Lesson 3

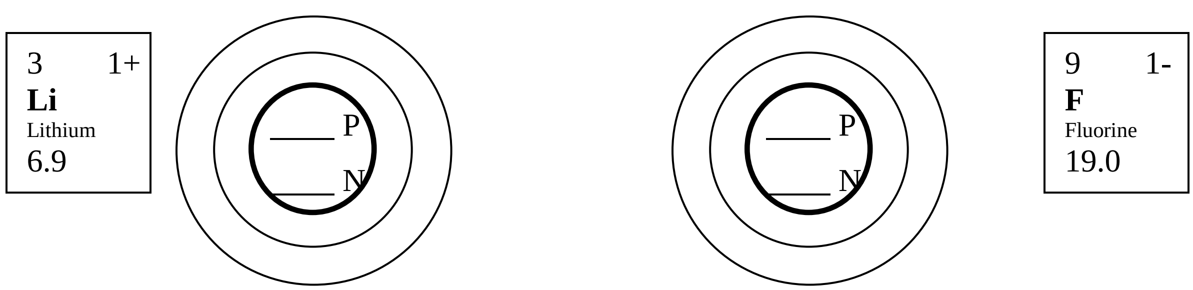
IONIC BONDING

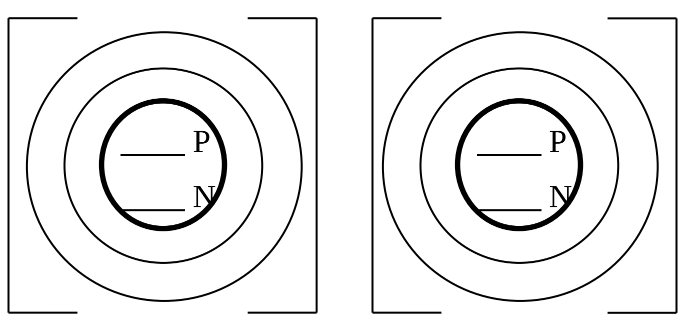
Ions
- Charged atoms; **gains** or **loses** to fill its valence shell (outer electron orbital)
- These extra electrons come from other **atoms** that are trying to fill their valence shells

Chemical bonds - the relatively strong force of attraction that hold atoms together in a **molecule**.

- ***Orally***: *There are two types of chemical bonds that we will focus on this chapter. Ionic and covalent. Today the focus is ionic bonding.*

Ionic Bonding
- Bonding of two or more **oppositely** charged ions.
- Metal atoms have electrons to **give** from the outer valence → forms a **positive** ion called a **cation**.
- Non-metal atoms need to **accept** electrons to fill the outer valence → forms a **negative** ion called an **anion**.
- When this happens, the ions become bonded together (opposite charges **attract**.)
- Example: lithium and fluorine





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- Example: beryllium and fluorine (charges must balance)

4 2+
Be
Beryllium
9.0

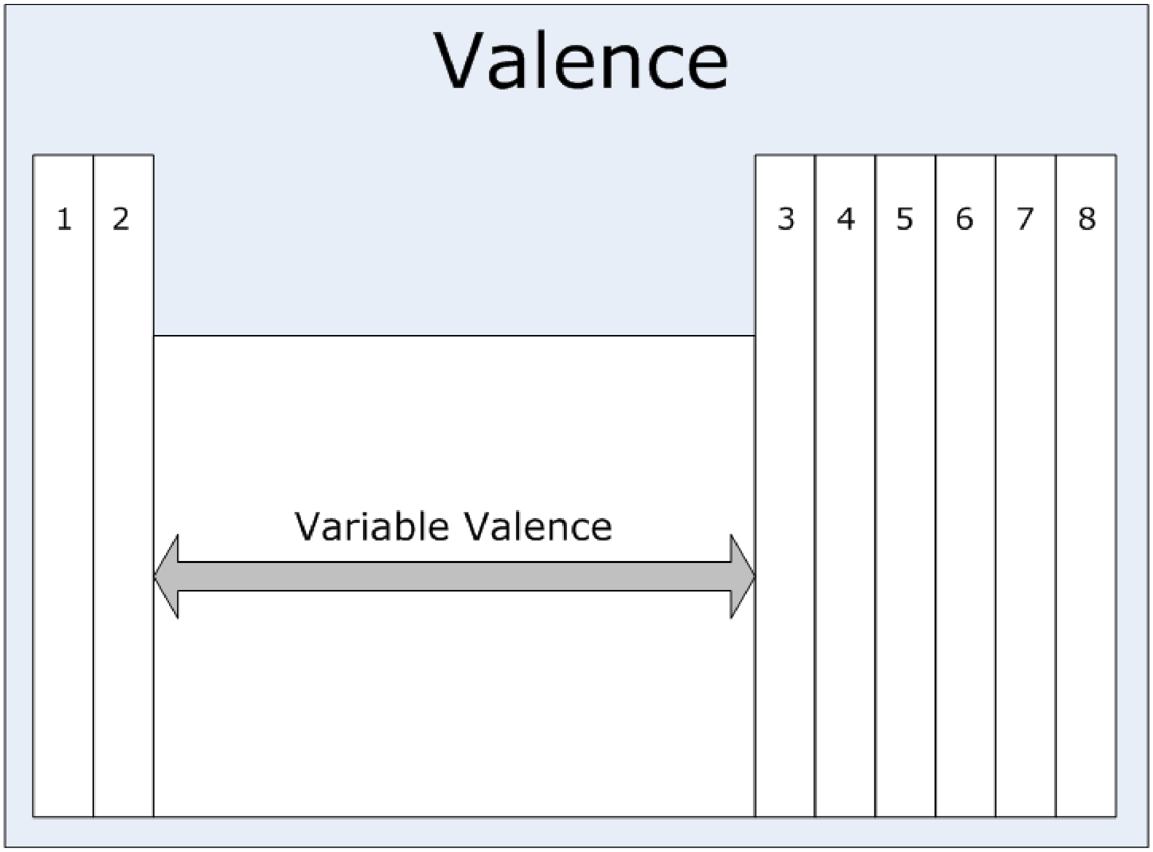
9 1-
F
Fluorine
19.0

Lewis Diagrams

- An easier way of showing bonding between atoms is using Lewis diagrams → use solid dots to represent **valence or outer** electrons.

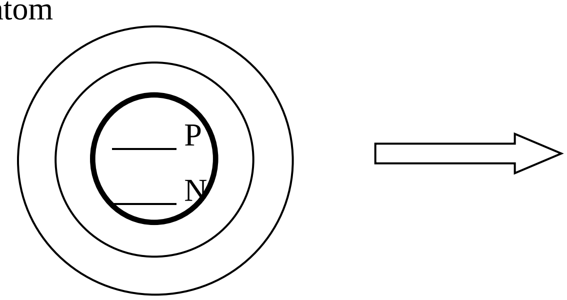
***Orally**:*
Question: Why only show the valence shell electrons?
Answer: Because these are the electrons that are directly involved in bonding.
The pattern that exists for the number of valence electrons and the group number of a given element is given by:

A simple way to remember the number of valence electrons in an atom is to use the last digit in the **group number** (i.e., the column number from the periodic table).



- Example: Oxygen atom

8 2-
O
Oxygen
16.0



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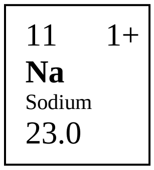
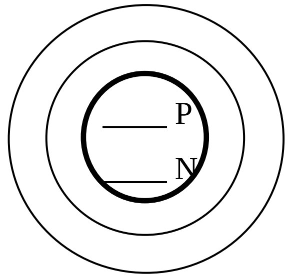
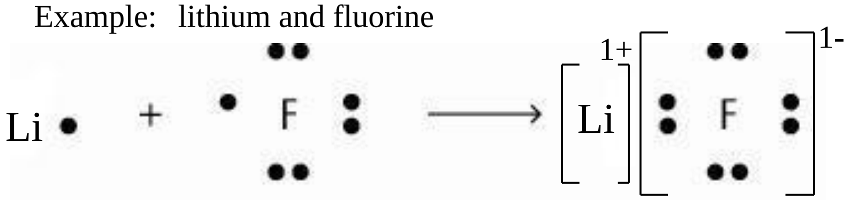
Example: Sodium atom





When forming compounds, the key is to make sure that the ion charges **cancel** (equal 0).

- Example: lithium and fluorine



(1+) + (1-) = 0

** Note that for the positively charged cations, there are no electrons drawn in for the Lewis Diagram.

- Example: calcium and chlorine

- Example: magnesium and sulfur

Homework: Ionic Lewis Diagram worksheet