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Unit 1 Exam Review (Due 10/20, 10/19 (for 5th))

4B: Intensive/Extensive Properties:

An **extensive property** is a **property** that changes when the size of the sample changes. Examples are mass, volume, length, and total charge. An **intensive property** doesn't change when you take away some of the sample.

Practice: Classify each of the properties listed below as extensive or intensive

Property	Intensive or Extensive
Color	
Combustibility	
Hardness	
Density	
Mass	
Melting point	
Ductility	
Volume	
Reactivity with acid	
Odor	
Weight	
Malleability	
Tendency of corrode	

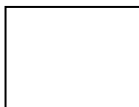
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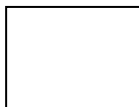
4C: Solid, Liquid, Gases:

Draw conceptual drawings of 16 circles representing particles in the solid, liquid and gaseous states.

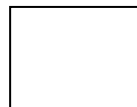
Solid



Liquid



Gas



Complete the following table by checking the state(s) where the property applies. Note some may have more than one answer.

Property	Solid	Liquid	Gas
Definite volume			
Easily compressed			
Takes shape of the container			
Flows			
High density			
Takes volume of the container			
Has a definite shape			

5B: Properties of the Periodic Table:

Complete the following table.

Group/Family	Group Number	Properties	Number of Valence Electrons	Configuration Always ends in....
Alkali Metals				s ¹
Alkali Earth Metals				

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Transition Metals			
Halogens			
Noble Gases			

5C: Periodic Trends:

Using the periodic table found bellow, draw the arrows to represent the periodic trends for atomic radius, ionization energy, and electronegativity.

	1A												2		18			
1	H 1.008 Hydrogen												He 4.003 Helium					
2	Li 6.941 Lithium	Be 9.012 Beryllium											B 10.812 Boron	C 12.011 Carbon	N 14.007 Nitrogen	O 15.999 Oxygen	F 18.998 Fluorine	Ne 20.180 Neon
3	Na 22.990 Sodium	Mg 24.305 Magnesium	3B	4B	5B	6B	7B	8	9	10	11B	12B	Al 26.982 Aluminum	Si 28.086 Silicon	P 30.974 Phosphorus	S 32.066 Sulfur	Cl 35.453 Chlorine	Ar 39.948 Argon
4	K 39.098 Potassium	Ca 40.078 Calcium	Sc 44.956 Scandium	Ti 47.867 Titanium	V 50.942 Vanadium	Cr 51.996 Chromium	Mn 54.938 Manganese	Fe 55.845 Iron	Co 58.933 Cobalt	Ni 58.693 Nickel	Cu 63.546 Copper	Zn 65.38 Zinc	Ga 69.723 Gallium	Ge 72.64 Germanium	As 74.922 Arsenic	Se 78.96 Selenium	Br 79.904 Bromine	Kr 83.798 Krypton
5	Rb 85.468 Rubidium	Sr 87.62 Strontium	Y 88.906 Yttrium	Zr 91.224 Zirconium	Nb 92.906 Niobium	Mo 95.96 Molybdenum	Tc (98) Technetium	Ru 101.07 Ruthenium	Rh 102.906 Rhodium	Pd 106.42 Palladium	Ag 107.868 Silver	Cd 112.412 Cadmium	In 114.818 Indium	Sn 118.710 Tin	Sb 121.760 Antimony	Te 127.60 Tellurium	I 126.904 Iodine	Xe 131.294 Xenon
6	Cs 132.905 Cesium	Ba 137.328 Barium	Lu 174.967 Lutetium	Hf 178.49 Hafnium	Ta 180.948 Tantalum	W 183.84 Tungsten	Re 186.207 Rhenium	Os 190.23 Osmium	Ir 192.217 Iridium	Pt 195.085 Platinum	Au 196.967 Gold	Hg 200.59 Mercury	Tl 204.383 Thallium	Pb 207.2 Lead	Bi 208.980 Bismuth	Po (209) Polonium	At (210) Astatine	Rn (222) Radon
7	Fr (223) Francium	Ra (226) Radium	Lr (262) Lawrencium	Rf (267) Rutherfordium	Db (268) Dubnium	Sg (271) Seaborgium	Bh (272) Bohrium	Hs (277) Hassium	Mt (281) Meitnerium	Ds (285) Darmstadtium	Rg (289) Roentgenium	Mass numbers in parentheses are those of the most stable or most common isotope.						
Lanthanide Series			57 La 138.905 Lanthanum	58 Ce 140.116 Cerium	59 Pr 140.908 Praseodymium	60 Nd 144.242 Neodymium	61 Pm (145) Promethium	62 Sm 150.36 Samarium	63 Eu 151.964 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.925 Terbium	66 Dy 162.500 Dysprosium	67 Ho 164.930 Holmium	68 Er 167.259 Erbium	69 Tm 168.934 Thulium	70 Yb 173.055 Ytterbium		
Actinide Series			89 Ac (227) Actinium	90 Th 232.038 Thorium	91 Pa 231.036 Protactinium	92 U 238.029 Uranium	93 Np (237) Neptunium	94 Pu (244) Plutonium	95 Am (243) Americium	96 Cm (247) Curium	97 Bk (247) Berkelium	98 Cf (251) Californium	99 Es (252) Einsteinium	100 Fm (257) Fermium	101 Md (258) Mendelevium	102 No (259) Nobelium		

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Practice:

- Rank the following elements in order of increasing atomic radius: iron, zinc, bromine and calcium.
- Rank the following elements in order of increasing electronegativity: sulfur, oxygen, and tellurium.
- Which has a greater size, a chlorine atom or a chlorine ion? Explain.
- Which element has the highest ionization energy?
- Which element has the greatest electronegativity?
- For each of the following, circle the correct element.
 - Largest atomic radii: Ga Al Si
 - Smallest ionization energy: N P As
 - Smallest ionic radii: Na S P

6A: History of the Atom

Fill in the following table:

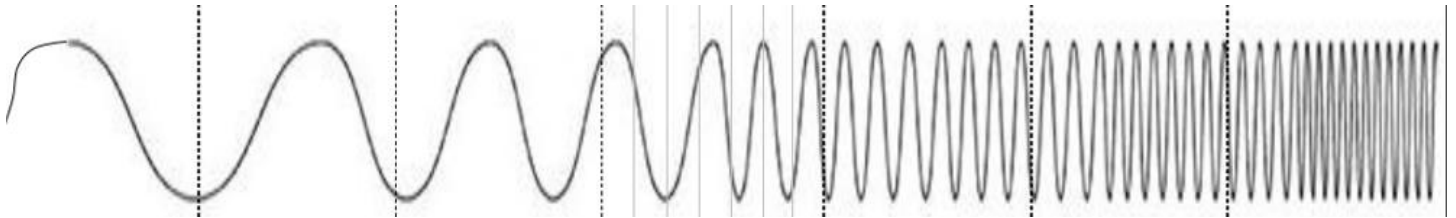
Scientist	Discovery	Experiment and/or Atomic Model
Dalton		Not applicable.
J.J. Thompson		
Ernest Rutherford		
Neils Bohr		

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6B: Electromagnetic Spectrum:

Label the spectrum below using the following waves: x-rays, microwaves, visible light, gamma rays, radio waves, infrared waves, and ultraviolet



Practice:

1. As the wavelength increases,
 - a. What happens to the frequency?
 - b. What happens to the energy?
 - c. What happens to the speed?
 - d. Is it able to travel through a vacuum?

2. As the wavelength decreases,
 - a. What happens to the frequency?
 - b. What happens to the energy?
 - c. What happens to the speed?
 - d. Is it able to travel through a vacuum?

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6C: Electromagnetic Spectrum Calculations:

Fill in the following table: **You must show all your work for full credit**

Wavelength (m)	Frequency (Hz)	Energy (J)
0.001		
	7.0×10^{13}	
5.0×10^{-7}		

6D: Isotopes Calculations:



***Remember CMA * It's easy as 1, 2, 3...**

1. **Convert** percent to decimal by moving the decimal over 2 times to the left.
2. **Multiply** the mass of the isotope by the decimal from the previous step. Continue with the rest of the isotopes provided.
3. **Add** all the values found on step 2.

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Practice:

- Calculate the average atomic mass of the following isotope: carbon-12 which exists 98.93% of the time in nature and carbon -13 which exists 1.07% of the time.

- Calculate the average atomic mass of the element iodine (I) using the following data:

Isotope %	Abundance
Iodine-127	80%
Iodine-126	17%
Iodine-128	3%

6E: Electron Configuration

Label the orbitals s, p, d, and f on the periodic table below. Indicate the energy levels for d and f. For example on period 4, d should be 3d and not 4d.

		Atomic number										Atomic mass										Name									
1	1A	1	2											13	14	15	16	17	18												
		H	He											B	C	N	O	F	Ne												
2		Li	Be											Al	Si	P	S	Cl	Ar												
3		Na	Mg	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18												
4		K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr												
5		Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe												
6		Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn												
7		Fr	Ra	Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg																			
		Mass numbers in parentheses are those of the most stable or most common isotope.																													
Lanthanide Series		57	58	59	60	61	62	63	64	65	66	67	68	69	70																
		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb																
Actinide Series		89	90	91	92	93	94	95	96	97	98	99	100	101	102																
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No																

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Practice: Fill in the table below.

Element	Family Name	Long Hand Configuration	Short Hand Configuration	Valence electrons	Orbital Filling diagram (valence electron)	Lewis Dot Structure
						<pre> •• •• •• Br •• •• •• </pre>
					<div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\downarrow \uparrow$ </div> 2s	
		$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$				
			$[Ar] 4s^2 3d^{10} 4p^6$			
Titanium				Not applicable		