Names: _____ _____

_____ _____

Grade	

Introduction to Spectroscopy

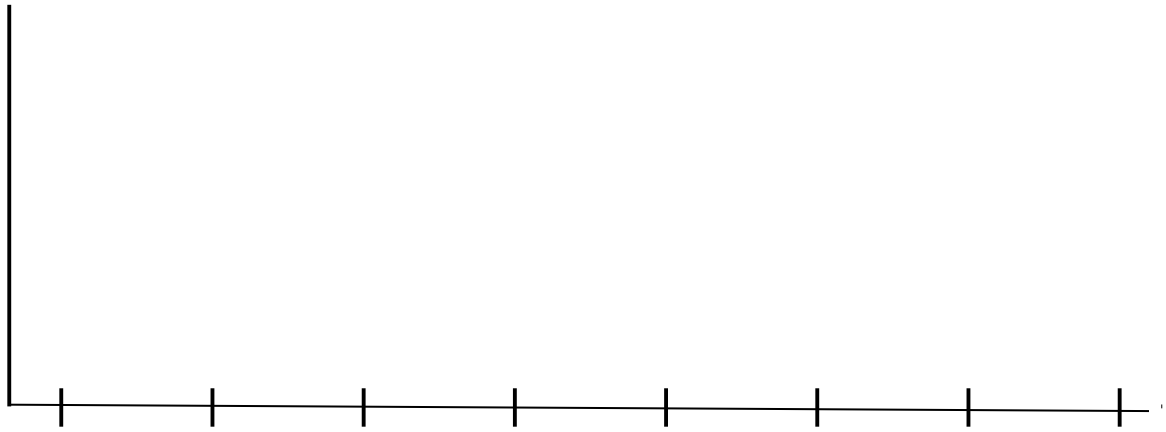
Pre-Lab Quiz

Record your team's answer as well as your reasonings and explanations.

1.
2.
3.
4.

Part 1: Visible Light

1. For each light in the black box, draw a sketch of the spectrum and record the minimum, maximum, and peak wavelengths λ, as well as the color. Label the axis on the graph and let the wavelength axis span 300 to 1000 nm.



Bulb	Color	λ_{min} (nm)	λ_{peak} (nm)	λ_{max} (nm)
1				
2				
3				
4				
5				
6				

2. What type of bulb is bulb #6 and why does it not appear to light up?

3. Why is the range of wavelengths for white light so large compared to the other single colors?

Part 2: Color and Temperature

1. For each type of light bulb, look at its spectrum and describe and explain the appearance of the diffraction pattern of the light.

LED (A)	
Fluorescent (B)	
Incandescent (C)	

2. For each light bulb type, determine whether it is a continuous or an emission line spectrum.

LED (A)	Fluorescent (B)	Incandescent (C)

3. Examine the spectrum of the lights in the room and/or the light in your camera phone. What bulb are these source(s) most like? Be sure to record what light you chose to examine.

4. Calculate the temperature of the incandescent bulb using Wien's law. Show your work.

5. Record the spectrum of the Sun and estimate its temperature using Wien's law, and compare the temperature and color of the incandescent bulb to the Sun.

Bonus: Why are there large dips in the Solar spectrum?

Part 3: Analyzing Emission Spectra

***Make sure to turn off the carousel when not in use*.**

1. Observe the spectrum of the hydrogen and helium samples. For each sample, record the wavelength of the strongest lines and rank them based on their relative strengths (1 = strongest, 2 = next strongest, and so on).

Hydrogen (H) – three strongest emission lines

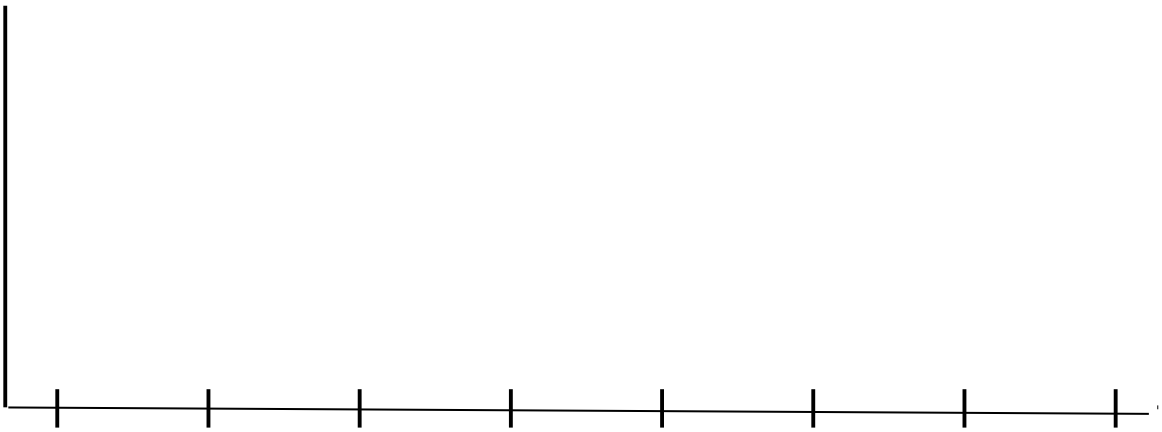
λ_{peak} (nm)	Relative Strength

Helium (He) – five strongest emission lines

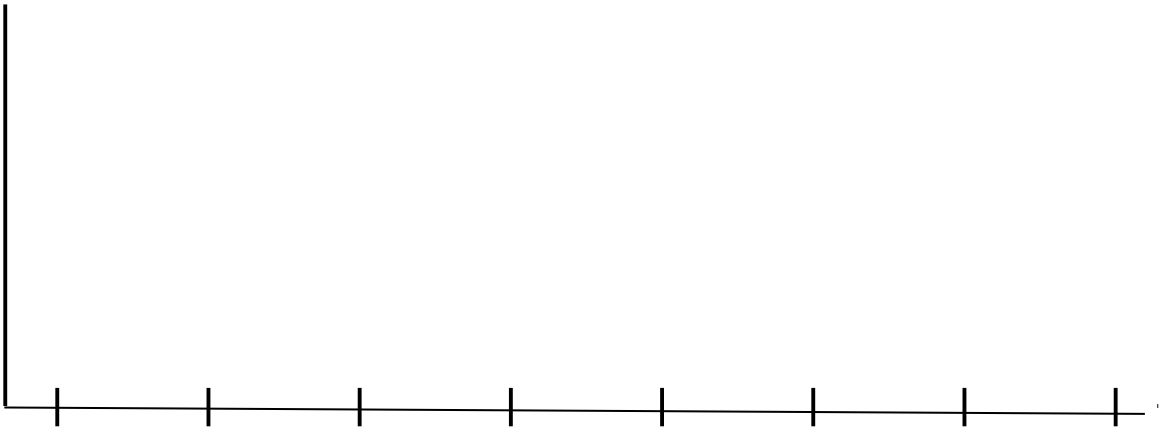
λ_{peak} (nm)	Relative Strength

2. Draw the spectrum of neon (Ne) and argon (Ar) and label the axis.

Gas: _____



Gas: _____



3. Why is neon orange?

4. Describe how we can determine what molecules are present in air.

5. Record the spectrum of air, carbon dioxide, and nitrogen on the same plot. After comparing these three spectra, what can you conclude about the presence of nitrogen and carbon dioxide in air?

Note: To overlay a new spectrum in *OceanView*, click the camera icon to "convert active spectrum to overlay".