



Module 2: Why do we study the Sun?

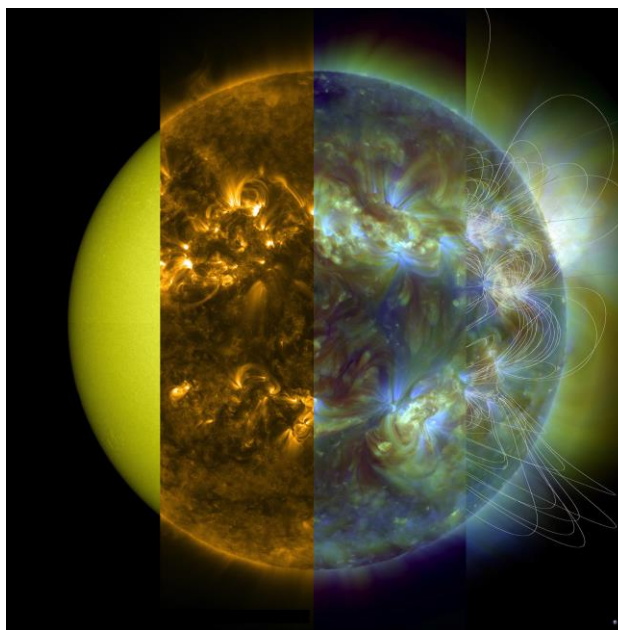
Activity C: Solar Research in Action! – Build a Spectroscope

Overview

Our Sun is a star that it has the same characteristics as other stars in the universe. The Sun consists of plasma and super-heated gases, which interact to give off heat, light, and other types of energy that are classified as the Electromagnetic (EM) Spectrum. The EM Spectrum is composed of various forms of energy arranged according to their increasing frequency and decreasing wavelength – from low energy Radio Waves to high-energy Gamma Rays.

Image: NASA

Solar scientists can interpret the Sun's and other stars' "fingerprint" characteristics by using a sophisticated instrument called a spectroscope. A spectroscope can detect Visible light as well as all the invisible light wavelengths of Radio Wave, Microwave, Ultraviolet, X-ray, and Gamma Ray radiation in the EM Spectrum. This information can enlighten scientists as to what elements a star is burning for fuel, its temperature, and even the speed and direction an object is moving or rotating in space.



Team Goal

As a group, your goal is to construct a spectroscope to refract Visible light into its rainbow of colors, and classify each color according to its wavelength and frequency along the Electromagnetic Spectrum.

Materials

- "Graphing the Rainbow" worksheet
- "Build a Spectroscope" lab sheet
- Cereal box
- Scissors
- Tape
- Diffraction gradient

Shared with class:

- Spectra gas tubes – Helium, Hydrogen, Nitrogen & Neon
- Power source

Engage & Explore!



1. BUILD Knowledge: EM Spectra

The Sun gives off light energy that we can see in the Visible (white) Light waveband of the Electromagnetic Spectrum. Visible Light is mid-point along the EM Spectrum. Visible Light can bend or refract, which causes it to separate into the color spectrum of the rainbow Red, Orange, Yellow, Green, Blue, Indigo, and Violet – the ROYGBIV color bands. Get familiar with how to look at different wavelengths of visible light with these NASA and LASP resources:

[Spectroscopy in Action Video](#)

[Spectroscopy Explained](#)

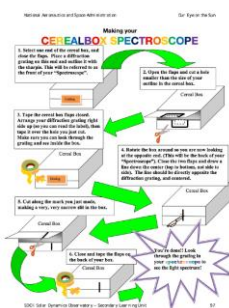
[Graphing the Rainbow Activity](#)



2. CREATE Resources & CONNECT to the Real World: Build a Spectroscope

In this activity, your group will create a functional artifact as part of the Module 4 SDO Exploration Museum 3-D Solar Exhibit. As a scientific team, take turns reading the “Build a Spectroscope” lab sheet background information and instructions aloud. Next, gather the required materials and follow the instructions to construct your spectroscope. Refer to the demonstration spectrograph to ensure your design is correct. Then, complete the “Build a Spectroscope” lab sheet questions. During the investigation, make sure each team member views each of the mystery gas tubes using your spectroscope. Have fun seeing things in a “new light”!

[Build a Spectroscope Activity \(see attached file\)](#)



Excellent, you're an EM Spectrum Expert!