

The Scientific Revolution, 1500s-1700s – outline

I. What was the Scientific Revolution?

- a. Beginning of modern science
- b. Scientific method – depends upon logic, observation, and reason rather than faith
- c. Created the technologies and techniques that built the modern world
- d. Created paradigm of our solar system

II. Revolution in epistemology and philosophy

- a. Universities formed
- b. Rediscovery of classical science
- c. Leading figures
 - i. Bacon
 - ii. Brahe
 - iii. Copernicus
 - iv. Descartes
 - v. Galileo
 - vi. Kepler
 - vii. Newton

III. Nicolaus Copernicus (1473-1543)

- a. Earth revolves around the sun
- b. Book *On the Revolutions of the Heavenly Spheres*
- c. Heliocentric theory – sun is the center of the universe

IV. Tycho Brahe (1546-1601)

- a. Danish royal astrologer
- b. Follower of Ptolemaic system
- c. Observed and mapped over 700 stars in a 20-year period

V. Sir Francis Bacon (1561-1626)

- a. Preferred inductive reasoning and facts over theory
- b. Invented the scientific method

VI. Galileo Galilei (1564-1642)

- a. “I recant”

- b. Invented the telescope, pendulum clock, thermometer, water pump, and sector
- c. Discovered speed of acceleration for gravity

VII. Johann Kepler (1571-1630)

- a. Brahe's student for 20 years
- b. Living during 30 years of war
- c. Loved the planets and made it his life's work to explain the motion of planets
- d. Invented Three Laws of Planetary Motion

VIII. Rene Descartes (1595-1650)

- a. Deductive logic
- b. Deduced the existence of God
- c. Invented Cartesian geometry (xy axis)
- d. "I think therefore I am"

IX. Sir Isaac Newton (1642-1727)

- a. *The Principia*
- b. Tied up the loose ends of Kepler and Galileo
- c. Three Laws of Motion
- d. Defined gravity and its laws
- e. Invented optics and calculus

X. Rise of the scientific community

- a. Developed the modern scientific method
- b. Universe ordered according to natural laws
- c. Discovered that scientific laws can be discovered by human reason
- d. Took the role of a deity or god out of the study of the universe
- e. Mechanical views of the universe
- f. Deistic view of God

XI. Review questions

- a. Describe the Scientific Revolution.
- b. What astronomer, author of *On the Revolutions of the Heavenly Spheres*, believed that the earth revolves around the sun?
- c. Who is credited with inventing the scientific method?
- d. Who came up with the Three Laws of Planetary Motion?
- e. What famous Italian astronomer was convicted of heresy by the Inquisition?
- f. What English scientist defined gravity?