

OAKLAND CUSD #5

CHEMISTRY

APRIL 20-24, 2020

WILLIAM SEWELL

Week: April 20-24, 2020

Teacher: 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 4/27/2020 either by sending a picture of it and turning it into Google Classroom or turning it into the office.

Assignments: All assignments will be in "Google Classroom" and a paper copy will be provided from the Oakland main office. 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	Collect 15 different rock samples. Take pictures or draw each and describe them: shape, various colors, size, sharp sides/ smooth, etc.	Take pictures of the moon and record the cycle that it is in from Monday through Friday. Please use the given table to complete. Please refer to page 779 in your book.	Repeat this activity for this week and make a comparison to last week, if you did this activity or wait til next week and compare it then. Take pictures of the moon and record the cycle that it is in from Monday through Friday. Please use the given table to complete. Please refer to page 779 in your book.
Physical Science	Record your (not family) water usage throughout the week. Please use the given table to complete.	Do speed lab of races. Record your distance and time yourself. Please use the given table to complete.	Graph your data of distance versus time. With distance on the vertical axis and time on the horizontal axis, using the given graph paper.
Chemistry	Do the Unit 5 worksheet entitled "The Mole". Use dimensional unit conversions to complete.	Unit 5: Relative Mass Lab video and write-up	Complete Unit 5 WS#2

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
Pre-calculus	Matrix WS #2	Matrix WS #3	New problems: Watch videos on Inverse trigonometric functions and do 8 problems for the exercises. They will be assigned in Khan academy.

Chemistry Unit 5 – The Mole*Sewell / Chem 1
Choice 1 / Apr. 20-24*

To help you better visualize the enormous size of Avogadro's number, 6.02×10^{23} , consider the following analogies:

1. If we had a mole of rice grains, all the land area of the earth would be covered with rice to a depth of about 75 meters!
2. One mole of rice grains is more grain than the number of **all** grain grown since the beginning of time.
3. One mole of marshmallows (standard 1 in³ size) would cover the United States to a depth of 650 miles.
4. If the Mount St. Helens eruption had released a mole of particles the size of sand grains, the entire state of Washington would have been buried to a depth equal to the height of a 10-story building.
5. A mole of basketballs would just about fit perfectly into a ball bag the size of the earth.

Your turn

Show your solutions to the following questions on the back of this sheet. Multiply by factors and show the cancellation of units. Keep 2 sf's in your answers.

6. Assuming that each human being has 60 trillion body cells (6×10^{13}) and that the earth's population is 6 billion (6×10^9), calculate the total number of living human body cells on this planet. Is this number smaller or larger than a mole? Divide the larger value by the smaller to determine the relative size of the two values.
7. A supercomputer, nicknamed Roadrunner, built by IBM for the Los Alamos National Labs can perform about 1.03 petaflop/s (1 petaflop is 10^{15} calculations). Determine how many seconds it would take this computer to count a mole of things. Convert this figure into years.
8. If you started counting when you first learned how to count and then counted by ones, eight hours a day, 5 days a week for 50 weeks a year, you would be judged a 'good counter' if you could reach 4 billion by the time you retired at age 65. If every human on earth (about 7×10^9) were to count this way until retirement, what fraction of a mole would they count?

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.

Sewell / Chem / Choice 2 / Apr. 20-24

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Data

Object Measured	Mass (g)	Adjusted Mass (g)	Relative Mass (imu 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.

Name _____

Date _____ Pd _____

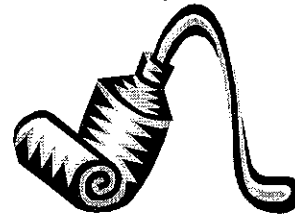
Sewell (Chem) Ch 1a 3/ Apr. 2024

Chemistry – Unit 5 Worksheet 2

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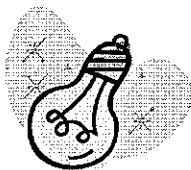
1. An old (pre-1987) penny is nearly pure copper. If such a penny has a mass of 3.3 g, how many moles of copper atoms would be in one penny?
2. Four nails have a total mass of 4.42 grams. How many moles of iron atoms do they contain?
3. A raindrop has a mass of 0.050 g. How many moles of water does a raindrop contain?
4. What mass of water would you need to have 15.0 moles of H₂O?
5. One box of Morton's Salt contains 737 grams. How many moles of sodium chloride (NaCl) is this?
6. A chocolate chip cookie recipe calls for 0.050 moles of baking soda (sodium bicarbonate, NaHCO₃). How many grams should the chef mass out?
7. Rust is iron (III) oxide (Fe₂O₃). The owner of a 1959 Cadillac convertible wants to restore it by removing the rust with oxalic acid, but he needs to know how many moles of rust will be involved in the reaction. How many moles of iron (III) oxide are contained in 2.50 kg of rust?

8. First-century Roman doctors believed that urine whitened teeth and also kept them firmly in place. As gross as that sounds, it must have worked because it was used as an active ingredient in toothpaste and mouthwash well into the 18th century. Would you believe it's still used today? Thankfully, not in its original form! Modern dentists recognized that it was the ammonia that cleaned the teeth, and they still use that. The formula for ammonia is NH_3 . How many moles are in 0.75 g of ammonia? How many molecules?



9. Lead (II) chromate, PbCrO_4 , was used as a pigment in paints. How many moles of lead chromate are in 75.0 g of lead (II) chromate? How many atoms of oxygen are present?

10. The diameter of the tungsten wire in a light bulb filament is very small, less than two thousandths of an inch, or about $1/20$ mm. The mass of the filament is so very small – 0.0176 grams – that it would take 1,600 filaments to weigh an ounce! How many tungsten atoms are in a typical light bulb filament?



11. Two popular antacids tablets are Tums and Maalox. The active ingredient in both of these antacids is calcium carbonate, CaCO_3 . Tums Regular Strength tablets contain 0.747 g and Maalox tablets contain 0.600 g of calcium carbonate. Compare the number of formula units of calcium carbonate in both Tums and Maalox.