

# AP Chemistry Summer Checklist

The summer assignment for AP Chemistry is attached. The assignments must be completed in this packet in your own handwriting, not typed. Additional resources can be found on google classroom. The google classroom code is 51zpgp.

## Important Information:

- You must pick up your textbook on one of the following days: June 6,7,13,14,20,21 from 9am to 12pm
- There will be a quiz on the polyatomic ions on your second class period (Aug. 20/21) Find the list of polyatomic ions on google classroom. They are also attached to this packet.
- There will be a quiz on your summer assignment on the 3<sup>rd</sup> class period (Aug. 22/23).
- The AP periodic table is provided on google classroom.
- There will be a section on google classroom with video links to help you on the summer assignment material. Videos can also be found on my website. **IT IS VERY IMPORTANT THAT YOU WATCH THE VIDEOS. DO NOT JUST LOOK FOR THE ANSWERS, ACTUALLY WATCH AND LISTEN.** The content explained in the videos, especially the NAMING videos can be difficult to understand and you are responsible for learning it on your own. There are many rules and exceptions to rules that you must know. **WATCH AND LISTEN CAREFULLY!!!**
- It is recommended that you have a binder, spiral bound graph paper notebook, and a scientific calculator on day 1.

## Assignment Checklist:

Use the following checklist to guide you through all of the work that you need to do this summer. Check off each assignment as it is completed. All of your work must be done in your own handwriting in this packet only, not separate sheets of paper. All notes are guided reading assignments that you need to fill in as you read each chapter. All book assignments have forms for your answers and work to be shown. The assignments are:

Assignment
Pick up textbook from library
Chapter 1 reading notes
Significant Figure Video Notes
p. 29-31 (25, 26, 29-36, 39-46)
Chapter 2 reading notes
Naming Video Notes
p. 68-70 (16, 21, 22, 30, 34, 35, 38, 46, 49, 50, 57-60)
Summer Naming Practice WS
Chapter 3 reading notes
p. 107 (13-19, 23-25, 39, 59)
MEMORIZE POLYATOMIC IONS (found on google classroom)



**Chapter 1 Notes:** Read p. 6-27 to help you complete the following.

**1.4 – Classification of Matter**

Define and give examples for the following:

Substance	Mixture
Homogeneous mixture	Heterogeneous Mixture
Element	Compound

Explain the difference between chemical and physical properties and give examples of each:

Physical Property	Chemical Property
Examples:	Examples

Fill in the table with the SI Unit that corresponds with each measurement:

Measurement	Name of Unit	Symbol
Length		
Mass		
Time		
Electrical Current		
Amount of a substance		

Metric Prefixes: Complete the following table:

Prefix	Symbol	Meaning	Example: 1 = _____ m
Mega-			
Kilo-			
Deci-			
Centi-			
Milli-			
Micro-			
Nano-			
Pico-			

Mass and Weight are not the same thing. How are they different?

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Volume

1 L = _____ mL	
= _____ cm <sup>3</sup>	1 mL = _____ cm <sup>3</sup>
= _____ dm <sup>3</sup>	

Equations:

Density	Celsius to Kelvin Temperature
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**1.8 Handling Numbers**

What are significant figures?
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Rules for determining # of significant figures:

1.
2.
3.
4.
5.

Do Example 1.4 on p. 20
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Do the Practice Exercise on p.21
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Math with significant figures:

Describe the rule for significant figures when <b>adding or subtracting</b> .
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Describe the rule for significant figures when <b>multiplying or dividing</b> .
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Do Example 1.5 on p. 21

Do the Practice Exercise on p. 22

**1.9 Dimensional Analysis in Solving Problems**

Example 1.6 on p. 25

1.6 Practice Exercise

Example 1.7 on p. 25

1.7 Practice Exercise

Example 1.8 on p. 25

1.8 Practice Exercise



## Video Notes: Significant Figures.

### **Video #1:** Significant Figures & Zeros

Fill in the chart below as you watch the video.

Rule:	Examples:
#1. Zeroes _____ between nonzero numbers are _____ significant.	3091 - 109,003 - 82024 - 5.00603 -
#2 -	0.000491 - 0.0132 - 0.00000000062 -
#3 - Zeros that come AFTER nonzero digits	83,000 - 83,000. - 83.00 - 4,532,100 - 789.000 - 90,000 - 200. - 50.00 -

### **Video #2:** Multiplication and Division with Significant Zeros

Complete the examples as you watch the video:

$307 \times 32,000 =$	$0.005 \times 9740 =$
$8.000 / 532 =$	$0.3010 \times 5030 =$
$480.00 / 23,000 =$	

### **Video #3:** Add & Subtract with Significant Figures

$13.0198 + 1.2 =$	$59.21 - 18.8722$
$94.00 + 15 + 182.113 =$	$8.679 + 0.3 + 5.88 =$

**Video #4: Scientific Notation and Significant Figures**

$50.00 \times 140.0 =$	$86 \times 23 =$
$112560 / 56.28 =$	$8.9 \times 56 =$
$20.0 \times 100.0 =$	

**Video #5: Why are significant figures important?**

1. So....what's the point of significant figures?

Calculate the density of the rock using the data from the Barbie playset....

What is wrong with the answer?

What should the actual answer be?

**Video #6: Using Significant Figures Practice Problems**

$5.64 + 8.1 + 4.31 + 25.85 =$	$14 \text{ people} \times 25.9 =$
$34 \text{ people} \times 4 \text{ bracelets} =$	



P.30-31 (25, 26, 29-36, 39-46). Show ALL work, DO NOT just put the answers.

25.a.)	b.)	c.)
26 a.)	b.)	c.)

29a.	b.	c.	d.
30a.	b.		
31a.	b.	c.	d.
32a.	b.	c.	d.
33a.	b.	c.	d.
33e.	f.	g.	h.
34a.	b.	c.	d.
34 e.	f.	g.	
35a.	b.	c.	d.

39.
40.
41.

42.

43.

44.

45.

**Chapter 2 Notes** – Read p. 46-64 to help you complete the following.

**2.3 Atomic Number, Mass Number and Isotopes**

What does the atomic number of an element tell you?
What does the mass number of an element tell you?
Write an equation that shows how you can determine the number of <i>neutrons</i> an atom has.

Example 2.1
Practice Exercise 2.1

\*Horizontal rows are called \_\_\_\_\_.

\*Vertical columns are called \_\_\_\_\_ or \_\_\_\_\_.

**Molecules and Ions**

What is a molecule?	
What is a diatomic molecule?  Give ALL examples:	What is a polyatomic molecule?  Give some examples:

**Define:**

<b>Ion:</b>	<b>Cation:</b>	<b>Anion:</b>
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**What charge do ions in each of the following groups have?**

<b>1A</b>	<b>2A</b>	<b>3A</b>	<b>5A</b>	<b>6A</b>	<b>7A</b>
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<b>Explain the difference between a molecular formula and an empirical formula.</b>
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**Formula of Ionic Compounds**

Show how the formula for Aluminum Oxide is determined and show how the sum of the charges in the compound is equal to zero.
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## Video Notes: Naming Compounds

### Video #1: Ionic vs. Molecular

1. What are molecular compounds also known as?
2. What elements make up ionic compounds?
3. What elements make up covalent/molecular compounds?
4. What elements are on the LEFT of the staircase line?
5. What elements are on the RIGTH side of the staircase line?
6. Identify the following compounds as Ionic or Molecular (Covalent):

NaCl	SO <sub>2</sub>	H <sub>2</sub> O	CuF <sub>2</sub>
C <sub>3</sub> H <sub>8</sub> O	LiNO <sub>3</sub>	NaSO <sub>4</sub>	

7. Fil in the table below about how Ionic and Covalent Compounds are formed. Include diagrams and examples:

Ionic	Molecular or Covalent
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8. Draw the differences in the structures of each type of compound:

Ionic	Molecular or Covalent
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## Video #2: Naming Covalent Molecular Compounds

1. List the 5 Rules for naming molecular compounds as they show up in the video:

1.
2.
3.
4.
5.

2. List the prefixes that go with each number:

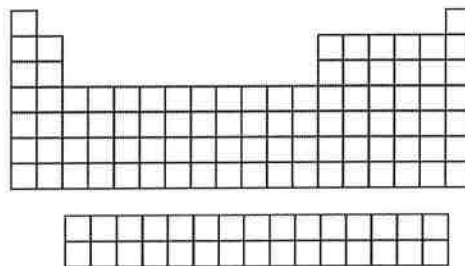
1	6
2	7
3	8
4	9
5	10

3. Name the examples below as he goes through them in the video:

$N_2O_3$	$P_4S_{10}$	$CF_4$
$PCl_5$	$Cl_2O_7$	$P_4O_6$
$CO$		

### Video #3: Writing Ionic Formulas Introduction

1. Label the periodic table below with the charges of the elements in each group/family (column):



2. Show how to write the formulas for the following compounds:

Lithium Oxide	Potassium Nitride
Sodium Chloride	Aluminum Oxide

### Video #4: What is a polyatomic ion?

1. Define *polyatomic ion*?
2. Name the following polyatomic ions:

$\text{NH}_4^+$	$\text{NO}_2^-$
$\text{CO}_3^{2-}$	$\text{PO}_4^{3-}$
$\text{OH}^-$	$\text{SO}_4^{3-}$
$\text{NO}_3^-$	$\text{SO}_3^{3-}$

3. Draw and show how the charges are determined for the following polyatomic ions?

Ammonium	Carbonate
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4. Define: **Cation, Anion**

**Video #5: Writing Ionic Formulas with transition metals**

1. What does the Roman numeral in the name represent?
2. Show how to determine the formulas for the following ionic compounds:

Chromium (II) Iodide	Manganese (III) Oxide
Lead (IV) Nitrate	

**Video #6: Naming Ionic Compounds with transition metals introduction**

1. Show how to name  $\text{FeCl}_3$ .
2. Which 2 transition metals always have the same charge and DO NOT need roman numerals in the name? What are their charges?
3. Name the compounds below:

AgCl	ZnCl <sub>2</sub>
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### Video #7: Writing formulas with polyatomic ions

Complete the examples below. Show the intermediate steps and the final formula:

Calcium Nitrate	Ammonium Nitrate
Sodium Carbonate	Ammonium Phosphate
Magnesium Phosphate	

### Video #8: Naming Acids Introduction

1. Define *acid*.
2. What is the name of an acid based on?
3. Complete the chart below:

Negative Ion Ending	Acid Name	Example
-ide		
-ate		
-ite		

4. Name the following exceptions:

$H_3PO_4$	$H_3PO_3$
$H_2SO_4$	$H_2SO_3$

5. Complete the statements below that will help you remember the acid naming rules.

My \_\_\_\_\_ has \_\_\_\_\_.

I \_\_\_\_\_ something \_\_\_\_\_.

\_\_\_\_\_ is \_\_\_\_\_.

**Video #9: Naming Acids Practice Problems**

HBrO <sub>4</sub>	H <sub>3</sub> AsO <sub>3</sub>
HF	H <sub>3</sub> PO <sub>3</sub>
HIO	

p.68-70 (16, 21, 22, 30, 34, 35, 38, 46, 49, 50, 57-60)

16.			
21a.	b.	c.	
22a.	b.	c.	d.
30a.	b.	c.	d.
34a.	b.	c.	d.
35.			
38.			
46. a.	b.	c.	d.
49.			
50.			

#57-60

#57	#58	#59	#60
A	A	A	A
B	B	B	B
C	C	C	C
D	D	D	D
E	E	E	E
F	F	F	F
G	G	G	G
H	H	H	H
I	I	I	I
J	J	J	J
K	K		K
L	L		
M	M		
N	N		



## Summer Naming Assignment

Name	Formula
Sodium Bicarbonate	
Sodium Fluoride	
Iron (III) Chloride	
Sodium Carbonate	
Copper (II) Sulfate	
Magnesium Hydroxide	
Barium Nitrate	
Lithium Sulfate	
Magnesium Chloride	
Silver Nitrate	
Aluminum Sulfate	
Calcium Hydroxide	
Calcium Sulfate	
Mercury (II) Nitrate	
Lead (IV) Nitrate	
Magnesium Iodide	
Sodium Nitride	
Disulfur tetrafluoride	
Carbon trioxide	
Nitrogen pentoxide	
Nitrogen tribromide	
Dinitrogen heptachloride	
Carbon tetrachloride	
Trihydrogen monophosphide	
Hydroiodic acid	
Perchloric acid	
Acetic acid	
Nitrous acid	
Sulfurous acid	
Phosphoric acid	

Formula	Name
NaCl	
Fe <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	
Cu(OH) <sub>2</sub>	
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	
LiNO <sub>3</sub>	
BaSO <sub>4</sub>	
Mg(NO <sub>3</sub> ) <sub>2</sub>	
AgCl	
Al(OH) <sub>3</sub>	
CaSO <sub>4</sub>	
FeS	
PbCl <sub>2</sub>	
NaI	
MgCO <sub>3</sub>	
Br <sub>2</sub> I <sub>4</sub>	
P <sub>5</sub> F <sub>8</sub>	
NO <sub>5</sub>	
NBr <sub>3</sub>	
N <sub>2</sub> O <sub>5</sub>	
BrCl <sub>3</sub>	
N <sub>2</sub> O	
HClO <sub>4</sub>	
H <sub>3</sub> PO <sub>4</sub>	
HCl	
H <sub>2</sub> SO <sub>4</sub>	
HNO <sub>2</sub>	
HF	
HCN	
H <sub>2</sub> CO <sub>3</sub>	
HNO <sub>3</sub>	

**Chapter 3 Notes** – Read p. 75 – 87 to help you complete the following.

**3.1 Atomic Mass**

Define atomic mass:

Define atomic mass unit:

Define average atomic mass:

**Example 3.1**

**3.1 Practice Exercise**

**3.2**

Define mole:

What is Avogadro's #?

If you have a mole of oranges, how many oranges do you have?

**Example 3.2**

**3.2 Practice Exercise**

**Example 3.3**

**3.3 Practice Exercise**

**Example 3.4**

**3.4 Practice Exercise**

**3.3 Molecular Mass**

How is molecular mass calculated?

How is molar mass calculated?

**Example 3.5**

**3.5 Practice Exercise**

**Example 3.6**

**3.6 Practice Exercise**

**Example 3.7**

**3.7 Practice Exercise**

**3.4 The Mass Spectrometer**

Read the section on how a mass spectrometer works and use that information to answer the following question:

Explain how the mass spectrometer enables chemists to determine the average atomic mass of chlorine, which has two stable isotopes (Cl-35 and Cl-37).

**3.5 Percent Composition**

What equation is used to calculate the percent composition of an element in a compound?



**Example 3.8**

**3.8 Practice Exercise**



p. 107 (13-19, 23-25, 39, 59)

13.

14.

15.

16.

17.

18.

19.

23a.

b.

c.

d.

e.

f.

g.

24a.

b.

c.

d.

e.

f.

25.

39.

59a
B
C
D
E
F
G
H
I
J
K
L
M
N

## Polyatomic Ions

You need to **memorize all names and formulas** (with charges) for the following ions. You will have a **quiz** on these ions on your **second day of class**. Half of the quiz will have ion names that you have to write the formula for. The other half will have ion formulas that you need to write the name for. \*Make flashcards and study these periodically...not just the night before the quiz. You need to know these all year and will be randomly quizzed on them several times throughout each semester.

Ion Name	Ion Formula
Ammonium	$\text{NH}_4^+$
Nitrite	$\text{NO}_2^-$
Nitrate	$\text{NO}_3^-$
Sulfite	$\text{SO}_3^{2-}$
Sulfate	$\text{SO}_4^{2-}$
Hydrogen Sulfate	$\text{HSO}_4^-$
Hydroxide	$\text{OH}^-$
Cyanide	$\text{CN}^-$
Phosphate	$\text{PO}_4^{3-}$
Hydrogen Phosphate	$\text{HPO}_4^{2-}$
Dihydrogen Phosphate	$\text{H}_2\text{PO}_4^-$
Thiocyanate	$\text{NCS}^-$
Carbonate	$\text{CO}_3^{2-}$
Hydrogen Carbonate	$\text{HCO}_3^-$
Hypochlorite	$\text{ClO}^-$
Chlorite	$\text{ClO}_2^-$
Chlorate	$\text{ClO}_3^-$
Perchlorate	$\text{ClO}_4^-$
Hypobromite	$\text{BrO}^-$
Bromite	$\text{BrO}_2^-$
Bromate	$\text{BrO}_3^-$
Perbromate	$\text{BrO}_4^-$
Hypoiodite	$\text{IO}^-$
Iodite	$\text{IO}_2^-$
Iodate	$\text{IO}_3^-$
Periodate	$\text{IO}_4^-$
Acetate	$\text{C}_2\text{H}_3\text{O}_2^-$
Permanganate	$\text{MnO}_4^-$
Chromate	$\text{CrO}_4^{2-}$
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$
Peroxide	$\text{O}_2^{2-}$
Oxalate	$\text{C}_2\text{O}_4^{2-}$
Amide	$\text{NH}_2^-$
Borate	$\text{BO}_3^{3-}$
Thiosulfate	$\text{S}_2\text{O}_3^{2-}$