**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Spectrum of Light Lab**

Background Information: The tubes used in this experiment are filled with gases that we are interested in studying. An electric current will run through the gas, providing the valence electrons in the gas atoms to move to a higher energy level, called the excited state. When the electrons fall back down to their lowest energy levels, known as the ground state, the electrons release energy in the form of radiant energy. The radiant energy can be seen using spectroscopic glasses, which diffract the light. The spectrum appears as a series of colored vertical lines that are unique to each element.

Guiding Question: Are you able to identify an unknown gas by its spectra?

Pre-lab:

1. Define the following:

Valence electrons- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

excited state- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ground state- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw the Bohr diagrams for Hydrogen and Neon.
2. Based on the Bohr diagrams, write a scientific explanation stating which element may have more lines in its spectra, or if they will have the same number of lines.

**Prediction**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Reasoning**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Procedure:

1. Obtain and wear a pair of spectroscopic glasses.
2. As each gas is demonstrated, write the name of the gas, its visible color (without your glasses) and the spectrum colors (with your glasses).
3. During the lab use crayons or colored pencils to record the color of the light you see with your glasses on. If you see multiple lines of the same color, show **approximately** how many.

**Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gas** | **Visible Color** | **Spectra Code** | **Colors** |
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|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| unknown |  |  |  |

Group Questions:

1. Identify the unknown gas shown in the experiment and give evidence to support your answer.
2. Construct a **claim** that supports or contradicts the prediction made in the pre-lab questions.
3. Provide **evidence** that supports your claim. Use your **reasoning** skills to explain why your evidence is relevant.
4. Why do you think spectral lines often referred to as a fingerprint for gases?
5. **Explain** how some of the noble gases were most likely discovered.