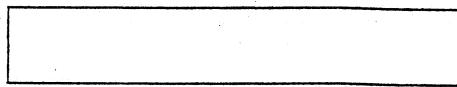


Draw spectrum you would get if Element C and D were mixed together.



R O Y G B I V

What color is associated with the most energy? \_\_\_\_\_

What color is associated with the least energy? \_\_\_\_\_

What color is associated with the highest frequency? \_\_\_\_\_

What color is associated with the lowest frequency? \_\_\_\_\_

What color is associated with the longest wavelength? \_\_\_\_\_

What color is associated with the shortest wavelength? \_\_\_\_\_

# Spectrum of Different Elements

**Introduction:** The atom is composed of a nucleus which contains protons and neutrons. Moving around the nucleus are electrons in different energy levels. Energy levels that are closer to the nucleus are lower in energy than those farther away from the nucleus. When energy is supplied to an atom, the electrons become excited and "jump up" to higher energy levels. These high energy electrons are unstable, however, and will eventually fall back down to their original energy level (ground state). When they do so, they release their energy in the form of light (photons). The wavelength or color of light that they release depends on how much energy they release. Different colors are associated with different elements because each element has a different number of electrons in different energy levels.

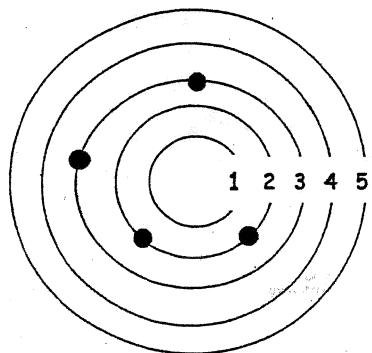
Colors associated with "jumping" electrons

| excited energy level | ground state | color                     |
|----------------------|--------------|---------------------------|
| 5                    | 1            | Ultraviolet (not visible) |
| 5                    | 2            | Violet                    |
| 4                    | 2            | Blue                      |
| 5                    | 3            | Green                     |
| 5                    | 4            | Yellow                    |
| 4                    | 3            | Orange                    |
| 3                    | 2            | Red                       |

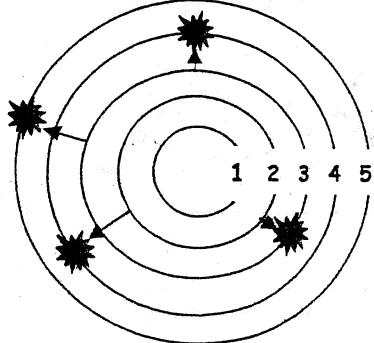
**Directions:** The first diagram for each element shows its ground state. The second picture shows it absorbing energy and the third picture shows the electrons releasing energy. For each electron, determine the excited energy level (second picture), figure out the ground state energy level (third picture), and use the key to figure out what color light the electron is going to release. Then draw the spectrum for each element in the box below.

## Element A

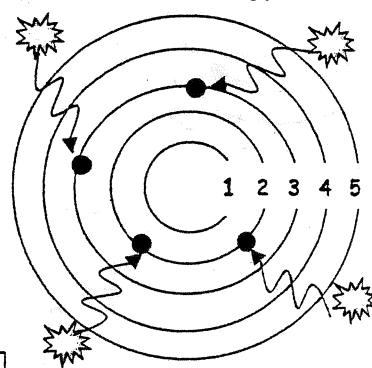
### Ground State



### Excited State (Gained energy)



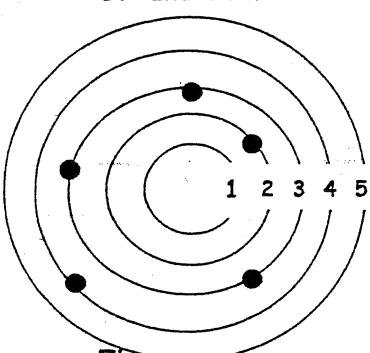
### De-excited State (Lost energy)



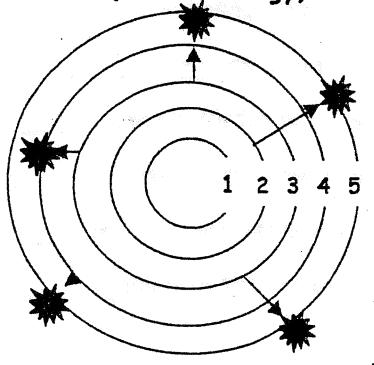
R O Y G B I V

## Element B

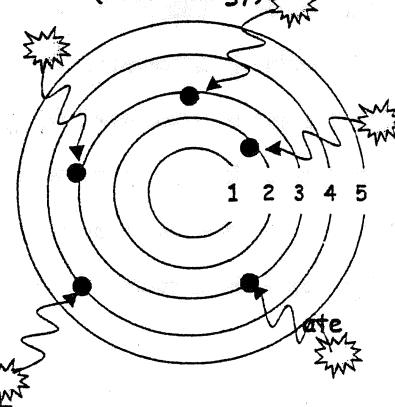
### Ground State



### Excited State (Gained energy)



### De-excited State (Lost energy)



## Element C

R O Y G B I V