AP Chemistry Summer Assignment 2022-2023

Welcome to AP Chemistry!

I am really excited to teach the course again next year and want to officially welcome you to class. Over the summer, please spend some time preparing for AP Chemistry by completing the summer assignment. Also, **please make sure to rest and enjoy your summer break.**

This assignment is required and will be collected on Friday, August 26, 2022.

Contact Information: The AP Chemistry teacher for the 2022-2023 school year is Ms. Woods. (makala_woods@dpsk12.net).

Go Formative: Please join our AP Chemistry class on Go Formative (www.goformative.com). Use the join code: UM6MNH

- If you took chemistry at East, you should already have a Go Formative Account.
- If you took chemistry at another school, you will need to create a Go Formative account using your dps student email and password.

I will post two activities for you to complete. The first assignment is Summer Chemistry Review 22 - 23. This assignment will only include the most important topics that I need you to review before entering the classroom in August. Some of these topics will include writing chemical formulas and reactions, balancing chemical equations, and most importantly stoichiometry (dimensional analysis). The other Formative is called Molarity. This is a new topic, but it should not be too difficult for you to understand on your own. **You should have access to all of these assignments by June 10th.** I am also going to ask that you memorize a few things. It is not as urgent that you memorize all of these topics by the time school starts, however, it will make your AP Chemistry experience a little bit smoother.

With all due respect, if you do not have the work ethic to complete this assignment (by the end of August), AP Chemistry is not the class for you. :)

Assignment:

1) Please complete the following activities on Go Formative and be prepared to turn it in on Friday, August 27.

   - ☐ AP Chemistry Review
   - ☐ Molarity

2) Memorize the items listed below. All of these items are listed on the next couple pages of this document.

   - ☐ Polyatomic Ions
   - ☐ Solubility Rules (focus on the Simple Rules 1-3 that I've listed for you)
   - ☐ Metric System Conversions prefixes and meanings
   - ☐ Names and element symbols for elements 1 - 56 and 72 - 88, and 92

Supplies Needed:

- scientific OR graphing calculator
- a binder
- a notebook

Polyatomic Ions

-1	-2	-3	-4
acetate $C_2H_3O_2^-$ **or** acetate CH_3COO^- nitrite NO_2^- nitrate NO_3^- hypochlorite ClO^- chlorite ClO_2^- chlorate ClO_3^- perchlorate ClO_4^- hypobromite BrO^- bromite BrO_2^- bromate BrO_3^- perbromate BrO_4^- hypoiodite IO^- iodite IO_2^- iodate IO_3^- periodate IO_4^- cyanide CN^- thiocyanate SCN^- dihydrogen phosphate $H_2PO_4^-$ hydrogen carbonate (bicarbonate) HCO_3^- hydrogen sulfate (bisulfate) HSO_4^-	carbonate CO_3^{2-} chromate CrO_4^{2-} dichromate $Cr_2O_7^{2-}$ hydrogen phosphate HPO_4^{2-} oxalate $C_2O_4^{2-}$ peroxide O_2^{2-} silicate SiO_3^{2-} sulfite SO_3^{2-} sulfate SO_4^{2-} thiosulfate $S_2O_3^{2-}$	phosphite PO_3^{3-} phosphate PO_4^{3-}	carbide C^{4-}
hydrogen sulfide (bisulfide) HS^- hydrogen sulfite (bisulfite) HSO_3^- hydroxide OH^- permanganate MnO_4^-			**+1** Ammonium NH_4^+

Solubility Rules			
Soluble = dissolves in water = (aq) Insoluble = solid = (s)			
Anion (Negative)	**Plus**	**Cation (Positive)**	**Soluble or Insoluble**
Any negative ion	+	Li^{1+}, Na^{1+}, K^{1+}, Rb^{1+}, Cs^{1+}, or NH_4^{1+}	Soluble (aq)
NO_3^{1-}	+	Any positive ion	Soluble (aq)
$C_2H_3O_2^{1-}$	+	Any positive ion	Soluble (aq)
HCO_3^{1-}	+	Any positive ion	Soluble (aq)
ClO_3^{1-}	+	Any positive ion	Soluble (aq)
ClO_4^{1-}	+	Any positive ion	Soluble (aq)
Cl^{1-} Br^{1-} I^{1-}	+	Ag^{1+}, Pb^{2+}, Hg_2^{2+}	Insoluble (s)
	+	Any other positive ion	Soluble (aq)
F^-	+	Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+}	Insoluble (s)
	+	Any other positive ion	Soluble (aq)
SO_4^{2-}	+	Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+}, Hg_2^{2+}, Ag^+	Insoluble (s)
	+	Any other positive ion	Soluble (aq)
CO_3^{2-} S^{2-} $Cr_2O_7^{2-}$ PO_4^{3-}	+	Li^{1+}, Na^{1+}, K^{1+}, Rb^{1+}, Cs^{1+}, or NH_4^{1+}	Soluble (aq)
	+	Any other positive ion	Insoluble (s)
OH^{1-}	+	Li^{1+}, Na^{1+}, K^{1+}, Rb^{1+}, Cs^{1+}, or NH_4^{1+}	Soluble (aq)
	+	Ba^{2+}, Sr^{2+}, Ca^{2+}	Marginally soluble
	+	Any other positive ion	Insoluble (s)
CrO_4^{2-}	+	Li^{1+}, Na^{1+}, K^{1+}, Rb^{1+}, Cs^{1+}, NH_4^{1+}, Ca^{2+}, Mg^{2+}	Soluble (aq)
	+	Any other positive ion	Insoluble (s)

Simple Rules for the Solubility of Salts in Water

1) Most nitrate (NO_3^{1-}), acetates ($C_2H_3O_2^{1-}$), chlorates (ClO_3^{1-}) and perchlorates (ClO_4^{1-}) salts are soluble.
2) Most salts containing the alkali metal ions (Group 1 ions) (Li^+, Na^+, K^+, Cs^+, Rb^+) and the ammonium ion (NH_4^+) are soluble.
3) Most chloride, bromide, and iodide salts are soluble. Notable exceptions are salts containing the ions Ag^+, Pb^{2+}, and Hg_2^{2+}.

Metric System Prefixes

Prefix	Symbol	Meaning	Example
Mega-	M	1,000,000	1,000,000 m = 1 Mm
Kilo-	K	1,000	1000 m = 1 km
Deci-	d	0.1	10 dm = 1 m
Centi-	c	0.01	100 cm = 1 m
Milli-	m	0.001	1000 mm = 1 m
Micro	μ	0.000001	1,000,000 μm = 1 m
Nano -	n	0.000000001	1,000,000,000 = 1 m

Periodic Table of the Elements

1 IA 1A	2 IIA 2A	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8	9 VIII 8	10	11 IB 1B	12 IIB 2B	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A
1 **H** Hydrogen 1.008																	2 **He** Helium 4.003
3 **Li** Lithium 6.941	4 **Be** Beryllium 9.012											5 **B** Boron 10.811	6 **C** Carbon 12.011	7 **N** Nitrogen 14.007	8 **O** Oxygen 15.999	9 **F** Fluorine 18.998	10 **Ne** Neon 20.180
11 **Na** Sodium 22.990	12 **Mg** Magnesium 24.305											13 **Al** Aluminum 26.982	14 **Si** Silicon 28.086	15 **P** Phosphorus 30.974	16 **S** Sulfur 32.066	17 **Cl** Chlorine 35.453	18 **Ar** Argon 39.948
19 **K** Potassium 39.098	20 **Ca** Calcium 40.078	21 **Sc** Scandium 44.956	22 **Ti** Titanium 47.867	23 **V** Vanadium 50.942	24 **Cr** Chromium 51.996	25 **Mn** Manganese 54.938	26 **Fe** Iron 55.845	27 **Co** Cobalt 58.933	28 **Ni** Nickel 58.693	29 **Cu** Copper 63.546	30 **Zn** Zinc 65.38	31 **Ga** Gallium 69.723	32 **Ge** Germanium 72.631	33 **As** Arsenic 74.922	34 **Se** Selenium 78.971	35 **Br** Bromine 79.904	36 **Kr** Krypton 83.798
37 **Rb** Rubidium 85.468	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.906	40 **Zr** Zirconium 91.224	41 **Nb** Niobium 92.906	42 **Mo** Molybdenum 95.95	43 **Tc** Technetium 98.907	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.906	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.868	48 **Cd** Cadmium 112.414	49 **In** Indium 114.818	50 **Sn** Tin 118.711	51 **Sb** Antimony 121.760	52 **Te** Tellurium 127.6	53 **I** Iodine 126.904	54 **Xe** Xenon 131.294
55 **Cs** Cesium 132.905	56 **Ba** Barium 137.328	57-71	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.948	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.207	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.217	78 **Pt** Platinum 195.085	79 **Au** Gold 196.967	80 **Hg** Mercury 200.592	81 **Tl** Thallium 204.383	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.980	84 **Po** Polonium [208.982]	85 **At** Astatine 209.987	86 **Rn** Radon 222.018
87 **Fr** Francium 223.020	88 **Ra** Radium 226.025	89-103	104 **Rf** Rutherfordium [261]	105 **Db** Dubnium [262]	106 **Sg** Seaborgium [266]	107 **Bh** Bohrium [264]	108 **Hs** Hassium [269]	109 **Mt** Meitnerium [278]	110 **Ds** Darmstadtium [281]	111 **Rg** Roentgenium [280]	112 **Cn** Copernicium [285]	113 **Nh** Nihonium [286]	114 **Fl** Flerovium [289]	115 **Mc** Moscovium [289]	116 **Lv** Livermorium [293]	117 **Ts** Tennessine [294]	118 **Og** Oganesson [294]

Lanthanide Series	57 **La** Lanthanum 138.905	58 **Ce** Cerium 140.116	59 **Pr** Praseodymium 140.908	60 **Nd** Neodymium 144.243	61 **Pm** Promethium 144.913	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.964	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.925	66 **Dy** Dysprosium 162.500	67 **Ho** Holmium 164.930	68 **Er** Erbium 167.259	69 **Tm** Thulium 168.934	70 **Yb** Ytterbium 173.055	71 **Lu** Lutetium 174.967
Actinide Series	89 **Ac** Actinium 227.028	90 **Th** Thorium 232.038	91 **Pa** Protactinium 231.036	92 **U** Uranium 238.029	93 **Np** Neptunium 237.048	94 **Pu** Plutonium 244.064	95 **Am** Americium 243.061	96 **Cm** Curium 247.070	97 **Bk** Berkelium 247.070	98 **Cf** Californium 251.080	99 **Es** Einsteinium [254]	100 **Fm** Fermium 257.095	101 **Md** Mendelevium 258.1	102 **No** Nobelium 259.101	103 **Lr** Lawrencium [262]