Names: _____ _____

_____ _____

Grade	

Introduction to Spectroscopy

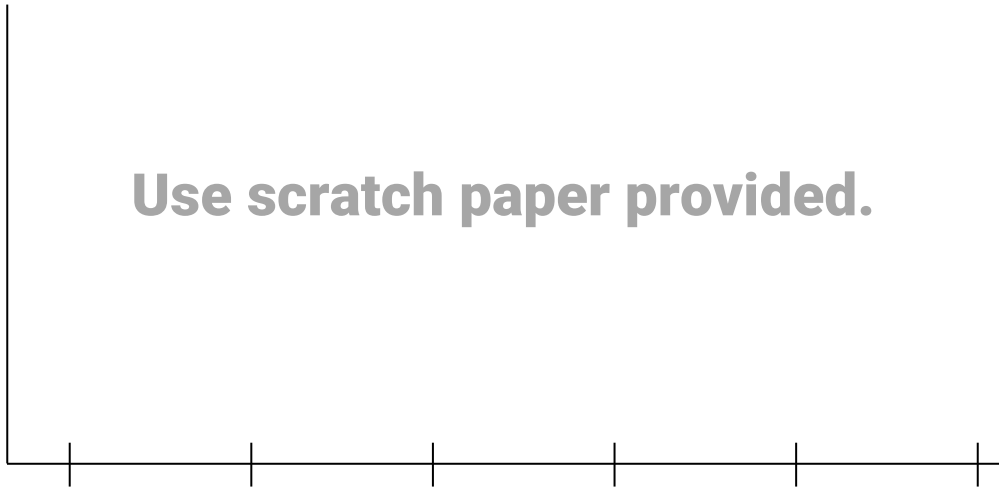
Pre-Lab Quiz

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

1.
2.
3.
4.

Part 1: Visible Light

1. Utilizing *LoggerPro*, 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 axes on the graph and let the wavelength axis span 350 to 1000 nm.



Bulb	Color	λ_{min} (nm)	λ_{peak} (nm)	λ_{max} (nm)
1				
2				
3				
4				
5				
6			950	1000

2. What type of bulb is bulb #6 and why does it not appear to light up? (Note: you may need to increase sampling time to 100ms to view its spectrum).

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, use the diffraction grating glasses to look at its spectrum and describe its appearance below.

LED (1)	
Fluorescent (2)	
Incandescent (3)	

2. For each type of light bulb, now use *LoggerPro* to look at its spectrum. Classify each type as a continuous or an emission line spectrum below.

LED (1)	Fluorescent (2)	Incandescent (3)

3. Examine the spectrum of the lights in the room and/or the light in your camera phone with *LoggerPro*. 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. Examine 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.

6. 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 with *LoggerPro*. For each sample, record the wavelength and intensity 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

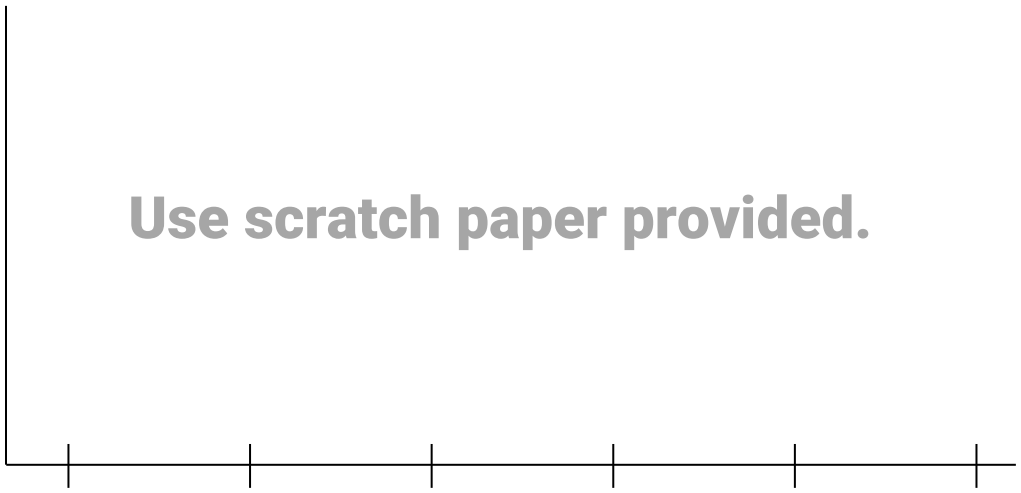
λ_{peak} (nm)	Intensity (rel)	Relative Strength

Helium (He) – three strongest emission lines

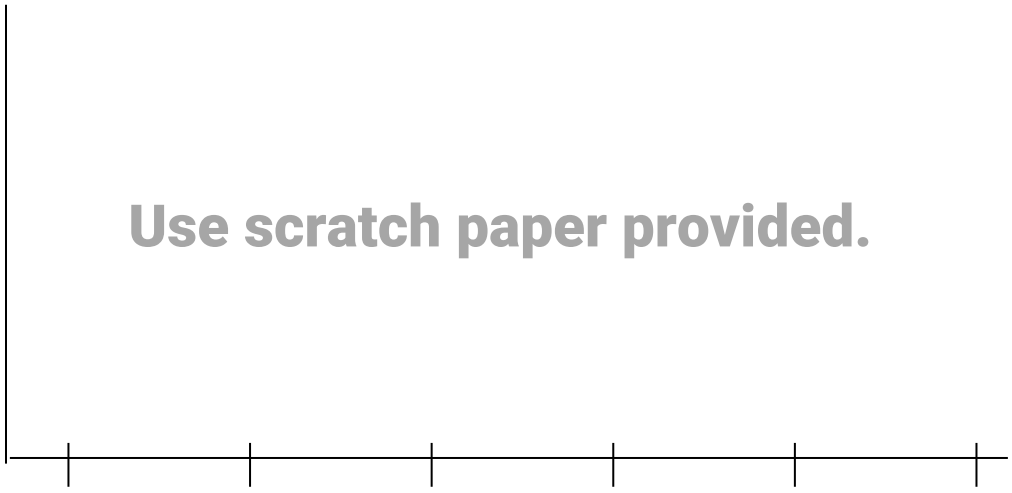
λ_{peak} (nm)	Intensity (rel)	Relative Strength

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

Gas: _____



Gas: _____



3. Based on the emission spectrum above, why does the Neon spectral tube appear to glow orange?

4. How can we use spectroscopy to determine which molecules are present in a gaseous mixture such as 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?