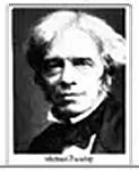
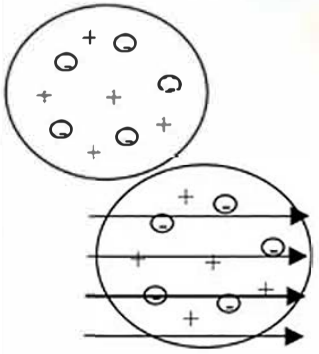
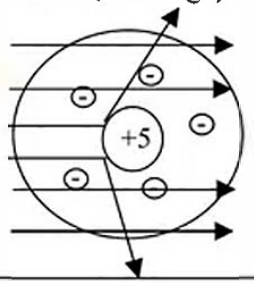
Atomic Theory Timeline

Democritus	**John Dalton**	**Michael Faraday**	**J. J. Thomson**	**Robert Millikan**	**Ernest Rutherford**
~450 BC 	1803 	1839 	1896 	1909 	1909 
Greek philosopher	English schoolteacher	English chemist	English physicist	American physicist University of Chicago	New Zealand scientist
All matter around us is made of indivisible tiny particles- "atomos"	**Dalton's Atomic Theory** 1) Elements are made of tiny particles called atoms. 2) Atoms of one element are identical while atoms of different elements are different. 3) Conservation of atoms—rearrangement in RXN (Lavoisier previously stated this in terms of the Law of Conservation of Matter) 4) Different atoms form compounds in **constant ratios.** (Proust previously stated this in terms of the constant mass ratios)	The structure of atoms is somehow related to electricity.	Discovered atoms have negative particles (electrons) using a cathode ray tube. Discovered electron's charge to mass ratio: 1.76×10^{8} C/g **Thomson's Plum Pudding Model, 1900** Electrons are dispersed in a uniform positive charge. 	Measured the charge of an electron using oil droplets. Electron's charge: 1.60×10^{-19} C Electron's mass: 9.11×10^{-28} g **Versus**	**Rutherford's Nucleus Theory** Positive charge is not like a pudding, but concentrated in the nucleus as shown in the **Gold Foil (alpha particle) experiment** *Most of an atom is empty space *1919- named positive charge the proton (+1) *1932- Rutherford and James Chadwick discover neutron in nucleus (no charge) 

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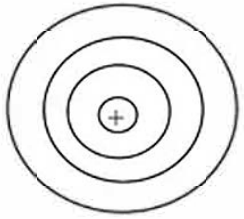
Henry Moseley (1887-1915) 	**Niels Bohr** 1911 	**Louis de Broglie & (Schrödinger)** 1924  
English scientist Rutherford student	Danish physicist	French graduate student
Moseley's Atomic # Each element contains a unique number of protons. (atomic #)	**Bohr's Orbit Model** *Electrons orbit the nucleus. *Model based on the hydrogen atom *Energy of the electrons is quantized. 	**Wave Mechanical Model** *Electrons can act like particles and waves (just like light) *Electrons occupy orbitals. **Orbitals are nothing like orbits.** They are areas of probability (90% of electron probability) *Clinton Davisson and Lester Germer performed experiments to support the wave mechanical model. S orbital  P orbital  D orbital