



Make Your Own Spectroscope

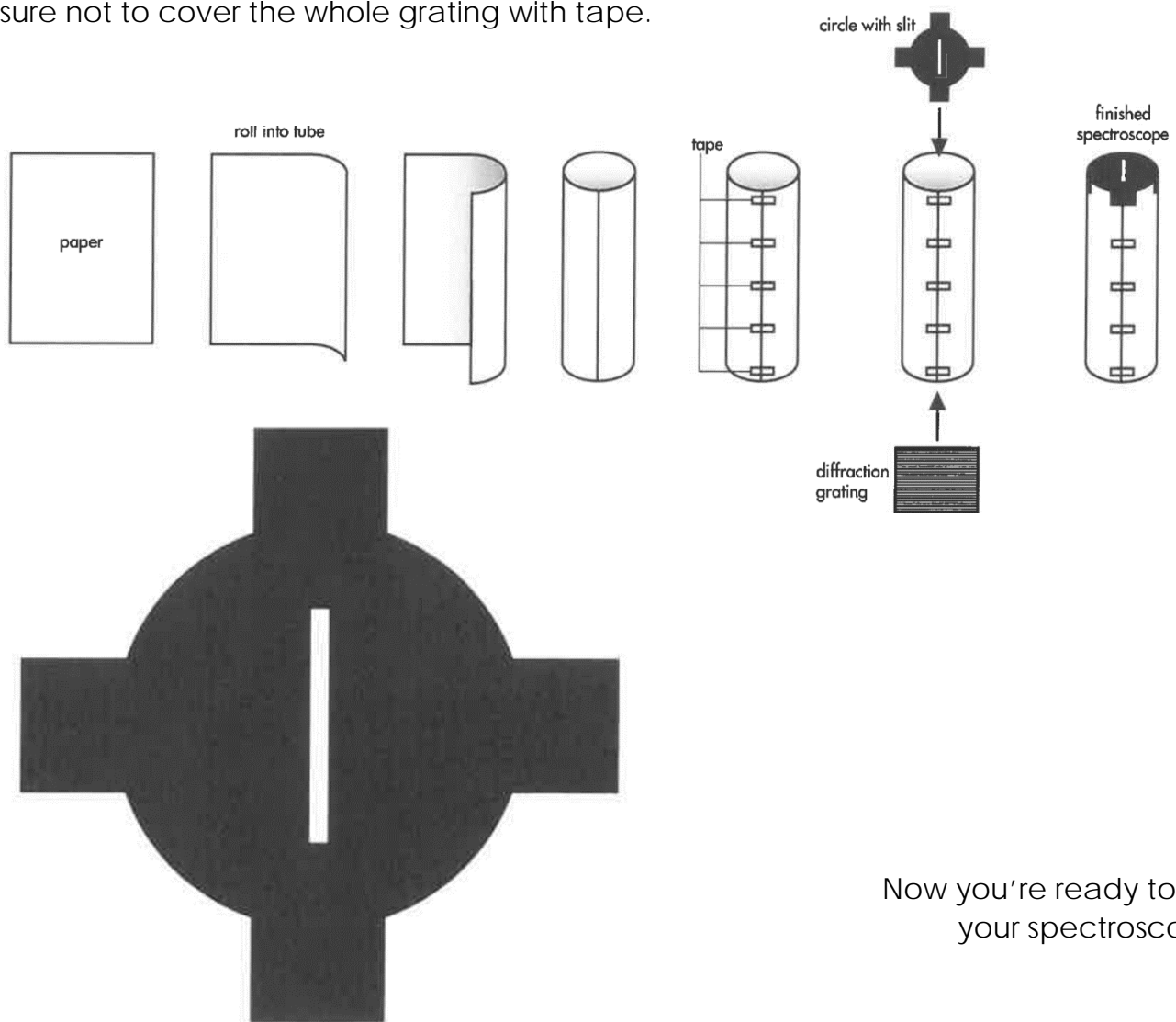
A **spectroscope** is a device that shows us all the different colors white light is made of.

What colors do you think mix together to make white light? _____

You will need: Tape, black construction paper, diffraction grating (you can use an old CD ROM for this! Just make sure to remove the label and the reflecting layer so it's clear)

Roll the black construction paper into a tube, and **tape** it securely. Next, **cut out** the circle below (don't forget the slit in the middle!), and **attach** it to one side of the tube with the tape. Last, **fasten** the diffraction grating to the other side with tape.

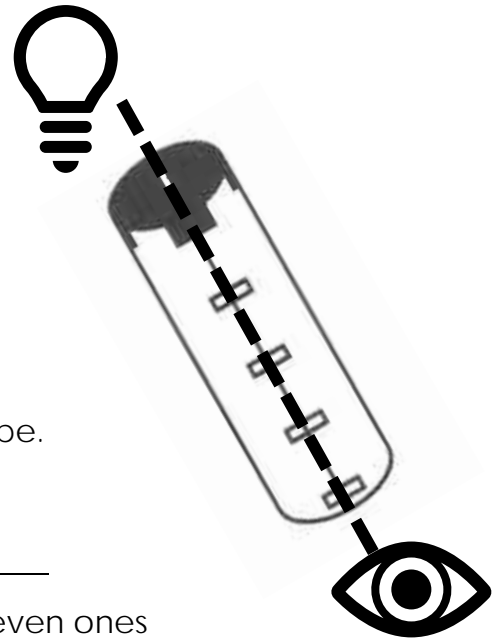
Make sure not to cover the whole grating with tape.



Now you're ready to use your spectroscope!



Make Your Own Spectroscope



Reminder: NEVER look directly at the Sun, even with a spectroscope!

Point the spectroscope at a white light source, like a lamp, and **observe what happens** along the inside sides of the tube.

Were you right about what colors make up white light?

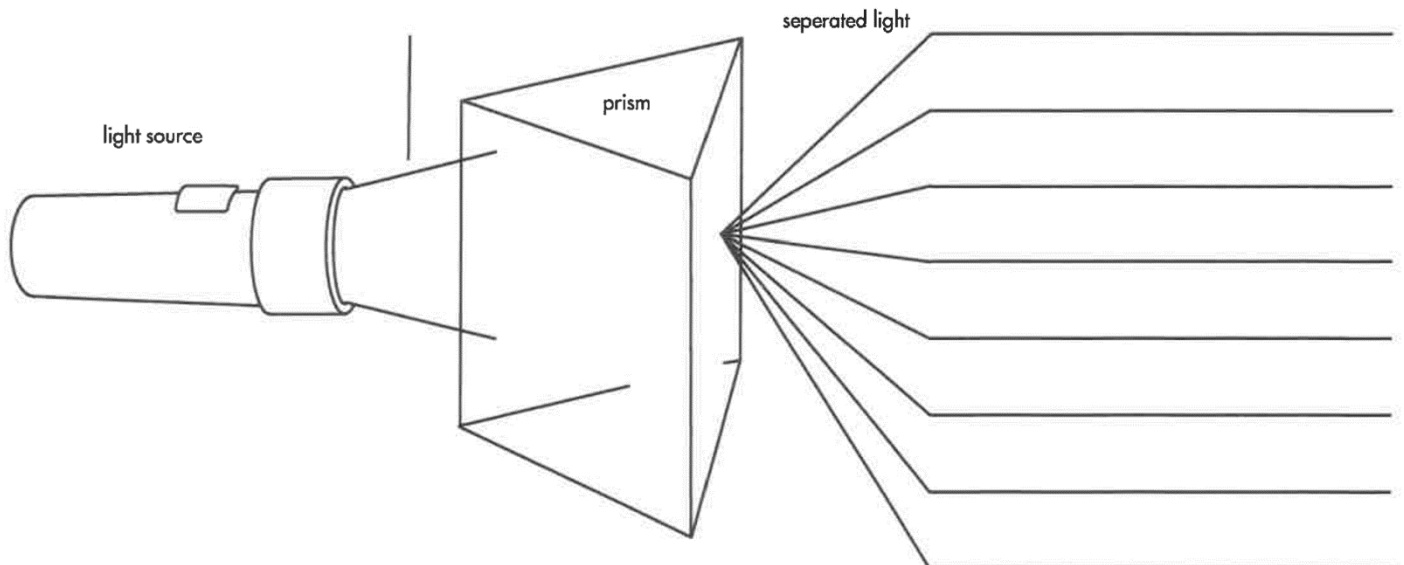
Now use your spectroscope to **look at other light sources**, even ones that are different colors! **Record what you find** in the table below.

Light Source	Colors present

A **prism** is a wedge-shaped piece of glass that also separates white light into different colors just like the diffraction grating in your spectroscope.

Color and label the different colors that you see in your spectroscope on the prism picture. Start with red at the top.

COLORS



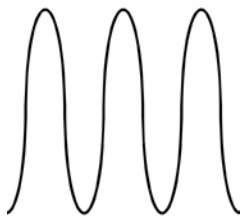


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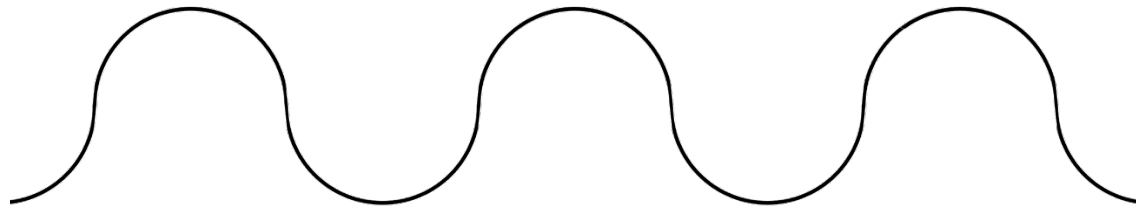
How can you explain what you have discovered with light? Scientists think of models that can explain the characteristics of light. One model is to think of light as a wave of energy. Some energy waves are short and others are long.

Each of the different colors that make up white light is a **wave with a different length**. Red light has the longest wavelength, and violet has the shortest.

Short wavelength



Long wavelength



When white light passes through a prism, or through a diffraction grating, the waves are bent. The waves that make up red light are bent less than the waves that make up orange light, and so on. The waves that make up blue and violet light are bent the most. Since the different sized waves are all bent different amounts, they are separated and you can see the colors.

Can you use this idea to explain why an apple looks red?

