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Element	Symbol	Atomic #	Group	Period	Block
Hydrogen	H	1	1	1	s
Helium	He	2	18	1	s
Lithium	Li	3	1	2	s
Beryllium	Be	4	2	2	s
Boron	B	5	13	2	p
Carbon	C	6	14	2	p
Nitrogen	N	7	15	2	p
Oxygen	O	8	16	2	p
Fluorine	F	9	17	2	p
Neon	Ne	10	18	2	p
Sodium	Na	11	1	3	s
Magnesium	Mg	12	2	3	s
Aluminum	Al	13	13	3	p
Silicon	Si	14	14	3	p
Phosphorus	P	15	15	3	p
Sulfur	S	16	16	3	p
Chlorine	Cl	17	17	3	p
Argon	Ar	18	18	3	p
Potassium	K	19	1	4	s
Calcium	Ca	20	2	4	s
Scandium	Sc	21	3	4	d
Titanium	Ti	22	4	4	d
Vanadium	V	23	5	4	d
Chromium	Cr	24	6	4	d
Manganese	Mn	25	7	4	d
Iron	Fe	26	8	4	d
Cobalt	Co	27	9	4	d
Nickel	Ni	28	10	4	d
Copper	Cu	29	11	4	d
Zinc	Zn	30	12	4	d
Gallium	Ga	31	13	4	p
Germanium	Ge	32	14	4	p
Arsenic	As	33	15	4	p
Selenium	Se	34	16	4	p
Bromine	Br	35	17	4	p
Krypton	Kr	36	18	4	p
Rubidium	Rb	37	1	5	s
Strontium	Sr	38	2	5	s
Yttrium	Y	39	3	5	d
Zirconium	Zr	40	4	5	d
Niobium	Nb	41	5	5	d
Molybdenum	Mo	42	6	5	d
Technetium	Tc	43	7	5	d
Ruthenium	Ru	44	8	5	d
Rhodium	Rh	45	9	5	d
Palladium	Pd	46	10	5	d
Silver	Ag	47	11	5	d
Cadmium	Cd	48	12	5	d
Indium	In	49	13	5	p
Tin	Sn	50	14	5	p
Antimony	Sb	51	15	5	p
Tellurium	Te	52	16	5	p
Iodine	I	53	17	5	p
Xenon	Xe	54	18	5	p
Cesium	Cs	55	1	6	s
Barium	Ba	56	2	6	s
Lanthanum	La	57	3	6	f
Cerium	Ce	58	4	6	f
Praseodymium	Pr	59	5	6	f
Neodymium	Nd	60	6	6	f
Europium	Eu	62	7	6	f
Gadolinium	Gd	64	8	6	f
Terbium	Tb	65	9	6	f
Dysprosium	Dy	66	10	6	f
Ytterbium	Yb	70	14	6	f
Lutetium	Lu	71	15	6	f
Hafnium	Hf	72	4	6	d
Tantalum	Ta	73	5	6	d
Tungsten	W	74	6	6	d
Rhenium	Re	75	7	6	d
Osmium	Os	76	8	6	d
Iridium	Ir	77	9	6	d
Platinum	Pt	78	10	6	d
Gold	Au	79	11	6	d
Mercury	Hg	80	12	6	d
Thallium	Tl	81	13	6	p
Lead	Pb	82	14	6	p
Bismuth	Bi	83	15	6	p
Polonium	Po	84	16	6	p
Astatine	At	85	17	6	p
Radium	Ra	88	2	7	s
Actinium	Ac	89	3	7	f
Thorium	Th	90	4	7	f
Protactinium	Pa	91	5	7	f
Uranium	U	92	6	7	f
N plutonium	Pu	94	8	7	f
Americium	Am	95	9	7	f
Curium	Cm	96	10	7	f
Berkelium	Bk	97	11	7	f
Californium	Cf	98	12	7	f
Einsteinium	Es	99	13	7	f
Fermium	Fm	100	14	7	f
Mendelevium	Md	101	15	7	f
Nobelium	Nb	102	16	7	f
Lanthanum	La	57	3	6	f
Cerium	Ce	58	4	6	f
Praseodymium	Pr	59	5	6	f
Neodymium	Nd	60	6	6	f
Europium	Eu	62	7	6	f
Gadolinium	Gd	64	8	6	f
Terbium	Tb	65	9	6	f
Dysprosium	Dy	66	10	6	f
Ytterbium	Yb	70	14	6	f
Lutetium	Lu	71	15	6	f

Chem 111: Isotope Practice

Name: _____

- Here are three isotopes of an element: $^{12}_6\text{C}$, $^{13}_6\text{C}$, $^{14}_6\text{C}$
 - The element is: _____
 - The number 6 refers to the _____
 - The numbers 12, 13, and 14 refer to the _____
 - How many protons and neutrons are in the first isotope? _____
 - How many protons and neutrons are in the second isotope? _____
 - How many protons and neutrons are in the third isotope? _____

2. Complete the following chart:

Isotope	atomic #	mass #	# of protons	# of neutrons	# of electrons
$^{235}_{92}\text{U}$					
$^{238}_{92}\text{U}$					
$^{10}_5\text{B}$					
$^{11}_5\text{B}$					

- In a sample of 400 lithium atoms, it is found that 30 atoms are lithium-6 (6.015 g/mol) and 370 atoms are lithium-7 (7.016 g/mol). Calculate the average atomic mass of the lithium sample.
- Copper is made up of two isotopes, Cu-63 (62.9296 amu) and Cu-65 (64.9278 amu). Given copper's atomic weight of 63.546, what is the percent abundance of each isotope?

Name: _____ Period: _____ Date: _____

ISOTOPES, IONS, AND ATOMS WORKSHEET

Atomic # = # of protons; Mass # = # of protons + neutrons; Protons = atomic #; Neutrons = mass # - atomic #; Charge = ion

Atom #	Mass #	Z	A	# of p	# of n	charge	Symbol
1)	17			17	0		
2)	180		71	109			
3)		40	38	46			
4)	92	238		86			
5)						206	Pu ⁺
6)		34		45	-2		
7)	113	48	49				
8)	21	42		0			
9)						31	P ⁺
10)		83	80	126			
11)						168	At
12)	116	49		-3			
13)	128	53		-1			
14)	76	188		72			

Year	Number of Pennies	Average Atomic Mass
0	10	2.5
1	9	2.55
2	8	2.61
3	7	2.665
4	6	2.72
5	5	2.775
6	4	2.83
7	3	2.885
8	2	2.94
9	1	2.995
10	0	3.05

Part 2: Taking a Closer Look at Average Atomic Mass

1. Once you have calculated your average atomic mass, write your value on the board and fill in the table below with data from your fellow chemists:

# of Before-1982 Pennies	# of After-1982 Pennies	Average Atomic Mass
0	10	2.5
1	9	2.55
2	8	2.61
3	7	2.665
4	6	2.72
5	5	2.775
6	4	2.83
7	3	2.885
8	2	2.94
9	1	2.995
10	0	3.05

2. What trends do you see in the table as the:

- Number of Before-1982 pennies increases?

the average atomic mass goes up

- Number of After-1982 pennies increases?

the average atomic mass goes down

- What does this tell us about the Average Atomic Mass?

This tells us that the average atomic mass is higher because the more 1982 pennies we have the more mass

3. Compare the average mass of all pennies to the average atomic mass. Explain what you notice.

The average mass of all pennies is in the middle of the atomic mass so when the ratio of pennies is even it equals it.

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