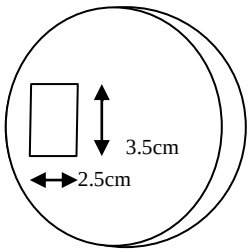
# Building a Spectrograph Student Directions

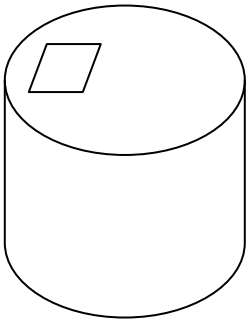
1. Cut a small slit off center in the lid of the container approximately 2.5 cm wide by 3.5 cm high.
2. Cut a hole the same size roughly opposite the hole in the lid on the opposite side of the container.
3. Careful not to cover any portion of the hole with tape, gently tape the diffraction grating to the inside of the lid.
4. Cut 2.5 cm off of each of the short ends of the index card. Keep the two pieces you cut.
5. Trim 1.5 cm off of the length of the index card pieces.
6. Color the index card pieces black using black marker.
7. Using the straightest edge of the index card pieces, tape over the hole in the bottom of the container so that they are almost touching, but not quite. Make a gap of less than 1 mm, as straight as possible. Tape using masking tape so that no light leaks into the box aside from the light coming through the gap (slit).
8. Put the lid back on, look through the lid, and point your spectrograph at the light source. You should see a continuous spectrum (a rainbow) very clearly. If you do not see a continuous spectrum clearly, rotate just the lid until you can see one.
9. Once your spectrograph is finished, decorate the outside of your container.

Illustrations:

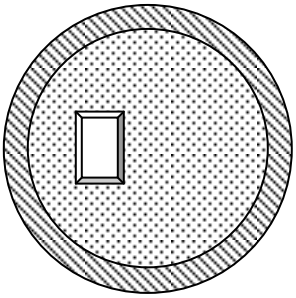
**1. Cut hole in lid off to one side.**



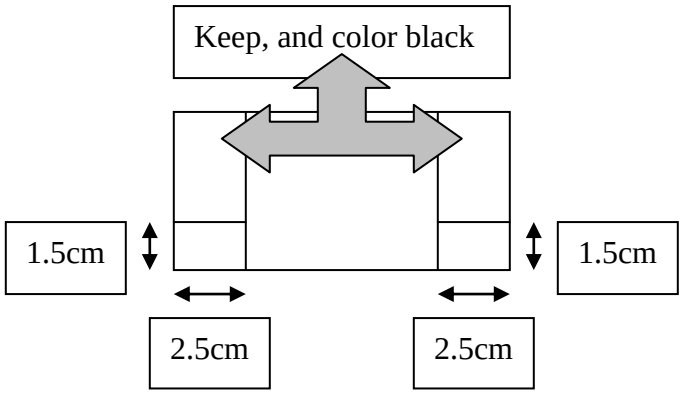

**2. Cut hole in container off to one side so that when lid is on, holes are roughly opposite one another.**



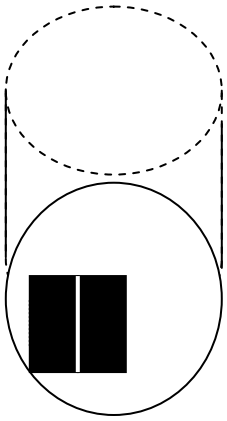
**3. Tape grating to hole on the inside of lid.**



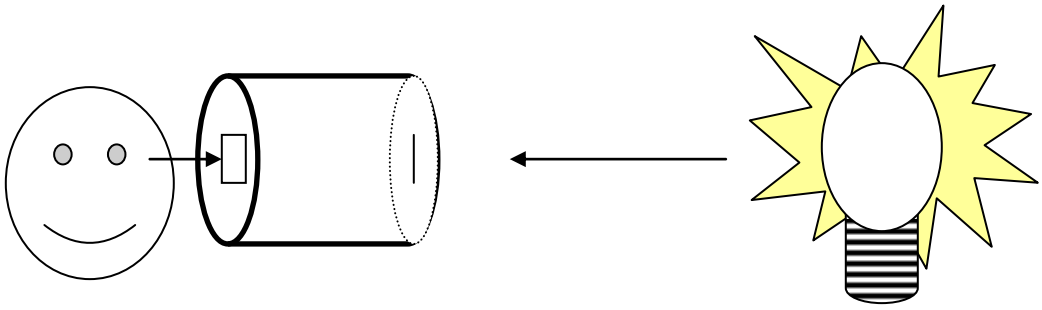
**4 - 6. Cut ends off of index cards, trim, and color black**



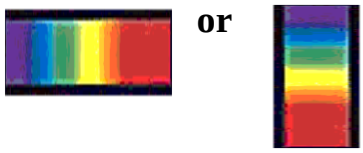

**7. Tape index card pieces to bottom of box so that they make a very small slit < 1mm. Make sure to use the straightest edge to make the slit.**



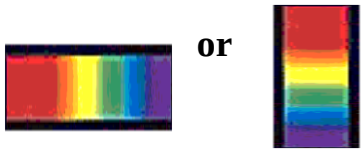
**8. Put the lid back on and look through the lid toward the light source. If you do not clearly see a rainbow, rotate the lid until you do.**



**On one side of the slit, you should see something like:**




**On the other side of the slit, you should see something like:**




**This is called a continuous spectrum. Both sides of the slit show a full continuous spectrum. When you are drawing the spectrum, just choose one or the other. Do not draw both.**

## Student Questions

1. Draw the spectrum you see when you look at the light source.

2. When you look at the light bulb without using the spectrograph, what color is it? Can you see the colors of the spectrum with your naked eye?

3. If a spectrograph is a special tool that shows us what light is made from, what do you think makes up this light source?

4. Do you think that there are kinds of light that cannot be seen with the naked eye?

5. If light exists that cannot be seen, how could it be possible to observe it?