

# AP Chemistry Summer Reading Assignment

Read chapter 1 in Chemistry: The Central Science

Answer the following questions at the end of the chapter:

1, 3, 5, 17, 18, 21, 23, 32, 35, 37, 43, 45

## Memorize the following information

There will be a test on this information during the first week of class. I recommend using flash cards especially for ions.

*The periodic table used on the AP test only has symbols not names, so you need to know the symbols for the common elements. You do not need to know the Latin names.*

**TABLE 1.2 Some Common Elements and Their Symbols**

Carbon	C	Aluminum	Al	Copper	Cu (from <i>cuprum</i> )
Fluorine	F	Bromine	Br	Iron	Fe (from <i>ferrum</i> )
Hydrogen	H	Calcium	Ca	Lead	Pb (from <i>plumbum</i> )
Iodine	I	Chlorine	Cl	Mercury	Hg (from <i>hydrargyrum</i> )
Nitrogen	N	Helium	He	Potassium	K (from <i>kalium</i> )
Oxygen	O	Lithium	Li	Silver	Ag (from <i>argentum</i> )
Phosphorus	P	Magnesium	Mg	Sodium	Na (from <i>natrium</i> )
Sulfur	S	Silicon	Si	Tin	Sn (from <i>stannum</i> )

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*In chemistry we use the SI system need to know these units.*

**TABLE 1.4 SI Base Units**

Physical Quantity	Name of Unit	Abbreviation
Mass	Kilogram	kg
Length	Meter	m
Time	Second	s <sup>a</sup>
Temperature	Kelvin	K
Amount of substance	Mole	mol
Electric current	Ampere	A
Luminous intensity	Candela	cd

<sup>a</sup>The abbreviation sec is frequently used.

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*Know the metric prefixes.*

**TABLE 1.5 Selected Prefixes Used in the Metric System**

Prefix	Abbreviation	Meaning	Example
Giga	G	$10^9$	1 gigameter (Gm) = $1 \times 10^9$ m
Mega	M	$10^6$	1 megameter (Mm) = $1 \times 10^6$ m
Kilo	k	$10^3$	1 kilometer (km) = $1 \times 10^3$ m
Deci	d	$10^{-1}$	1 decimeter (dm) = 0.1 m
Centi	c	$10^{-2}$	1 centimeter (cm) = 0.01 m
Milli	m	$10^{-3}$	1 millimeter (mm) = 0.001 m
Micro	$\mu^a$	$10^{-6}$	1 micrometer ( $\mu\text{m}$ ) = $1 \times 10^{-6}$ m
Nano	n	$10^{-9}$	1 nanometer (nm) = $1 \times 10^{-9}$ m
Pico	p	$10^{-12}$	1 picometer (pm) = $1 \times 10^{-12}$ m
Femto	f	$10^{-15}$	1 femtometer (fm) = $1 \times 10^{-15}$ m

<sup>a</sup>This is the Greek letter mu (pronounced "mew").

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*Ions are atoms or groups of atoms that have gained or lost electrons. Cations are ions that lost electrons and have a positive charge. Learn the names, symbols, and charges. You do not need to know the Latin names. You should learn the names where the Roman numerals tell you the charge.*

**TABLE 2.4 Common Cations\***

Charge	Formula	Name	Formula	Name
1+	<b>H<sup>+</sup></b>	<b>Hydrogen ion</b>	<b>NH<sub>4</sub><sup>+</sup></b>	<b>Ammonium ion</b>
	Li <sup>+</sup>	Lithium ion	Cu <sup>+</sup>	Copper(I) or cuprous ion
	<b>Na<sup>+</sup></b>	<b>Sodium ion</b>		
	<b>K<sup>+</sup></b>	<b>Potassium ion</b>		
	Cs <sup>+</sup>	Cesium ion		
	<b>Ag<sup>+</sup></b>	<b>Silver ion</b>		
2+	<b>Mg<sup>2+</sup></b>	<b>Magnesium ion</b>	<b>Co<sup>2+</sup></b>	<b>Cobalt(II) or cobaltous ion</b>
	<b>Ca<sup>2+</sup></b>	<b>Calcium ion</b>	<b>Cu<sup>2+</sup></b>	<b>Copper(II) or cupric ion</b>
	Sr <sup>2+</sup>	Strontium ion	<b>Fe<sup>2+</sup></b>	<b>Iron(II) or ferrous ion</b>
	Ba <sup>2+</sup>	Barium ion	Mn <sup>2+</sup>	Manganese(II) or manganous ion
	<b>Zn<sup>2+</sup></b>	<b>Zinc ion</b>	<b>Hg<sub>2</sub><sup>2+</sup></b>	<b>Mercury(I) or mercurous ion</b>
	Cd <sup>2+</sup>	Cadmium ion	<b>Hg<sup>2+</sup></b>	<b>Mercury(II) or mercuric ion</b>
			Ni <sup>2+</sup>	Nickel(II) or nickelous ion
			<b>Pb<sup>2+</sup></b>	<b>Lead(II) or plumbous ion</b>
			Sn <sup>2+</sup>	Tin(II) or stannous ion
	3+	<b>Al<sup>3+</sup></b>	<b>Aluminum ion</b>	<b>Cr<sup>3+</sup></b>
			<b>Fe<sup>3+</sup></b>	<b>Iron(III) or ferric ion</b>

\*The most common ions are in boldface.

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Anions are ions that have gained electrons and have a negative charge. Learn the names, symbols, and charges.

**TABLE 2.5 Common Anions\***

Charge	Formula	Name	Formula	Name
1-	H <sup>-</sup>	Hydride ion	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>	Acetate ion
	F <sup>-</sup>	<b>Fluoride ion</b>	ClO <sub>3</sub> <sup>-</sup>	Chlorate ion
	Cl <sup>-</sup>	<b>Chloride ion</b>	ClO <sub>4</sub> <sup>-</sup>	<b>Perchlorate ion</b>
	Br <sup>-</sup>	<b>Bromide ion</b>	NO <sub>3</sub> <sup>-</sup>	<b>Nitrate ion</b>
	I <sup>-</sup>	<b>Iodide ion</b>	MnO <sub>4</sub> <sup>-</sup>	Permanganate ion
	CN <sup>-</sup>	Cyanide ion		
	OH <sup>-</sup>	<b>Hydroxide ion</b>		
2-	O <sup>2-</sup>	<b>Oxide ion</b>	CO <sub>3</sub> <sup>2-</sup>	<b>Carbonate ion</b>
	O <sub>2</sub> <sup>2-</sup>	Peroxide ion	CrO <sub>4</sub> <sup>2-</sup>	Chromate ion
	S <sup>2-</sup>	<b>Sulfide ion</b>	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	Dichromate ion
			SO <sub>4</sub> <sup>2-</sup>	<b>Sulfate ion</b>
3-	N <sup>3-</sup>	Nitride ion	PO <sub>4</sub> <sup>3-</sup>	<b>Phosphate ion</b>

\*The most common ions are in boldface.

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These prefixes will be used when we learn to name covalent compounds.

**TABLE 2.6 Prefixes Used in Naming Binary Compounds Formed Between Nonmetals**

Prefix	Meaning
Mono-	1
Di-	2
Tri-	3
Tetra-	4
Penta-	5
Hexa-	6
Hepta-	7
Octa-	8
Nona-	9
Deca-	10

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Learn the names and symbols of the strong acids and bases. Examples of names of bases: LiOH is called lithium hydroxide Ca(OH)<sub>2</sub> is called calcium hydroxide.

**TABLE 4.2 Common Strong Acids and Bases**

Strong Acids	Strong Bases
Hydrochloric, HCl	Group 1A metal hydroxides (LiOH, NaOH, KOH, RbOH, CsOH)
Hydrobromic, HBr	Heavy group 2A metal hydroxides [Ca(OH) <sub>2</sub> , Sr(OH) <sub>2</sub> , Ba(OH) <sub>2</sub> ]
Hydroiodic, HI	
Chloric, HClO <sub>3</sub>	
Perchloric, HClO <sub>4</sub>	
Nitric, HNO <sub>3</sub>	
Sulfuric, H <sub>2</sub> SO <sub>4</sub>	

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### Practice questions:

Name the elements:

Cu \_\_\_\_\_  
P \_\_\_\_\_  
F \_\_\_\_\_

Pt \_\_\_\_\_  
Na \_\_\_\_\_  
Ag \_\_\_\_\_

Write the symbol for each element:

Iron \_\_\_\_\_  
Barium \_\_\_\_\_  
Lead \_\_\_\_\_

Carbon \_\_\_\_\_  
Silicon \_\_\_\_\_  
Silver \_\_\_\_\_

What is the SI unit for

Amount of a substance \_\_\_\_\_  
Temperature \_\_\_\_\_  
Mass \_\_\_\_\_

What is the metric prefix for:

10<sup>-6</sup> \_\_\_\_\_  
10<sup>-3</sup> \_\_\_\_\_  
10<sup>-9</sup> \_\_\_\_\_

What is the formula and charge of each ion?

Lithium ion \_\_\_\_\_  
Chloride ion \_\_\_\_\_  
Barium ion \_\_\_\_\_  
Zinc \_\_\_\_\_  
Iron II \_\_\_\_\_

Aluminum ion \_\_\_\_\_  
Ammonium ion \_\_\_\_\_  
Nitrate ion \_\_\_\_\_  
Phosphate \_\_\_\_\_  
Cyanide \_\_\_\_\_

*Name the following ions*

$\text{Cu}^{2+}$  \_\_\_\_\_

$\text{OH}^-$  \_\_\_\_\_

$\text{I}^-$  \_\_\_\_\_

$\text{SO}_4^{2-}$  \_\_\_\_\_

$\text{Na}^+$  \_\_\_\_\_

$\text{CO}_3^{2-}$  \_\_\_\_\_

$\text{S}^{2-}$  \_\_\_\_\_

$\text{NO}_3^-$  \_\_\_\_\_

*Write the formula for the following acids and bases*

Hydrobromic acid \_\_\_\_\_

Nitric acid \_\_\_\_\_

Sodium hydroxide \_\_\_\_\_

Sulfuric acid \_\_\_\_\_