THE KNOX SCHOOL

Chemistry
2020 Summer Assignment

Directions: Below you will find some introductory assignments to prepare you for the first couple of chapters of the course and to lay a solid base for the remainder of the school year.

Due Date: First day of your Chemistry class.

Week 1.

1. Define the following terms and pick any 6 to write a sentence with. At the end of all your definitions write your 6 sentences and underline or highlight each of the terms used.
    a. Chemistry, Mass, Volume, independent variable, dependent variable, control, theory, law, hypothesis, unit, density, scientific notation, dimensional analysis, accuracy, precision, error, matter, mole and significant figure.
2. What is the branch of chemistry that involves matter that does not contain carbon?
3. What branch of chemistry involves the energy and heat movement within a chemical reaction?
4. What branch of chemistry studies the composition or components of various substances?
5. What branch of chemistry studies matter and the processes within living organisms?

Week 2.

1. Go to the American Chemical Society homepage by following the website (https://www.acs.org/content/acs/en.html). Once there scroll half way down the page and look for the area that says Molecule of the Week. Click on the yellow box that says "what molecule am I?" This will bring up the current molecule of the week information. You are to read the information about this substance and complete the following:
    a. What is the date ? _____
    b. What is the name of the substance? _____
    c. What is the formula of this material (it is listed on the page)? _____
    d. Write a paragraph about what you learned regarding this substance of the week.
    e. Hand draw the picture / structure of the substance. (shown on the page)
2. Explain the process of the Scientific Method and give an example of when it might be used.

Week 3.

1. Explain the difference between a manipulated variable and a responding variable. After your response, write the terms and next to each one write down the vocabulary term from the list of week 1 which means the same thing.

   Manipulated Variable = _____

   Responding Variable = _____
2. ThoughtCo is an informative website with many different types of concepts. Visit the page (https://www.thoughtco.com/reasons-to-study-chemistry-609210) and describe 4 things that you learned about chemistry from this article.
3. Why do you think that Chemistry is often called "the Central Science"? If you are completely unsure, do a little bit of research before you respond.

Week 4.

1. Visit the SciWorthy website at (https://sciworthy.com/o-the-drama/) and read through the posted article. Upon completion of your reading, summarize the article to the best of your ability.

Week 5.

1. What is the density of a material that has a volume of 24 mL and a mass of 30 grams?

2. What is the volume of liquid inside a container when the liquid has a mass of 81 grams and density of 2.4 g/ml ?

3. What is the mass of a gas that has a density of 0.51 g/ml and occupies a space of 11.4 mL?

4. Convert 2.8 hours to minutes. (show work setup)

5. Convert 500.3 minutes to hours. (show work setup)

6. Convert 204.55 milligrams to decigrams. (show work setup)

7. Convert 1.93 kilograms to centigrams. (show work setup)

8. What does a prefix " M " represent when placed in front of "gram" ?

9. What does the prefix " c " represent when placed in front of "liter" ?

Week 6.

1. Create a line graph for the information provided in the table and then answer questions relating to the data.

Weekly June through July Rainfall in centimeters	
City 1	**City 2**
2.2	0.8
2.0	1.0
1.6	1.8
1.8	1.6
1.5	1.9
1.8	2.0
1.4	2.3
1.1	2.8

2. What is the independent variable?
3. What is the dependent variable?
4. What does it mean when the two lines merge?

Week 7.

1. The scientific method has the following steps: 1. Ask a question 2. Form a hypothesis 3. List materials needed 4. Decide the steps in the procedure 5. Perform the experiment 6. Analyze the results 7. Draw a conclusion.

   In 1872 a wealthy railroad tycoon named Leland Stanford (Stanford University is named after him) made a bet with a friend about a galloping horse. Put the step number (from above) next to each step of the scientific method for this problem. _____ Mr. Stanford proposed that the hooves of a galloping horse don't touch the ground at some point in time during the gallop. _____ Before there were digital cameras the film in the camera needed to be developed into pictures. _____ A racehorse, a jockey and a camera _____ Some of the pictures showed that the horse's hooves were all in the air at the same time. _____ Leland Stanford made a bet that the hooves of a galloping horse don't touch the ground at some point in time. _____ Mr. Stanford decided to ask a photographer to take pictures of a horse galloping at the racetrack. _____ The jockey rode the galloping horse around the racetrack. _____ Mr. Stanford looked at the pictures the photographer brought him.

2. A shopping mall wanted to determine whether the more expensive "Tough Stuff" floor wax was better than the cheaper "Steel Seal" floor wax at protecting its floor tiles against scratches. One liter of each brand of floor wax was applied to test sections of the main hall of the mall. The test sections were all the same size and were covered with the same kind of tiles. After 3 weeks, the number of scratches in each of the test sections was counted to observe the wax's effectiveness.
   Identify:
   Independent variable: _____
   Dependent variable: _____
   Constants:_____

3. Mr. Smith wanted to see if the color of light shined on a plant had an effect on the number of leaves it had. He gathered 2 groups of the same species of plants, gave them the same amount of water, and did the test for the same amount of time. On one group of plants he used white light. On the second group he changed the light color to red. Identify:
   Independent variable: _____
   Dependent variable: _____
   Constants: _____
   Control group (What would Mr. Smith use as a control group?):

4. When running an experiment, you find that your data does not fit with what your original hypothesis was. What should be your next step? Explain.

Week 8.

1. What 3 particles are found within an atom? _____, _____, _____.
2. What is an atom?
3. What is an isotope?
4. What is Dalton's Atomic Theory?
5. Do some research about Ernest Rutherford. Write a paragraph, in your own words, detailing the importance of this person in the foundations of Chemistry.

Week 9.

1. At room temperature, a mixture of sand and water could be separated by means of
   a. Filtration
   b. Sublimation
   c. Combustion
   d. ionization

2. Which process is a physical change?
   a. Water evaporating
   b. A fire burning a wood log
   c. A piece of paper turning color and crumpling due to sitting in the sun.
   d. Light being released by a glow stick

3. Which process is a chemical change?
    a. Melting ice
    b. Boiling water
    c. Water breaking down into hydrogen and oxygen
    d. Ice subliming into a gas

4. How many significant digits are in the following number, 20.070 km?
    a. 2
    b. 3
    c. 4
    d. 5

5. Which Kelvin temperature is equal to -24°C ?
    a. 226 K
    b. 249 K
    c. 273 K
    d. 297 K

6. How many significant digits are in the number 0.00304 ?
    a. 5
    b. 4
    c. 3
    d. 2

7. Which of the following is NOT a SI base unit?
    a. Second
    b. Kilogram
    c. Degree celsius
    d. Meter

8. Which one of the following is the correct representation of 702.0 grams written in proper scientific notation?
    a. $7.02 * 10^{3}$
    b. $70.20 * 10^{1}$
    c. $7.020 * 10^{2}$
    d. $70.20 * 10^{2}$

9. When working with chemicals in the lab, which is something that you should NOT do?
    a. Read all labels on chemical bottles
    b. Pour unused materials back into the original bottle
    c. Use lots of water to wash skin that has been splashed with chemicals
    d. Take only as much as you need of shared chemicals

10. 3 dimensional volume is calculated by
    a. D * V * mL
    b. Mass * Volume
    c. Length * Width * Height
    d. Length * depth * mass

Week 10.

1. Complete the chart below by writing the elemental symbol, element name, and classification of element (metal, nonmetal, semimetal).

Element #	Symbol	Name	Classification
1	H	Hydrogen	Nonmetal
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
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25			