

## History of the Atom

### **Democritus** ~ 400 BC

- Greek philosopher
- Claimed that matter can be cut in half repeatedly until reaching the smallest possible bit of matter
  - He called this smallest particle "atomos" which meant indivisible (cannot be divided)

### **Aristotle**

- Greek philosopher
- Had much more influence at the time than Democritus
- Didn't buy into the idea that Democritus proposed, so most others didn't either.

*Neither Democritus nor Aristotle based their ideas on experimentation or observation. They were philosophers – they were just thinking and reasoning.*

*More than 2,000 years passed before people started looking into the topic of matter again and this time, the process was more experimental.*

### **Dalton** - 1800s

- Came up with the Atomic Theory (5 parts)
  - 1) All matter is composed of atoms
  - 2) Atoms cannot be created nor destroyed
  - 3) All atoms of the same element are identical
  - 4) Chemical reactions occur when atoms are rearranged
  - 5) Compounds are two or more different kinds of atoms

*The idea of the atom was now accepted. Now people wanted to know more about the atom.*

### **Thomson**

- Discovered the electron – negatively charged particle
- Knew that the atom had to have a neutral charge so his model showed electrons evenly distributed throughout the atom.

### **Rutherford**

- Discovered the proton – positively charged particle
- Found a dense area in the center of the atom, called it the nucleus
- This dense area had a positive charge
- Electrons circulated around the nucleus, so most of the atom must be empty space

### **Bohr**

- Electrons travel around the nucleus in energy levels (orbits)
  - Electrons could not exist between the energy levels
- Electrons *can* move up from one level to the next if they are given enough energy
  - Quantum of energy – just enough energy to move an electron up one level

### **Heisenberg**

- Heisenberg Uncertainty Principle – it is impossible to know the speed and location of an electron (or any particle for that matter) at the same time.

### **Schrodinger**

- Since it is not possible to pinpoint the location of an electron, we can only know regions of probability of finding an electron in a given area (we call these "orbitals")
  - Electron cloud model

### **Chadwick**

- Discovered neutron
- In the nucleus along with protons