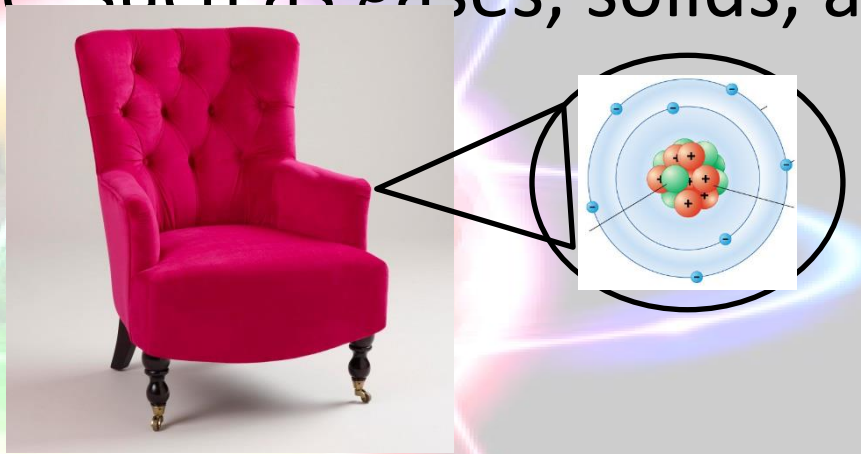
Chapter 4 Lesson 1 Notes

What is the current atomic model?

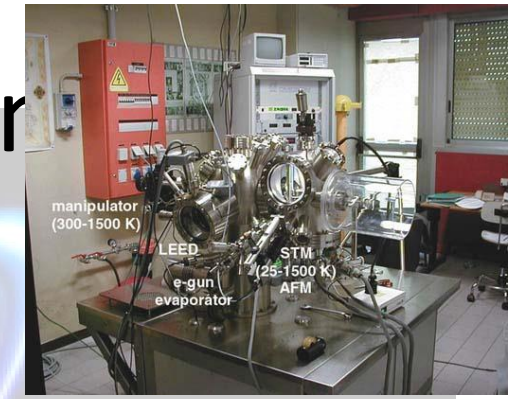
- **Matter** is everything that has mass and takes up space, such as gases, solids, and liquids.

Matter is not sound, heat, or light—these are forms of energy.



- An **atom** is a very small particle that makes up all matter.

Parts of the Ator



- Atomic-force microscopes show the surfaces of atoms.

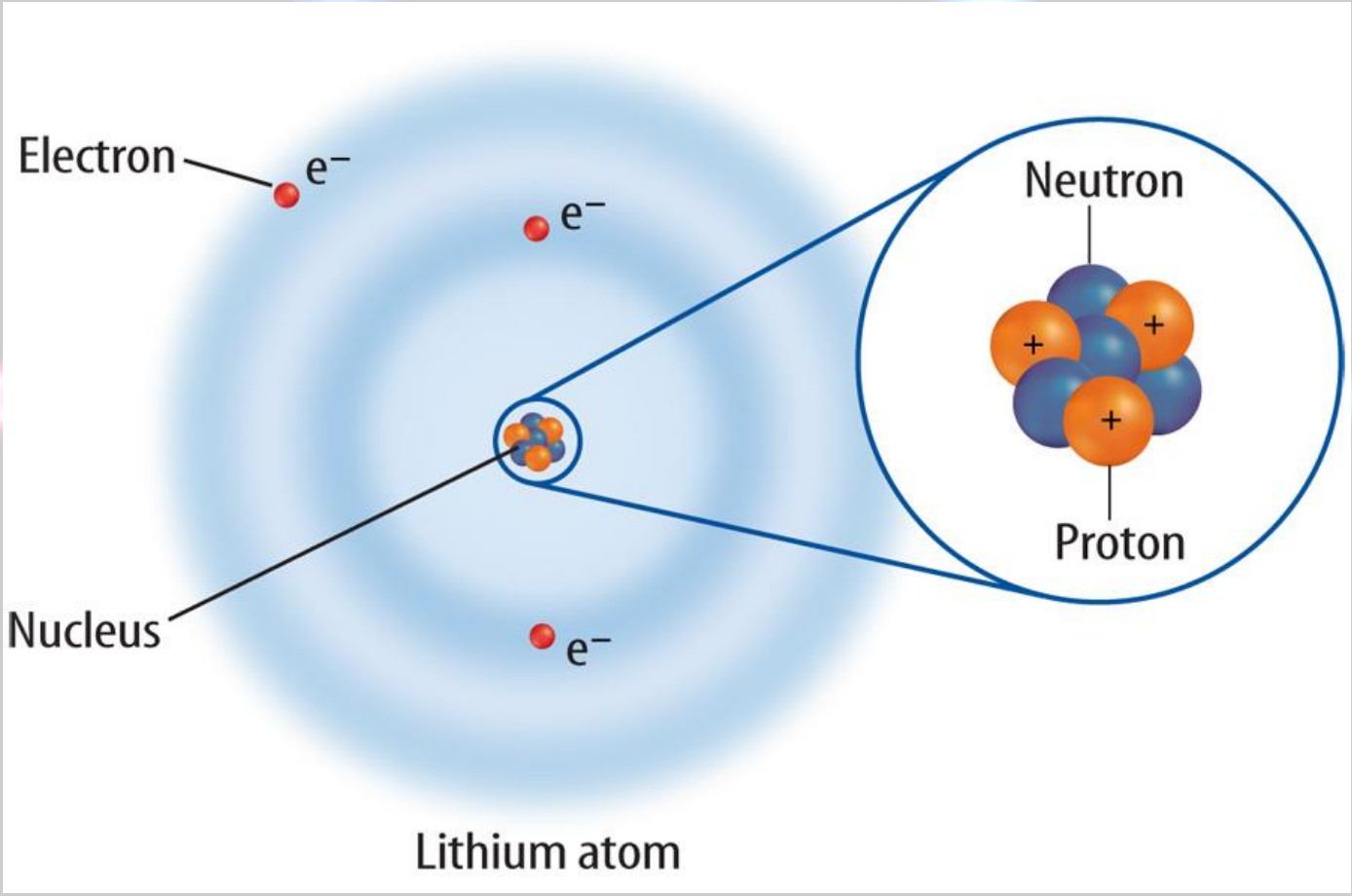
- The **nucleus** is the region located in the center of the atom.

- A particle with a positive charge is a **proton.**

- A particle with a negative charge is an **electron.**

- A **neutron** has no charge.

Parts of the Atom (cont.)



Parts of the Atom (cont.)

Concepts In Motion

The Size of Atoms

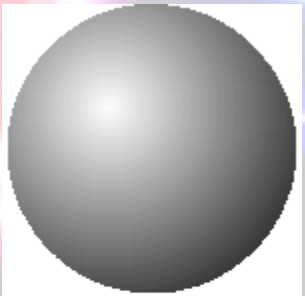
- Protons, neutrons, and electrons are all smaller than the atom.

Table 1 Properities of Atomic Particles

Particle	Charge	Mass (g)	Mass (amu)
Proton	+1	1.6727×10^{-24}	1.007316
Neutron	0	1.6750×10^{-24}	1.008701
Electron	–1	9.110×10^{-28}	0.000549

Historical Evidence of Atoms

- Democritus (460–370 B.C.) was the first to propose that atoms were indivisible solid spheres with no holes.



Democritus
(400 B.C.)

Homeroom

- You may work on homework from other classes
- You may work on your mission statement due Monday
- Remember your permission slips are due TOMORROW!!!!!

Flaming Wool!!!

- Observation: Steel wool can catch on fire!
- Question: Will the mass/weight of the wool change after it is on fire?
- Hypothesis:
- Experiment:
  - Take a piece of steel wool
  - Measure it's weight in a beaker and record.
  - Set it on fire
  - Use a beaker to put it in
  - Measure it's weight after the fire goes out

Flaming Wool

Observation: Steel wool can catch on fire!

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Hypothesis:

Experiment:

Take a piece of steel wool

Measure it's weight in a beaker and record.

Set it on fire

Use a beaker to put it in

Measure it's weight after the fire goes out

- Results: The steel wool and beaker weighed _____ before being set on fire, and _____ after being set on fire.
- Conclusion: The mass of the wool _____ after the chemical reaction of being set on fire.

The Law of Conservation of Mass

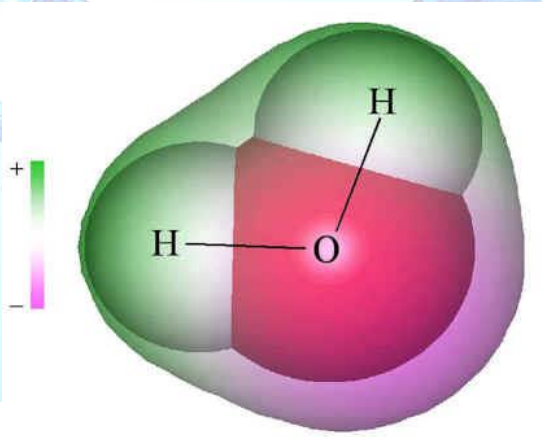
* Demonstration—Steel Wool

- A chemical reaction rearranges atoms of one substance into another substance with different properties.

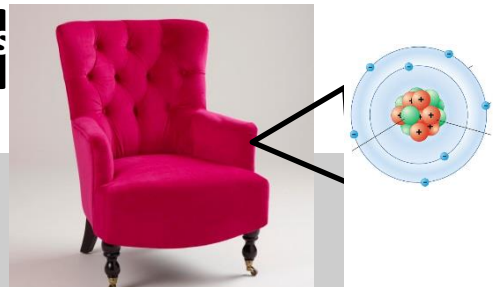
- The total mass of the starting materials is always equal to the total mass of the product.

The Law of Definite Proportions

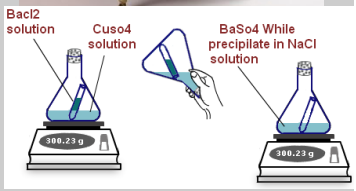
- Any pure compound always contains the same elements in the same proportion.
  - Water from your kitchen is the same as water in a glacier on Mars.
  - H_2O: two hydrogen atoms and one oxygen atom



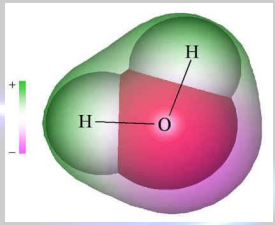
Dalton's Atomic Mod



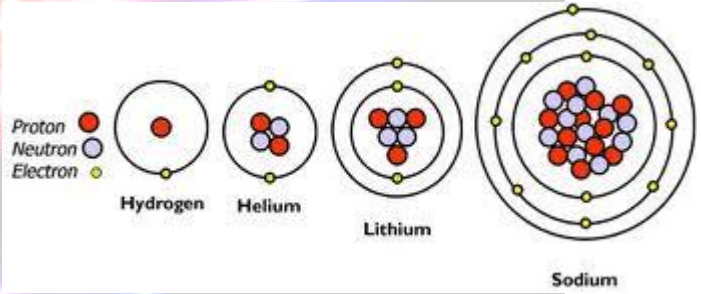
1. All matter is made up of atoms.
2. Atoms are neither created nor destroyed in chemical reactions.



3. Atoms of different elements combine in whole-number ratios.

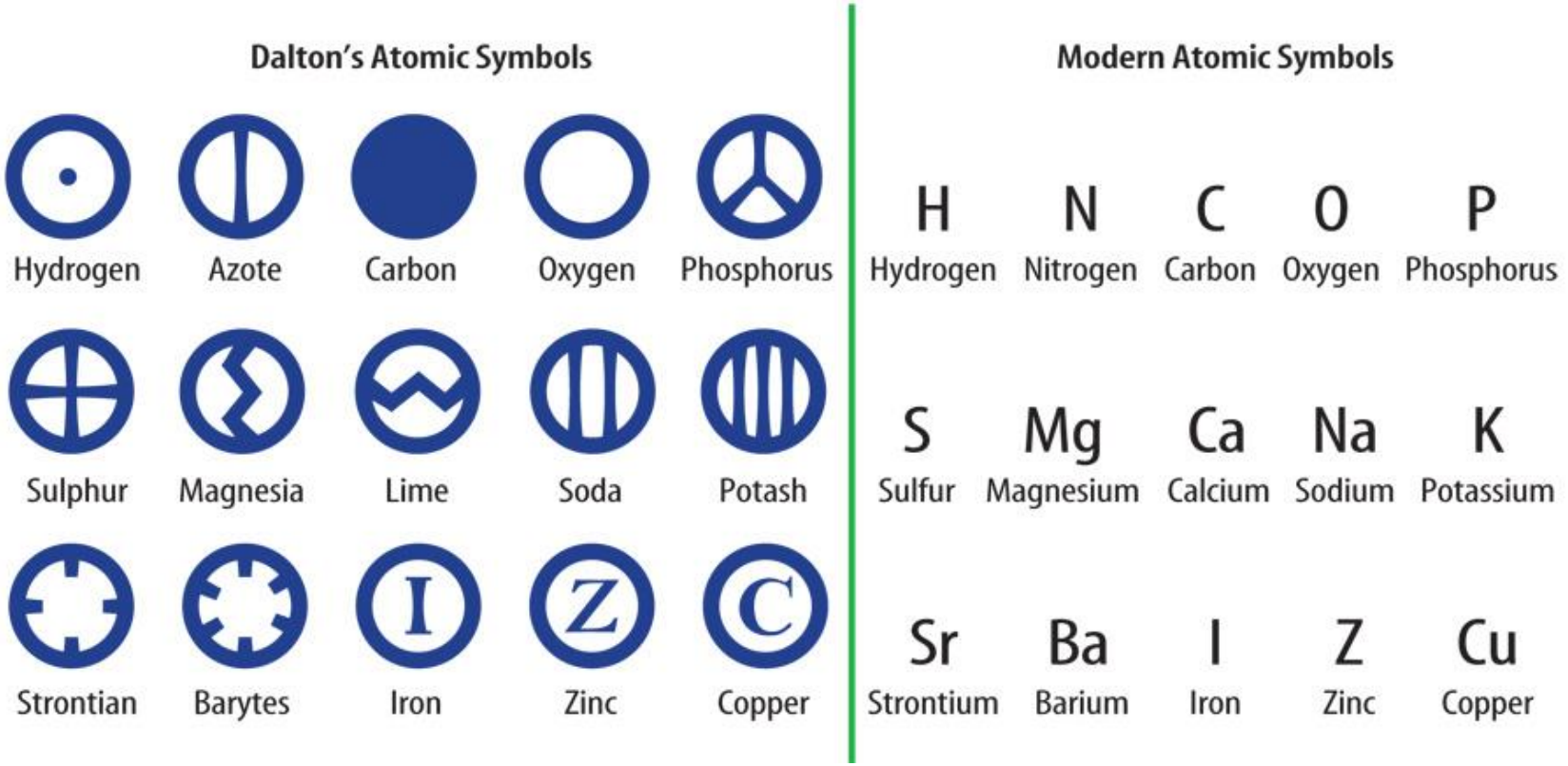


4. Each element is made of a different kind of atom.



5. The atoms of different elements have different masses and properties.

Dalton's Atomic Model (cont.)



LESSON 1 Review

CheckPoint

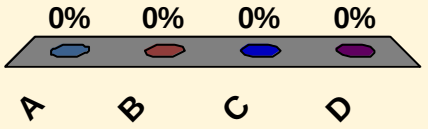
Which is NOT a particle in an atom?

A positron

B neutron

C electron

D proton



LESSON 1 Review

CheckPoint

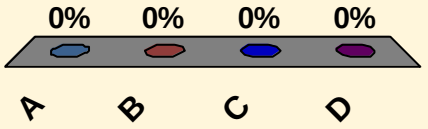
Which law states that the total mass of the starting materials equals the total mass of the product in a chemical reaction?

A Dalton's atomic model

B the law of conservation of mass

C the law of definite proportions

D Democritus' law



LESSON 1 Review

CheckPoint

_____ make up the nucleus of an atom.

A Protons and electrons

B Neutrons and electrons

C Protons and neutrons

D Neutrons and photons