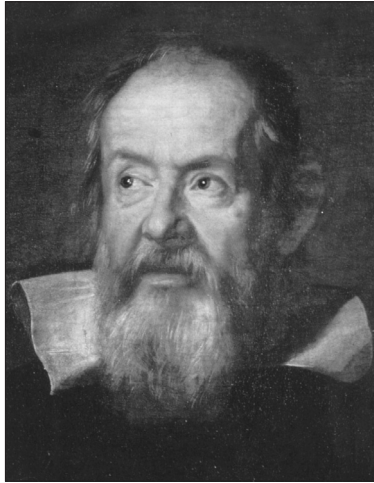


Educational Activities for the International Year of Astronomy

The year 2009 has been designated the International Year of Astronomy (IYA) by UNESCO, the International Astronomical Union, and more than 100 countries around the world. It will be a global celebration of astronomy and its contributions to society and culture. The year celebrates the 400th anniversary of remarkable achievements made in 1609 by two astronomers, Galileo Galilei and Johannes Kepler. Activities on this poster are provided by the SCOPE observatory partners and are based on Galileo's and Kepler's work. We hope they will help you bring the IYA to life in your classroom.

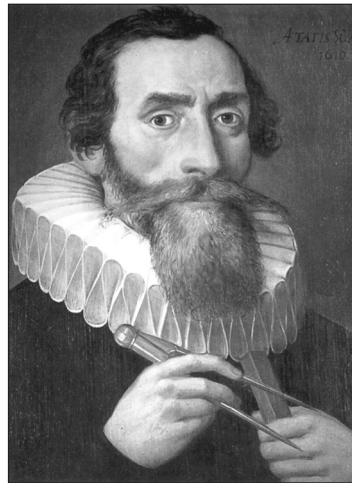


GALILEO GALILEI

After learning of the invention of the telescope in 1609, Italian astronomer Galileo Galilei (1564-1642) decided to build one. His initial telescope magnified objects three times, but he eventually improved his design to a magnification of 20. With this better telescope, he examined the surface of the Moon that same year and found Earth-like features: craters, mountains, and smooth darker areas that he named "mare," which is the Latin word for seas. Galileo suggested that the Moon is a physical world like Earth. We still use Galileo's names for features on the Moon. To follow in Galileo's footsteps, try out our classroom activity *Observing the Moon*.

Galileo also used his telescope to discover four moons of Jupiter, and countless stars beyond what could be seen by the unaided eye. He published his first telescopic observations in his 1610 book *Sidereus Nuncius* (The Starry Messenger). Later, Galileo discovered the phases of Venus, which proved it lies between Earth and the Sun, and observed dark blotches on the Sun which we call sunspots. To learn more about sunspots, try our classroom activity *400 Years of Sunspots*.

Galileo's telescopic discoveries convinced him that Aristotle's concept of a perfect, Earth-centered universe was wrong, and that the model of a Sun-centered universe first advocated by Nicholas Copernicus in 1543 was correct.



JOHANNES KEPLER

German mathematician Johannes Kepler (1571-1630), a contemporary of Galileo, moved to Prague in 1600 to work with astronomer Tycho Brahe. Tycho had devoted his life to making unaided-eye observations of celestial objects, and hired Kepler to use his observations of Mars to prove Tycho's own (incorrect) theory of the universe.

When Tycho died, Kepler used the thousands of accumulated astronomical observations to deduce his first two laws of planetary motion. They state that all planets orbit the Sun in elliptical paths with the Sun at one focus, and that a planet sweeps out equal areas in equal amounts of time as it moves around the Sun. Kepler published these two laws in his 1609 book *Astronomia Nova* (The New Astronomy). To help your students understand Kepler's laws, try out the classroom activity *Learning About Elliptical Orbits*.

Kepler also wrote books with tables of planetary positions (based on his laws), explanations of the Sun-centered universe theory, and more. He was the first to explain how the Moon causes tides in Earth's oceans, the first to explain how a telescope works, and the first to suggest that the Sun rotates on its axis.