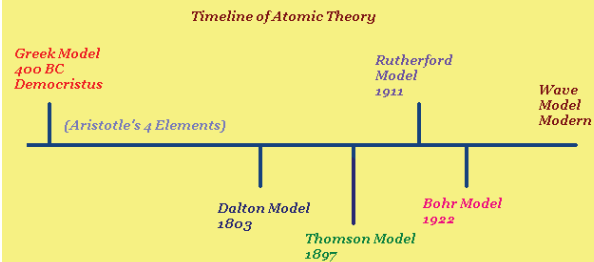
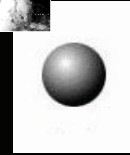


The History of Atomic Theory



Democritus

- Greek philosopher
400 BC
- Matter could not be divided into smaller and smaller pieces forever.
- Named the smallest piece of matter "atomos," meaning "not to be cut."



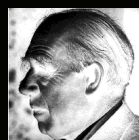
Why?

Aristotle and Plato favored the earth, fire, air and water approach to the nature of matter.

Their ideas were believed because of their standings as philosophers.



Who are these men?

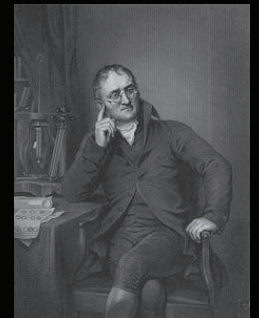


This theory was ignored and forgotten for more than 2000 years!

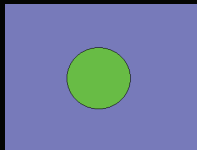


Dalton's Model

- English Chemist John Dalton
- Early 1800s
- Performed experiments that eventually led to the acceptance of the idea of atoms.



Foundation of Modern Chemistry



- Elements are composed of atoms.
- Atoms are indivisible and indestructible.
- Atoms of the same element are exactly alike.
- Atoms of different elements are different.
- Compounds are formed by the joining of atoms of two or more elements.



- Atom = positively charged substance with negatively charged electrons scattered about, like raisins in a pudding.

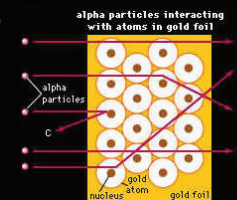
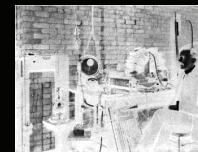


- When passed current through gas, it gave off rays of negatively charged particles.



Rutherford's Gold Foil Expt

- English physicist Ernest Rutherford
- 1908
- Fired (+) particles at gold foil (2000 atoms thick)
- Most went "through"; some bounced back



Thomson's Plum Pudding Model



- English scientist J.J. Thomson
- 1897
- 1st hint that an atom is made of even smaller particles.

Conclusions:

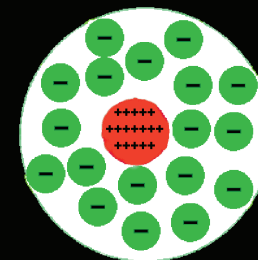
- (-) charges came from within the atom.
- The atom was divisible!
- He called them "corpuscles," today known as electrons.
- He reasoned there must be (+) particles, but never found them.

Where did they come from?



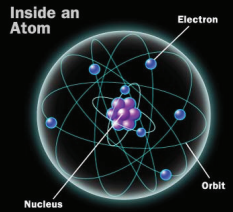
Conclusions

- Atoms were mostly open space
- An atom had a small, dense, positively charged center that repelled his positively charged "bullets."
- He called the center = the "nucleus"
- Electrons are outside nucleus.



Bohr Model

- Danish scientist Niels Bohr
- 1913
- Electrons move in orbits around nucleus
- These orbits, or energy levels, are located at certain distances from the nucleus.



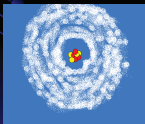
Electron Cloud

- A space in which electrons are likely to be found.
- E- whirl about the nucleus billions of times in one second
- E- with lowest energy are found closest to the nucleus
- E- with highest energy are found, farther from the nucleus.



The Wave Model

- Based on wave mechanics.
- Electrons do not move about an atom in a definite path, like the planets around the sun.
- Impossible to know exact location of an electron.
- According to the modern atomic model, an atom has a small positively charged nucleus surrounded by a large region in which there are enough electrons to make an atom neutral.



Review

	Indivisible	Electron	Nucleus	Orbit	Electron Cloud
Greek	X				
Dalton	X				
Thomson		X			
Rutherford		X	X		
Bohr		X	X	X	
Wave		X	X		X