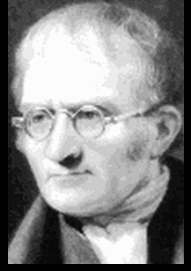
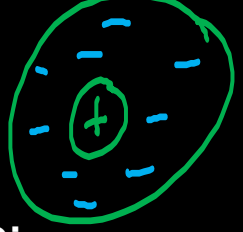
Discoveries About the Atom

FAMOUS SCIENTISTS TIMELINE



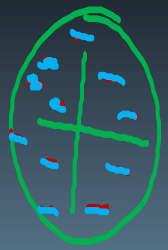
Publishes atomic theory (atom is sphere)
John Dalton
1808

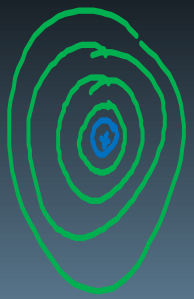


Discovers positively charged nucleus
Ernest Rutherford
1911

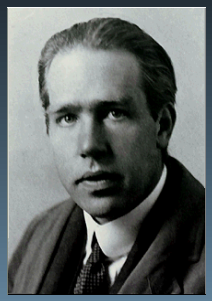
Does work that leads to electron cloud model
Erwin Schrödinger
1926

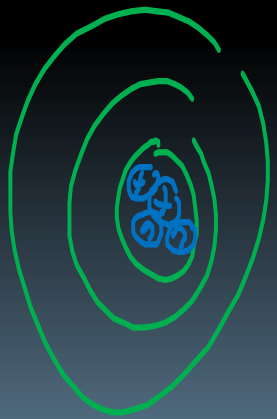
1897
JJ Thomson
Discovers electron, develops Plum Pudding Model of the atom



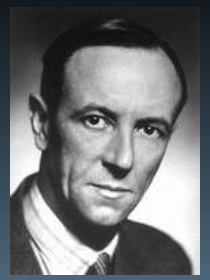


1913
Niels Bohr
Proposes electrons move in orbits around nucleus



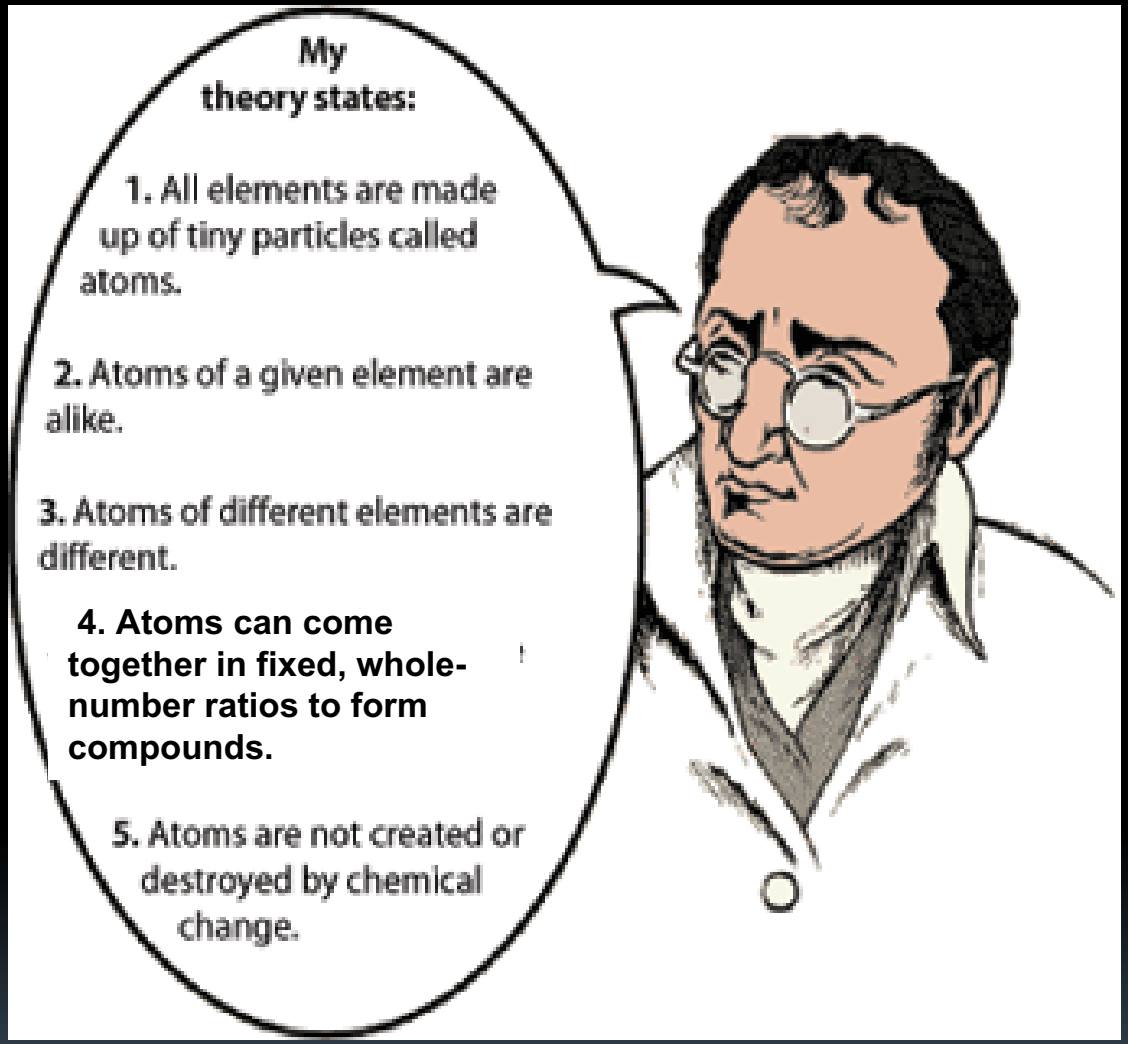


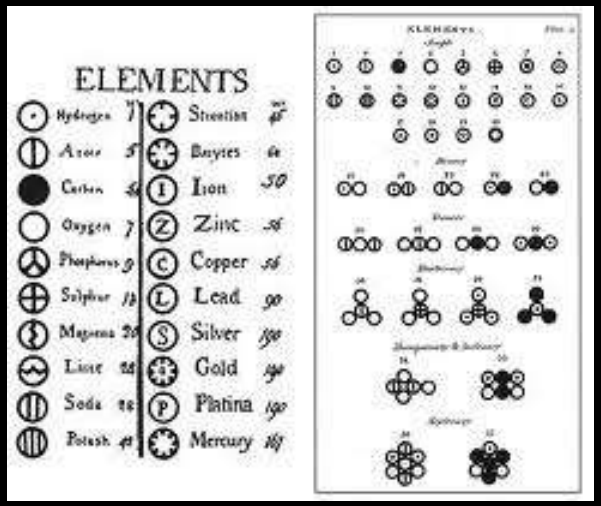
1932
James Chadwick
Confirms existence of neutron



The End

Dalton's Model of Atom and Atomic Theory

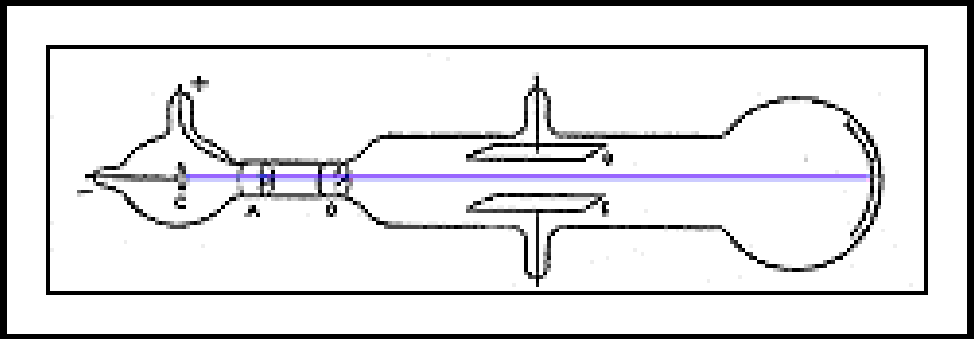


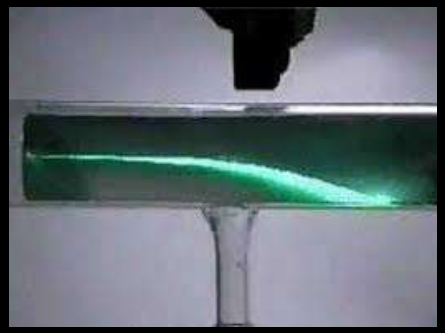


He also developed the first table of atomic masses. This is from his work *New System of Chemical Philosophy.*

These are pictures of the actual models Dalton created to illustrate his theory about the atom. He believed atoms were indivisible, indestructible spheres. These balls are currently on display in the Science Museum in London.

Source: http://www.sciencemuseum.org.uk/objects/experimental_chemistry/1949-21.aspx?keywords=Dalton

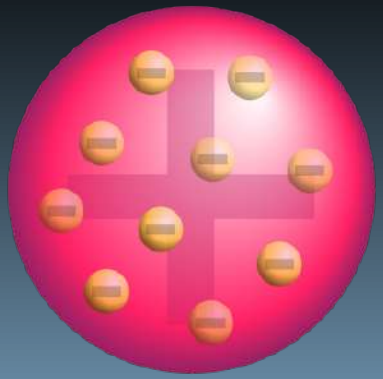




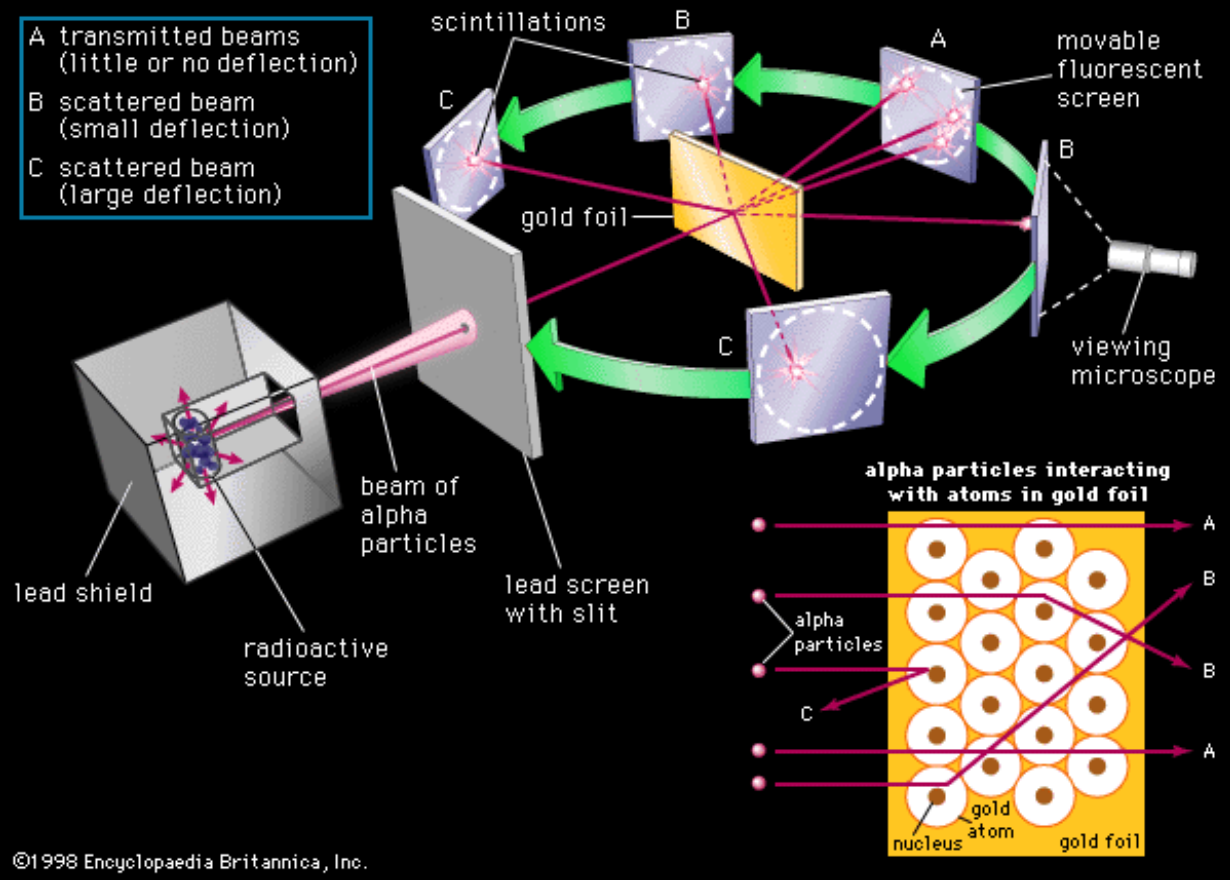
Cathode Ray Tube (CRT) Experiments

In the late 1800s, J.J. Thomson was working with something called electric discharge tubes. It was known the glowing beam was produced by something being emitted from the positive plate (cathode), but he wanted to know what it was…

Based on his results, he developed the Plum pudding model of the atom, modeled on a popular Christmas desert. In this depiction, the atom is still a sphere, with the entire atom being a field of weakly positive charge that has negative charges (electrons) scattered throughout. The overall effect was that of a neutral atom, which Thomson knew to be true.

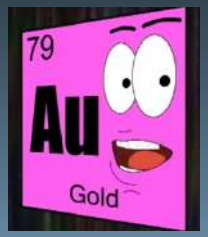


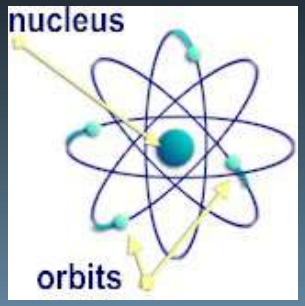
Don't like the idea of plum pudding? Think of it as the chocolate chip cookie model.



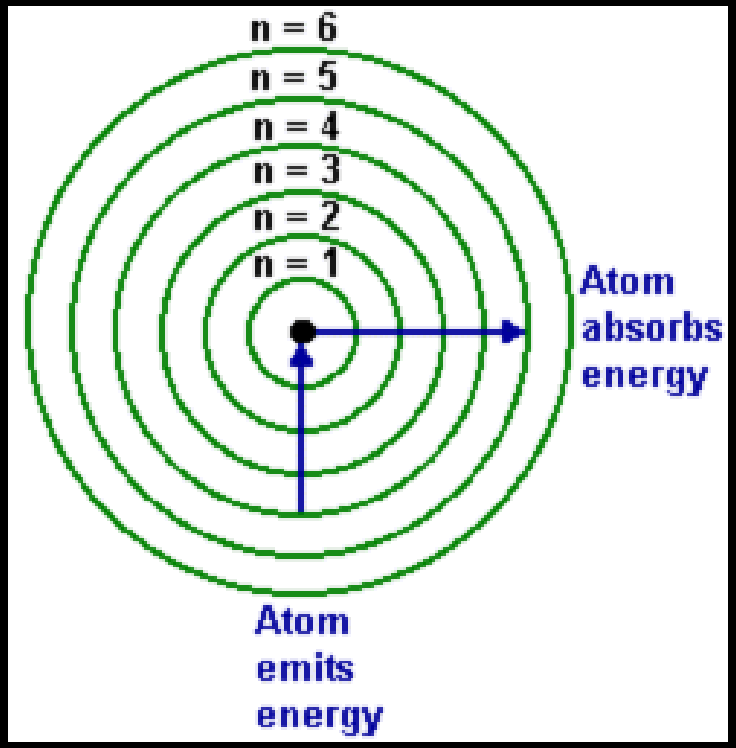
Nucleus

Rutherford discovered the nucleus with his famous Gold Foil Experiment. He believed that the electrons orbited the nucleus. The nucleus was positive, the electrons were negative.





Bohr Model

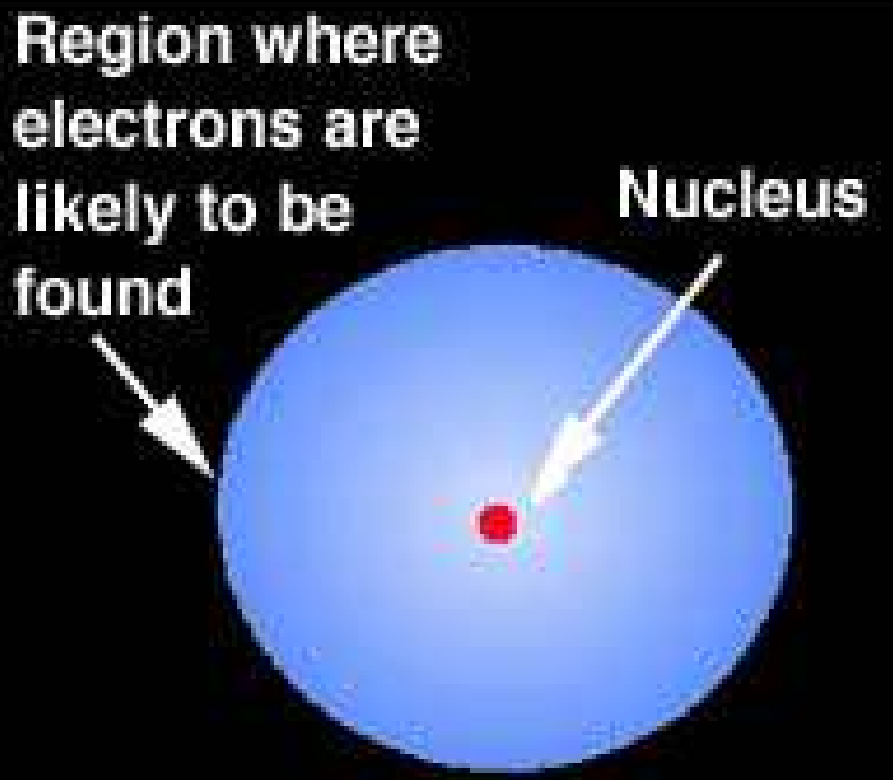


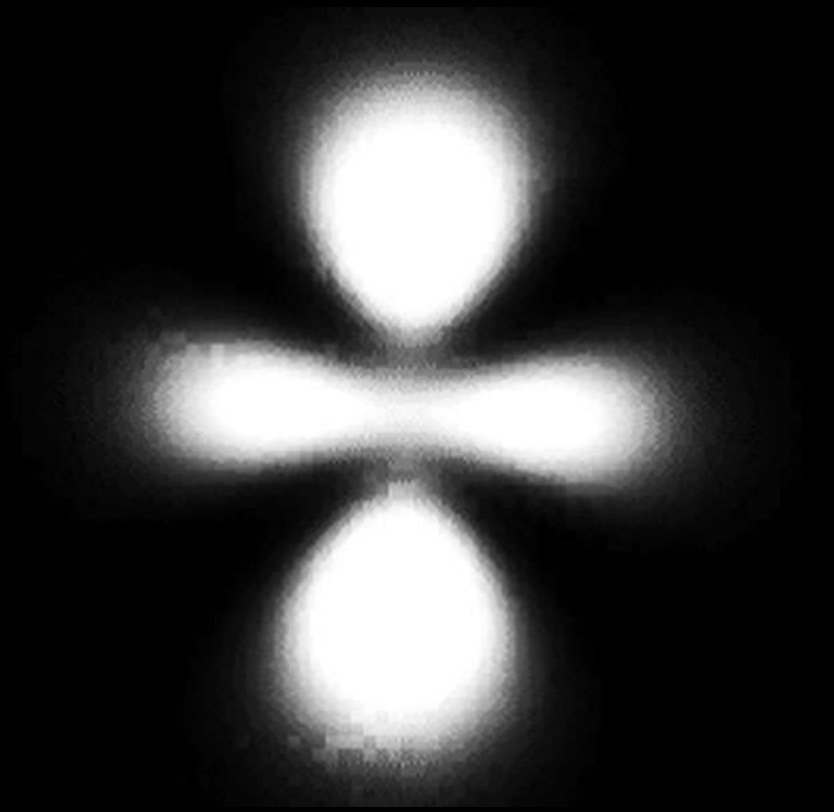
Bohr discovered that the electrons exist in distinct levels that surround the nucleus. He believed that all of these levels were spherical layers around the nucleus, and that the electron was confined within these layers. They could from one to another, but they were always found in one of the layers.

Think like an onion.

(Or an ogre…ogres have layers…)

*Interesting: Bohr was Rutherford's student.

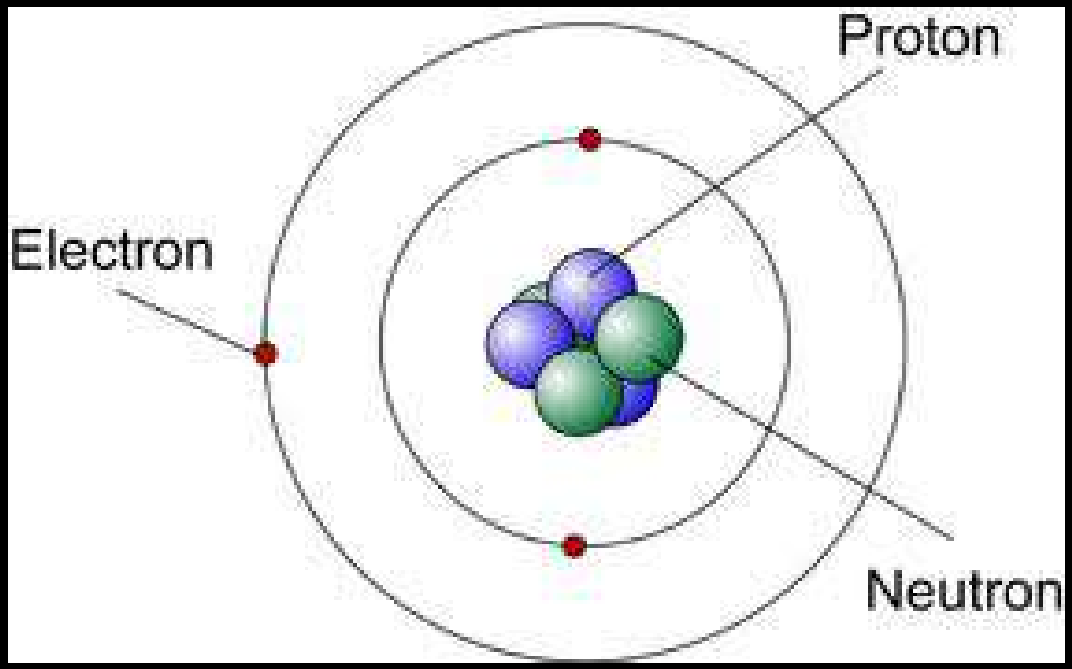


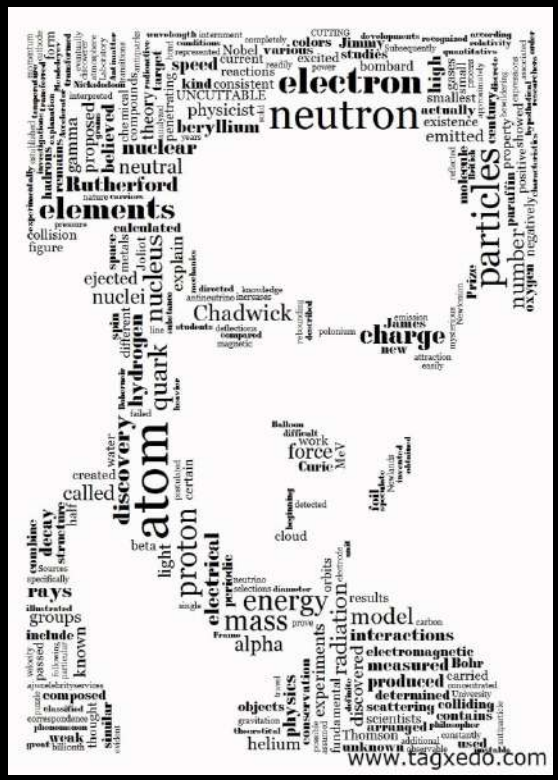


Quantum Mechanical Model

Schrödinger did some mathematical modeling that led him to develop the electron cloud model of the atom. (Which was 3D, unlike Bohr's.) In this theory, the electrons are found outside the nucleus, in "cloud" areas. Later, imaging proved his theory to be correct.

In reality, the atom is a blend of Bohr's model and the electron cloud model. The "clouds" are layered, combining both models – to give the quantum mechanical model – our currently accepted model of the atom.





Atom with Neutrons

Chadwick discovered the neutron, which accounted for the "missing" mass that was known to be present in the nucleus.
More information….

*Even more Interesting: Chadwick was also Rutherford's student.