

Scientific Revolution

$E=mc^2$  ?

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Scientific Revolution

- Defined
  - New way of thinking about the natural world based on careful observation and willingness to question.
- Time frame
  - This new way of looking at everything began about the mid-1500.

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Other Important Terms

- Scientific theory-is model that describes accurately a large class of observations, and makes definite predictions about the results of future observations.
- Heliocentric theory-stated the sun was at the center of the universe
- Scientific method-logical procedure for gathering and testing ideas

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### View of the Universe Before 1500

- Based on Aristotle's 2000 year old views which were based on what he saw. He put these views in a book *On the Heavens*
- In the second century A.D. Ptolemy worked Aristotle's views into a complete model of the universe

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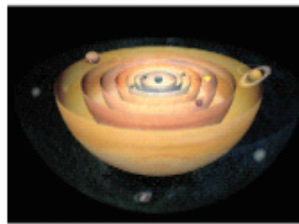
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### View of the Universe Before 1500



Ptolemy's model of Ptolemy's model. The earth is at the center of the universe, surrounded by eight spheres carrying all the known heavenly bodies.

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### Nicholas Copernicus

- His idea was that the sun was stationary at the center and the planets moved in circular orbits around the sun.
- His theory was not published until 1543.



Nicholas Copernicus (c. 1473-1543) was a Polish astronomer, mathematician, and engineer. He is best known for his theory of heliocentrism, which placed the sun at the center of the universe. This theory was published in 1543 in his book 'De Revolutionibus Orbium Coelestium'.

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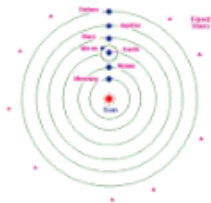
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### The Published Theory



- Copernicus did not want to be at odds with the church.
- The Pope only wanted him to use his findings to reform the calendar.

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### The Published Theory

- Nearly a century passed before the idea was taken seriously.
- Then two astronomers Kepler and Galileo publicly supported the theory.

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### Kepler



- Proved the accuracy of the Copernican theory.
- Also found the planets were not moving circles, but in ellipses

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## Galileo

- The Law of Acceleration: All things fall at 32 ft/sec/sec.
- With a telescope he found the following:



Galileo Galilei, portrait by Ottavio Leoni, 1630. Galileo Galilei, portrait by Ottavio Leoni, 1630. Galileo Galilei, portrait by Ottavio Leoni, 1630.

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## Galileo

- Jupiter had moons in orbit around it.
- And our moon had mountains like the Earth.
- Also the Sun had spots.
- Finally, the planets moved the way the Copernican theory predicted.

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## Galileo and the Church

- In 1632 Galileo published a *Dialogue Concerning the Two Chief World Systems*.
- In it he defended the Copernican theory, and basically said science should be apart from the Church.
- He was arrested and the Copernican theory was banded.

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### Sir. Isaac Newton



- In 1687 published *Principia Mathematica*
- In it he explains the Law of Gravity

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### The Law of Gravity

- Every Body is attracted to every other body.



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### Publication Information

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