

# Exercise 00.1

## Summer Work 2018

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

### Introduction

Welcome to AP Chemistry! Starting with this summer work packet and culminating next May with the AP Chemistry Exam, we will be covering the equivalent of a first-year college chemistry class. This class builds on skills learned in Chemistry and the expectations that I have of you will be those that I would have for a college freshman. There will be very little time for remediating concepts from Chemistry. To that end, you are being assigned the following checklist to ensure that you are ready to go on August 8<sup>th</sup>. All items on the checklist should be completed before August 8<sup>th</sup>, and the assignments will be due on that date.

### Summer Checklist

- Review the College Board AP Chemistry Course Overview.  
Go to college board website <https://apstudent.collegeboard.org/apcourse/ap-chemistry> and review the course by clicking on the "AP Course Overview (PDF)" link and the "AP Chemistry Course and Exam Description (PDF)" link.
- Get Yourself Organized and Ready.  
You will need the following items for class:
  - Three-Ring Binder  
While it would be useful to have a single binder just for chemistry, it is not necessary. You should use one, however, to keep your assignments organized.
  - Quad-ruled Data Book  
This is the standard hard-cover, graph-paper, composition book with permanently bound (not perforated) pages. This book should last the entire year if taken care of.
  - Scientific calculator.  
It does not *need* to be a graphing calculator, though you are welcome to use a graphing calculator if you already have one. (There will be scientific calculators available in class.)
- Memorize Element Name/Symbols and Common Ions.  
Students are expected to know the names and symbols of elements 1-56, 74, 78-86, and 92, and all ion names, formulas and charges of the common ions on the included common ion chart. There will be a test over the elements and ions the first day.
- Complete AP Chemistry Assignment  
This is due on the first day of class. You may work together, but don't copy work. You are responsible for these skills. See the guidelines for completing assignments below before starting.
  - Read and outline each section in Chapters 1-3 of *Chemistry: The Central Science, 12<sup>th</sup> Edition (AP)* by Brown, LeMay, et al.
    - Complete a thorough outline of each section of each chapter and answer the corresponding questions. The outline for each section (e.g., 1.1 – The Study of Chemistry) must be a minimum of one-half page but will likely be closer to a full page – perhaps more. See the attached sheet on Outlining the Chemistry Text.

Chapter 1		Chapter 2		Chapter 3	
Section	Problems	Section	Problems	Section	Problems
1.1	None	2.1	11	3.1	1, 12, 13
1.2	1, 11	2.2	1	3.2	4, 15
1.3	2, 17, 21	2.3	17, 21, 25	3.3	24
1.4	4, 5, 25, 27, 29	2.4	2, 34, 35, 36	3.4	31, 33, 38
1.5	8, 33, 35, 37, 39, 40	2.5	37	3.5	5, 51
1.6	45, 47, 62	2.6	43, 47, 48	3.6	6, 61, 67
		2.7	4, 5, 7, 49, 53, 56, 60	3.7	8, 77, 81
		2.8	6, 8, 63, 66, 69, 71		
		2.9	94, 105		

### Guidelines for Completing Assignments

- Outlines and problems for each chapter must be compiled into a packet.
  - Start each section outline on a new sheet of paper, with the title of the section at the top.
  - The backs of pages may be used.

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- Complete the assigned problems.
  - o The assigned problems should be started immediately following the outline on the same sheet of paper.
  - o You do NOT need to write the questions, but it might be useful to write something about the question, so you can use the completed work to study later.
  - o All work should be done as neatly as possible in pencil.
  - o Calculations must show all work including: required equations, labeled known and unknown values, algebra showing the rearrangement of the equation, the equation with substituted values, and the final answer with units (as shown below).

A gas whose behavior closely resembles that of an ideal gas has a volume of 3.00 L at a temperature of 25.0 °C and a pressure of 800. mm Hg. How many moles are in the sample?

$$P = 800 \text{ mmHg}$$

$$V = 3.00 \text{ L}$$

$$n = ?$$

$$R = 62.359 \text{ mmHg}\cdot\text{L}/\text{mol}\cdot\text{K}$$

$$T = 25^\circ\text{C} (298 \text{ K})$$

$$PV = nRT$$

$$\frac{PV}{RT} = \frac{nRT}{RT}$$

$$\frac{PV}{RT} = n$$

$$n = \frac{(800 \text{ mmHg} \times 3.00 \text{ L})}{(62.359 \text{ mmHg}\cdot\text{L}/\text{mol}\cdot\text{K} \times 298 \text{ K})} = 0.129 \text{ mol}$$

$$= 0.129 \text{ mol}$$

2. The outlines/problems for each section should be placed in order and stapled together by chapter.

### Have a Good Summer

Yes, it's a bit of work, but the AP Chemistry test isn't easy. Some suggestions to make it a little less painful: start a study group online (or in person) to share the fun; use online videos (Tyler DeWitt, the Organic Chemistry Tutor, Bozeman Science, etc. on YouTube) to review first year chemistry; make some flash cards for ions and element names; and, space the work out so you're not doing it the night before school starts.

If you have questions, please try emailing me (matt\_fry@redlands.k12.ca.us). I may be travelling at times, but I'll try to get back to you.

See you in August!



# Chemistry Outlines

## Processing Your Textbook

Outlines are a useful way of organizing information from a textbook or lecture by representing the information in a hierarchical framework. Main ideas are listed at the top of the hierarchy and the details relating to them are listed below, creating the support for the main idea. The use of spacing, indentation and symbols (different styles, fonts and bullets) along with underlining and highlighting can help create an organized record of the information.

The main ideas in textbooks usually appear as section titles, headings, or perhaps, even subheadings. Often, main ideas are stated in the first sentence of a paragraph. In lectures, main ideas are usually addressed at the beginning of a lecture or written as lecture topics on the board.

Supporting ideas come in the form of diagrams, explanations, examples, and numbered lists. Often these supporting ideas will have their own details which should be included in the outline. Every time a new level of detail is encountered a new level of indentation should be added. Enough detail should be written to fully explain the main idea but be selective in what you write.

### TIPS FOR MAKING OUTLINES

1. Roman numerals, letters, and different widths of indentation are used to indicate the relative importance of information to each other piece of information. (*You may use symbols in the place of Roman numerals, letters, and numbers if you prefer.*)

#### Chapter Title

##### First section heading in the chapter

- ▶ 1<sup>st</sup> topic
- ▶ 2<sup>nd</sup> topic
  - 1<sup>st</sup> supporting detail
  - 2<sup>nd</sup> supporting detail
- ▶ 3<sup>rd</sup> topic

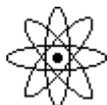
2. All ideas of equal importance have the same width of indentation, same size Roman numeral, letter, number, or symbol.
3. Main ideas and related information are recorded in short phrases using abbreviations and symbols when possible. This keeps notes as short as possible while preserving understanding.
4. To clearly identify and separate main ideas and details, the use of space is necessary. Leaving white space helps you find information quickly and leaves space to add additional notes later.
5. Don't forget to look around the page and use the pictures and diagrams to help you understand the material. Include important diagrams in the outline.
6. Every vocabulary word should appear in the outline. Highlight these words!
7. Every formula should appear in the outline. Highlight these formulas along with their names and the values/names of any constants in the formula. Always include a legend to the meaning of the variables.
8. The outline is to be used as your study guide for the chapter, so the more complete it is, the better prepared you will be.

### EXAMPLE OF A GENERAL OUTLINE FORMAT

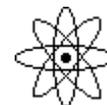
#### Chapter Title

- I.** First section heading in the chapter
  - A. 1<sup>st</sup> topic related to section I.
  - B. 2<sup>nd</sup> topic related to section I.
    1. 1<sup>st</sup> supporting detail related to B.
    2. 2<sup>nd</sup> supporting detail related to B.
  - C. 3<sup>rd</sup> topic related to section I.
- II.** Second section heading in the chapter
  - A. 1<sup>st</sup> topic related to section II.
  - B. 2<sup>nd</sup> topic related to section II.
- III.** Third section heading in the chapter
  - A. 1<sup>st</sup> topic related to section III.
    1. 1<sup>st</sup> supporting detail related to A.
    2. 2<sup>nd</sup> supporting detail related to A.
  - B. 2<sup>nd</sup> topic related to section III.
    3. 1<sup>st</sup> supporting detail related to B.
    4. 2<sup>nd</sup> supporting detail related to B.
      - a. Important supporting detail related to 2.
      - b. Important supporting detail related to 2.

**D** iagrams/charts/graphs  
**E** ffects/causes  
**T** rait/characteristics  
**A** nalogies/reasons/explanations  
**I** ncidents/examples  
**L** ogic/proof/research  
**S** teps/processes



# Common Ion Chart



## Positive Ions (Cations)

+1	
Ammonium	NH <sub>4</sub> <sup>+</sup>
Copper (I), cuprous	Cu <sup>+</sup>
Gold (I), aurous	Au <sup>+</sup>
Hydrogen	H <sup>+</sup>
Hydronium	H <sub>3</sub> O <sup>+</sup>
Lithium	Li <sup>+</sup>
Mercury (I), mercurous	Hg <sub>2</sub> <sup>2+</sup>
Potassium	K <sup>+</sup>
Rubidium	Rb <sup>+</sup>
Silver	Ag <sup>+</sup>
Sodium	Na <sup>+</sup>
+2	
Barium	Ba <sup>2+</sup>
Beryllium	Be <sup>2+</sup>
Cadmium	Cd <sup>2+</sup>
Calcium	Ca <sup>2+</sup>
Chromium (II), chromous	Cr <sup>2+</sup>
Cobalt (II), cobaltous	Co <sup>2+</sup>
Copper (II), cupric	Cu <sup>2+</sup>
Iron (II), ferrous	Fe <sup>2+</sup>
Lead (II), plumbous	Pb <sup>2+</sup>
Magnesium	Mg <sup>2+</sup>
Manganese (II), manganous	Mn <sup>2+</sup>
Mercury (II), mercuric	Hg <sup>2+</sup>
Nickel (II), nickelous	Ni <sup>2+</sup>
Strontium	Sr <sup>2+</sup>
Tin (II), stannous	Sn <sup>2+</sup>
Zinc	Zn <sup>2+</sup>
+3	
Aluminum	Al <sup>3+</sup>
Bismuth (III), bismuthous	Bi <sup>3+</sup>
Boron	B <sup>3+</sup>
Chromium (III), chromic	Cr <sup>3+</sup>
Cobalt (III), cobaltic	Co <sup>3+</sup>
Gold (III), auric	Au <sup>3+</sup>
Iron (III), ferric	Fe <sup>3+</sup>
Manganese (III), manganic	Mn <sup>3+</sup>
Nickel (III), nickelic	Ni <sup>3+</sup>
+4	
Lead (IV), plumbic	Pb <sup>4+</sup>
Tin (IV), stannic	Sn <sup>4+</sup>
+5	
Bismuth (V), bismuthic	Bi <sup>5+</sup>

## Negative Ions (Anions)

-1	
Acetate	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>
Bromate	BrO <sub>3</sub> <sup>-</sup>
Bromide	Br <sup>-</sup>
Chloride	Cl <sup>-</sup>
Chlorate	ClO <sub>3</sub> <sup>-</sup>
Chlorite	ClO <sub>2</sub> <sup>-</sup>
Cyanate	NCO <sup>-</sup>
Cyanide	CN <sup>-</sup>
Fluoride	F <sup>-</sup>
Hydride	H <sup>-</sup>
Hydrogen Carbonate, Bicarbonate	HCO <sub>3</sub> <sup>-</sup>
Dihydrogen Phosphate, Biphosphate	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>
Hydrogen Oxalate, Binoxalate	HC <sub>2</sub> O <sub>4</sub> <sup>-</sup>
Hydrogen Sulfate, Bisulfate	HSO <sub>4</sub> <sup>-</sup>
Hydrogen Sulfide, Bisulfide	HS <sup>-</sup>
Hydrogen Sulfite, Bisulfite	HSO <sub>3</sub> <sup>-</sup>
Hydroxide	OH <sup>-</sup>
Hypochlorite	ClO <sup>-</sup>
Iodate	IO <sub>3</sub> <sup>-</sup>
Iodide	I <sup>-</sup>
Nitrate	NO <sub>3</sub> <sup>-</sup>
Nitrite	NO <sub>2</sub> <sup>-</sup>
Perchlorate	ClO <sub>4</sub> <sup>-</sup>
Permanganate	MnO <sub>4</sub> <sup>-</sup>
Thiocyanate	SCN <sup>-</sup>
-2	
Carbonate	CO <sub>3</sub> <sup>2-</sup>
Chromate	CrO <sub>4</sub> <sup>2-</sup>
Dichromate	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>
(Mono)Hydrogen Phosphate	HPO <sub>4</sub> <sup>2-</sup>
Oxalate	C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>
Oxide	O <sup>2-</sup>
Silicate	SiO <sub>3</sub> <sup>2-</sup>
Sulfate	SO <sub>4</sub> <sup>2-</sup>
Sulfide	S <sup>2-</sup>
Sulfite	SO <sub>3</sub> <sup>2-</sup>
Tartrate	C <sub>4</sub> H <sub>4</sub> O <sub>6</sub> <sup>2-</sup>
Thiosulfate	S <sub>2</sub> O <sub>3</sub> <sup>2-</sup>
-3	
Arsenide	As <sup>3-</sup>
Borate	BO <sub>3</sub> <sup>3-</sup>
Nitride	N <sup>3-</sup>
Phosphate	PO <sub>4</sub> <sup>3-</sup>
Phosphide	P <sup>3-</sup>
Phosphite	PO <sub>3</sub> <sup>3-</sup>
-4	
Carbide	C <sup>4-</sup>
Silicide	Si <sup>4-</sup>

The first name listed is the "systematic name", the second name is the outdated "common name".

Molecular Naming Prefixes		
1 – mono-	6 – hexa-	
2 – di-	7 – hepta-	
3 – tri-	8 – octa-	
4 – tetra-	9 – nona-	
5 – penta-	10 – deca-	

Naming Acids		
Anion suffix	Acid Name	
-ide	hydro	ic acid
-ate		-ic acid
-ite		-ous acid