathematics—substantiated each other. Still, his work led to new questions. Why were the planetary orbits elliptical? Indeed, why did the planets move in orbits at all? If there were no spheres, why didn’t the planets simply move along straight-line tangents and shoot off into space? Another theory would be needed to fully explain planetary motion.

**Galileo Galilei (1564–1642)**

Galileo possessed one of the greatest minds of the Scientific Revolution. Philosopher, physicist, mathematician, and accomplished musician, Galileo’s most important contributions would come in the field of astronomy.

In 1609, Galileo first pointed a telescope at the heavens. Simple telescopes were available throughout Europe by 1609, but Galileo adapted the invention by pairing a concave lens with a convex one and greatly improving the design. He became the first European to make systematic observations of the heavens with the telescope and was the first person to see a close-up view of the moon. His observations led him to correctly surmise that the moon had mountains, just like the earth. He later discovered the phases of Venus and sunspots. Using the telescope, Galileo discovered that the heavens were much more complex and diverse than previous astronomers knew. Furthermore, he argued that heavenly bodies were made of the same substances as the earth.

As he improved his telescope, Galileo discovered the four moons of Jupiter, which meant that Jupiter did not rest in a crystalline sphere. His observations also
showed that the earth was not the only planet that could orbit around the sun while having another body—a moon—orbiting around it. In Galileo’s words, “our eyes show us four stars that wander around Jupiter, as does the Moon around the Earth, and these stars together with Jupiter describe a large circle around the Sun . . . .” Galileo published his findings in Starry Messenger in 1610.

Galileo’s monumental discoveries and observations proved that the heavens were no more perfect in design than the earth and provided further evidence, particularly with the phases of Venus, for a heliocentric universe as set forth by Copernicus. (Galileo had already supported a heliocentric universe, writing to Kepler in 1597 to tell him that he too was a Copernican.) Galileo knew his views were controversial, so in an attempt to gain the favor of a powerful patron, Galileo named the moons of Jupiter after the Medici family and dedicated them to the Grand Duke of Tuscany Cosimo II, also a Medici. The move worked. In 1610, only months after publishing Starry Messenger, Galileo left the University of Padua and became the philosopher and mathematician to the Grand Duke of Tuscany.

In the following years, Galileo came under scrutiny for his views of the universe as he publicly defended the Copernican system. He was called before the Catholic Inquisition in 1616 for heresy and forced to recant the views set forth in Starry Messenger. The Catholic Church condemned the Copernican model and ordered Galileo to reject the hypothesis. Galileo was told he could discuss the Copernican model as a mathematical construct, but not as a fact. Galileo’s support of a heliocentric universe threatened scriptural accounts of the universe that had been held for centuries. To Galileo, it made little sense for the church to determine the nature of physical reality on the basis of biblical texts that were open to interpretation, and he set forth this view in his famous “Letter to the Grand Duchess Christina.”

After Galileo’s condemnation in Rome, he returned to Florence for a number of years and kept a low profile. But when his good friend and admirer was elected pope in 1623, Galileo saw an opportunity to publish his ideas—albeit as conjectures and hypotheses only. The result of this effort was Dialogue on the Two Chief Systems of the World, published in 1632. In this work, Galileo further promoted the Copernican theory, but this time the response was severe. In 1633, he was once again taken before the Inquisition and placed on trial. Galileo was threatened with prison and torture and forced to recant his “errors.” He was placed under house arrest and spent his remaining eight years studying and contributing greatly to the field of physics while confined to his house.

Galileo believed the universe was governed by mathematical laws and set forth two important laws of physics. His law of freely falling bodies states that when two objects of unequal weight are dropped, they accelerate at the same rate. In other words,
two objects of unequal weight will strike the ground at the same time if allowances are made for differences in air resistance. To demonstrate this law, Galileo is said to have dropped a 10-pound weight and a 1-pound weight simultaneously from the Tower of Pisa. When both weights landed simultaneously, Galileo disproved earlier theories that said the heavier object would fall faster. Galileo’s second law stated that the path of a projectile is a precise parabola.

Galileo’s work in mechanics also disproved some important tenets of Aristotelian physics. Aristotelian physics maintained that an object at rest remained at rest unless a force was applied against it. If that force was applied at a constant rate, the object would move at a constant rate. When the force was removed, the object would stop. However, Galileo demonstrated that if a uniform force was applied to an object, it would actually move at an accelerated rate of speed, rather than a constant speed. He also discovered the law of inertia, in which a body in motion continues in motion unless deflected by another force. Thus, uniform motion is just as natural and common as a state of rest.

Throughout his life, Galileo championed the experimental method—the cornerstone of modern science. The experimental method involves making observations,
forming a hypothesis, making a prediction, and then conducting an experiment to either confirm or deny the predictions. The experimenter then analyzes the results, draws conclusions, and reports his or her work to the scientific community so additional experiments can be performed. He applied the experimental method to astronomy, with his improved telescope, and to physics with various experiments. He elaborated on and secured the modern scientific method by conducting controlled experiments to see what actually happened, rather than relying on age-old custom or theory.

Galileo’s arrest stymied scientific advancement in Italy, which had been at the forefront of scientific innovation and study. Leadership in the sciences turned to the northern countries, especially England, France, and the Dutch Netherlands. Galileo’s research during his house arrest had to be smuggled out of Italy and published in other countries, and Galileo corresponded closely with friends in France during his confinement. For intellectuals, Galileo’s trial and condemnation established a sharp divide between religious belief and scientific inquiry, although not all scientific thinkers believed this had to be the case.

Newton’s Triumph

Englishman Isaac Newton (1642–1727) was born the year that Galileo died. Their collective lifetimes spanned the 1600s, a fact that has led some historians to call this century “the century of genius.” Newton, by all accounts, was a genius. He integrated the astronomy of Copernicus and Kepler with the physics of Galileo in his monumental work the *Mathematical Principles of Natural Philosophy*, better known by its shortened Latin title, *Principia*.

Newton left his hometown of Woolsthorpe, Lincolnshire, in 1661 to study at Cambridge University. However, the university was shut down for a period in 1665 due to fear of impending plague, so Newton returned home. There he spent the next two highly productive years beginning his theory of gravitation, studying optics and mathematics, and inventing calculus. Two years after he returned to study at Cambridge, Newton accepted a chair in mathematics. He studied optics for many years, making important discoveries about the composition and behavior of light, before returning to physics in 1684. For 18 months, Newton immersed himself in his research, eventually formulating *Principia*, which was published in 1687. It was the last highly influential European work to be published in Latin.

Newton’s work answered the pressing question that remained after the astronomical work of Brahe, Kepler, and Galileo. How do the planets move in orderly orbits? Newton claimed that all motion in the universe could be measured, timed, and described by mathematical formulas. He showed that the planetary laws of motion set forth by Kepler and the terrestrial laws of motion explained by Galileo were one in the same: all motion was explained by universal gravitation.

The key feature in Newton’s synthesis was the law of universal gravitation, which states that every body in the universe attracts every other body according to precise mathematical relationships. Newton proved that the sun, moon, earth,
and other planets (along with all other bodies) move in accordance with the same basic force of gravitation. This finding showed that the universe could be explained at least in part through mathematics. Newton’s law of gravitation would not be widely accepted for another century, and Newton made no attempt to explain how gravity actually works.

Newton developed a set of three mathematical laws to explain motion and mechanics. These laws led to his discovery of universal gravitation. His first law of motion held that every object continues in a state of rest or uniform motion in a straight line unless deflected by a force. His second law stated that any change in the motion of an object is proportional to the force placed upon it. His third law of motion said that for every action, there is always an equal and opposite reaction. He applied these laws of motion to the study of planetary motion, which explained why planets do not travel in straight lines but in elliptical, orderly orbits around the sun.

Despite the tension between the church and scientists, as seen during Galileo’s trial, Newton did not think that religion and science had to be in conflict. He hoped that his discovery of universal laws would lend support to the existence of God and an orderly creation. Later generations dropped his spiritual premise that God was “everywhere present.” This view of an orderly world operating according to absolute laws in time and space would dominate Western thought until Albert Einstein’s theory of relativity emerged in the twentieth century.

After having a nervous breakdown in 1693, Newton sought an administrative post at the royal mint, where he served as warden until his death in 1727. He was made a fellow of the Royal Society of London in 1672 and the president of the society in 1703. He was knighted for his achievements in 1705. He is the only English scientist laid to rest in Westminster Abbey and at the time of his death enjoyed a glowing reputation and an immense following of Newtonians, both in England and on the continent. Although some criticized Newton for his study of alchemy—he left thousands of unpublished manuscripts—and his acceptance of the occult qualities in nature, no one could question his achievements. As his universal laws gradually came to be accepted, so too did the philosophical ideas of Francis Bacon, who shared Newton’s intellectual philosophy.

Finding Truth: Francis Bacon and René Descartes
As Brahe, Kepler, Galileo, and Newton revolutionized scientific thought, Western philosophy also experienced a major shift. Francis Bacon (1561–1626) and René Descartes (1596–1650) led this philosophical revolution. Both men promoted a means by which humans could verify the truthfulness of knowledge. They were informed by a mechanical view of the universe that proceeded from the astronomical and mathematical discoveries taking place in European science. They branded ideas of previous generations as useless and trivial. They ridiculed the scholastic faith in ancient manuscripts and thinking and maintained that truth is something one arrives at after an arduous process of investigation and experimentation. Both men published their influential works between 1620 and 1640. However, their philosophies and methods were quite different. Newton had shared the methods of reason espoused by Bacon, but very much opposed those of Descartes.
Francis Bacon was an English politician, lawyer, and writer who advocated that empirical research and inductive reasoning were the keys to better understanding the natural world. An inductive method uses specific examples and particular instances to come to general conclusions. For example, if you were to examine hundreds of flowers one by one—looking at their shape, texture, components, and characteristics—then come up with a general conclusion regarding the nature of all flowers, you would have used the inductive method. Bacon’s most influential work was his Novum Organum, published in 1620, which promoted inductive reasoning and urged natural philosophers to do their own research to find answers, rather than to simply interpret the knowledge of the ancients. Bacon believed that pure knowledge had practical applications—a cannon could be made more powerful and accurate if its builders understood certain mathematical and scientific principles, for instance—and he wanted science to be the driving force behind advances in industry, agriculture, and trade. In his words, “the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and power.” He claimed that scientific progress would allow humans to exert more control over the natural environment, make people rich, and make nations powerful.

Despite his far-reaching ideas about knowledge and truth, Bacon never had much influence on the actual development of science. He failed to understand the role of mathematics and was only an amateur natural philosopher himself. His major accomplishment was not in the practice of science, but in rethinking the atmosphere and methods of science in a way that would foster scientific research. Bacon formalized the empirical method—which had already been in use by Brahe and Galileo—and laid the philosophical cornerstone for modern experimental science.

René Descartes was a French mathematician and philosopher. Before Descartes’s well-known philosophical work, he made important contributions to the field of mathematics. When he was only twenty-three years old and serving his country in the Thirty Years’ War, he invented coordinate geometry. He believed that all of nature could be reduced and understood by mathematic formulas. Along with mathematics, Descartes stressed the deductive method. Deductive reasoning calls for an examination of general principles to arrive at specific conclusions. Continuing with the flower example, if you were to research the general nature of flowers—they have petals, are often brightly colored, and need pollination—you could infer that a particular kind of flower would also have these characteristics. This type of logic is deductive reasoning.

Descartes’s philosophy was set forth in Discourse on Method, published in 1637, which was eventually placed on the Index of Prohibited Books. Instead of Latin, the book was written in French so it could receive wide circulation and application. In this work, Descartes said that everything should be doubted. Cogito ergo sum or “I think therefore I am” showed his belief in his own existence and nothing else. He would accept only those things that his reason said was true. For these ideas, Descartes is considered the “father of modern rationalism.”

Descartes’s view of the world, called Cartesian dualism, reduced all substances into either matter (everything outside the mind, which was therefore objective) or
mind (spirit, consciousness, and subjective experience). According to Descartes, the mind cannot be doubted, but the body and material world can. As such, the mind and mathematics are the best tools for understanding the natural world. This split had a profound impact on traditional religious views of the universe and the way that westerners viewed themselves.

Individually, both Bacon’s and Descartes’s views contained flaws and did not present a complete picture. But taken together, the contributions of these two men served to solidify the scientific method at the close of the seventeenth century. Modern science had arrived.

**Consequences of the Scientific Revolution**

The consequences of the Scientific Revolution were long-lasting and far-reaching. Many changes that came about as a result of the Scientific Revolution have helped define the modern world. The effects of the Scientific Revolution obviously reached the practice of science and the scientific community first, but they also eventually touched every facet of European life. In the century immediately following the Scientific Revolution, however, its impact was primarily on European intellectuals and leaders in certain industries and trades.

As a result of the Scientific Revolution, science came to rely on a modern scientific method that incorporated both theoretical and experimental approaches. Scientists no longer relied on tradition or established sources. They did not look to the ancients and interpret past knowledge. Instead, they asked new questions and sought to formulate new theories about the rational, ordered, and mechanistic natural world that surrounded them. Scientists investigated this world by using close observation and deliberate experiments. Science gained a broader audience among upper-class women and men. However, since women could not attend most universities, their involvement in scientific activities was less visible.

This new approach to science resulted in a greater understanding of the natural world, including the first coherent theory of the physical universe. Scientists did not limit their inquiries to the heavens, however. The revolution led to a much better understanding of the human body, as well. Andreas Vesalius published *Structure of the Human Body* in 1543, and its descriptions of human tissues and muscles overthrew many ancient ideas about anatomy and dissection. William Harvey produced *On the Movement of the Heart and Blood* in 1628, and the work established the idea of the continual circulation of blood through veins and arteries. Using a microscope, Anton van Leeuwenhoek was the first to see blood corpuscles, spermatozoa, and bacteria.

The new astronomical knowledge had practical implications, as well. The tides could now be understood and predicted based on the gravitational relationship between the sun, earth, and moon. The invention of timepieces and a more exact understanding of the celestial bodies helped in mapmaking and navigation. While latitude measurements had been used by the ancient Greeks, longitude studies appeared in the eighteenth century. As local and regional maps improved, Europeans developed more accurate ideas of the sizes and shapes of continents.

With the changing practice of science, the scientific community changed, as well. Scientists had increased contact with each other, and an international scientific community emerged. Science was considered one of the principal enterprises of European
society and one whose primary aim was the expansion of knowledge. Organized groups formed to pool funds and equipment and foster the exchange of ideas. The most notable of these early societies was the Royal Society of London, founded in 1662, which Newton presided over in the early eighteenth century. Groups such as these led to the proliferation of scientific knowledge and the rapid spread of ideas.

Changing ideas about science and new knowledge about the natural world had profound implications in other areas of the European society, including religious thought. The belief that human reason would unlock the mysteries of the universe ended religion’s dominance over society. At the same time, paradigms were adjusted as humans learned they were no longer at the center of the universe. The ancient views of perfect and predictable heavens were shattered. This revolution and shift in thought increased the gap between Christianity and science. On the other hand, the Scientific Revolution also brought about a new sense of hope and belief in man’s capacity to understand all things through reason, math, and science. Alexander Pope expressed this best: “Nature and natural laws lay hid in night; God said, ‘Let Newton be,’ and all was light.” This confidence in reason and science led to the secularization of European societies, while religious enterprises were pushed to the sidelines.

Although practical applications of the Scientific Revolution took time to reach everyday citizens, other less obvious consequences touched European society. The new reliance on evidence changed legal practices and inspired an end to witchcraft accusations and trials. People who studied the humanities pursued more evidence, authenticated manuscripts, and emphasized chronology. The emphasis on reason and order also promoted the idea of a fundamentally orderly universe for all people, a belief that led to the idea of universal justice and the hope for orderly and harmonious societies.

Practical applications of the new knowledge would increasingly be applied to diverse problems as the eighteenth century unfolded, influencing living standards and economic policies by 1800. The Scientific Revolution paved the way for agricultural and industrial improvements in Great Britain. The practical application of science also had political ramifications. Absolutist rulers viewed science as a means for enhancing their power and prestige. In turn, they supported social organizations and provided government stipends for scientific activity and research. Constitutional states also encouraged scientific research, although often without direct government support or patronage. The development of calculus and new discoveries in chemistry increased the use and production of artillery. More artillery meant increased taxes, increased governmental crises (as governments paid for more expensive armies), and European dominance of other peoples through military advantage.

Ironically, as institutions, laws, and power solidified around the mathematical certainties that underpinned the Scientific Revolution, the era also ushered in a growing tide of skepticism. Michel de Montaigne was one of the early skeptics who wrote in the late sixteenth century. His essay “On Cannibals” suggested that, while Europeans could easily recognize the barbarity of the actions taken by a society that accepted and practiced cannibalism, they were blind to the barbarity that was accepted and practiced in their own society. By the end of the seventeenth century, Pierre Bayle was the great spokesman for skepticism. In 1697, Bayle published his *Historical and Critical Dictionary*, in which he argued that those things humans considered as truth are often subjective opinion, and that holding onto one’s fixed beliefs is ill-advised. Bayle and
Montaigne’s views promoted more toleration of the cultures that were opening up to Europeans as they travelled the globe.

Although the Scientific Revolution had many consequences for Europeans, some of those effects were not realized for decades. Some immediate consequences were not obvious. For although the methods and goals of science had changed, it was the new ways in which people thought about science, the universe, and the heavens that were truly radical. What began with Copernicus and ended with Newton has been called “the greatest spiritual readjustment that human beings have been required to make.” On all accounts, it was revolutionary indeed.

**Extensions**

- Read Galileo Galilei’s *Starry Messenger*. In what ways would Galileo’s claims stun European intellectuals? What did Galileo see with the telescope that he devised?
- Read *Discourse on Method* by René Descartes. What approach does Descartes promote for discovering truth?
- Search online for a biography of Galileo Galilei and read one that you find.
- Watch the film *Galileo* (a 1975 film version of the Bertolt Brecht play *The Life of Galileo*). Why was the Catholic Church so threatened by Galileo’s theories? If you were Galileo, would you have responded in a similar or different manner? Why?

**Summary**

After Copernicus, other astronomers and mathematicians began studying the heavens. Brahe compiled vast amounts of data at his observatory. Kepler used this data to formulate three laws of planetary motion and find a mathematical explanation for a heliocentric universe. Galileo used the telescope to provide further evidence for heliocentrism and erase the boundaries between the earthly and heavenly realms. Newton put all these ideas together in his *Principia*. He showed that motion on earth and in the heavens was explained by the same laws and subject to gravitation. Newton explained why celestial bodies, including the earth, moved as they did.

The revolution in science was accompanied and aided by philosophical changes. Francis Bacon and René Descartes provided systematic methods to find truth and urged thinkers to doubt the wisdom of the ancients and find true knowledge in reason and the natural world. Together their ideas formed the basis for the modern scientific method and ushered in a new way of thinking about the world and our relationship to it. Although the eventual consequences of the Scientific Revolution were many, the most important for most Europeans of this era was a new way of thinking about the universe.

**Looking Ahead**

The Scientific Revolution set the stage for a new worldview seen in the Enlightenment. European thinkers would come to value reason, progress, natural science, and man’s intellectual autonomy from God—all ideas that can be seen emerging from the Scientific Revolution. Enlightenment thinkers believed that the methods of
natural science should be applied to every aspect of European life. Although people thought that science and progress could lead to a better life for all Europeans, the Enlightenment primarily involved intellectuals and aristocrats, including a group known as the philosophes. However, some of the practical applications of the Scientific Revolution would start to impact the economic and social lives of Europeans during the eighteenth century.

**SELF-CHECK ANSWERS**

1. Kepler developed three laws of planetary motion: (1) planetary motion is elliptical, not circular; (2) planets do not travel at a uniform speed in their orbits; (3) the length of time a planet takes to make a complete revolution around the sun is related to its distance from the sun.

2. The law of universal gravitation

3. Bacon advanced the inductive method, while Descartes advocated the deductive method.

4. The Royal Society of London
**Essential Questions**

- What events, ideas, or people helped inspire the Enlightenment?
- What topics and currents of thought were important to thinkers during the Enlightenment?
- What were the roles of the philosophes during the Enlightenment?
- Why did the Enlightenment develop most extensively in France?

**Keywords**

deism  
double entendre  
innuendo  
natural law
Set the Stage

As a result of the Scientific Revolution, Europeans started thinking about their world—indeed their universe—in a whole new way. The facts had changed, but thanks to the scientists and philosophers of the seventeenth century, ways of uncovering them changed too. As the ideas of the Scientific Revolution became more accessible to middle-class Europeans, people began looking for ways to apply the scientific method and natural laws to all aspects of life, not just scientific pursuits. This appeal to reason, intellect, and progress started coalescing at the end of the seventeenth century. It would soon come to be known as the Enlightenment, a movement spread by prominent philosophers and writers known as the philosophes.

Origins of the Enlightenment

The Enlightenment was an intellectual and cultural movement that developed gradually and reached its climax around 1750. The Enlightenment spanned nearly a century, with each generation developing more radical ideas than its predecessors. The decades immediately before and after 1700 were especially crucial in developing a new worldview based on the Scientific Revolution. This worldview stressed that the methods of natural science could successfully be applied to all aspects of life. Reason could help inform and improve people, institutions, government, and society as a whole.

On the heels of the Scientific Revolution, talented writers and philosophers made the ideas of the Scientific Revolution more accessible to nonscientists, and the popularization of science was a major factor in bringing about the Enlightenment. Perhaps the most famous and influential of these popularizers was Bernard de Fontenelle (1657–1757). His Conversations on the Plurality of Worlds, published in 1686, coupled fiction with a discussion of the new astronomy described in layman’s terms. In his book, Fontenelle describes an upper-class woman who, after two evenings under the stars with her lover, comes to understand and embrace the basics of the mechanistic universe discovered during the Scientific Revolution. Although

Fontenelle contemplating the plurality of worlds
Fontenelle was not a scientist, he was able to communicate scientific knowledge to a wider, more general reading audience.

These writers also brought science into conflict with religion, which was a major development in changing eighteenth-century thought. The majority of seventeenth-century scientists—including Galileo, Kepler, and Newton—had undertaken their studies to glorify or better understand God’s design. But as scientific knowledge spread, the opposite occurred. Instead of strengthening religion, scientific knowledge caused more people to question the beliefs they once held as truths.

Skepticism, which had appeared in various forms for centuries, increased on the eve of the Enlightenment. Pierre Bayle (1647–1706) attacked dogmatism and religious intolerance in his Historical and Critical Dictionary of 1697. Bayle was a French Huguenot who, like his fellow Huguenots, was exiled from his native France by Louis XIV. He found refuge in the Netherlands where religious toleration and intellectual freedom abounded. Bayle did not believe in forcing people to believe in a given set of religious ideas. He thought that a diversity of religions would benefit, rather than harm, nation-states. Bayle criticized past religious customs and argued that human beliefs about religion were riddled with error and subject to various interpretations. He promoted open-minded toleration, which became a theme for many Enlightenment thinkers. He maintained that individual conscience should determine one’s behavior and actions. Like many other thinkers of his era, Bayle believed that the Bible should be held to the same rigor of textual examination and criticism as other documents.

In addition to religious and scientific writings, the Enlightenment was also inspired by travel literature. As Europeans travelled the globe, they brought home reports of other cultures from China, Africa, India, and the Americas. Traders, missionaries, doctors, and explorers described people with diverse religious and cultural beliefs and practices. As Europeans saw the diversity of humanity, they began to have reservations and increasing questions about European culture and Christianity. Things that were once grounded in absolute truth were being viewed through the lens of custom and relativity.

Although all of Europe had started forming new ideas about knowledge and the universe, the legacy of two Englishmen—Isaac Newton and John Locke—did much to inspire the Enlightenment. Newton’s success in physics and his ability to form natural laws based on experiment inspired his fellow countryman John Locke to look at human psychology in terms of experience. Locke’s Essay Concerning Human Understanding, published in 1690, shook traditional views about how humans learn. According to Locke, our knowledge comes from reason, not faith, and from environment, not heredity. The combined ideas of Newton and Locke led to the Enlightenment idea of progress based on reason, and as the eighteenth century unfolded, intellectuals of the Enlightenment believed they could apply Newton’s ideas about the universe and natural laws to government, economics, law, religion, politics, and the arts.
Finally, the Enlightenment was possible due to the period of stability in Britain following the Glorious Revolution of 1688. This peaceful period provided an example of mutually beneficial progress and reform. Europeans looked to Britain as a prime example of enlightened reforms, including religious tolerance (for most), limited royal power, and relative freedom of the press. Britain’s more relaxed policies had not led to a corrupt and unmanageable populace, but instead to a nation of loyal, content, and relatively prosperous citizens. This situation, although somewhat idealized, was contrasted with more repressive policies throughout the rest of Europe, especially in France. Writers who would come to shape the Enlightenment looked to spread the liberal ideas they saw flourishing in Britain. One influential Enlightenment writer, François Marie Arouet, who later became known as Voltaire, spent three years in England in the late 1720s and played a major role in popularizing the ideas of English science and politics.

**The Main Currents of Enlightenment Thought**

Although the Enlightenment came about gradually, by the late 1740s, some people had started to consciously identify themselves as part of the movement. Unlike many periods throughout history, the Enlightenment was given its name by its participants during their own time. These writers, thinkers, and philosophers—called philosophes—viewed their era as the point in history when European civilization would emerge from the darkness of the past into a period of enlightenment, where reason and education would dispel the myths and superstition of the past. Among these philosophes were Voltaire, Montesquieu, Rousseau, and Diderot. *Reason, natural law, progress,* and *hope* were the buzzwords during the Age of Enlightenment.

The eighteenth-century philosopher Immanuel Kant (1724–1804) defined the Enlightenment as “man’s leaving his self-caused immaturity.” He defined immaturity as “the incapacity to use one’s intelligence without the guidance of another.” Enlightenment thinkers believed that the same method natural scientists used to explore nature should be used when studying all other aspects of human existence. The scientific method, they argued, could discover laws of human society, as well as those governing the natural world. This application of the scientific method to all realms of life was what the philosophes meant by reason. No aspect of life or
knowledge should be taken on faith. Everything was subjected to rational, experimental, and critical ways of thinking. Enlightenment thinkers believed that reason would reform societal ills. Kant’s motto for the Enlightenment was, “Sapere Aude [Dare to know]! Have the courage to use your own intelligence!”

The emphasis on faith in reason, as opposed to faith in faith, caused discord between Enlightenment thinkers and established churches. Churches drew their authority from the Bible and Christian theology, but like everything in the Enlightenment, these sources of knowledge were being questioned. The Enlightenment was a secular development, and it regenerated the secular and material ideas of the Renaissance. In the Encyclopédie—the massive work published between 1751 and 1772 that exemplifies Enlightenment thought—an entry on “The Philosopher” notes that “Reason is in the estimation of the philosopher what grace is to the Christian. Grace determines the Christian’s action; reason the philosopher’s.”

The ideas of the Scientific Revolution, coupled with the destruction that resulted from the Thirty Years’ War (1618–1648) and its religious intolerance, caused many Europeans to question conformity to religious doctrine and unity. What good was it to strive for religious unity if it just led to war and suffering? Many thinkers doubted whether religious truth could be ascertained at all. Philosophes used many ideas in Pierre Bayle’s Dictionary to attack theology and belief in superstition. As a testament to Bayle’s influence during the Enlightenment, his Dictionary was found in more private libraries in eighteenth-century France than any other work.

As some Enlightenment thinkers criticized religion, another kind of nonreligious faith started to dominate European society. It was the idea of progress—a faith that the human condition and human intellect will improve as time goes on. Although the idea of progress was present before the Enlightenment, it coalesced and became explicit around 1700. Progress was a mainstay of Enlightenment thought, and it continues to dominate modern Europe. Enlightenment thinkers believed in the possibility and pursuit of progress, especially intellectual progress. They also thought that human societies and individuals would improve with changes in their environment. Material improvements—such as better standards of living—would lead to moral improvement and better civilizations. Through humanitarian efforts and paradigms, inhumane behavior and institutions could be stamped out.

Although religion came under attack during the Enlightenment and religious skepticism grew, not all philosophes opposed religion. The philosophes were interested in a religion without fanaticism and persecution—a religion that fit with the new worldview that came out of the Scientific Revolution. Some philosophes, including Voltaire, found their answer in deism, which came to be the religion of the Enlightenment. Deism, or “natural religion,” promotes an impersonal or “clockmaker God,” who set the universe in motion but does not intervene in the daily lives of people. Newtonians believed that nature was rational, and deism set forth a rational creator that fit well with many currents of Enlightenment thought.

---

2. **SELF-CHECK**

Who wrote the influential Historical and Critical Dictionary, published in 1697?

---

3. **SELF-CHECK**

What Latin term did John Locke use to refer to the impressionable, moldable nature of infants?

---

**deism** the religion of the Enlightenment that promoted an impersonal or “clockmaker God,” who set the universe in motion but did not intervene in people’s daily lives.
The Role of the Philosophes
The philosophes were intellectuals who discussed the major ideas of the Enlightenment. Although *philosophe* is the French word for philosopher, not all philosophes were French, and most were not philosophers. In the eighteenth century, being a philosophe meant one was inquisitive and critical. A few of the philosophes were university professors, but most were publicists, statesmen, political scientists, freelancers, journalists, and social reformers. Although they lived all over Europe, they mainly came from the nobility and middle class. They often gathered in the salons of wealthy upper-class women’s homes. The gatherings came to be known as salons. In salons, the philosophes discussed politics, religion, science, and philosophy without fear of censorship or punishment.

The philosophes did not examine questions of existence in the traditional philosophical sense. They didn’t merely discuss the world; they sought to change it. They were people who hoped to spread knowledge and reason to others. They wanted their beliefs to impact all European economic and social elites. They wanted to reach the public. To the philosophes, the public was the educated middle class, the commercial and professional classes, noblemen, and country gentlemen. Philosophes were not concerned about reaching the common people, who, because they had neither the time nor the money to engage in intellectual pursuits, they believed would always adhere to superstition and be plagued with confusion.

Philosophes had a wide audience, thanks to the demand for newspapers, encyclopedias, surveys in all fields, and magazines—all of which had proliferated throughout Europe. The Enlightenment flourished in print culture. As literacy increased across Europe, the printed word became the primary method of communicating. As books became more common, they were increasingly filled with secular and material matters, rather than religious ones. Writers could earn a living from their trade, and some of the most popular philosophes did. However, as books became more accessible and allowed the public to freely spread ideas, continental governments continued regulating the book trade, punishing authors for heretic material and censoring work.

All philosophes wrote under some censorship, but the degree of censorship varied. It was relatively mild in England, but quite strong in Spain. Although France had laws against open criticism of the church and state, censorship was not very common and was not much of an issue at all after 1750. Due to the varying degrees of censorship, the philosophes wrote plays, novels, and manuscripts with heavy doses of satire and *innuendo*. They used comedy and *double entendre* to communicate their ideas. Some philosophes wrote under pseudonyms and used double meanings to make their critical points. These writers attacked ideas rather than specific institutions and people. A prime example of Enlightenment writing was the Baron de Montesquieu’s *Persian Letters*, published in 1721, which were written from the perspective of a tourist who viewed European customs in clever and critical ways.

**innuendo** a subtle hint, allusion, or insinuation

**double entendre** ambiguous language that can have a double meaning or lead to multiple interpretations
Despite facing censorship, particularly in the early Enlightenment, philosophers were committed to the ideas of reform, reason, and progress for the sake of human liberty. They appealed to facts and experience while challenging the authority of churches, condemning superstitious behavior, and rejecting traditional Christianity. Since many philosophers were not allowed to freely write as they wished, they called for freedom of expression. They promoted equality of rights for those of different religious views. They also called for reducing the privileges for nobility, and they promoted fairer administration of justice and taxation. Some philosophers also supported increased (but not equal) rights for women, especially in the form of more education.

No area of thought was more contentious or pervasive for the philosophes than politics and government. Many philosophes were discontent with their own governments, but none more so than the French. Their ideas about proper government varied, but most philosophes opposed democracy in favor of a limited monarchy sharing powers with the nobility. Though it may seem strange today, for eighteenth-century Europeans, royal absolutism was a fact of life. Philosophes proposed reform in the shape of a benevolent, enlightened ruler because, ultimately, they distrusted the common people and did not think that government by the people would be possible, much less productive. Philosophes did succeed in promoting the ideas of enlightened absolutism. Frederick the Great of Prussia was himself a philosophe. He was a friend of Voltaire and hosted gatherings with literary and scientific figures in Potsdam. He wrote on various subjects and was known for having a keen wit. Catherine the Great of Russia was also a philosophe, as was Joseph II of Austria.

Although they disagreed on many issues, the philosophes were mostly united in their efforts for reform and their belief in individual liberty, rationalism, and progress for much of the eighteenth century. Around 1770, however, the unity and harmony among philosophes broke down. Some philosophes, such as Baron Paul d’Holbach (1723–1789), tried to distinguish themselves by exaggerating ideas and taking extreme antireligious positions.

D’Holbach, like other philosophes, regularly met with other writers and intellectuals. One of these was the Scottish philosopher David Hume (1711–1776). Hume believed that we are informed by our sensory experiences and that reason cannot get one any closer to the truth than our senses can. This belief undermined the Enlightenment faith in reason, which was also attacked by Jean-Jacques Rousseau. The Swiss Rousseau was greatly influenced by the early philosophes, such as Voltaire and Denis Diderot, but he later became suspicious and paranoid. Becoming a loner, he broke from many of his predecessors’ ideas and condemned rationalism and civilization for causing the degeneration of individuals.

The Enlightenment and France
The movement touched all of Europe, but Paris was the capital of the Enlightenment. France was the wealthiest and most populous country of the age, and it was the
cultural center of Europe. French was the international language of the educated elite by the 1700s, and it was the language of the academies in St. Petersburg and Berlin. Even Frederick the Great wrote in French. French tutors educated the rich and powerful throughout Europe, inculcating the values of the Enlightenment in their pupils.

Another reason the Enlightenment thrived in France was because the French stronghold on religious conformity, orthodoxy, and absolutism weakened slightly after Louis XIV’s death in 1715. Books could be censored or banned, and sometimes were, but their authors were only jailed, not executed or tortured. Intellectual radicals faced challenges and resistance, but not in the overwhelming ways that their counterparts did in central and eastern Europe. These radicals gathered in Parisian salons, which were the hub of Enlightenment thought, discourse, and exchange.

Extensions
• Read John Locke’s *An Essay Concerning Human Understanding*. What does Locke say about innate ideas? According to Locke, where do ideas originate? To Locke, what are the limits of human understanding?

Summary
On the heels of the Scientific Revolution, a new way of thinking developed, leading to the Enlightenment of the eighteenth century. Writers and philosophers made the ideas of the Scientific Revolution more accessible to middle-class Europeans, and as scientific knowledge reached the layman, skepticism spread. Skepticism was fueled by travel writers, who brought home reports of foreign cultures and religions around the world, and by John Locke, who argued that experiences and environment shape human understanding.

Enlightenment thought stressed reason, natural law, progress, and hope. Religion came under increasing attack, and a new type of religion—deism—found support during this time. Enlightenment ideas were spread by the philosophes, who were writers and thinkers who critically and inquisitively examined all aspects of European life. They often had to express their ideas creatively, through comedy, satire or innuendo, due to pervasive censorship and fear of punishment. Although the philosophes were spread throughout Europe, the intellectual hub of the Enlightenment was in France, especially in the French salons.

Looking Ahead
Individual philosophes shared many ideas, but the group did not have one unified voice. Indeed, many of the most influential philosophes, such as Voltaire, Montesquieu, Rousseau, and Diderot, held divergent views on issues related to religion, society, and government. Meanwhile, economic matters in the eighteenth century were heavily influenced by a group called the physiocrats. The physiocrats’ theories and writings pushed Europe away from traditional and accepted ways of doing business and helped bring about the modern world’s economic systems.
1. The generation set between Newton’s *Principia* in 1687 and Louis XIV’s death in 1715 was responsible for solidifying a new worldview based on the ideas of the Scientific Revolution.
2. Frenchman Pierre Bayle
3. Locke said that infants were born as tabula rasa, or blank slates.
4. Deism
5. Salons
The Philosophes and the Physiocrats

Essential Questions

• What were the key beliefs of Voltaire, Montesquieu, Rousseau, and Diderot?
• What was the role of the physiocrats in eighteenth-century French economic theory?
• What were the similarities and differences between the philosophes and the physiocrats?

Keywords

invisible hand of the marketplace
laissez faire
Old Regime
universalists
Set the Stage

The philosophes popularized Enlightenment thought, and though they agreed on many issues, it would be a mistake to imagine that there existed one all-encompassing strain of Enlightenment philosophy. Contradictions and disagreements abounded. Indeed, some of the most influential philosophes, including Voltaire, Montesquieu, Rousseau, and Diderot, held beliefs on government, religion, and society that were not uniform.

In another realm of society, the Atlantic economy had been growing since the mid-seventeenth century through mercantilist policies that increased the power of the state. Agricultural improvements had improved production and efficiency. This growing economy made economic matters prominent in the Enlightenment, and many philosophers and economists looked for ways to reform and improve economic theory, practice, and institutions. One prominent group to do just that was the physiocrats, who promoted economic theories that addressed historical problems and helped shape modern economics.

The Philosophes

During the Enlightenment, the philosophes agreed on some things but had divergent ideas about the political, religious, and social issues of their day. Although there were many philosophes, four prominent figures were Voltaire, Montesquieu, Rousseau, and Diderot. Examining the ideas of these four men provides a closer look at Enlightenment ideas and those who spent their time communicating those ideas to middle- and upper-class Europeans.

Voltaire (1694–1778)

François Marie Arouet, better known by his pen name Voltaire, was a prolific and witty critic of the Old Regime. He produced numerous essays, letters, stories, plays, and histories that helped popularize the ideas of the Enlightenment. It wasn’t until after he was forty, however, that Voltaire’s work focused on matters of philosophy. The first collected edition of Voltaire’s works, published from 1784–1789, totaled 92 volumes. Voltaire’s sarcasm, clever style, and commitment to intellectual freedom won him both admiration and resentment.

Voltaire’s writings took aim at religious fanaticism and hypocrisy. One of Voltaire’s most famous works was the satirical tale Candide, published in 1759. This novelette attacked superstition, religious persecution, war, and an uncritical optimism about the human condition. Candide responded to the stupidity and shallow optimism that Voltaire believed characterized human nature. The story recounts the misadventures of a young man who ultimately learns the best we can hope for is “to cultivate our own garden”—or to develop our own intellectual capacities without interference.

Like all philosophes, Voltaire had strong ideas about government, although political liberty concerned him much less than it did Montesquieu and some
other philosophes. Voltaire was a proponent of enlightened despotism. He corresponded with Catherine the Great of Russia and Frederick the Great of Prussia, the latter of which he regarded as the ideal of an enlightened ruler. Voltaire spent two years at the court of Frederick the Great. The two men believed in enlightened top-down reform and distrusted the ignorant masses. To Voltaire, enlightened government meant religious and intellectual tolerance, a subordinate clergy, and an agenda against sloth and ignorance that advanced material and technological progress.

While some monarchs promoted reforms that were designed to make their governments more efficient, even the most enlightened ruler would not enact reforms that might undermine his or her absolute authority. The French Revolution of 1789 tempered even these moderate reforms. Monarchs across Europe feared that more reforms may inspire revolutionary upheaval.

While Voltaire criticized religious fanaticism and traditional Christianity, he advocated deism. In fact, many philosophes were followers of deism, which seemed like a more natural and logical approach to religion than the supernatural and mystical teachings of Christianity. The deists believed in a God who created the universe and set it in motion to operate in accordance with natural laws. This God, who they called the Prime Mover, did not interfere with the operation of his creation. He was not involved with people's daily lives and did not respond to prayer. Many deists did believe in life after death. They thought God would reward or punish individuals based on their moral conduct during their lives on earth. Deists rejected many of the fundamental doctrines of the Christian faith.

Largely as a result of his own experiences, Voltaire wrote about and advocated tolerance. After being imprisoned for two short periods by the French authorities after insulting a French official and a nobleman, Voltaire lived in England from 1726 to 1729. While there, he witnessed Isaac Newton's burial at Westminster Abbey in 1727. He admired Britain's tolerant policies in matters of politics and religion. After he returned to France, Voltaire wrote *Letters on the English* (1733)—which expressed the author's approval of England's constitutional government and criticized French absolutism—and *Elements on the Philosophy of Newton* (1738), which helped popularize the ideas of the Scientific Revolution. Voltaire

![Voltaire at a salon](image-url)
believed that Newton was history’s greatest man, and Voltaire did much to spread the Enlightenment ideas of science and reason passed on from the Scientific Revolution.

Voltaire vehemently crusaded for religious tolerance. In his Treatise on Tolerance (1763), Voltaire defended Jean Calas, a Huguenot merchant from Toulouse who was executed in 1762 for allegedly murdering his son to prevent the son’s conversion to Catholicism. Voltaire contended that the case was groundless and that Calas was convicted by a court dominated by anti-Protestant hysteria. Voltaire claimed that “revealed” religion made people stupid and cruel. He famously called for people to destroy organized religion when he proclaimed, “crush the infamous thing!” Voltaire urged the authorities to conduct a new investigation, which led to Calas’ acquittal in 1765.

**Baron de Montesquieu (1689–1755)**

Charles-Louis de Secondat, Baron de Montesquieu, was a French attorney and philosopher. As an aristocrat, Montesquieu inherited a seat in the Parlement of Bordeaux, one of France’s thirteen high courts, from his uncle. His experience as a French Protestant and a member of the Bordeaux parlement greatly influenced his writing. Montesquieu was also a member of the Bordeaux Academy of Science, where he presented scientific papers. After his early success with The Persian Letters in 1721, Montesquieu and his family settled on a large French estate where he studied history and politics. Like Voltaire, first-hand experiences with the English political system profoundly impacted Montesquieu’s ideas. Both men used wit and satire, and both attacked superstition. However, Montesquieu’s most influential works were concerned with government.

Montesquieu’s greatest work was The Spirit of the Laws, published in 1748, which held up the British constitutional model as the best example of a government with regulated power. The Spirit of the Laws set forth two primary ideas. The first, despite Montesquieu’s admiration for the British system, held that different types of government were appropriate for different groups of people. Unlike Voltaire, Montesquieu did not hold any one political system in higher regard than the others. Rather, which system was appropriate for a given nation depended on its people, size, customs, religion, and even its climate. Montesquieu thought that large nations, such as Russia, tended toward despotism; medium-sized nations, such as France, toward monarchy; and small-sized nations, such as Switzerland, toward a republic. Like Voltaire, however, he advocated for a constitutional monarchy in France.

The second idea set forth in The Spirit of the Laws was the concept of the separation of powers between the executive, legislative, and judicial branches of government. Montesquieu believed this division of authority with its checks and balances would place effective limits on the power of the executive and thereby protect individual rights. This concept seemed an indictment of the abuses within French absolutism. Montesquieu maintained that checks and balances would restrain the vices of varied political systems: tyranny with monarchies, factionalism with oligarchies, and anarchy with democracies. Montesquieu advocated for the aristocracy and thought that the parlements played an important role in limiting the power of the monarch. These ideas
influenced the writers of the American Constitution in 1787 and the French Constitution of 1791.

Jean-Jacques Rousseau (1712–1778)

Born in Geneva, Jean-Jacques Rousseau was the Protestant son of a watchmaker. He rebelled against the restrictions imposed by the Calvinist tradition of the city, and his life was riddled with misfortune. He was a neglected child and a runaway by age sixteen. He shuffled from job to job, found patronage among older women, and eventually married a local barmaid. With her he had five children, whom he later abandoned and sent to an orphanage. Rousseau did not find success as a writer until he was in his forties. For most of his life, he remained an outsider, constantly complaining of being misunderstood. He resented the influence of French women, especially those who hosted the Enlightenment salons where, unlike many philosophers, Rousseau did not feel at home.

Despite his personal misfortunes and maladjusted nature, Rousseau was one of the most profound and influential writers of his day. In Discourses on the Arts and Sciences and Discourses on the Origin of Inequality Among Men, two of Rousseau’s earlier works, he portrayed civilization as corrupting humans’ natural inclination for mutual association, leading to exploitation and artificial divisions. While other philosophes believed that material progress and increased production would lead to the good life, Rousseau questioned the definitions typically given for the good life. He thought the commercial, industrial life of Europeans precluded a moral, virtuous, and sincere existence. Rousseau glorified the life of the noble savage, exemplified by Native Americans. These humans, Rousseau argued, had no need for reason; instinct and emotion produced all the happiness they needed. The best qualities in humans—kindness, honesty, understanding, and unselfishness—were products of nature, not society. Rousseau was the “man of feeling” who trusted senses and impulses more than reason and logic. He became a critic of the Enlightenment and an influence on the coming age of romanticism.

In matters of religion, Rousseau also differed from many of the philosophes. He was religious by temperament, but did not believe in the established religions with their churches, revelation, ritual, and clergy. He respected the Bible and believed in a God of love and beauty. Rousseau’s ideas on religion made it easier for his contemporaries to reject the established orthodoxy and discipline of the church. As such, established churches feared Rousseau. Protestants and Catholics accused him of being the most dangerous of the philosophes regarding religious matters.

Although Rousseau differed from the other philosophes in many ways, he shared their passion for reform. Rousseau especially argued for reforms in education and government, advocating for natural education. He believed that people living in a state of nature had once been virtuous, free, equal, and happy. People needed education that was free of the corruption and constraints of society. Rousseau established these ideas in Emile or On Education (1762), which is part treatise and part novel. The story has two heroes: Rousseau, the teacher, and Emile, his pupil. Rather than the formal book learning typical of eighteenth-century schools, Emile is educated through direct experience. He was not forced to read at a young age or subjected to severe discipline. Rousseau’s ideas promoted a new approach to
child-rearing and education. He emphasized positive experiences, rather than memorization or an early emphasis on reason.

Within Rousseau’s educational system and worldview, he espoused different social spheres for men and women. He viewed women as naturally fitted for the domestic sphere only—he saw no place for them in politics or civic life. Rousseau believed women were fundamentally subordinate to men and their education should be toward that end. In Rousseau’s mind, women were inferior to men in every way, except perhaps in their ability to provide love and nurturing. Paradoxically, Rousseau amassed a huge following among women, perhaps because he did stress their vital role in the home and noted the importance of their emotions. Rousseau portrayed the domestic role of women as noble, fulfilling, and purposeful. Rousseau’s writings had the practical effect of encouraging women to breast-feed and nurture their own children, rather than sending them to wet nurses, as was common during the age.

Rousseau communicated his ideas on government and politics in *The Social Contract* (1762). The treatise opens with the words: “All men are born free, but everywhere they are in chains.” Rousseau believed that government restricted individual freedoms, but he also thought it was a necessary evil. Rousseau hoped government could be less evil, however, if it could be reconciled with individual liberty. In an effort to promote reconciliation, Rousseau advocated a radical form of the contract theory of government. Rejecting the extreme individualism advocated by many of his fellow philosophes, Rousseau stressed the role of the individual as a member of society. Like Plato and Calvin, Rousseau believed that freedom was obeying the law.

Rousseau’s social contract involved the members of society who agreed to be ruled by their general will (the pursuit of the common good), rather than a contract between people and a monarch. Although Rousseau never made it clear how the general will would operate in actual practice, he believed that all members of society would participate in the formulation of the general will, which would then be executed by a small group. Rousseau maintained that the general will is always right and obedience to the general will was an act of freedom. Rousseau did not actually favor democracy in the modern sense of the word, but his idea of the general will—and particularly the idea that ultimate sovereignty resides with all the people—had a great influence on the development of democracy.

**Denis Diderot (1713–1784)**

Denis Diderot achieved fame for being one of the editors of the *Encyclopédie* or *Reasoned Dictionary of the Sciences, Arts, and Trades*, a seventeen-volume reference work that ambitiously set out to arrange the sum total of human knowledge alphabetically, without deference to religious or political authority. Between 1751 and 1772,
Diderot and d’Alembert edited the massive work that had over 160 contributors, including Voltaire, Rousseau, and Montesquieu. The *Encyclopédie*, published in France, was both a compendium of knowledge and a means for spreading the philosophes’ often radical ideas about government, economics, religion, philosophy, and other current affairs. Many of the articles created controversy by taking a critical perspective on organized religion or by revealing the trade secrets of guilds. In addition to print articles, the *Encyclopédie* provided illustrations designed to convey practical knowledge about science, the military arts, and manufacturing.

Diderot possessed an expansive mind, which led him to write in a variety of genres, including drama and education for the deaf. He was also incredibly committed to the *Encyclopédie* and was almost entirely responsible for holding together the massive writing, editing, and publishing effort that spanned decades. He was a favorite in the salons and courts across Europe, including Catherine the Great’s court in Russia.

Diderot was one of the first outspoken atheists and a vocal critic of European empires. Diderot believed that no standard and superior view of humanity should allow cultures to conquer and dehumanize other peoples. Diderot believed that the new cultures encountered by European explorers should be respected and understood. He condemned the greed of Europeans and denounced slavery, telling Europeans “you have no right to the natural products of the country where you land, and you claim a right over your fellow-men. Instead of recognizing this man as a brother you only see him as a slave, a beast of burden.” Although Diderot’s anti-slavery ideas became part of a larger movement in the late eighteenth century, his critique of imperialism remained on the periphery, shared only by a few other philosophers during the Enlightenment.

**The Physiocrats**

In France, physiocrats were men who concerned themselves with economic reform. They believed current legislation and administration prevented natural laws from operating freely in the market and society. Out of this criticism came the economic idea of *laissez-faire*. The term had its roots in the dictum of the French physiocrats: “Laissez faire, laissez passer,” or “Let do, let pass.” Those who advocated laissez-faire believed that the economy would regulate itself through its own natural laws if left alone. In advancing this doctrine, physiocrats repudiated mercantilism, the prevailing economic practice of the age, which emphasized state regulation of economic activity. Physiocrats believed that mercantile legislation—which was designed to protect a country’s trade from external competition—along with labor regulation by governments and guilds actually hampered the expansion of trade, agriculture, and manufacturing. Furthermore, the physiocrats argued that all economic production depended on agriculture. Physiocrats advocated for larger, more efficient farms in the spirit of the Enlightenment emphasis on rationalism and improvement.

In France, the physiocrats under François Quesnay (1694–1774) were the main advocates of laissez-faire economics. Quesnay was a biologist and surgeon who served as physician to King Louis XV and his mistress Madame de Pompadour. Quesnay rejected the mercantilist view that stressed the importance of nations...
gathering wealth in gold and silver. Instead, he insisted that land was the only true source of wealth. Quesnay believed that trade should not be regulated—a key mercantilist argument—but should be free of control. Rather than making goods more expensive by imposing tariffs and other taxes on them, Quesnay believed that the state should establish only one tax on income derived from land.

Adam Smith (1723–1790) was the eighteenth century’s most influential advocate of laissez-faire economics. Smith was a Scottish economist who attacked mercantilist doctrine and practice in his Inquiry into the Nature and Causes of the Wealth of Nations (1776). Smith contended that a nation’s wealth resulted from its production of goods by farmers, artisans, and factory workers. Since mercantilist regulations interfered with production, they restricted the expansion of a nation’s wealth. Smith believed that individuals should be free to pursue their own economic self-interest in a free economy, which would thereby promote the prosperity of the entire society as if individuals were guided by an “invisible hand of the marketplace.” He argued against monopolies and government favoritism. Instead of regulating economic activity, the government should restrict its role to that of a passive policeman, protecting the life, liberty, and property of its citizens. Smith’s ideas formed the basis of modern economics and capitalism.

The Wealth of Nations also embraced a prominent theory of the age—the four-stage theory. According to this theory, human societies progress through four different stages: hunting and gathering, pastoral or herding, agricultural, and commercial. Advancing through these stages meant moving from barbarism to civilized society. The commercial society was the most advanced, with developed cities, vast trading empires, and complex property and financial arrangements. The commercial stage also happened to describe the northwestern Europe of Smith’s era. Thus, his work allowed Europeans to see themselves as the ultimate society and justify their imperial agenda during the coming century. Europeans saw themselves as bringing civilization to the “barbaric cultures” around the world.

The Roles of the Philosophes and Physiocrats
Unlike the philosophes, many of the physiocrats were close to the government, working as administrators or advisers. Quesnay, for example, was a royal physician, while Anne-Robert-Jacques Turgot (1727–1781) was an experienced official who later became finance minister to Louis XVI of France. Men like these concerned themselves with fiscal and tax reform and worked to increase the national wealth of France. These were the first men to use the term laissez-faire as a principle of economic activity. They opposed guild regulations and price controls as impediments to producing and circulating goods. They favored strong government, however, that would overcome traditional obstructions and produce incentives for establishing new industries.

The physiocrats believed that progress would be achieved through the state with a rightly ordered government. That government might be a limited monarchy like the English model favored by Montesquieu, an enlightened despotism as espoused by Voltaire, or an ideal republican commonwealth as portrayed by Rousseau. The state would be able to shake people out of old habits, remove local regulations, and preserve law and order along with the enforcement of contracts. As such, the ideal state ensured the existence of a free market.
Although both philosophes and physiocrats depended on the state for many things, they were not nationalists in any later sense of the term. They were universalists who believed in the unity of mankind under the natural laws of reason. They maintained this classical and Christian outlook but in a secular way. They assumed that all peoples would participate in progress. For these men, no nation should have a particular message or identity. French ideas enjoyed a wide currency, but no one thought of them as particularly French or arising from an essentially French character. They believed that the French were simply in the vanguard of civilization at that time.

Marie-Jean Caritat, the marquis de Condorcet (1743–1794) supported these ideas. Condorcet was a leading philosophe in the Enlightenment and a champion of liberal causes. He embraced the French Revolution when it broke out. Condorcet wrote his Sketch of the Progress of the Human Mind (1794), in which he laid out the entire course of human affairs in ten stages, nine of which had already taken place. The tenth stage, Condorcet claimed, would bring utopia. Condorcet died in prison, a victim of the revolution he had supported. Many of the ideas of the philosophes and physiocrats would carry extensive influence and weight in the revolutions and economic upheavals of the nineteenth century.

**Extensions**

- Read Emile or On Education by Jean-Jacque Rousseau. Describe Rousseau’s ideal education for women.

**Summary**

Both philosophes and physiocrats wrote about the pressing issues of eighteenth-century Europe. Voltaire, Montesquieu, Rousseau, and Diderot were some of the most renowned philosophes. These men had varying beliefs about religion and government, although all were critical of some aspects of both. They advocated for reforms in government and education and set forth religious beliefs that countered traditional Christianity. All these men contributed to the Encyclopédie, which epitomized the Enlightenment idea that all knowledge was attainable.

French physiocrats and other economists and philosophers criticized the eighteenth-century economic system. They stressed the importance of agriculture and production and criticized mercantilism. They advocated a laissez-faire system of economics as set forth by Adam Smith in Wealth of Nations. They believed that nations and individuals would both be more prosperous with less regulation and government involvement in the economy. The idea of a laissez-faire economy follows with the Enlightenment emphasis on natural laws. Advocates believed that leaving the economy alone would allow natural laws to operate freely and that natural laws would result in the greatest benefit for all.

**Looking Ahead**

Although the most prominent philosophes and physiocrats were men, women played an important part in the Enlightenment. Either by hosting salons, acting as patrons for prominent thinkers, or contributing to the spirited debate of the
Enlightenment, many women sought to influence the trajectory of European society and philosophy. A few women played central roles in Enlightenment reforms through their roles as enlightened despots. While not all monarchs were viewed as enlightened despots, governments and political systems throughout Europe were influenced by the Enlightenment and the philosophes and physiocrats who called for reform.

**SELF-CHECK ANSWERS**

1. *Candide*
2. Montesquieu
3. The idea of the general will influenced the development of democracy.
4. Jean le Rond d’Alembert
5. Physiocrats argued against mercantilism, which aimed to protect a country from external competition and increase control of the state.
The Enlightened Despots

Essential Questions

• In what ways and to what extent did Enlightenment thought affect the reigns of Joseph II of Austria, Frederick the Great of Prussia, and Catherine the Great of Russia?

• What events and ideas characterized the reigns of Maria Theresa of Austria and Peter the Great of Russia?

• How did Maria Theresa’s policies compare with those of her son, Joseph II?

• What were the differences and similarities between the reigns of Peter the Great and Catherine the Great in Russia?

Keywords

conscription
enlightened despot
incognito
Old Believers
Set the Stage

Enlightenment thought affected every aspect of European life, including its political systems and rulers. Most of the philosophers advocated for top-down reform. Absolutism was a way of life in eighteenth-century Europe, and the philosophers hoped to influence the rulers with Enlightenment ideals. Many of them did. During the last half of the century, some rulers consciously promoted the ideas of the Enlightenment, but their efforts received varying levels of support from the aristocracy and the peasants. The rulers most associated with enlightened absolutism were in Austria, Prussia, and Russia. It was through the reforms of the Russian monarchs in the eighteenth century that Russia began to have a greater presence in European political and military matters.

During the Enlightenment, many philosophers and other intellectuals called for government reform. Outside of England, however, people thought successful reform would come from the top down and be achieved through an enlightened despot. The philosophes, like the monarchs, distrusted the masses and thought only a benevolent monarch could successfully enact needed reforms. Many philosophes corresponded with Europe’s rulers. They hoped to enlighten the monarchs, and some of the monarchs wanted to be enlightened. Rulers like Catherine the Great of Russia and Frederick the Great of Prussia sought the advice of the philosophes and valued their opinions. But the level of success the enlightened despots had in applying Enlightenment ideas and enacting meaningful reforms varied. The most influential of the enlightened despots were the rulers in Austria, Prussia, and Russia. These monarchs had two agendas in common. First, they wanted to increase and centralize the power of the state at the expense of other traditional centers of power, including the nobility, the church, and local governments. Second, they wanted to be major political and military forces in Europe.

Enlightened Absolutism in Austria

Maria Theresa

Maria Theresa reigned from 1740 to 1780. When her father, Charles VI, knew that he was not going to have a male heir, he devised a plan to guarantee the undivided succession of the Habsburg domains to his daughter. The agreement—called the Pragmatic Sanction—included his family, major foreign powers, and the nobility throughout his realms. When Charles VI died in 1740, Maria Theresa came to power as the empress of Austria, but as a woman she could not serve as the Holy Roman Empress. So instead her husband, Francis of Lorraine, became Holy Roman Emperor Francis I in 1745. His responsibilities as emperor left him little time for Austrian affairs, so that became the realm of Maria Theresa. Almost immediately after she came to power, Maria Theresa was drawn into the War of the Austrian Succession, which lasted from 1740 to 1748. She inherited an empire with little
money and a poorly organized bureaucracy. She was in a poor position to defend her throne against the French and Prussians, who disregarded the Pragmatic Sanction. During the conflict, Maria Theresa defended her right to inherit the domains of the Austrian Habsburgs. Although her efforts to preserve the political power of the Habsburg Empire were successful, she did lose Silesia to the Prussians.

The war convinced Maria Theresa that she should extend her control over her domains, so she enacted various reforms after 1748. She wanted to give the state greater control and increase its efficiency. Although Maria Theresa was extremely devout, she limited the political power of the papacy and taxed the clergy. She discouraged some of the more extreme practices of the church, such as public flagellation, but she did not believe in religious toleration. She also undertook serious administrative reforms, which centralized the bureaucracy, resolved provincial differences, and modified the tax system to make the nobility pay a share. While she did not attempt to extinguish the regional diets of the local nobility, she successfully diminished their control by creating a centralized bureaucracy for local affairs. She also made German the language for administrative affairs throughout Austria. During her reforms, Maria Theresa tripled the size of the military and established a military academy and engineering school. Later in her reign, she also promoted primary education to support economic productivity.

Apart from her son, Joseph II, who came to power after her death in 1780, Maria Theresa accomplished more in the way of alleviating serfdom than any other ruler in eighteenth-century eastern Europe. As a ruler, she was genuinely concerned about the welfare of her people, including the peasants and serfs. She worked toward reform for the agricultural population by reducing the power that lords had over their serfs and peasant tenants. She also reduced the amount of service labor, or robot, that landowners could impose on peasants. She advocated for smallpox vaccinations, abolished torture and capital punishment, and eased the burdens of serfdom. Although her reforms benefitted the Austrian people, Maria Theresa’s ultimate goal was to strengthen state control and recapture Silesia as tensions continued to mount between Austria and Prussia over the contentious piece of land.

Those tensions erupted in 1756 when Count von Kaunitz (1711–1794), an Austrian diplomat and adviser to Maria Theresa, engineered an impressive diplomatic coup. He successfully convinced the French government to give up its long-standing opposition to the Habsburgs. The French entered into an alliance with Austria and Russia against the “greater threat” of Prussia. In this Diplomatic Revolution of 1756, Britain was forced to pick sides to prevent another continental disruption in the balance of power. Britain supported Prussia because it wanted
to protect Hanover, the ancestral home of the British monarchy. Britain’s support of Prussia reignited the colonial conflict between Great Britain and France that played out around the globe. When the Seven Years’ War broke out in 1756, Prussia and Austria continued their battles, but now all the other alliances had changed, with profound consequences for three continents. Prussia succeeded in retaining Silesia under the leadership of another enlightened despot—Frederick the Great.

Joseph II

Joseph II, Maria Theresa’s son, was elected Holy Roman Emperor in 1765 following his father’s death. Although he served as coregent of Austria with his mother, he did not come to power until Maria Theresa died in 1780. During his ten-year reign, Joseph built on his mother’s reforms, although his efforts were more wide-ranging. Joseph aimed to modernize the instruments of the Austrian government to increase the crown’s control over Habsburg domains. He also increased the power of the monarchy over the church and nobility. He limited the power of the regional diets and the aristocracy even more than his mother had. He stressed passionless rationality above all else, but he did try to improve his subjects’ lives.

Joseph was a practicing Catholic, but unlike his mother, he granted limited religious tolerance to his other Christian subjects—including Lutherans, Calvinists, and Greek Orthodox—in his Edict of Toleration (1781). He also removed some of the restrictions on Jews and Protestants. Joseph also diminished the resources of the Catholic Church while further increasing state control over the church. He eliminated several hundred monasteries and convents and confiscated much of the church’s land, saying it was an unproductive use of the land. He set forth these ideas in his Edict on Idle Institutions. Joseph diverted the funds that previously went to church institutions to the development of secular hospitals and to the state treasury. He reorganized the training of the priests, hoping to instill in them greater loyalty to his subjects than to the papacy. The Roman Catholic seminaries were replaced with eight general seminaries under state control. The clergy essentially became employees of the state. He also reduced the power of the papacy in Austria by mandating that all communication to and from Rome be sent through the government in Vienna. Joseph required that all bishops and high-ranking clergy swear obedience to Austria’s ruler.

Joseph enacted many legal and economic reforms. He eliminated several internal tariffs to promote trade, and he encouraged infrastructure development, such as road building and river transportation improvements. Joseph himself inspected manufacturing districts and farms. He also granted freedom of the press. He introduced legal equality in many arenas. While Joseph’s mother taxed the nobles and the peasants to varying degrees, Joseph taxed all of his subjects equally. He also insisted on equal punishments for the same crime, regardless of the offender’s social class. Joseph’s reforms for equality even included the Jews. He granted equal rights and equal duties to Jews, making them responsible for military service for the first time in Europe.
Joseph believed peasants would be more productive if they were free, and he granted them increased rights, such as the right to marry, to send children for training without a landowner’s permission, and to engage in skilled labor themselves. Joseph freed serfs in Austria, Bohemia, Hungary, and Transylvania through a series of decrees in the early 1780s. Thereafter, peasants could seek retribution from the state against oppressive lords. He also abolished the robot in 1789. The robot mandated that peasants perform services for landowning nobility. In its place, Joseph enacted a tax on the peasants—part went to the landowners, and the rest to the state. Both the peasants and nobility were deeply opposed to the tax. Although the tax was set up to help the peasants, it was a strain on them because they lacked capital and relied on a barter economy.

Joseph was committed to Enlightenment ideas. He issued more than 10,000 edicts for the betterment of his subjects. Many of those reforms, however, were reversed after Joseph died prematurely at age 49. Joseph’s efforts to centralize the lands of the empire and better the lives of his subjects alienated and offended many people, including the clergy and nobility. Although many of his reforms were too quick and too vast for the empire to handle, his policies of religious toleration were maintained by his successor and brother Leopold II.

**Enlightened Absolutism in Prussia**

**Frederick the Great**

Frederick II—who became known as Frederick the Great—ruled Prussia from 1740 to 1786. He established the nation as one of the great powers in Europe and is probably the best example of an enlightened despot. Frederick’s father, Frederick William I, left him an impressive army. By the end of his reign, the army had grown from 45,000 to 83,000 men, making it the fourth largest army in Europe. Frederick the Great was determined to use this army and did so almost immediately. He invaded Silesia—the largely Germanic province of Austria—when Maria Theresa took power in 1740. This battle started the War of the Austrian Succession (1740–1748), which Prussia dominated. Maria Theresa was forced to cede nearly all of Silesia to Prussia, thus doubling Prussia’s population and solidifying its superiority among the German states as a European power. However, Frederick would spend much of his reign defending Prussia against other European attacks. He succeeded in retaining Silesia during the Seven Years’ War (1756–1763), in which Russia, France, and Austria allied themselves against Prussia and tried to acquire its territory. Later in his reign, he participated in the first partition of Poland in 1772. This gave Frederick the Polish territory between Prussia and Brandenburg, resulting in greater unity of the scattered lands that characterized Prussian domains. By the end of Frederick’s reign, he had enlarged the army to more than 200,000 men.

The brutality of the Seven Years’ War made Frederick realize that Enlightenment thinking and political reforms for individuals might benefit Prussia. Frederick was deeply familiar with the ideas of the Enlightenment. As a youth, he had embraced culture and literature more than the military life. He played the flute and wrote poems and prose in French, the language of the Enlightenment. In fact, he preferred
French over his native German language. Considered a philosophes himself, he was a friend of Voltaire, who stayed with Frederick in his court for two years, until their egos proved too large to share the space.

Frederick enacted enlightened reforms to increase the power of the Prussian monarchy rather than to promote justice. He modernized equipment and created new agencies, including the bureaus of excise and tolls, mines, forestry, and commerce and industry. With the assistance of French experts, he also reorganized the system of indirect taxes. The reorganization provided more revenue to the state than the system of direct taxation on individuals. Frederick oversaw the codification of Prussian law so that a single code existed for all of his dominions. Prussia's renowned bureaucracy enforced this law. Frederick saw to it that nobles filled high bureaucratic positions rather than allowing commoners to rise to those positions as they had under his father. Legal matters were decided quickly and impartially by judges. Like other enlightened despots, Frederick outlawed the use of torture except in cases of treason or murder. He relaxed censorship and outlawed capital punishment, except in the military.

Frederick enacted various economic and religious policies, as well. He promoted economic development and industry expansion into Silesia and elsewhere. He imposed tariffs to protect young industries and reduced internal trade barriers. The Bank of Berlin freed up credit for economic development, and the empire built new canals. In agricultural development, Frederick had swamps drained to provide more arable land. Farmers grew new crops, including potatoes and turnips, which had never been farmed extensively in the region before.

In the tradition of the philosophes, Frederick the Great was a strong skeptic. He practiced some religious tolerance and allowed Catholics and Jews to settle in areas where Protestants were the majority. He also respected the rights of the Silesians, who were predominantly Catholic. Throughout Frederick's reign, however, Prussian Jews remained an oppressed group. Frederick once claimed that “everyone must be allowed to go to heaven in his own way,” yet he refused to emancipate Prussian Jews. He faulted Jews for hurting Christian business. He declared that Jews were not useful to the state. It was not until eight years after Frederick's death that every inhabitant of the Prussian state was given freedom of conscience and religion.

Frederick had neither the inclination nor the time to indulge in the sort of opulent decadence that was a hallmark of the French court. Berlin was nothing like Versailles, but it served Frederick well. From there he laid out his ideas in his *Forms of Government* (1781). This work described how each part of society was an essential element that made it possible for the whole machine of the state to operate. He justified the monarchy with appeals to reason and practical results, not by reference to divine right. His policies to improve efficiency, however, did not also promote equality. His taxes primarily burdened the peasants, as he always worked to maintain the interests and favor of the nobles. During Frederick's reign, Prussian social classes were legally defined and offered little or no movement between them. Prussian law reinforced the distinctions between commoners and the nobility or landed aristocrats, also known as Junkers. Marriages between Junkers and commoners were not recognized. Frederick the Great freed serfs
on royal domains, and these serfs could serve in the Prussian army. However, Frederick refused to eliminate serfdom on private property. He did not wish to reorganize social hierarchies—he relied on the nobles and wanted to secure their loyalty. As such, he reversed many of his father’s merit-based policies for rising to power in the civil service. When the interests of state and subjects diverged, Frederick always chose the needs of the state. His choice reflects the shortcomings of enlightened despotism.

**Enlightened Absolutism in Russia**

**Peter the Great**

Peter I—better known as Peter the Great—ruled Russia from 1682 to 1725. Following a bloody struggle between rival bands of his father’s two widows, Peter became tsar when he was only ten years old and acted as a core ruler with his sickly half-brother Ivan V. Although Peter and Ivan’s sister Sophia was named regent, Peter’s supporters overthrew her in 1689. From this time forward, Peter controlled Russia, although he technically shared the crown until 1696, when Ivan died. Peter was about six and a half feet tall and suffered from chronic back pain. He had a nervous tic that was particularly obvious when he was anxious or angry. As tsar, Peter was convinced of two things: first, he had to control the old nobility (boyars) and the guards of the Moscow garrison (streltsi) to ensure his own power; second, Russia needed to build its military.

The young Peter the Great was fascinated by western Europe. He was intrigued by all things modern, especially science, technology, and industry. Growing up in Moscow, he enjoyed spending time in the company of westerners who lived in the so-called German suburb of Moscow. In this company, he learned about engineering and manufacturing. He became the first tsar to travel through the West when he visited Prussia, the Netherlands, and England in 1697 with an entourage of hundreds of technical advisers. Peter often attempted to travel *incognito*, thus avoiding formal ceremonies, but his tall frame and large traveling party made him hard to miss. Whenever possible he passed himself off as a humble worker, feeling more at home with the shipyard workers and artisans than with nobles and government officials. In England, Peter studied finance, commerce, shipbuilding, and military organization.

During Peter’s absence, the streltsi took advantage and rebelled in 1698. Peter rushed back to Russia and quashed the revolt, executing 1,200 rebels and piling up their corpses in public as a warning to others who might have similar ideas. But Peter’s visit to western Europe had inspired him to modernize and westernize Russia. He established control over the boyars, strengthened Russia’s military (by building Russia’s first navy and modernizing the army), reorganized the central administration, promoted economic development, and increased state control over the Russian Orthodox Church.

One of the first ways that Peter tried to westernize Russia was by reforming the boyars and their attachment to traditional Russian culture and practices. He demanded that nobles become educated. He ordered them to wear western clothing and remain clean shaven. He also banned the wearing of veils by...
women. He demanded that upper-class women participate in the social affairs of men, thus ending their traditional seclusion. German became the language at court, and Peter added Italian and German artwork to his royal collection. Peter also mandated that all nobility serve the state either in the military or civil service for life. This reform by Peter was an attempt to build loyalty to the state. He issued the Table of Ranks in 1722, which set forth a class system based on merit and an individual’s service to the state, rather than his status as a noble. The fourteen-rank system mandated that all individuals start at the bottom and earn their way up.

Peter’s economic reforms aimed to modernize Russia’s economy. He ordered the boyars to send their sons to western Europe for technical training. He also encouraged craftsmen and technicians from western Europe to settle in Russia and sent Russian craftsmen abroad to cultivate their skills. He established schools, universities, hospitals, and the Russian Academy of Science. Russia now required all young noblemen to take five years of mandatory schooling away from home, a reform that the nobility detested. Peter also subsidized private industries to help them expand, and he established state mines and factories to support his extensive military operations. Metallurgy, mining, and textile factories even employed serfs.

Since Peter’s reforms and military efforts were expensive, he was forced to raise more money for the state. He established a soul tax, which placed a head tax on every Russian male. He also collected income from various monopolies, including those on caviar and salt. These funds allowed Peter to pursue mercantilist policies and commercialize Russia, which soon had its own joint-stock companies and merchant fleet. Peter’s economic reforms did help to modernize Russia, but they also served to divide its citizens. The small, semi-westernized upper class was increasingly set apart from the Russian masses—peasants still living in poverty and ignorance. The peasantry’s taxes tripled during the reign of Peter the Great. Despite Peter’s economic reforms, Russia still lacked accessible raw materials, a merchant middle class, and sufficient capital.

To reorganize his central administration, Peter followed the Swedish model, which had government departments headed by a small group of individuals, called a college, rather than a single minister. He created nine colleges, each with eleven members, to oversee foreign affairs, the navy, the army, mines and manufactures, income, expenditures, commerce, justice, and control. Peter established a senate with nine members who could oversee and direct the administration in the tsar’s absence. Peter also gave himself a new title in 1711: Emperor of All Russia.

In Peter’s efforts to gain greater control of the state, the church did not escape his reforms. The Russian Orthodox Church was extremely conservative, both in its theology and its attitude toward westernization. Peter’s reforms
brought the church under more state control. He abolished the office of patriarch, which was the bishop in charge of the church, thereby increasing the state’s secular control. He replaced the patriarchate with the Holy Synod, an agency composed of bishops and headed by a layman, the procurator-general. Peter’s reforms brought the church under complete state control, as the Holy Synod governed the church according to the tsar’s wishes.

Peter was perhaps best known for drawing Russia into extensive wars. Although he was greatly interested in westernization, military power and domination were also key goals during his reign. From 1689 through 1725, only one year was peaceful. Peter gradually replaced mercenary soldiers with Russian troops through military conscription, thus raising the first standing army in Russia. He hired Western commanders to train and prepare his army. He waged battles against the Ottoman Empire and Sweden to expand Russian territory into the Black Sea and the Baltic. Russia went to war with the Turks in 1695 and captured Azov, a town on the Black Sea, the next year. However, the Turks regained the port in 1711, demonstrating the backwardness of the Russian military.

Sweden was Russia’s main rival, and Peter coveted the Swedish territory in the Baltic. Sweden was ruled by Charles XII (r. 1697–1718), who was a talented but unpredictable military leader. He defeated a superior Russian force at the battle of Narva in 1700. This battle started the Great Northern War, which spanned two decades (1700–1721). Peter learned from his mistakes in the battle of Narva, changing his tactics and technology. He established a standing army of 200,000 soldiers, drafting more than 130,000 soldiers in the first decade of the eighteenth century. Charles, on the other hand, became bogged down in Polish politics. The two armies faced off again in 1709, but this time Peter used the traditional Russian strategy of drawing the enemy into the country to endure a harsh Russian winter. Peter crushed Charles’ army at the Battle of Poltava in the Ukraine and forced the ruler into exile in the Ottoman Empire. Thereafter, Russia replaced Sweden as the dominant power in the Baltic region.

With the Treaty of Nystadt, signed in 1721, Russia gained vast new territory in the Baltic, including Estonia, Livonia, and part of Finland. This expansion was vital because it gave Russia its first ice-free ports and a connection with the rest of Europe. In this new territory, Peter built a new capital city that served as a window to the west. He named his city St. Petersburg, and its western architects ensured that it looked like a western city rather than the old capital of Moscow and other traditional Russian cities. By the time of Peter’s death in 1725, Russian influence had never extended so far into Europe. Russia’s territory had increased sixfold since the reign of Ivan the Terrible.

Peter had a huge personality and an equally large vision. He wanted to bring Russia into the European state system and turn his nation into a great power within a generation. Peter largely succeeded in westernizing Russia and making his country known to the rest of Europe. Russia’s emergence in the late 1600s as a European power was a completely new development in European politics. When he died in 1725, Russia was a force to be reckoned with, feared by other nations for its sheer size and military potential. While many nobles had eagerly accepted Peter’s reforms.
because they were beneficial for the elites and for national power, those reforms often came at the expense of the masses—the serfs, lower classes, and Old Believers. In general, serfdom became more oppressive during Peter’s rule. Peter had also succeeded in showing a façade of technological and industrial might, but the nation remained firmly entrenched in an autocratic form of government, which would become a major issue during the Russian Revolution of the twentieth century.

**Catherine the Great**

Like Joseph II and Frederick the Great, Catherine the Great believed in Enlightenment ideals. She admired the reforms set forth by the Enlightenment and was adored by the philosophes. She ruled from 1762 to 1796 and was perhaps the most famous and admired woman of her age. Numerous weak rulers had governed Russia after Peter the Great’s death in 1725 and before Catherine came to power in 1762. In the absence of a strong ruler, the nobility had regained much of its power.

Catherine was a German princess by birth, but her mother was related to the Russian Romanovs. Peter the Great had abolished the tradition of hereditary succession of the tsars so he could appoint his own successor—although he never did so—who would continue his programs. After a series of rulers came to power after Peter’s death, his youngest daughter Elizabeth eventually took the crown. Elizabeth chose her nephew Peter as heir to the throne and selected Catherine for his wife in 1744. Catherine didn’t care her husband, but she very much wanted the throne. Only six months after Peter became tsar, Catherine orchestrated a coup and had her husband murdered, thus securing her reign.

Catherine entertained the philosophes of the Enlightenment, including Voltaire and Diderot, and believed deeply in Enlightenment ideals. She kept up an active correspondence with Voltaire and other prominent Enlightenment thinkers. Catherine was a strong ruler, however, and although she was very committed to Enlightenment ideas, she often compromised those beliefs in the face of political realities. She had a reputation for acting ruthlessly when it served her interests. When Enlightenment ideals conflicted with her absolute rule, Catherine disregarded them. At one point, she imprisoned those with whom she disagreed. As a result, she lost favor with Diderot.

Catherine hoped to bring the sophisticated culture of the Enlightenment and western Europe to Russia, which she saw as backward and unrefined. She brought in artists, sculptors, intellectuals, and musicians and established a good reputation in the West, probably based in part on her friendship with the philosophes. She set the tone for the nobility, westernizing their
way of thinking. She also wrote a famous treatise, *Instruction to the Legislative Commission*, in 1767 that expressed her belief in equality and reason. She established schools for girls and abolished capital punishment and torture.

Catherine set out to make many domestic reforms and hoped to improve the laws. To do so, Catherine established the Legislative Commission in 1767. The group had more than five hundred members from all social classes except the serfs. Catherine hoped the members would propose productive legal reforms, but each group only seemed interested in promoting its own interests. The group accomplished little and was disbanded in 1768. Catherine did continue the emphasis on economic development started by Peter the Great. She reduced internal trade barriers, and Russia’s exports of fur, grain, and naval stores increased.

One of the main challenges for Catherine was the increased power the nobility had amassed since Peter the Great’s death. After 1725, the nobility was able to evade many of the restrictions Peter had placed on them. The nobility exerted greater control over the serfs and owed fewer obligations to the state. Catherine was in a tough position: although she wanted to increase the power of the monarchy, she owed her position to the nobility. However, Catherine’s domestic reform agenda took a drastic turn when Emelian Pugachev, a Don Cossack, led a serf rebellion from 1773 to 1775 in the Volga region.

The rebellion happened because of how poorly serfs were treated. Serfs were often sold separate from the land, sent to mining and manufacturing industries, exiled to Siberia, or severely punished for misdeeds. These practices broke families apart. Because of these conditions, Pugachev and thousands of his supporters joined together, rose up, rounded up the landlords and officials, and beheaded them. Pugachev was eventually captured and killed, betrayed by some of his own supporters and outmatched by Catherine’s army. While Catherine would not allow him to be tortured, he was executed by drawing and quartering his body, a punishment commonly given to those accused of treason.

Not only did it fail to emancipate the serfs, Pugachev’s revolt also inspired Catherine to reorganize local government and marked a noticeable turning point in Catherine’s domestic policies. She created fifty provinces in place of the twenty that had existed. The governments of the new provinces were left in the hands of the local nobility. Catherine formally recognized the rights and privileges of the nobility in 1785 when she issued the Charter of the Nobility. This proclamation exempted the nobles from taxes and military service and granted them total control of their estates and serfs. The nobles at last were freed of any remaining service to the state handed down from Peter the Great’s reign. Although Catherine had proposed a constitution for all of the Russian people, she never followed through on this idea.

During Catherine’s reign, her most substantial accomplishment may have been her acquisition of new lands, as Russia continued the push to acquire warm-water ports. She added more territory to the nation than any other ruler by defeating the Ottoman Empire and partitioning Poland out of existence. She also defeated the last descendants of the Mongols and the Crimean Tartars and started conquering the Caucasus.
Russia acquired territory from the Ottoman Empire during a war that lasted from 1769 to 1774. The Treaty of Kutchuk-Kainardji in 1774 granted Russia most of the Ottoman lands on the north coast of the Black Sea and full access to the Turkish Straits, which connect the Black and Aegean seas. The treaty also recognized the independence of the Crimea, which Catherine annexed less than a decade later in 1783. Included in the treaty was a vague clause establishing Russia as the protector of the Orthodox Christian subjects of the Ottoman sultan. This detail in the treaty provided Russia with a pretext for later interventions in the Ottoman Empire. Russia waged another war against the Turks from 1787 to 1792. As a result, Russia expanded its southwest border to the Dniester River, which included the remaining Turkish land along the northern coast of the Black Sea.

Catherine’s efforts in Poland were perhaps her most successful. Poland had become weak and decentralized by 1700. After Russia’s show of force in the Ottoman Empire between 1768 and 1772, Frederick the Great came to Catherine with a deal in an attempt to keep the balance of power between Russia and Austria in eastern Europe. Frederick proposed that Austria, Russia, and Prussia combine forces to divide up Poland between themselves. Catherine agreed. The first partition of Poland occurred in 1772, followed by additional divisions in 1793 and 1795, after which Poland disappeared from the map for over a century. Catherine was the only ruler to take part in all three partitions of Poland. The Poland partitions demonstrated the consequences of failing to establish a strong monarchy, army, and bureaucracy within the eighteenth-century European state system. Catherine’s territorial acquisitions helped keep the nobility happy, as she doled out large estates with many serfs to those in her favor.

Catherine often took advisers and political allies as lovers, earning her a reputation for promiscuity due to the double standard that existed toward women. One of her lovers was Grigori Potemkin, whose name was given to fake villages Catherine set up to impress foreign dignitaries. These one-street villages were even staged with crowds of cheering, happy villagers to greet passing dignitaries. Much like the Potemkin villages, Russia appeared strong, great, and powerful during Catherine’s reign, but beneath the façade was a country that suffered due to unfinished reforms.

Extensions
• Read The Edict of Toleration by Joseph II of Austria. How does Joseph define toleration?

Summary
The Enlightened despots of eighteenth-century Europe had different methods, successes, and ideas, but all of them hoped to strengthen the power of their state and play a more prominent role in European politics and military strategy. Some rulers increased the power of the nobility, while others limited it, but they all realized that their relationship with the aristocracy was an important part of maintaining state power. Likewise, some rulers increased freedoms for the peasants, while others increased their servitude, but all enlightened despots acted in ways to ultimately
ensure governmental authority over all else. Most of the enlightened despots, at least in the last half of the century, also limited the power of the church and brought it under increasingly secular control. Whether these enlightened despots truly deserve such a title continues to be debated by historians, but all agree that enlightened absolutism was highly influential in Austria, Prussia, and Russia.

**Looking Ahead**

Though many of the most prominent Enlightenment thinkers were French, the absolutist regime in France during the height of the Enlightenment was not headed by an enlightened ruler. A strong yet financially troubled nation, France was instead under the control of Louis XV and his regent, the Duke of Orléans, for much of this period. The actions of these men ultimately helped restore the power of the aristocracy and set France on a path toward revolution. The trajectory of France can be contrasted with those of the nation-states of eastern Europe, where rulers influenced by the ideas of the Enlightenment made reforms that better prepared their countries for the century to come.

---

**SELF-CHECK ANSWERS**

1. Silesia
2. Joseph II of Austria
3. The Seven Years’ War
4. The Table of Ranks was issued by Peter the Great, and it set forth a class system based on merit and an individual’s service to the state, rather than his status as a noble.
5. The three partitions of Poland took place in 1772, 1793, and 1795.
Absolutism and the Enlightenment

Essential Questions
- What were the main characteristics and events that defined French absolutism?
- To what extent did Austrian, Prussian, and Russian despots deserve the title “enlightened despots”?

Keywords
hereditary
aristocrat
Set the Stage

Rulers in eastern Europe, including the monarchs in Austria, Prussia, and Russia, were influenced by Enlightenment ideas, but the Enlightenment impacted the French government, as well. France, after all, was the center of Enlightenment thought. The French monarchy had reached its pinnacle under Louis XIV, the Sun King. When he died in 1715, the nobility fought to regain some of their power. This clash between the monarchy and the aristocracy characterized the politics of eighteenth-century France, which looked very different than the politics of eastern Europe.

The French Example

Enlightened absolutism was least successful in France, especially when compared to the course it took in eastern Europe. Though military defeat in the War of the Spanish Succession (1701–1714) left France weaker than it had been in 1680, the nation still remained a great power. The country had the largest population in Europe, an advanced (if beleaguered) economic system, and an efficient administrative structure created by Louis XIV. When Louis XIV died in 1715, his five-year-old great-grandson, Louis XV, took the throne. Louis XV reigned from 1715 to 1774. His cousin, the Duke of Orléans (1674–1723), was named regent and remained at that post until his death. Financial and moral scandals plagued the regency, which further tarnished the prestige of the monarchy.

The Duke of Orléans was a gambler, and in 1716 he entrusted John Law (1671–1729), a Scottish mathematician and fellow gambler, with managing the financial affairs of the kingdom. Law thought that increasing the supply of paper money would stimulate France’s troubled economy. With the regent’s permission, he established a central French bank that issued paper money. Law also organized the Mississippi Company, a monopoly controlling trade between France and the French North American colony of Louisiana, where the company founded the city of New Orleans in 1718. The Mississippi Company also assumed management of France’s national debt.

In exchange for government bonds, which were declining in value, the company offered shares of stock. Law encouraged speculation in the company’s stock to redeem large quantities of bonds, and the stock price rose substantially in 1719. Unfortunately for Law, savvy investors cashed out their stocks for a handsome profit. When they took their paper money and tried to redeem it for gold, Law’s bank ran out of gold. In February 1720, all gold payments in the nation stopped. Shortly thereafter, Law fled the country, and the fiasco came to be known as the Mississippi Bubble. When the bubble burst, the government that had endorsed and empowered Law was disgraced. Although the Mississippi Company eventually reorganized, fear of speculation and paper money lingered in France for decades to come.

The Duke of Orléans also reduced the monarchy’s power when he attempted to draw the French nobility into government decision-making processes once again.
The duke set up a system of councils on which nobles served with bureaucrats. But the years of complacency at Versailles had taken their toll: the nobles had neither the desire nor the talent to effectively serve on the councils. The council system failed, but it did not eliminate the nobles’ desires to assert their privileges, rights, and influence over the monarchy. Throughout the eighteenth century, the nobles attempted to influence the monarchy and limit its control. They worked through the parlements, or regional courts, that were run by the aristocracy.

The Duke of Orléans further diminished the monarchy’s authority by fully reinstating the parlements in 1715, thereby reversing a noted policy of Louis XIV. The Parlement of Paris had the power to approve or dismiss laws. Other parlements had also managed to find wider public support for their power and could therefore undermine the monarchy. Parlements became centers of aristocratic and popular could therefore undermine royal authority until the revolution in 1789. The parlements, rather than the crown, represented the views of the nation, which was a huge departure from the popular support enjoyed by the monarchy during the reign of Louis XIV.

By 1726, Cardinal Fleury (1653–1743) had taken over after the Mississippi Bubble debacle and the political direction of the nation. He was seventy-three years old when he came to power and ninety when he left. The cardinal worked to maintain the monarchy’s power while still serving the local interests of the nobility. He continued to repress the Jansenists. He pursued economic development at home and peace abroad. Despite his efforts, Fleury could not prevent France’s involvement in global colonial conflict after 1740. When Fleury died in 1743, Louis XV began acting as his own chief minister. Louis XV was lazy, untalented, and ignorant when it came to government affairs. He much preferred hunting and spending time with his mistresses. One such lady, Madame de Pompadour, exercised strong influence on government matters. Rumors of Louis XV’s weak rule and personal foibles only served to further damage faith in the monarchy.

Matters abroad did not help the French government either. The War of the Austrian Succession took a financial toll on France. Louis’s attempt to raise taxes on the nobles and clergy had to be abandoned in the face of determined resistance. Soon the situation grew worse, as the Seven Years’ War (1756–1763) left France badly defeated and even deeper in debt.

France’s national debt demonstrated the monarchy’s failure to control the aristocracy’s political power in parlements during the late eighteenth century. French absolutism had previously been successful in maintaining ongoing negotiations between the crown and the aristocratic institutions, but this negotiation became more difficult.
after the death of Louis XIV in 1715. The aristocracy tried to gain some of the influence it had lost, and by mid-century was beginning to reap the benefits of those efforts.

For the quarter century following the Seven Years’ War, a standoff occurred between the royal government and the aristocracy. The wartime taxes were withdrawn in 1764, but then minister after minister attempted to levy new taxes on the wealthy only to experience strong resistance from the Parlement of Paris and other local parlements. Both Louis XV and later Louis XVI lacked the political skills, character, and resolution to settle the matter. Instead of coming up with a policy to deal with the aristocracy’s resistance and the national debt, the royal government often lied, retreated, and hesitated.

Louis XV appointed René de Maupeou (1714–1792) as chancellor in 1768. Maupeou wanted to break the power of the parlements and successfully increase taxes on the nobility. He disbanded the parlements and banished their members to various parts of the country. Maupeou then instituted an ambitious program to reform the administration and make it more efficient. In place of the aristocratic parlements, he founded a new parlement of government officials. Maupeou’s judges had no property rights in their seats; they were salaried government officials. As such, these judges were forbidden to oppose any royal edicts or to pass judgment on their constitutionality. With this parlement in place and the old ones removed, Maupeou again attempted to raise taxes. Yet Maupeou’s reforms did not succeed due to resistance by the nobility. When Louis XV unexpectedly died of smallpox in 1774, Louis XVI—a shy twenty-year-old—took control and dismissed Maupeou in an effort to regain popular support. Louis XVI reinstated the parlements, too scared to go against the general will of France’s educated elite, but this only confirmed their power. Maupeou’s failed efforts were the most profound effort at enlightened reform in France to that point.

Although Louis XVI restored the parlements, he also appointed a reforming minister named Anne-Robert-Jacques Turgot (1727–1781). As a philosophe and physiocrat, Turgot made efforts to suppress the guilds, raise taxes, and reduce internal trade barriers. He planned to reduce peasant labor requirements to the state and replace it with a tax. Turgot even supported some religious tolerance for the Protestants. But the Parlement of Paris vehemently opposed Turgot and his agenda. Under pressure, Turgot resigned in 1776. Louis XVI then ensured that reform would be impossible by reinstating the parlements.

Historically, parlements had represented aristocratic interests, but by the second half of the eighteenth century...
century, they had broader public support. By this time, the French nobility shared many of the same concerns and interests as the wealthy professional and commercial classes. These groups all saw monarchical absolutism’s traditional, inefficient, and costly institutions as a burden. And although the aristocrats dominated the parlements, they employed the language of reform and liberty. Parlements characterized the monarchy as despotic. In France, it was the parlements, rather than the despot, that studied and implemented the ideas of the Enlightenment philosophes—such as Montesquieu—and the physiocrats.

In contrast, the monarchy did not rally public support. It lost much of its prestige and moral authority by the late eighteenth century. Louis XV’s sexual scandals were known throughout France, and the memory of his behavior continued to plague the reputation of the crown even after his death. Louis XVI’s reign did not improve the situation. His wife, Marie Antoinette (1755–1793), earned a reputation for sexual transgressions and lavish personal indulgences, and she became the subject of numerous pornographic works that circulated in Paris and beyond. For his part, Louis XVI maintained a positive reputation, but his reputation could not overshadow the other scandals that plagued the monarchy. In sharp contrast to Louis XIV, Louis XVI rarely left the comforts of Versailles to interact with his subjects or the aristocracy, who increasingly resided in Paris or on their estates. Louis XVI also stood apart from the parlements and the aristocracy, giving him a distinct popular disadvantage during their clashes. In the 1780s, these clashes finally led to revolution.

To make matters worse, the nation’s economy was already on shaky ground when the French government supported America’s revolt against Great Britain. The nation’s financial difficulties worsened. Just before the revolution, France’s interest and payments on the royal debt were more than half of its entire budget. Though France’s debt was not overly large or disproportionate to national debts across Europe, the royal government in France seemed unable to tap into the nation’s wealth to repay it. Essentially, France was a wealthy nation with a poor government.

These troubles made absolutism in France much more problematic than it was in other European nations. Personal accounts and public opinion created the perception that Frederick the Great of Prussia and Joseph II of Austria were servants of the state. Although George II of Great Britain had his own political troubles, his subjects believed he was an upstanding monarch who genuinely worked to improve the economy of Great Britain. All three men were regarded as frugal leaders who mingled among their citizenry, which was not the case in France. The French monarchs during the Age of Enlightenment were viewed as aloof, incompetent, and untrustworthy.

**The Legacy of Enlightened Absolutism**

Seen in retrospect, the era of enlightened despotism foreshadowed a time of revolution and social upheaval. Enlightened despotism attempted to reform society from above. The government espoused necessary reforms while people were told what privileges, liberties, or taxes were undesirable or unjust. Governments
claimed that many past traditions only served to confuse the present or cause injustice and inefficiency. The state solidified its power, acting as complete sovereign, whether in the name of its own interests or for those of the people. Old institutions and ways of doing things were questioned, including the rights of kingdoms and provinces, social orders and classes, traditional legal bodies, and corporate groups. Legal codes replaced customary and common law and governments made all persons equal subjects by pushing aside the power of the church and feudal interests. Enlightened despotism, in this respect, honored equality more than the law. But these ideas of equality and undermining tradition could go only so far—the monarch was, after all, a hereditary aristocrat. No government would revolutionize itself out of existence.

The reforms of the enlightened despots, although lauded by the philosophes, did little to actually improve the lives of common people. Peasant life remained very difficult throughout the eighteenth century. Humanitarian motivations were secondary for the enlightened despots in eastern Europe. These monarchs primarily wanted to increase state power and maintain a formidable military presence against their neighbors. To achieve these goals, the enlightened rulers continued the state-building emphasis of earlier monarchs. They reorganized armies and militaries, raised taxes, and increased troops because they had to. The partitions of Poland showed what could happen to weak, decentralized states.

Where these enlightened despots did differ from earlier rulers was in the manner and pace of the reforms they enacted. The enlightened despots were more likely to compromise than their predecessors, and they applied reason and critical thinking to their political and military planning. They justified their actions because they were useful and effective, not because they had divine right. They also considered how humane laws could bring increased power to the state and make their subjects more productive and content. Overall, the enlightened despots of eastern Europe were much better at the process than their French counterparts.

Enlightened absolutism had run its course before the French Revolution broke out in 1789. Despots across Europe had gone as far as their enlightened reforms could take them, either for reasons of politics or principle. In Austria and Prussia, the nobility increasingly resisted the monarchy, while in Russia, peasant unrest threatened political stability. The regimes in Prussia, Austria, and Russia had become more conservative and repressive. Louis XVI appeased the upper classes in France, but Joseph II’s failure to do so in Austria led to open revolt. In response to aristocratic resistance, Joseph increasingly called for censorship and use of the secret police. Catherine the Great and Frederick the Great had brilliant reigns, but their reforms impacted landlordism and led to upheaval from the masses. Frederick the Great also grew more aloof as he aged, which left a power vacuum the aristocracy was more than happy to fill. Catherine the Great never fully recovered from the Pugachev Rebellion, and the French Revolution only served to heighten her fear of the masses. After 1789 she increasingly called for censorship of Enlightenment books and exiled authors to Siberia.

The aristocracy and feudal systems experienced a revival across Europe, and even the church renewed itself. Many Europeans still invoked the divine right of

**hereditary aristocrat** a member of the nobility who inherited rather than earned his or her title

### Self-Check

**4** Why did Maupeou’s reforms fail?

**5** What two enlightened despots censored books later in their reigns?
the monarchy, and new alliances between the crown and the church emerged. The French Revolution terrified old, vested interests and accelerated the existing clashes between the aristocracy and the crown. Since the Middle Ages, European monarchies had been progressive institutions, looking toward the future and moving along the path that Europe seemed destined to take. These monarchies often set themselves apart from the ecclesiastical and feudal powers. Enlightened despotism would prove to be the culmination of the historic institution of the monarchy. After the French Revolution, monarchies became nostalgic institutions, looking backward rather than toward the future. These post-French Revolution monarchies were largely supported by the church and the aristocracy—the very groups that enlightened despots so often alienated—and very rarely by individuals looking toward their nation’s future.

**Extensions**
- Go online to learn more about Madame de Pompadour. How would you describe the life of an official royal mistress?

**Summary**
Absolutism in France took a different course than it did in Austria, Prussia, and Russia. After the War of the Spanish Succession, France remained strong yet financially troubled. When five-year-old Louis XV came to the monarchy, the Duke of Orléans became regent. His reforms did much to strengthen the power of the aristocracy and weaken the monarchy, especially when he reinstated the parlements. Then, mid-century wars plunged the nation into financial crisis. The rest of the century witnessed tax reforms designed to increase the wealth of the French government by collecting taxes from those who traditionally enjoyed tax exemption. These efforts were largely unsuccessful, and the aristocratic parlements increased their power and found wider public support.

The legacy of enlightened absolutism in Europe is a complex one. Although their programs were largely a continuation of the state- and military-building agendas of their predecessors, the enlightened despots’ reforms were influenced by the Enlightenment. They enacted more humane policies, and the pace and attitude of their reforms were markedly different from their predecessors’. Leaders in eastern Europe equipped their states with adaptable and efficient bureaucracies that would be valuable and enduring in the next century.

**Looking Ahead**
As the eighteenth century came to a close, revolution erupted in France and America. Just as the Enlightenment had influenced the despots in eastern Europe, it also inspired the revolutionaries. But to understand why the revolution occurred and what it meant, both for governments and for the people, it is first necessary to get a better idea about eighteenth-century life in Europe. The Agricultural Revolution, European wars, and economics all impacted ordinary people in the eighteenth century. Great changes occurred in family life, medicine, and education during the period, as well.
1. John Law was responsible for the financial crisis known as the Mississippi Bubble. Law organized the Mississippi Company, which established a trade monopoly with the French territory of Louisiana. Law also encouraged speculation in the company. When stocks rose sharply, Law’s newly established French national bank did not have the gold to back investors’ cash.

2. The War of the Austrian Succession, the Seven Years’ War

3. Maupeou’s reforms did not succeed largely because Louis XV died unexpectedly, and his successor Louis XVI dismissed Maupeou.

4. Anne-Robert-Jacques Turgot

5. Joseph II of Austria, Catherine the Great of Russia