AP Chemistry
Summer Work Packet for 2022-2023 School Year

Mrs. McClelland

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WELCOME to AP chemistry – "the toughest class you'll ever love"! We will cover all the topics and labs required for the AP exam in May 2023. All of you will find AP chemistry to be challenging, some of you will find it to be downright hard. There is much that we need to cover and while we can do it, we will all need to work hard. You should expect this class to be more difficult than your first chemistry class. Since there is so much material to learn (2 semesters of college chemistry), we must stay on schedule to get through everything before the test. Many students who take AP classes are also involved in other activities that will take them away from class. You need to make sure that you are staying current with all assignments, and come in for help if you are falling behind. We need to use our class time effectively during the upcoming year, and the goal of this summer packet is to review material from your first chemistry class. This assignment must be completed and ready to turn in by the FIRST day of class. We will also have take-home work over all breaks (Thanksgiving, Winter, and Spring) as well as snow day assignments as needed. **AP Chemistry will be taught with the assumption that all students are taking the AP exam in the spring.**

WHY DO WE HAVE TO DO SUMMER WORK?

- It is a review of basic content covered in 1st-year chemistry, which you may not have seen for over a year. - It provides the necessary fundamentals you will need to be successful in AP chemistry. - There will not be enough time before the AP exam in May to reteach Chemistry 1 and cover all the material tested on the AP exam

SUMMER WORK ASSIGNMENTS All work should be done neatly and clearly. All work for every problem (including units) needs to be shown. This is an expectation on the AP exam in the spring and we want to make this a habit early. Remember on the AP exam you must show all work including units or you will lose points. (Accordingly in this class and this packet, credit will NOT be given for answer-only responses!) So..... you need to show all work for every problem including

- equation you will be using (if applicable)

 - knowns/unknowns (if applicable)

 - plugged in equations and any algebraic work

You should spread out the following assignments over several weeks. Many of you will be taking several AP classes so do not try to cram these assignments in towards the end of the summer or you will get stressed out before school even starts.

Summer Work Assignments Checklist

_____ Part 1 – Why are you taking this course? - This is due on the 1st day of class. Write a short concise paragraph answering the following questions (1) "Why are you taking this course?" and (2) "What do you hope/expect to get out of the course?". This may be typed or handwritten

 _____ Part 2 – Review AP Chemistry Course Online -Get a feel for what the course covers. Go to the college board website https://apstudent.collegeboard.org/apcourse/ap-chemistry and review the course by clicking on the "AP Course Overview (PDF)" link and the "AP Chemistry Course and Exam Description (PDF)" link

 _____ Part 3 - Complete Summer Packet of Chemistry 1 Review - This is due on the 1st day of class. Students are encouraged to work together to complete the packet but THAT DOES NOT MEAN COPY! There will be a quiz on the material covered in this packet on the **SECOND DAY OF CLASS**.

WHAT DO I NEED FOR CLASS? (If you have issues acquiring any of these things, please let me know)
– Composition Book - college rule for your lab book. You will write up your major labs in this book during the year. You will not need this until a few weeks into the school year, so no rush.
– Scientific calculator. It does not need to be a graphing calculator, though you are welcome to use a graphing calculator if you already have one. (There will be scientific calculators available in class.)
– a LARGE notebook and binder (2 or 3 inches) to be designated exclusively to AP CHEMISTRY
– ENTHUSIASM AND A GREAT WORK ETHIC!!!!

AP Chemistry Class Perception and Reality

Students need to be realistic about the expectations for this course. Many students THINK they are ready for college level work, but really don't know what that means. In order to get a more realistic view of this course, I have included some perceptions entering students have, and the reality of the situation.

1. **PERCEPTION:** I can miss class (sports, activities, family vacations, jobs, field trips, etc.) and catch up on my own. I always have before. **REALITY**: You can't!!! In AP Chemistry, missing class is the number one reason why students fall behind, get lost, give up, and either drop the class or get a low grade. You cannot be gone for three days and expect to get caught up with a 10-minute session after school. I cannot teach in 10 minutes what it took 4.5 hours to teach earlier. You will need to come in for tutoring and/or make arrangements for assignments to catch up.

2**. PERCEPTION**: Mrs. McClelland is making this class a lot tougher than it really needs to be **REALITY:** Never forget-this is a college level course NOT an advanced high school course. If I am doing my job, students in this course should learn as much as they would if they were taking freshman chemistry at any college or university in the United States. A second goal is to properly prepare students for the AP Exam in May. I cannot make the course easier and still accomplish the above goals.

3. **PERCEPTION**: If the majority of the class falls behind. Mrs. McClelland will just have to slow down so that we can catch up. **REALITY**: I can't!!! You will find that time is of the essence in this course. As much as I may like to, our schedule cannot be adjusted. You will need to come in for tutoring if you fall behind. Students will be expected to study the text on their own, and class time will be used more for practice problems, labs and activities than for reviewing old material. There is really no other way to cover the vast amount of material required by the AP exam. If we slow down to make the course easier, we will not cover the required subject matter, and students will have to face exam questions on material not covered in class. As a result, I will make up a schedule that will allow us to complete all required material prior to the exam, and students MUST keep to this schedule. Chemistry topics build upon each other, and students who fall behind have to be responsible and take action to catch back up.

4. **PERCEPTION**: All of this work Mrs. McClelland is talking about must be necessary only if I don't pay attention in class. I've never had to study before! **REALITY**: All students who expect to be successful in this course will have to spend time after school—either by getting help with an assignment, completing lab work/ homework, or reviewing for tests. If you are not willing or able to work/study after school to complete chemistry work, you should not take this course! I WILL be available almost every day both before and after

school. Students are encouraged to come in for help and to form study groups with peers. Students should expect to spend time outside of class in the study of chemistry most nights. Students who have after- school jobs or who are heavily involved in after-school activities will have to budget their time accordingly.

5. **PERCEPTION**: Mrs. McClelland doesn't really expect us to do a summer assignment, and she isn't really going to test us the first week of class. **REALITY**: I am serious about this—the summer assignment is mainly a review of the first year of chemistry skills. This early work will allow us to spend additional time later in the year on more difficult topics.

6. **PERCEPTION**: I have always been a "straight A" student and always will be. **REALITY**: AP Chemistry is challenging. Although there are many "A" grades, there are also "B's " C's "D's, and sometimes "F's. If your main purpose in taking this class is to collect one more "A", you are taking the class for the wrong reason. There are easier classes in which to get an "A".

Congratulations on choosing AP Chemistry!!! It is a fun and interesting course, but both of those outcomes depend upon WORK. You should be proud that you are challenging yourself to the limit of your academic ability, and know that if you apply yourself you will reap the rewards of said work.

Mrs. McClelland

Part 1: (1) "Why are you taking this course?" and (2) "What do you hope/expect to get out of the course?"

Part I: Significant Figures

How many significant figures in the following numbers:

1. _____ 1,245m

2. _____ 0.030m

3. _____ 10,000m

4. _____ 1.340 x 10^{23}m

5. _____ 3.02003 x 10^{14}m

6. _____ 0.0000001m

7. _____ 1,000.s

8. _____ 0.10000010s

9: Convert the following numbers into standard notation:

    a. 96.3 x 10^4 g _____

    b. 0.05 x 10^{23} s _____

    c. 123 x 10^{-7} m _____

Problems 10 – 18: Perform the following Calculations and record your answers in the proper number of significant figures and units.

10. 0.6030s + 0.82s =

11. 4.1m + 0.3789m – 153.22m =

12. 3.1567 x 10^2g + 9.212 x 10^4g – 4.677 x 10^6g =

13. $\dfrac{0.307g}{(1.0\times 10^{-3})ml}$ =

14. $\dfrac{1.26\times10-3kg}{(3.2m + 10m + 8.9m)(4.3\times10^{-6}s)}$ =

15. $\sqrt{5.33 \times 10^5}m$ =

Part II: Metric Conversions

Make the following conversions – preserve the number of significant figures in the answer!

1. 450 nm _____ mm

2. 34km _____ cm

3. 43000 mm _____ m

4. 4.0×10^6 nm _____ μm

5. 3.98×10^{-3} km _____ m

6. 456mm _____ km

7. 136 000m _____ km

8. 4.89×10^{12} mm _____ km

9. 2.68×10^6 m _____ km

10. 456000 μm _____ mm

11. 450mm _____ m

12. 23cm _____ mm

13. 234 μm _____ cm

14. 2.34×10^4 cm _____ m

15. 4.56×10^{-7} cm _____ nm

Part III: Dimensional Analysis

The following conversions may be useful

1 inch = 2.54 cm   1 meter = 3.28084 feet   1 year = 31556952 seconds

1 ounce - 28.3395 grams   1 hectare=1 sq. dekameter = 100 m^2= 2.47 acres

1. I have 470 milligrams of table salt, which is the chemical compound NaCl. How many liters of NaCl solution can I make if I want the solution to be 0.90% NaCl? (9 grams of salt per 1000 grams of solution). The density of the NaCl solution is 1.0 g solution/mL solution.

2. I have a bar of gold that is 7.0 in 4.0 in 3.0 in. The density of gold is 19.3 g/cm³. The price of gold currently is $1,945.94 per ounce. How much is my gold bar worth?

3. If the RDA for vitamin C is 60 mg per day and there are 70 mg of vitamin C per 100 g of orange, how many 3 oz. oranges would you have to eat each week to meet this requirement?

4. Owls generally maintain territories of 3 acres. How many owls could live in a large wooded area of 20.6 hectares?

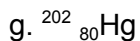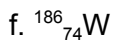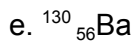5. The speed of light is 3.00 x 10^8 m/s. Convert this speed into feet per year.
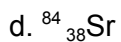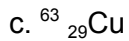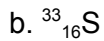
6. Many candy bars have 9 g of fat per bar. If during a "chocolate attack" you ate one pack of candy (0.6 dekabars), how many ounces of fat would you have eaten?

B) There are approximately 9 Calories per gram of fat, how many Calories is this?

C) A Calorie is 4184 joules (J). It takes 4.184 J to heat 1 gram of water by 1 C. If you wanted to raise the temperature of water by 10 C, how many liters of water could you heat with the energy from a pack of candy bars? (Density of water = 1 g/mL)

Part IV: Subatomic Particles and the Periodic Table

7) Indicate the number of protons, neutrons, and electrons in each of the following species:

a. $^{15}_{7}N$

b. $^{33}_{16}S$

c. $^{63}_{29}Cu$

d. $^{84}_{38}Sr$

e. $^{130}_{56}Ba$

f. $^{186}_{74}W$

g. $^{202}_{80}Hg$

8. Define, with two examples, the following terms:

a. alkali metals

b. alkaline earth metals

c. halogens

d. noble gases

9. Name the following compounds:

a. KClO   f. $(NH_4)_2SO_4$

b. Ag_2CO_3 g. FeO

c. HNO_2 h. Fe_2O_3

d. $KMnO_4$ i. $TiCl_4$

e. $CsClO_3$ j. NaH
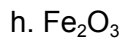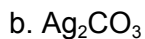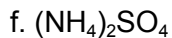
10. Write the formulas for the following compounds:

a. rubidium nitrite   e. calcium hydrogen phosphate

b. potassium sulfide   f. potassium dihydrogen phosphate

c. sodium hydrogen sulfide   g. iodine heptafluoride

d. magnesium phosphate   h. ammonium sulfate

Part V: Mole Conversions, Stoichiometry, and Molarity

11. When potassium cyanide (KCN) reacts with acids, a deadly poisonous gas, hydrogen cyanide, HCN, is produced. Here is the equation: KCN (aq) + HCl (aq) → KCl (aq) + HCN (g) . If a sample of 0.140 g of KCN is treated with excess HCl, calculate the amount of HCN formed, in grams.

12. How many moles of $MgCl_2$ are present in 60.0 mL of 0.100 M $MgCl_2$ solution?

13.. How many grams of KOH are present in 35.0 mL of a 5.50 M solution?