Applied Chemistry Optional Summer Videos and Lecture Notes

You only need to watch these if you need to review or relearn some of the material. If you are completely sure that you understand something, you do not need to watch the associated video. If you took Chemistry rather than Honors Chemistry at St. Francis, you were probably taught to use ratios to solve stoichiometry problems. ***You cannot use that method in Applied Chemistry as all students must solve these problems the same way.*** Therefore, students who took Chemistry should watch the Stoichiometry Lecture Using Dimensional Analysis videos.

Types of Bonds: https://www.youtube.com/watch?v=-aoBFNnlNKQ

Determining the # of Valence Electrons (only watch from 0:10 - 1:06):
https://www.youtube.com/watch?v=qAbloqc3HeE

Lewis structures: https://www.youtube.com/watch?v=eYVtC750Kaw

Stoichiometry Lecture Using Dimensional Analysis (Problems 1 & 2):
https://www.youtube.com/watch?v=6Las7Z2JGfY&feature=youtu.be

Stoichiometry Lecture Using Dimensional Analysis (Problem 3):
https://www.youtube.com/watch?v=4JMgb-fABQM

I've also included the lectures notes on this handout. The lecture notes have an outline of the lecture prepared so that you don't have to write everything.

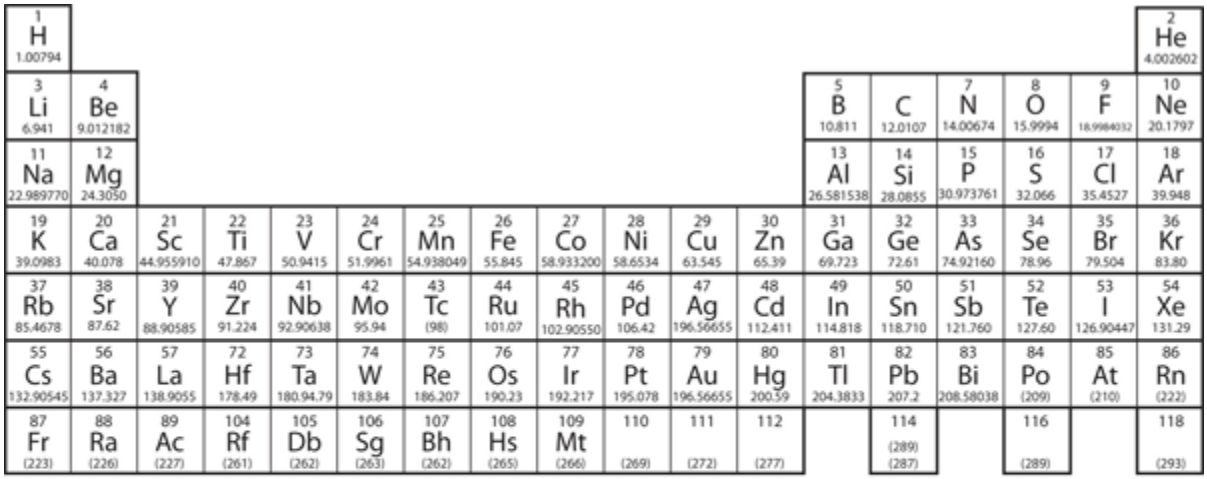
Review Info for Making Lewis Structures Lecture Notes

Types of bonds

1. Single bond
    a. 1 pair e- shared
    b. Represent with
2. Double bond
    a. 2 pairs e- shared
    b. Represent with
3. Triple bond
    a. 3 pairs e- shared
    b. Represent with

(Go to next page).

Determining the # of valence electrons of main group elements based on position in periodic table



1 H 1.00794																	2 He 4.002602
3 Li 6.941	4 Be 9.012182											5 B 10.811	C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.9984032	10 Ne 20.1797
11 Na 22.989770	12 Mg 24.3050											13 Al 26.581538	14 Si 28.0855	15 P 30.973761	16 S 32.066	17 Cl 35.4527	18 Ar 39.948
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6534	29 Cu 63.545	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.504	36 Kr 83.80
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 196.56655	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	72 Hf 178.49	73 Ta 180.94.79	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.56655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.58038	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 (269)	111 (272)	112 (277)		114 (289) (287)		116 (289)		118 (293)

58 Ce 140.116	59 Pr 140.50765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
90 Th 232.0381	91 Pa 231.035888	92 U 238.0289	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

Lewis Structures Lecture Notes

Rules:

1. Count # available electrons
2. Make skeleton structure
3. Add pair of electrons between bonded atoms
4. Add electrons until all atoms have an octet (except H)
5. Count electrons and make sure using correct number
6. If using too many electrons, try a double or triple bond
7. Note: If C is present, it is mostly likely the central atom. If multiple Cs are present, they are probably part of a chain and the other atoms are attached to them.

Stoichiometry Lecture Notes

1. When baking soda ($NaHCO_3$) is heated it decomposes as shown below.

   $2NaHCO_3(s) \rightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$

   How many moles of carbon dioxide (CO_2) will be produced when 3.0 mol of $NaHCO_3$ are heated?

2. Chloroform ($CHCl_3$), an important solvent, is produced by a reaction between methane and chlorine.

   $CH_4(g) + 3Cl_2(g) \rightarrow CHCl_3(g) + 3HCl(g)$

   How many grams of Cl_2 are needed to produce 50.0 g $CHCl_3$?

3. When copper wire is placed into a silver nitrate solution, silver crystals and copper(II) nitrate solution form.

   $Cu(s) + 2AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2Ag(s)$

   If a 20.0-g sample of copper is used, determine the theoretical yield of silver. If 60.0 g silver is actually recovered from the reaction, determine the percent yield of the reaction.