

# Building a Homemade Telescope

Need to see a little further? Why not have a go at building a homemade telescope that's slim enough to slip into a backpack, no problem.

There are many different ways to make your own telescope, but the fundamentals are always going to be relatively similar.



## What You Need

To get started you are going to need a few items. Here is a list of the simple items you can put together to create your telescope:

- One Larger Convex lens – this must be smaller than the tube you are going to use, if you can get one that fits the inside perfectly
- One Smaller Concave or convex lens – a convex lens will give you the same view but turn everything upside down
- One long cardboard tube or 2 cardboard tubes in which one fits snugly inside the other – Old wrapping paper tubes are great for this.
- A piece of thick cardboard – one that has the ridged bit in the middle
- Sticky tape
- Craft knife
- Glue
- Colored tape – electrical tape is best as it's a bit stretchy and more flexible
- Paint – black is the best choice for a telescope as it restricts light
- Stickers – optional



## For 1 Cardboard Tube

These first instructions are for anyone who will be using a single cardboard tube. It's a simple step by step guide to cutting down your tube to the correct size ready for constructing the telescope.

1. Cut the cardboard tube in half
2. Draw 2 parallel lines about 1/2 inches apart lengthways along one of the tubes, and then cut out the cardboard between the lines. This will be the inner tube.
3. Check that the inner tube fits snugly into the second tube but can still slide nicely in and out.
4. Now you need to tape the tube back together, the easiest way to do this is to secure the tube at both

ends, then around and across the middle with sticky tape.

5. As the sticky tape is difficult to paint, cover it (apart from one end) with some coloured tape.



## Make Your Telescope

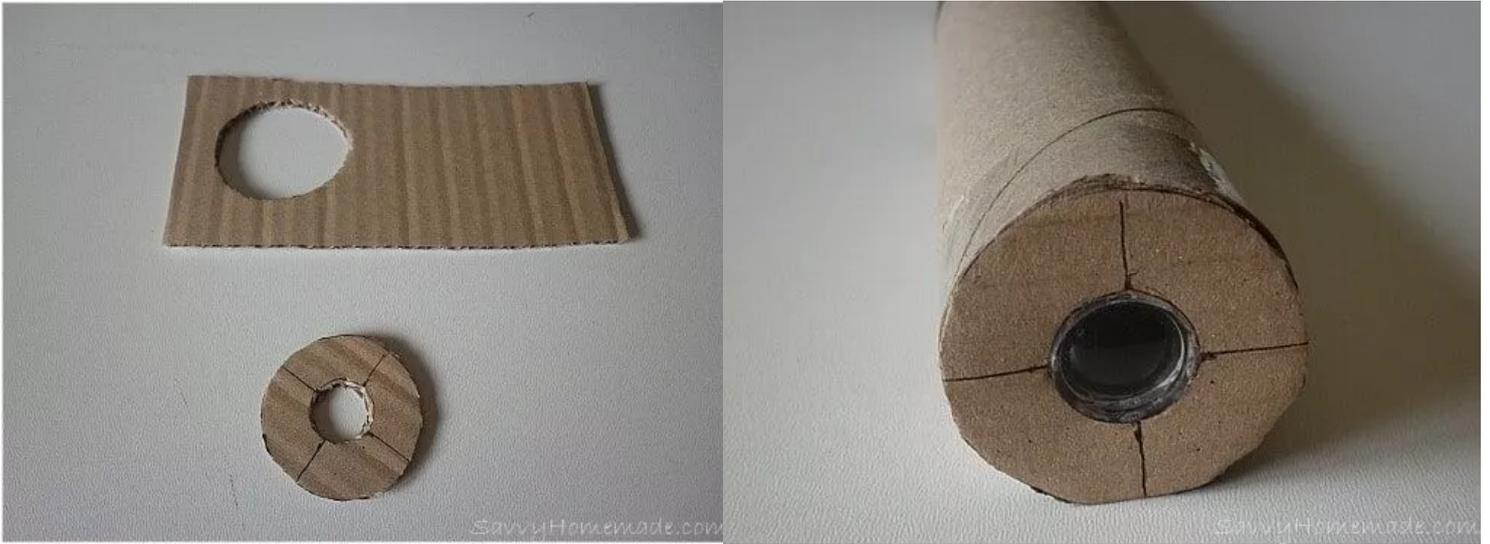
1. Mark a circle onto the piece of cardboard by drawing around the inner tube.
2. Place the small lens onto the center of this circle and draw around this too. You may find this easier to use a ruler and mark out a cross in the larger circle first; this will give you a guide to the most central position to place the lens before drawing around it.
3. Using the craft knife, cut the inner circle out of the cardboard, and then cut around the larger circle to remove it.

4. If you are using a concave lens the flat side of the lens



is the side that should be facing you, the convex lens is also placed with the curved side facing the sky.

5. Push the eye lens into the center of the cardboard hole, it should be a good fit and held securely in place with the cardboard, if you wish to you can add a dab of glue to the inside of the hole before pushing the lens in for extra security.
6. Coat the rim of the inner tube with glue and press the cardboard circle that holds the lens onto it. To help it stick, stand the tube up with the cardboard lens facing down and leave to dry.



7. Once dry wrap with electrical tape, try to over overlap the edge of the tube with the tape slightly so that it can be pressed around the eyepiece (see picture) this will give extra strength and a nice finish.



8. Fitting the large lens to the outer tube; if you have purchased your large lens to fit the outer tube, you should be able to just push it into a good tight position in the end of the tube.
9. Once again wrap the end with electrical tape, over overlapping the edge of the tube with the tape slightly,



so that it can be pressed around the lens (see picture) otherwise construct using the same procedure as you did with the inner tube and eye lens.

10. Paint both the tubes and leave to dry before adding any stickers and placing the inner tube into the outer one.



11. If you can keep the two lenses the right distance from each other, keep them parallel, and maintain a good line of sight, your new homemade telescope will be the perfect fit

for you, your children, or a classroom full of eager young astronomers.



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