Science 8: Unit 2 – Chemistry
Lesson 2.4A – Atomic Theory Part I

Learning Outcomes

- **Many scientists contributed to the further development of atomic theory.**

Democritus (460-370 BCE)

- Greek philosopher
- proposed that _____ was made up of tiny particles that exist in empty space
- called these particles “atamos”, which means “uncuttable” because they could not be created, destroyed or divided any further
- based only on reason and _____

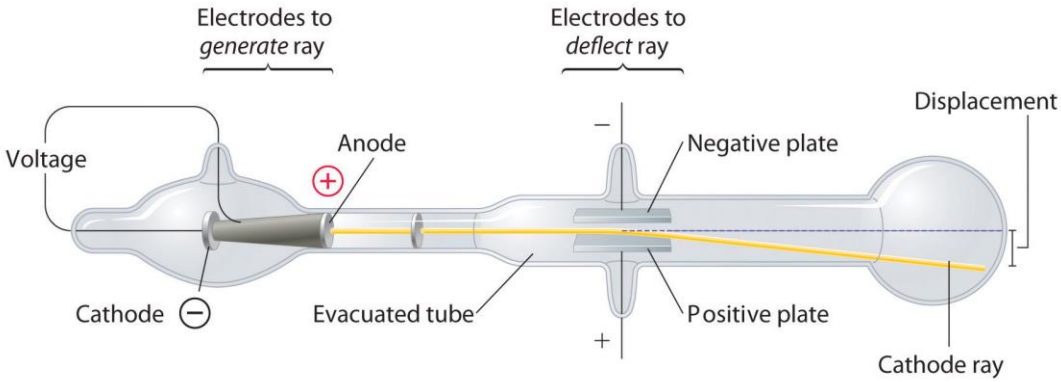
John Dalton (1776-1844)

- all matter is made of extremely small _____ called atoms
- atoms cannot be created, destroyed or divided
- all atoms of the same _____ are identical in size, mass and chemical properties
    - atoms of a specific element are different from atoms of another element
- compounds can be formed from different _____ combined in whole-number ratios
- in a chemical reaction, atoms are separated, combined or rearranged

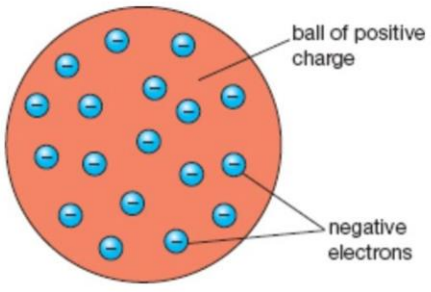
JJ Thomson (1856-1940)

- discovered the _____
    - studied electric currents in cathode ray tubes

- scientists had discovered that when they attached a _____ to the tube, a ray travelled through the tube
- his experiments determined that the ray was a stream of negatively _____ particles



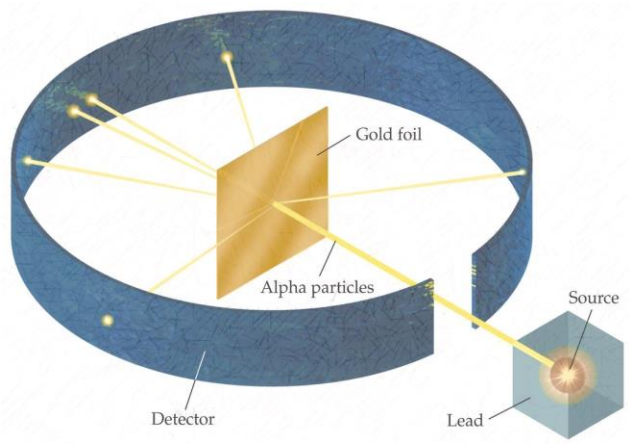
- determined that the mass of the charged particles was smaller than the mass of an atom of hydrogen
  - this meant that there were _____ particles than the atom
- developed the “plum pudding” _____
  - a positively charge ball with negatively _____ electrons embedded in it



Thomson’s ‘plum-pudding’ model of the atom

Ernest Rutherford (1871-1937)

- discovered the nucleus
    - had already discovered _____ particles (a helium nuclei)
    - gold foil experiment
        - performed by Hans Geiger and Ernest Marsden
        - aimed a stream of alpha particles at a very thin _____ of gold
        - alpha particles were deflected and some even bounced backwards



        - theorized that only a dense, positively charged mass could do this
        - called the central mass the _____
        - proposed that an atom was made of a positively charged nucleus surround by a cloud of _____

James Chadwick (1891-1974)

- doctoral student under Rutherford
- discovered that the _____ of an atom also contained neutral particles
- called them _____

Neils Bohr (1885-1962)

- also a student of _____
- analyzed the light released by various gases and knew that the light emitted by the gases was a result of high-energy electrons releasing _____
    - noted that electrons of a given _____ only emitted light of specific wavelengths
- proposed that this could only happen if the electrons surrounding the nucleus only occupy specific “energy levels” or “energy _____”
    - the _____ the shell, the higher the energy of an electron occupying it
    - showed that the chemical properties of an atom were determined by the number of electrons in the _____orbits

Assignment:

1. Topic 2.4 Atomic Theory Booklet