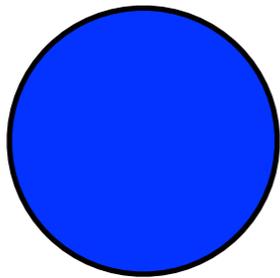
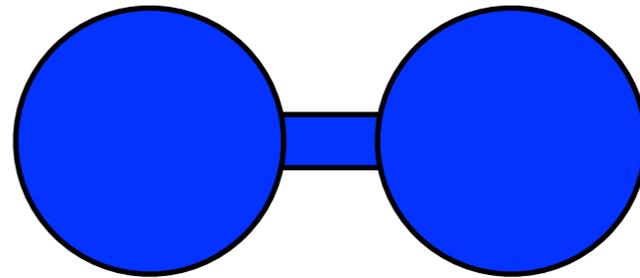


Diatomic elements:

Elements found in nature as pairs of atoms (two identical atoms bonded together).



Monatomic



Diatomic

You need to know all seven:



They're also known as the Super Seven:

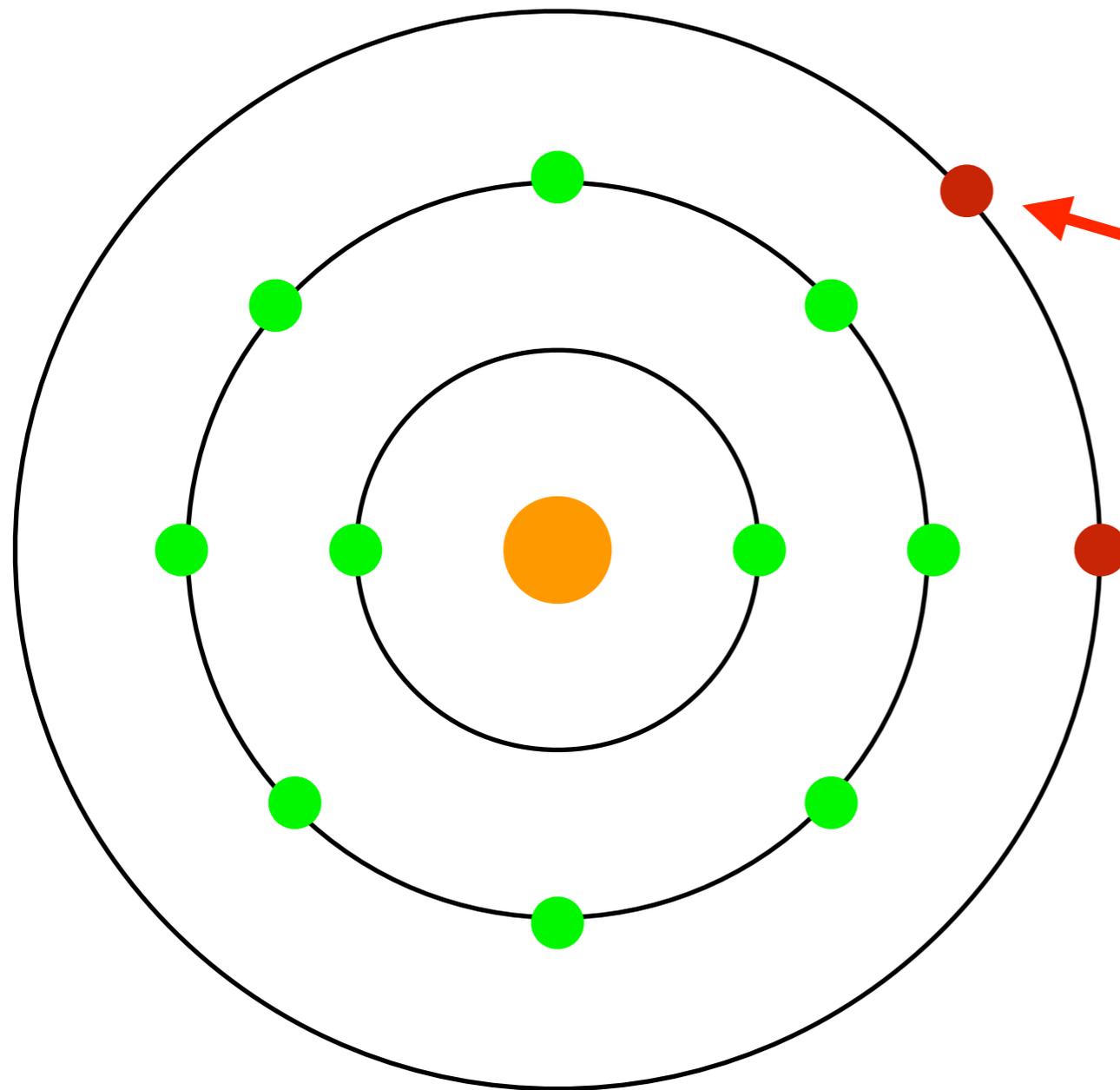
			3A 13	4A 14	5A 15	6A 16	7A 17	8A 18			
Hydrogen 1 H 1.008			Boron 5 B 10.811	Carbon 6 C 12.011	Nitrogen 7 N 14.007	Oxygen 8 O 15.999	Fluorine 9 F 18.998	Helium 2 He 4.003			
			Aluminum 13 Al 26.982	Silicon 14 Si 28.086	Phosphorus 15 P 30.974	Sulfur 16 S 32.065	Chlorine 17 Cl 35.453	Neon 10 Ne 20.180			
10	1B 11	2B 12	Nickel 28 Ni 58.693	Copper 29 Cu 63.546	Zinc 30 Zn 65.39	Gallium 31 Ga 69.723	Germanium 32 Ge 72.64	Arsenic 33 As 74.922	Selenium 34 Se 78.96	Bromine 35 Br 79.904	Krypton 36 Kr 83.80
			Palladium 46 Pd 106.42	Silver 47 Ag 107.868	Cadmium 48 Cd 112.411	Indium 49 In 114.818	Tin 50 Sn 118.710	Antimony 51 Sb 121.760	Tellurium 52 Te 127.60	Iodine 53 I 126.904	Xenon 54 Xe 131.293
			Platinum 78 Pt 195.078	Gold 79 Au 196.967	Mercury 80 Hg 200.59	Thallium 81 Tl 204.383	Lead 82 Pb 207.2	Bismuth 83 Bi 208.980	Polonium 84 Po (209)	Astatine 85 At (210)	Radon 86 Rn (222)

Valence electrons:

- The electrons of an atom found in the outermost s and p sublevels
- Maximum number of valence $e^- = 8$
- Responsible for the chemical properties of the elements
- All elements in a family have the same number of valence e^-

Draw this diagram:

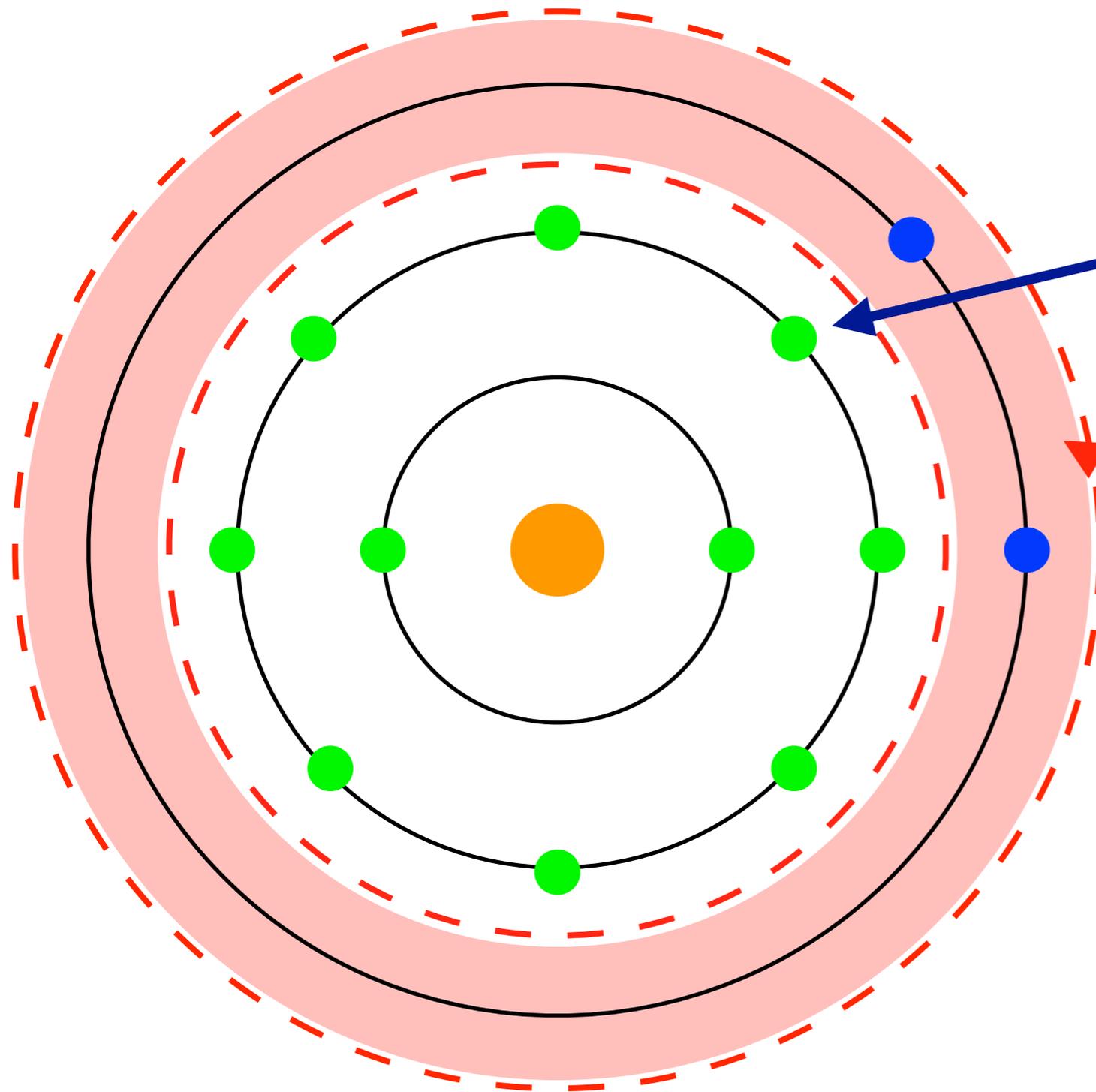
$_{12}\text{Mg}$



**Valence
Electrons**

(electrons in
the *highest*
energy level)

Add to your diagram:



Core Electrons
(Interior electrons)

Valence Shell
The region of space occupied by the valence e⁻

The group numbers 1A-8A indicates the number of valence electrons:

Group 1A = 1 valence e⁻

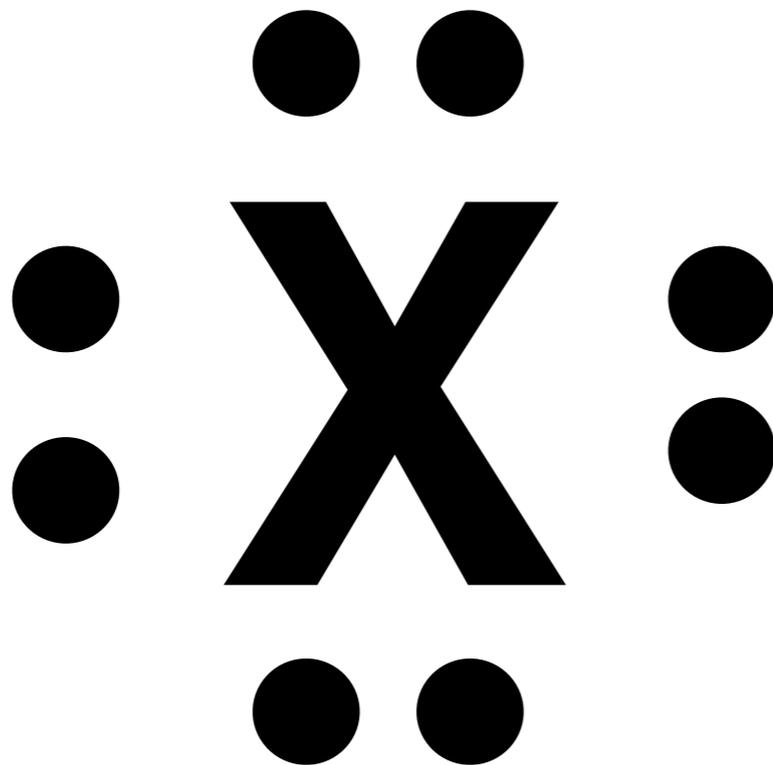
Group 2A = 2 valence e⁻

Group 3A = 3 valence e⁻

etc.

Note: Transition elements all have only 2 valence e⁻

Electron dot notation: the use of dots to represent the valence e⁻ around an atom.



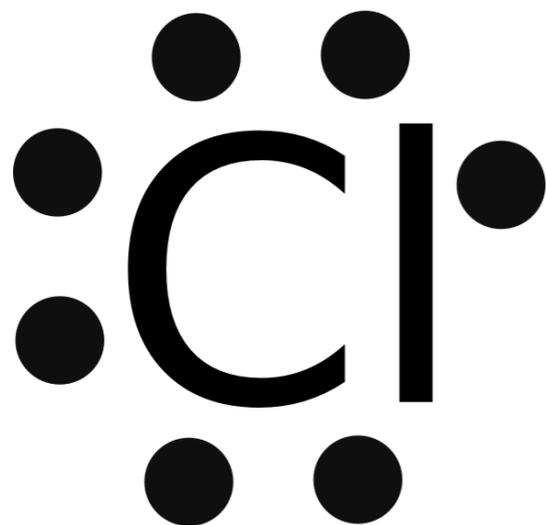
**One dot on
each side
before adding
the second**

(≈ Hund's rule)

Practice

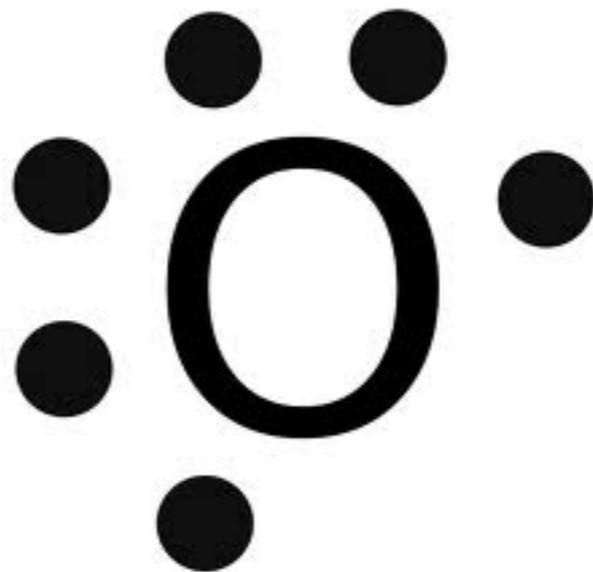
Chlorine

7 valence e⁻



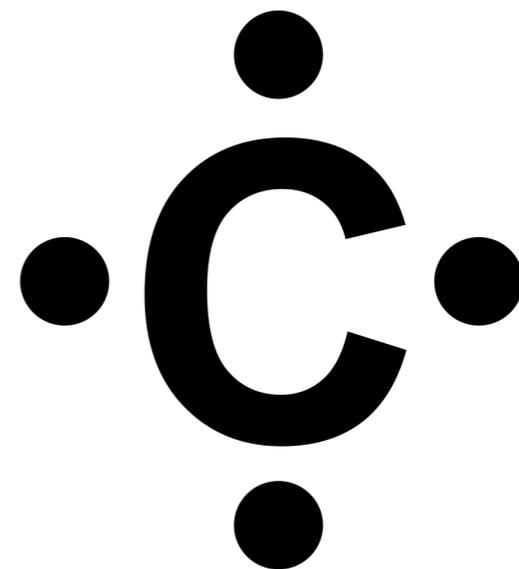
Oxygen

6 valence e⁻



Carbon

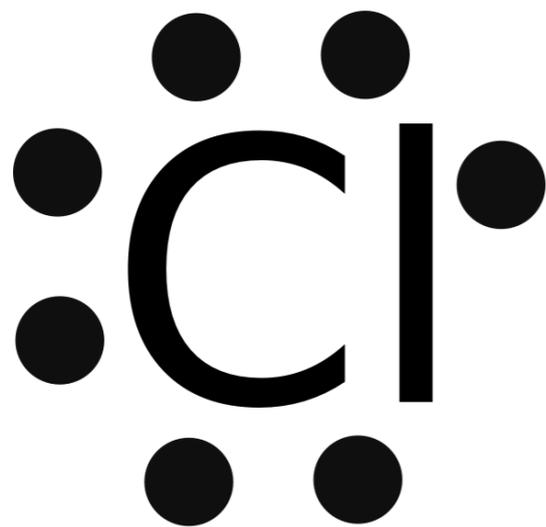
4 valence e⁻



Practice

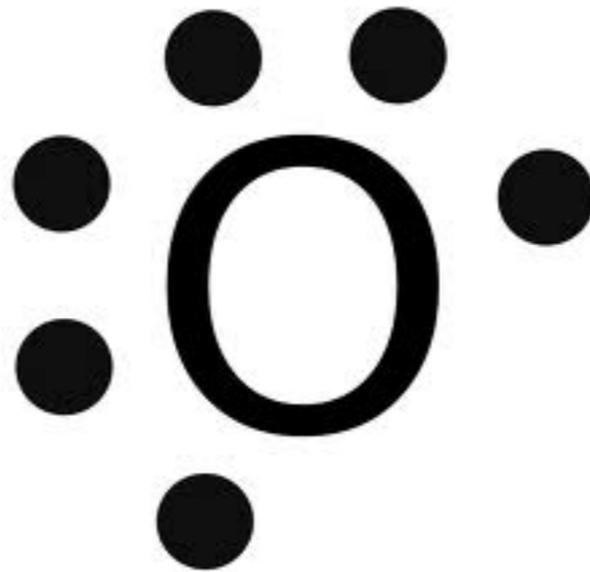
Chlorine

7 valence e⁻



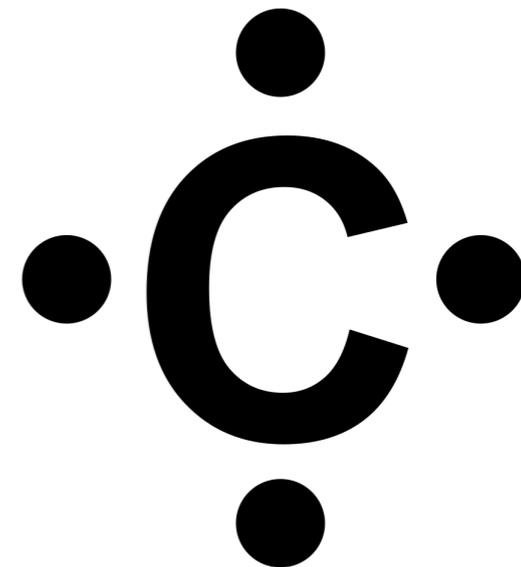
Oxygen

6 valence e⁻



Carbon

4 valence e⁻

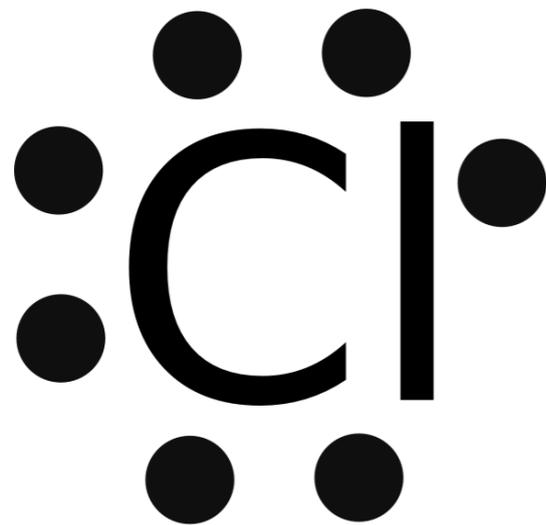


Valence electron configuration:

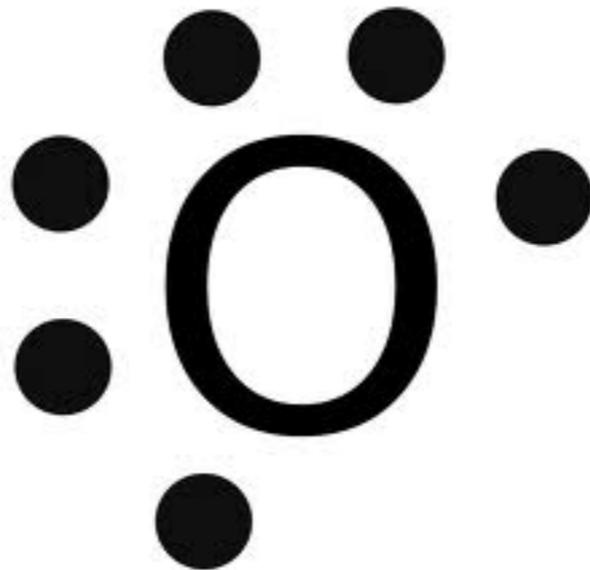
Only the highest level s and p electrons

Examples:

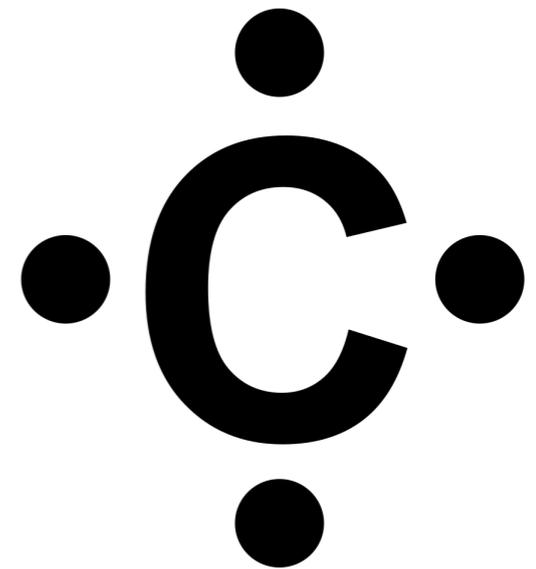
chlorine:



oxygen:



carbon:



The Octet Rule:

Atoms tend to lose, gain, or share electrons in order to obtain the configuration of a noble gas (called a “stable octet”)

Note: Noble gases have a very stable, low energy electron configuration.

This is why they are so unreactive! 😎

Ionic charge:

- Metals: *lose* valence e^- and become *positive* ions (“cations”)
- Nonmetals: *gain* e^- and become *negative* ions (“anions”)

Ionic charge by location on the periodic table:

Group	Charge
1A	+1
2A	+2
3A	+3
4A (C)	-4
5A (N,P)	-3
6A (O,S,Se)	-2
7A	-1
8A	0