



Welcome to AP Chemistry class! I am looking forward to helping you gain a deeper understanding of chemistry and how it impacts our lives. I hope you are looking forward to a busy and challenging year. Since you have elected to take this course, I assume you have the interest, intelligence and motivation needed to be successful.

The Advance Placement Chemistry experience is designed to provide a full year of college-level chemistry, so it places heavy demands on the student, especially in terms of the time commitment required. In fact, the College Board suggests that students devote a minimum of five hours per week for individual study outside of the classroom work. The ultimate objective, of course, is to prepare you to take the AP Chemistry test in May 2020, and in order to accomplish this, topics are covered rather quickly. For this reason, most students take AP Chemistry after they have already completed a year of high school chemistry, since that provides them with a solid foundation.

It is also important that you realize up front how your performance in this course will be measured. We will follow curriculum pacing guidelines according to National Math and Science Initiative. The course grade will mainly depend on your assessment scores, although your lab reports will be evaluated too. I do drop your lowest quiz grade every nine weeks. ☺

There is a vast amount of chemistry available on the Internet, including sources that I have cited here. With ready access to these websites in your home, school or at the

local library, I am confident that you will have everything you need to learn chemistry at the AP level.

I recommend that you spread out the Summer Assignment, rather than trying to complete it in the final week of the summer! Remember, AP Chemistry is an equivalent course to an Introductory Chemistry college course, a full year program. You are already aware that taking a college level course in high school is difficult, and it requires commitment, hard work and time, but completion of a class like this is a great investment in your education. Prepare yourself for a successful year in AP chemistry.

You may contact me by email over the summer, and I will do my best to respond quickly. mallime@boe.richmond.k12.ga.us

Have a **great summer** and **enjoy** chemistry.

Mrs. Meena

Summer Assignment May 2019

Use Internet resource to complete these problems. The URLs below represent a tiny fraction of the available chemistry addresses available. Please feel free to expand the list and find other web sites that help prepare you for the coming year. We recommend that you complete as many online quizzes as possible, take detailed notes, and practice the items indicated in the packet.

Completed work, showing all calculations, must be submitted the day school reopens in August. I will review the answers and clarify your questions if any, in the first week of school.

Useful links:

<http://www.gpb.org/chemistry-physics>

<http://www.collegeboard.com/ap/students/chemistry/index.html>

www.chemmybear.com

www.youtube.com

www.khanacademy.org

- What does it mean by “significant numbers”? Why is it important to consider significant numbers / digits in calculations. How does it help the scientist?
- Write the **most common guidelines** to determine significant figures (digits) with an example? How does it differ in math operations like multiplication/division/ addition/subtractions?
- Use **factor labeling** method to **convert** the following: Use significant digits to express the final answer.
 - 4000 meters = ___ miles.
 - 3450 cm = ___ Km
 - 10.0 years= _____ seconds.
- Classify each of the following as units of mass, volume, length, density, energy, or pressure.
 - $\text{Kg.m}^2/\text{s}^2$
 - Liter
 - cm^3
 - mm
 - kg/m^3
 - pascal
 - atm
 - cal.
- Convert the following temperature 45°C into kelvin and Fahrenheit. What does temperature of an object mainly signify? How did these measuring scale develop.
 - $^\circ\text{F}$
 - Kelvin
- Record the following in correct **scientific notation**:
 - 3.0002 mol
 - 0.00045 \AA
 - 85640000 atoms
 - 0.00340 rams
- Calculate the following to the **correct number** of significant figures.
 - $4.45 \text{ g} / 5.296 \text{ cm}^3$
 - $22 \text{ g} + 0.457 \text{ g}$
 - $6.5478 \times 8.173 \times 3.4$
 - $101 - 2.35 - 0.4 - 1.23 =$
 - 738.90 m has _____ SigFigs.
 - 0.0304 g has _____ SigFigs.
 - 1.4×10^4 joules has _____ SigFigs.
 - 1 dozen donuts has _____ SigFigs.
 - 40 mL has _____ SigFigs.
 800. m has _____ SigFigs.
- Give the **chemical symbols** for the following elements:
 - Carbon
 - sulfur
 - Krypton
 - Fluorine
 - lead
 - Arsenic
 - Potassium
 - chloride
 - Iron
- Write **the latin** names for each of the elements symbols:
 - Na
 - Au
 - Ag
 - Sn
 - Fe
 - Hg
 - K
 - Pb
- Define a physics change and chemical change. Label each of the following as either a **physical process** or a **chemical process**.
 - Cutting a piece of aluminum metal.
 - Melting of wax.
 - Pulverizing ice.
 - Frying a samosa or (potato).

- e. Explosion of nitroglycerin.
f. Electrolysis of water.
11. What is the main difference between element, compound, and mixture? Draw a particle diagram to show the difference.
12. Name some of the common separation methods for pure **substances and mixtures**? Use examples to show how they work.
13. State the postulates of Dalton's atomic theory. What were the drawbacks and explain why.
14. Write the formula of the following compounds?
 a. Calcium Acetate. b. Ammonium Phosphate c. Lithium Nitrite
 d. Barium perchlorate. e. Barium Oxide f. Zinc (II)sulfate.
 g. Sodium Per bromate I. Calcium Iodide J. Gallium(III) Carbonate.
15. Define the words: **atomic number, atomic mass, mass number, molecular formula, structural formula, empirical formula, isotopes, cation, anion, metalloid, and isotope**
16. Classify the following into diatomic molecule, molecular compound, ionic compound, Atomic element.
 a. F₂ b. Cl₂ c. C d. NaCl e. KF f. CO₂ g. H₂ h. Ag
 i. Rust (Fe₂O₃) j. MgO k. O₂ l. I₂ m. CO n. K₂CO₃
17. **State the contribution of the following chemist in one line.**
 a. **Democritus** b. Mendeleev c. Henry Becquerel d. Roentgen e. J.J
 Thompson plum pudding model f. Rutherford gold foil experiment g. Chadwick
 h. Millikan oil drop method i. Proust j. Cavendish k. Madam Curie
18. What is the difference between a. Nitrogen and Nitride ion b. Phosphorus atom and Phosphate ion.
19. Why do we call Mg(NO₃)₂ magnesium nitrate, but we call Ni(NO₃)₂ Nickel(II) nitrate?
20. A cylindrical rod formed from silicon is 21.3 cm long and has a mass of 5.00 kg. The density of silicon is 2.33 g/cm³. What is the diameter of the cylinder? (The volume of cylinder is given by $V = \pi r^2 h$, where r is the radius and h is the length.)
21. Write the chemical formula for the following:
 a. Calcium carbonate b. Ammonium phosphate c. Chromium (III) fluoride
 d. Iron(II) oxide e. Vanadium (V) sulfate f. Nickel (III) nitrite
 g. Gold (I) chloride h. Potassium cyanide i. Manganese(II) nitrate
 j. Iron(III) phosphate k. Zinc phosphide
22. Complete the list of ionic compounds. (Write the name or the formula.)
 a. Copper (II) hydroxide b. Strontium chromate c. Hypochlorous acid
 d. Pb(HCO₃)₂ e. Fe₂(CO₃)₃ f. Sodium hydroxide g. H₃PO₄

23. Write a balanced chemical equation for each of the following:
- The reaction of magnesium oxide with iron to form iron(III) oxide and magnesium.
 - The decomposition of dinitrogen oxide gas to its elements.
 - The reaction of solid calcium carbide with water to form calcium hydroxide and acetylene (C_2H_2) gas.
 - The reaction of solid calcium cyanamide ($CaCN_2$) with water to form calcium carbonate and ammonia gas.
 - Propane (C_3H_8) burns in excess air (oxygen).
 - Nitrogen gas reacts with hydrogen to form ammonia.
 - Hydrogen reacts with iodine gas to form hydrogen iodide.
 - Sodium reacts with iodine gas to form sodium iodide.
 - Sodium oxide reacts with water to form sodium hydroxide.
 - Magnesium and nitrogen gas combine to form magnesium nitride.
 - Concentrated hydrochloric acid reacts with concentrated sodium hydroxide to form sodium chloride and water.

24. Name the following:

- CO_2
- P_4S_{10}
- NI_3
- PCl_5
- CCl_4
- SF_6
- CH_4
- C_2H_6
- C_3H_8

Memorize the following strong acids and bases:

Strong Bases

$LiOH$ lithium hydroxide

$NaOH$ sodium hydroxide

KOH potassium hydroxide

$CsOH$ cesium hydroxide

$Ca(OH)_2$ calcium hydroxide

$Sr(OH)_2$ strontium hydroxide

$Ba(OH)_2$ barium hydroxide

Strong Acids

HCl hydrochloric acid

HBr hydrobromic acid

HI hydroiodic acid

HNO₃ nitric acid

H₂SO₄ sulfuric acid

HClO₃ chloric acid

HClO₄ perchloric acid

Memorize polyatomic ions

Table E
Selected Polyatomic Ions

H ₃ O ⁺	hydronium	CrO ₄ ²⁻	chromate
Hg ₂ ²⁺	dimercury (I)	Cr ₂ O ₇ ²⁻	dichromate
NH ₄ ⁺	ammonium	MnO ₄ ⁻	permanganate
$\left. \begin{array}{l} \text{C}_2\text{H}_3\text{O}_2^- \\ \text{CH}_3\text{COO}^- \end{array} \right\}$	acetate	NO ₂ ⁻	nitrite
CN ⁻	cyanide	NO ₃ ⁻	nitrate
CO ₃ ²⁻	carbonate	O ₂ ²⁻	peroxide
HCO ₃ ⁻	hydrogen carbonate	OH ⁻	hydroxide
C ₂ O ₄ ²⁻	oxalate	PO ₄ ³⁻	phosphate
ClO ⁻	hypochlorite	SCN ⁻	thiocyanate
ClO ₂ ⁻	chlorite	SO ₃ ²⁻	sulfite
ClO ₃ ⁻	chlorate	SO ₄ ²⁻	sulfate
ClO ₄ ⁻	perchlorate	HSO ₄ ⁻	hydrogen sulfate
		S ₂ O ₃ ²⁻	thiosulfate