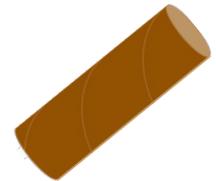


## Spectroscope

Spectroscopes are instruments which separate light depending on its wavelength. They can be used to analyse light – from the light of everyday objects like streetlights to the light from stars far away in space.

To make a simple spectroscope at home you will need:

- A cardboard tube such as from a kitchen roll or poster tube
- An old CD
- Paper or card
- Scissors
- Sellotape



### Step 1

Cover the top end of the tube with card or paper and tape down.



### Step 2

Cut a narrow slit in the card, a few mm wide (less than 5mm) and 2cm long.



### Step 3

Make a V-shaped cut in the tube, around one third of the way up from the bottom.



### Step 4

Cut out a “viewing window” – a square hole on the opposite side of the V-shaped cut.



### Step 5

Push the CD, shiny side up, into the V-shaped cut. It can be taped into place if it's wobbly!

Point the top end of the tube towards a light source, but NEVER directly at the Sun, and look through the viewing window onto the surface of the CD.

Experiment with the angle at which you hold the tube, see which colours you can find.

## What is happening?

All light is made up of waves of electromagnetic radiation. The colours that make up white light all have slightly different wavelengths. A spectroscope spreads out the different wavelengths of light so that we can see the colours of the spectrum.

Information is stored on CDs as a regular series of grooves which are etched onto the reflective surface. The grooves are spaced apart at a distance just a little wider than the wavelength of light. When light hits the surface of the CD, the different wavelengths of light are bent by different amounts which splits the light into its different colours.

If you point the slit at a window (**never** directly at the Sun) you will see a smooth, unbroken rainbow. However, point the tube at a fluorescent light and you'll see bright lines, the spectrum of mercury gas inside the fluorescent tube. Different light sources produce different patterns, the spectrum of light from that particular light source. Experiment to see what different patterns you can find.