Calculating Average Atomic Mass:

1. Calculate the average atomic mass of Bromine. One isotope of bromine has an atomic mass of 78.92 amu and a relative abundance of 50.69%. The other major isotope of bromine has an atomic mass of 80.92 amu and a relative abundance of 49.31%.   79.91 g/mol

2. Calculate the average atomic mass of Magnesium based on the following isotopic composition:

Isotope	Mass (amu)	Relative abundance
Mg-24	23.985	78.70%
Mg-25	24.986	10.13%
Mg-26	25.983	11.17%

24.31 g/mol

3. Find the average atomic mass for Boron if 19.9% of Boron atoms are B-10 with a mass of 10.013 amu and 80.1% are B-11 with a mass of 11.009 amu.

    10.8 g/mol

4. Calculate the average atomic mass of Gold if Au-197 has a relative abundance of 50.00 % with a mass of 196.798 amu, and Au-198 has a relative abundance of 50.00 % with a mass of 197.882 amu

    197.3 g/mol

5. Calculate the average atomic mass of Uranium using the isotopic composition shown in the table.

Isotope	relative abundance
Ur-234	0.01%
Ur-235	0.71%
Ur-238	99.28%

2 E 2 g/mol (or 200 g/mol)

6. Calculate the average atomic mass of Sulfur if 95.00% of all sulfur atoms have a mass of 31.972 amu, 0.76% has a mass of 32.971amu and 4.22% have a mass of 33.967amu.

    32 g/mol

Stoichiometry:

1.   How many moles are there in 25.0 g of NaCl?   0.428 moles NaCl

2.   If you had 125.43 g of H_2SO_4 how many molecules do you have?   7.78 E 23 molecules H_2SO_4

3.   100. g of $KMnO_4$ is equal to how many moles?   0.633 moles $KMnO_4$

4.   15 moles of KCl would weigh how much (in grams)   1.12 E 3 gKCl

5.   If you needed 0.35 moles of $CuSO_4$ how many molecules do you need   2.1 E 23 molecules $CuSO_4$

6.   4.0 moles of CO_2 has how many total atoms in it?   7.2 E 24 atoms

7. 6.02×10^{24} molecules of NaCl weighs how much (in grams)?   584 g NaCl

8. 1.23×10^{24} molecules of H_2SO_4 has how many total atoms?   8.61 E 24 atoms

9. 1.5×10^{20} molecules of $KMnO_4$ is equal to how many moles?   2.5 E -4 moles $KMnO_4$

10.   How many Cl^- ions are there in 70 g of KCl dissolved in water?   6 E 23 ions of Cl^-

11.   40.043 g of $CuSO_4$ would yield how many Cu^{2+} ions?   1.51 E 23 Cu^{2+} ions

12.   How many molecules are in 30 g of CO_2 4 E 23 molecules CO_2

Rules for using significant figures in calculations with multiple operations (addition and multiplication)

1. The answer is same as the number with the fewest significant figures
2. Do not round any numbers for significant figures until the end of the problem

How to convert nanometers (nm) to meters: It's just stoichiometry with metrics!!!!!

$$\frac{nm}{} \times \frac{1\ m}{1\ E\ 9\ nm}$$ (this will convert from nm to m) $$\frac{m}{} \times \frac{1\ E\ 9\ nm}{1\ m}$$ (this converts m to nm)

Please calculate the wavelength, frequency, and energy of light using Planck's constant and the speed of light for the following problems. You must show all of your work to get credit and answers must be in correct significant figures!

A. $c = \lambda\, f$ **B.** $E = h\, f$ **C.** $E = \frac{h\ c}{\lambda}$

Constants: Planck's constant = 6.63 x 10^{-34} J *s   Speed of light (c) = 3.00 x 10^{8} m/s

1. A certain substance strongly absorbs infrared light having a wavelength of 6,500 nm. Calculate the frequency in Hz of this light?

    4.6 E 13 1/s

2. Calculate the energy of a photon of radiation with a frequency of 8.5 x 10^{14} Hz.

    5.6 E -19 J

3. Calculate the energy of a gamma ray photon whose frequency is 5.02 x 10^{20} Hz?

    3.33 E -13 J

4. Calculate the energy of a photon of radiation with a wavelength of 6.4 x 10^{-7} nm.

    3.1 E -10 J

5. Calculate the energy of light whose wavelength is 4.06 x 10^{-11} nm?

    4.90 E -6 J

6. If the energy of a photon of light is 5.35 x10^{-13} J calculate the wavelength of the particle of light?

    3.72 E -13 m

7. Calculate the frequency of a beam of light if the energy level is 4.32 x 10^{-4} J.   6.52 E 29 1/s