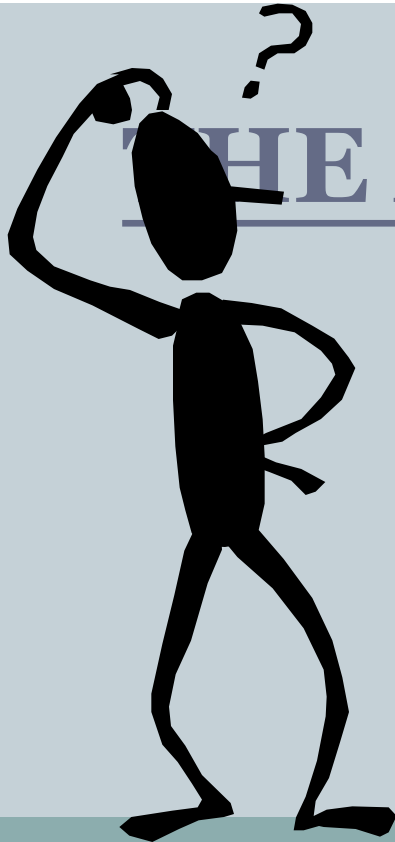


The Scientific Revolution & The Enlightenment



THE AGE OF REASON



What was the Scientific

- The Scientific Revolution was a drastic change in scientific thought and application
 - It occurred in the 1600s and built off of the questioning spirit of the Renaissance
 - The Scientific Revolution liberated human beings from the fear of a chaotic or haphazard universe.
 - God does not regulate natural laws! Use reason and the scientific method to understand the universe.
 - Science became central to Western intellectual life, a result not occurring in other civilizations!

What was science like before the revolution?

Science was primitive and based on the works of **Aristotle and Ptolemy** (90-168 CE). Ptolemy believed the Earth was the center of the universe, which became teachings of the Roman Catholic Church.

Alchemists (wizards!) worked for kings to change common minerals into gold

Women with medicinal knowledge were often accused of **witchcraft**





Nicolaus Copernicus

1473-1543

Polish astronomer who wrote *On the Revolutions of the Heaven Spheres*

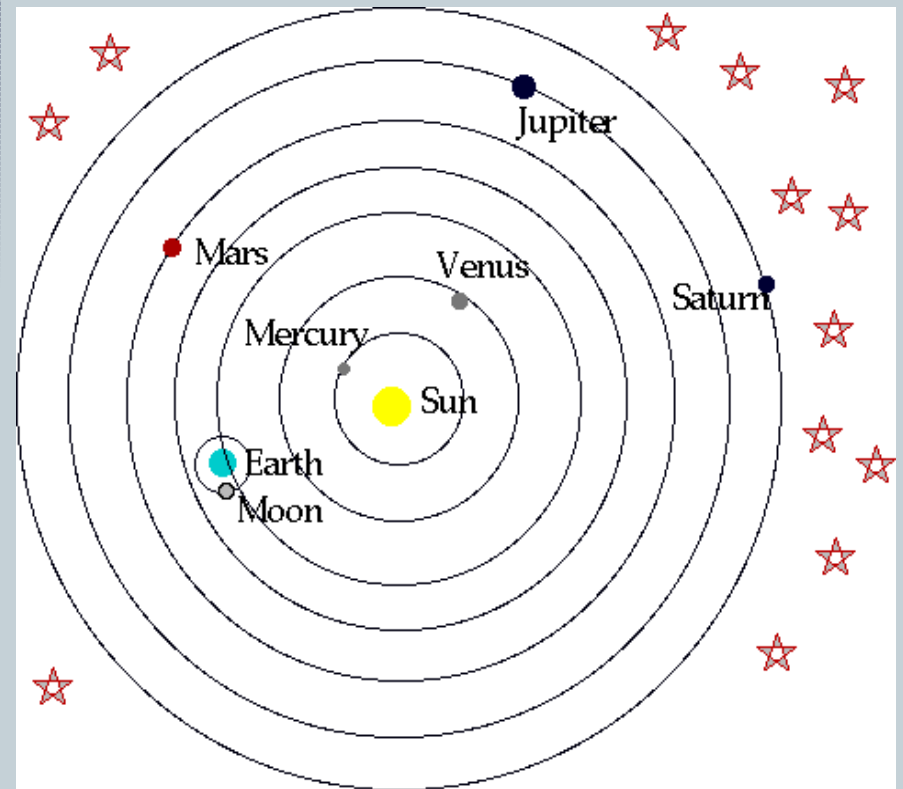
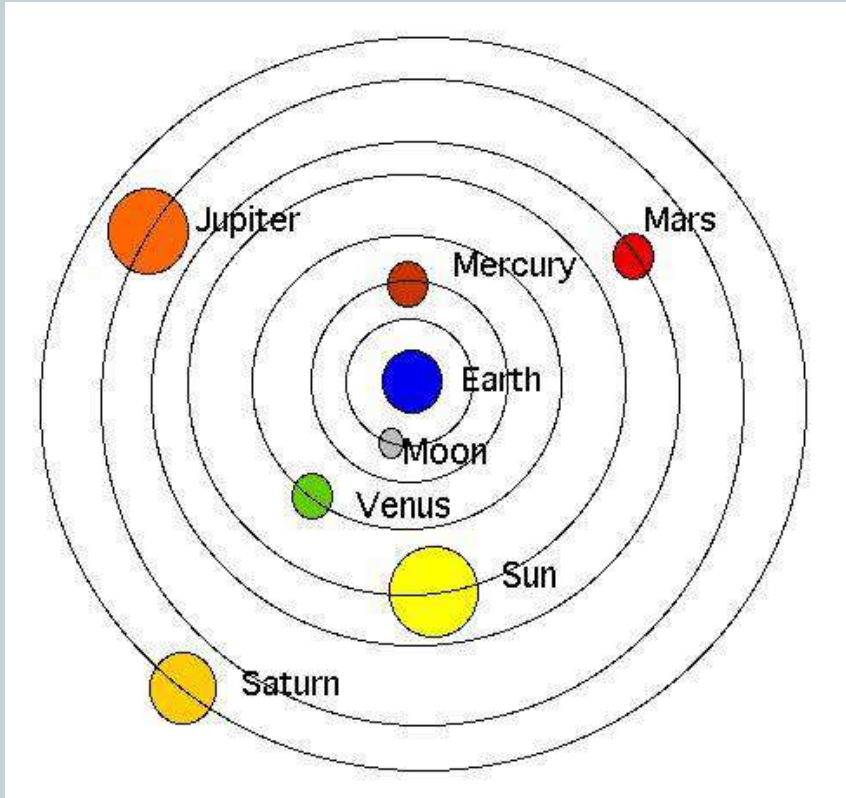
Copernicus stated that the sun is the center of the universe not the Earth! (**Heliocentric theory**)

- Math became the basis for astronomy
- **Empirical data**, observation & math became the model to which the new scientific thought would conform to.

Birth: Torun, Poland

Death: Frauenburg, Poland

Geocentric vs. Heliocentric Models



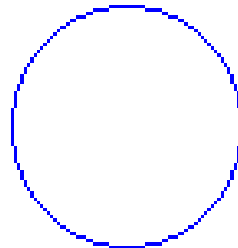


Kepler

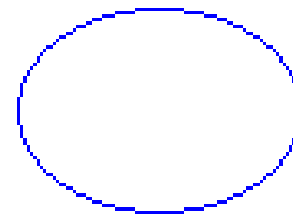
Johannes Kepler (1571-1630)

- German Astronomer
- 1609 *On the Motion of Mars*
- Kepler solved the problems of planetary orbit by using Copernicus's sun-centered universe and other **empirical**

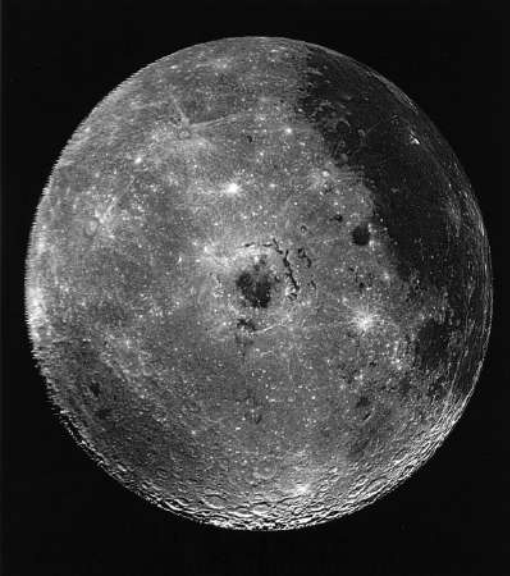
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Circle



Ellipse



Galileo Galilei

(1564-1642)

“I do not feel obliged to believe that the same god who has endowed us with sense, reason and intellect has intended us to

forgo their use.”

• 1632 *Dialogues on the Two Chief systems of the World*
—Galileo

• *Dialogues* brought down on him the condemnation of the Roman Catholic Church

• He articulated the concept of a universe totally subject to mathematical law, championed the application of math to scientific investigation



• Italian Scientist that turned telescope on heavens



• He saw mountains on the moon, moons orbiting Jupiter

Francis Bacon

(1561-1626)

“The world's a bubble and the life of man less than a span.”

- English writer
- Father of empiricism and of experimentation in science
- Set a tone and helped to create a climate in which other scientists worked
- Championed innovation and change



**Scientific
Method- Bacon
urged the
value of
empirical
research**

Bacon attacked the scholastic belief that most truth had already been discovered and only required explanation, as well as the scholastic reverence for intellectual authority in general

Who's the guy who had an apple fall on his head?

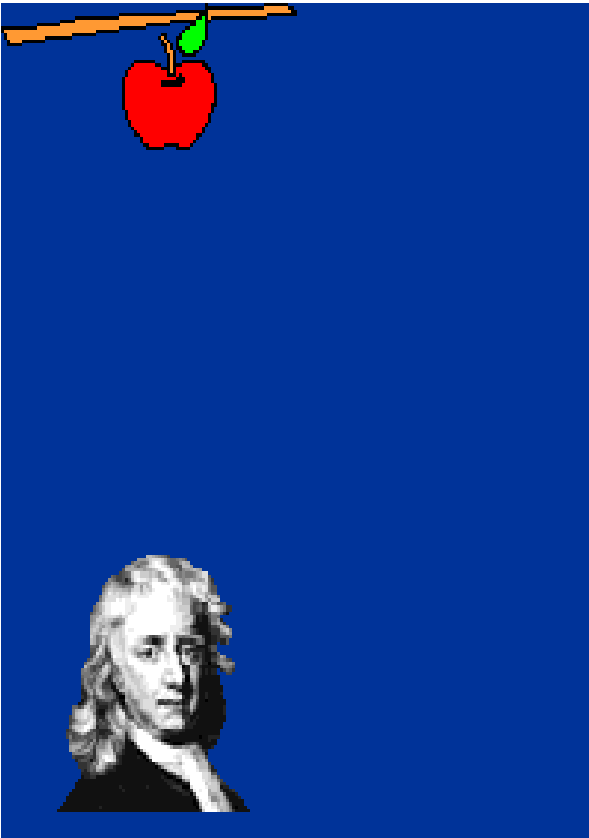


Sir Isaac Newton

Not

Fig Newton





Sir Isaac Newton

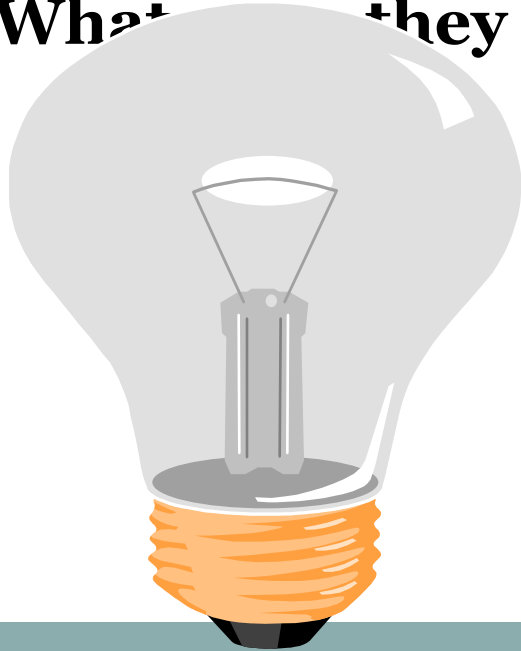
(1642-1727)

- English Scientist
- 1687-*The Mathematical Principles of Natural Philosophy* or *Principia Mathematica*
- Planets and all other physical objects in the universe affect every other object through **gravity**.
- Discovered inertia could exist in either a state of motion or a state of rest
- Newton demonstrated his theories using mathematical formulas
- Natural universe became a realm of law and regularity

The Enlightenment

Why was this period in history called the Enlightenment?

What did they enlighten about?



Philosophes-writers who popularized rationalism and scientific ideas. They promoted change in government and society.



Francois Marie Arouet

Voltaire

(1694-1778)

- 1733-*Letters on the English*
- The book praised the virtues of the English and criticized the abuses of the French Society
- 1759 *Candide* satirical play
- He attacked wars, religious persecution in his play
- Attacked serfdom and slavery
- Fought for **freedom of speech**
- Was admired by and was Pen pal of Catherine the Great of Russia

“I Shall not cease to preach tolerance from the rooftops as long as persecution does not cease.”

“I may not agree with a word you say, but I will defend to the death your right to say it.”

—Voltaire



"The good of the people must be the great purpose of government. By the laws of nature and of reason, the governors are invested with power to that end. And the greatest good of the people is liberty. It is to the state what health is to the individual." (from *L'Encyclopédie*)
Diderot, (1713-1784)

- The objective of the editors of the *Encyclopédie* was to gather all the knowledge in the world
- Like most encyclopedias, the *Encyclopédie* attempted to collect and summarize human knowledge in a variety of fields and topics, ranging from philosophy to theology to science and the arts.
- Unlike prior encyclopedias, the *Encyclopédie* reorganized knowledge into three primary categories, each a component of **human thought**, rather than a component of theology. The writers addressed knowledge as a product of human reason rather than divine intervention
- It was a vast compendium of knowledge, notably on the technologies and processes of the period. These articles applied a scientific approach to understanding the mechanical and production processes, and offered new ways to improve machines to make them more efficient. Diderot felt that people should have access to "useful knowledge" that they can apply to their everyday life



John Locke (1632-1704): AKA the Philosopher of Freedom

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"Good and evil, reward and punishment, are the only motives to a rational creature: these are the spur and reins whereby all mankind are set on work, and guided."

- 1689- English philosopher, wrote *Two Treatises on Government*
- Had the greatest impact on Europe and the United States
- Believed the human mind was blank and all knowledge is derived from natural experiences
- In *Two Treatises*-Locke argued that rulers are not absolute in power
- He believed people and monarchs enter **political contracts** -empowering legislatures and monarchs to create order and protect their **NATURAL RIGHTS** (*life, liberty, right to own property*)
- **A monarch who violated the trust that had been placed in him can be overthrown**



"In republican governments, men are all equal; equal they are also in despotic governments: in the former, because they are everything; in the latter, because they are nothing."

Montesquieu

The Spirit of Laws

Baron de Montesquieu

(1689-1755)

- French noble and magistrate
- 1748-*The Spirit of Laws*
- Father of the study of government-political science
- Believed abuses of liberty occurred when power was concentrated in the hands of a single person or group
- Advocated **3 branches of government:**
 - Executive-enforces laws
 - Legislature-make laws
 - Judicial-interpret laws and punish law breakers





Jean Jacques Rousseau

(1712-1778)

- 1762- *The Social Contract*
 - In favor of equality, calling for the abolition of all titles of rank and nobility
 - Believed human nature was good and that society corrupted people
 - “General will of the people”=
-
- BUT urged a traditional role for women and believed women should be educated for a position subordinate to men

“Man is born free and everywhere he is in chains.”

Rousseau



Adam Smith

(1723-1790)

- English economist
- 1776-*Wealth of Nations*
- Urged the mercantile system in England to be abolished
- Believed economic regulation by the state interfered with the natural system of economic liberty
- Encouraged economic growth and consumer-oriented economy by unleashing individuals to pursue their own selfish economic interest
- Laissez-faire economics -limited role of government in economic life and regulation



Women and the Enlightenment

In France a number of wealthy, educated women held informal meetings (*Salons*) in their homes.

- Salons provided the atmosphere for discussions on issues
- Salons help to shape the manners and customs of the Enlightenment
- Relatively little advance to the rights of women, but created awareness

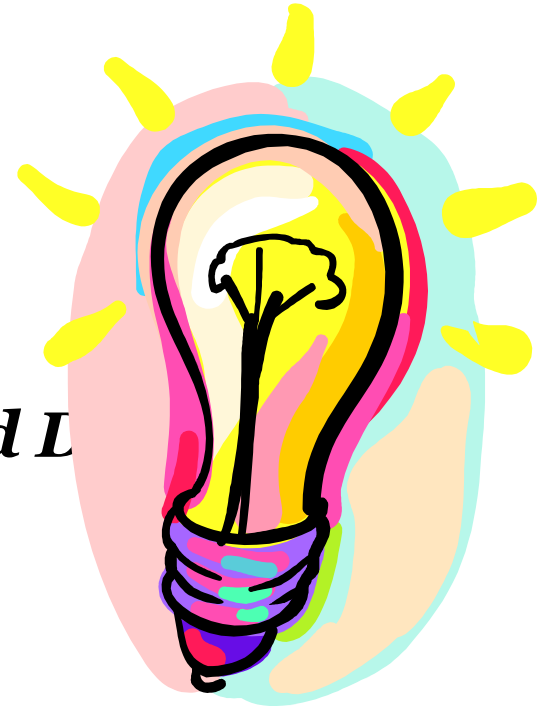
Mary Wollstonecraft

(1759-1797)



- 1792-*A Vindication of the Rights of Women*
- Accused Rousseau of attempting narrow women's vision and limit their experience
- She argued that, to confine women to separate domestic sphere's because of their physical limitation was to make them sensual slaves of men
- She wanted equality-legal rights and the right to own property

What makes a ruler an “Enlightened L



Joseph II of Austria

(1765-1790)

- Increased the power of the central monarchy
- Reorganized local government
- Freedom of religion
- Dissolved the power of the Roman Catholic Church
- Abolished serfdom
- Gave peasants personal freedoms
- Marry, engaged in skilled work, have children working in skilled labor
- Manorial courts were reformed



QVVM OMNES REX. AD.
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IOSEPHVS. II.
AD NOS. RIT.
HICQVE. INVENTIT.
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Catherine age 30

Catherine the Great

(1762-1796)

- Empress of Russia
- She approved the deposition and murder of Peter III her husband
- 1775-reorganized local government
- 1785-Charter of Nobility-guaranteed rights to nobles
- 1768 &1774-Treaty of Kuchuk-Kainardj
- Expanded Russia to get a warm water port on the Black Sea-Odessa
- Love to read Voltaire

Who do you think was an Enlightened Despot and why???????

Was it Joseph II or Catherine the Great?

Result of the Enlightenment:

Which country's revolutions occurred because of the Enlightenment?



We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness. That, to secure these rights, Governments are instituted among Men, deriving their just Powers from the consent of the governed. That, whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such Principles and organizing its Powers in such form, as to them shall seem most likely to effect their Safety and Happiness.