

**6 • Structure of the Atom
The Subatomic Particles
(1 of 8)**

<u>Name</u>	<u>Symbol</u>	<u>Mass</u>	<u>Charge</u>	<u>Location</u>
protons	p ⁺	1 u	1+	part of the nucleus
neutron	n ^o	1 u	0	part of the nucleus
electron	e ⁻	$\frac{1}{1837}$ u	1-	normally at large distances from the nucleus

J.J. Thompson is given credit for discovering **electrons** using a Crookes tube and testing many different gases. Cathode rays were found to be beams of electrons.

Cavendish is given credit for the discovery of the **neutron**.

**6 • Structure of the Atom
Terms I-- Atomic Structure
(2 of 8)**

atoms	the smallest particle of an element . It consists of a central nucleus and electron clouds outside the nucleus.
nucleus subatomic	the dense central portion of an atom. smaller than an atom. The proton, neutron, and electron are subatomic particles.
net charge	the difference in the positive charge due to protons and the negative charge due to electrons in an atom.
nucleons	the particles that make up the nucleus.

**6 • Structure of the Atom
Terms II-- Atomic Structure
(3 of 8)**

atomic number	the number of protons in an atom. This number determines the identity of an element.
mass number	the number of protons + neutrons
isotopes	atoms with the same number of protons, but different numbers of neutrons. Atoms with the same atomic number, but different mass numbers.
isotopic notation	shorthand notation for a nucleus that shows the mass #, atomic # and the symbol. U-238 would be ${}_{92}^{238}\text{U}$

**6 • Structure of the Atom
Calculating Atomic Mass
(4 of 8)**

Any **real** sample of an element contains more than one naturally occurring **isotope**. For instance, **boron**

isotope	abundance	mass #	isotopic mass
boron-10	${}_{5}^{10}\text{B}$ 19.78%	10	mass = 10.013 u
boron-11	${}_{5}^{11}\text{B}$ 80.22%	11	mass = 11.009 u

The atomic mass is the weighted average of the isotopes.
 at. mass = $\frac{(19.78\%)(10.013\text{u}) + (80.22\%)(11.0009\text{u})}{100}$ or
 at. mass = (0.1978)(10.013u) + (0.8022)(11.0009u) = 10.81 u

