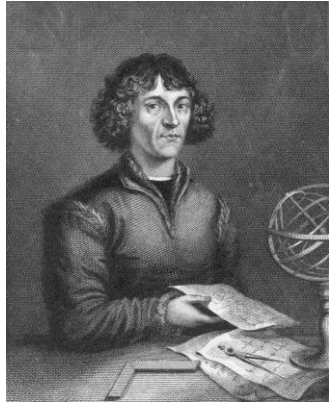


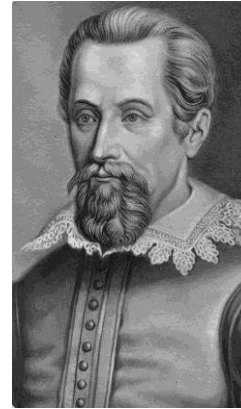
7.50 Compare and contrast heliocentric and geocentric theories of the Greeks (geocentric), Copernicus (heliocentric), and Kepler (elliptical orbits).

Study Guide for the Scientific Revolution



Nicolaus Copernicus

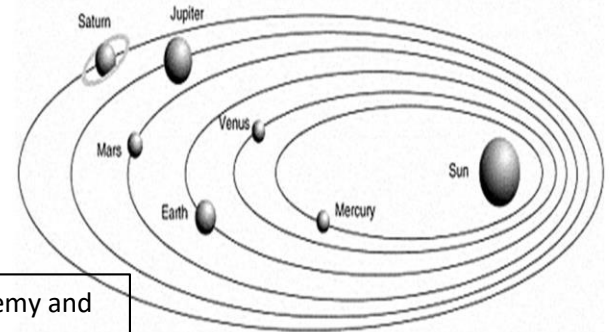
- Polish astronomer
- Disagreed with Ptolemy's theory that Earth was center of universe
- Developed a heliocentric, or sun-centered universe
- Earth and other planets followed circular path around the sun
- Publication of book delayed because it disagreed with Church's teachings



Johannes Kepler

- German astronomer
- Used math to support Copernicus' theory that planets revolved around the sun
- Planets moved at oval paths called ellipses
- Planets do not travel at the same speed
- Theories marked beginning of modern astronomy

Kepler's Elliptical Orbits

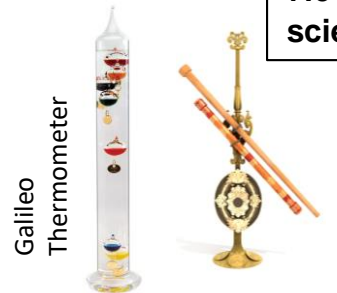
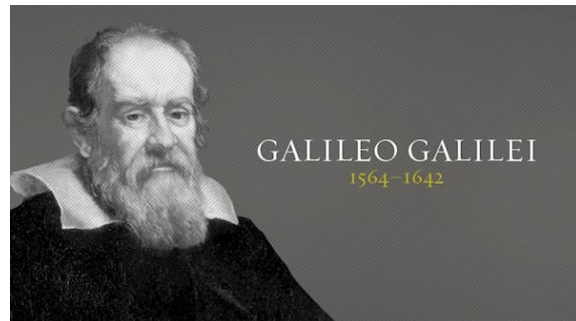


An **elliptical orbit** is the revolving of one object around another in an oval-shaped path called an ellipse. The planets in the solar system **orbit** the sun in **elliptical orbits**.

Geocentric – (Geo – earth) Ptolemy and the Greeks

Heliocentric – (Helio – sun) Copernicus

7.51 Examine Galileo Galilei's theories and improvement of scientific tools, including the telescope and microscope.



Galileo Thermometer

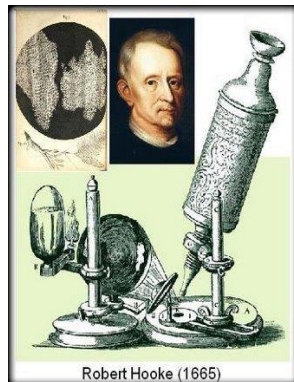
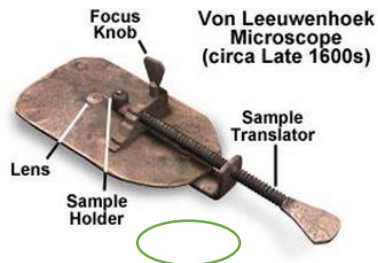
Galileo Telescope

- Discovered objects fall at the same speed no matter what they weigh – Motion of Objects
- Designed telescope
- Improved clocks, invented a water thermometer
- Assistant built first barometer, device that measures air pressure

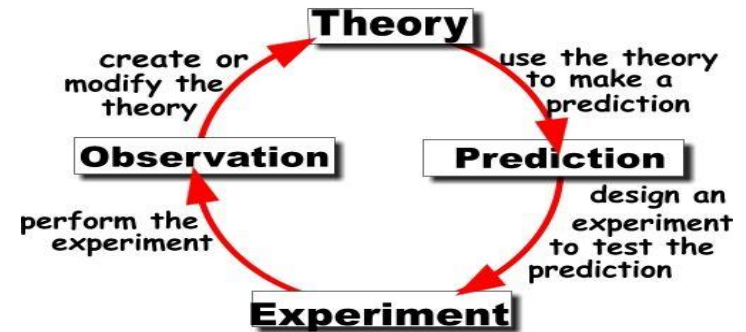
7.51 Examine Galileo Galilei's theories and improvement of **scientific tools**, including the telescope and microscope.

DEVELOPMENT OF THE MICROSCOPE

- 1590, Dutch spectacle makers, Zaccharias *Janssen* and his father Hans started experimenting with magnifying lenses.
- Galileo** heard of their experiments and started experimenting on his own.
 - described the principles of lenses and light rays and **improved** both the **microscope** and telescope.
 - added a focusing device to his **microscope**
- Antonie Philips van Leeuwenhoek was a Dutch businessman and scientist developed his own microscope.
 - commonly known as "the Father of Microbiology", and one of the first microscopists and microbiologists
- ROBERT HOOKE** – upgraded the microscope and discovered cells, the smallest units of living matter.
- Microscope lead to the understanding of diseases**

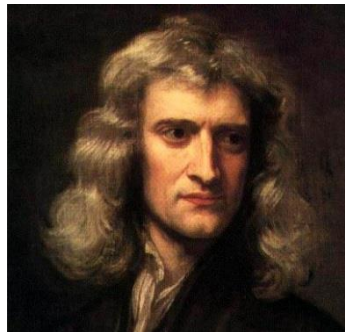


7.52 Explain the significance of the following in regards to the Scientific Revolution: Sir Francis Bacon in establishing the scientific method and Sir Isaac Newton's three Laws of Motion



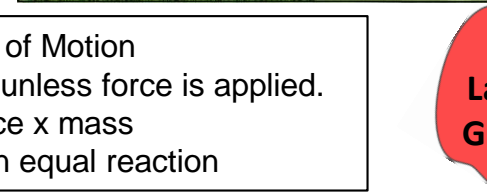
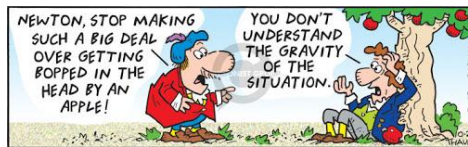
Scientific Method – Sir Francis Bacon

Sir Francis Bacon – English, developed the scientific method, thus changing the direction of science through the need of evidence and data.



Sir Isaac Newton

- English mathematician
- Noticed apple fall to the ground– led him the idea of gravity
- 1687– published book *Principia*, most important book in history of modern science
- Law of Gravitation**– force of gravity holds the solar system together



Newton's 3 Laws of Motion

- A body at rest stays at rest unless force is applied.
- Acceleration is equal to force x mass
- For every action, there is an equal reaction

