

Enlightenment STAD Terms

1. **geocentric** – places Earth at the center of the universe
2. **philosophe** – intellectual thinker in the Age of Enlightenment
3. **separation of powers** – Montesquieu's idea: executive legislative and judicial branches of the government limit and control each other in a system of checks and balances
4. **federal system** – power shared between national and state governments
5. **ellipse** – oval paths in which planets move around the Sun
6. **scientific method** – means of attaining knowledge by repeated observation and experimentation
7. **natural law** – universal moral law that could be understood through reason
8. **rationalism** – reliance on reason as the best guide for belief and action
9. **deism** – religious philosophy based on reason and natural law
10. **enlightened absolutism** – system by which rulers tried to govern by Enlightenment principles while maintaining their royal powers
11. **mulatto** – offspring of Africans and Europeans
12. **heliocentric** – relating to a reference system based at the center of the Sun
13. **social contract** – entire society agrees to be governed by its general will
14. **salon** – social gathering in which ideas of the Enlightenment were discussed
15. **hypothesis** – theory that attempts to explain a set of facts
16. **pacifist** – rejects violence or war as a means of settling disputes
17. **alchemist** – branch of chemistry that tries to turn base metal into precious metals
18. **cell** – fundamental biological unit discovered by Robert Hooke
19. **Rene Descartes** – developed rationalism. "I think therefore I am"
20. **calculus** – developed by Newton
21. **laissez-faire** – French term meaning to let alone. Applied to economic theory
22. **Francis Bacon** – developed scientific method
23. **Adam Smith** – The Wealth of Nations: the economy will function best when individual are free to pursue their own economic self-interest
24. **John Wesley** – started the protest fair known as Methodism
25. **Scientific Revolution** – medieval scientists relied on the ancient works on the Greeks (especially Ptolemy, Archimedes, Plato, and Aristotle)
26. **Enlightenment Period** – 1600-1700 A.D.

Enlightenment STAD Terms Practice Quiz

- ___ 1. Theory that attempts to explain a set of facts
- ___ 2. French term meaning to let alone. Applied to economic theory
- ___ 3. Montesquieu's idea: executive legislative and judicial branches of the government limit and control each other in a system of checks and balances
- ___ 4. Places Earth at the center of the universe
- ___ 5. The Wealth of Nations: the economy will function best when individuals are free to pursue their own economic self-interest
- ___ 6. Developed rationalism. "I think therefore I am"
- ___ 7. Oval paths in which planets move around the Sun
- ___ 8. Religious philosophy based on reason and natural law
- ___ 9. Offspring of Africans and Europeans
- ___ 10. Universal moral law that could be understood through reason
- ___ 11. Entire society agrees to be governed by its general will
- ___ 12. Branch of chemistry that tries to turn base metal into precious metals

- A. Geocentric
- B. Mulatto "
- C. Social Contract
- D. Ellipse
- E. Separation of Powers
- F. Natural law
- G. Hypothesis
- H. Deism
- I. Laissez-faire
- J. Alchemist
- K. Rene' Descartes
- L. Adam Smith

ANSWERS: G I E A L K D H B F C J

- ___ 13. Developed scientific method
- ___ 14. Rejects violence or war as a means of settling disputes
- ___ 15. Started the protestant faith known as Methodism
- ___ 16. Power shared between national, state, and local government
- ___ 17. Developed by Newton
- ___ 18. Fundamental biological unit discovered by Robert Hooke
- ___ 19. Social gathering in which ideas of the Enlightenment were discussed
- ___ 20. Reliance on reason as the best guide for belief and action
- ___ 21. Sun centered solar system
- ___ 22. Intellectual thinker in the Age of Enlightenment
- ___ 23. Means of attaining knowledge by repeated observation and experimentation
- ___ 24. System by which rulers tried to govern by Enlightenment principles while maintaining their royal powers
- ___ 25. Enlightenment period

- A. Calculus
- B. Philosophe
- C. Federal System
- D. Francis Bacon
- E. Heliocentric
- F. Salon
- G. Cell
- H. Pacifist
- I. 1600-1700 A.D.
- J. Enlightened Absolutism
- K. Rationalism
- L. Scientific Method
- M. John Wesley

ANSWERS: D H M C A G F K E B L J I

Enlightenment Notes

The Scientific Revolution

Causes:

- I. New technology and mathematics
 - a. Advancements were made in mathematics including; trigonometry
 - b. New mathematicians through away ancient methods and developed their own

Scientific Breakthroughs

- I. Ptolemaic System
 - a. Ptolemaic system was geocentric = ear was center of universe
 - b. Ear is fixed and all things move around it
- II. Copernicus and Kepler
 - a. Copernicus = heliocentric – sun was center of universe
 - b. Kepler = used data to prove Copernicus' idea and confirmed the orbits were elliptical
- III. Galileo's Discoveries
 - a. Used observations through telescope that absolutely confirmed Copernicus' theories
 - b. Published his works and was harshly criticized by the Catholic Church
 - c. Was threatened with charge of heresy and he recanted his theories
 - d. Church officially forgave Galileo in 1993
- IV. Newton's view of the Universe
 - a. Wrote *Principia* = defined laws of motion; universal law of gravitation
 - b. Defined how universe worked; widely accepted
- V. Breakthroughs in medicine = found source of blood flow was the heart instead of the liver; dissected humans to learn more of anatomy
- VI. Breakthroughs in Chemistry = Boyle doing controlled experiments for first time; Lavoisier made system of naming elements used today

Women Contributions

- I. Margaret Cavendish = published books under her own name regarding philosophy
- II. Mara Winkelmann = Prussia's expert in astronomy

Philosophy and Reason

- I. Descartes and Rationalism = used rational thought to prove things rather than relying on his senses
- II. Bacon and the Scientific Method
 - a. Scientific method = a systematic procedure for collecting and analyzing evidence
 - b. Used inductive reasoning = proceeding from the particular to the general

The Enlightenment

Path to Enlightenment

- I. John Locke = influenced intellectuals of the Enlightenment with his belief that people were influenced by things collected from their senses
- II. Isaac Newton = influenced intellectuals with his findings of the working of everything according to physics and wanted to apply this to social situations

Ideas of the Philosophers

- I. Role of Philosophy = change the world socially
- II. Montesquieu
 - a. French noble; wrote *The Spirit of the Laws* = tried to use scientific method in social relationships
 - b. Three branches of government and checks and balances
- III. Voltaire
 - a. Well known for criticism of Christianity; supported religious tolerance
 - b. Deism = world was like a clock, God being the clockmaker, and it ran w/out interference from him
 - c. Wrote *Candide*
- IV. Diderot
 - a. Edited and published *Encyclopedia*
 - b. Attacked French society, religious superstition, and called for social reform

New Social Sciences

- I. Smith on Economics
 - a. Laissez-faire = government to stay out of business affairs
 - b. *Wealth of Nations*; gave government role of protection and maintenance of public works
 - c. Beccaria on Justice = spoke out against capital punishment and other harsh punishments for crime; not a deterrent

The Spread of Ideas

- I. The Social Contract
 - a. Rousseau = society agrees to be governed and people are forced to do what is best for the general will of the community
 - b. Thought that education should foster natural rights; his own kids were raised in orphanages
- II. Women's Rights
 - a. Mary Wollstonecraft = fought for equal rights for women
 - b. Argued that Enlightenment thinkers were hypocritical in thinking of equality of the people but excluding women as equals
- III. Growth of Reading = many new books were being published that help spread the ideas of the Enlightenment; many readings audience was the middle class
- IV. The Salon = small parties where people got together and discussed latest issues of the time
- V. Religion of the Enlightenment
 - a. Many philosophers attacked Christianity
 - b. Religion had settled into patterns
 - c. New movement started by John Wesley; Methodists

Impact of the Enlightenment

Enlightenment and Absolutism

- I. Enlightened Absolutism = rulers try to govern by Enlightenment principles while maintaining their royal power
 - a. Prussia: Frederick William I & Frederick II
 - Major power of the 18th century
 - Frederick II
 1. Abolished the use of torture (except in treason & murder cases)
 2. Granted limited freedom of speech & press

3. Greater religious tolerance
4. Kept rigid social structure in place

b. Austria: Maria Theresa

- Worked to centralize and strengthen the state
- Joseph II = Maria's son
 1. Abolished serfdom
 2. Established principle of equality before the law
 3. Religious reforms = toleration
 4. Programs largely failed = no support from nobility and serfs could not understand changes, Church unhappy with religious reforms

c. Catherine the Great (Russia)

- Ruled from 1762-1796
- Did nothing because needed support of nobility
- Tightened control on peasants after a failed revolt
- Serfdom was expanded
- Worthy successor to Peter the Great

II. Enlightened Absolutism

- a. Only Joseph II sought truly radical changes
- b. All three absolutist were primarily concerned with their interest in the power and welfare of their state

Seven Years War

I. Austrian Succession

- a. Charles VI died w/out a male heir; daughter Maria Theresa took throne
- b. Prussia invades Silesia
- c. War took place in Europe, India, and North America
 - Europe
 1. France allied w/ Austria
 2. Russia allied w/ Austria
 3. Britain allied w/ Prussia
 4. Russia withdraws & a treaty is made where all remove from freight territories except Russia from Silesia
 - India
 1. Great War for Empire = Britain v. France
 2. Britain wins
 - North America (French & Indian War)
 1. Fight over control of Ohio River Valley & Gulf of St. Lawrence
 2. William Pitt (Britt) puts most resources into winning in North America and defeat French
 - a. All French lands east of Mississippi River and Canada go to Brit; Florida goes to Brit. From Spanish
 - b. Spanish receive Louisiana Territory from France

Government

- A. Thomas Hobbes – English philosopher who used the idea of natural law to argue that absolute monarchy was the best form of government
 - believed that without an absolute government, chaos would occur
 - believed people were naturally born bad
 - published his book *Leviathan* in 1651
- B. John Locke – English philosopher who believed that people have natural rights, or rights belonging to all humans from birth-included the right to life, liberty, & property
 - believed people were born good
 - believed that a government functioned best when its powers were limited and it was acceptable to all citizens. However, if a government failed to protect natural rights, people had the right to over throw it/start a new one
- C. Jean-Jacques Rousseau – French Philosopher who claimed that people should rely more on instinct and emotion
 - published *La Nouvelle Heloise*, a novel that described the beauties of nature and the pleasures of simple country life
 - book, *Emile*, emphasized the importance of education in the development of human personality
 - Most famous work, *The Social Contract*, has shaped democratic thought – said that people have the right to create a government devoted to the common good
- D. Baron de Montesquieu – contributor to the *Encyclopedia*
 - believed that power should be equally divided among the branches of government
 - believed in the rights of individuals
 - “makes laws, enforces laws, interprets laws”

Literature

- A. Voltaire – French author who wrote plays, poetry, essays, and books
 - works mocking the church and royal court of France earned him one prison term, he received a second term when he was accused of insulting a nobleman
 - exiled from France
 - credited with the famous statement in defense of free speech, “I disapprove of what you say, but I will defend to the death your right to say it”
- B. Denis Diderot – editor of the *Encyclopedia*, which criticized the Catholic Church and government and praised religious tolerance
 - went to prison for some of his writings in the encyclopedia

Philosophers

- A. Francis Bacon – claimed that ideas based solely on tradition or unproven facts should be discarded completely
 - helped develop the scientific method
- B. Rene Descartes – inventor of analytical geometry
 - published his book, *Discourse on Method*, to explain his philosophy
 - began his search for knowledge by doubting everything except his own existence: “I think, therefore, I am”

Biology

- A. Andreas Vesalius – accurately described the individual organs and the general structure of the human body by dissecting human bodies at the University of Padua; broke French laws
- B. William Harvey – showed that the heart was the beginning point for the circulation of blood
 - proved that the same blood flows through the veins and arteries and makes a complete circuit through the body
- C. Robert Hooke – discovered the cell using the newly invented microscope

Chemistry


- A. Robert Boyle – one of the first scientists to conduct controlled experiments in chemistry
 - his work led to Boyle's law: the volume of a gas varies with the pressure exerted on it
- B. Antoine Lavoisier – invented a system for naming chemical elements still used today
 - considered (by some) the founder of modern chemistry
 - experimented w/ oxygen
 - discovered the nature of combustion

Marie Lavoisier – helped her husband by learning English and Latin so she could translate scientific essays

 - made illustrations for her husband's writing
- C. Joseph Priestly – conducted further experiments into the properties of air and discovered the existence of oxygen; his study of the properties of CO₂ resulted in his invention of carbonated drinks

Astronomy, Physics, & Mathematics

- A. Nicolas Copernicus – a mathematician who published *On the Revolutions of the Heavenly Spheres*
 - introduced the Heliocentric System which said that the sun is the center of the universe, not Earth
 - also stated that the planets revolved around the sun and that the moon revolves around Earth
- B. Johannes Kepler – observations confirmed that the sun is at the center of the universe (toward the end of the ellipse)
 - Kepler's laws showed that the planets' orbits around the sun are not circular, but they're elliptical (egg-shaped)
- C. Galileo Galilei – made regular observations of the heavens using a telescope
 - discovered mountains on Earth's moon, four moons revolving around Jupiter, & sunspots
 - his observations made heavenly bodies appear to be composed of material substance instead of just orbs of light
- D. Isaac Newton – defined the 3 laws of motion that govern the planetary bodies
 - came up with the universal law of gravitation which states that everything in the universe is attracted to something else by a force called gravity
 - this one universal law could explain all motion
 - developed calculus

 **Guided Reading Activity 17-1**

The Scientific Revolution

DIRECTIONS: Answer the following questions as you read Section 1.

1. What did the writings of Ptolemy and Archimedes make obvious?

2. What new invention helped to spread new scientific ideas quickly and easily?

3. Where is Earth placed in the universe according to the Ptolemaic system?

4. Contrary to Ptolemy, what did Copernicus argue concerning the construction of the universe?

5. What discoveries did Galileo make using a telescope?

6. Why did the Church order Galileo to abandon the Copernican idea of the nature of the universe?

7. What did Isaac Newton define in his first book, *The Principia*?

8. What did William Harvey's observations and experiments show?


9. What field of science in Germany provided opportunities for women?

10. What did René Descartes emphasize and assert?

11. Who developed the scientific method?

SECTION 17-1

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Guided Reading Activity 17-2

The Enlightenment

DIRECTIONS: Fill in the blanks below as you read Section 2.

The (1) _____ was an eighteenth-century philosophical movement of intellectuals who were greatly impressed with the achievements of the (2) _____ Revolution. (3) _____, natural law, hope, and (4) _____ were common words to the thinkers of the Enlightenment.

Montesquieu's analysis of the system of checks and (5) _____ through separation of powers was his most lasting contribution to political thought. Voltaire was especially well-known for his criticism of (6) _____ and his strong belief in religious toleration. Diderot's most famous contribution to the Enlightenment was the (7) _____, or *Classified Dictionary of the Sciences, Arts, and the Trades*.

The (8) _____, a French group, were interested in identifying the natural economic laws that governed human society. They believed the state should not interrupt the free play of natural economic forces by imposing government (9) _____ on the economy. This doctrine became known as (10) _____, meaning "to let do."

Jean-Jacques Rousseau argued for a social (11) _____ between the government and the people. Through a social contract, an entire society agrees to be (12) _____ by its general will. The English writer Mary (13) _____ advanced the strongest statement for the rights of women.

Many Enlightenment philosophes (14) _____ the Christian churches. But many people also sought a deeper personal (15) _____ to God. (16) _____ proved that the need for spiritual experience had not been eliminated by the eighteenth-century search for reason.

Guided Reading Activity 17-3

The Impact of the Enlightenment

DIRECTIONS: Fill in the blanks below as you read Section 3.

- I. Enlightenment thought influenced European _____ in the eighteenth century.
 - A. Frederick II of _____ was well-versed in the ideas of the Enlightenment.
 - B. Joseph II of Austria said, "Philosophy is the _____ of my empire."
 - C. Catherine II of Russia said Diderot's _____ theories "would have turned everything in my kingdom upside down."
- II. The philosophes _____ war as a foolish waste of life and resources.
 - A. In 1740 a major war broke out in connection with the succession to the _____ throne.
 - B. The _____ Years' War had three major areas of conflict: Europe, India, and North America.
 - C. The struggle between Britain and France in the rest of the world, known as the _____, was fought in India and North America.
- III. The Enlightenment brought important changes in art, _____, and literature.
 - A. By the 1730s, a new artistic style known as _____ had spread over Europe.
 - B. Eighteenth-century Europe produced some of the world's most enduring _____.
 - 1. Johann Sebastian _____ was one of the greatest composers of all time.
 - 2. Wolfgang Amadeus _____ was a true child prodigy of the age.
 - C. European _____ began to choose realistic social themes over the past century's focus on heroic deeds and the supernatural.

SECTION 17-3

 **Guided Reading Activity 17-4**

The American Revolution

DIRECTIONS: Fill in the blanks below as you read Section 4.

1. The United Kingdom of _____ came into existence in 1707, when the governments of England and Scotland were united.
2. By 1757 Britain controlled _____ English colonies on the eastern coast of the present United States.
3. After the Seven Years' War, British leaders wanted to get new _____ from the colonies.
4. In 1765 Parliament imposed the _____, which required legal documents to carry a stamp showing that a tax had been paid to _____.
5. Fighting finally erupted between colonists and the British army in April 1775 in _____ and _____.
6. On July 4, 1776, the Second Continental Congress approved the _____.
7. When General Cornwallis was forced to surrender to the American and French forces at _____, the British decided to end the war.
8. The _____, signed in 1783, recognized the _____ of the American colonies and granted American control of territory to the _____ River.
9. The proposed Constitution created a _____ system, in which the national and state governments shared power.
10. The _____ guaranteed freedom of religion, speech, press, the right to bear arms, and trial by jury.

People in World History Activity 17

Profile 1

Nicholas Copernicus (1473–1543)

In the early 1500s, most people believed Ptolemy's theory of the universe. More than 1,000 years earlier, the Greek astronomer had concluded that Earth was the center of the universe. According to Ptolemy, Earth was stationary, and all the other planets moved around it in complicated paths, or orbits. Copernicus, however, dared to disagree with his theory.

Born in Toruń, Poland, Copernicus began his studies at the University of Kraków. His uncle was a prelate, a powerful church official. When Copernicus was 24, his uncle used his influence to have him appointed a canon, an official of the cathedral in Frombork, Poland. Copernicus used the income from this position to finance his studies in mathematics, astronomy, and medicine in Italy. When he was 33, he earned a doctorate from the University of Ferrara. Then he returned to Poland and his position as church canon.

While finishing his formal education, Copernicus became aware of serious problems within the Ptolemaic theory. Most significantly, Ptolemy's theory of the planets' movement in the galaxy seemed too complicated. Looking for a way to make sense of this defective logic, Copernicus began to review other theories of the universe.

After years of careful study, Copernicus came to believe that the Sun is stationary and located near the center of the universe. Further, he theorized that Earth is a planet like all the other planets in the sky. As a result, Earth must move like the other planets. Copernicus believed Earth to be in the third planetary orbit around the Sun.

Disturbing fixed ideas about the universe was a dangerous thing. Copernicus's theory of the universe not only challenged Ptolemy's theory, but it also refuted the Church's view of the universe. If Copernicus's theory became known, he could have been severely punished. Copernicus, however, was careful, and he shared his ideas only with those people with whom he could trust his life. Nonetheless, news of his thesis spread rapidly. Copernicus's masterpiece, *On The Revolutions of the Heavenly Spheres*, was published right before his death in 1543. For his achievements, Copernicus is considered the founder of modern astronomy.



CHAPTER 17

REVIEWING THE PROFILE

Directions: Answer the following questions on a separate sheet of paper.

1. How was Copernicus's theory of the universe different from Ptolemy's theory?
2. **Critical Thinking** Determining Cause and Effect. Why would the Church have been angered by Copernicus's theory?
3. **Critical Thinking** Recognizing Ideologies. Why do you think people in Copernicus's time reacted so negatively to his ideas?

People in World History Activity 17

Profile 2

Adam Smith (1723–1790)

How can social order and human progress be possible in a society where people follow their own self-interests? This is the problem that Adam Smith set out to solve.

Smith argued that people's personal interests lead to progress and order. To make money, people make things that other people want to buy. People spend money for the things they want the most. Buying and selling creates social harmony. Smith claimed that all this would happen without control, as if by an "invisible hand." This belief came to be called *laissez-faire* economics, the policy that a government should impose the fewest possible restrictions on prices and trade. *Laissez-faire* is a French phrase meaning "let do" or "leave them alone." As a result of his work with freedom and order, economic process, and a unified social theory, Adam Smith is considered the founder of modern economics.

Smith was born in Kirkcaldy, Scotland, to a distinguished family. His father was an important lawyer and public official; his mother was a member of the upper class. His college education was the best that could be had: first at Scotland's University of Glasgow and then at England's Oxford University. Smith left Oxford when he was

23 years old. Two years later, he became a professor at the University of Edinburgh, where he taught literature, law, and philosophy. In 1751, he was made a professor of logic at the University of Glasgow. Later that year Smith accepted a post as professor in moral philosophy.

At Glasgow, Smith wrote his first book, *The Theory of Moral Sentiment* (1759). He then was hired to tutor the Duke of Buccleuch. While accompanying the young duke on a tour of France, Smith began his most important book, *The Wealth of Nations*.

When Smith returned to England in 1766, the young duke's stepfather provided him with a regular income. Freed from the need to earn a living, Smith was able to leave teaching and spend the next decade writing and studying. He published the first edition of *The Wealth of Nations* in 1776 and revised it five times during his life. The book became a major influence on economic policy in the early nineteenth century.



REVIEWING THE PROFILE

Directions: Answer the following questions on a separate sheet of paper.

1. What social dilemma did Smith address in *The Wealth of Nations*?
2. What is *laissez-faire* economics?
3. **Critical Thinking** Recognizing Bias. What assumptions about human nature did Adam Smith make?
4. **Critical Thinking** Identifying Alternatives. What might be the advantage of a government that controls trade—"hands-on" as opposed to Smith's "*laissez-faire*" ideal?



Reteaching Activity 17

Revolution and Enlightenment

In the Age of Enlightenment, innovative ideas in astronomy, physics, mathematics, medicine, chemistry, and philosophy changed the way people viewed the physical and social world. New theories and beliefs based on the scientific method and on reason replaced old beliefs based on magic, mysticism, and ancient writings.

DIRECTIONS: The outline below lists fields that changed tremendously in the Age of Enlightenment and people who initiated or contributed to these changes. In the space provided, record the discoveries, contributions, or ideas of these individuals.

I. Astronomy, Physics, and Mathematics

- A. Copernicus _____
- B. Kepler _____
- C. Galileo _____
- D. Newton _____

II. Biology

- A. Vesalius _____
- B. Harvey _____

III. Chemistry

- A. Boyle _____
- B. Lavoisier _____

IV. Government

- A. Rousseau _____
- B. Montesquieu _____

V. Literature

- A. Voltaire _____
- B. Diderot _____