

Week of April 6-10, 2020

High School Science

William Sewell

Communication: email: william.sewell@oakland5.org or Google Hangout-Meet

Office hours: Monday and Wednesday: 12:00 to 2:00 p.m., Tuesday and Thursday: 12:00 to 1:00 p.m.

Due Date: All assignments are due 4/13/2020 either by sending a picture of it and turning it into Google Classroom or turning it into boxes located in the Lake Crest foyer.

Assignments: All assignments will be in "Google Classroom" and a paper copy will be provide from the Oakland main office. This week will provide time for everyone to "catch up" on their assignments and provide opportunities for others to move forward. A lot of these assignments are duplicates from what was assigned on 3/16/2020, but a few new. I will have office hours as listed above which we can review the assignments given, and I will help you as much as needed. However, the expectation is the same as it was before. I expect you to have made a serious effort to complete the assignment, before asking for help. You will not learn anything with me just giving you the answers.

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
Earth Science	Chapter 25: Worksheets, p.35-36, and p.37-38.	Chapter 25 Test, p.45-47	Chapter 26, worksheets, p.59-60, 61-62, p.63-64.
Physical Science	Chapter 13: Worksheet- p.19-20, 29-30	Chapter 13: Worksheet- p.31-32	Chapter 13: Review Worksheet, p.35-36, and the Chapter Test, p.37-38
Chemistry	Unit 4: Worksheet 3 and 4	Unit 4 Test (To be completed with notes and other resources)	Unit 5: Relative Mass Lab video and write-up
Pre-calculus	Complete Composite Function WS	Complete Composite Function Quiz 1 and Quiz 2	Complete Composite Functions Unit Test on Khan or paper version. If you are finished with this you can start working through the unit on trigonometry.

Due Apr 13

20 points

Understanding Definite Proportions in Compounds: Week of 4/6/2020



William Sewell 6:42 AM (Edited 12:37 PM)

You are to choose from one of the following 3.

Choice #1

These worksheets are meant to teach you how compounds combine in a fixed amount. If you have water it will always be 2 hydrogen and 1 oxygen. I will update this assignment later with further instructions. T

Unit 4 WS #3: We already started this worksheet in class. This is just a simple ratio of the masses. Round off the decimals that you get from dividing the compounds as stated and then convert it into a fraction. Remember your calculator has a feature on it to do it for you, if you do not know how to do this by hand.

Unit 4 WS #4: This is a continuation of WS#3 as extra practice. Only complete #1-4.

Choice #2: Complete Unit 4 Test. The assumption is that you complete this test on your own, but you are welcome to use your notes, worksheets, and other related material. It is on the honor system. I expect you to honestly try doing the test on your own and then asking for help after you have tried.

Choice #3: I will post a video which you will watch me completing the lab. While you are watching the lab, you are to write down the data values, which I have collected and then answer the following questions. There will be a follow-up to explain the extreme importance of this lab. The file for this choice is "03_remasslab ommlne.v".

Chem Choice #1

Name _____

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Chemistry – Unit 4 Worksheet 3

*Sewell
Choice 1, p. 1*

Use the following information about the masses of elements in each pair of compounds to help you suggest formulas that account for these ratios.

1. Compounds of carbon and oxygen

Compound A: 57.1 g O / 42.9 g C

Compound B: 72.7 g O and 27.3 C

- Determine the value of the ratio $\frac{\text{mass O}}{\text{mass C}}$ in each compound. A _____ B _____
- How does the mass ratio for compound B compare to that in compound A?
- Express these ratios as improper fractions.
- For each hypothesis, sketch particle diagrams for the compounds of A and B that account for these mass ratios. Write the formula for the compound in each diagram.

Hypothesis 1 Atoms of C and O have the same mass	Hypothesis 2 Atoms of O are heavier than C atoms by the ratio in compound A.
A	A
B	B

2. Compounds of copper and oxygen

Compound A: 79.9 g Cu / 20.1 g O

Compound B: 88.8 g Cu / 11.2 g O

- a. Determine the value of the ratio $\frac{\text{mass Cu}}{\text{mass O}}$ in each compound. A ____ B ____
- b. How does the mass ratio for compound B compare to that in compound A?
- c. Express these ratios as improper fractions.
- d. For each hypothesis, sketch particle diagrams for the compounds of A and B that account for these mass ratios. Write the formula for the compound in each diagram.

Hypothesis 1	Hypothesis 2
Atoms of Cu and O have the same mass	Cu atoms are heavier than O atoms by the ratio in compound A.
A	A
B	B

Which hypothesis seems more reasonable to you? Justify your answer.

Use the hypothesis you have chosen to suggest formulas for the following pairs of compounds.

3. Compounds of copper and chlorine

Compound A: 35.9 g of Cl / 64.1 g of Cu

Compound B: 52.8 g of Cl / 47.2 g Cu

- Determine the value of the ratio $\frac{\text{mass Cl}}{\text{mass Cu}}$ in each compound. A ____ B ____
- How does the mass ratio for compound B compare to that in compound A?
- What are the simplest formulas for compounds A and B? Explain your reasoning.

4. Compounds of iron and chlorine (be careful!)

Compound A: 56.0 g of Cl / 44.0 g of Fe

Compound B: 65.6 g of Cl / 34.4 g of Fe

- Determine the value of the ratio $\frac{\text{mass Cl}}{\text{mass Fe}}$ in each compound. A ____ B ____
- The ratios you determined in step (a) give the mass of Cl that combines with 1 g of Fe in each compound. To determine how the mass of Cl in compound B compares to the mass of Cl in compound A for the same amount of Fe, divide these ratios and express the answer as an improper fraction. What does this fraction tell you about the *number* of Cl atoms in each of the two compounds?
- What would be the formulas of the two compounds, assuming that each compound contains one atom of Fe?

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Chemistry – Unit 4 Worksheet 4

Answer the following questions on your own piece of paper. Be sure to show all mathematical work and reasoning and use complete sentences in explanations.

- Table sugar is a compound known as sucrose. Sucrose is composed of the elements carbon, hydrogen, and oxygen. Analysis of a 20.0 g of sucrose from a bag of sugar finds that the sugar is composed of 8.44 g of carbon, 1.30 g of hydrogen, and 10.26 g of oxygen.
 - Express, as fractions, the ratio of the mass of each element to the total mass of the sample.
 - Using these ratios, calculate the percent composition by mass of each element in the compound.
- A similar chemical analysis is performed on a 500.0 g sample of the sugar isolated from a sample of pure sugar cane. Analysis shows this sample contains 211.0 g of carbon, 32.5 g of hydrogen, and 256.5 g of oxygen.
 - Determine the percent composition by mass of each element in the sugar cane sample.
 - Could the sugar in this sample be sucrose? Justify your conclusion.
- A similar chemical analysis is performed on a 200.0g sample of the sugar found in corn syrup. This sample contains 80.0g of carbon, 13.3 g of hydrogen and 106.7 g of oxygen.
 - Determine the percent composition by mass of each element in the sugar cane sample.
 - Could the sugar in corn syrup be sucrose? Justify your conclusion.
- A 1.0 g sample of hydrogen reacts completely with 19.0 g of fluorine to form a compound of hydrogen and fluorine.
 - What is the percent by mass of each element in the compound?
 - What mass of hydrogen would be present in a 50 g sample of this compound?
 - Justify your answer to b.
- Explain how the previous examples help to illustrate the Law of Definite Proportions.

6. Two compounds of hydrogen and oxygen are tested. Compound I contains 15.0 g of hydrogen and 120.0 g of oxygen. Compound II contains 2.0 g of hydrogen and 32.0 g of oxygen.
- Determine the ratio of the mass of oxygen to the mass of hydrogen in each of the compounds.
 - Why are the compounds not the same?
 - What is significant about these mass ratios?
 - If compound I is water, what could be the formula of compound II?
7. Nitrogen and oxygen combine to form a variety of compounds. The following data were collected for three different compounds of nitrogen and oxygen:

Analysis Data of Nitrogen & Oxygen Compounds	
Compound	Mass of Nitrogen that combines with 1.00 g of Oxygen
A	1.750 g
B	0.8750 g
C	0.4375 g

- Additional evidence shows that the formula of compound B is NO. Sketch particle diagrams of molecules of all three compounds.
 - Justify your representations above.
8. Explain how the examples in questions 6 and 7 help to illustrate the Law of Multiple Proportions.

#2

Name _____

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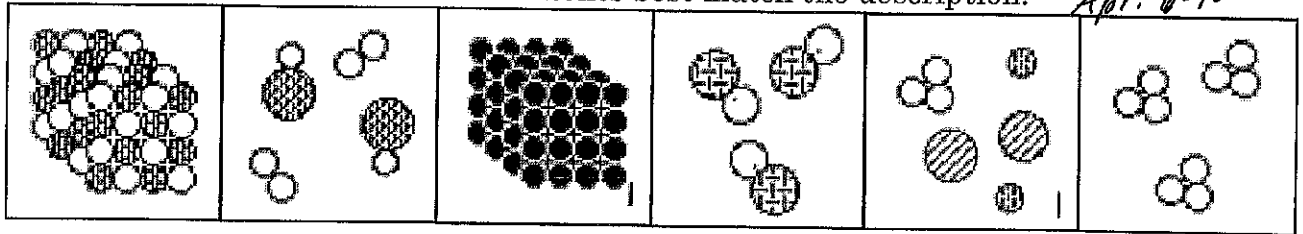
Write the letter(s) of the word(s) or phrase(s) that match the definition.

- ___ 1. This substance consists of two or more elements in a fixed mass ratio.
- element
 - compound
 - mixture
 - pure substance
- ___ 2. This substance cannot be broken down by physical or chemical means.
- element
 - compound
 - mixture
 - pure substance
- ___ 3. The composition of this substance is variable; its physical properties depend on the composition.
- element
 - compound
 - mixture
 - pure substance
- ___ 4. Electrolysis can be used to separate this substance.
- element
 - compound
 - mixture
 - pure substance
- ___ 5. This substance can be either homogeneous or heterogeneous.
- element
 - compound
 - mixture
 - pure substance

2

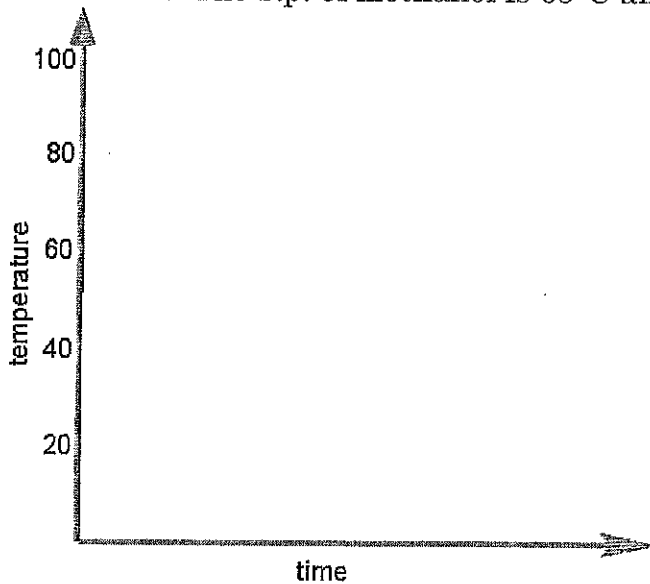
Chem Swell
Choice 2, p 2
Apr. 6-10

Write the letter of the box whose contents best match the description.



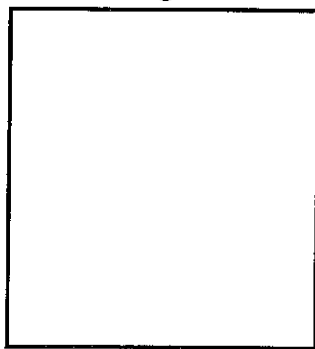
- a b c d e f
- ___ 6. a mixture of molecules
- ___ 7. atoms of a pure metal
- ___ 8. molecules of an element
- ___ 9. a solid compound
- ___ 10. a mixture of elements

11. Sketch a graph of temperature vs. time for the heating of a mixture of methanol and ethanol. The b.p. of methanol is 65°C and that of ethanol is 78°C .

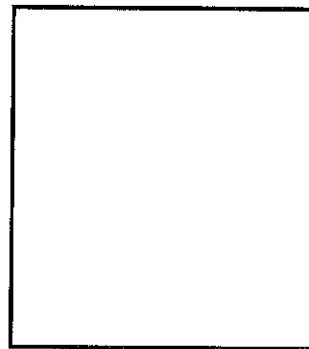


12. Describe how you could use the information in the graph you sketched for Q 11 to separate a mixture of methanol and ethanol.

13. Sketch a particle diagram representing a mixture of hydrogen and oxygen gases. Sketch a particle diagram for the compound formed when these gases react. Describe how these diagrams are different.

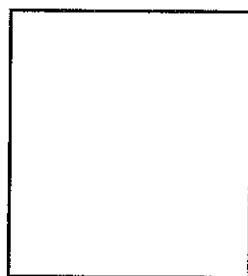


mixture



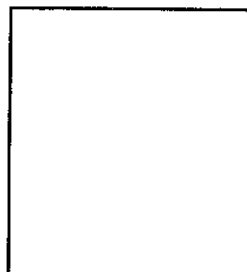
compound

14. Suppose that one volume of gas A combined with two volumes of gas B to form one volume of product when measured at the same pressure and temperature. Sketch particle diagrams for molecules of gas A, gas B and the product; assume gases A and B are monatomic.

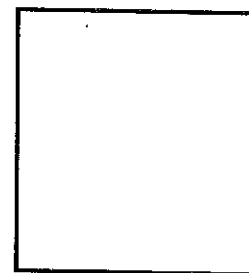
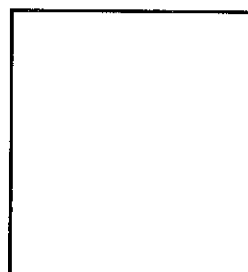


gas A

+



gas B



product

15. If the gases in Q 14 were diatomic, how many volumes of the gaseous product would be formed? Explain.

16. Nitrogen and oxygen form several compounds. Two of these have the following mass composition.

Compound A: 63.6 g of N and 36.4 g of O

Compound B: 46.7 g of N and 53.3 g of O

- Determine the value of the ratio $\frac{\text{mass N}}{\text{mass O}}$ in each compound. A ____ B ____
- How does the mass ratio for compound A compare to that in compound B?
- Sketch particle diagrams for the compounds of A and B that account for these mass ratios. Write the formula for the compound in each diagram.

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Chemistry—Unit 5 Relative Mass Lab

Purpose

The purpose of this lab is to determine the relative mass of different items and to recognize the connection between such an activity and the information on the periodic table.

Data

Object Measured	Mass (g)	Adjusted Mass (g)	Relative Mass (mu or item mass units)
Empty vial			
Vial + Item #1			
Vial + Item #2			
Vial + Item #3			
Vial + Item #4			
Vial + Item #5			
Vial + Item #6			

Calculations and Discussion Questions

- Each vial contains the same number of pieces. From each mass, subtract the mass of the empty vial to determine the adjusted mass. (Do you think the empty vial will have an adjusted mass?) To find the relative mass, divide the mass of each item by the mass of the smallest item. (What will the relative mass of the smallest item be?) Don't forget units and significant figures. Show all work for one item below.

2. What does *relative* mean in the phrase relative mass?
3. When calculating relative mass, why is it important to be sure the same number of items are in each vial?
4. Which item is used to determine relative masses of the other items? Why?
5. Why do you think the units were changed from grams to mu's in the table above?

Conclusion

6. Which element is used to determine relative masses of the other elements? Explain the connection between this activity and the work of Gay-Lussac and Avogadro.