

Name: \_\_\_\_\_ Period: \_\_\_\_\_

## Flame Test

In this activity you will dampen a Q-tip with water and then use it to collect various metal ions. Hold it briefly in a Bunsen burner flame. Observe the color given off and record it. If the Q-tip begins to actually burn, remove it from the flame. When you have observed the all of the ions provided, test the unknown ion and use the color to identify the unknown metal cation.

Compound	Metal ion	Color of Flame
Q-tip	(control)	
	Na <sup>+</sup>	
	Li <sup>+</sup>	
	Sr <sup>2+</sup>	
	Ca <sup>2+</sup>	
	Ba <sup>2+</sup>	
	K <sup>+</sup>	
	Cu <sup>2+</sup>	
Unknown	Unk	

**Data:** Record the color of the metal ion from each station. Don't forget to record the color the Q-tip emits by itself as your control.

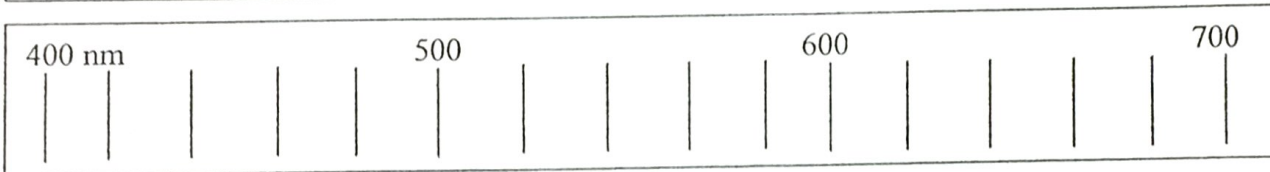
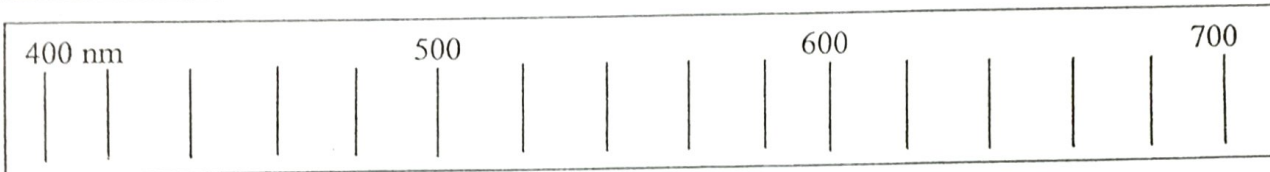
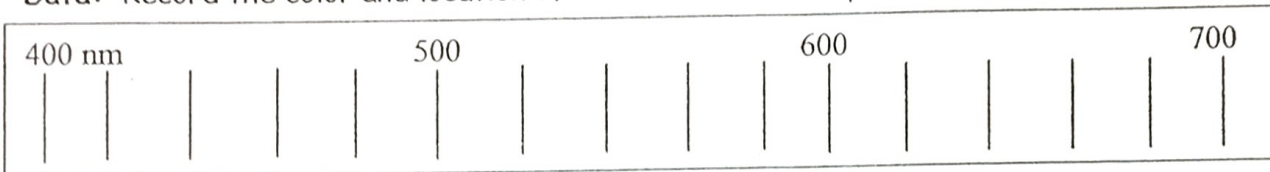
**Questions:** Use complete sentences to answer each of the following.

- 1) What was the probable identity of the unknown cation?
- 2) Which ions, if any, produce similar colors in the flame tests?
- 3) State at least two problems that may be involved when using flame tests for identification purposes.
- 4) What did the Bunsen burner do to the metal cations at the subatomic level?
- 5) Explain why the colors observed when the compound is placed in the flame.  
(Be sure your answer includes: electron, ground state, excited state, photon, absorbing, emitting)
- 6) Use the Bohr model & Electromagnetic spectrum to place the 7 metal ions in order from lowest to highest frequency of light emitted.

## Spectroscopy

In this activity you will look through a spectroscope that has a scale to allow you to measure the wavelength of light that you see. When you look through a spectroscope the light source is directed through a small slit straight in front of the eyepiece you look through. The spectrum that you are measuring is off to the right. When you look through the eyepiece, look straight ahead and you will see the color of the gas discharge tube with all the wavelengths blended. Look to the right and see the separated wavelengths of light from the gas discharge tube.

**Data:** Record the color and location of at least three lines you see in the spectroscope.



### Questions:

7) Classify each spectrum above as continuous or discontinuous? Explain how you can tell.

Answer questions 8-10 using the spectrum of \_\_\_\_\_ from above.

8) Write your colors of light emitted in order of shortest to longest wavelength.

9) Write these colors in order of lowest to highest frequency of light.

10) Write these colors in order of lowest to highest energy.