4.1: Contextualizing the Scientific Revolution and the Enlightenment

Modes of Thought

- **Humanism**:
    - Emphasizes the value and agency of human beings
    - Stresses the importance of reason and critical thinking
    - Rejects supernatural explanations and focuses on naturalistic approaches
- **Individualism**:
    - Emphasizes the importance of individual autonomy and self-reliance
    - Values personal achievement and self-expression
    - Rejects conformity and groupthink
- **Intellectualism**:
    - Emphasizes the importance of knowledge and education
    - Values critical thinking and rational inquiry
    - Rejects dogma and superstition.

The Enlightenment

- The **Enlightenment** was a philosophical movement that emerged in Europe in the 17th and 18th centuries. It was characterized by a focus on reason, science, and individualism, and a rejection of traditional authority and dogma.
- **Key Ideas**
    - **Reason**: Enlightenment thinkers believed that reason was the key to understanding the world and solving its problems. They emphasized the importance of empirical evidence and scientific inquiry.
    - **Individualism**: Enlightenment thinkers emphasized the importance of individual rights and freedoms. They believed that individuals should be free to pursue their own interests and make their own choices.
    - **Progress**: Enlightenment thinkers believed that society could be improved through reason and scientific progress. They believed that human beings were capable of creating a better world through their own efforts.
    - **Secularism**: Enlightenment thinkers rejected traditional religious authority and emphasized the importance of reason and science over faith.
- **Key Thinkers**
    - **John Locke**: English philosopher who emphasized the importance of individual rights and freedoms, and argued that government should be based on the consent of the governed.
    - **Voltaire**: French philosopher who championed freedom of speech and religious tolerance, and criticized the abuses of the Catholic Church and the French monarchy.

    - **Jean-Jacques Rousseau**: Swiss philosopher who emphasized the importance of individual freedom and the social contract between individuals and society.
    - **Immanuel Kant**: German philosopher who emphasized the importance of reason and the scientific method, and argued that morality should be based on rational principles.
- **Impact**
    - The Enlightenment had a profound impact on Western society and culture.
    - It paved the way for the scientific revolution, the rise of democracy and individualism, and the development of modern capitalism.
    - It also challenged traditional religious and political authority, and paved the way for the French Revolution and other movements for social and political change.

Scientific Revolution

- The **Scientific Revolution** was a period of time from the 16th to the 18th century, during which new ideas and knowledge in physics, astronomy, biology, and chemistry emerged. It was a time of great change in the way people thought about the world and their place in it.
- **Key figures**
    - **Nicolaus Copernicus**: proposed the heliocentric model of the solar system
    - **Galileo Galilei**: made important discoveries in physics and astronomy, including the moons of Jupiter and the phases of Venus
    - **Isaac Newton**: developed the laws of motion and universal gravitation
    - **Francis Bacon**: developed the scientific method, emphasizing empirical observation and experimentation
    - **René Descartes**: emphasized the importance of reason and logic in understanding the natural world
- **Key ideas**
    - **Empiricism**: the idea that knowledge comes from observation and experience
    - **Rationalism**: the idea that reason and logic are the best ways to understand the world
    - **Scientific method**: a systematic approach to scientific inquiry that emphasizes observation, experimentation, and the testing of hypotheses
    - **Natural laws**: the idea that the universe operates according to predictable laws that can be discovered through observation and experimentation
- **Impact**
    - The Scientific Revolution had a profound impact on society, leading to the development of new technologies and the advancement of medicine.
    - It also challenged traditional beliefs and authority, paving the way for the Enlightenment and the rise of modern science.

Public Venues and the Print Media

- **Public Venues**

    - Public venues like coffeehouses, salons, and clubs were important for intellectuals and the public to exchange ideas about politics, philosophy, and science.
    - Coffeehouses were popular in England and France, where people could drink coffee, read newspapers, and debate radical ideas.
    - Wealthy women hosted salons for intellectuals to discuss ideas in a refined setting.
    - Clubs brought together people with similar interests to share knowledge and engage in intellectual discussions.
- **Print Media**
    - Print media was crucial in spreading Enlightenment ideas.
    - The printing press allowed for producing books, newspapers, and pamphlets on a large scale, resulting in widespread dissemination of ideas and information.
    - Newspapers provided global news and were used to spread political ideas and criticize the government.
    - Pamphlets were inexpensive and widely distributed, promoting political and scientific ideas.

Intellectualism and Commoners

- **Intellectualism during the Enlightenment**
    - The Enlightenment was a time of great intellectual activity, with philosophers, scientists, and writers producing new ideas and challenging traditional beliefs.
    - Key Enlightenment thinkers included Voltaire, Rousseau, and Montesquieu, who advocated for individual rights, democracy, and the separation of powers.
    - The Enlightenment also saw the rise of scientific inquiry, with figures such as Isaac Newton and Galileo Galilei making groundbreaking discoveries in physics and astronomy.
- **Commoners during the Enlightenment**
    - While the Enlightenment is often associated with the intellectual elite, commoners also played a significant role in spreading Enlightenment ideas.
    - The rise of literacy and the printing press allowed for the dissemination of ideas to a wider audience, with books and pamphlets being produced in large quantities.
    - Commoners also participated in the public sphere, attending salons and coffeehouses where they could discuss and debate Enlightenment ideas.
    - The French Revolution, which was inspired by Enlightenment ideals, was largely driven by commoners who sought to overthrow the aristocracy and establish a more democratic society.

4.2: The Scientific Revolution

New Ideas and Methods

- **Empiricism:** This is the idea that knowledge should be based on observation and experimentation rather than on tradition or authority. Scientists began to rely on empirical evidence to support their theories and hypotheses, rather than relying solely on philosophical or religious arguments.
- **Mathematical reasoning:** Scientists began to use mathematics to describe and explain natural phenomena. This allowed them to make precise measurements and predictions, and to develop new theories and models.
- **The scientific method:** This is a systematic approach to scientific inquiry that involves making observations, formulating hypotheses, testing those hypotheses through experimentation, and drawing conclusions based on the results. The scientific method helped to ensure that scientific findings were based on reliable evidence and could be replicated by other scientists.
- **The heliocentric model of the universe:** This is the idea that the sun, rather than the Earth, is at the center of the solar system. This model was proposed by Nicolaus Copernicus in the 16th century and was later supported by the observations of Galileo Galilei and others.
- **The laws of motion:** These are a set of mathematical principles developed by Isaac Newton that describe the behavior of objects in motion. Newton's laws of motion helped to explain many natural phenomena, including the movements of planets and the behavior of falling objects.

Anatomy and Medicine

- **Andreas Vesalius** was a Flemish anatomist who is considered the father of modern anatomy. He published "De humani corporis fabrica" in 1543, which was a detailed and accurate description of the human body based on his own dissections.
- **William Harvey** was an English physician who is known for his work on the circulatory system. He discovered that blood circulates through the body in a closed system, and that the heart is responsible for pumping the blood.
- **Antonie van Leeuwenhoek** was a Dutch scientist who is credited with the invention of the microscope. He used his microscope to observe and describe microorganisms, which were previously unknown.
- **Galen** was an ancient Greek physician whose ideas dominated medicine for centuries. However, during the Scientific Revolution, his ideas were challenged and disproven by new discoveries.
- **Paracelsus** was a Swiss physician who rejected the traditional methods of medicine and instead emphasized the use of chemicals and minerals to treat diseases.
- **The Royal Society** was founded in England in 1660 and played a key role in the advancement of science during the Scientific Revolution. It provided a platform for scientists to share their ideas and discoveries.

Astronomy and Alchemy

- **Astronomy**

    - The scientific revolution was a period of great advancement in astronomy.
    - Nicolaus Copernicus proposed the heliocentric model of the solar system, which placed the sun at the center and the planets orbiting around it.
    - Galileo Galilei made significant contributions to the field of astronomy, including the discovery of Jupiter's four largest moons and the phases of Venus.
    - Johannes Kepler developed the laws of planetary motion, which described the elliptical orbits of the planets around the sun.
    - Isaac Newton's law of universal gravitation explained the motion of the planets and other celestial bodies.
- **Alchemy**
    - Alchemy was a precursor to modern chemistry and was practiced during the scientific revolution.
    - Alchemists sought to transform base metals into gold and to discover the elixir of life, which would grant immortality.
    - Many famous scientists, including Isaac Newton, were also alchemists.
    - Alchemy contributed to the development of modern chemistry by introducing new laboratory techniques and equipment.
    - However, alchemy was eventually discredited as a scientific practice due to its reliance on mystical and supernatural beliefs.

4.3: The Enlightenment

Political Theories

Traditional Political Theories

- **Absolutism**
    - The belief that a monarch has absolute power and authority over their subjects.
    - This theory was challenged during the Enlightenment by the idea of natural rights and the social contract.
- **Divine Right of Kings**
    - The belief that a monarch's authority comes from God.
    - This theory was also challenged during the Enlightenment by the idea of natural rights and the social contract.
- **Mercantilism**
    - The belief that a country's wealth is measured by its accumulation of gold and silver.
    - This theory was challenged during the Enlightenment by the idea of free trade and laissez-faire economics.

New Political Theories

- **Social Contract**

    - The idea that individuals agree to give up some of their natural rights in exchange for protection and security provided by the government.
    - This theory was popularized by philosophers such as John Locke and Jean-Jacques Rousseau.
- **Natural Rights**
    - The belief that individuals have inherent rights that cannot be taken away by the government.
    - These rights include life, liberty, and property.
    - This theory was popularized by philosophers such as John Locke and Thomas Paine.
- **Separation of Powers**
    - The idea that government power should be divided among different branches to prevent any one branch from becoming too powerful.
    - This theory was popularized by philosopher Montesquieu.
- **Laissez-Faire Economics**
    - The belief that the government should not interfere with the economy.
    - This theory was popularized by economist Adam Smith.

Women's Rights

- **Mary Wollstonecraft**
    - Mary Wollstonecraft was a British writer and philosopher who is considered to be one of the earliest feminists. In her book "A Vindication of the Rights of Woman" (1792), she argued that women should have the same rights as men, including the right to education and the right to participate in politics.
- **Olympe de Gouges**
    - Olympe de Gouges was a French playwright and political activist who wrote the "Declaration of the Rights of Woman and the Female Citizen" (1791). In this document, she argued that women should have the same rights as men, including the right to vote and the right to hold public office.
- **Enlightenment Thinkers**
    - Enlightenment thinkers such as Jean-Jacques Rousseau and John Locke also discussed women's rights. Rousseau argued that women were naturally inferior to men and should be educated differently, while Locke believed that women should have the same rights as men.

Economic Theories

- **Physiocracy**
    - Physiocracy was a new economic theory that emerged in France during the mid-18th century.
    - It was based on the idea that the wealth of a nation was derived from the productivity of its land, and that the role of government should be to promote agriculture and free trade.

    - Physiocrats believed that the market should be allowed to operate freely, without government intervention, and that taxes should be levied on landowners rather than on trade.
- **Adam Smith and Classical Liberalism**
    - Adam Smith was a Scottish economist who is widely regarded as the father of modern economics.
    - His book, "The Wealth of Nations," published in 1776, laid out the principles of classical liberalism, which emphasized the importance of individual freedom, free markets, and limited government intervention in the economy.
    - Smith argued that the market should be allowed to operate freely, without government interference, and that competition would lead to greater efficiency and innovation.

Religious Theories

- **Deism**: It was a religious theory that emerged during the Enlightenment. It held that God created the universe but did not intervene in its workings. Deists believed that God was like a watchmaker who created the universe and then let it run on its own. This theory was popular among many Enlightenment thinkers, including Thomas Jefferson and Benjamin Franklin.
- **Natural Religion**: It was another religious theory that emerged during the Enlightenment. It held that religion should be based on reason and observation of the natural world, rather than on revelation or tradition. Natural religion was often associated with the idea of a "divine watchmaker" who created the universe and set it in motion.
- **Skepticism**: It was a philosophical position that was popular during the Enlightenment. It held that knowledge could not be certain and that all beliefs should be subject to questioning and examination. This position was often applied to religious beliefs, and many Enlightenment thinkers were skeptical of traditional religious doctrines.
- **Toleration**: It was a key value of the Enlightenment. Many Enlightenment thinkers believed that people should be free to practice their own religion without interference from the state or other religious groups. This idea was a departure from the religious intolerance that had characterized much of European history.

4.4: 18th-Century Society and Demographics

Population Growth

- The population growth was due to a decline in mortality rates, which was caused by improvements in medicine, sanitation, and hygiene.
- The agricultural revolution also played a role in population growth, as it led to an increase in food production and a decrease in famine.
- The growth of trade and commerce also contributed to population growth, as it led to an increase in wealth and a higher standard of living.

- The population growth had both positive and negative effects. On the positive side, it led to an increase in economic growth and innovation. On the negative side, it led to overcrowding, urbanization, and environmental degradation.
- The population growth also had social and political implications, as it led to a shift in power from the aristocracy to the middle class. This shift was due to the fact that the middle class had more resources and were better able to adapt to the changing economic and social conditions.

Medicinal Advancement

- **Inoculation against smallpox:** Inoculation against smallpox was introduced in Europe in the early 18th century. Lady Mary Wortley Montagu, the wife of the British ambassador to the Ottoman Empire, observed the practice in Turkey and had her own children inoculated. The practice was controversial, but it eventually became widely accepted and helped to reduce the incidence of smallpox.
- **Discovery of oxygen:** In 1774, Joseph Priestley discovered oxygen, which led to a better understanding of respiration and the role of oxygen in the body.
- **Development of vaccination:** In 1796, Edward Jenner developed the first vaccine against smallpox. He observed that milkmaids who had contracted cowpox did not get smallpox, and he used cowpox to inoculate a young boy, who then became immune to smallpox.
- **Improvements in surgery:** Surgery became more advanced during the 18th century, thanks to developments such as the use of anesthesia and the introduction of antiseptic techniques. In 1846, William Morton demonstrated the use of ether as an anesthetic, which revolutionized surgery.
- **Advancements in pharmacology:** The 18th century saw the development of new drugs, such as quinine for the treatment of malaria and digitalis for the treatment of heart conditions. The use of opium as a painkiller also became more widespread.

Agricultural Revolution

- **New farming techniques:** The Agricultural Revolution saw the introduction of new farming techniques, such as crop rotation, selective breeding of livestock, and the use of fertilizers. These techniques helped to increase crop yields and improve the quality of livestock.
- **Enclosure movement:** The Enclosure movement was a process of fencing off common lands and converting them into private property. This allowed landowners to experiment with new farming techniques and improve their yields.
- **Increased food production:** The Agricultural Revolution led to a significant increase in food production, which helped to support the growing population of Europe.
- **Population growth:** The increased food production and improved living conditions led to a population boom in Europe during the 18th century.
- **Urbanization:** The Agricultural Revolution also contributed to the growth of cities, as people moved from rural areas to urban centers in search of work.

- **Impact on the economy:** The Agricultural Revolution had a significant impact on the European economy, as it led to increased trade and commerce, and helped to fuel the Industrial Revolution.

Urbanization

- During the 18th century, Europe experienced a significant increase in urbanization due to various factors such as industrialization, population growth, and agricultural changes.
- The growth of cities led to the emergence of new social classes, including the bourgeoisie and the working class.
- The development of transportation systems, such as canals and roads, facilitated the movement of goods and people between cities.
- The growth of cities also led to the development of new forms of entertainment, such as theaters and cafes.
- However, urbanization also had negative effects, including overcrowding, poor living conditions, and the spread of diseases.
- Governments responded to these issues by implementing urban planning and public health measures.
- Overall, urbanization during the 18th century in Europe had a significant impact on the social, economic, and cultural development of the continent.

4.5: 18th-Century Culture and Arts

Literature

- The novel became a popular literary form, with works such as "Robinson Crusoe" by Daniel Defoe and "Pamela" by Samuel Richardson.
- The Enlightenment movement led to the rise of philosophical and political literature, including works by Voltaire and Jean-Jacques Rousseau.
- The Romantic movement emerged towards the end of the century, with poets such as William Wordsworth and Samuel Taylor Coleridge.

Music

- The **Baroque period** continued to dominate music, with composers such as Johann Sebastian Bach and George Frideric Handel.
- The **Classical period** emerged towards the end of the century, with composers such as Wolfgang Amadeus Mozart and Ludwig van Beethoven.

Art

- The **Rococo style** emerged in the early 18th century, characterized by ornate and decorative designs.

- The **Neoclassical style** emerged towards the end of the century, inspired by classical Greek and Roman art.
- Famous artists of the time include Jean-Honoré Fragonard, Antoine Watteau, and Jacques-Louis David.

Fashion

- The 18th century saw the rise of elaborate and ornate fashion, with men wearing powdered wigs and women wearing corsets and voluminous dresses.
- The Industrial Revolution led to advancements in textile production, making clothing more affordable and accessible to the middle class.

4.6: Enlightened and Other Approaches to Power

Rise of Prussia

- Prussia was a small state in northern Germany that emerged as a major power in Europe during the 18th century.
- The rise of Prussia was largely due to the efforts of its rulers, particularly Frederick William I and his son Frederick II, also known as Frederick the Great.
- Frederick William I, who ruled from 1713 to 1740, transformed Prussia into a military state by creating a powerful army and imposing strict discipline on his subjects.
- Frederick II, who ruled from 1740 to 1786, continued his father's policies and expanded Prussia's territory through a series of wars, including the War of the Austrian Succession and the Seven Years' War.
- Frederick the Great was also a patron of the arts and sciences, and his court in Berlin became a center of intellectual and cultural activity.
- Prussia's rise to power had a significant impact on European politics and helped to shape the balance of power on the continent.
- Prussia's military success also inspired other European states to adopt similar military reforms and strategies, leading to the development of the modern nation-state and the concept of total war.

Enlightened Despots

- **Napoleon Bonaparte (1800-1815)**
    - French military and political leader who rose to prominence during the French Revolution
    - Became the first consul of France in 1799 and later declared himself emperor in 1804
    - Conquered much of Europe and implemented a series of reforms known as the Napoleonic Code

    - Defeated in 1815 at the Battle of Waterloo and exiled to the island of Saint Helena, where he died in 1821
- **Maria Theresa of Austria (1740-1780)**
    - Archduchess of Austria and queen of Hungary and Bohemia
    - Known for her reforms in education, agriculture, and the military
    - Strengthened the power of the central government and modernized the economy
    - Mother of Marie Antoinette, who became queen of France
- **Joseph II of Austria (1765-1790)**
    - Holy Roman Emperor and co-ruler of Austria with his mother, Maria Theresa
    - Implemented a series of reforms known as Josephinism, which aimed to modernize and centralize the government
    - Abolished serfdom, established religious toleration, and reformed the legal system
    - Faced opposition from the nobility and the Catholic Church
- **Frederick William I of Prussia (1713-1740)**
    - King of Prussia known for his military reforms and expansion of the army
    - Established compulsory education and promoted the growth of industry and agriculture
    - Known for his frugality and devotion to the military
- **Frederick William II of Prussia (1786-1797)**
    - King of Prussia during the French Revolution and Napoleonic Wars
    - Attempted to maintain neutrality in the wars but was eventually forced to join the coalition against France
    - Faced opposition from the nobility and the growing middle class
- **Catherine the Great of Russia (1762-1796)**
    - Empress of Russia who expanded the country's territory and power
    - Implemented a series of reforms known as the Nakaz, which aimed to modernize the legal system and promote education
    - Encouraged the growth of industry and agriculture and established a system of local government
    - Faced opposition from the nobility and the serfs, who were not granted any significant rights or freedoms.