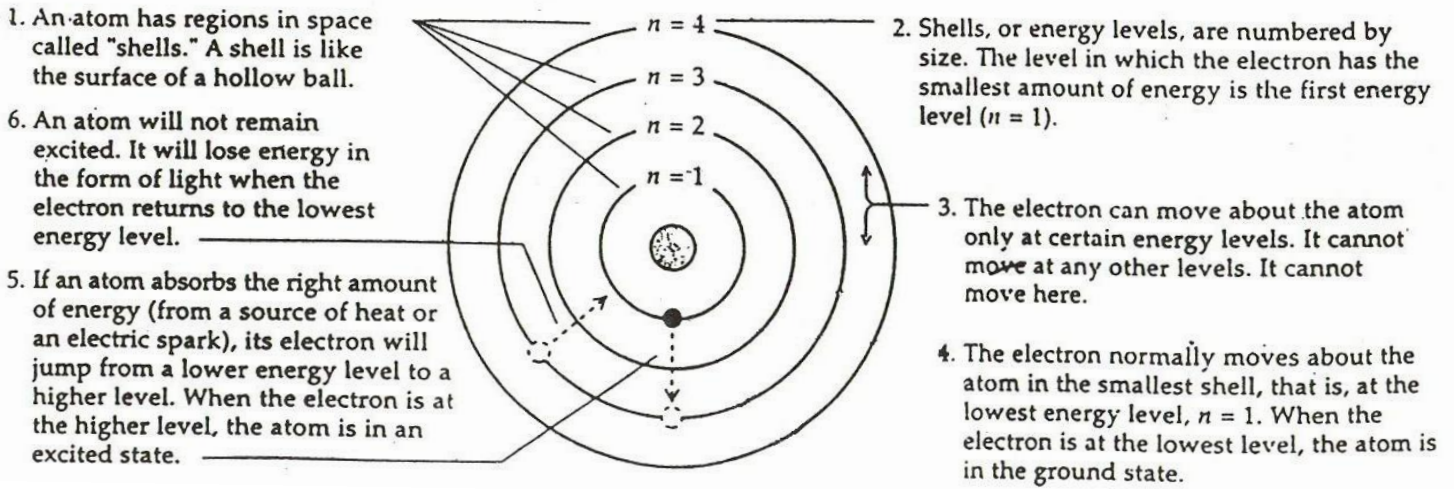


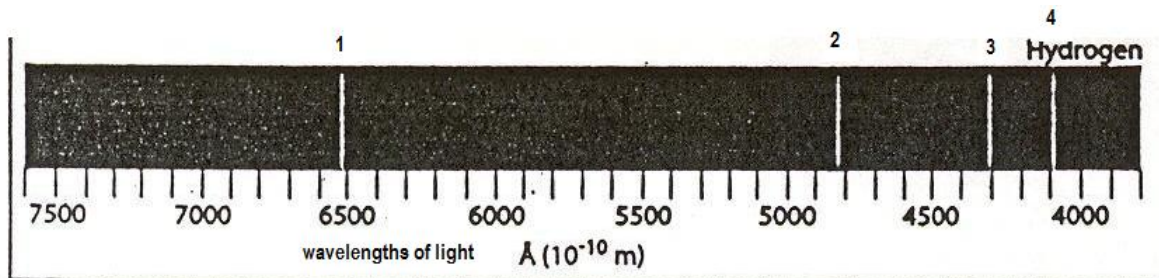
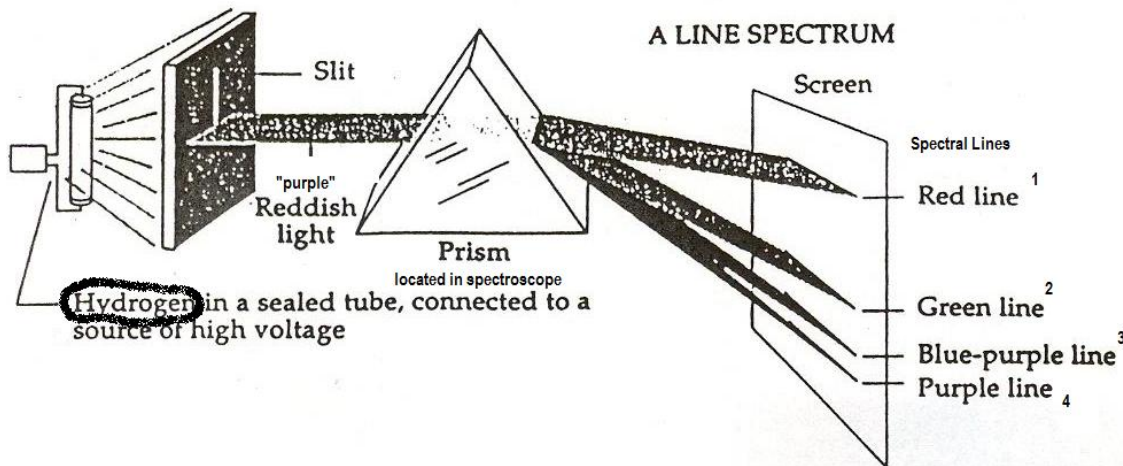
**Aim:** How was the structure of the atom discovered? (Part 2b)

1) Review of Electron Transitions

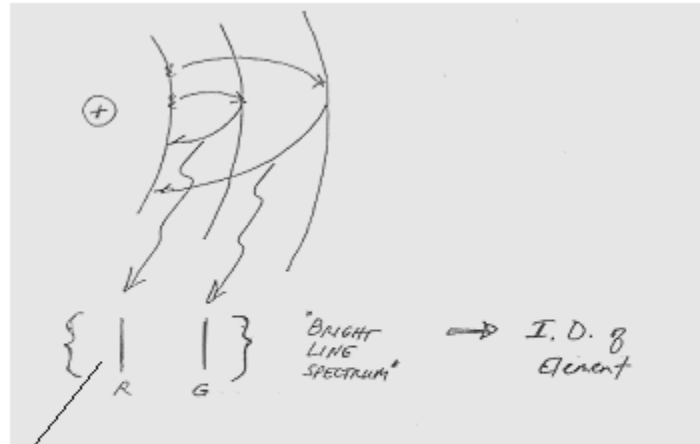


2) Like the light in our classroom, the light emitted by an excited element is a mixture of colors that can be separated with a spectroscope. Refer to Handout with Spectral Chart.

**Demo:** spectral glasses, spectroscope, BLS Chart

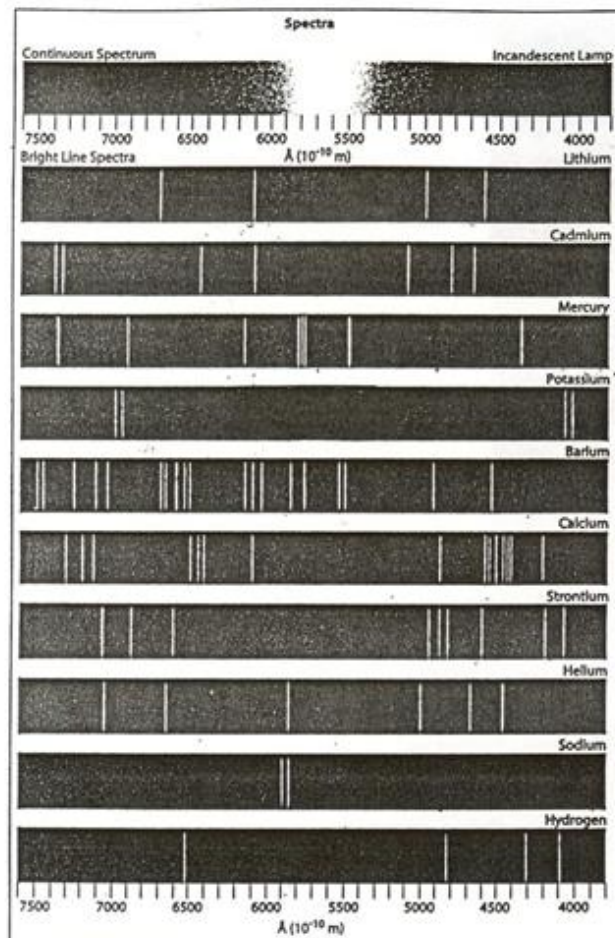


3) An element can produce more than one colored spectral line because there can be more than one possible electron jump in the atoms of that element.



a red spectral line

4) Since no two elements have the same Bright Line Spectrum, spectra can be used to identify elements.



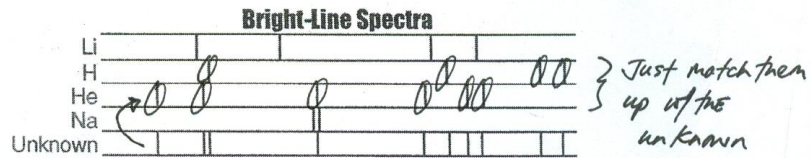
OK, let's do some problems.

Name: \_\_\_\_\_

- 1) When compared with the energy of an electron in the first shell of a carbon atom, the energy of an electron in the second shell of a carbon atom is  
A) the same B) less  C) greater
- 2) An electron in an atom moves from the ground state to an excited state when the energy of the electron  
A) remains the same  B) increases C) decreases
- 3) Compared to an atom of hydrogen in the ground state, an atom of hydrogen in the excited state has  
A) both released and absorbed energy  B) absorbed energy, only C) released energy, only D) neither released nor absorbed energy
- 4) Which electron transition represents a gain of energy?  
A) from 3rd to 1st shell B) from 3rd to 2nd shell  C) from 2nd to 3rd shell D) from 2nd to 1st shell
- 5) When the electrons of an excited atom return to a lower energy state, the energy emitted can result in the production of  
A) protons B) isotopes  C) spectra D) alpha particles
- Distance from nucleus, ↑ energy of e<sup>-</sup>*
- Jump*
- Light photons*

Questions 4 and 5 refer to the following:

The diagram below shows bright-line spectra of selected elements.



- 4) Identify the two elements in the given unknown spectrum.

*H & He*

- 5) Explain how a bright-line spectrum is produced (in terms of excited state, energy transitions, and ground state).

*Light is emitted when an e<sup>-</sup> jumps from the excited state to the ground state.*