

**Introduction**

We usually think of light as being white. Some of you may already know that white light is actually the total of all the colors of the rainbow working together. Each color of the rainbow, Red, Orange, Yellow, Green, Blue, and Purple corresponds to a particular wavelength. We will use the Spectrophotometer to determine the wavelength that corresponds to each particular color.

Look down into the hole of the Spectrophotometer and observe the colored light reflecting off the angled piece of chalk that has been placed in the test tube that is placed in the hole.

**Procedure**

GENTLY turn the dial while peering in the hole and observe that the color of light changes. Do not turn the dial beyond the moment that the color goes black.

Go back and turn the dial for each color and record a wavelength for the start of each color and the wavelength at the end of each color in the space below:

**Data / Results**

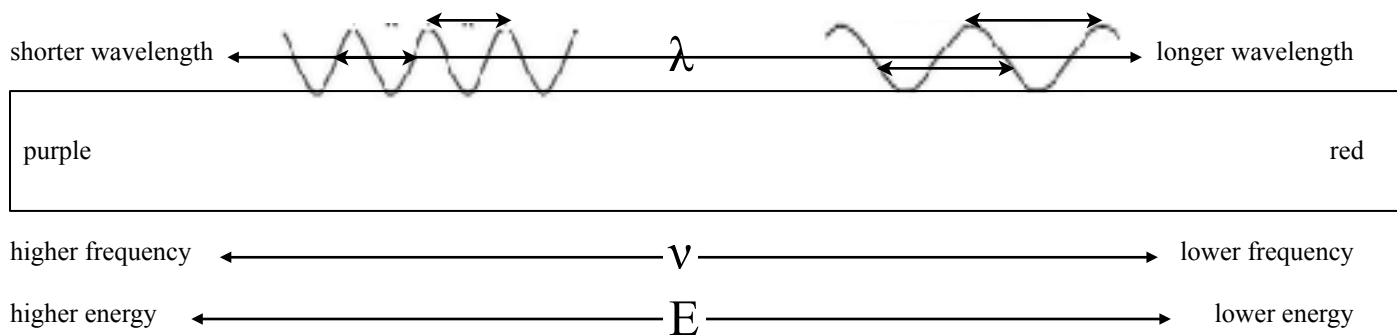
Color	End Wavelength (lower value)	End Wavelength (higher value)	Width of color band (difference in the low and high values)
Purple			
Blue			
Green			
Yellow			
Orange			
Red			

**Processing the Data / Results**

Color in the chart below blending from color to color showing all six the colors of the rainbow below.

Try to make the width of each color proportional to the width indicated by the numbers above.

Review your sketched spectrum with the one on NoteSheet D1



Answer the Post LAD Questions on the back.

**Processing the Data / Results**

1. All light travels at the same speed, that is the speed of light is a constant. In science we often report this speed as  $3 \times 10^8$  meters/sec. Look up the conversion factors you may need, and change the speed of light to miles per hour. *Show your work.*
2. On the previous page, above the rainbow spectrum that you colored, there is a visual representation of purple wavelengths and red wavelengths. How would you describe a wavelength?
3. Compare red light to blue light? Circle the italicized word(s) that best completes the sentence below.  
Red light is *higher lower* energy compared to blue light.
4. How is the wavelength of light related to the energy of light? Circle the italicized word(s) that best completes the sentence below.  
For light, the wavelength is *proportional inversely proportional* to the energy.
5. Frequency is the number of times that a wavelength passes a particular point. Circle the italicized word(s) that best completes the sentence below.  
For light, the wavelength is *proportional inversely proportional* to the frequency.
6. How is the energy of light related to the frequency of light? Circle the italicized word(s) that best completes the sentence below.  
For light, the frequency is *proportional inversely proportional* to the energy.
7. The symbols that are used to describe energy, wavelength, and frequency are shown on the previous page. Write the appropriate symbol that is used for each of the following characteristics of light.
  - energy \_\_\_\_\_
  - frequency \_\_\_\_\_
  - wavelength \_\_\_\_\_
8. Read your Note Sheet D1. Is ultraviolet light higher or lower energy compared to microwave “light?” Do you suppose it is more dangerous to be exposed to UV light or microwaves?
9. A candle is an example of incandescent light. Give an example of luminescent light.
10. In your own words, describe the difference between incandescent light and luminescent light.