

AP European History Detailed Outline

Chapter 6: “New Directions in Thought and Culture in the Sixteenth and Seventeenth Centuries”

**Chapter Overview:**

* Due to science and the discovery of a “heliocentric” universe, there was a transformation of humankind’s perception of its place in the larger scheme of things.
* This new worldview led to new thinking aboutmoral and religious matters, as well as scientific theory.
* New ideas and methods of science challenged modes of thought associated with late medieval times like scholasticism and philosophy.
* The Protestant Reformation and the discovery of the Americas presented new uncertainties that caused Europeans to question their souls, geographical knowledge, and physical nature.

**Section One: The Scientific Revolution**

* **Section Overview**
	1. The process that resulted in the view of the universe is typically called the Scientific Revolution.
	2. The Scientific Revolution was not rapid as it took the brilliant minds of dislocated scientists in laboratories in Poland, Italy, Denmark, Bohemia, France and Great Britain, as well as many local artisans they hired to help created instruments for study to produce this new science.
	3. During the fifteenth century, individuals interested in natural philosophy worked at universities, in home workshops, or the courts of royal families; it wasn’t until the late seventeenth century that formal societies and academies devoted to science were founded.
	4. Science became the greatest cultural authority in the western world.
* Why was the Geocentric theory so widely accepted?
	+ It was based on reality - sit in one place and watch the sky...everything moves and you don’t.
	+ Biblical - puts Man (made in God’s image) at the center of everything. We are important!
	+ RC Church said so!
* **Nicolaus Copernicus Rejects an Earth-­‐Centered Universe (Slide 6)**

Biographical information

* Polish priest and scientist
* educated at the University of Krakow
* published *On the Revolutions of the Heavenly Spheres* in 1543 (the year he died...WHY?)
* Commissioned to find astronomical justification so that the papacy could change the calendar so that it could correctly calculate the date of Easter, Copernicus’s work provided an intellectual springboard from which scientist could pose questions about Earth’s position in the universe.
1. **Ptolemaic System**
	* Ptolemy, a Roman citizen of Greek ancestry, wrote the *Almagest* (150CE) was considered the authority on astronomy throughout the Middle Ages and it suggested a geocentric model of the universe.
	* Above the earth lay a series of concentric crystal spheres, one of which contained the moon, another the sun, and still others the planets and the stars.
	* The outer realm contains God and angels and heaven
	* **Copernicus’s Universe**
	* Copernicus’s Model adopted many elements in the Ptolemaic model, but transferred them to a *heliocentric* model, which assumed the earth moved about the sun in acircle.
	* He proposed that the farther planets are away from the sun, the longer they took to revolve around it, which enabled astronomers to rank the planets in terms of distance.
	* Wrote On Heavenly Spheres for academics who would understand his maths and ideas. Church accepted it but were not about to let this information out. It would undermine their authority!
	* He published the work basically as he died to avoid RC Church persecution. (Reformation in full swing and RC Church was very worried...)
	* Although very few astronomers embraced the Copernican system—at least for a century— it did allow other people who were not satisfied with the Ptolemaic view to think in new directions.
* **Tycho Brahe (1546-­‐1601) (SLIDE 7) and Johannes Kepler (1571-­‐1630) (SLIDE 8)**
* Brahe’s contributions to science
	+ He did not believe Copernicus’s view and spent much of life advocating for a geocentric system.
	+ He thought that Mercury and Venus revolved around the sun but that the moon, the sun, and other planets revolved around the earth.
	+ He collected very detailed data of his observations. (This is his contribution! He was fanatical)
* Kepler’s contributions to science
	+ He studied under Brahe and was given his data when he died.
	+ Math genius!!!
	+ Kepler found mathematical proof of a sun-centered universe.
	+ 3 Laws of Planetary Motion:
		- He found that in order for heliocentrism to be true, planets must have an elliptical, rather than circular orbits.
		- Planets orbits speed up and slow down
		- Distance travelled along the orbit is proportional to its distance from the sun.
		- These were all correct but he could not explain why
	+ Kepler published his findings in a book called*The New Astronomy* (1609) in which he used Copernicus’s sun-­‐centered model and Brahe’s empirical data to solve the problem of planetary motion.
* **Galileo Galilei Argues For A Universe Based on Mathematical Laws**
	+ The condemnation of the Catholic Church of Galileo in 1633 is the most famous incident of conflict between modern science and religious institutions.
	+ Copernicus had thought that the heavens conformed to mathematical regularity; Galileo saw this regularity throughout all physical nature.
	+ Well known for ideas around physics - acceleration, terminal velocity, friction. (slide 9)
	+ Following the Council of Trent, the Catholic Church taught a more literal interpretation of scripture in order to respond to Protestant criticisms and it did not want to surrender the

interpretation of scripture to a layman like Galileo.

* + In 1609, he used a recently invented telescope (he did not invent it - the Dutch did. He improved it!) to observe the skies, he saw stars where none had been before, mountains on the moon, spots moving across the sun, and moons orbiting Jupiter. **Why were these issues?**
	+ In *The Starry Messenger* (1610) and *Letters on Sunspots* (1613), he used his rhetorical skills to argue that his new evidence—particularly in the phases of Venus—required a Copernican interpretation of the heavens. HELIOCENTRIC.
	+ Galileo published a *Letter to the Grand Duchess Christina* (1615) in order to explain how scripture should be interpreted to accommodate the new science.
1. Church was not happy... In 1616, the Catholic Church put Copernicus’s book *On the Revolutions of the Heavenly Spheres* on a list of prohibited books, but Galileo was able to resume his defense of the Copernican view when an acquaintance of his, Pope Urban VIII became pope in 1623.
	* Galileo taught at the University of Padua, where He popularized the Copernican system and articulated the concept of a universe subject to mathematical laws, before being hired by the Grand Duke of Tuscany, who was a Medici.
	* Published “Dialogue on Two Chief World Systems” a hypothetical argument between a person advocating Geocentrism and one advocating Heliocentrism. This book was clearly designed to defend the physical truthfulness of Copernicanism.
	* The voices in the dialogue favoring the older system appeared slow-­‐witted to which Pope Urban VIII found insulting and consequently ordered the trial of Galileo in 1633
	* Church orders him to appear before Inquisition. (**Slide 11)**
	* Galileo was condemned, forced to renounce his views, and was placed under house arrest in his home near Florence for the rest of his life.
	1. In 1992, Pope John Paul II formally ordered the reassessment of the Galileo case and the Roman Catholic Church admitted that errors had occurred, particularly in the biblical interpretations of Pope Urban VIII’s advisors.
	* For many people, the power of the mathematical arguments that appeared irrefutable proved more persuasive than the new information from physical observation that produced so much controversy; few intellectual shifts have wrought such momentous changes for Western civilization. However, Galileo’s fate also demonstrated the power of the Church to control information and impose its will. As a result, Southern European, Catholic countries stopped leading European advancement and instead it was the Northern Protestants that overtook them.
* **Isaac Newton Discovers the Laws of Gravitation (Northern European protestant)**
	+ Astronomers like Copernicus, Kepler, and Galileo were still confused about how and why the planets and other heavenly bodies moved in an orderly fashion.
* In his book, *The Mathematical Principles of Natural Philosophy* (1687), Newton identified the cause of planetary motion, and in so doing, established a foundation for the study of modern phsyics.
	+ One of Newton’s findings was that the principle of inertia applied to both objects at rest and in motion.
	+ He also reasoned that the planets and all other physical objects in the universe moved through mutual attraction, or gravity.
* The attraction of gravity explained why the planets moved in an orderly rather than chaotic fashion.
* Newton, along with Francis Bacon **(slide 12)**, believed in empiricism—that one must observe phenomena before attempting to explain it through mathematics.
* Newton was deeply religious and believed that his work proved the existence of God as it was logical, mathematical, provable, and reasonable. It therefore the Universe was created by a rational God!
	+ Church of England loved it as a protestant had proved God and used it against RC Church.
	+ Following Newton’s works, natural philosophers came to see themselves as studying nature to come to a better understanding of the Creator.
	+ *Physio-­‐theology*—religious thought associated with the deducing of religious conclusionsfrom nature.
* By the late seventeenth century, natural philosophy and its practical achievements had become associated in the public mind with consumption and the market economy.
* John Ray’s *The Wisdom of God Manifested in His Works of Creation*(1690)
* Argued that God wanted human beings to first understand the work, then turn this knowledge into productive practical use through rationality.
	+ - People came to believe that God wanted human beings to improve the world. Wealth is seen as a reward from God. Protestants will adopt this. It becomes the Protestant Work Ethic that drives their countries to excel.
		- This outlook provided a religious justification for the processes of economic improvement that would characterize the eighteenth century.

**Video for the Scientific Revolution:** <https://www.dailymotion.com/video/x6d3d3i> **It is a little dated and British of course!**

**Section Two: Philosophy Responds to Changing Science**

* **Section Overview**
* Revolutionary scientific thought also affected Western philosophy, and several important scientists—like Bacon and Descartes—began studying and writing philosophy.
	+ Bacon emphasized the importance of empirical research. EMPIRICISM. (this is what you live by...Use your sense to define the world around you.
	+ Descartes (**Slide 17)** looked for certainty through the exploration of his own thinking process. RATIONALISM (Use your mind) Famous saying: “I think therefore I am.” Idea that the only thing you can be certain of is your own existence. Senses can be tricked and therefore cannot be trusted to define anything.
		- “THE MATRIX” IS DESCARTES. Prove you are not dreaming...
* **Nature As Mechansim**
	+ Philosophers began to view the universe as a machine and many of them used the imagery of a clock to explain the workings of the universe.
		- Some coalesced the view of the universe as a machine with spirituality by suggesting that God was a divine mechanic or clockmaker who had arranged the world likea machine that would thereafter function automatically.
1. The new world view of the universe as a machine took away the mystery of the world and the previous assumption of the presence of divine purpose in nature as Europeans no longer looked for symbolic or sacramental meaning in nature.
	1. Knowledge of the universe became the path toward physical improvement of human beings through their ability to command and manipulate the processes of nature.
* **Francis Bacon: The Empirical Method**
	1. Biographical information
* Although Bacon is known as the father of empiricism and experimentation in science—a designation that he did not earn—his real accomplishment was setting an intellectual tone and helping create a climate conducive to collaboration and scientific work.
* Bacon’s Works
	+ In *The Advancement of Learning* (1605)*,* the *Novum Organum* (1620), and *The New* *Atlantis* (1627), he attacked the scholastic belief that most truth and knowledge had been discovered andonly required explanation.
	+ Bacon believed that many scholastics paid too much attention to tradition and the classics and encouraged scientist to blaze new trails in their understanding of nature.
	+ Bacon believed that human knowledge should produce deeds rather than words and encouraged the application of knowledge to the improvement of the human condition.
	+ Bacon’s Significance
		- He represented and advocated the sentiment ofrejecting the past not from simple contempt or arrogance, but rather from a firm understanding that the world was much more complicated than medieval scholars had thought.
		- Bacon influenced monarchs and governments as he encouraged leaders to use new knowledge to increase the efficiency and productivity of governments.
* **Rene Descartes: The Method of Rational Deduction**
	1. Contributions to Mathematics and Philosophy
		+ Descartes (1596-­‐1650) was a top-­‐notch mathematician who invented analytic geometry.
	+ He also developed a scientific method that relied more on deduction—reasoning from general principle to arrive at facts—than empirical observation and induction
	+ Major Works
		- *Discourse on Method* (1637)
		- Descartes stated that he would doubt everything except those propositions about which he could have clear and distinct ideas.
		- His approach rejected all forms of intellectual authority except the conviction of his own reason.
		- He deduced the existence of God and since God was not a deciever, the ideas of God-­‐given reason could not be false.
		- He concluded that human reason could fully comprehend the world.
	+ *Meditations* (1641)
	+ In this book, Descartes encouraged an emphasis on deduction, rational speculation, and internal reflection of the mind.
	+ Descartes’ deductive methodology, however, lost favor to scientific induction, whereby scientists draw generalizations derived from and test hypotheses against empirical observations.
* **Thomas Hobbes: Apologist for Absolute Government (Slide 20)**
	1. Biographical Information
	+ English political philosopher who lived from 1588-­‐1679.
	+ Think about the things he lived through and how these would influence his life
	+ He traveled to Paris, where he studied alongside Descartes, and Italy where he exchanged ideas with Galileo.
	+ His first publication was a translation of theThucydides’ classic *History of the* *Peloponesian War* which showed his dark view of human nature.
	+ HOBBES - H FOR HATE. HUMANS ARE INHERENTLY EVIL
* Hobbes’s Works
	+ - ***Leviathan***(1651) (A giant Seamonster!)
		- Written shortly after the English Civil War, he attempts to justify the necessity for a strong central authority. Because humans are out for themselves at all costs, Government must be able to control their behavior.
		- Hobbes traced all psychological processes to bare sensation andregarded all human motivations as egotistical, intended to increase pleasure and minimize pain.
* The Social Contract
* Hobbes contends that only a sovereign commonwealth established by a contract between the ruler and the ruled could enable human beings to meet their needs by limiting the free exercise of the natural human pursuit of self-­‐interest with all its potential conflict.
* Hobbes rejects the idea that human beings are naturally sociable but rather self‐centered creatures.
* In the state of nature, Hobbes believed, humans live in constant conflict and fear of destruction and death.
* Essentially, he believes human beings are naturally willing to give up the absolute individual freedom of the state of nature for the comfort and protection provided by a strong central ruler. ABSOLUTIST, DICTATOR etc.
* **John Locke: Defender of Moderate Liberty and Toleration (Slide 21)**
1. Biographical information
	* Locke (1632-­‐1704) was the most influential philosophical and political thinker of the seventeenth century. Different era - more peaceful.
	* He criticized absolutism.
2. Locke’s works
	* *Second Treatise of Civil Government*
		+ He advocated for a government that must be responsible for and responsive to the concerns of the people.
		+ Contrary to Hobbes, Locke regarded humans in the state of nature as creatures of reason and basic goodwill. (LOCKE - L FOR LOVE)
		+ Humans enter into the social contract in order to form political society to secure and preserve the rights, liberty, and property that they already possess prior to
		+ The relationship between the people and the government is one of trust, and if the government breaks that trust, it is the responsibility of the governed to replace them.
	* *Letters Concerning Toleration*
	* Locke advocated for extensive religious toleration among Christians to prevent the chaos caused by over a century of religious struggles.
	* He believed that religious salvation was an individual endeavor not to be mandated by the state.
	* He did not, however, believe tolerationshould be extended to Roman Catholics whom he believed to have pledged allegiance to a foreign prince [the papacy].
* *Essay Concerning Human Understanding* (1690)
	+ The major work of European psychology during the eighteenth century.
	+ He believed the mind to be a “blank tablet” (Tabula Rasa) at birth whose content would be determined by sense experience; therefore, the human condition could be improved by changing the environment.

# Section Three: The New Institutions of Expanding Natural Knowledge

* **Section Overview**
1. People in the seventeenth and eighteenth centuries began to believe that genuinely new knowledge about nature and humanity could be discovered in contrast to medieval and Renaissance notions of looking back on antiquity for knowledge.
2. Universities began establishing natural philosophy as an area of study and offered increasing funding for it.
3. Due to initial reluctance of universities to pledge full support for the sciences, scientists formed “institutes for sharing” ideas about science.
	* Inception of Scientific Societies (**Slide 13)**
		+ Royal Society of London was founded in1660 whose members followed the path of Bacon.
		+ Academy of Experiments in Florence had been established in 1657 and the French Academy of Science in 1666.
		+ Germany only slowly overcame the destruction of the Thirty Years’ War and didn’t establish a scientific society until 1700.
	* Mission of scientific societies
		+ Although most of the members were from the literate class, they invited people outside the elite class like craftspeople, who could manufacture scientific equipment, sailors, whose travels had taken them to different parts of the world with different people, plants, and animals, and workers who had practical knowledge of problems in the countryside.
		+ Explorers brought specimens and experiences back from exotic places that required classification, analysis, and observation.

**Section Four: Women in the World of the Scientific Revolution (Slide 19)**

* **Section Overview**
1. Women were excluded from the growing advances in science
2. Some women had power at princely courts to whomscientists—like Galileo—went for

patronage, but they usually did not determine the patronage decisions or benefit from them.

1. Queen Christina of Sweden, who brought Rene Descartes to set up a new science academy, was

an exception who had a major impact on the development of science.

1. However, a few noblewomen and women from the artisan class did manage to engage in scientific activity.
* Margaret Cavendish (1623-­‐1673)
* Margaret Cavendish produced a *Description of a New World, Called the Blazing World* (1666) to introduce women to the new science.
* wife of the duke of Newcastle, wrote *Observations* *Upon Experimental Philosophy* (1666) and *Grounds of Natural Philosophy* (1668), and was the only woman in the seventeenth century to be allowed to visit the Royal Society of London.
* Maria Cunitz
* German woman from the artisan class who took over her husband’s shop— which produced equipment for astronomy—when he died.
* She published a book on astronomy.
* Elisabetha and Johannes Hevelius constituted a husband-­‐wife astronomical team as did Maria and Gottfried Winkelmann.
* Winkelmann had worked jointly with her husband at the Berlin Academy of Sciences but her application to continue their work after his death was rejected.
1. Some scientists began writing solely for female audiences.
* Bernard Fontenelle wrote *Conversations on the Plurality of Worlds*and Francesco Algarotti published *Newtonianism for the Ladies* in 1737.
* Emilie Chatelet (1706-­‐1749) translated Newton’s *Principia* into French.

**Section Five: The New Science and Religious Faith**

* **Section Overview**
	1. New science threatened religion for three reasons
* Certain theories and discoveries did not agree with biblical statements about the heavens.
* Who would decide conflicts between religion and science—church authorities or the natural philosophers?
* For many religious thinkers, the new science seemed to replace a universe with spiritual meaning and significance with a purely materialistic one.
* **Blaise Pascal: Reason and Faith**
	1. Biographical information
		+ He was a French mathematician who lived from 1623-­‐1662. (Pascal’s triangle.)
* Pascal’s works
	+ He aspired to write a work that would refute the dogmatism especially RC and skepticism in order to reconcile faith and the new science.
	+ *Pensees* (*Thoughts)*, published after his death, was a collection of reflections onhumankind and religion.
* He believed that in religious matters, only the reasons of the heart and a “leap of faith” could prevail.
	+ Two Christian truths:
	+ A loving God exists
	+ Human beings, because they are corrupted by nature, are utterly unworthy of God.
* He believed that atheists and deists of his day placed too much emphasis on reason which was too weak to resolve the problems of human nature.
	+ Pascal engaged in a famous bet (Pascal’s wager) with skeptics. He insisted that it is a better bet to believe God exists and to stake everything on his promised mercy than not to do so.

**Section Six: Continuing Superstition**

* **Section Overview**
1. Despite the great optimism of many European thinkers, traditional beliefs and fears retained their hold on Western culture as many people continued to be preoccupied with death, sin,and the devil.
	1. Until the end of the seventeenth century all Europeans—in one way or another—believed in the power of demons, the occult, or magic.
* **Witch-­‐Hunts and Panic (Witch hunts PowerPoint)**
	1. Between 1400 and 1700, European courts sentenced an estimated 70,000-­‐100,000 people to death for harmful magic and witchcraft.
1. Witches were accused of attending mass meetings, to which they were believed to fly, they were accused of participating in sexual orgies with the devil, who appeared in animal form (most often as a he-­‐goat), and cannibalism as it was believed that witches devoured small Christian children.
2. Why did witch panics occur in the sixteenth and seventeenth centuries?
	* Religious division and warfare
	* Protestants and Catholics were keen to show their religion was better at finding and rooting out evil. This led to areas of the HRE where Protestant and Catholic regions were neighbors to be the worst in killing.
	* Some believe the Reformation took away traditional safeguards against devils and demons and people felt the need to seek protection preemptively by seeking out witches.
	* Political consolidation led rulers to eliminate potential rivalries to their loyalty in their realms.
* **Influence of the Clergy/Bible (slide 3)**
	+ When the church expanded into areas where its power and influence were small, it encountered semi-­‐pagan cultures rich in folkloric beliefs, the Christian religious authorities clashed with those of the traditional villages.
1. The Christian clergy practiced high magic—they could transform water into wine and bread into the body of Christ; they also claimed the power to cast out demons.
	1. However, the church claimed to have a monopoly on magic and anyone else who claimed to possess it would be severely punished.
* **Origins (slide 4)**
1. Origins of witches are found in both popular and elite culture as feared and respected “cunning folk” helped people cope with disasters by magical means.
2. The possession of magical powers made one an important person in a village and oftentimes widowed-­‐women were those who needed to boost their social prestige.
	* In village society witch beliefs may have been a way to defy urban Christian society’s attempts to impose orthodox beliefs, laws, and institutions on the countryside.
* **Who Were the Witches**
	1. 80% of the victims of witch-­‐hunts were women
1. Three groups of women seem to be most targeted by witch-­‐hunts. Outside societal norms...
	* Widows
	* Midwives
	* Women healers and herbalists
	* Way of disposing of potential rivals for husbands. War meant men were in short supply...
	1. Nowhere do we find women being randomly rounded up for burning; the witch-­‐hunts targeted specific women.
* **End of Witch Hunts**
	1. A more scientific point of view helped end witch hunts as it became harder to rationalize how thoughts of the mind or words on the lips could alter physical things.
1. With advances in medicine, the emergence of insurance companies, and the availabilityof

lawyers, people felt increasingly more secure against physical afflictions and natural disasters.

1. Witch-­‐hunts began to get out of hand and threatened anarachy.

**Section Seven: Baroque Art (Slides 3 and 4 of Wars of Religion Ch 4)**

* **Section Overview**
1. Baroque—style associated with seventeenth-­‐century paintings, sculptures and architecture.
	* Characteristics of Baroque style
		+ Result of reformation and Counter reformation.
		+ A WOW factor to get people back into Catholic Churches.
		+ Artists depict subjects in a more realistic way rather than an idealized manner.
		+ VERY Ornate - maybe over the top!
		+ Deeper understanding of human anatomy

Baroque Art and the Church

* + 1. Painters portrayed biblical scenes and from the lives of saints intended to instruct the observer in religious truths. Baroque style became associate with Roman Catholicism and absolutism.
	+ Baroque Artists
	+ Michelangelo Caravaggio (Italian)
		- Known for contrasts between light and darkness, which created dramatic scenes
		- Works known to be theatrical as they draw the viewer into an emotional involvement in the work.

Gian Lorenzo Bernini

* + - Designed and oversaw the construction of a great tabernacle that stands beneath St. Peter’s Bascilica’s towering dome directly over the space where St. Peter is said to be buried.
		- Behind the tabernacle, he designed a monument to papal authority known as the chair of St. Peter.
		- In the Church of Santa Maria de la Vittoria in Rome, he created a sculpture of the Spanish mystic St. Teresea of Avila. **“The Ecstacy of St Teresea”** REMEMBER ALL THE SYMBOLISM...
1. Baroque Art and the ideology of absolutism
* King Charles I of England—who ruled in the 1630s without calling Parliament—hired the Roman Catholic Flemish artists Peter Paul Rubens to decorate the ceiling of Banqueting Hall at his palace in London.
* Louis XIV’s palace of Versailles contains the most elaborate monument that symbolizes political absolutism.
	+ - Room after room on the interior was decorated with vast and dramatic paintings presenting Louis as the Sun King.
		- The Hall of Mirrors, which runs across the entire rear of the palace, allowed for a glittering and elaborate play of light whose purpose was to reflect the power of the monarch.