

#ExperimentsAtHome



Experiment shared by:
Amy Castle, STEM Ambassador

MAKE A SPECTROSCOPE (PHYSICS) #CHASETHERAINBOW

You will need:

- Empty paper towel roll
- Craft knife and/or scissors
- Blank or old CD
- Pencil
- Small piece of cardboard or cardstock
- Tape
- Paint (optional)



Instructions:

1. If you'll be painting your paper towel roll, you'll want to do that first and let it dry.
2. Use a craft knife (an adult should do this) to cut a thin slit at a 45° angle toward the bottom of the cardboard tube.



3. Directly across from the slit, make a small peephole or viewing hole using your craft knife (another step for an adult).



4. Trace one end of your paper towel roll onto your small scrap of cardboard or cardstock. Cut it out.



5. Cut a straight slit right across the center of your cardboard circle.
6. Tape the circle to the top of your spectroscope.
7. Insert the CD into your 45° angled slit with the shiny side facing up.



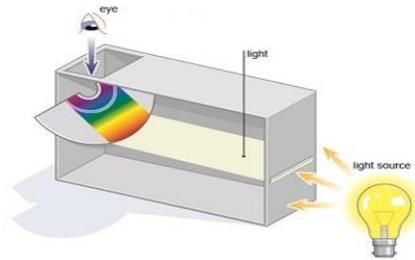
Start by taking your spectroscope outside. Point the top slit up at the sky (NOT directly at the sun). Look through the peephole. You will see a rainbow inside!

Explore Further

Now try your spectroscope with other light sources like fluorescent light, neon light and candle light. Compare what you see! What is the same? What is different?

How it works!

The CD has lots of little grooves on its surface that are equally spaced out. When the light from the sun (or other light source) hits the CD, the little grooves split the light into its different wavelengths – which are different colours. The colours are then reflected back to our eyes due to the CD's mirrored surface.



The sun mainly emits visible light and some ultraviolet light. Of the visible wavelengths of the electromagnetic spectrum, red, with the longest wavelength, is diffracted most; and violet, with the shortest wavelength, is diffracted least. Because each colour is diffracted a different amount, each colour bends at a different angle. The result is a separation of white light into the seven major colours of the spectrum or rainbow. This [BBC Learning Video](#) explains how the colours are made.

Here's what it should look like...



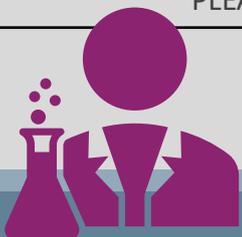
A **spectrometer** is a measuring device that collects light waves. It uses these light waves to determine the material that emitted the energy, or to create a frequency spectrum. Astronomers use spectrometers to determine the makeup of stars or other celestial bodies. This [BBC Learning Video](#) explains the use of a spectroscope.

Share your results!

We'd love to see photos and videos of you doing the experiment. Please share on Twitter with hashtag #ExperimentsAtHome and tag in @STEM_HUBNMSEY

Thank you!

PLEASE ASK FOR ADULT PERMISSION AND/OR SUPERVISION WHEN REQUIRED.



We hope you have fun!