

Spectroscope

What Do I Need?

- black film canister, no lid
- old CD
- scissors
- utility knife
- clear tape
- duct tape



What Do I Do?

1. First, **ask an adult** to carefully cut a slit measuring 1/8 inch wide by 1 inch long on the bottom of the film canister.
2. Next, place a piece of duct tape on the labeled side of the CD and press down firmly. Quickly pull the tape from the CD. You should have removed some of the silver coating from the CD with the tape. Repeat this process until you have removed most of the silver coating.
3. Use the scissors to cut a circular piece from the CD. It should be slightly larger than the opening of the film canister.
4. Tape the circular shape of the clear CD over the opening of your canister.
5. Point the slit of your spectroscope toward a light source and look through the opening with the CD. **Never aim it directly at the sun!** What do you see inside the container?

Now Try This!

Try aiming your container at different sources of light, such as an incandescent light bulb, a fluorescent light, an LED light, or even the flame of a candle. Does the pattern inside the container look different? You can also try varying the width of the slit.



What's Going On?

The device you made is called a spectroscope, and the pattern of colors you see inside the container is called a spectrum. Visible light from the sun is actually made up of many different colors, or frequencies, of light. When you point your spectroscope at a light source, the CD acts like a prism, spreading light into its component colors. Violet light (the highest frequency of visible light) is at one end of the spectrum and red light (the lowest frequency of visible light) is at the other. The surface of the CD contains many small grooves. When light hits the CD, these little grooves separate the colors so they reflect at different angles onto the inside wall of the spectroscope.

Does the pattern of colors inside your spectroscope change when you point it at different sources of light? Incandescent light bulbs and sunlight will produce a continuous spectrum, where all the colors merge smoothly into each other. A fluorescent light will produce a spectrum of bright lines separated by dark spaces. Try drawing each spectrum with colored pencils and comparing them.