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=aoBFNnIINKQ](https://www.youtube.com/watch?v=aoBFNnIINKQ)

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

Lewis structures: [https://www.youtube.com/watch?v=eYVtC750Kaw](https://www.youtube.com/watch?v=eYVtC750Kaw)


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

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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

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 (NaHCO₃) is heated it decomposes as shown below.
   
   \[ 2\text{NaHCO}_3(s) \rightarrow \text{Na}_2\text{CO}_3(s) + \text{CO}_2(g) + \text{H}_2\text{O}(g) \]
   
   How many moles of carbon dioxide (CO₂) will be produced when 3.0 mol of NaHCO₃ are heated?

2. Chloroform (CHCl₃), an important solvent, is produced by a reaction between methane and chlorine.
   
   \[ \text{CH}_4(g) + 3\text{Cl}_2(g) \rightarrow \text{CHCl}_3(g) + 3\text{HCl}(g) \]
   
   How many grams of Cl₂ are needed to produce 50.0 g CHCl₃?

3. When copper wire is placed into a silver nitrate solution, silver crystals and copper(II) nitrate solution form.
   
   \[ \text{Cu}(s) + 2\text{AgNO}_3(aq) \rightarrow \text{Cu(NO}_3)_2(aq) + 2\text{Ag}(s) \]
   
   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.