Unit 3 NAME

Class Work 10/31/13

3.5 Distinguishing Atoms

SPARK

1. What was concluded about the structure of the atom as the result of the gold foil experiment?

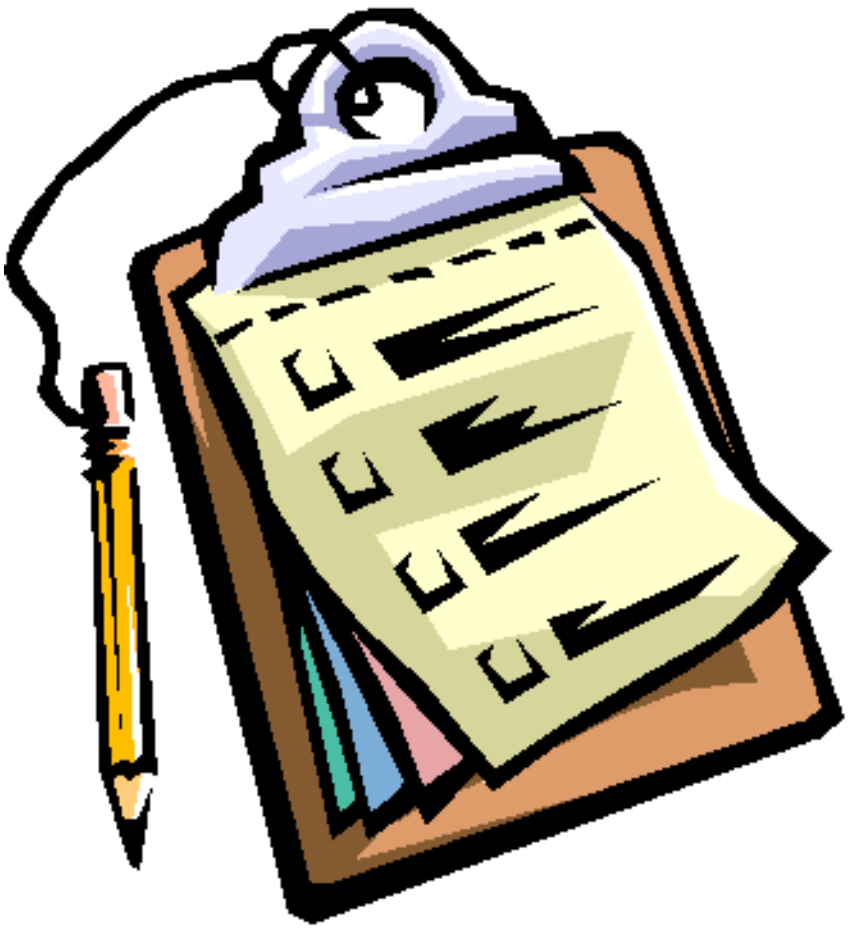
(1) a positively charged nucleus surrounded by positively charged particles
(2) a positively charged nucleus surrounded by mostly empty space
(3) a negatively charged nucleus is surrounded by positively charged particles
(4) a negatively charged nucleus is surrounded by mostly empty space

Objective

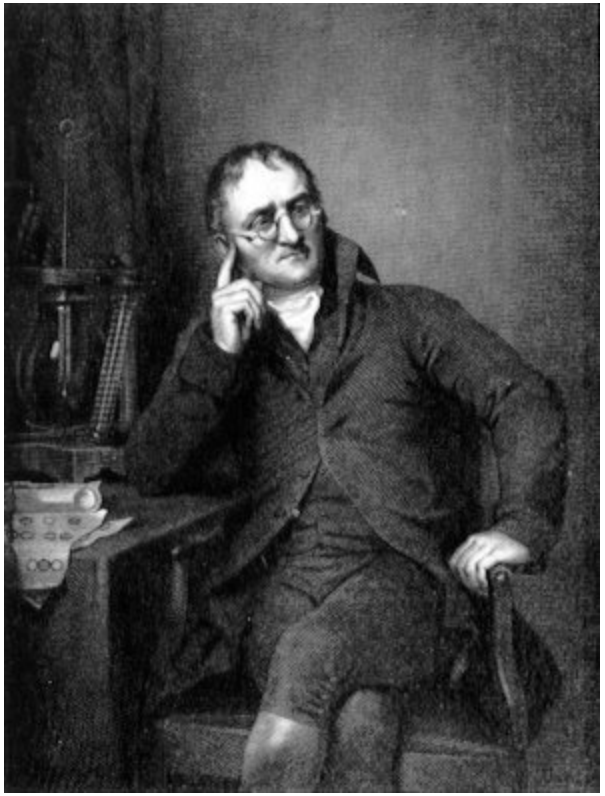
SWBAT identify an element given its atomic number and calculate the mass of an atom, the number of neutrons or the number of protons, given the other two values.

Agenda:

- SPARK
- Objective
- Notes
- Practice
- Homework



Where Dalton was Wrong!



***All atoms of a given element are NOT identical

Postulate should read: all atoms of a given element have the same **# of protons**

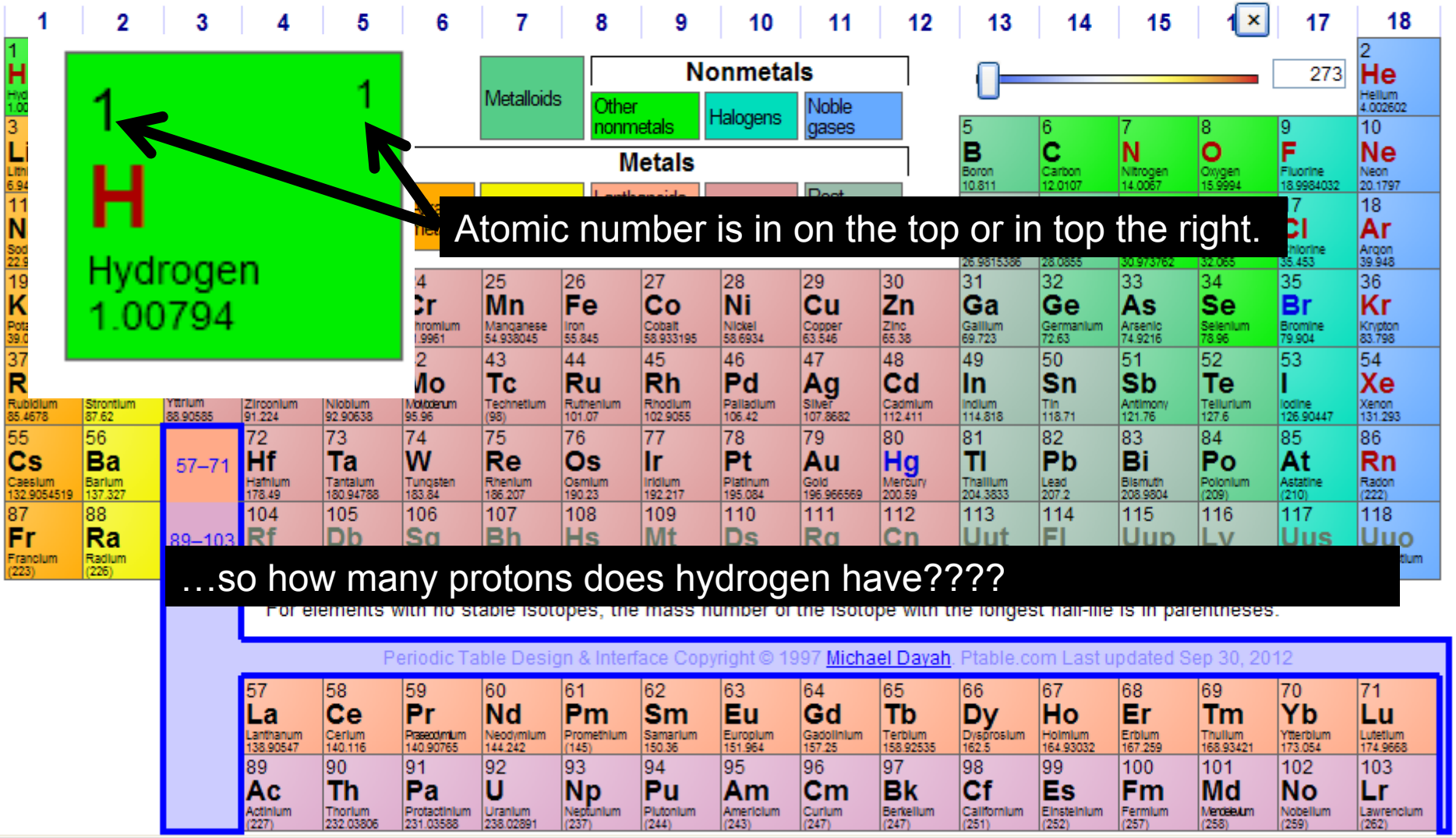
Atom Brainpop

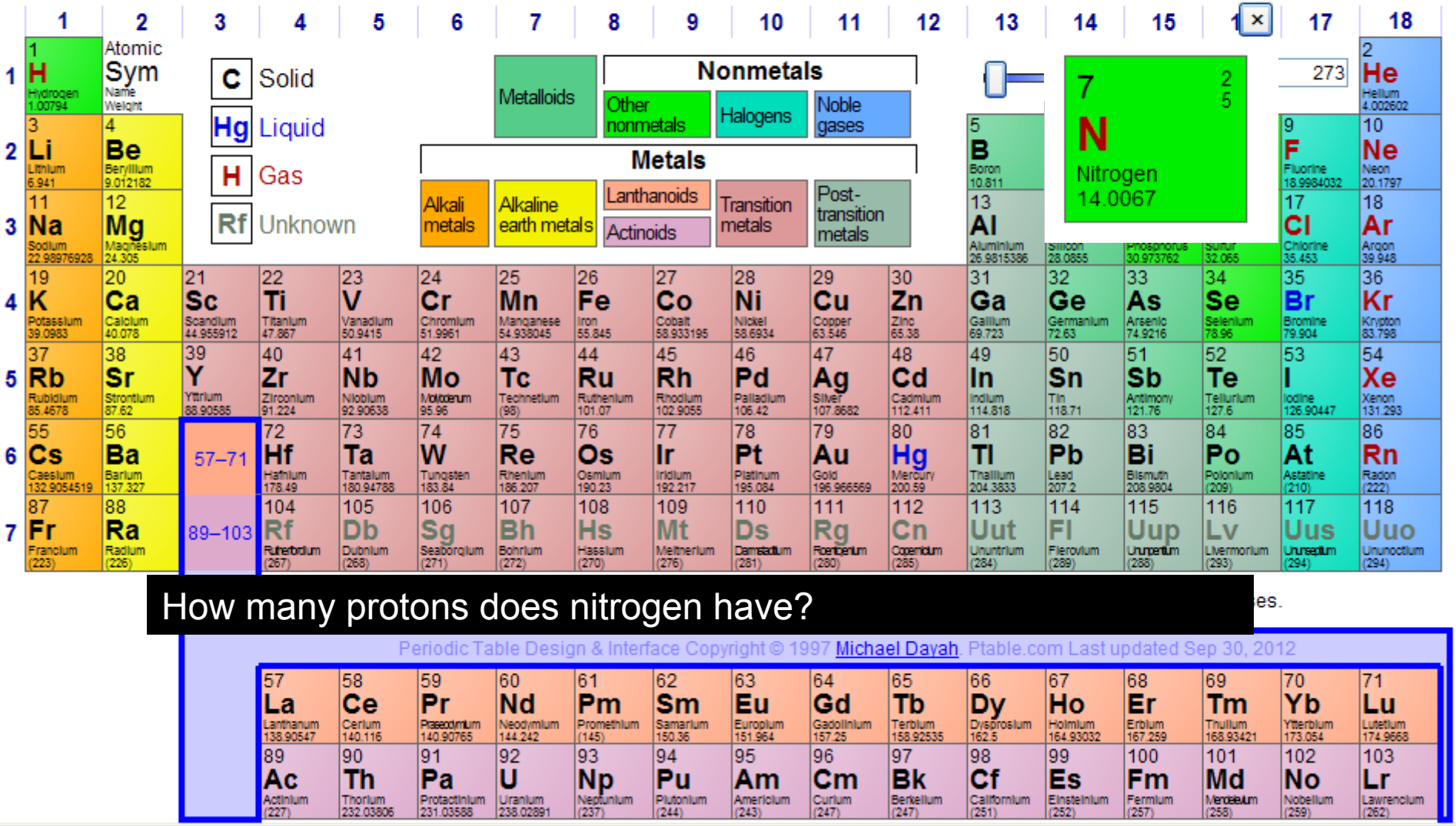
Atomic Number

- **Atomic number (Z)** of an element is the number of protons in the nucleus of each atom of that element.

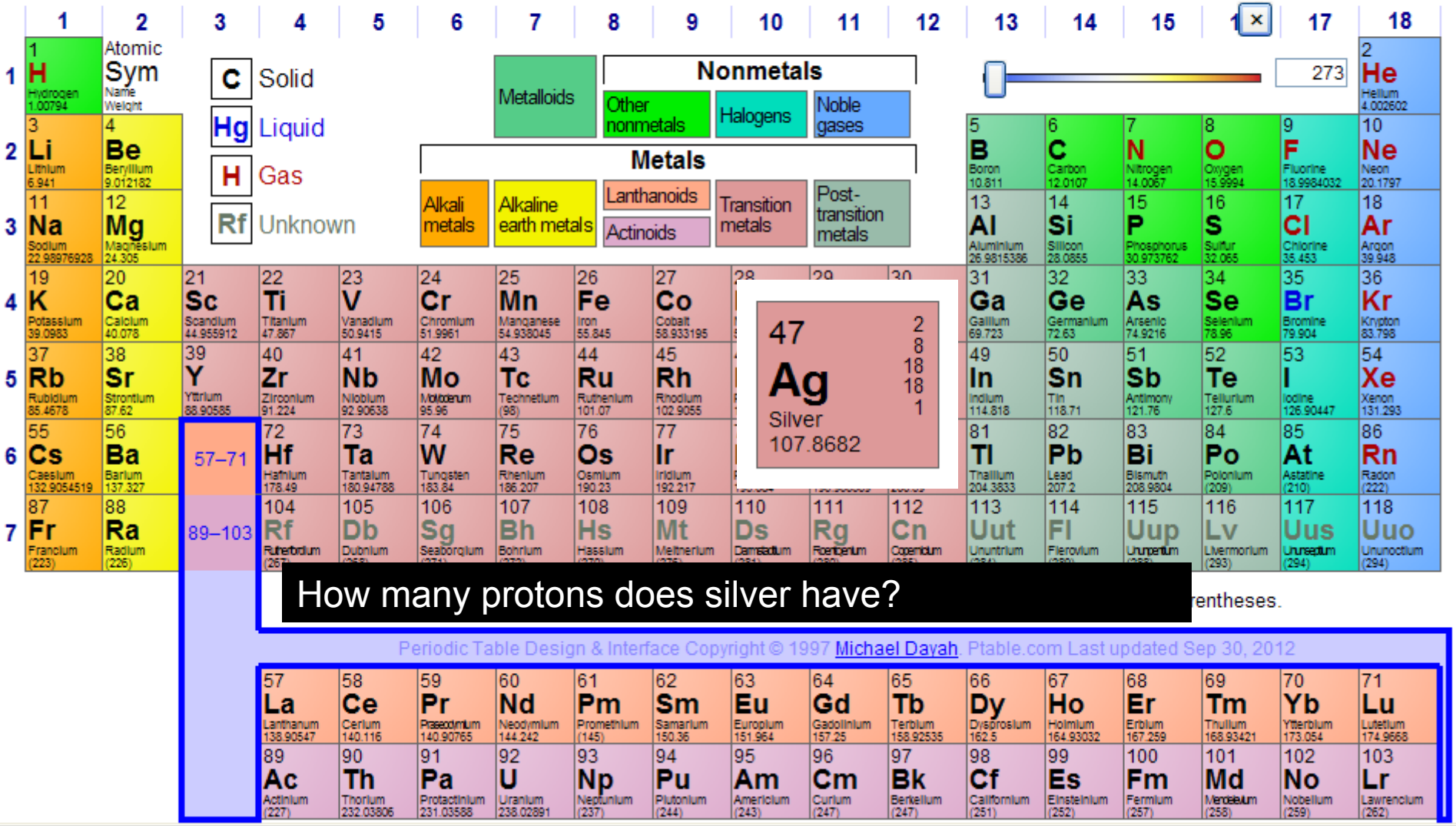
- The number of protons defines the element.

- It can be found on the periodic table of elements. You have been memorizing this!


1
H
Hydrogen
1.00794
Atomic number is in on the top or in top the right.
…so how many protons does hydrogen have????
Metalloids
Nonmetals
Other nonmetals
Halogens
Noble gases
Metals
273
57–71
89–103
Periodic Table Design & Interface Copyright © 1997 Michael Dayah. Ptable.com Last updated Sep 30, 2012



How many protons does nitrogen have?



How many protons does silver have?

Mass Number

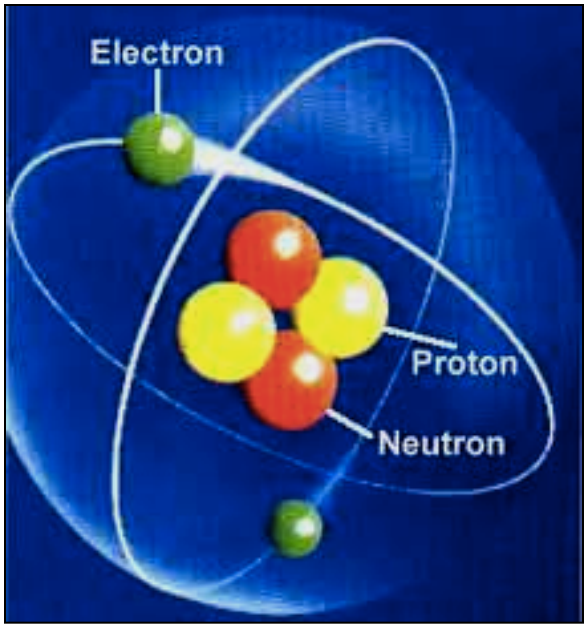
- Recall the mass of our subatomic particles…
- a.m.u. = atomic mass units

Particle	Charge	Mass (a.m.u)	Location
Electron	-1	[redacted]	Electron cloud
Proton	+1	[redacted]	Nucleus
Neutron	0	[redacted]	Nucleus

Mass Number

Mass number is the number of protons and neutrons in the nucleus of an atom.

$$\text{Mass \#} = p^+ + n^0$$



$$n^0 = \text{Mass \#} - p^+$$

$$p^+ = \text{Mass \#} - n^0$$

Mass Number

If an atom has 8 protons and 8 neutrons, what is its mass number?

$$\boxed{p^+ + n^0 = \text{Mass \#}}$$

8 + 8 = 16

Mass Number

Mass number is the number of protons and neutrons in the nucleus

Mass # = p^+ + n^0

Neutral Atom	p^+	n^0	e^-	Mass #
Oxygen - 18	8	10	8	18
Arsenic - 75	33	42	33	75
Phosphorus - 31	15	16	15	31

How do we write mass number

- Elements can be written to tell you the mass number of the atom.

  – Carbon – 12 has a mass # of 12

  – Fluorine – 19 has a mass # of 19

  Or as $^{16}_{8}O$ » Means mass # of 16 and 8 protons

  $^{32}_{16}S$ » Means mass # of __ and __ protons

  32 16

Think and Write

- Why is it NOT true that an atom is the smallest thing we can have?

Think and Write

- Why is the charge of a nucleus always going to be positive even though the nucleus is made up of protons AND neutrons?

Think and Write

- Why are atoms NEUTRAL in charge?

Independent Work

- Describe the structure of a typical atom. Identify where each subatomic particle is located.
- Compare and contrast Thomson's plum pudding atomic model with Rutherford's nuclear atomic model?

HOMEWORK

Complete 3.5 HW