

## LAB: EMISSION SPECTRA OF ELEMENTS

Elements can be identified because each has a unique pattern of lines in its light spectrum. In this experiment you will use a spectroscope to observe the light given off by various elements.

### MATERIALS

1 spectrometer

Colored pencils

Element discharge tubes and power source

### PROCEDURE

1. Look at a **fluorescent light** through the spectrometer. Be careful to aim the slit (on the right side of the spectrometer) at the light bulb **BUT** look straight ahead at the spectrum on the scale. The spectrum from the fluorescent light should include several bright vertical "lines". These are images of the slit.
2. Calibrate your spectrometer by checking that you see a vertical green line at 546 nm. If you do not, take your spectrometer to your teacher to be adjusted.
3. Observe the light from different discharge tubes and record the color in the space below.
4. View the light using the spectrometer. Use color pencils to draw the lines where you see them at the correct places on the scale.

### OBSERVATIONS

1. Fluorescent light

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

2. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

3. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

4. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

5. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

6. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

7. Element: \_\_\_\_\_

Color of light: \_\_\_\_\_

V	I	B	G	Y	O	R

## ANALYSIS

1. How are electrons "excited" in this part of the lab? What happens when the electrons fall to the ground state?
2. What do the different colors in a line spectrum represent? Why are the spectra for each element unique?
3. Each element has its own unique line emission spectrum, just like fingerprints. Explain how this technique can be used to determine the elemental composition of stars.
4. What gas do you think is found in the fluorescent light bulb? Refer back to your results from the Spectroscopy Lab, Part 2. Explain your reasoning.
5. Look closely at the spectrum below. The last spectrum is a mixture of which two or more elements?

