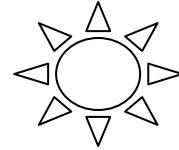


## Lab: The Sun's Energy

## Materials Needed:

- 1 piece of graph paper
- pencil
- colored pencils- brown, red, yellow, pink, purple
- ruler

**Background**

- The Sun emits energy in all of the different wavelengths, but that energy is not equally divided among the parts of the spectrum.
- Forty-one percent of the Sun's energy is emitted in the visible range.
- Fifty-two percent is emitted in the infrared range. These waves provide heat from the sun. Seven percent is what is called the "near" UV - those wavelengths that are closer in length to visible light.
- X-rays and the shorter UV wavelengths are only 0.001 percent of the total energy emitted. At the other end of the spectrum, radio waves and microwaves are only about 0.0000000001 percent.
- Scientists are particularly interested in UV emissions, for some frequencies of this wavelength are dangerous to humans, other animals, and plant life. Some exposure on your skin is healthy as it creates vitamin D. Variations in UV emissions can also cause changes in the atmosphere. If there is more UV, chemical reactions speed up, increasing the heat in the atmosphere. If the Sun's output is changing in any way, it is important for us to know about it. To get a picture of the Sun's output wavelength, try this activity.

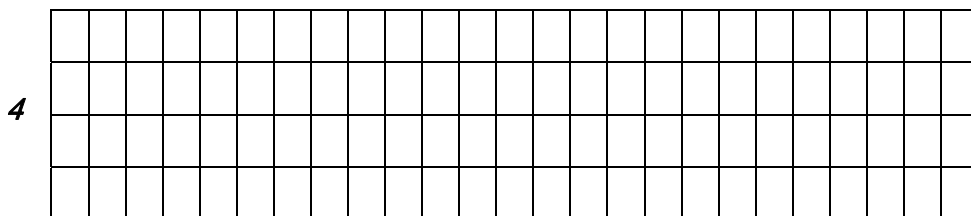
**Procedure**

1. Turn your graph paper sideways (landscape view)
2. Use a ruler and outline an area that is 25 squares by 4 squares.

Or

Use scissors to cut out a section of graph paper 25 x 4 squares. Center it on a piece of paper and glue it down with a glue stick.

***Your table will look like this:***



**25**

3. Make a black border around the box. Think of each square as a percent [0.01 or 1/100th].
4. Draw a thin brown line at the far left edge of the box. This line will represent radio waves and microwaves emitted by the sun because the percent of radio waves in this part of the spectrum are almost too small to mark. Above the brown line label it **Radio Waves**. Below the line label it **long wavelength, low frequency, low energy**.
5. Counting from the left, color 52 boxes (13 columns) red, to represent the **infrared waves**.
6. Determine the number of blocks that will represent **visible light** (See background info above). Color these yellow.
7. Figure the number of blocks for the near UV, and color these pink. They will be placed to the far right of the box.
8. Because this leaves almost no space for remaining shorter wavelengths of UV and X-ray, draw a thin purple line across the far right end of the box to represent these wavelengths. Label above the purple line **UV, X-ray, and Gamma rays**. Label below the line **Short wavelength, high frequency, high energy**.

Remember that these waves do not have the "color" that you used in the drawing. The colors you used are just symbols for differences in wavelengths.

*Answer these questions on your paper.*

- 1) How many blocks represent visible light?
- 2) How many will represent the near UV?
- 3) What wavelength enables us to see?
- 4) Which waves provide most of Earth's heat?
- 5) Which waves are beneficial to human, animal, and plant life? Use your class notes to help you.