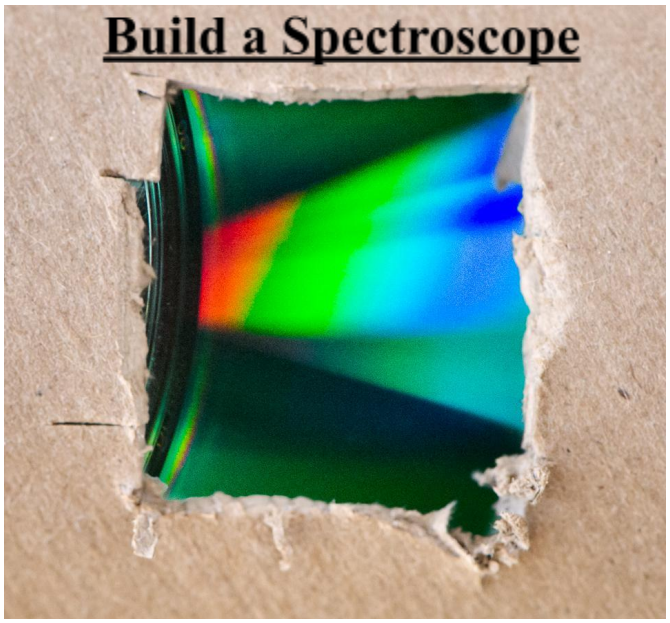
Build a Spectroscope



Theme: Spectroscopy

Curriculum Area: Physical Science

Activity:

The spectroscope is an important tool for all scientist around the world. They use it to see different things such as stars, distant galaxies, the moon, planets, and much more. Not only that, but scientist also use spectroscopes to determine the chemical composition of these distant objects. The spectroscope breaks light from a single color into different colors the way a prism splits white light into a rainbow. The spectrum allows scientists to analyze the light and discover properties of these objects. So why is it important to see these colors? Well, because atoms and molecules have unique spectra (a band of colors). These spectra can be used to help scientists to identify and measure information about the atoms and molecules. So they can make new discoveries such as a planet having air or water. White light is a mixture of different colored lights. A great example is when you combine green, blue, and red colors you will be able to see white. Therefore we see the rainbow pattern when white light is fragmented into different color or the light spectrum. The students will build their own spectroscope using a CD. The white light that bounces off the CD mirror side will create the same rainbow affect.

Age of Children: 5-6th graders

Materials Needed:

Things we need
CD (old and unwanted)
Paper towel roll

Scissors or craft knife
Pencil
Tape
Cardstock

Developmental Objectives/Domains:

By participating in this activity, children will:

1. Be able to see different types of light sources and the properties when seen through this spectroscope.
2. Be able to describe what is a spectrophotometer.
3. Be able to describe how diffraction grating of light allows the tool to work.
4. Understand that a CD is a mirrored surface. Because the CD has spiral tracks, they are evenly spaced how and can separate colors. The CD's surface is also mirrored, and light can reflect to your eye.
5. Understand the basic concepts of white Light composition and how rainbows are formed

Procedure:

1. Slit into the paper towel roll at a 45-degree angle close to the bottom but not too close using your craft knife, ask a parent.
2. Directly across from the slit, make a small peephole using the craft knife, ask an adult to help you.
3. Trace the end of your paper towel roll on your cardstock, and then cut it out.
4. Cut a slit in the center of your cardstock circle.
5. Now tape up the circle on the top of your roll
6. Grab the CD, shinny side up, and slide it into the 45-degree angle slot we did.
7. Try using it with different light sources and record your findings.

Reference: https://www.livescience.com/41548-spectroscopy-science-fair-project.html

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Video: https://youtu.be/FYWqjgpXt2U