

# AP Chemistry Summer Assignment

The following assignment is to be completed and brought on the first day of class.

## Scientific Notation

Write the following numbers in scientific notation.

3,400 _____	0.000023 _____
101,000 _____	0.010 _____
45.01 _____	1,000,000 _____
0.00671 _____	

Write the following number in standard notation.

$2.30 \times 10^4$ _____	$1.76 \times 10^{-3}$ _____
$205.901 \times 10^{-7}$ _____	$8.65 \times 10^{-1}$ _____
$9.11 \times 10^3$ _____	$5.40 \times 10^1$ _____
$1.76 \times 10^{11}$ _____	$7.4 \times 10^{-5}$ _____

## Sig Figs

Determine the number of sig figs in the following numbers:

1) 0.0000055 _____	2) 1.6402 _____	3) 0.0964070 _____	4) $3.40 \times 10^3$ _____
5) 1.020 _____	6) 1020 _____	7) 902,000,000 _____	

Determine the answer for the following calculations with correct number of sig figs.

1.  $(45.0 / 9.0) \times 89.22 =$  \_\_\_\_\_

2.  $(2.88 + 0.5) - (23,000 - 0.11) =$  \_\_\_\_\_

3.  $[(10.31) + (0.0225)] / [(12.6) \times (0.01345)] =$  \_\_\_\_\_

## Metric Conversions

Make the following metric conversions.

36.52 mg = _____ g	14.72 kg = _____ mg	0.0035 hm = _____ dm
0.134 m = _____ km	25 mm = _____ $\mu$ m	243 daL = _____ L
45.23 L = _____ mL	0.035 ML = _____ cL	27.32 mm = _____ m

## Nomenclature

1. Name the following covalent compounds

IF<sub>7</sub> \_\_\_\_\_ N<sub>2</sub>O<sub>5</sub> \_\_\_\_\_ XeF<sub>2</sub> \_\_\_\_\_  
N<sub>2</sub>O<sub>4</sub> \_\_\_\_\_ As<sub>4</sub>O<sub>10</sub> \_\_\_\_\_ SF<sub>6</sub> \_\_\_\_\_

2. Name the following ionic compounds

AlCl<sub>3</sub> \_\_\_\_\_ MgO \_\_\_\_\_ BaI<sub>2</sub> \_\_\_\_\_  
KI \_\_\_\_\_ SrBr<sub>2</sub> \_\_\_\_\_ Na<sub>2</sub>S \_\_\_\_\_

3. Name the following ionic compounds that contain transition metals

CuCl<sub>2</sub> \_\_\_\_\_ Fe<sub>2</sub>O<sub>3</sub> \_\_\_\_\_ SnO \_\_\_\_\_  
PbCl<sub>4</sub> \_\_\_\_\_ Cu<sub>2</sub>S \_\_\_\_\_ HgS \_\_\_\_\_

4. Name these ionic compounds that contain polyatomic ions.

Fe(NO<sub>3</sub>)<sub>3</sub> \_\_\_\_\_ NaOH \_\_\_\_\_ Cu<sub>2</sub>SO<sub>4</sub> \_\_\_\_\_  
Ca(ClO<sub>3</sub>)<sub>2</sub> \_\_\_\_\_ KNO<sub>2</sub> \_\_\_\_\_ NaHCO<sub>3</sub> \_\_\_\_\_

5. Name these binary acids

HCl \_\_\_\_\_ HI \_\_\_\_\_ HF \_\_\_\_\_

6. Name these acids with polyatomic ions.

HClO<sub>4</sub> \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> \_\_\_\_\_ HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> \_\_\_\_\_  
H<sub>3</sub>PO<sub>4</sub> \_\_\_\_\_ HNO<sub>2</sub> \_\_\_\_\_ H<sub>2</sub>CrO<sub>4</sub> \_\_\_\_\_

7. Name these compounds appropriately.

CO \_\_\_\_\_ NH<sub>4</sub>CN \_\_\_\_\_ HIO<sub>3</sub> \_\_\_\_\_  
NI<sub>3</sub> \_\_\_\_\_ AlP \_\_\_\_\_ OF<sub>2</sub> \_\_\_\_\_  
LiMnO<sub>4</sub> \_\_\_\_\_ HClO \_\_\_\_\_ HF \_\_\_\_\_  
SO<sub>2</sub> \_\_\_\_\_ CuCr<sub>2</sub>O<sub>7</sub> \_\_\_\_\_ K<sub>2</sub>O \_\_\_\_\_  
FeF<sub>3</sub> \_\_\_\_\_ KC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> \_\_\_\_\_ MnS \_\_\_\_\_

8. Write the formulas for the following compounds.

Tin (IV) phosphide _____	copper (II) cyanide _____
Magnesium hydroxide _____	sodium peroxide _____
Sulfurous acid _____	lithium Borate _____
Potassium nitride _____	chromium (III) carbonate _____
Gallium arsenide _____	cobalt (II) chromate _____
Zinc fluoride _____	perchloric acid _____

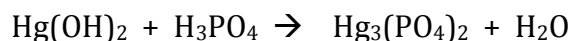
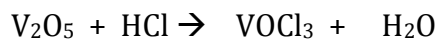
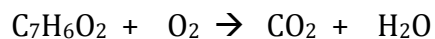
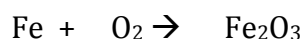
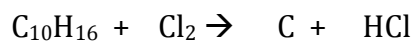
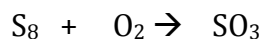
## Solubility rules

Review solubility rules and identify each of the following compounds as soluble or insoluble in water.

Na <sub>2</sub> CO <sub>3</sub> _____	CoCO <sub>3</sub> _____	Pb(NO <sub>3</sub> ) <sub>2</sub> _____
K <sub>2</sub> S_____	BaSO <sub>4</sub> _____	(NH <sub>4</sub> ) <sub>2</sub> S_____
AgI_____	Ni(NO <sub>3</sub> ) <sub>2</sub> _____	KI_____
FeS_____	PbCl <sub>2</sub> _____	CuSO <sub>4</sub> _____
Li <sub>2</sub> O_____	Mn(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub> _____	Cr(OH) <sub>3</sub> _____
AgClO <sub>3</sub> _____	Sn(SO <sub>3</sub> ) <sub>4</sub> _____	FeF <sub>2</sub> _____

## Balancing Equations

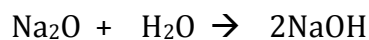
Balance the following equations with the lowest whole number coefficients.



## Stoichiometry and Limiting Reactants

Make sure you report answers with the correct number of sig figs.

1. Given the equation below, what mass of water would be needed to react with 10.0g of sodium oxide?

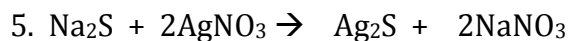


2.  $2\text{NaClO}_3 \rightarrow 2\text{NaCl} + 3\text{O}_2$

What mass of sodium chloride is formed along with 45.0g of oxygen gas?

3.  $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$

What mass of water will be produced when 100.0g of ammonia is reacted with excess oxygen?



- a. If the above reaction is carried out with 50.0g of sodium sulfide and 35.0g of silver nitrate, which is the limiting reactant?
- c. What mass of silver sulfide would form?

6. Calcium carbonate decomposes upon heating, producing calcium oxide and carbon dioxide gas.

- a. Write a balanced chemical equation for this reaction.
- b. How many grams of calcium oxide will remain after 12.25 g of calcium carbonate is completely decomposed?
- c. What volume of carbon dioxide gas is produced from this amount of calcium carbonate at STP? (remember that at STP, 1 mole of gas = 22.4 L of gas)

7. Hydrogen gas and bromine gas react to form hydrogen bromide gas.

- a. Write a balanced chemical equation for this reaction.
- b. How many grams of hydrogen bromide gas can be produced from 3.2 g of hydrogen gas and 9.5 g of bromine gas?
- c. How many grams of which reactant is left unreacted?
- d. What volume of HBr, measured at STP, is produced in b)?

8. When ammonia gas, oxygen gas and methane gas ( $\text{CH}_4$ ) are combined, the products are hydrogen cyanide gas and water.

- a. Write a balanced chemical equation for this reaction.
- b. Calculate the mass of each product produced when 225 g of oxygen gas is reacted with an excess of the other two reactants.
- c. If the actual yield of the experiment in b) is 105 g of HCN, calculate the percent yield.