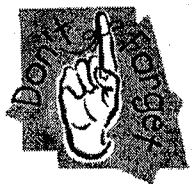
Atomic Symbol Worksheet

Name: _____ Date: _____ Period: _____



*Atomic number is always the same as number of protons.
*# of protons = # of electrons unless you have an ion (+ or - charge such as Cu^{+2}
*Mass number (atomic mass rounded off) = protons + neutrons
*When a symbol in a problem is written as: ${}^{14}_{6}C$, the top number is the mass and the bottom is the atomic number.

Fill in missing information:

Symbol	Atomic number	Number of protons	Mass number	Number of neutrons	Number of electrons
${}^{1}_{1}H$	1	1	1	0	1
${}^{2}_{1}H$	1	1	2	1	1
${}^{3}_{1}H$	1	1	3	2	1
${}^{14}_{6}C$	6	6	14	8	6
${}^{13}_{6}C$	6	6	13	7	6
${}^{12}_{6}C$	6	6	12	6	6
${}^{90}_{38}Sr$	38	38	90	52	38
${}^{34}_{16}S$	16	16	34	18	16
${}^{32}_{16}S$	16	16	32	16	16
${}^{137}_{55}Cs$	55	55	137	82	55
${}^{239}_{94}Pu$	94	94	239	145	94
${}^{235}_{92}U$	92	92	235	143	92
${}^{238}_{92}U$	92	92	238	146	92

Inside the atom

Atom (A)/ Ion(I)	Symbol	Name	Atomic Number	Atomic Mass	# of Protons	# of Neutrons	# of Electrons	Overall Charge
A	$^{14}_{7}N$	Nitrogen-14	7	14	7	7	7	0
A	$^{20}_{10}Ne$	Neon - 20	10	20	10	10	10	0
A	$^{137}_{56}Ba$	Barium-137	56	137	56	81	56	0
A	$^{197}_{79}Au$	Gold-197	79	197	79	118	79	0
A	$^{207}_{82}Pb$	Lead-207	82	207	82	125	82	0
A	$^{40}_{20}Ca$	Calcium-40	20	40	20	20	20	0
I	$^{27}_{13}Al^{3+}$	Aluminum-27 cation	13	27	13	14	10	3+
A	$^{27}_{13}Al$	Aluminum-27	13	27	13	14	13	0
A	$^{244}_{94}Pu$	Plutonium-244	94	244	94	150	94	0
A	$^{1}_{1}H$	Hydrogen-1	1	1	1	0	1	0
A	$^{2}_{1}H$	Hydrogen-2	1	2	1	1	1	0
A	$^{3}_{1}H$	Hydrogen-3	1	3	1	2	1	0
A	$^{238}_{92}U$	Uranium-238	92	238	92	146	92	0
I	$^{24}_{12}Mg^{+2}$	Magnesium-24 cation	12	24	12	12	10	2+
I	$^{7}_{3}Li^{+1}$	Lithium-7 cation	3	7	3	4	2	1+
I	$^{80}_{35}Br^{-1}$	Bromide-80	35	80	35	45	36	1-

Atomic Structure Review: Isotopes and Average Atomic Mass

Atoms of the **same element** always have the **same number of protons**.

Atoms of the **same element** will always have the **same atomic number**.

Atoms of the same element may have a **different number of neutrons**.

If atoms of the **same element** have different numbers of neutrons they will have **different masses.**

Isotopes are atoms of the same element that have a different number of neutrons.

The atomic masses reported on the periodic table are the **average atomic masses**.

The **average atomic mass** for an element is the weighted average of the masses for all of the different isotopes of that element.

Average atomic mass is calculated using the following formula:

$$average\ atomic\ mass = (mass\ I_1) * relative\ abundance\ I_1 + (mass\ I_2) * R.A.\ I_2 + .$$

Relative abundance is the percent abundance in **decimal** form.

A percent abundance of 75% would be a relative abundance of 0.75.

Problems:

1. Isotopes of an element differ in the # of neutrons in the nucleus. They will also have different masses
2. One of the tin isotopes has 50 protons and 63 neutrons. Another isotope of tin might have _____. 50p⁺ + 60n° or 50p⁺ + 61n°
3. What is the mass number of an isotope of hydrogen consisting of 1 proton, 1 electron, and 2 neutrons? 1p⁺ + 2n° = 3
4. In what way are magnesium–24 and magnesium–25 different?
   Mg-24 = 12n° Mg-25 = 13n°
5. A hypothetical element **X** has three isotopes: ^{40}**X**, ^{41}**X**, and ^{42}**X**. Their abundances are 72.0%, 9.00%, and 19.0% respectively. What is the atomic mass of **X**?
   (40 × 0.720) + (41 × 0.0900) + (42 × 0.190) = 40.47 amu ignore sig. fig
6. The atomic masses of most elements are not whole numbers mainly because___.
   of the existence of isotopes.