

Space Science Researcher Badge

Purpose: Understand more about the amazing properties of light and how we use it to make discoveries about the universe and space science.

Resources:

- Newton's Disk activity: youtube.com/watch?v=_z7BDab3N7w
- NASA tour of electromagnetic waves: youtube.com/watch?v=HPcAWNIVl-8
- Infrared light activity: youtube.com/watch?v=KI9LN3j9CiA
- Observing with NASA: mo-www.cfa.harvard.edu/cgi-bin/OWN/Own.pl
- Sky Maps: skymaps.com/downloads.html
- Protecting the Night: nps.gov/subjects/nightskies/index.htm
- Globe at Night: globeatnight.org
- Loss of the Night: lossofthenight.blogspot.com
- Dark Sky: darksky.org

Step 1. What more can you see?

When you study space science, you are studying light from stars and other objects in space, including our Sun. Because visible light reaches our eyes by bouncing off objects, we see green trees, red cars, and planets of different colors. The light from our star—the Sun—appears to be one color. Is it possible it's made of all the colors we see? Find out more about how we perceive light by watching the video in the resources and making your own Newton's Disk.

Step 2. Explore "invisible" light

All around us are waves of energy. There are many different kinds, such as light waves, thermal waves, and sound waves. The waves of energy are all different sizes and have different uses and effects on the world around us. Certain light waves are just the right length for us to detect with our eyes. The colors we see are called visible light, but there are other kinds of light we cannot see, like X-rays and infrared. Even though our eyes can't see them, we can build things to detect them. Did you know the camera on a smartphone can detect infrared waves? Watch the video on infrared light to learn how, then take a look at the electromagnetic waves video from NASA to learn more about different kinds of waves.

Step 3. See the stars in a new way

As the Earth orbits the Sun, our view of the sky changes from night to night and from season to season. Take a photograph to learn and see stars in a new way and share the image with family and friends. You can even capture a digital image of a star or the moon using a MicroObservatory from NASA. Use the link in the resources section to navigate to Observing with NASA. Here you will be able to control a real robotic telescope and capture your own image of a star! Take multiple photos on different days—what differences do you notice? Which images turned out best?

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Girl Scout Cadettes

Step 4: Expand your vision

Thousands of years ago, people began cataloging the stars by brightness and organizing the sky into constellations. Then, in the 1600s, the invention of the telescope helped expand their view. Expand your own view by looking up and exploring the night sky. On a dark night, download a sky map from the link in the resources section and try to find the constellations on your own. Use a notebook to document how bright each star is in a constellation and what color it appears to be. Does anything change from night to night?

Step 5: Conserve the night sky

Darkness at night is good for living things. When there is too much light at night, it not only wastes energy and prevents astronomers from being able to observe the night accurately, but it also can have negative effects on the health and safety of animals, including humans. This excess light is called light pollution. Learn more about light pollution using the links in the resources. You can help to protect the night sky by becoming a citizen scientist and observing and reporting on the conditions of the night sky where you live. You can also put your imagination to use to design a light fixture or shade that directs light downward to where it's needed instead of upward toward the sky and polluting the view of astronomers.

Congratulations! You've earned the Space Science Researcher badge!

