

# Light and Color

## **OVERVIEW:**

Constructing a spectroscope is a great way for children of any age to learn about color.

What is color? Color is a psychochemical phenomenon which involves three factors: a colored object, light and a human being with eyes and a brain. Quite complicated for something most of us take for granted!

A spectroscope uses a different grating to separate the component parts of the light into the various colors called the spectrum. This will allow the students to discover what color is.

This type of visual aid could be used in a science lesson, actually for almost any age of kids. (The lesson is ideal for 3<sup>rd</sup>-4<sup>th</sup> graders.) It is a fun, easy, and hands-on way for them to learn about color and the color spectrum.

On the following pages are the materials needed and the instructions for building and for the use of the spectroscope.

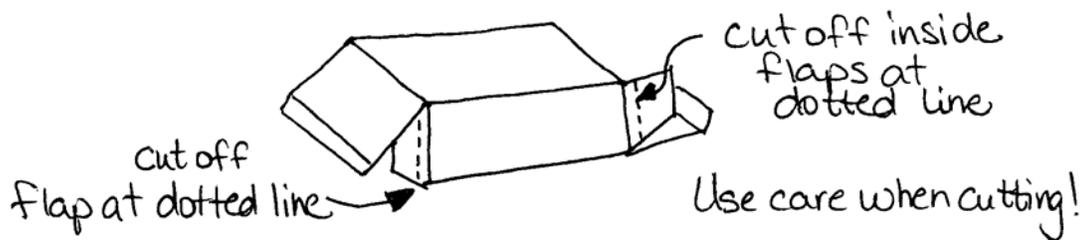
## **MATERIALS (FOR EACH STUDENT):**

- Small box (8" x 8" x 2 ½")
- Scissors
- Ruler
- Razor blade (used by the teacher ONLY)
- Corrugated cardboard
- Black electrical tape
- Transmission diffraction grating (may be obtained from a science supply catalog)

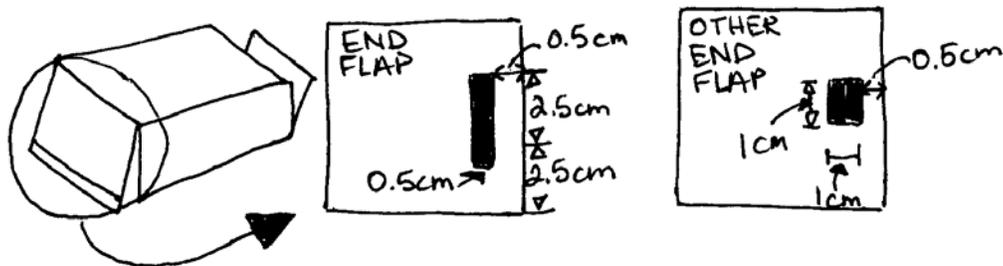
- Scotch tape
- Masking tape

**INSTRUCTIONS:**

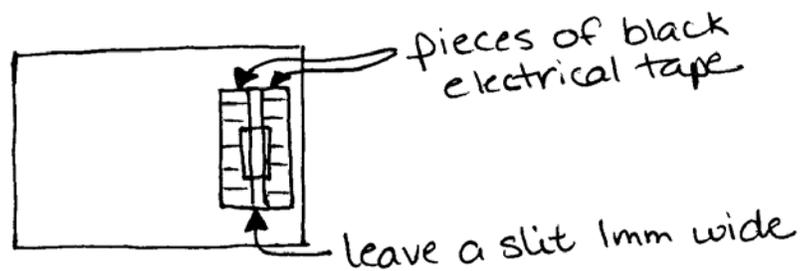
1. Obtain your box.
2. Cut off the inside flaps to with approximately 0.5cm of the box sides.



3. With a razor blade, the teacher will need to cut holes as shown below. (Do all of the cutting on a piece of corrugated cardboard.)



4. Cut 2 pieces of black electrical tape approximately 2" (5cm) long and stick it over the rectangular hole to form a narrow slit, 1mm wide.



5. Obtain a small piece of transmission diffraction grating and hold it over the  $\frac{3}{8}$ " x  $\frac{3}{8}$ " hole at the rear end of the spectroscope. Point the spectroscope slit at a fluorescent light and look into the box via the grating. If the grating is the right way up, you will see a horizontal spectrum consisting of 3 prominent lines and a continuous spectrum, inside the box (toward the dark side of the box). If you do not see this, turn the grating 90 degrees.
6. Carefully scotch tape the grating, at the edges, to the box.
7. Put masking tape around the edges of flaps and the box.

#### **FOLLOW-UP:**

The spectroscope can be used to look at any type of light (ie: sunlight, candle, and an incandescent light bulb). Just remember, if you use sunlight, do not look directly at the sun with your box. Looking only into the sky on a sunny day will accomplish the purpose.

While looking at the different light sources, the students can draw and color pictures of what they see. When students are done, they can discuss and compare their pictures and ideas about the spectroscope and color in general.