Topic 2.1 Evolving Theories of Matter

**Historical Timeline**

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| ***Date*** | ***Scientist*** | ***Theory*** | ***Model*** | ***Analogy*** |
| 400 B.C. | Democritus | **Atomos Theory of Matter** – all matter is composed of tiny indivisible particles |  |  |
| 350 B.C. | Aristotle | All matter is composed of earth, wind, fire and water |  |  |
| 1660 A.D. | Robert Boyle | Tiny particles group together in various combination to form all matter |  |  |
| 1780 A.D. | Antoine Laurent Lavoisier | Father of modern chemistry - Developed a system for naming all matter |  |  |
| 1794 A.D. | Marie Lavoisier | First female chemist continued the work of her husband in naming matter |  |  |
| **1808 A.D.** | **John Dalton** | **Billiard Ball Model of Matter – Each element is composed of a particle called an atom with identical, unique mass.** | **Featureless Sphere**  http://www.keetee.com/downloads/sphere.jpg | **Billiard Balls**  **http://www.poolandcuebilliards.com/images/balls.jpg** |
| **1897 A.D.** | **J.J. Thomson** | **Raisin Bun Model of Matter – Atoms are positively charged spheres in which negatively charged electrons were embedded like raisins in a bun** | **Uniform Charge distribution**  http://www.clickandlearn.org/images/jjthompson.gif | **Raisin Bun** http://www.thebakerscottage.com.my/bun/Butter%20Raisin%20bun.jpg |
| **1904 A.D.** | **Hantaro Nagaoka** | **Solar System Model of Matter – Negatively charged electrons in atoms orbit around a large positive charge.** | **http://www.clickandlearn.org/Gr9_Sci/atoms/dalton.gifFlat ring of electrons** | **Saturn**  http://www.clickandlearn.org/Gr9_Sci/atoms/saturn.gif |
| **1908 A.D.** | **Ernest Rutherford** | **Atoms were mainly empty space with a tiny positively charged centre called a nucleus calculated to be about 1/10 000th the size of the atom** | **Nuclear Model**  http://www.clickandlearn.org/Gr9_Sci/atoms/bohr.gif | **http://www.clickandlearn.org/Gr9_Sci/atoms/beehive.gifBeehive** |
| **1922 A.D.** | **Niels Bohr (Rutherford contemporary)** | **Electrons orbit in specific circular orbits or electron shells. Electrons jump between these shells by gaining or losing energy.** | http://www.clickandlearn.org/Gr9_Sci/atoms/ruther.gif | http://www.clickandlearn.org/Gr9_Sci/atoms/planetary.gif |
|  | James Chadwick | Refined Bohr’s model of atoms suggesting that the nucleus of an atom was made up of positively charged particles called protons and neutrally charged particles called neutrons. |  |  |
|  | Quantum Mechanics Theory | Electrons probability orbital’s (wave patterns). A cloud of electrons surrounding the nucleus. | Today’s quantum mechanics model describes the atom as a cloud of electrons surrounding a nucleus |  |