



Make A Toy Telescope

Imagine the universe with a toy telescope!

Materials Needed:

Paper towel tube, scissors, tape, decorating materials (colorful paper, stickers, sequins, etc.), Lens Caps Printable.*

*You can make your own lens caps by drawing on a piece of paper or cutting out pictures from magazines. The visible image should be a circle about 1.75 inches (4.5 cm) in diameter, with a 0.5 inch (1.25 cm) border so it will fit over the end of the tube.



Instructions:

Step 1: Decorate a paper towel tube for your telescope. Use colorful paper, markers, stickers, sequins, or whatever you have available! Leave 1 inch (2.5 cm) clear of decorations at one end of the tube.



Step 2: Cut out each of the 6 lens caps. Cut along each dotted line.

Step 3: Fold the paper flaps to fit the lens cap over the top of the tube. Make sure the picture side faces into the tube! Tape the flaps together so that you can remove the lens cap and it keeps its fitted shape. Repeat for each lens cap.

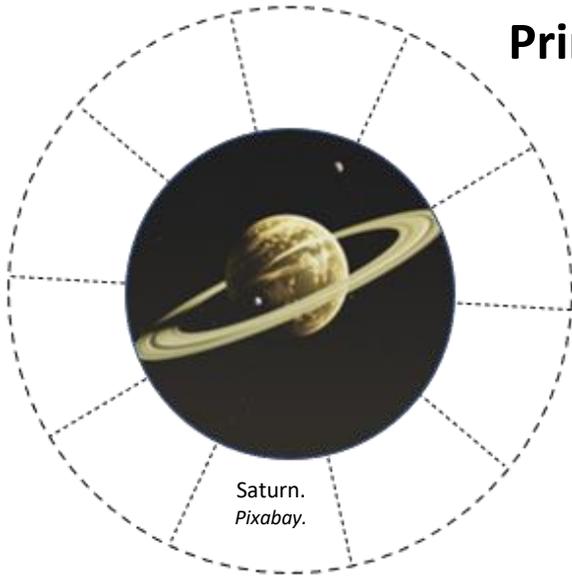


Step 4: Place a lens cap on the end of the tube. Look through the other end. The tube lets light in, which allows your eyes to see the picture.

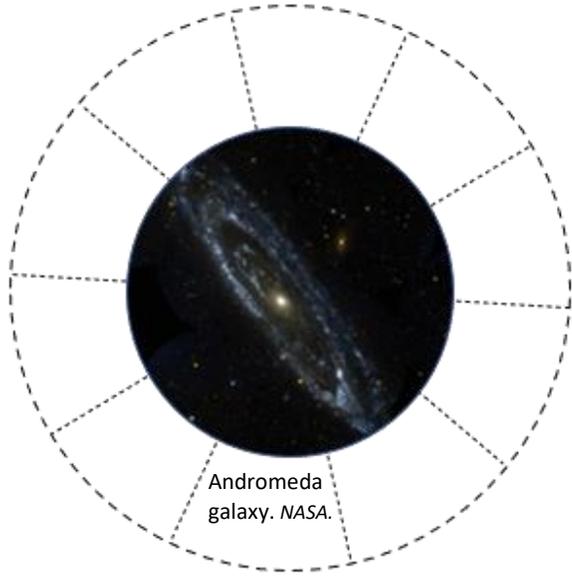
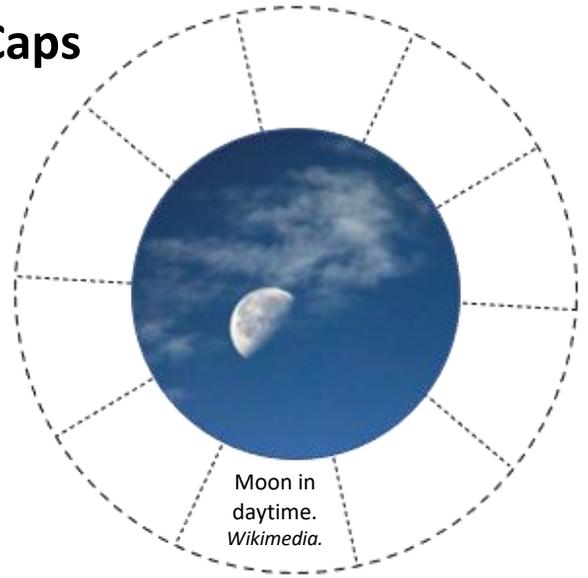
Explore outer space and wildlife scenes with the different lenses!

Use the toy telescope without a lens and practice finding objects that are far away!

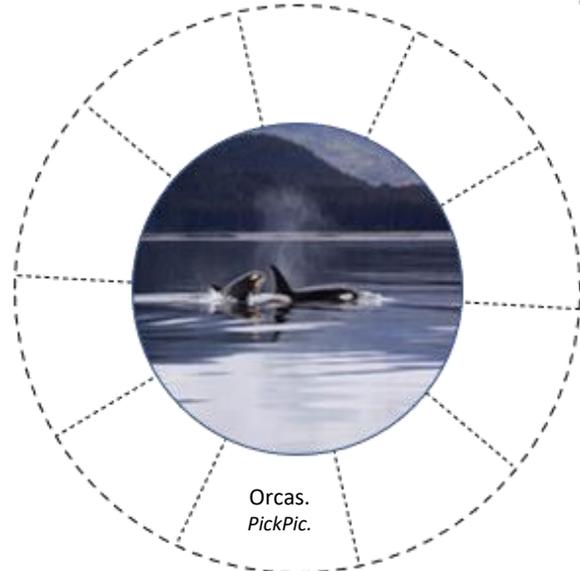
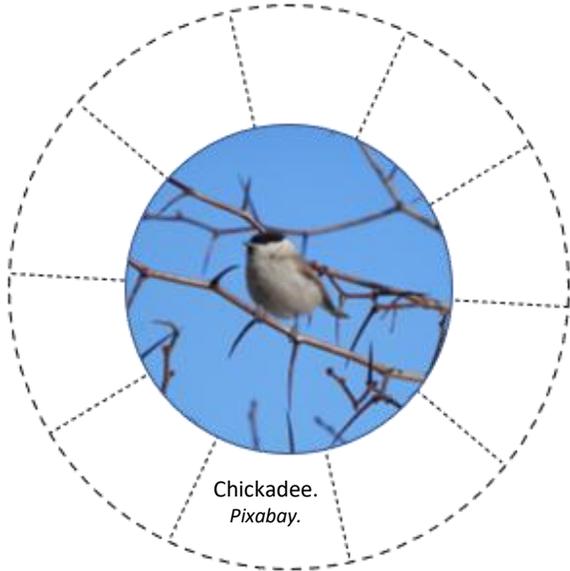
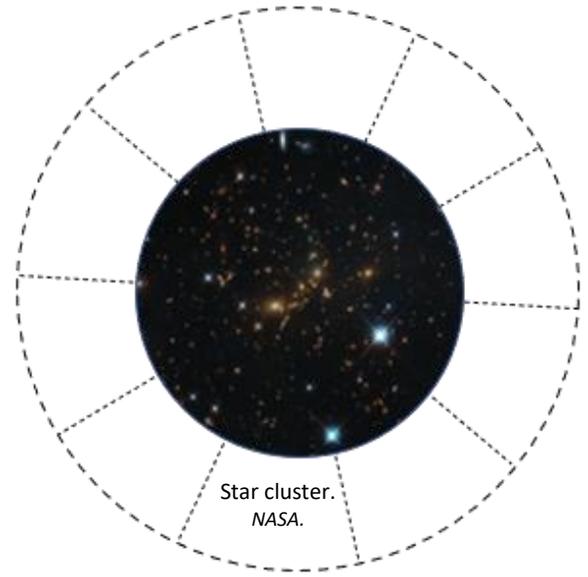
Printable Lens Caps



*Cut circles along
the dotted lines.*



*Fold edges over
end of the paper
towel tube. Tape
in place.*



Discover Telescopes



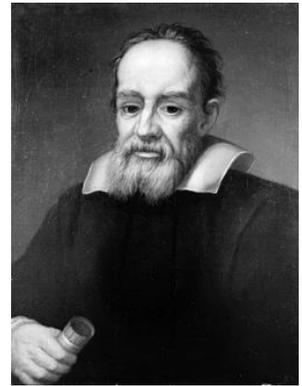
How Do Telescopes Work?

We are limited in how far we can see with just our eyes alone. As objects get farther away from us, they become smaller and darker. Our eyes cannot see small amounts of light that are far away. Telescopes concentrate light and magnify objects so that we can see them at a much farther distance.

The First Telescopes

Dutch eyeglass maker Hans Lippershey built some of the first telescopes with magnifying lenses on each end of a tube over 400 years ago!

In the early 1600s, Galileo Galilei was one of the first astronomers to use a telescope to study the sky. He improved telescopes to magnify objects up to 30 times. Galileo shared the first detailed drawings of the Moon, discovered that Jupiter had moons, and studied sunspots on the Sun.



Galileo Galilei.
Image: Wikimedia Commons.

Looking Up at the Sky

Today, telescopes use both lenses and mirrors to concentrate light. Larger and larger mirrors are being used to see farther into the sky. Our view of the sky from Earth is distorted by the atmosphere, so space observatories are often built on mountaintops where the atmosphere is thinner.

The largest telescope in the world is the Gran Telescopio Canarias in Las Palmas, Spain. It has a mirror 10.4 meters in diameter and sits 7,000 feet above sea level. Larger telescopes are under construction, with mirrors up to 39 meters in diameter!



Gran Telescopio Canarias.
Image: Pachango via
Wikimedia Commons.

Telescopes in Space

Scientists have launched several telescopes into space, where they can take pictures without distortion from the Earth's atmosphere. The Hubble Telescope has orbited the Earth since 1990, and can see much more detail than telescopes on the ground. The James Webb Space Telescope, scheduled to be launched in 2021, will be the largest, most powerful, and complex space telescope ever built.



Hubble Telescope.
Image: ESA.