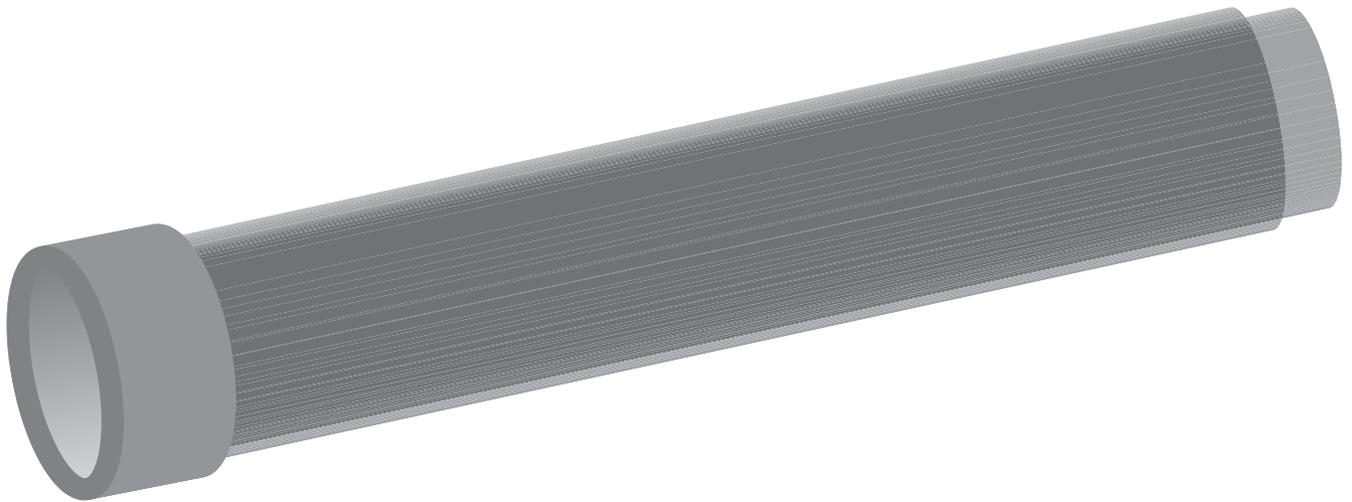


Adapted from the Project STAR Activity Book, *Where We Are in Space and Time*

How to Make and Use a Project STAR Telescope for Elementary Grades



About Project STAR Hands-on Science Materials

Project STAR Activities were developed by teachers and scientists at the Harvard Smithsonian Center for Astrophysics and have been thoroughly tested by students and teachers worldwide. The activities stress general scientific skills and can be used in a variety of class levels from elementary grades to college.

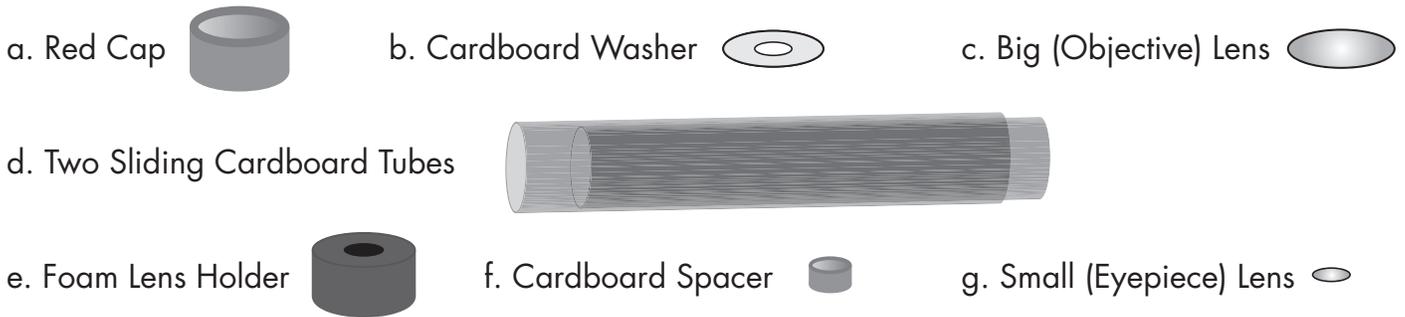
Project STAR (Science Teaching through its Astronomical Roots) activities are based on the philosophy that students will better learn a concept when they first explore and then test their own theories with hands-on, model-building exercises.

For more information on Project STAR Hands-on Science Materials contact:

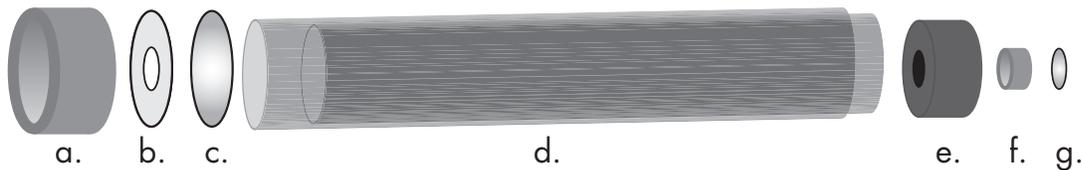
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What You Need to Make Your Telescope

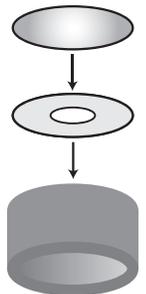
You should have the following pieces:



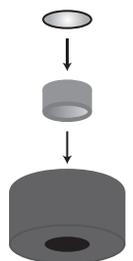
How to Make Your Telescope



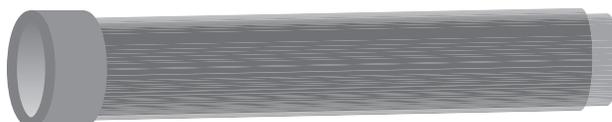
1. Lay the red cap down on a table with the wide open end up.
2. Place the cardboard washer into the red cap.
3. Holding it carefully by the edges, place the big (objective lens) with the curved side DOWN in the cap. To figure out which is the curved side, carefully place the lens on the table. If it rocks when you touch the edge, the curved side is against the table. If it lays still when you touch the edge, the curved side is facing up.



4. Insert the larger end of the 2 sliding cardboard tubes in the cap.
5. Place the foam lens holder on the table.
6. Push the cardboard spacer into the foam lens holder so that it goes all the way to the bottom, touching the table. Using a tissue, push the small (eyepiece) lens with the curved side UP into the foam until it stops against the cardboard spacer.



7. Now push the smaller end of the 2 sliding cardboard tubes over the foam eyepiece holder.
8. Your telescope is ready to use!



What Does This Telescope Do?

Like binoculars, this simple telescope lets you see things that are far away much more easily. You can use it at night to see details on the moon such as craters, to look at the bark on a tree across the street and you can use it in your class to read words on posters that are all the way across the room! **But, never, ever use the telescope to look at the sun – you will damage your eyes!**

How Does it Work?

When you look at something using the telescope, light enters through the hole in the red cap. The curve of the big lens in the cap (called the objective lens) takes the scattered light and bends it into one point. When the lens bends the light, it also causes the image (whatever you are looking at) to flip upside down! Then the light goes through the small eyepiece lens at the other end of the telescope. This small lens focuses the image so that you can see it.

Try It!

Activity 1

- Anchor your elbows on a stable surface like a desk, table or car if you are outside. Look through the smaller end of the two tubes (the black foam end) then aim the lens end with red cap at a small object far away in the room or outside.
- Slowly slide the tubes in or out to focus the telescope. The closer the object is to you, the further out you will have to slide the telescope tubes to focus on the object. What is the first thing you notice about the image you see? [It's upside down!]

Activity 2

- Now try aiming the telescope at a poster or some words about 20 feet away. Without the telescope you may not be able to read the words, but with the telescope, you can (especially if you are good at reading upside down)!

The telescope improves your vision, making things look larger and closer! That is because the width (diameter) of the lens in the telescope, and therefore the light-gathering power, is larger than that in your eye.

For Fun

- Decorate your telescope using paints, crayons, markers, stickers and your imagination.
- On a clear night when the moon is visible, use your telescope to take a good look at the moon. Don't forget to anchor your arms to keep the telescope steady. Write down what you see!