

Neil's Bohr Rap

<http://www.youtube.com/watch?v=rSZrZWXxxgQ&feature=related>

Atom Review

- The atomic number is **ALWAYS** the same as the number of protons in a nucleus
- To calculate the number of neutrons:
 1. Round off the atomic mass
 2. Calculate: Atomic mass – atomic number = neutrons
 - Example:
 - Chlorine – Atomic mass = 36, Atomic # = 17
 - $36 - 17 = 19$ (the number of neutrons)
 - You try with Barium – Atomic mass = 137, Atomic # = 56
 - $137 - 56 = 81$

Vocabulary Review

- What is the difference between an “atom” and an “ion”
 - “atom” is always neutral: the same number of protons (+) and electrons (-)
 - An “ion” always has a charge:
 - more protons than electrons (cation = + charge)
 - more electrons than protons (anion = - charge)

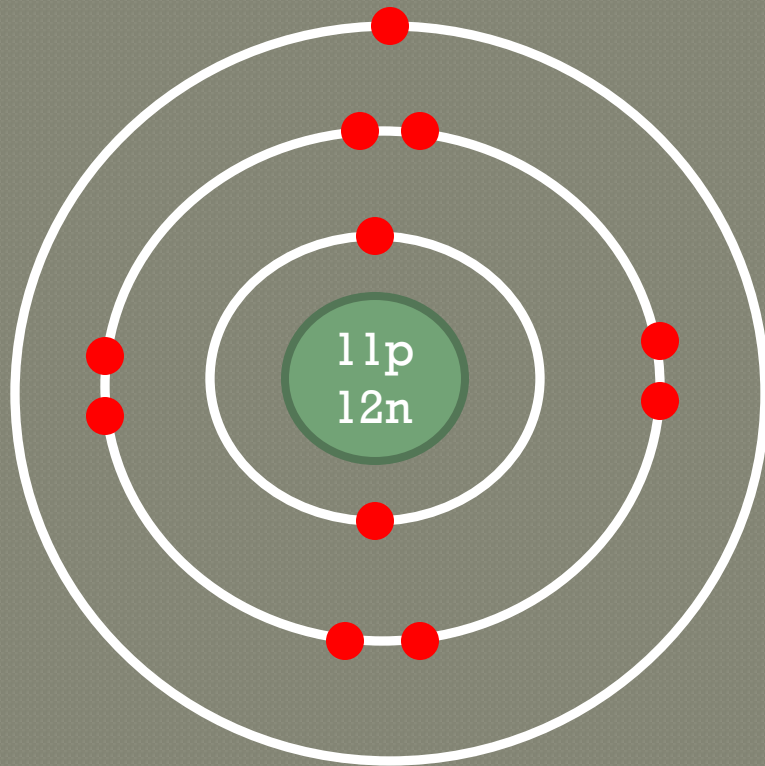
Vocabulary Review

- What is a valence shell?
 - The outermost shell of electrons
- What is a valence electron?
 - Any electrons that occupy the outermost shell...
These are the electrons that are involved in bonding
- What is an “octet”?
 - When the valence shell has 8 electrons – the most stable condition for the second or third shell.

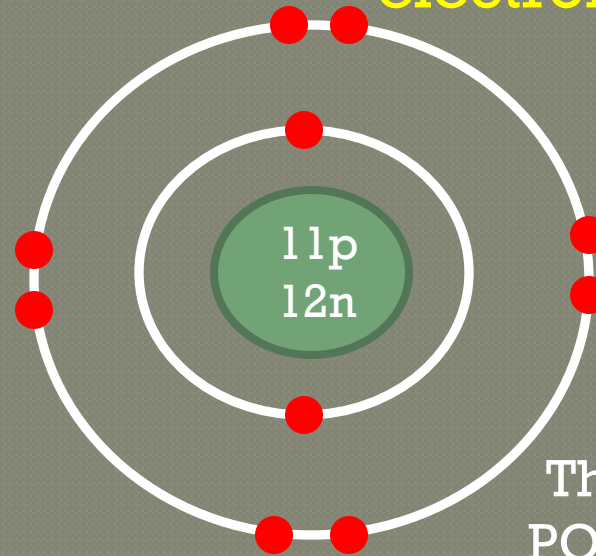
Draw the Bohr model of a Sodium atom and a Sodium ion (Hint: The symbol for sodium is Na)

Atom:

Ion:



Lost one electron
-Now there are 11
protons, but only 10
electrons



This is now a
POSITIVE ION
(cation)
with a charge of 1+

Bonding

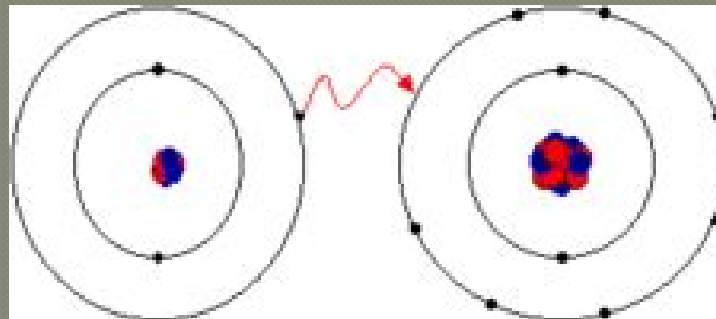
Two types....

Ionic or Covalent

Forming Bonds

- When two atoms get close together, their valence electrons interact.
 - Each atom in the compound wants a stable number of valence electrons (like the nearest noble gas).

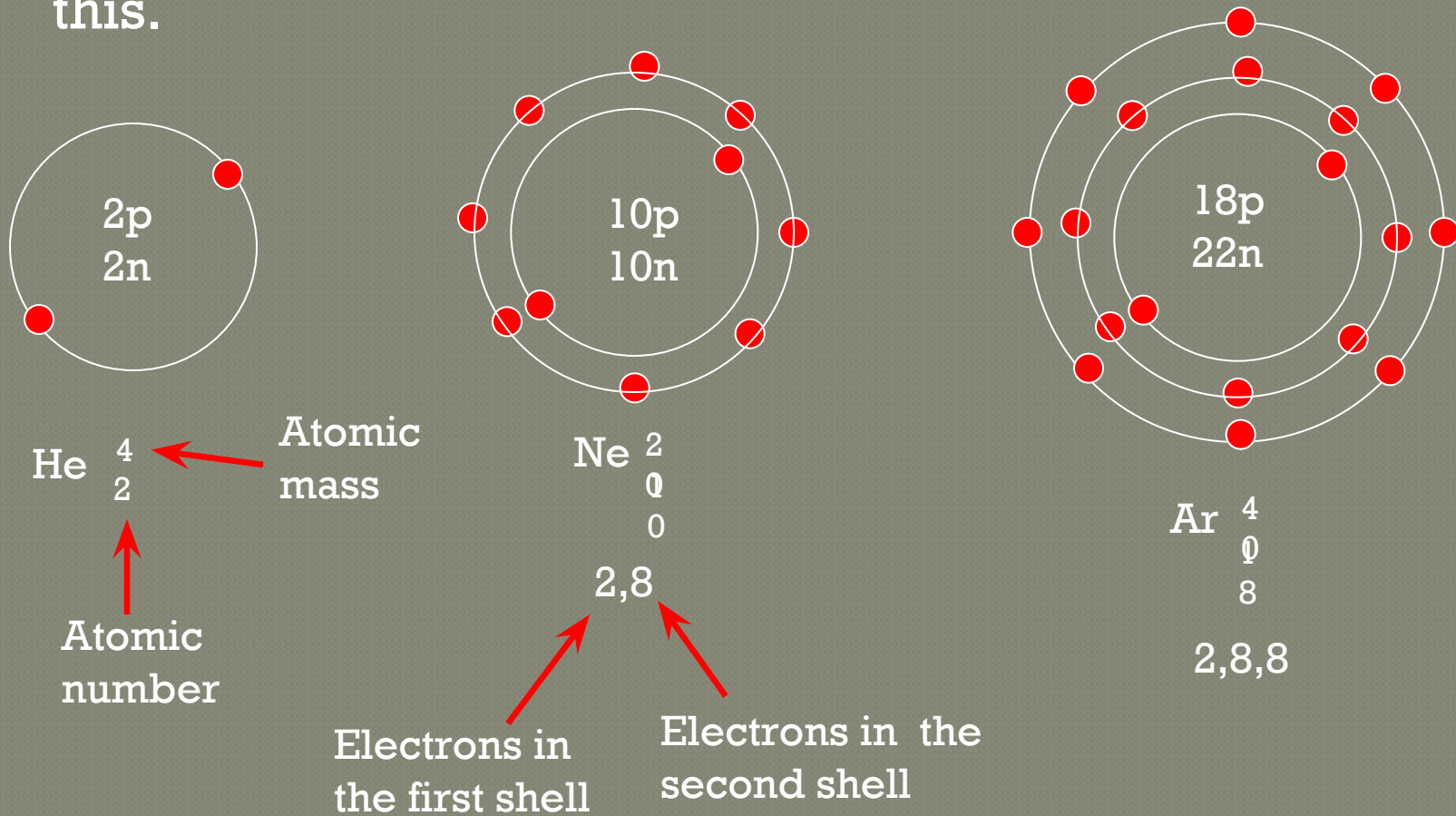
Lithium gives up an electron to become as stable as helium (valence shell of 2)



Fluorine accepts an electron from lithium to become as stable as neon (valence shell of 8)

Helium, neon and argon are atoms which do not react with other atoms because they each have a full outer electron shell (valence shell).

We call them the Inert Gases (or Noble Gases) because of this.

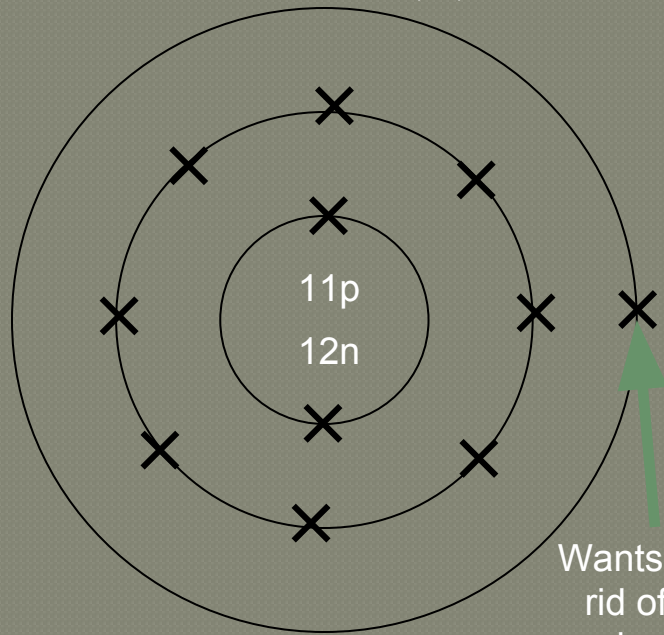


The Ionic Bond

Ionic Bonding

- When the valence electrons of a metal and a non-metal come close to each other the METAL may LOSE its valence electrons and the NON-METAL may GAIN valence electrons
- For example:
Na has 1 electron in its valence shell, Cl wants one more electron because it has 7
Na (the metal) will give its extra electron to Cl (the non-metal) so that they BOTH have the most stable electron shells

Sodium $^{23}_{11}\text{Na}$
2,8,1



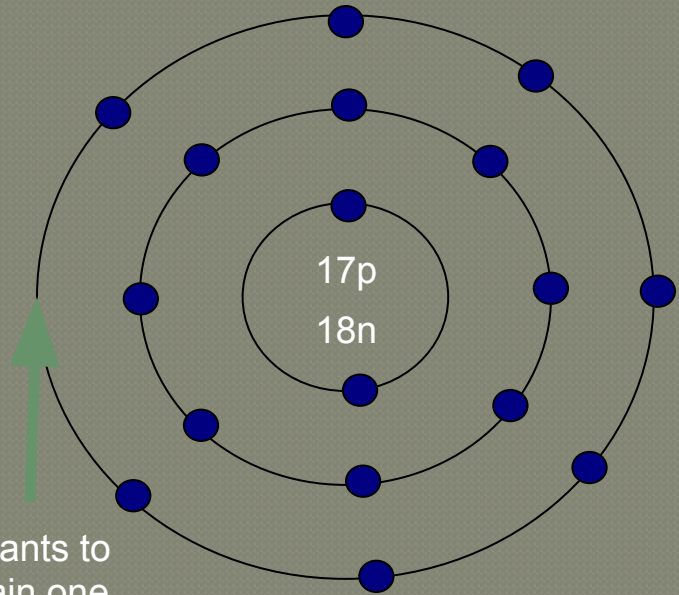
Wants to get rid of one electron

11 protons

12 neutrons

11 electrons

Chlorine $^{35}_{17}\text{Cl}$
2,8,7



Wants to gain one electron

17 protons

18 Neutrons

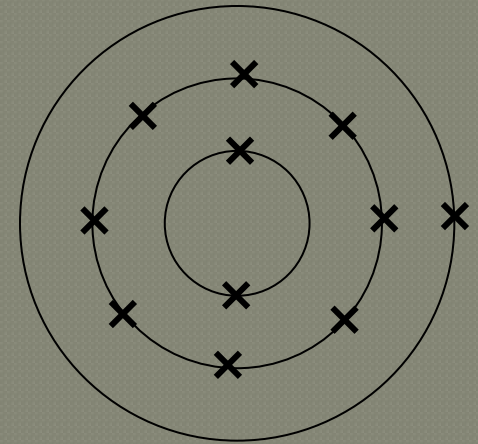
17 electrons

The Sodium atom has 1
Electron in it's outer shell.

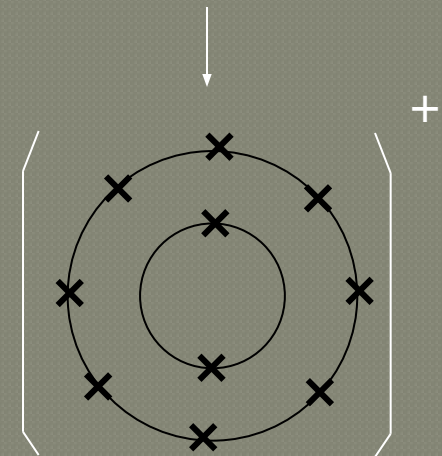
The Sodium loses 1 electron
to leave a complete outer
shell.

It is now a Sodium ion with a
charge of 1 +

Na
Electron count: 2,8,1
Atom

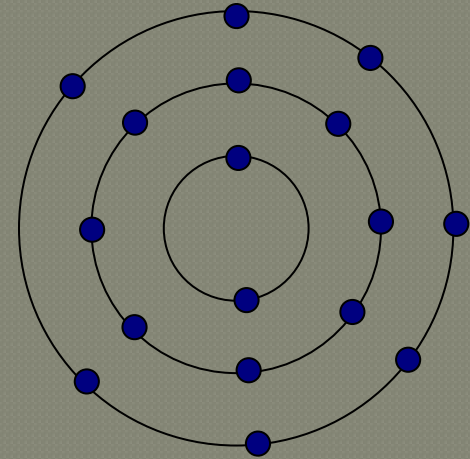


(Na⁺)
(2,8)⁺
Ion



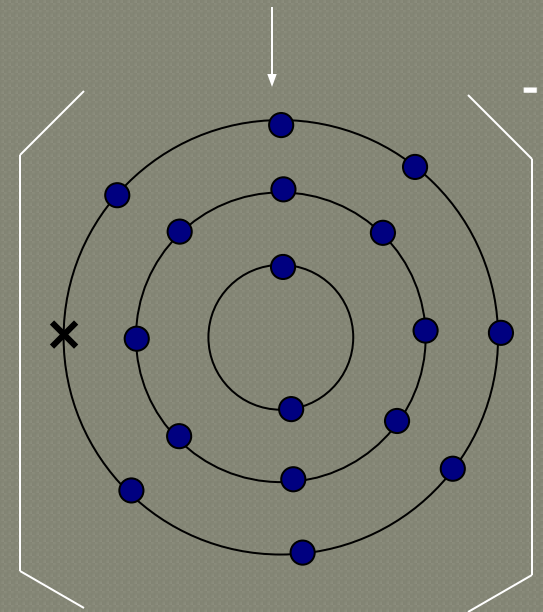
The Chlorine atom has 7 electrons in it's outer shell.

Cl
Electron count: 2,8,7
Atom



The Chlorine gains 1 electron to gain a complete outer shell.

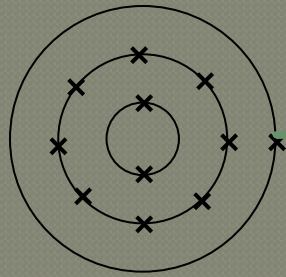
(Cl⁻)
(2,8,8)⁻
Ion



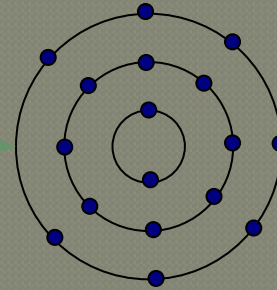
It is now a Chlorine ion with a charge of 1 -

The Ionic Bond

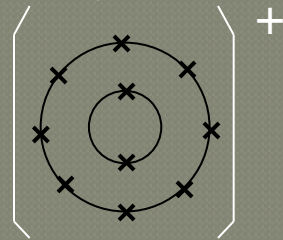
Sodium atom
Na



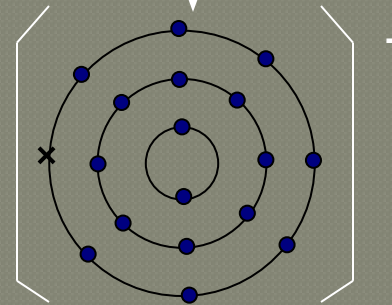
Chlorine atom
Cl



Sodium ion
(Na⁺)



Chlorine ion
(Cl⁻)



The sodium atom loses one electron to get a complete outer shell and becomes a positive ion (Na⁺).

The Chlorine atom gains one electron to attain a complete outer shell and becomes a negative ion (Cl⁻).

Strong electrostatic forces attract the sodium and chlorine ions to each other = AN IONIC BOND

Ionic Bonding Video

http://www.youtube.com/watch?v=xTx_DWboE_Vs&feature=related