

Developing Models of Matter

Empedocles - about 450 BC

- Earth, Air, Wind, Fire

Democritus - about 400 BC

- matter made of tiny particles
- called them *atoms*

AD 500-1600

- Alchemists-part philosopher, mystic, magician and chemist

Robert Boyle - about 1650

- " a pure substance that cannot be broken down into simpler substances"

Priestly, Lavoisier and Cavendish - late 1700's

- isolated oxygen and later hydrogen and recognised them as elements

John Dalton - 1808

- All matter is made of tiny particles
- Each element has its own kind
- Compounds are created when elements combine
- atoms cannot be created or destroyed

1831- Michael Faraday

- matter must contain positive and negative charges
- opposite charges attract, like charges repel
- atoms combine to form compounds because of electrical attractions

Ernest Rutherford -1911

- gold foil experiment
- a tiny dense positive core called the nucleus
- surrounded by mostly empty space containing the rapidly moving negative electrons

Inside the Atom

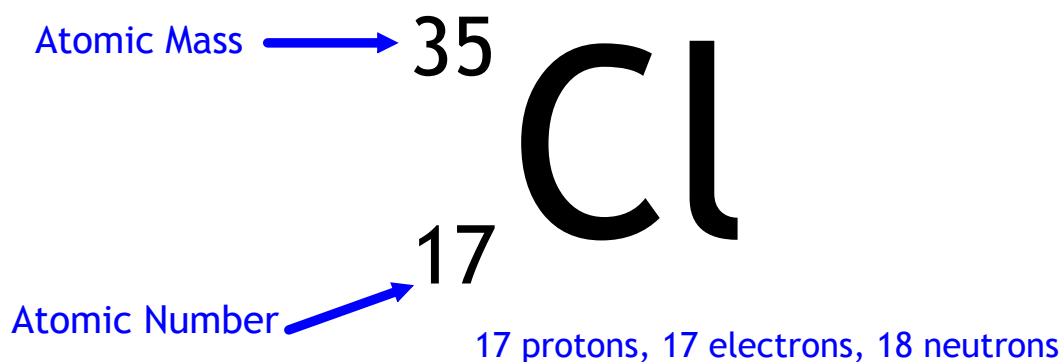
- atoms consist of sub-atomic particles
 - protons-positively charged
 - electrons-negatively charged
 - neutrons-neutral
- the number of protons is significant since it is this that determines what the element actually is

atomic number = number of protons

number of protons = number of electrons

number of neutrons = mass number - number of protons

Standard Atomic Notation



-Can also be written as Cl-35

Charged Atoms

- normally # of protons = # of electrons
- # of protons NEVER changes
- gaining or losing electrons produces what is called an ion
- this is a charged particle

EXAMPLE:

-sodium, Na, is atomic #11, therefore 11 protons and 11 electrons

-a sodium atom can lose 1 electron and therefore have 11 protons and 10 electrons

-this is one more + charge

