Warm-up Week 4 Day 2

1. All science is based on which two beliefs?

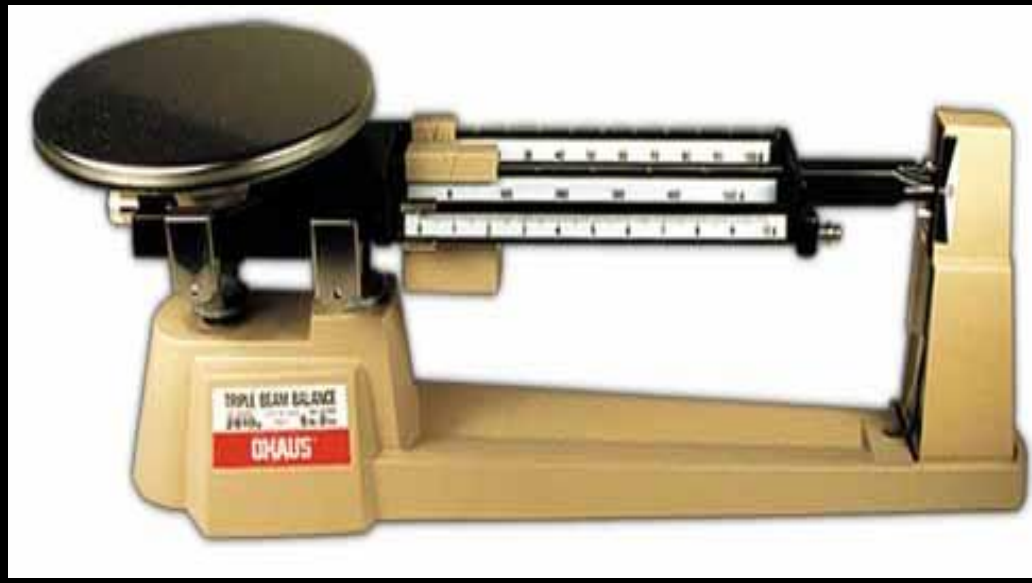
2. What is the difference between a HYPOTHESIS and a THEORY?

“Matter”

Chapter 2, Section 1

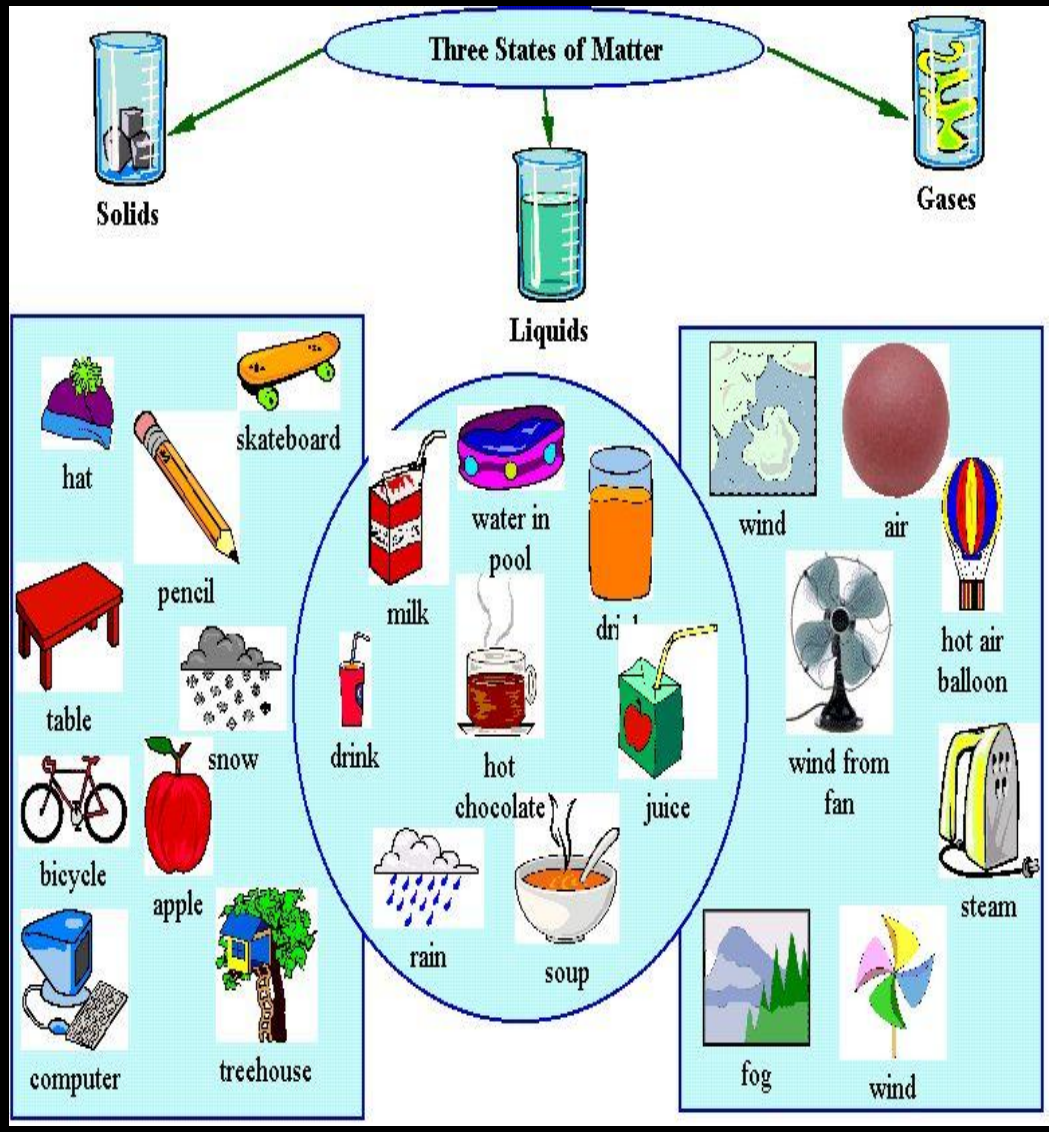
What is **Matter**?

- Anything that **has VOLUME & MASS.**
- ml
- g



States of Matter.

1. **Solid**
   - Certain shape
   - Certain volume
2. **Liquid**
   - Uncertain Shape
   - Certain Volume
3. **Gas**
   - Uncertain Shape
   - Uncertain Volume



Elements.

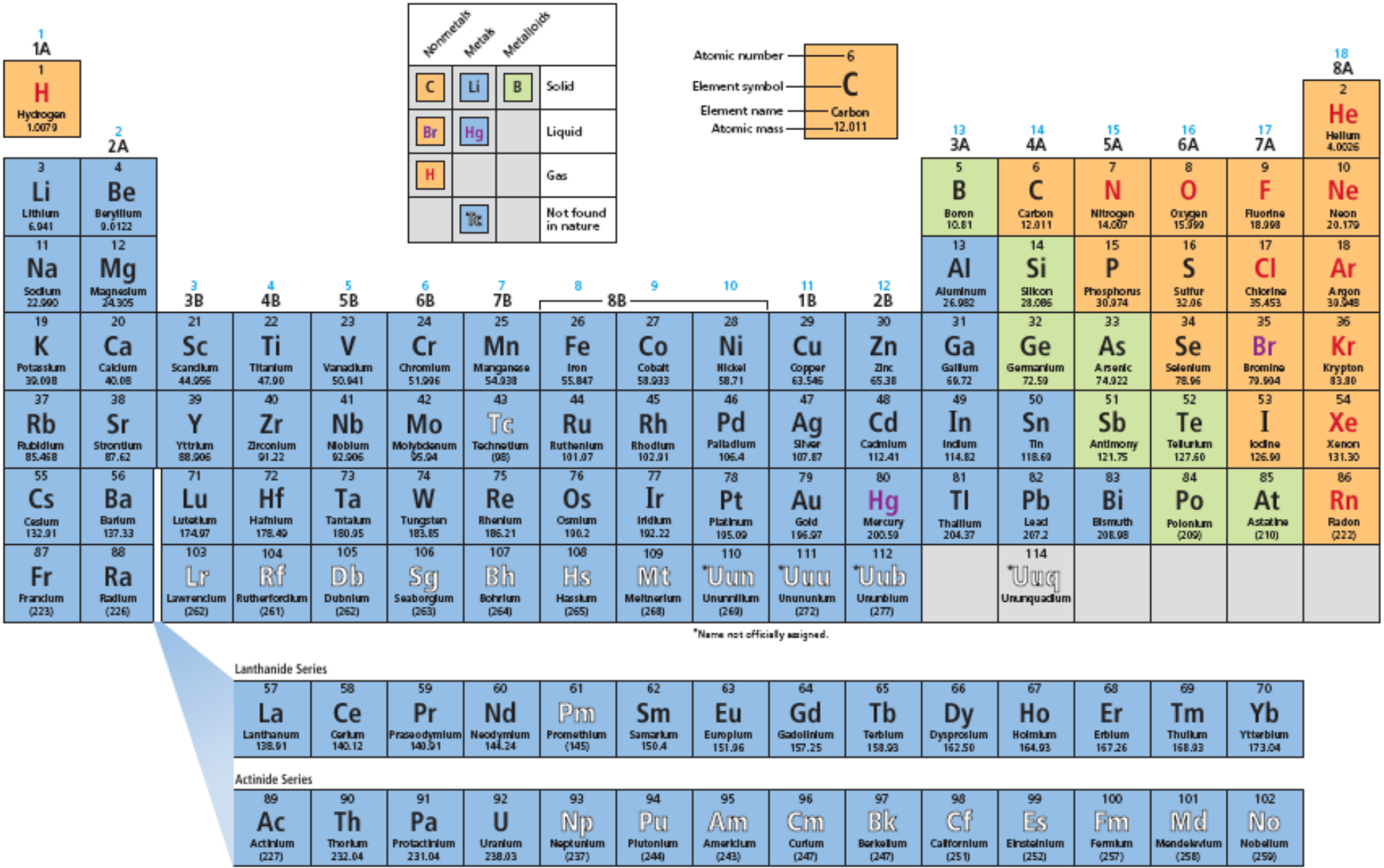
- **Simplest substance** possible.
- Building blocks of matter.
  - 112 Elements
  - 92 Natural
  - 8 = Earth's Crust.

Relative abundance of the most common elements in Earth's continental crust.

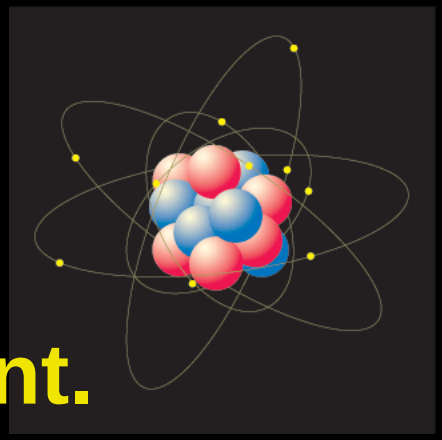
Element	Approximate Percenta by Weight
Oxygen (O)	46.6
Silicon (Si)	27.7
Aluminum (Al)	8.1
Iron (Fe)	5.0
Calcium (Ca)	3.6
Sodium (Na)	2.8
Potassium (K)	2.6
Magnesium (Mg)	2.1
All others	1.7
Total	100

Source: Data from Brian Mason

Periodic Table of Elements.



Atoms.



Smallest particle of Element.

Same Characteristics.

3 Parts.

1. **Protons (P^+)**
2. **Neutrons (N^o)**
3. **Electrons (E^-) (smallest!)**

Nucleus.

- Center of Atom.

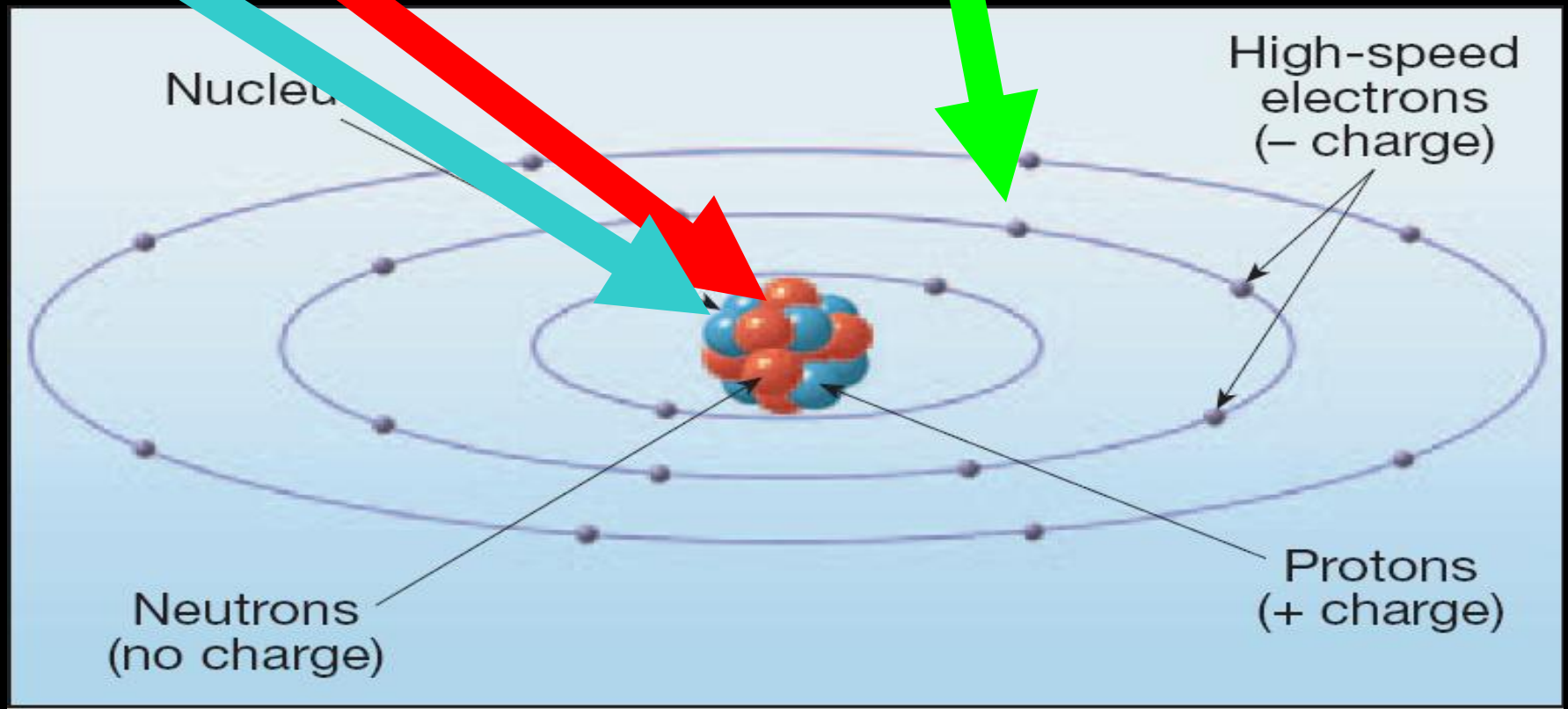
P^+

N^o

"Electron Cloud"

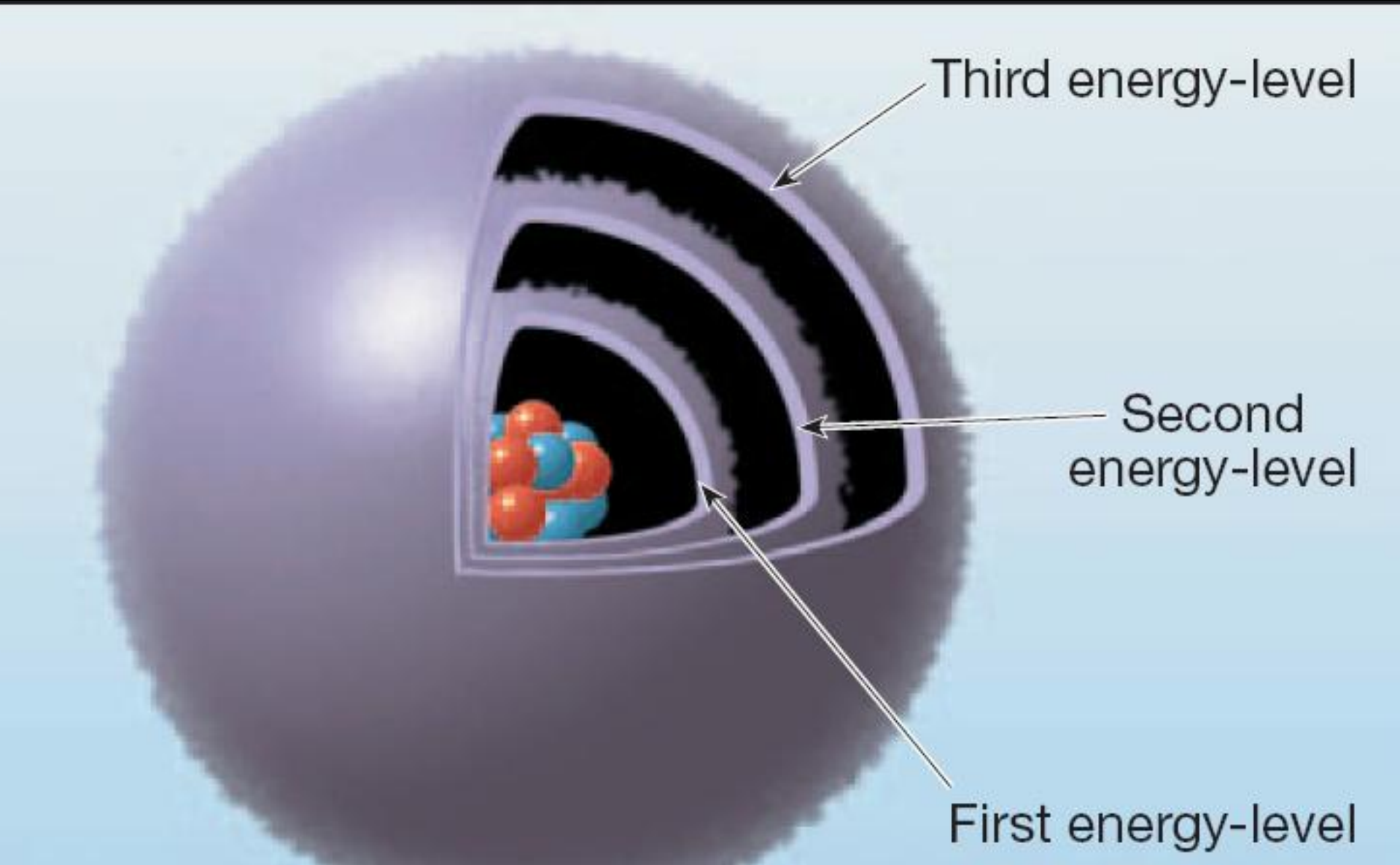
- Outside Nucleus.

E^-



Energy Level:

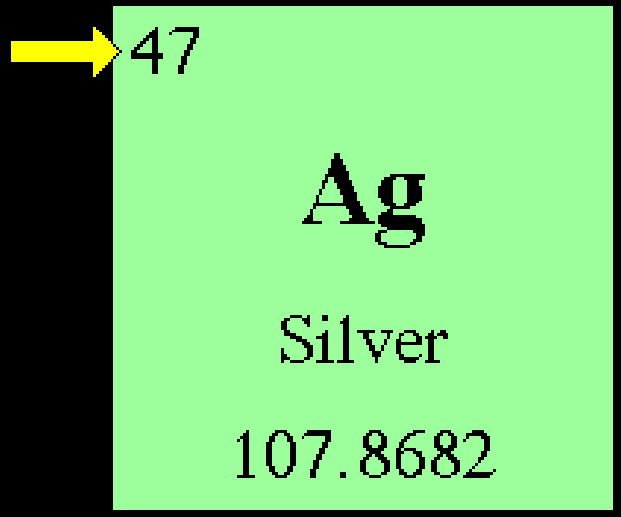
Area around nucleus. **Where electrons are.**



Atomic Number.

 # Protons in Nucleus of an Atom.

P^+ = # E^-

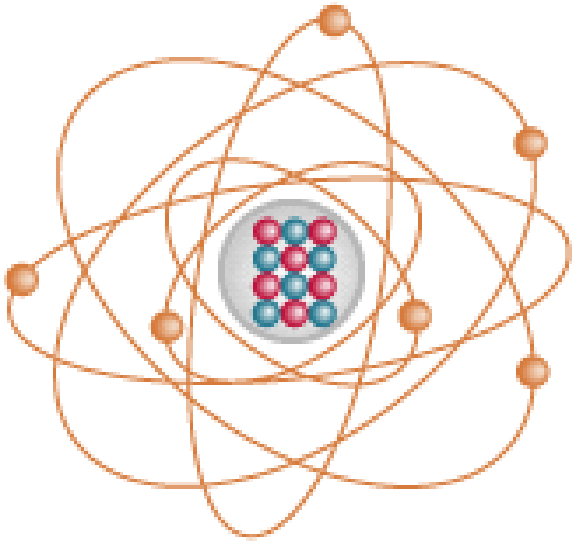


Mass Number:

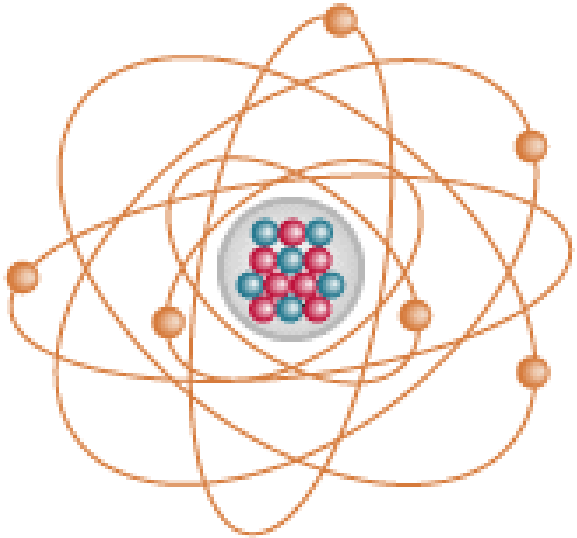
mass P^+ + mass N^o

Isotope.

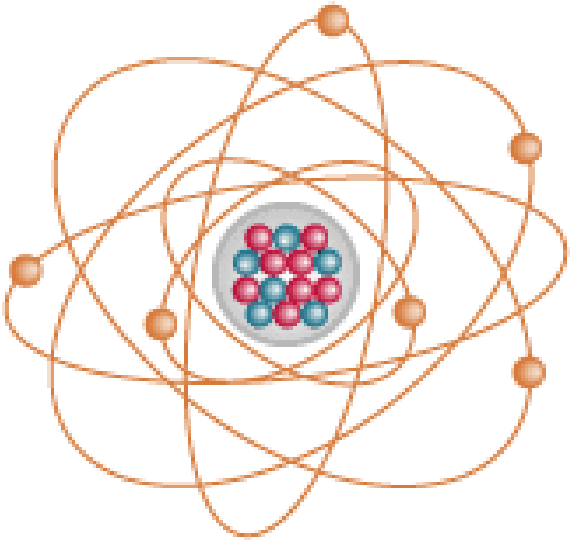
- Atom with diff. #'s P^+ and N^o
- Radioactive Decay.



Carbon-12
stable



Carbon-13
stable

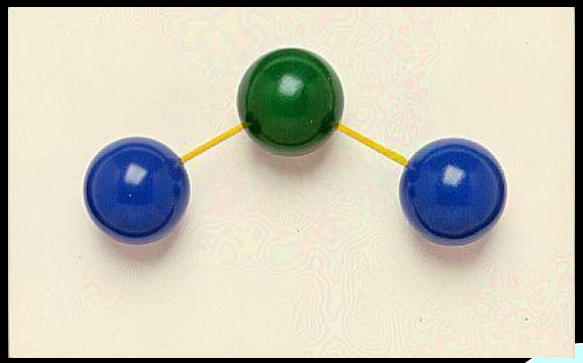


Carbon-14
unstable (radioactive)

Proton Neutron Electron

Compounds.

- **Combination of Elements.**
- Ex: H_2O
- Stable atoms.

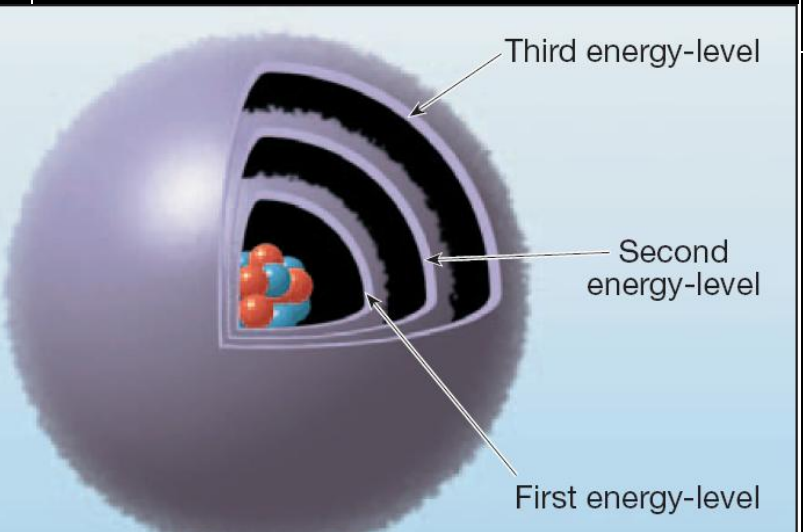


Atom. → **Element.** → **Compound.**

Atomic "**Bonding.**"

- Coming **together.**
- **Ex: "male bonding"**

- RECALL:
  - Energy Levels.

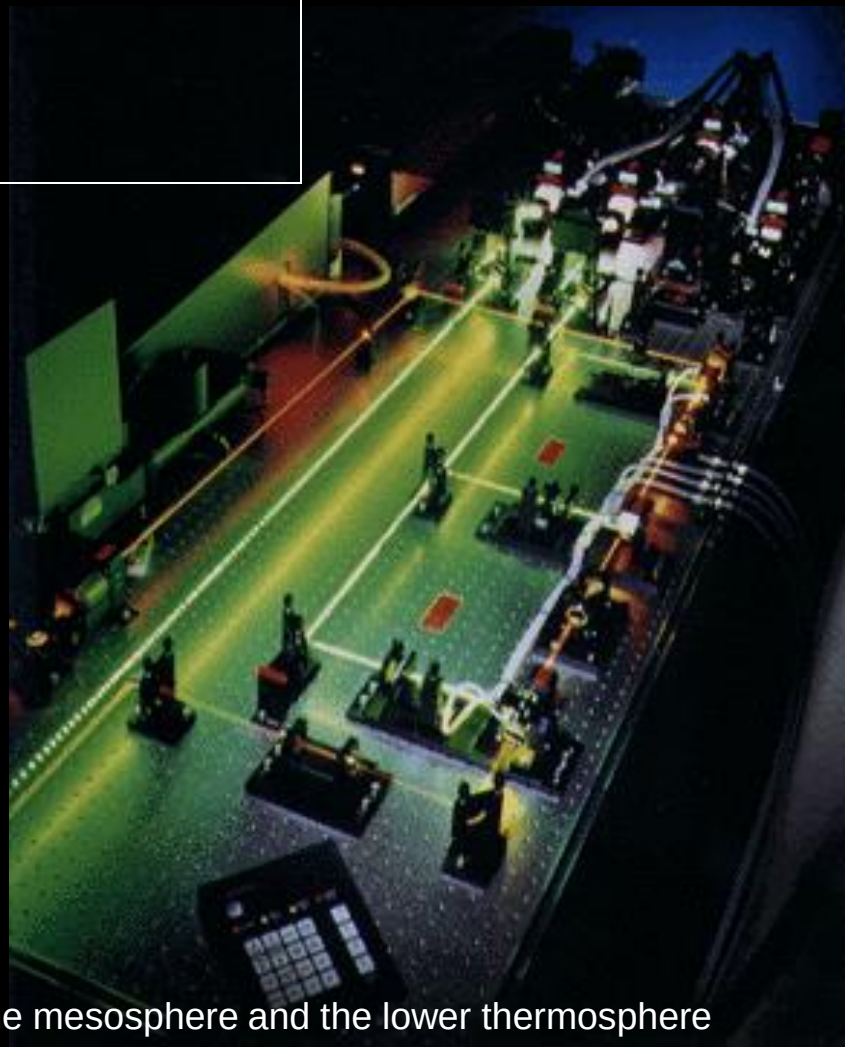


1. Energy Level: ≠ Max. # E^-
2. Chemical Bond w/ another atom.

Atoms vs. Ions

- **Atoms = same number P^+ & E^-**
  - Ex: (+3) + (-3) = 0
  - **charge is ZERO**

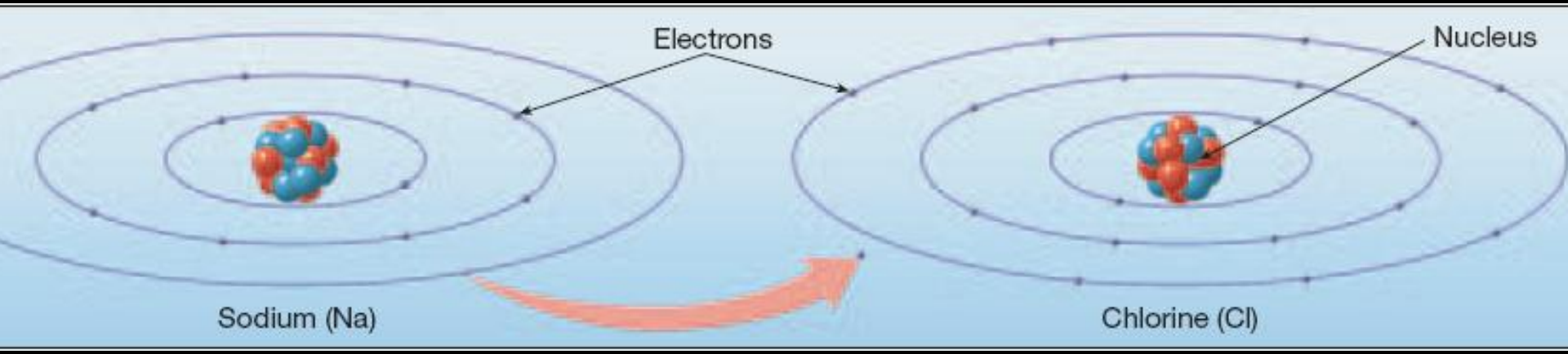
- **Ions** = same # P^+,
  …but **more or less** E^-
  - Ex: (+3) + (-4) = -1
  - Ex: (+3) + (-2) = +1
  - **Charge is (+ or -)**



*sodium ion laser is used to determine the temperature in the mesosphere and the lower thermosphere

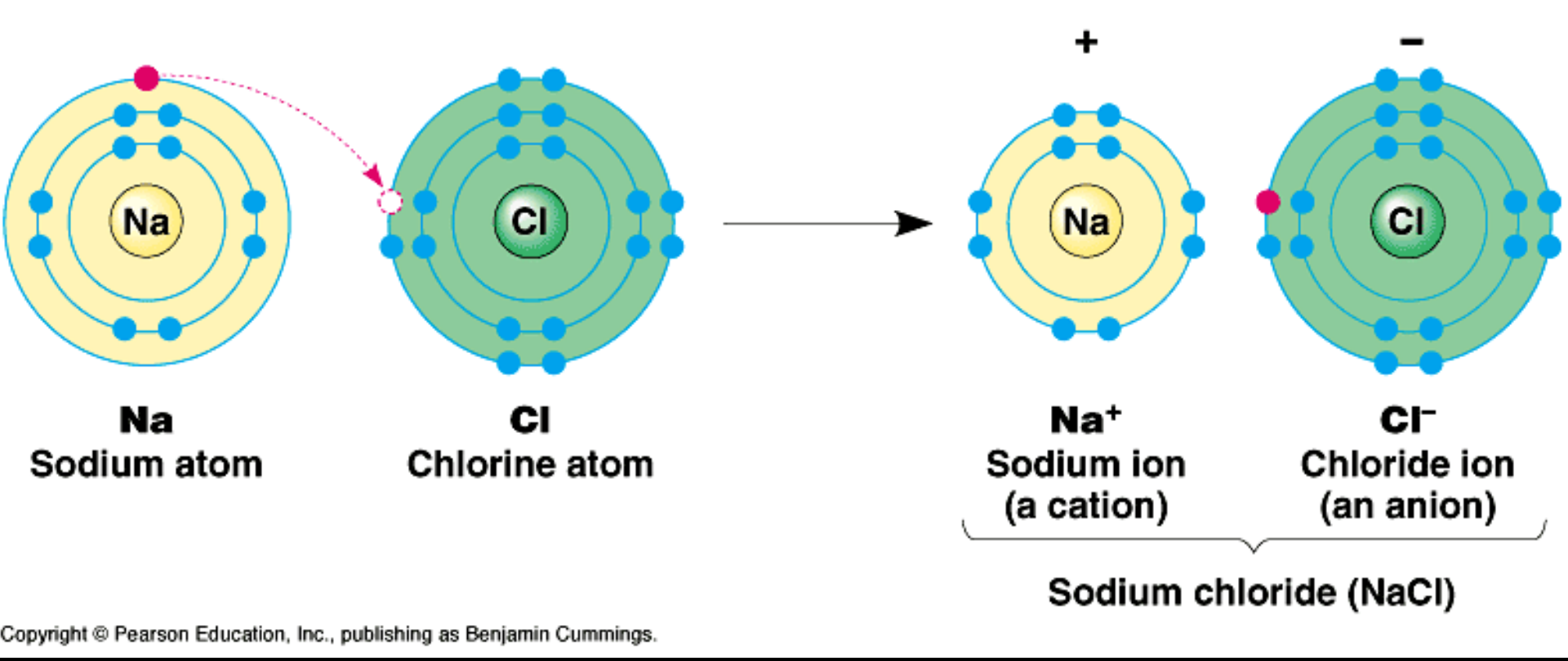
Chemical Bond.

Force. Holds atoms together.



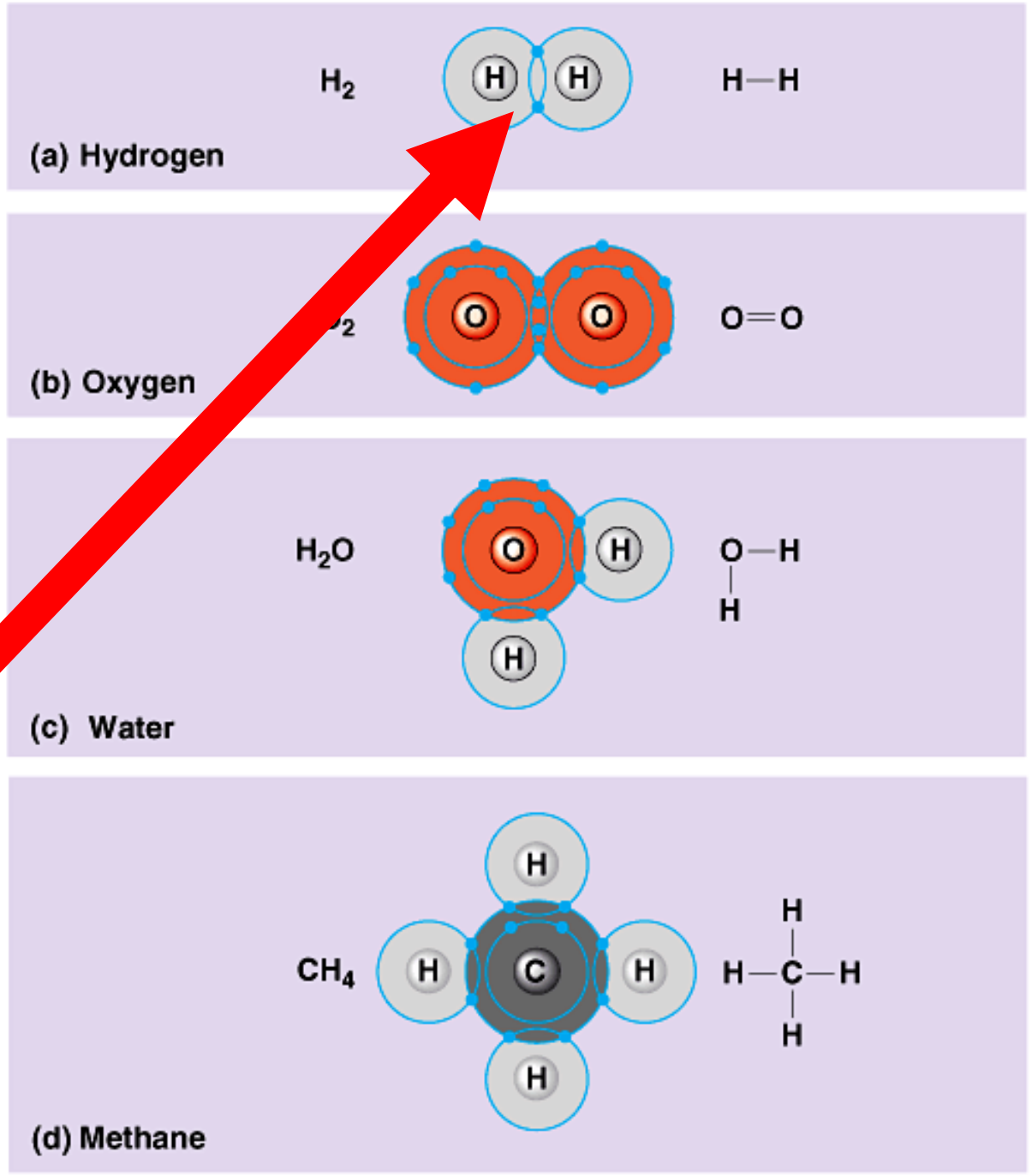
Ionic Bonds.

- Force between **Positive+ & Neg- Ions.**
- Like a **magnet.**

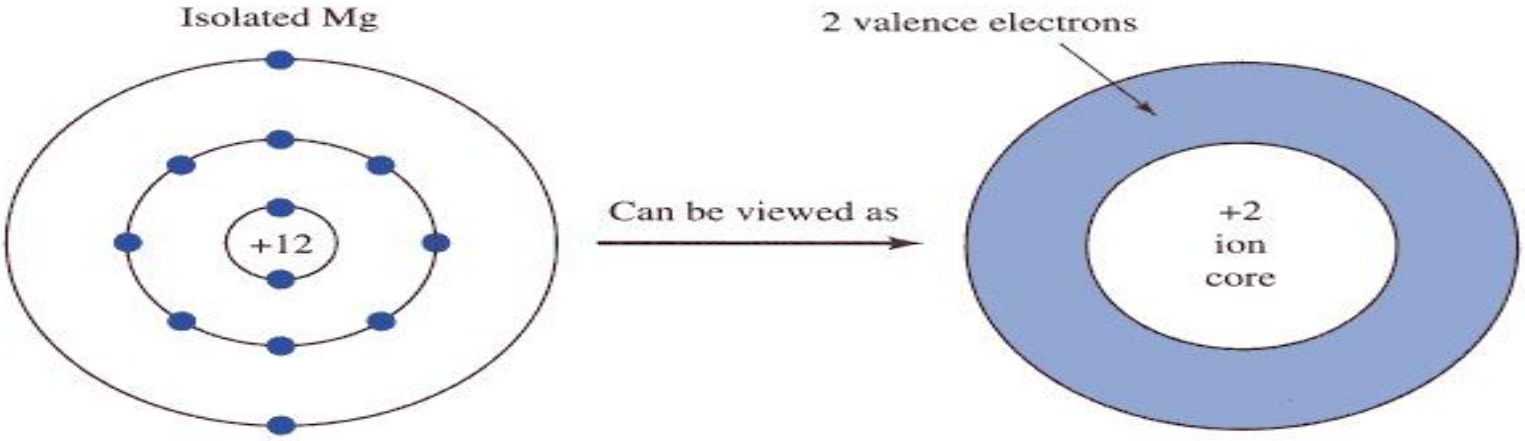


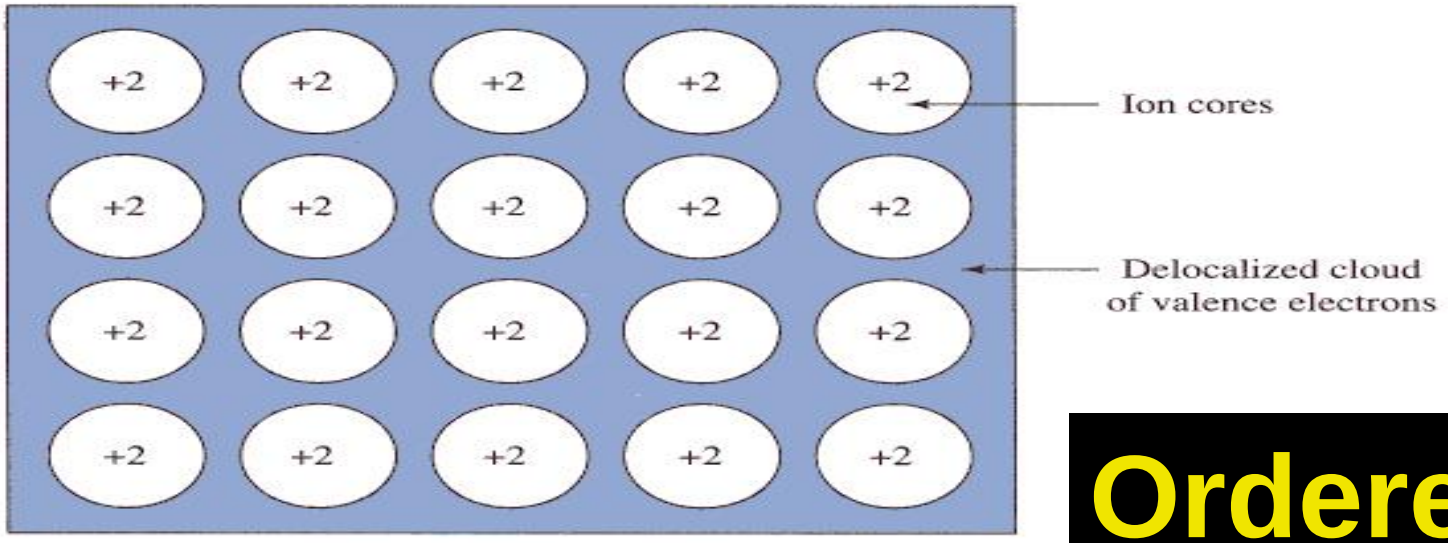
Covalent Bonds.

- 2 atoms
- Share E^-



Metallic Bonds.





Ordered!

Assignment.

- Use the **periodic table on p.36-37**
- **Pick one of the following elements:**
  - Helium (He)
  - Carbon (C)
  - Nitrogen (N)
  - Oxygen (O)

1. **Draw the element box** from the periodic table **(5pts)**
2. **Draw & COLOR** a picture of the atom **(5pts)**
   a) Make sure the # of PROTONS^{+}, NEUTRONS^{o} and ELECTRONS^{-} is correct!
   b) Label Protons, Neutrons, Electrons
3. **Draw & COLOR** a picture of a Positive^{+} or Negative^{-} ION for this atom. **(5pts)**
   a) Label Protons, Neutrons, Electrons

Assignment

- Read Chapter 2, Section 1 (pg. 34-43)
- Do Section 2.1 Assessment #1-6 (pg. 43)