

# Chapter 16: Properties of Atoms and the Periodic Table

## Section 1: Structure of the Atom

**Atom:** smallest particle of an element that retains the element's properties

- So, the element iron is made of iron atoms
- Made up of subatomic particles:
  - **protons:** positively charged
  - **neutrons:** neutral in charge
  - **electrons:** negatively charged
- **Nucleus:** small positively charged center of an atom
  - contains protons and neutrons

The Atomic Model:

- Greek philosopher Democritus (400 BC) proposed that matter was formed of small particles that could not be cut into smaller pieces.
  - He called it *atomos* meaning “uncuttable”
- Aristotle, philosopher, disputed Democritus's ideas and proposed that matter is uniform throughout and was not composed of these small particles
- John Dalton, English scientist, (1800s) was able to present evidence to suggest that atoms exist and have certain characteristics
  - He proposed the Atomic Theory

- J.J. Thomson – Plum pudding model (1904)
  - Electrons all “floating” around the atom
- Ernest Rutherford – Gold foil experiment (1911)
  - Discovered the positive nucleus in the atom
- Niels Bohr – called the “planetary model” (1913)
  - hypothesized that electrons travel in fixed orbitals
- Electron Cloud finalized the atomic theory (1926)
  - the area around the nucleus of an atom where electrons are most likely to be found
  - the electron cloud is 100,000 times larger in diameter than the diameter of the nucleus
- The size of an atom can be compared to a marble on the 50- yard line of a football field with the electrons all around