

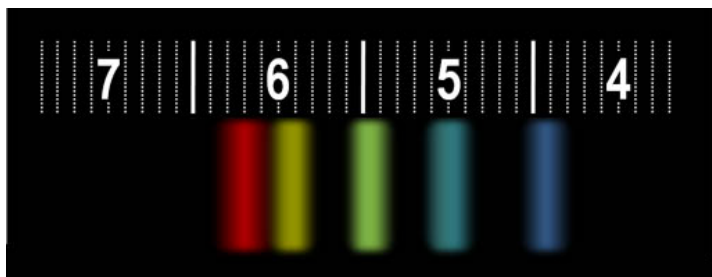
ATOMIC FORENSIC SCIENCE – SPECTRUM ANALYSIS LAB

Objectives: You will be able to. . .

- Observe and read atomic emission spectrum data from a handheld spectroscope.
- Identify the different kinds of light emitted by different elements.
- Describe how spectroscopy can determine what something is made of from afar.

KEY VOCABULARY (reference your notes):

- Spectral lines - a series of dark or bright lines that appear in a spectrum.
- Spectroscopy - the study of spectral lines to determine what elements something is made of
- Spectroscope - an instrument used to measure and study spectral lines.
- Emission spectrum - a unique set of spectral lines emitted by a source when heated.
- Wavelength - the distance between two consecutive peaks or dips of a wave that gives it its color.



How to Read a Spectroscope:

A spectroscope will read the light diffracted into it on a scale from 400 nanometers ('4' on the figure to the left) to 700 nanometers ('7' on the figure to the left). This is a measure of that color's wavelength.

In between numbers, each line represents an additional **10 nanometers**.

EXAMPLE: The blue line closest to '4' in the image would have an approximate value of **495 nanometers**.

★ **WARM-UP:** From right to left, write the wavelength measurements of the remaining four lines in the image above in nanometers.

(Red)

(Yellow)

(Green)

(Blue-Green)

WARNING! Essential guidelines for this lab:

Do **NOT**, for any reason, touch any part of the spectral tube boxes aside from the **power switch**. Violating this rule will result in an instant failing grade for the lab. They are incredibly delicate, expensive, and **DANGEROUS**.

Additionally, Do not leave a spectral tube on for more than 30 seconds at a time. (We'll be timing the use of each lamp, one rotation at a time.)

Directions:

1. With a partner, view a spectral tube set up by your teacher. You will share a spectroscope with your partner.
2. One partner will view and read the spectral lines through the scope.
3. The other will turn the tube on/off and record the spectral lines on paper. You may switch roles as you please.
4. When at a spectral tube box, quickly turn it on and read as much data as possible. Ensure the recorder is marking lines on the diagram below corresponding to your tube's number label.
5. If you cannot get all your data within 30 seconds, turn your box off and wait 10 seconds before continuing.
6. Once you have all your data, move to a new box. Repeat data collection for all 6 boxes.
7. Compare your results with known atomic emission lines on a separate handout. The element whose lines most closely match your observation is your mystery substance.

1	400 500 600 700	Element(s)?
2	400 500 600 700	Element(s)?
3	400 500 600 700	Element(s)?
4	400 500 600 700	Element(s)?
5	400 500 600 700	Element(s)?
6	400 500 600 700	Element(s)?