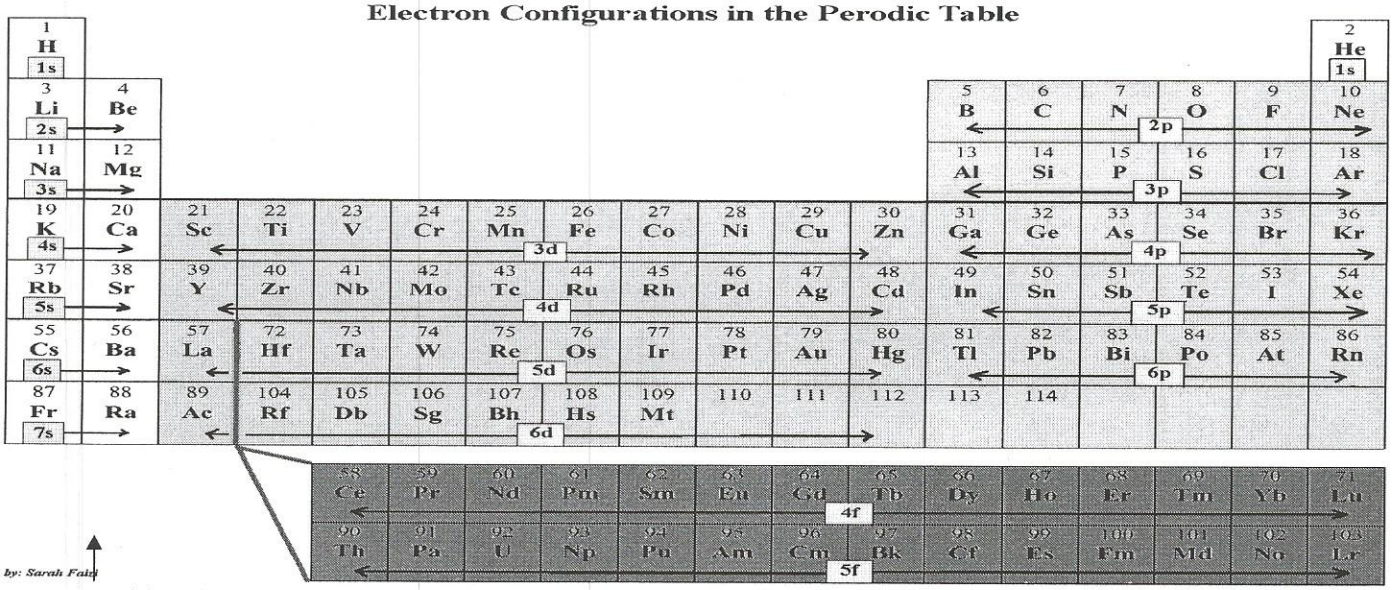
Review Electron Configuration & Covalent Bonding Name Jen Da Teach Hansenator Period _

ELECTRON CONFIGURATION- the arrangement of electrons in an atom



Sublevels (s,pd,f)

s 1↿ The s sublevel has 1 orbital that can hold 2 electrons.

p 1↿ 1↿ 1↿ The p sublevel has 3 orbitals, can hold 6 electrons
*Hund states 1 electron on each orbital before doubling.

d 1↿ 1↿ 1↿ 1↿ 1↿ The d sublevel = 5 orbitals 10 electrons

f 1↿ 1↿ 1↿ 1↿ 1↿ 1↿ 1↿ *7 orbitals can hold 14 electrons!

Arrows represent electrons!

Dashed lines are called orbitals!

Sample Questions

1. How many orbitals are in a p sublevel? 3
2. How many electrons can fit on an orbital? 2
3. How many electrons does it take to fill a d orbital? 10
4. Aufbau said the lowest energy levels fill first. What is the first energy level/sublevel configuration for every element except hydrogen? $1s^2$
5. What is the electron configuration for Hydrogen? $1s^1$
6. Hund said that in a given sublevel such a (p, d, and f) one electron must fill each orbital before doubling up. Thus if a p orbital had 4 electrons the configuration would be:

p 1↿ 1 1

Scientist Names:
Aufbau
Pauli
Hund

7. The Pauli exclusion principal states that electrons that occupy the same orbital have opposite spin. That basically means that one electron will be traveling clockwise while the other electron travels counter clockwise. This is why the orbital notation for 1 s^2 looks like this:

1s 1↿

#8 Electron states Matching Options:

Excited ✓
Ground ✓

8. In the flame test lab we learned that electrons can be excited to a different energy level. With added energy we call this an "excited" state of an electron. As it "calms" down or loses energy it returns to ground state.

9. Write the electron configuration, orbital notation, and noble gas configuration for the following elements:

Element	Electron Configuration	Orbital Notation	Noble Gas Configuration
C	$1s^2 2s^2 2p^2$	1s ↑↓ 2s ↑↓ 2p 1 1 _	$[He]2s^2 2p^2$
Mg	$1s^2 2s^2 2p^6 3s^2$	1s ↑↓ 2s ↑↓ 2p ↑↓ ↑↓ ↑↓ 3s ↑↓	$[Ne]3s^2$
Br	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$	1s ↑↓ 2s ↑↓ 2p ↑↓ ↑↓ ↑↓ 3s ↑↓ 3p ↑↓ ↑↓ ↑↓ 4s ↑↓ 3d ↑↓ ↑↓ ↑↓ ↑↓ ↑↓ 4p ↑↓ ↑↓ 1	$[Ar]4s^2 3d^{10} 4p^5$
K	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$	1s ↑↓ 2s ↑↓ 2p ↑↓ ↑↓ ↑↓ 3s ↑↓ 3p ↑↓ ↑↓ ↑↓ 4s 1	$[Ar]4s^1$
Fe	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$	1s ↑↓ 2s ↑↓ 2p ↑↓ ↑↓ ↑↓ 3s ↑↓ 3p ↑↓ ↑↓ ↑↓ 4s ↑↓ 3d ↑↓ 1 1 1 1	$[Ar]4s^2 3d^6$

10. Periods are horizontal on the periodic table. Draw an arrow representing which way horizontal is. ⟷ Groups/families are vertical columns on the periodic table. Draw a line showing which way vertical is ↕.

11. How many valence electrons do each of the following groups have:
    a. Halogens 7
    b. Alkali Metals 1
    c. Alkaline Earth metals 2
    d. Noble Gases (except Helium) 8

12. Draw a lewis dot structure for the following elements:
    a. Phosphorus

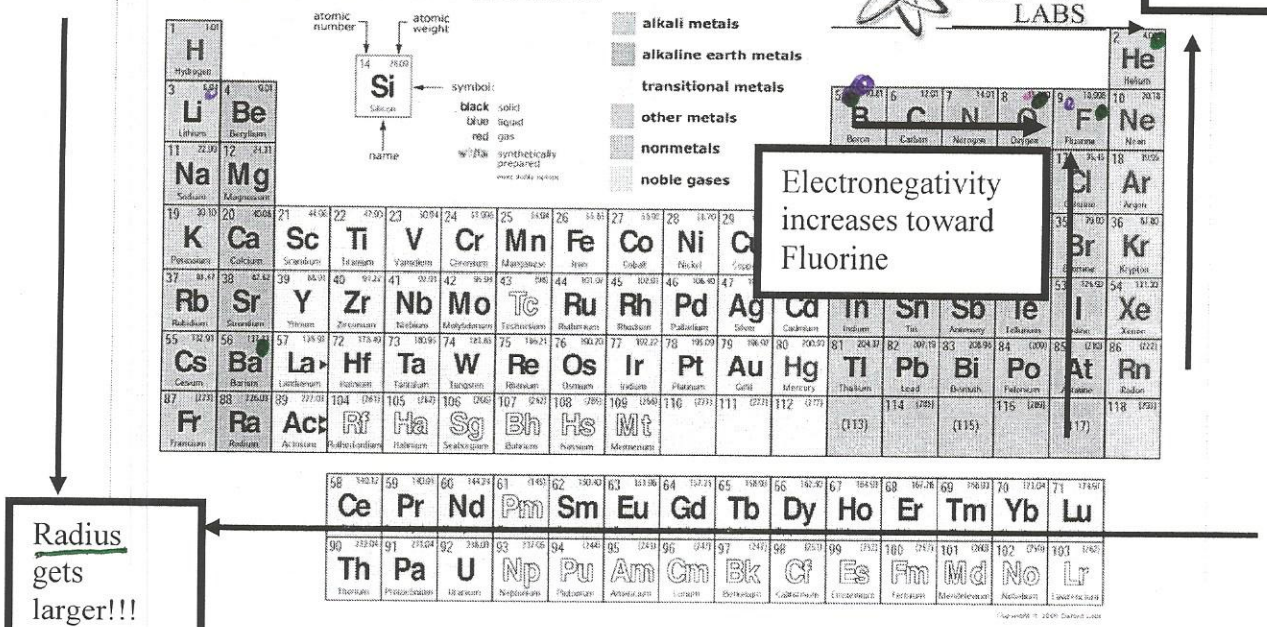
    b. Potassium

    c. Chlorine

    d. Sulfur

Know These Patterns On Test Day!

Ionization Energy increase toward Helium



13. Put the following elements in order of increasing atomic radius

Ba, F, O ,He He, F, O, Ba

14. Put the following elements in order of increasing electronegativity

B, F, O Li F, O, B, Li

15. Put the following elements in order of increasing ionization energy

~~He~~, Li, Ne Li, Ne, He

16. Ionic/Covalent Naming

$MgCl_2$ Magnesium Chloride N_2O_5 Dinitrogen pentoxide

CO_3 Carbon trioxide $AlCl_3$ Aluminum chloride

Fe_2O_3 Iron III oxide P_6O_7 Hexaphosphorus Heptoxide

CO Carbon monoxide FeO Iron II oxide

17. Ionic/Covalent Formula Writing

Diphosphorus trioxide P_2O_3 Barium chlorate $Ba(ClO_3)_2$

Cobalt III sulfide Co_2S_3 Pentasulfur tribromide S_5Br_3

Dihydrogen dioxide H_2O_2 Iron II oxide FeO

Magnesium oxide MgO Cesium phosphide Cs_3P

18.

Word Bank			
~~Shared~~	~~Ionic~~	~~Transferred~~	Sea of electrons
~~Covalent~~	~~Metal~~	Metallic	Polar

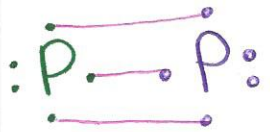
Covalent bonds are between *two nonmetals*. In this type of bond, electrons are Shared

Ionic bonds form between a metal and a nonmetal. In this type of bond electrons are Transferred

19. DRAW LEWIS STRUCTURES FOR THE FOLLOWING COMPOUNDS.
Predict the *molecular shape* and *polarity of the molecule* for each.

a. P_2

Shape Linear
Polar or (Nonpolar)

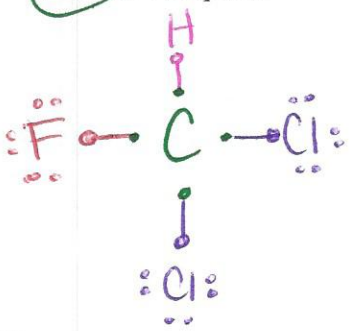


b. HF

Shape Linear
(Polar) or Nonpolar

c. $CHFCl_2$

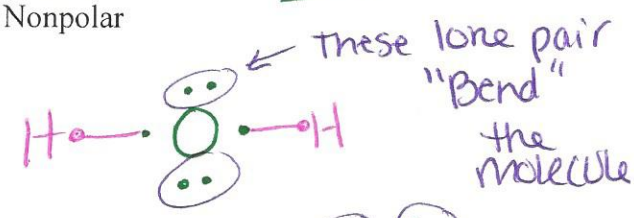
Shape Tetrahedral
(Polar) or Nonpolar



d. H_2O

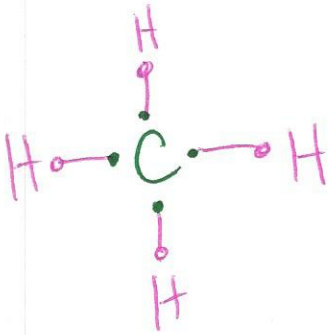
Shape Bent
(Polar) or Nonpolar

* Bent molecules ALWAYS polar



e. CH_4

Shape Tetrahedral
Polar or (Nonpolar)



f. AsH_3

Shape Trigonal Pyramidal
(Polar) or Nonpolar