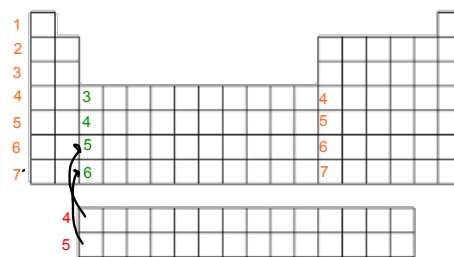


Schrodinger:

- Model was based on mathematics
- Based on energy levels, but the exact path of electrons is not defined
- Electron Cloud:** area where you are most likely to find an electron
- Orbital:** electrons have a 90% probability of occupying that region in space
 - each orbital has a maximum of 2 electrons

Energy Levels (Shells):



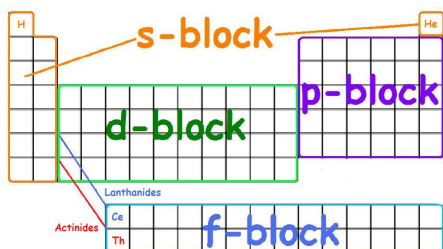
Sep 19-2:25 PM

Sep 19-2:31 PM

Sublevels (subshells):

s, p, d, f

"some people drive fast"



Sublevels (subshells):

- s = spherical clouds**
 - one orbital
 - maximum of 2 electrons
- p = dumbbell shaped clouds**
 - 3 orbitals
 - maximum of 6 electrons
- d = varied clouds**
 - 5 orbitals
 - maximum of 10 electrons
- f = varied clouds**
 - 7 orbitals
 - maximum of 14 electrons

Sep 19-2:34 PM

Sep 19-2:34 PM

Electron Configurations:

-- the way electrons are arranged around the nucleus

-- 3 different types:

1. orbital configuration
2. electron configuration
3. noble gas configuration

Sep 19-2:49 PM

Order of Filling:

-- use the periodic table to help you

-- know where the different blocks are on the periodic table

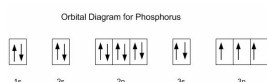
-- know the maximum number of electrons in each sublevel

-- read from left to right across the periodic table starting with hydrogen and ending with your element

Sep 19-2:53 PM

Rules for Electron Configurations:

1. **Aufbau Principle**- electrons fill lowest energy levels first (1s 2s 2p 3s 3p 4s 3d 4p etc)
2. **Pauli Exclusion Principle**- only 2 electrons can be placed in an orbital
 - The electrons must have opposite spins (clockwise and counter clockwise)
3. **Hund's Rule**- electrons entering orbitals of equal energy will fill one into each orbital with the same spin & then add a second spin when all contain one



Sep 19-2:56 PM

Orbital Diagrams:

Includes a **box** for each of the atom's orbitals, **arrows** represent electrons

- An empty box represents an **unoccupied** orbital
- A box with **one** arrow represents an orbital with **one** electron
- A box with **2** arrows (one up and one down) represents a **filled** orbital
- Boxes should be labeled with the **energy level** and **sublevel** (s, p, d, f)

You can use an orbital diagram to **identify** an element

Sep 19-3:01 PM

Electron Configurations:

· Sometimes called **ground state** electron configurations because all electrons are in their **lowest** possible energy levels

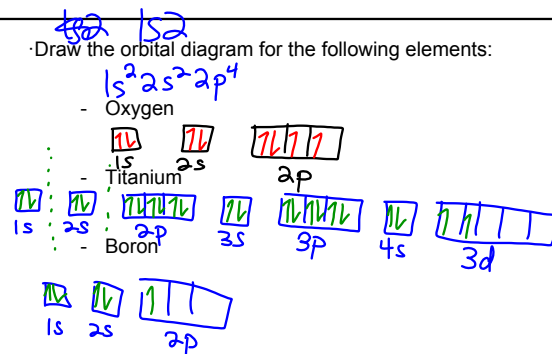
· Steps for writing a ground state electron configuration:

- Start from **hydrogen**
- Write **energy level** (1-7) (for s and p sublevel it is the period #)
- Write **sublevel** (s,p,d,f)
- Write number of **electrons** in the sublevel as an **exponent** (superscript)
- Stop at the desired number of **electrons**

Sep 19-3:04 PM

Practice

· Draw the orbital diagram for the following elements:

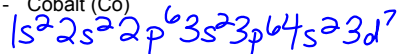


Sep 19-3:05 PM

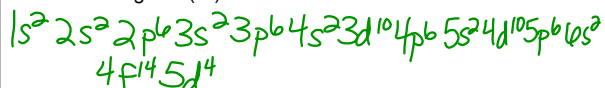
Practice

· Write the electron configuration for the following elements:

- Cobalt (Co)



- Tungsten (W)



Sep 19-3:05 PM

Practice

· Elements can be identified by their ending electron configurations

· Examples:

3d⁸

2p⁴

5s¹

1s²

Sep 19-3:05 PM