Revolution & Enlightenment
1550–1800

Chapter 10
Key Events

- As you read the chapter, look for these key events in the history of the Scientific Revolution and the Enlightenment
  - The ideas of the Scientific Revolution and the Enlightenment laid the foundation for a modern worldview based on rationalism and secularism
  - Enlightenment thought led some rulers to advocate such natural rights as equality before the law and freedom of religion
  - The American colonies formed a new nation and ratified the Constitution of the United States
The Age of Reason

- Renaissance Humanists
  - Rediscovered Ancient Science through an Understanding of Greek and Latin
  - New Inventions Made Scientific Discoveries Possible
    - Telescope
    - Microscope
    - Printing Press to Spread Ideas
  - Increased Understanding of Mathematics
  - Great Mathematicians of the Age of Reason:
    - Copernicus, Kepler, & Galileo
Revolution in Astronomy

- Ancient Astronomy
  - Geocentric (Earth Centered) Model of the Universe
  - Ptolemaic System
    - Universe is a Series of Spheres
    - The Earth is Fixed in the Middle
    - Everything Revolved around the Earth
    - God and the Saved Souls Resided in the 10th Sphere

Ptolemy (83-161 AD?)
Revolution in Astronomy

- Nicholas Copernicus
  - Sun Centered (Heliocentric Model of the Universe)
  - Published his Theory in the Book "On the Revolutions of the Heavenly Spheres"
  - The Planets Revolve around the Sun
  - The Sun’s Movement was in Fact the Rotation of the Earth
  - The Moon Revolves around the Earth
Revolution in Astronomy

Copernican Universe
Revolution in Astronomy

- Kepler’s Laws of Planetary Motion
  - Believed in the Heliocentric Model of the Universe (Sun Centered)
  - German Mathematician Used Observation to Determine the Planetary Motions were Elliptical (Egg Shaped)

Johannes Kepler
Revolution in Astronomy

• Questions Yet Unanswered
  ➢ What are the Planets Made of?
  ➢ How do we Explain the Movements of the Universe?

• Galileo Galilei—Italian Mathematician
  ➢ First to Use the Telescope to make regular observations of Planetary movements
  ➢ 1610–Galileo’s Findings Were Published in “The Starry Messenger”
  ➢ Planets and Moon Appeared to be More than Orbs of Light—Made of Substance
Revolution in Astronomy

- Galileo’s Theories Were in Conflict with the Church
  - 1632 Called before the Inquisition in Rome
  - He was found guilty of Heresy and disobedience
  - He was forced to declare his findings false, in favor of the “Earth Centered” Universe
  - Galileo Did what he had to do, but always believed he was correct!

Galileo Galilei
Revolution in Astronomy

- Isaac Newton
  - Professor of Mathematics at Cambridge University
  - Published "Principia" Explaining the Laws that Governed Planetary Motion
- Universal Law of Gravitation
  - Every Object in the Universe is attracted to Every other object through the Force of Gravity
  - The Universe was a Well Regulated Machine
Revolution in Astronomy
Medicine and Chemistry

- Andreas Vesalius - “On the Fabric of the Human Body” (1543)
  - Professor of Surgery at the University of Padua
  - Vesalius Used Human Dissection to Understand the Human Body
Medicine and Chemistry

- William Harvey - “On the Motion of the Heart and Blood”
  - Heart, not the Liver was what circulated blood
  - Same Blood Flows through both Veins and Arteries
Robert Boyle

- Boyle was the first scientist to conduct controlled experiments
- Boyle’s Law - Volume of a Gas Varies Depending on the Pressure exerted on it
  - Example: Inflating a tire with an air compressor
Antoine Lavoisier
- The Father of Modern Chemistry
- Invented a System for the Identification and Classification of the Chemical Elements
- Still Used today
Women of the Scientific Revolution

• Margaret Cavendish
  ➢ “Observations Upon Experimental Philosophy”
    ➢ Humans have No Control Over Natural Causes and Effects
    ➢ Laws of Nature Cannot be Changed by Humans

• Maria Winkelmann—German Astronomer
  ➢ Married to Astronomer Gottfried Kirch
    ➢ Credited with the Discovery of a Comet
    ➢ Denied a Position at the Berlin Academy because of her gender
Descartes and Reason

- René Descartes
  - 1637 - "Discourse of Method"
  - Accept as true, only what has been reasoned to be true
  - "I think, therefore I am"
  - Descartes Separated Mind and Matter
  - Because Matter was viewed as dead, it could be scientifically investigated
  - Descartes is the father of modern "Rationalism"
    - Reasoning is the source of knowledge
The Scientific Method

- Francis Bacon - The Scientific Method
  - Scientific Method - Systematic Method of Observation (Collecting and analyzing data)
  - Inductive Reasoning - Scientists should move from the Particular to the General
  - Use Science to Control Nature - to make life better for people
  - Science should be of Practical matters
Paths to the Enlightenment

• Can Universal Laws be applied to Govern Human Actions?
  ➢ Newton’s Law – Reason can be applied to understand the motions of the Universe
  ➢ John Locke – Reason and Scientific Method could be Used to govern human interactions
    ➢ Answering these questions can lead to a better society
    ➢ “Essay Concerning Human Understanding” – Every person was born with “Tabula rasa” or a clean slate
    ➢ Locke thought a perfect society could be achieved by reason
Paths to the Enlightenment
Philosophes and Their Ideas

• Montesquieu
  - 1748 “The Spirit of the Laws”
  - Identified 3 Basic Kinds of Governments:
    1. Republics – Suitable for Small States
    2. Despotism – For Large States
    3. Monarchies – For Moderate Sized States
  - Separation of Powers – In England: Executive, Legislative, and Judicial
  - Checks and Balances Limit the Branches of Government
Philosophes and Their Ideas

- Voltaire
  - Voltaire was a French Philosopher
  - Considered by many as the Greatest philosopher of the Enlightenment
  - 1763 Wrote the “Treatise on Toleration”
  - Outspoken Critic of Religious Intolerance
  - Belief in Deism—God Created Heaven and Earth and the Natural Laws
  - God Did Not Interfere with the Operations of the Earth
Philosophes and Their Ideas

- Diderot - Wrote the “Encyclopedia”
- Attacked Religious Intolerance
- Called for social and political improvements to society
- “Encyclopedia” sold to Doctors, Lawyers, Teachers, & Clergymen
Philosophes and Their Ideas

- Adam Smith - Founder of Economics
  - The State Should not try to Control the flow of the Economy
  - Laissez-faire - “to leave alone”
  - Laissez-faire economics let the market determine the flow of goods and services
  - 1776 - “The Wealth of Nations” Smith outlined his economic principles

Economist Adam Smith
Philosophes and Their Ideas

- Cesare Beccaria
  - “On Crimes and Punishment”
    - 1764 – Punishments should not be exercises in brutality
  - Opposed Capital Punishment
  - He felt it was ironic that society used murder to punish and prevent murders
The Later Enlightenment

- Jean-Jacques Rousseau
  - "Discourse on the Origins of the Inequality of Mankind" Pointed out that Laws exist to support inequalities and privileges of the elite
  - "Social Contract" 1762- All must follow the rules that are best for society
  - "Emile" Education should foster, not restrict a child’s natural instincts
  - Believed that a woman’s education should fulfill her role as wife and mother
The Later Enlightenment

- Rights of Women
  - Mary Wollstonecraft (1759–1797) Founder of the Woman’s Rights Movement in Europe and America
  - “A Vindication of the Rights of Women” - Pointed out that many criticisms used against government, also applied to men’s treatment of women
  - Women have reason, they are entitled to the same rights as men
Social World of the Enlightenment

The Growth of Reading

- Much, but not all of the Enlightenment was Directed to the Aristocracy
  - Books became Less Expensive, More Common and Appealed to a growing number of Common people
  - Middle Class, Women, and Urban Artisans Were the New Reading public
  - Magazines - 25 Periodicals in 1700 grew to 158 by 1780
  - First Daily Newspaper Published in London, England in 1702
- Salons - Social Gatherings Hosted by the Elite
  - People Exchanged Ideas in intellectual conversations
Religion in the Enlightenment

- **John Wesley - Methodism**
  - Wesley was a revivalist who preached salvation to the masses in England
  - Methodist societies were organized to spread Wesley’s Words
  - Gave the Lower and Middle Classes a sense of community
  - Methodism became a separate Protestant Religion after Wesley’s death
The Rococo Movement Characterized the Age of Enlightenment

- Emphasized Grace, Charm, and Gentile Action
- Highly Secular - The Pursuit of Pleasure
Enlightenment Art

- Rococo Artist Antoine Watteau
  - Painting revealed Upper-class Pleasure and Joy
  - Some suggest that his paintings reflect the limits of human pleasure, love and life
  - Watteau’s paintings show the elegance that was the Upper class lifestyle
Paintings of Antoine Watteau
Music of the Enlightenment

• One of the Greatest Periods in the History of European Music (Baroque Composers)

  • Johann Sebastian Bach - German Composer
    • “Mass in B Minor”
    • One of the Greatest Composers of All Times
Music of the Enlightenment

- George Frederic Handel
  - Handel’s “Messiah” Is Still Widely Performed Today
  - The mass appeal of the “Messiah” distinguishes Handel as one of the greatest Enlightenment composers
Music of the Enlightenment

• One of the Greatest Periods in the History of European Music (Classical Composers)
  • **Franz Joseph Haydn**
    • A visit to England Taught Haydn that music could be directed to the masses

Symphony No. 101
Music of the Enlightenment

- Wolfgang Amadeus Mozart
  - Haydn Referred to Mozart as the Greatest Composer

Violin Concerto No. 4 in D Major
Music of the Enlightenment

Wolfgang Amadeus Mozart
Enlightened Absolutism

- Enlightened Philosophers believed in the rights of all people—Such as:
  - Equality before the Law
  - Freedom of Religious Worship
  - Freedom of the Press
  - Freedom to Own Property
  - Freedom of Speech
  - The Right to Assemble

- The American Declaration of Independence is a reflection Enlightenment Values
Enlightened Absolutism

- Did Rulers of the Period Reflect the principles of the Philosophers?
  - Could Strong Rulers protect the Natural Rights of their subjects?
  - Could Rulers allow religious toleration, freedom of speech, and a free press?
  - Was science and education to be supported or feared by the ruling class?
  - Could laws protect the weak and strong alike?
  - Could Power Exist along with Liberty?
Enlightened Absolutism – Prussia

- Under Frederick William and Frederick II, Prussian Military Strength Grew
  - Feudal Values were reflected in the Prussian Army
  - Nobles were officers who owed allegiance to the King
  - Frederick II made a Few Reforms representing Enlightenment Ideals but kept the feudal social structure intact
Enlightened Absolutism—Austria

- Maria Theresa—Empress of Austria
  - Had to work hard to keep a large and culturally diverse empire together
  - Her Son Joseph II tried to make the reforms of the Enlightenment materialize in Austria
  - Much of his reform failed and he made more enemies than friends
Enlightened Absolutism – Russia

- Russia Under Catherine the Great
  - Ruled Russia from 1762–1796
  - She was open minded to the reforms of the Enlightenment
  - She did little because she needed the support of the nobility to keep her empire together
  - The peasants rebelled, but the rebellion was crushed
  - After the uprising, all reforms stopped

Catherine II of Russia
Wars of the Enlightenment

• War of the Austrian Succession
  • 1740— Maria Theresa Came to Power in Austria
    • She was perceived to be weak because she was a woman
    • King Frederick II of Prussia Attacked the Austrian Province of Silesia
    • The War was fought in Europe, Asia, and America
    • The Treaty of Aix-la-Chapelle in 1748 Ended the Conflict
  • Prussia’s Refusal to return Silesia to Austria set the stage for another period of warfare
Wars of the Enlightenment

• The Seven Years’ War
  • Diplomatic Revolution—(By Austria) Ended the French/Prussian Alliance
    • Bitterness between France and Austria was replaced by bitterness between France and England
      • *England and France were Colonial Rivals*
    • Russia Feared a Strong Prussia and Allied with France and Austria
      • England allied with Prussia
  • War broke out in 1756 and was fought to a stalemate in Europe
The Seven Years’ War (1756–1763)

- The North American Theater of the Seven Years’ War was Called the French and Indian War
  - France and Her Native American Allies Fought against the English, and Colonial Militias
Wars of the Enlightenment
Wars of the Enlightenment

- The Seven Years’ War (1756–1763)
  - France Controlled Canada, and the Interior of the Continent (River Systems, & Fur Trade)
  - British Colonies Had a Population of about 1 Million
  - Dispute over the Ohio Valley
  - French Control over the St. Lawrence and Mississippi Rivers
  - Prime Minister William Pitt Made a Commitment to Win the North American War
  - Treaty of Paris - 1763 Ended the War
Wars of the Enlightenment
Colonial Empires & American Revolution

- Spanish and Portuguese Empires 1500–1750
  - Portugal Controlled Brazil
  - Spain Controlled Much of the Rest of Latin America
  - Spanish had a Diverse society
    - Mestizos - Descendents of Spanish and Native Americans
    - African American Slaves (8 Million)
    - Mulattoes - Descendents of African and Europeans
  - Spain and Portugal made money from their colonies
    - Gold and Silver
    - Agricultural Items - (Plantation or “Cash” Crops) Sugar, Tobacco, Rice, Indigo
    - Colonies were markets for manufactured goods from Europe
Colonial Empires & American Revolution

- Spanish and Portuguese Empires 1500–1750
  - Distance and the Nature of Transportation Made Control of the North American Colonies Difficult
    - Communication was time consuming
    - Colonial people had a great deal of self-rule
  - One Important Objective of the Colonial System was the Spread of Christianity
    - Catholic Missionaries - Dominicans, Franciscans, Jesuits
    - Missions were established to control native populations
    - The effects of the Mission System are still felt in Latin America today
Colonial Empires & American Revolution

• British North America
  • Parliament gained the Right to make laws, levy taxes, pass the budget, and influence the monarchs
  • The head of Parliament came to be called the Prime Minister
  • England’s Colonial Empire was to be beneficial to the people of England
    • The colonies were ruled by the British Board of Trade, the Royal Council, and Parliament
    • Colonial Legislatures often were in conflict with British Policy
    • Colonial Merchants grew in both political and economic power
Colonial Empires & American Revolution

• British Taxation policy following the French and Indian War Resulted in the Declaration of Independence

• Who Should Pay for the Security of the Colonies? England or the Colonists?
Colonial Empires & American Revolution

• The Declaration of Independence
  • Based on the principles of the Enlightenment
  • Written by Thomas Jefferson, John Adams, and Benjamin Franklin (Readers of John Locke)
  • Declaration of Independence was a “Letter to the Crown and to the World”

• What is the Likelihood that the War will Succeed?
  • England- Most Powerful Nation in the World
  • Colonies- No Army, Manufacturing, Money, or Navy
  • Franklin and the French Alliance
1781—The Surrender of General Cornwallis at Yorktown Ended Hostilities in North America between the Colonies and England
Colonial Empires & American Revolution

- The Treaty of Paris - 1783
  - America Gained:
    - Independence
    - Land from the Appalachian Mountains to the Mississippi River & From the Great Lakes to Florida
    - Fishing Rights in the Gulf of St. Lawrence
  - “The British don’t make peace, they buy it.”
- The Articles of Confederation Was the first attempt at establishing a National Government (too weak)
  - All Power rested in the States
  - Not an effective government for the conducting of Trade
Colonial Empires & American Revolution

- The Constitution
  - The Federal System - Shared Power between the States and National Government
  - The New National Government was Considerably Stronger than the government under the Articles
  - Separation of Powers: Executive, Legislative, & Judicial Branches (Checks and Balances)
  - Each branch may exercise only the powers granted to it by the Constitution
Colonial Empires & American Revolution

- The Bill Of Rights—1789 (First 10 Amendments)
  - Guaranteed Freedoms to the People Such as: Religion, Speech, Assembly, Press, Petition, Trial by Jury, Due Process of Law, Security against Unreasonable Searches and Seizures, the right to Keep and Bear Arms, etc.

- The American Bill of Rights Reflect the philosophies of the Enlightenment

- The American Experiment is the Embodiment of the European Idea of the Ideal Society