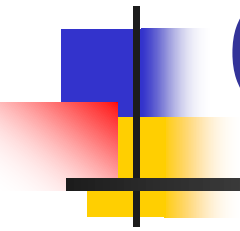


Chapter 1

Atomic Structure and Chemical Bonds

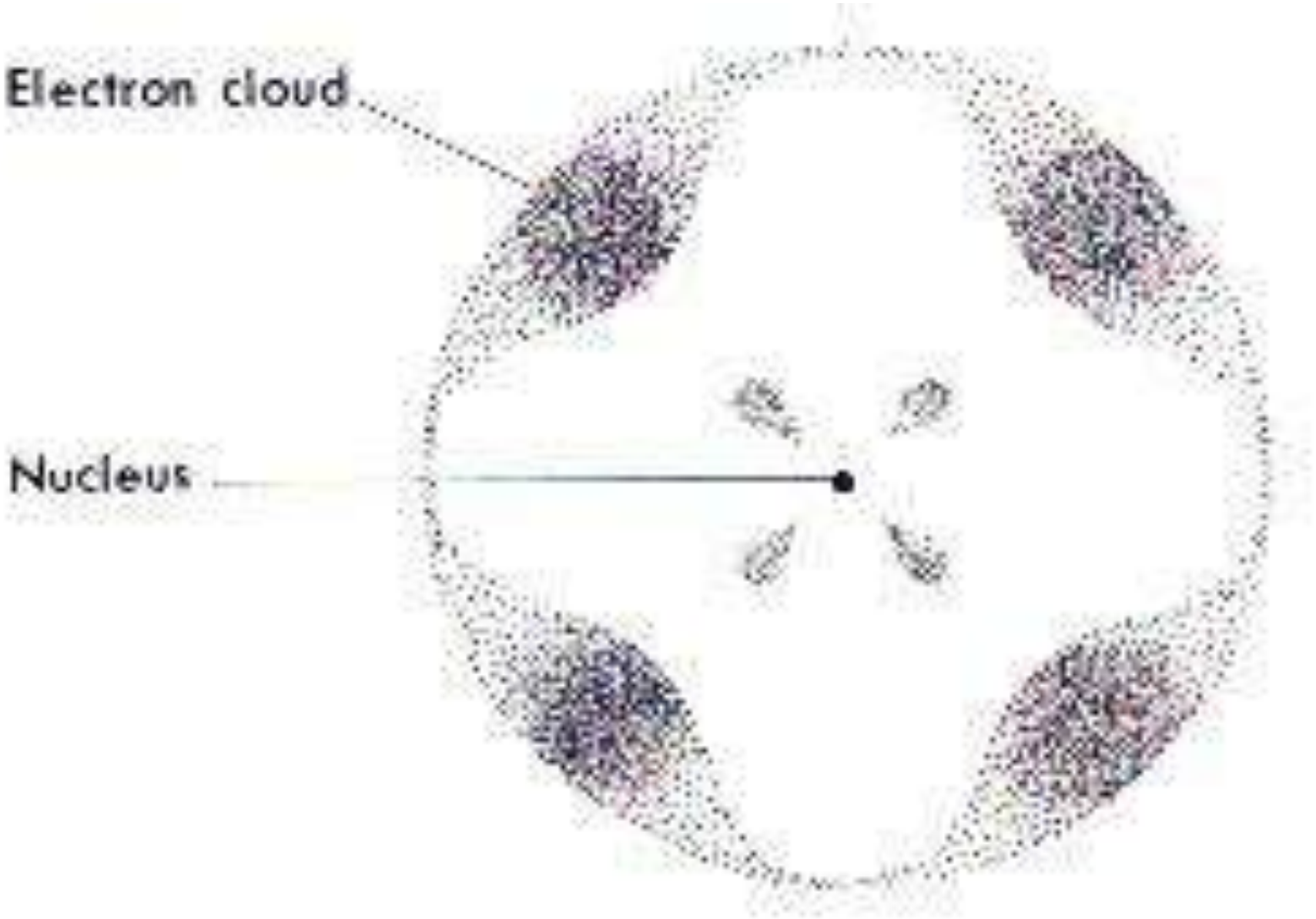
1 -1 Why do atoms combine ?

Atomic Structure

- Atom Size and Structure
  - Imagine Heinz Field…
    - If the nucleus was the size of a paper clip, the nearest electron would be in the furthest seat.
  - Most of the atom is empty space

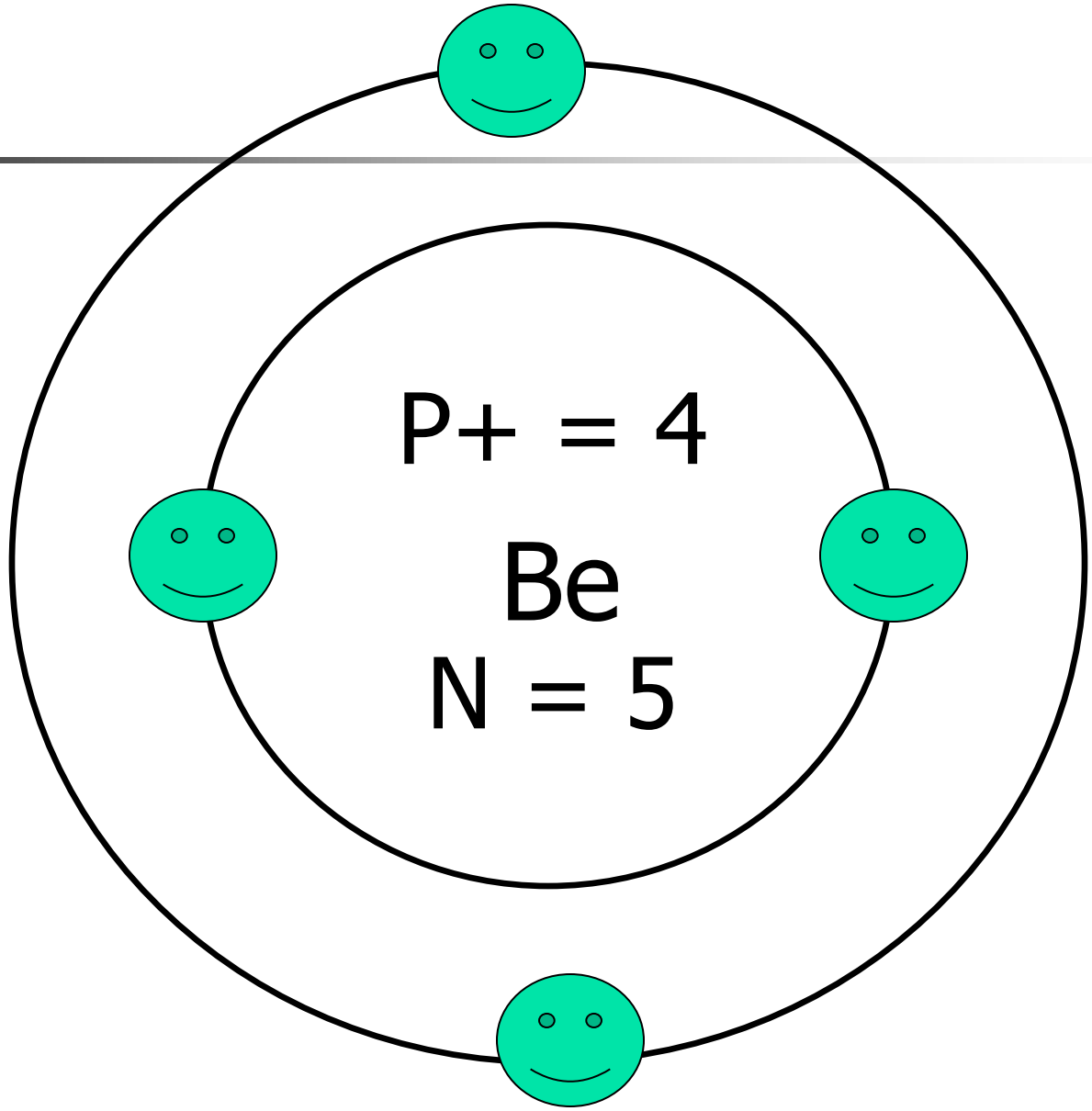
Electron Cloud

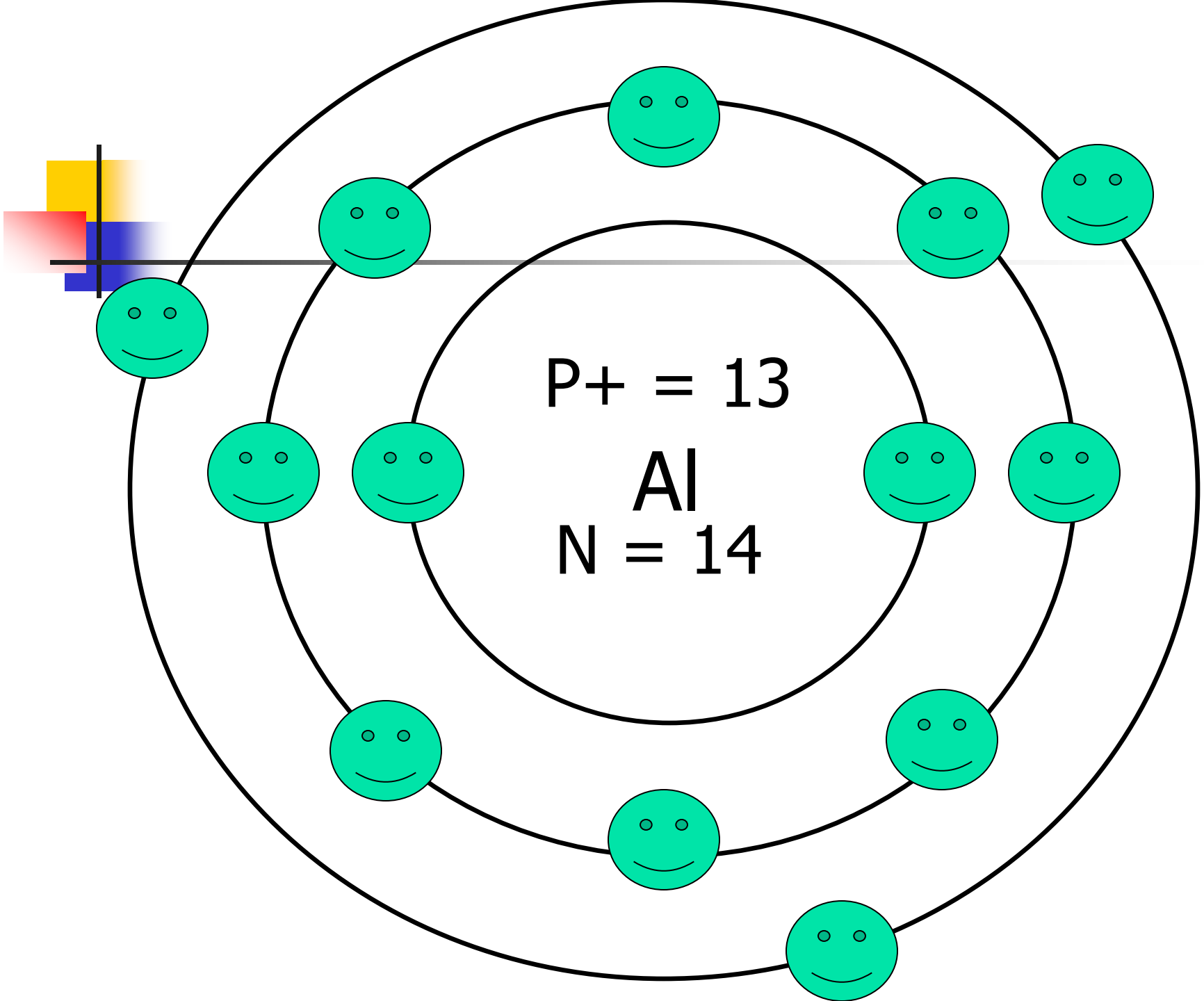
- The nucleus contains the protons and the neutrons.
- The electrons are found outside the nucleus in the electron cloud.


Electron cloud
Nucleus

Energy Levels

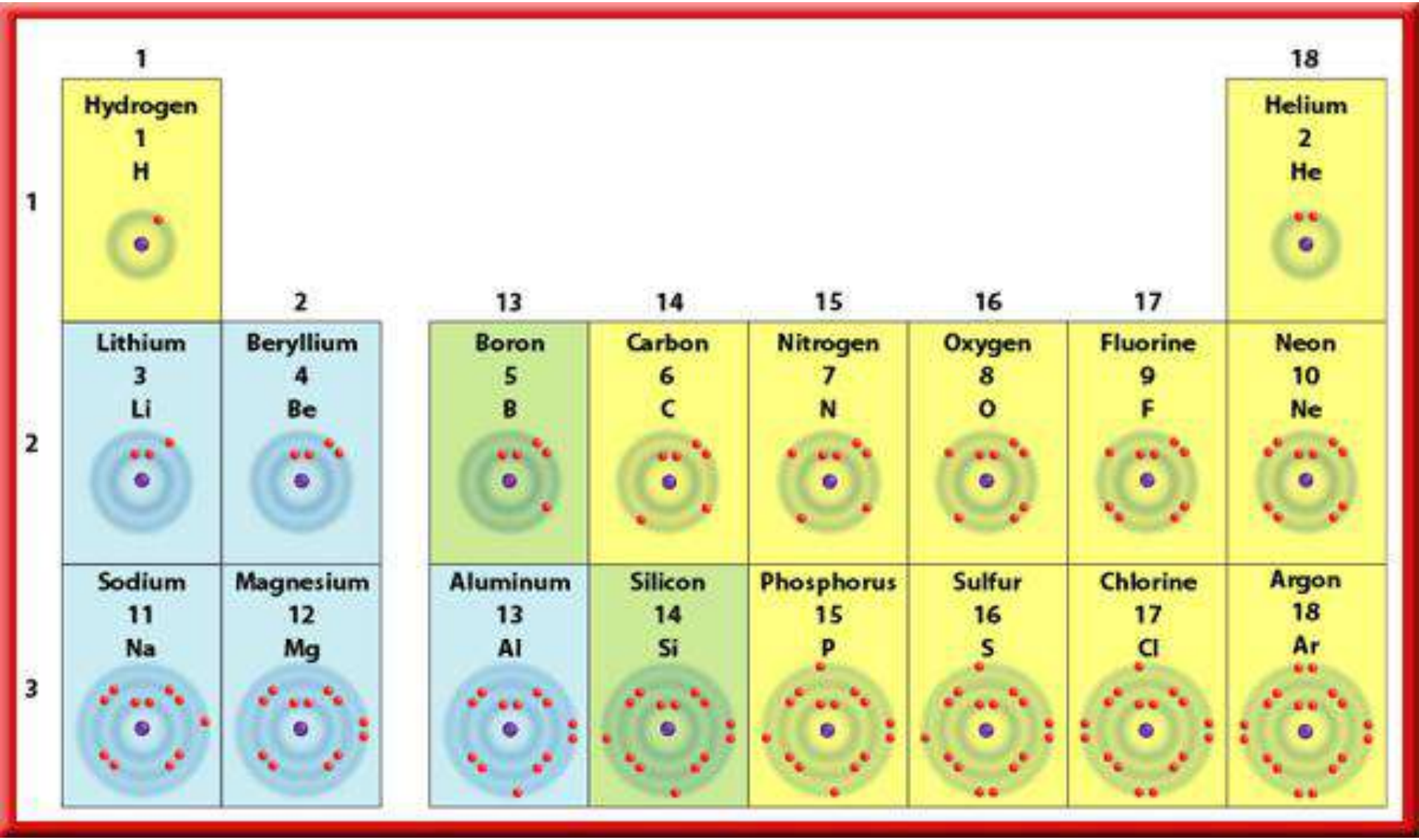
Energy Level	# of Electrons
1	2
2	8
3	18
4	32


P+ = 4
Be
N = 5


P+ = 13
Al
N = 14

Electron Energy

- The electrons in the first energy level have the lowest amount of energy.
- The electrons in the furthest energy level (valence electrons) have the most energy.
  - The valence electrons are the easiest to remove.

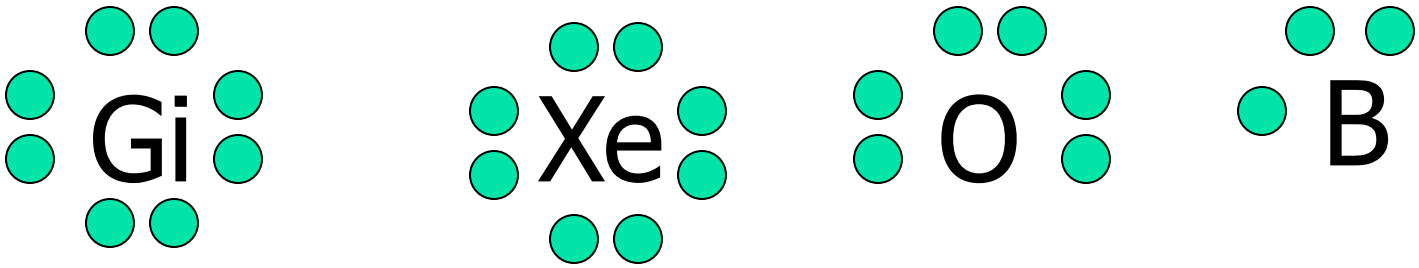

1
18
1
Hydrogen
1
H
Helium
2
He
2
13
14
15
16
17
2
Lithium
3
Li
Beryllium
4
Be
Boron
5
B
Carbon
6
C
Nitrogen
7
N
Oxygen
8
O
Fluorine
9
F
Neon
10
Ne
3
Sodium
11
Na
Magnesium
12
Mg
Aluminum
13
Al
Silicon
14
Si
Phosphorus
15
P
Sulfur
16
S
Chlorine
17
Cl
Argon
18
Ar

Noble Gases

- They either have a full outer energy level or have 8 valence electrons making them Stable.
  - They have 8 electrons making them stable.
  - Helium is the exception only having 2 electrons.

Electron Dot Diagrams

1. The symbol of the element.
2. Surrounded by the number of valence electrons.
   - The dots are written in pairs around the four sides of the element symbol.


Gi
Xe
O
B

Chemical Bonds

- Chemical Bonds – the force that holds two atoms together.
- Atoms bond so that they can become stable
  - Their outer energy levels become full.