

Name: _____

Period: _____

Unit 3 Atomic Structure- Guided Notes

The Periodic Table

- _____ is credited for creating the first version of the modern periodic table
- _____ is a chart showing all the elements arranged in columns in such a way that all the elements in a given column exhibit similar chemical properties
- The periodic table is organized in order of _____
- The periodic is organized in....
 - Columns called _____ or _____
 - Rows are called _____
- Where are the following types of elements located on the Periodic Table of Elements?
 - Metals: _____
 - Metalloids: _____
 - Nonmetals: _____
 - _____ is the only metal touching the stair case
 - _____ is the only nonmetal on the left side of the stair case
- Properties of Metals, Nonmetals, and Metalloids:

Metals	Metalloids	Nonmetals

- Label the families and the number of valance electrons on the periodic table below:

I	II												III	IV	V	VI	VII	VIII
1	2												13	14	15	16	17	18
1 H 1.008																		2 He 4.003
3 Li 6.941	4 Be 9.012												5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
11 Na 22.990	12 Mg 24.305												13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.066	17 Cl 35.453	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.88	23 V 50.942	24 Cr 51.996	25 Mn 54.93	26 Fe 55.847	27 Co 58.933	28 Ni 58.69	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80	
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.906	46 Pd 106.42	47 Ag 107.868	48 Cd 112.411	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.906	54 Xe 131.29	
55 Cs 132.905	56 Ba 137.327	57 La 174.967	58 Hf 178.49	59 Ta 180.948	60 W 183.85	61 Re 186.207	62 Os 190.2	63 Ir 192.22	64 Pt 195.08	65 Au 196.967	66 Hg 200.59	67 Tl 204.383	68 Pb 207.2	69 Bi 208.980	70 Po (209)	71 At (210)	72 Rn (222)	
87 Fr (223)	88 Ra 226.025	89 Lr (262)	90 Rf (261)	91 Db (262)	92 Sg (266)	93 Bh (262)	94 Hs (265)	95 Mt (266)	96 (271)	97 (272)	98 (277)	99 (285)	100 (289)	101 (293)	102 (293)	103 (293)	104 (293)	
57 La 138.906	58 Ce 140.115	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.965	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.934	70 Yb 173.04					
89 Ac 227.028	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (260)	102 No (259)					

Name: _____

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- Periodic Families

- Elements in the same _____ have similar properties
- _____ are the most reactive metals
- _____ are the most reactive non-metals
- _____ are inert (do not react)

The Atom

- Draw and label the parts of an atom

- Atomic Structure:

Particle	Charge	Mass	Location
Proton			
Neutron			
Electron			

- Amu stands for _____

The Periodic Table of Elements

molybdenum ←
42 ←
Mo ←
95.94 ←

- The whole number is the _____ this identifies the element
- # of protons = _____
- # of electrons = _____
- # of neutrons = _____
- Mass # = _____
- Mass # is _____
- Practice:
 1. How many protons are in Zinc?
 2. What is the atomic number of Calcium?
 3. What is the average atomic mass of Oxygen?
 4. How many neutrons are in Lithium?
 5. How many electrons are in Carbon?
 6. Why do the number of protons equal the number of electrons?

Ions

- If an atom gains or loses electrons, it is called an _____

Name: _____

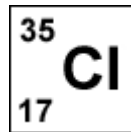
Period: _____

- When an atom gains or loses an electron, its overall charge _____
- A positively charged ion is called a _____
 - _____ are formed by atoms _____ electrons
- A negatively charged ion is called an _____
 - _____ are formed from atoms _____ electrons
- Practice:
 1. If a sodium atom loses an electron, what will its charge be?
 2. How many electrons are in the following?
 - a. Cl^{-1}
 - b. Ca^{2+}

Isotope Notation/ Nuclear Symbol



- Mass Number:
- Charge:
 - _____ charge if lost electrons; _____ charge if gained electrons
 - Do not write _____ for neutral
- Atomic Number: _____
- # electrons= _____
- Nuclear Symbols ONLY contain _____ numbers
- You may also see the following format: Element Name- Mass Number
 - Example: Oxygen-16
- Practice:
 1. Write the nuclear symbol for gold.
 2. What is the mass of chlorine to the right?
 - 3.
 4. What is the atomic number of chlorine-35?
 4. How many neutrons are in Uranium?
 5. How many electrons are in Uranium?



Atomic Mass

- The masses of protons, neutrons, & electrons are expressed in _____ . It is abbreviated as _____ .
- The mass of a(n)...
 - proton is about _____ amu
 - neutron is about _____ amu
 - electron is almost _____ amu (1/1836 amu)
- The mass number of an element is the _____ + _____

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Isotopes

- Isotopes are atoms that have the same # of _____ (meaning it is the same _____) but a different # of _____ (meaning it has a different _____)
- The difference between an element & its isotope is the _____.
- Isotopes have a higher mass.
- Place the isotope's mass in the upper left corner of the chemical symbol of the element. Ex. ^{37}Cl

Average Atomic Mass

- The mass number is the mass of one isotope
- The average atomic mass is the mass of each isotope and how abundant it is in the universe
- The average atomic mass depends on the _____ of each isotope
 - _____ is the amount the isotope occurs in nature
 - For example: Abundance of Lithium
 - Lithium-6 is _____% abundant
 - Lithium-7 is _____% abundant
- Steps to calculating Average Atomic Mass:
 - Multiply the mass of each isotope by its percent abundance (remember %s are decimals; 85% as a decimal is 0.85)
 - Add you answers from number 1 together
 - Round your answer to 2 decimal places
- Practice:
 1. A sample of Cesium is 75% ^{133}Cs , 20% ^{132}Cs , and 5% ^{134}Cs . What is the average atomic mass?
 2. Carbon-12 is 98% abundant and Carbon-14 is 2% abundant. Calculate the average atomic mass of carbon.

Electrons

- Electrons are arranged in _____ or _____ around the nucleus of an atom.
- The energy levels and shells together are called the _____
- Electrons in the outer most shell are called _____
- _____ determine the behavior of an atom

Scientists

Scientists to know in this unit:

- | | |
|----------------|---------------|
| • Aristotle | • Rutherford |
| • Democritus | • Chadwick |
| • Boyle | • Bohr |
| • Dalton | • Schrodinger |
| • J.J. Thomson | • Heisenberg |
| • Millikan | • Mendeleev |