History of the Atom

Democritus (470 - 380 B.C)
- coined the term "atom"

a/tom
- a: no, not, none
- tom: to cut
- noncutable

Aristotle - (384 - 322 BC)
4 Element Theory - air, earth, fire, H_2O

John Dalton (1766 - 1844 England)
- Atomic Theory (1803)

1.) Elements are made up of tiny particles called atoms.
2.) All atoms of an element are identical (later to be revised)
3.) The atoms of a given element are different from those of another element.
4.) Elements combine to form compounds
5.) Law of Conservation of Matter (Lavoisier)
Mass/matter cannot be created or destroyed in a chemical reaction but can be rearranged.

J.J. Thomson (British - 1856 - 1940)

- experimented with cathode rays and saw "streams of mysterious particles" - proposed these particles were smaller than atoms
- Plum Pudding Model of the Atom
  - the atom is made up of a positively charged pudding with negative electrons distributed throughout to neutralize it.
- given credit for the discovery of the electron

Millikans Oil Drop Experiment -

Ernest Rutherford - (New Zealand, 1871 - 1937)

- given credit for discovery of the nucleus + the proton

Gold Foil Experiment - (1909) - conclusion

- the atom is mainly empty space through which electrons move + there is a tiny dense nucleus centrally located that contains all the atoms positive charge

Gold Foil Experiment

James Chadwick (British 1891-1974)
- discovery of the neutron
- noticed that the proton did not account for all the mass of the atom
- protons should be repelling each other
- protons + electrons attracting each other

Neils Bohr (Danish 1885-1962)
- if electrons gain energy they can jump from ground state to a higher energy level (excited state). When the atom losses energy + falls back to a lower energy level - it gives off a photon of light

Werner Heisenberg (1901-1976 German)
Uncertainty Principle - impossible to know both the exact location of an electron + its velocity at the same time