History of the Atom – Scientists

Democritus (460 BC – 370 BC)

- Proposed an Atomic Theory (along with his mentor Leucippus) which states that all atoms are small, hard, indivisible and indestructible particles made of a single material formed into different shapes and sizes.
- Issues with Aristotle (extra information)

Helpful Websites

http://www-groups.dcs.st-and.ac.uk/~history/Mathematicians/Democritus.html
http://periodictable.com/pages/AAE_Democritus.html
http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://scienceworld.wolfram.com/biography/Democritus.html
http://en.wikipedia.org/wiki/Democritus
http://chemsite.lsrhs.net/AtomicTheory/democretus.html
http://dbhs.wvusd.k12.ca.us/webdocs/AtomicStructure/Greeks.html

Antoine Lavoisier (1743 – 1794)

- Known as the "Father of Modern Chemistry"
- Was the first person to generate a list of thirty-three elements in his textbook
- Devised the metric system
- Was married to a 13-year old Marie-Anne Pierette Paulze; she assisted him with much of his work
- Was a tax-collector that was consequently guillotined during the French Revolution
- Discovered/proposed that combustion occurs when oxygen combines with other elements
- Discovered/proposed the Law of Conservation of Mass (or Matter) which states, in a chemical reaction, matter is neither created nor destroyed

Helpful Websites

http://www.vanderkrogt.net/elements/chemical_symbols.html
http://www.biographybase.com/biography/Lavoisier_Antoine_Laurent.html
http://mattson.creighton.edu/History_Gas_Chemistry/Lavoisier.html
http://chemsite.lsrhs.net/AtomicTheory/Lavoisier.html
http://www.chemheritage.org/classroom/chemach/forerunners/lavoisier.html
http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://scienceworld.wolfram.com/biography/Lavoisier.html

John Dalton (1766 – 1844)

- In 1803, proposed an Atomic Theory which states:
  - All substances are made of atoms; atoms are small particles that cannot be created, divided, or destroyed.
  - Atoms of the same element are exactly alike, and atoms of different elements are different
  - Atoms join with other atoms to make new substances
- Calculated the atomic weights of many various elements
- Was a teacher at a very young age (extra information)
- Was color blind (extra information)

Helpful Websites

http://www.slcc.edu/schools/hum_sci/physics/whatis/biography/dalton.html
http://www.chemheritage.org/classroom/chemach/periodic/dalton.html
http://www.iun.edu/~cpanhd/C101webnotes/composition/dalton.html
http://antoine.frostburg.edu/chem/senese/101/atoms/dalton.shtml
http://www.woodrow.org/teachers/chemistry/institutes/1992/Dalton.html
http://scienceworld.wolfram.com/biography/Dalton.html
http://www.bareket.org.il/colourblind/dalton.html
http://chemsite.lsrhs.net/AtomicTheory/dalton.html
http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://www.broadeducation.com/htmlDemos/AbsorbChem/HistoryAtom/page.htm
http://dbhs.wvusd.k12.ca.us/webdocs/AtomicStructure/Dalton.html

J.J. Thomson (1856 – 1940)

- Proved that an atom can be divided into smaller parts
- Using cathode-ray tubes, discovered corpuscles, which were later called electrons
- Stated that the atom is neutral
- In 1897, proposed the Plum Pudding Model which states that atoms mostly consist of positively charged material with negatively charged particles (electrons) located throughout the positive material
- Won a Nobel Prize (extra information)

Helpful Websites

http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://chemsite.lsrhs.net/AtomicTheory/thomson.html
http://scienceworld.wolfram.com/biography/Thomson.html
http://www.aip.org/history/electron/jjhome.htm
http://www.broadeducation.com/htmlDemos/AbsorbChem/HistoryAtom/page.htm
http://library.thinkquest.org/28582/history/elecdisc.htm

http://dbhs.wvusd.k12.ca.us/webdocs/AtomicStructure/Thomson-Model-Intro.html
http://dbhs.wvusd.k12.ca.us/webdocs/AtomicStructure/Disc-of-Electron-Intro.html
http://dbhs.wvusd.k12.ca.us/webdocs/AtomicStructure/HO2-DiscoveryElectron.pdf
http://www-outreach.phy.cam.ac.uk/camphy/nucleus/nucleus1_1.htm
http://www.jracademy.com/~jtucek/science/origins3.html
http://www.sciencemuseum.org.uk/on-line/electron/section2/shockwave2.asp

Ernest Rutherford (1871 – 1937)

- In 1909, performed the Gold Foil Experiment and suggested the following characteristics of the atom:
    - It consists of a small core, or nucleus, that contains most of the mass of the atom
    - This nucleus is made up of particles called protons, which have a positive charge
    - The protons are surrounded by negatively charged electrons, but most of the atom is actually empty space
- Did extensive work on radioactivity (alpha & beta particles, gamma rays/waves) and was referred to as the "Father of Nuclear Physics" (extra information)
- Won a Nobel Prize (extra information)
- Was a student of J.J. Thomson (extra information)
- Was on the New Zealand $100 bill (extra information)

Helpful Websites

http://www.accessexcellence.org/AE/AEC/CC/historical_background.html
http://www.nzedge.com/heroes/rutherford.html
http://chemsite.lsrhs.net/AtomicTheory/Rutherford.html
http://www.micro.magnet.fsu.edu/electromag/java/rutherford/index.html
http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://scienceworld.wolfram.com/biography/Rutherford.html
http://www.broadeducation.com/htmlDemos/AbsorbChem/HistoryAtom/page.htm
http://www-outreach.phy.cam.ac.uk/camphy/nucleus/nucleus6_1.htm
http://www.bcpl.net/~kdrews/introterms/intro7.html
http://www.almaz.com/nobel/
http://www.mhhe.com/physsci/chemistry/essentialchemistry/flash/ruther14.swf

Niels Bohr (1885 – 1962)

- In 1913, proposed the Bohr Model, which that suggests that electrons travel around the nucleus of an atom in orbits or definite paths. Additionally, the electrons can jump from a path in one level to a path in another level (depending on their energy)
- Won a Nobel Prize (extra information)
- Worked with Ernest Rutherford (extra information)

Helpful Websites

http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://chemsite.lsrhs.net/AtomicTheory/Bohr.html
http://csep10.phys.utk.edu/astr162/lect/light/bohr.html
http://scienceworld.wolfram.com/biography/BohrNiels.html
http://www.broadeducation.com/htmlDemos/AbsorbChem/HistoryAtom/page.htm
http://www-outreach.phy.cam.ac.uk/camphy/nucleus/nucleus7_1.htm
http://www.pbs.org/wgbh/aso/databank/entries/bpbohr.html
http://www.crystalinks.com/bohr.html
http://www.colorado.edu/physics/2000/quantumzone/bohr2.html
http://www.colorado.edu/physics/2000/quantumzone/bohr.html
http://www.epa.gov/radiation/understand/rutherford.htm

Erwin Schrodinger (1887-1961)

- In 1926, further explained the nature of electrons in an atom by stating that the exact location of an electron cannot be stated; therefore, it is more accurate to view the electrons in regions called electron clouds; electron clouds are places where the electrons are likely to be found
- Did extensive work on the Wave formula (extra information)
- Won a Nobel Prize (extra information)

Helpful Websites

http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://scienceworld.wolfram.com/biography/Schroedinger.html
http://www.colorado.edu/physics/2000/quantumzone/schroedinger.html
http://www.epa.gov/radiation/understand/rutherford.htm
http://web.jjay.cuny.edu/~acarpi/NSC/3-atoms.htm

James Chadwick (1891 – 1974)

- Discovered the Neutron in 1932
- Worked on the Manhattan Project (extra information)
- Won a Nobel Prize (extra information)
- Worked with Ernest Rutherford (extra information)

Helpful Websites

http://www.manchester2002-uk.com/celebs/scientists4.html
http://atschool.eduweb.co.uk/kingworc/departments/chemistry/chadwick.html
http://www.chemsoc.org/timeline/pages/timeflash_01.html
http://scienceworld.wolfram.com/biography/Chadwick.html
http://chemsite.lsrhs.net/AtomicTheory/chadwick.html
http://nobelprize.org/physics/laureates/1935/chadwick-bio.html
http://www-outreach.phy.cam.ac.uk/camphy/physicists/physicists_chadwick.htm