Objective:

Students will learn how to use a simple "Galileo" telescope to find laminated space targets like planets and satellites.

Arkansas State Standards Addressed:

Science

NS.1.4.13 Use simple equipment, age appropriate tools, technology, and mathematics in scientific investigations (e.g., balances, hand lenses, microscopes, rulers, thermometers, calculators, computers)

4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Activity:

Galileo Galilei (1564-1642) was a famous scientist and mathematician who helped to disprove the commonly held theory that the Sun revolved around the Earth (Geocentrism). In 1609, Galileo made improvements to refracting telescopes at the time, which work by bending and focusing light with its lenses. His telescope, the Galilean telescope, uses a convex lens (which bulges or curves outward) and a concave lens (which curves inward) to improve magnification. First, it focuses the light by using the objective lens to make a small image of the object, and then the eyepiece lens magnifies the image. Galileo’s telescope allowed him to discover the four moons of Jupiter and observe other planets and stars in detail. The Galilean telescope is still used today.

This is a basic diagram of a Galilean telescope:

Students will learn how to use a Galilean telescope to find laminated space objects placed at various distances. To operate the telescope, have students practice focusing the instrument by directing at a faraway object and turning the knobs next to the eyepiece. If the knob is turned
Towards you, the telescope tube will extend to provide more focus for a faraway object. Turn the knob away from you, and the telescope can focus on closer items.

To extend this activity, have students construct their own Galilean telescope out of cardboard tubes and lenses. More details can be found here: https://www.savvyhomemade.com/building-a-homemade-telescope/.

Additional Resources at Bentonville Public Library

The following resources are specifically about Galileo and astronomy. All items are available for checkout at Bentonville Public Library; call numbers are included in brackets. Online resources are available through BPL's Student Portal: http://www.bentonvillelibrary.org/student-portal/

Books

- Be an Astronomer by Nicole Shea. [JNF 520.23 SHE]
- Galileo: Astronomer and Physicist by Robin Doak. [JNF 92 Galileo]
- Galileo: Conqueror of the Stars by Nancy Dickman. [JNF 92 Galilei Galileo]
- I, Galileo by Bonnie Christensen. [JNF 92 Galileo]
- Little Kids First Big Book of Space by Catherine D. Hughes [JNF 520 HUG]
- The Magic School Bus Sees Stars [JNF 523.8 WHI]
- Sir Isaac Newton: Overlord of Gravity by Angela Royston [JNF Newton, Isaac]
- Starry Messenger: A Book Depicting the Life of a Famous Scientist, Mathematician, Astronomer, Philosopher, Physicist, Galileo Galilei by Peter Sis. [JNF 92 Galileo]
- Telescopes and Space Probes, World Book’s Solar System & Space Exploration Library [JNF 522.2 TEL]

Online Resources

(K-4) PebbleGo

(K-4) PowerKnowledge Earth Space Science

(5-6) The Encyclopedia of Arkansas History and Culture:
http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=6626
http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=6626

(5-6) World Book Student

Learn More:
NASA has created a student website that helps kids explore space-based careers and topics:
https://www.nasa.gov/audience/forstudents/k-4/index.html

Smithsonian Institution: National Air and Space Museum:
https://airandspace.si.edu/exhibitions/exploring-the-planets/online/discovery/galileo.cfm

PBS: Galileo’s Telescope:
http://aetn.pbslearningmedia.org/resource/phy03.sci.phys.energy.galileotele2/galileos-telescope/

Explore Space Exhibit Information:

Explore Space: A Cosmic Journey, a traveling exhibition for libraries, is part of the STAR Library Education Network (STAR_Net) led by the National Center for Interactive Learning at the Space Science Institute. Exhibit partners include the American Library Association, the Lunar and Planetary Institute, and Afterschool Alliance. Explore Space is supported through a grant from the National Science Foundation.