

# Basic Atomic Structure Worksheet

1. The 3 particles of the atom are:

- a. proton
- b. neutron
- c. electron

Their respective charges are:

- a. positive
- b. neutral
- c. negative

2. The number of protons in one atom of an element determines the atom's identity, and the number of electrons determines the charge of the element.
3. The atomic number tells you the number of protons in one atom of an element. It also tells you the number of electrons in a neutral atom of that element. The atomic number gives the "identity" of an element as well as its location on the periodic table. No two different elements will have the same atomic number.
4. The atomic mass of an element is the average mass of an element's naturally occurring atom, or isotopes, taking into account the abundance of each isotope.
5. The mass number of an element is the total number of protons and neutrons in the nucleus of the atom.
6. The mass number is used to calculate the number of neutrons in one atom of an element. In order to calculate the number of neutrons you must subtract the atomic no. from the mass number.
7. Give the symbol of and the number of protons in one atom of:

Lithium Li - 3  
 Iron Fe - 26  
 Oxygen O - 8  
 Krypton Kr - 36

Bromine Br - 35  
 Copper Cu - 29  
 Mercury Hg - 80  
 Helium He - 2

8. Give the symbol of and the number of electrons in a neutral atom of:

Uranium U - 92  
 Boron B - 5  
 Chlorine Cl - 17

Iodine I - 53  
 Xenon Xe - 54

9. Give the symbol of and the number of neutrons in one atom of:

(Mass numbers are ALWAYS whole numbers...show your calculations)

Barium Ba -  $\frac{137}{-56}$  81  
 Carbon C -  $\frac{12}{-6}$  6  
 Fluorine F -  $\frac{19}{-9}$  10  
 Europium Eu -  $\frac{152}{-63}$  89

Bismuth Bi -  $\frac{209}{-83}$  126  
 Hydrogen H -  $\frac{1}{-1}$  0  
 Magnesium Mg -  $\frac{24}{-12}$  12  
 Mercury Hg -  $\frac{201}{-80}$  121

10. Name the element which has the following numbers of particles:

- a. 26 electrons, 29 neutrons, 26 protons Iron<sup>3+</sup>
- b. 53 protons, 74 neutrons Iodine
- c. 2 electrons (neutral atoms) Helium
- d. 20 protons Calcium
- e. 86 electrons, 125 neutrons, 82 protons Lead<sup>-4</sup>
- f. 0 neutrons Hydrogen

11. If you know ONLY the following information can you ALWAYS determine what the element is? (Yes/No)

- a. Number of protons yes
- b. Number of neutrons no
- c. Number of electrons in a neutral atom yes
- d. Number of electrons no

12. Fill in the missing items in the table below.

NAME	SYMBOL	Z	A	# PROTONS	# ELECTRONS	# NEUTRONS	ISOTOPIC SYMBOL
a. Sodium	Na	11	23	11	11	12	<sup>23</sup> <sub>11</sub> Na
b. Chlorine	Cl	17	35	17	18	18	<sup>35</sup> <sub>17</sub> Cl <sup>-</sup>
c. Potassium	K	19	39	19	19	20	<sup>39</sup> <sub>19</sub> K
d. Phosphorus	P	15	31	15	15	16	<sup>31</sup> <sub>15</sub> P
e. Iron	Fe	26	56	26	24	30	<sup>56</sup> <sub>26</sub> Fe <sup>2+</sup>
f. Iodine	I	53	127	53	53	84	<sup>127</sup> <sub>53</sub> I
g. Silver	Ag	47	108	47	47	61	<sup>108</sup> <sub>47</sub> Ag
h. Krypton	Kr	36	84	36	36	48	<sup>84</sup> <sub>36</sub> Kr
i. Tungsten	W	74	184	74	74	110	<sup>184</sup> <sub>74</sub> W
j. Copper	Cu	29	64	29	29	35	<sup>64</sup> <sub>29</sub> Cu
k. Indium	In	49	115	49	49	66	<sup>115</sup> <sub>49</sub> In
l. Gold	Au	79	197	79	78	118	<sup>197</sup> <sub>79</sub> Au <sup>+</sup>
m. Sulphur	S	16	32	16	18	16	<sup>32</sup> <sub>16</sub> S <sup>2-</sup>