

# Astronomy in the Revolution

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## Copernicus

•One of the earliest scientists of the revolution was Nicholas Copernicus in Poland. He lived from 1473-1543, and wrote *On the Revolutions of Celestial Spheres*. He did not allow it to be published until the time of his death in 1543, for fear of persecution by the Catholic Church.

•In his book, Copernicus put forth the *Heliocentric* theory, or the idea that the sun was the center of the universe. He suggested that planets orbited the sun in a circular fashion. Many other scientists were captivated by the 'Copernican' theory, and sought to prove his ideas.



## Kepler

•Johann Kepler (1571-1630) was a young German astronomer and mathematician who made important changes to the Copernican theory of the universe.

•Kepler observed that planetary orbits around the sun were *elliptical*, not circular. He also noted that the *speed* of the planet in its orbit varied. As the planet neared the sun, it sped up, as it was far from the sun, it slowed.

•Kepler believed that some force held the planets in their orbits, and that a similar force held the moon to the earth. (The force, of course, is gravity, but he was unable to name it or calculate it.)



## Galileo (1564-1642)

•Galileo Galilei was one of the most important scientists, inventors, and astronomers of the Scientific Revolution. Albert Einstein has called him the *father of modern science*.

•Galileo's astronomical observations were made using his improved version of the telescope.

•He was a major champion of the *heliocentric theory*, and offered many proofs of it. He was able to observe the phases of Venus (thus disproving the geocentric theory), spots on the sun, mountains and craters on the moon, and the four largest moons of Jupiter (named after him).

•Galileo's writings brought him into conflict with the Catholic Church, which held the geocentric theory. Galileo was, by this time, old, nearly blind and arthritic. He was forced to *recant* (take back) his views, and remain under house arrest for the rest of his life.



## Newton

•Sir Isaac Newton (1643-1727) is considered to be one of the most influential men in history. In many ways, he was the crowning achievement of the Scientific Revolution.

•Newton's work in physical motion included his explanation of *universal gravitation*, as well as his *Three Laws of Motion*.

•These explanations helped to prove the theories of Copernicus, Kepler & Galileo. The story about Newton being hit on the head by an apple and discovering gravity is not entirely true, but not entirely false either. He was living out in the countryside, and watched the fall of an apple from a tree. Newton himself credits this for his inspiration.

•Newton's work in math included the creation of *calculus*, which provided the numerical proof of earlier scientists' theories.

