Applied Chemistry & Technology Summer Assignment

For help or for clarification on this material, email me (Mrs. Sharon) at ksharon@stfrancishs.org.

Summary of Summer Assignment:

1. Complete this packet. The Problems are due the first day of class after summer. You should memorize required the information in the table from the section Subatomic Particles. (I will be preparing short OPTIONAL lecture videos for each of these topics; I will post them on Youtube and send the links to your St. Francis email address this summer. If you would rather review your notes from your first year chemistry class or seek other sources of help, that is fine also).
2. Prepare for the test on this information upon our return to school.
3. ***Read & sign and have your parents read & sign the "Safety Handout". This is due the first day of class!***

Topics to Review / Study guide for Summer Test:

- Perform simple stoichiometry calculations (mole-mole, mass-mass, percent yield)
- Be able to create Lewis structures for simple molecules containing single, double, and/or triple bonds.
- Know the charges and relative masses of subatomic particles.

PROBLEMS (These will be turned in on the first day of class).

Stoichiometry Problems (mole-mole, mass-mass, percent yield)

1. Given the following equation: $2\ NaOH + H_2SO_4 \rightarrow 2\ H_2O + Na_2SO_4$
   How many grams of sodium sulfate will be formed if you start with 20 grams of sodium hydroxide and you have an excess of sulfuric acid?
2. Given the following equation: $Pb(SO_4)_2 + 4\ LiNO_3 \rightarrow Pb(NO_3)_4 + 2\ Li_2SO_4$
   How many grams of lithium nitrate will be needed to make 25 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?
3. Given the following equation: $2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$
   How many moles of O_2 can be produced by letting 12 moles of $KClO_3$ react?
4. Given the following equation: $2\ K + Cl_2 \rightarrow 2\ KCl$
   How many grams of KCl are produced from 2.5 g of K and excess Cl_2?
5. Given the following equation: $Na_2O + H_2O \rightarrow 2\ NaOH$
   How many grams of Na_2O are required to produce 1.6 grams of NaOH?
6. Given the following equation: $Fe + S \rightarrow FeS$
   What mass of iron is needed to react with 16 grams of sulfur?
   (Final problems on next page)
7. Given the following equation: $2\ NaClO_3 \rightarrow 2\ NaCl + 3\ O_2$
   A student heats 2.7 g of $NaClO_3$ in a test tube until it decomposes, producing 1.0 g of oxygen gas. What is the percent yield?
8. Given the following equation: $Cu + 2\ AgNO_3 \rightarrow Cu(NO_3)_2 + 2\ Ag$
   5.0 g of Cu react with excess silver nitrate and 15.3 g of silver are produced. What is the percent yield?
9. The average human requires 120.0 grams of glucose ($C_6H_{12}O_6$) per day. How many grams of CO_2 (in the photosynthesis reaction) are required for this amount of glucose? The photosynthetic reaction is: $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$

Lewis Structures

Make Lewis structures for each of the following compounds.

10. PH_3
11. NF_3
12. CO_2
13. CS_2
14. O_3 (there are two correct possibilities; you just need to create one of them)
15. SO_3 (there are three correct possibilities; you just need to create one of them)

16. SO_2 (there are two correct possibilities; you just need to create one of them)
17. OCl_2
18. CF_4
19. $SiCl_4$
20. H_2S
21. SCl_2
22. C_2H_6
23. C_3H_8
24. C_4H_{10}
25. C_2H_4
26. C_2H_2
27. C_3H_6 (this can be drawn two ways; either is correct)
28. HCN

MEMORIZE THIS INFORMATION

Subatomic Particles

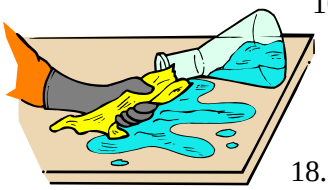
Particle	Charge	Approximate Mass
Electron	-1	negligible*
Proton	+1	1 amu
Neutron	0	1 amu

* small enough to ignore

Science Laboratory Safety Rules

1. Protective goggles are required to prevent splashing and spattering in your eyes. You will not be permitted in the laboratory without them.
2. You must notify the instructor when wearing contact lenses in the laboratory.
3. Some sort of laboratory apron or coat is required to protect you and your clothing.
4. Prepare a safe laboratory environment by ensuring all bags and backpacks are off the floor and chairs are pushed in.
5. No running, shouting, shoving, or fooling around is permitted in the lab.
6. Your apparel should be appropriate for laboratory work. Long hanging necklaces, bulky jewelry, and excessive and bulky clothing should not be worn. Feet should be <u>fully</u> covered.
7. Long hair must be secured away from your face and lab materials, especially chemicals and burners.
8. You should know the location of and how and when to use the fire extinguisher, eye wash, fire blanket, exits, shower, and gas shut off.
9. NEVER taste chemicals. Touching of chemicals should be avoided unless told otherwise by your teacher.
10. Dispose of all waste materials in designated waste containers.
11. Be VERY cautious when testing for odors. Fan the odors to your nose.
12. Never aim the opening of a test tube or flask at yourself or anyone else.

13. Use fume hoods whenever irritating fumes are involved. Adequate ventilation is important for safety.
14. Never leave anything unattended while it is being heated or reacting rapidly. Do not leave Bunsen burners burning or hot plates heating while not in use. Do not leave gas jets on while not in use. Do not use burners when they are not needed.
15. A clean lab is a safe lab. Return materials to the proper place and keep your work area clean at all times.



16. Always concentrate on what you are doing and report any accident to the teacher <u>at once</u>.
17. NEVER WORK ALONE IN THE LABORATORY. You should only work in the laboratory while under the supervision of your teacher.
18. No food, drinks or chewing gum may be brought into the lab (unless authorized by the teacher).
19. You should know and understand the dangers and hazards of each experiment before you start the experiment. Read all instructions for a lab <u>before</u> you start work.
20. Follow all written and verbal instructions for each lab.
21. You should not mix chemicals together unless you have been instructed to do so by your teacher or the instructions of the experiment.
22. Hot items should be handled with gloves or tongs.
23. Flammable liquids should be used in small amounts.

24. When lighting a Bunsen burner, light the match first then turn on the gas.

25. Avoid using cracked or broken glassware as it can chip further or break and cause injury.

26. Dispose of broken glassware in the proper container. Do not put broken glassware into the trash can.

27. When cleaning glassware, turn on the water first, then place the glassware under the faucet.

28. When obtaining reagents that have a similar appearance, properly label glassware to avoid confusion, cross-contamination or unwanted reactions.

Science Class Safety Agreement

All students will be required to pass with a score of at least 85%, a laboratory safety test before being allowed to participate in lab activities.

Students will be removed from the science activity area by the teacher if:

A. Their personal appearance or dress is such that they cause injury to themselves or to other students.

B. They are behaving in such a manner that they can cause injury to themselves or to other students.

C. They are not following the prescribed safety rules for the science activity area or the particular science activity being conducted.

D. They are going beyond the limits of the science activity into areas that may lead to an unsafe situation.

E. They have not completed the pre-experiment activities that will allow them to work safely in the laboratory situation.

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I, _____, have read this handout thoroughly. I understood what they
(Print student name)
meant or I had the teacher explain them to me.

I, _____, have read the above rules. I have discussed them with my
(Print parent/guardian name)
child and feel that my child understands what they mean and the consequences for removal from class. I would like to inform the school that my child has the following physical or medical situations that could affect their learning.

Student signature _____

Parent/Guardian signature _____