

7.60 Gather relevant information from multiple print and digital sources explaining the significance of new scientific theories, the accomplishments of leading figures including Sir Francis Bacon, Nicolaus Copernicus, Rene Descartes, Galileo Galilei, Johannes Kepler, and Sir Isaac Newton, and new inventions, including the telescope, microscope, thermometer, and barometer

Sir Francis Bacon (1561-1626)

- Father of the Scientific Revolution
- Articulated Scientific Method
- Emphasis on practical, useful knowledge
- New attitude toward nature



Scientific Method



PURPOSE

What do I want to learn?



RESEARCH

Find out as much about your topic as you can.



HYPOTHESIS

Predict what the answer to the problem is.



EXPERIMENT

Design a test to confirm or disprove your hypothesis.



ANALYSIS

Record what happened during the experiment.

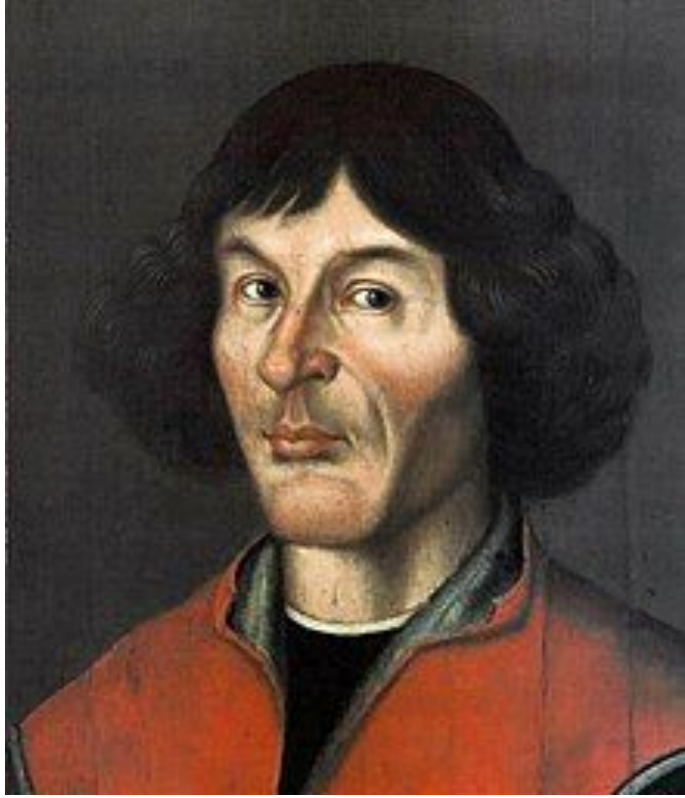


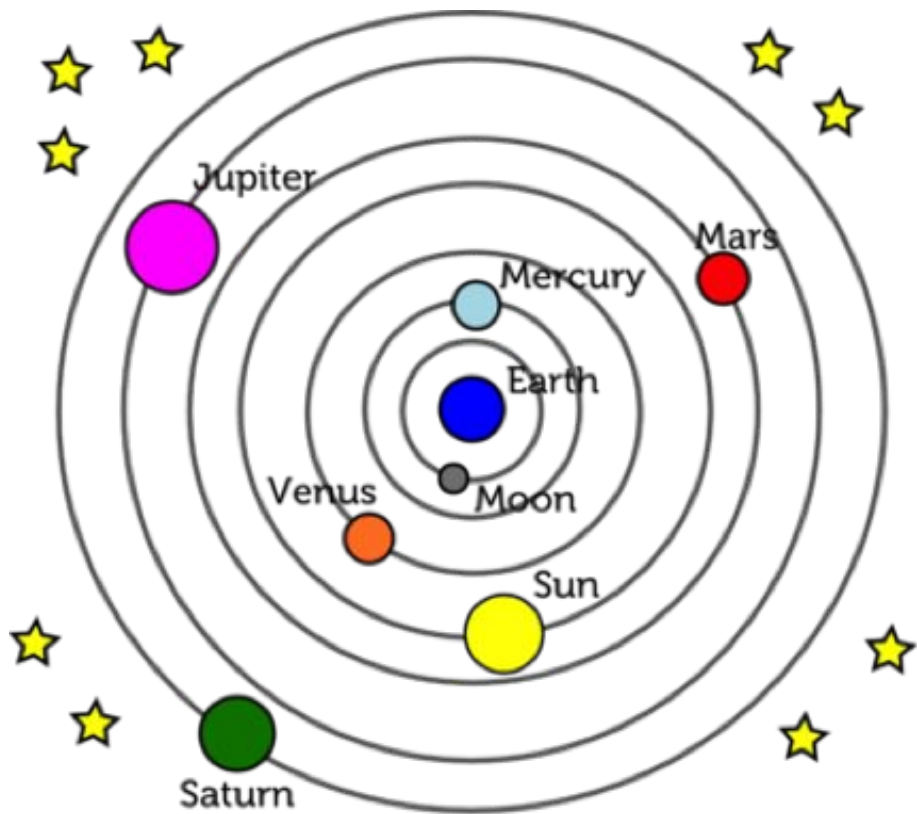
CONCLUSION

Was my hypothesis correct?

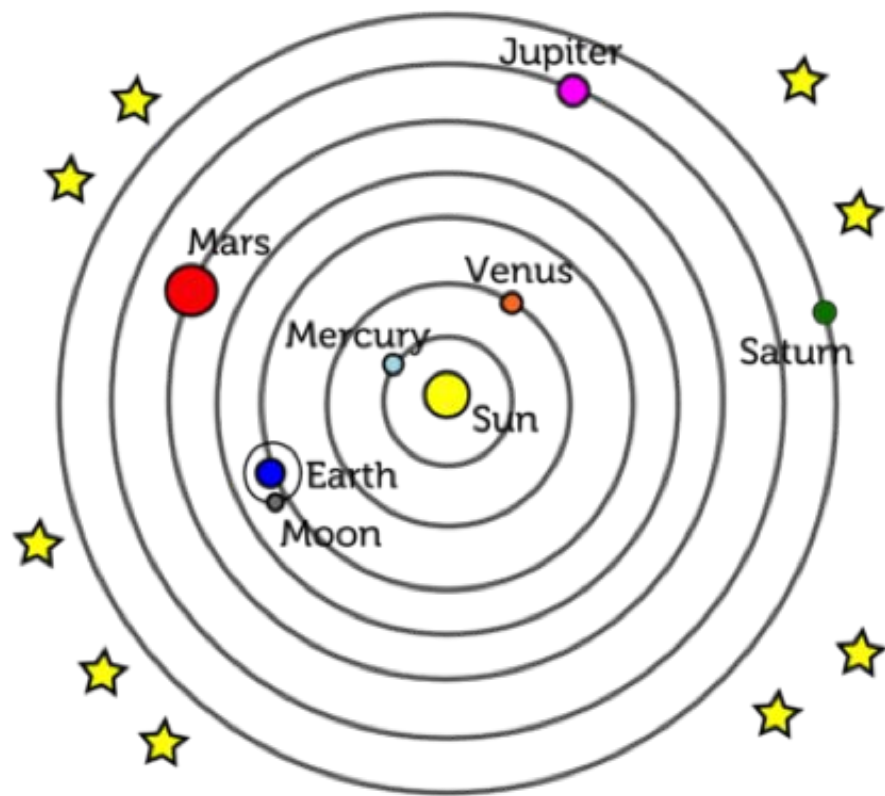
Nicolaus Copernicus (1473-1543)

- Sun-centered universe (heliocentrism)
- Challenged circular orbits
- Earth no different than any other planet
- *On the Revolutions of Heavenly Spheres* (1543)





Earth at the Center




Sun at the Center

Rene Descartes (1596-1650)

- Significance of doubt
- The Deductive Method
- Spatial relationships can be expressed in mathematical formulas
- Father of “analytical geometry”



GEOMETRIA,
à
RENATO DES CARTES
Anno 1637 Gallicè edita; postea autem
Unà cum NOTIS
FLORENTINI DE BEAUVNE,
In Curia Blesensi Consilarii Regii, Gallicè conscriptis in
Latinam linguam versa, & Commentariis illustrata,
Opera atque studio
FRANCISCI à SCHOOTEN,
in Acad. Lugd. Batavae Mathematicos Professoris,
*Nunc demum ab eodem diligenter recognita, locupletioribus Commentariis
instruita, multaque egregiis accessionibus, tam ad uberiores expli-
cationem, quam ad ampliandam hujus Geometriae ex-
cellentiam faciendis, exornata,*
Quorum omnium Catalogum pagina versa exhibet.



AMSTELÆDAMI,
Apud Ludovicum & Danielem Elsevirios,
c1o 1664.

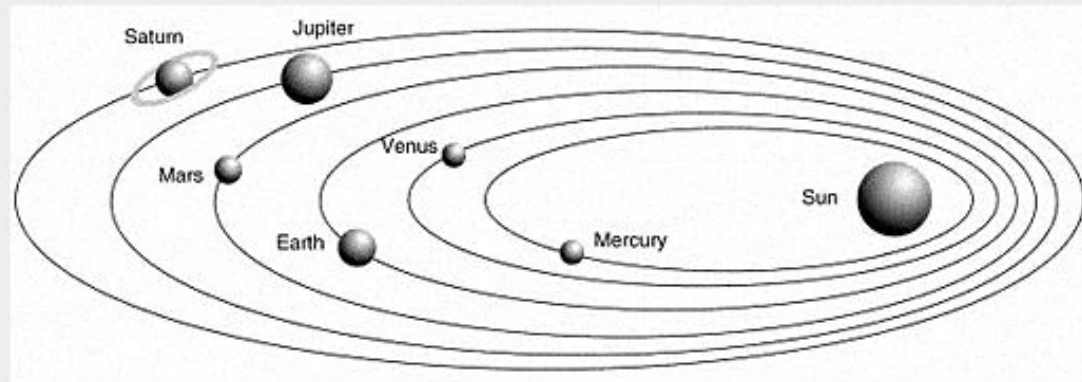
Galileo Galilei (1564-1642)

- Early practitioner of the experimental method
- Mathematical formula for acceleration of falling objects
- Law of inertia
- His discoveries made using the telescope
- Found guilty of heresy and died under house arrest



Johannes Kepler (1571-1630)

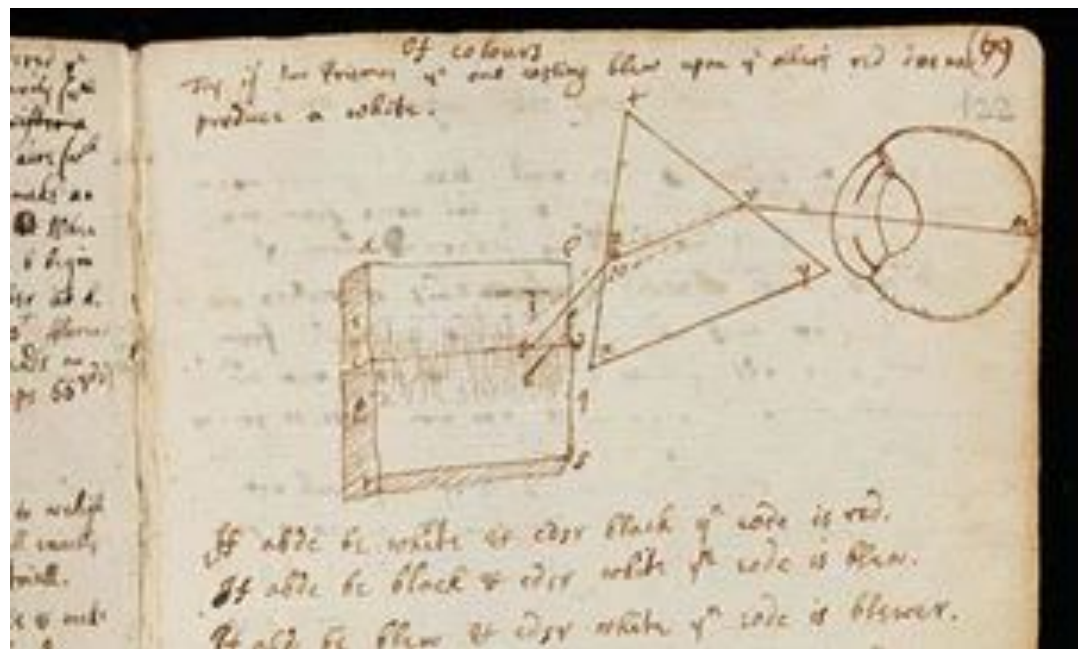
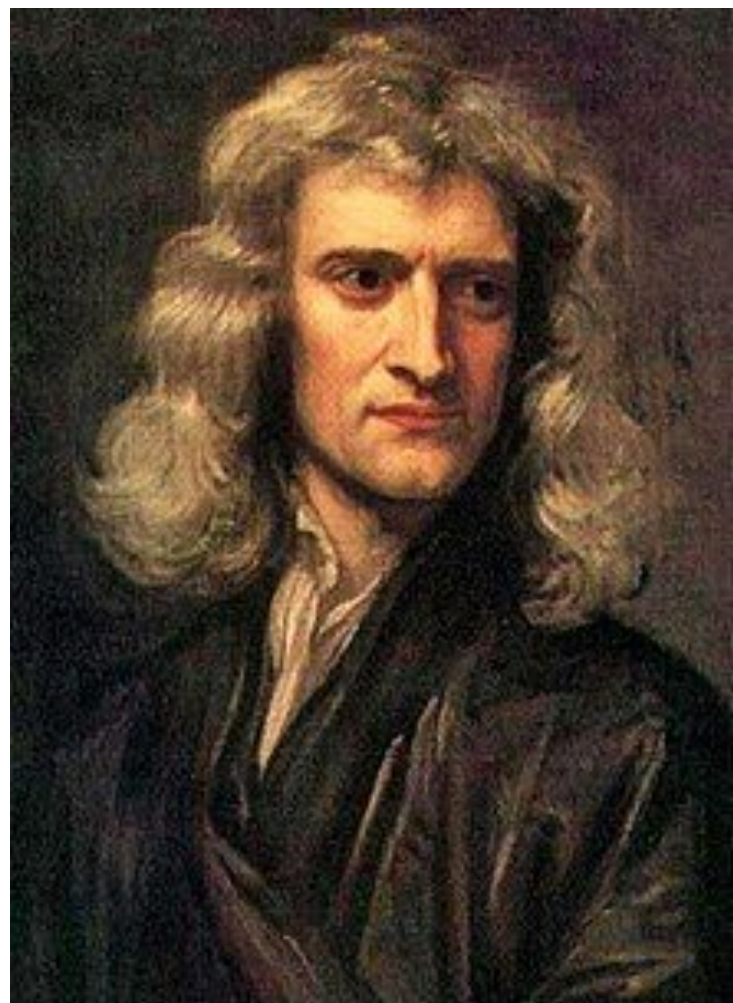
- Planetary motion conforms to mathematical formula
- Elliptical orbits
- Planets do not move at uniform speed in their orbits



Kepler's Laws

Sir Isaac Newton (1642-1727)

- Argued for a universe governed by natural laws
- Laws of gravity and inertia
- Invented calculus
- *Principia; Mathematical Principles of Natural Philosophy* (1687)



Consequences of the Scientific Revolution

- Rise of the “Scientific Community”
 - Royal Society of London (1662)
 - Academy of Royal Sciences (1666)
- The modern scientific method
- A universe ordered according to natural laws
- Laws discovered by human reason
- “De-spiritualized” and de-mystified the universe
- Mechanical view of the universe