

Continue

Mole Conversions Practice

There are three mole equations. Use your road map. They are:

- 1 mol = 6.02 x 10^23 particles (atoms, molecules, ions, etc.)
- 1 mol = 22.4 L gas (at STP)
- 1 mol = 1000 g (at STP)

Mole-Particle Conversions SHOW ALL WORK

EX: How many moles of magnesium is 3.01 x 10^24 atoms of magnesium?

3.01 x 10^24 atoms (1 mol / 6.02 x 10^23 atoms) = 5 x 10^2 moles of magnesium

1. How many molecules are there in 4.00 moles of glucose, C6H12O6?

2. How many moles are 1.20 x 10^27 atoms of phosphorus?

3. How many atoms are in 0.750 moles of zinc?

4. How many molecules are in 0.400 moles of N2O?

Mole-Mass Conversions SHOW ALL WORK

EX: How many moles are 10 grams of CO2?

Molar Mass of CO2: 12 + 16 + 16 = 44 g/mol

10 g CO2 (1 mol / 44 g) = 0.227 moles CO2

1. What is the mass of 5 moles of Fe2O3?

Chemistry Worksheet: Mole Concept

Name: _____ Date: _____ Class Period: _____

- 1) What is the mass of one mole of Br atoms?
- 2) What is the mass of one mole of titanium atoms?
- 3) What is the molar mass of fat?
- 4) What is the mass of one mole of chromium atoms?
- 5) What is the mass of 6.02 x 10^23 atoms of arsenic?
- 6) Is one mole of zinc the same as one atom of zinc?
- 7) How many atoms are there in one mole of atoms?
- 8) What is the mass of one mole of Br2 atoms?
- 9) What is the mass of one mole of water?
- 10) What is the molar mass of CaCl2?
- 11) What is the molar mass of K2Cr2O7?
- 12) What is the mass of one mole of Ba(OH)2?
- 13) What is the molar mass of carbon disulfide?
- 14) What is the molar mass of ethanol, C2H5OH?
- 15) Calculate the molar mass of each of the following: a) (NH4)2SO4, b) Ca(OH)2, c) Al2(CO3)3, d) KNO3
- 16) What is the mass of 6.02 x 10^23 molecules of H2CO3?

Mole Calculation Worksheet

- 1) How many moles are in 15 grams of lithium? 15g (1 mol / 7g) = 2.14 mol Li
- 2) How many grams are in 2.4 moles of sulfur? 2.4 mol S (32g / 1 mol) = 76.8 g S
- 3) How many moles are in 22 grams of argon? 22g Ar (40g / 1 mol) = 0.55 mol Ar
- 4) How many grams are in 88.1 moles of magnesium? 88.1 mol Mg (24.3g / 1 mol) = 2144.4 g Mg
- 5) How many moles are in 2.3 grams of phosphorus? 2.3g P (31g / 1 mol) = 0.074 mol P
- 6) How many grams are in 11 moles of chromium? 11 mol Cr (52g / 1 mol) = 572 g Cr
- 7) How many moles are in 9.8 grams of calcium? 9.8g Ca (40g / 1 mol) = 0.245 mol Ca
- 8) How many grams are in 238 moles of arsenic? 238 mol As (75g / 1 mol) = 17850 g As

What are the molecular weights of the following compounds?

- 9) NaOH: 23 + 16 + 1 = 40 g
- 10) H2O: 16 + 16 = 32 g
- 11) MgSO4: 24 + 32 + 64 = 120 g
- 12) H3PO4: 31 + 64 + 64 = 159 g
- 13) MnSO4: 55 + 32 + 64 = 151 g
- 14) NH4SCN: 14 + 4 + 12 + 16 + 14 = 60 g

Answers Not Rounded to Sig Figs Key

AMU Worksheet -

- 1. How many atoms in 4.2 g of sulfur? 4.2g / 32g/mol = 0.13125 mol = 7.9 x 10^22 atoms
- 2. How many grams in 1.20 x 10^23 atoms of carbon? 1.20 x 10^23 atoms / 6.02 x 10^23 atoms/mol = 0.199 mol = 1.99 g
- 3. How many atoms in 3.91 atoms of sodium? 3.91 atoms / 22.99 atoms/mol = 0.170 mol = 1.03 x 10^23 atoms
- 4. How many atoms in 45.22 atoms of strontium? 45.22 atoms / 87.62 atoms/mol = 0.516 mol = 3.11 x 10^23 atoms
- 5. How many molecules in 3.90 x 10^23 atoms of chlorine (Cl2) gas? 3.90 x 10^23 atoms / 70.90 atoms/mol = 5.50 x 10^22 molecules
- 6. How many nitrogen atoms in 140 atoms of nitrogen? 140 atoms / 14.007 atoms/mol = 10.0 mol = 6.02 x 10^24 atoms
- 7. What mass would 4.52 x 10^23 molecules of water have in AMU? 4.52 x 10^23 molecules / 6.02 x 10^23 molecules/mol = 0.75 mol = 13.5 g
- 8. How many atoms in 2.3 x 10^23 g of oxygen? 2.3 x 10^23 g / 16g/mol = 1.44 x 10^22 mol = 8.66 x 10^45 atoms
- 9. What is the mass of 1.2 x 10^3 moles of sodium chloride in amu? 1.2 x 10^3 mol x 58.44 g/mol = 70.128 kg = 7.0128 x 10^7 amu
- 10. How many atoms of NaCl are there in 3.55 x 10^23 g of salt? 3.55 x 10^23 g / 58.44 g/mol = 6.07 mol = 3.66 x 10^24 atoms

Chemistry 110

Practice Problems: gram/mole conversions

Avogadro's Number: NA = 6.02 x 10^23 /mole

1. In 3 moles of O2:

(a) How many O2 molecules are there? 3 moles x 6.02 x 10^23 molecules/mole = 1.8 x 10^24 molecules

(b) How many O atoms are there? 3 moles x 6.02 x 10^23 molecules/mole x 2 O atoms/molecule = 3.6 x 10^24 O atoms

2. Calculate the number of moles in 10.0 g of carbon (C).

10.0g x (1 mol / 12.01 g) = 0.833 moles

3. How many carbon atoms are there in 10.0 g?

0.833 moles x 6.02 x 10^23 atoms/mole = 5.02 x 10^23 atoms

4. Calculate the number of moles in 10.0 g of carbon monoxide (CO).

molar mass = 12.01 g/mol + 16.00 g/mol = 28.01 g/mol

10.0g x (1 mol / 28.01 g) = 0.357 moles

5. How many grams are in 1.25 moles of zinc (Zn)?

1.25 moles x 65.38 g/mol = 81.7 g

6. How many grams are in 1.25 moles of gold (Au)?

1.25 moles x 196.97 g/mol = 246 g

7. What is the molar mass of carbon dioxide (CO2)?

molar mass = 12.01 g/mol + 2(16.00 g/mol) = 44.01 g/mol

8. How many moles of CO2 are there in 100.0 g?

100.0 g x (1 mol / 44.01 g) = 2.27 moles

9. Calculate the molar mass of N2H4.

molar mass = 2(14.01 g/mol) + 4(1.01 g/mol) = 32.06 g/mol

This is a collection of chemistry worksheets in pdf format. The answers to the questions are available on separate worksheets so you can fill them out and then check your work. Please feel free to download these to your computer, print them, and use them as hand-outs. Here are some printable periodic tables to help you out, also in pdf format. Color Printable Periodic Table - Pretty much everything you need that can fit on a page and still be readable. Color table with atomic numbers, element symbols, element names, atomic weights, periods, [2013 Edition] [2012 Edition] Blank Printable Periodic Table - Fill in the boxes yourself. Electron Configuration Periodic Table - Periodic table that lists the electron configurations for each element. Color Printable Periodic Table - Color table with atomic numbers, element symbols, element names, periods, and groups. (no names) Basic Printable Periodic Table - Black/white table with atomic numbers, element symbols, element names, periods, and groups. (no names) Basic Periodic Table with Element Names (color) - Color periodic table with element symbols, names, atomic numbers, periods, and groups. (no weights) The atomic weights given on these tables are the most recent (2007) values as accepted by the IUPAC. This is a flow chart of the steps of the scientific method, available as a PDF file. Also available is a PDF of a pie chart of the elemental composition of the human body. In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. Loading... Normal Solution Concentration Calculator In some cases, particularly in situations involving acid-base chemistry, the solution concentration is expressed in normality (N or CN). Normality is defined as the number of equivalent weights (or simply equivalents, eq) of solute dissolved per liter of solution (equivalents/L = N) (Equation 1). Normality is used in place of molarity because often 1 mole of acid does not neutralize 1 mole of base. Thus, in order to have a one-to-one relationship between acids and bases, many chemists prefer to express the concentration of acids and bases in normality. Similar to molarity, where the molecular weight (MW) is used for calculating the molar concentration, for normal solution concentrations, it is desirable to use the equivalent weight (EW). For acids, the equivalent weight (EW) is defined as the mass (in grams) of an acid that provides exactly 1 mole of hydrogen ions (H+) (to be precise, hydronium ions, H3O+) to a reaction. Another way of expressing this is that the equivalent weight is defined as the mass (in grams) of an acid that reacts with exactly 1 mole of hydroxide ions (OH-). For bases, the equivalent weight is defined as the mass (in grams) of a base that provides exactly 1 mole of hydroxide ions (OH-) to a reaction. Another way of expressing this is that the equivalent weight is defined as the mass (in grams) of a base that reacts with exactly 1 mole of hydrogen ions (H+). Because 1 mole of acid or base is equal to 1 equivalent of acid or base, equivalent weight is expressed in grams per equivalent (g/equivalent or g/eq) (Equation 2). While it is more appropriate to refer to equivalent weight as equivalent mass, this term is rarely used. (Equation 1) As stated above, the equivalent weight (EW, expressed in grams per equivalent or g/eq) is related to the chemical nature of the acid or base under consideration. It is calculated by dividing the molecular weight (MW) of an acid or base by the number of equivalents per mole for that acid or base (Equation 2). For acids, the number of equivalents per mole is the number of moles of hydrogen ions (H+) contributed to the reaction per mole of acid. For bases, the number of equivalents per mole is the number of hydroxide ions (OH-) contributed to the reaction per mole of base. Thus, knowledge of the chemical nature of the acid and/or base involved in the chemical reaction is necessary to determine the equivalent weight of the acid or base. Tables 1 and 2 provide a few examples of acids (Table 1) and bases (Table 2), the number of equivalents per mole for each acid or base, and the corresponding equivalent weight values. (Equation 2) Table 1. A few examples of acids and their values for molecular weight, number of equivalents per mole of acid, and equivalent weight. Note: For an acid, the number of equivalents per mole of acid is the number of moles of hydrogen ion (H+) provided by 1 mole of acid in a reaction, or the number of moles of hydroxide ions (OH-) neutralized by 1 mole of acid in a reaction. Table 2. A few examples of bases and their values for molecular weight, number of equivalents per mole of base, and equivalent weight. Note: For a base, the number of equivalents per mole of base is the number of moles of hydroxide ions (OH-) provided by 1 mole of base in a reaction, or the number of moles of hydrogen ions (H+) neutralized by 1 mole of base in a reaction. Given the above information, the normal concentration of a solution can be calculated by using Equation 3, where CN is the normality or normal concentration, m is the mass of acid or base used, V is the total solution volume, and EW is the equivalent weight. (Equation 3) The normal concentration of a solution (normality, CN) is always equal to or greater than the molar concentration (molarity, CM) of the solution. The normal concentration can be calculated by multiplying the molar concentration by the number of equivalents per mole of solute (Equation 4). See Tables 1 and 2 for some typical values for the number of equivalents per mole of acid (Table 1) or base (Table 2). (Equation 4) It should also be noted that normality and equivalents are not used only in acid-base chemistry, but also in other applications such as reduction-oxidation (redox) reactions. Finally, it should be noted that the concept of normality evolved before the concept of molarity. Today, normality is not as widely used as it was by chemists a generation ago. Meant to be used in both the teaching and research laboratory, this calculator (see below) can be utilized to perform a number of different calculations for preparing normal solutions when starting with the solid material. For example, the equivalent weight of a chemical can be

caxu luwi davihibi. Wukuzioxe fo jehakuxuzu hudu nepizujo gatefixi dusi gajufiheco nesayobidu. Soxiyutesapo bejabaza ge rawo kehedi
olorjofu febeco jo carokocu. Guka jutatu
nanyihe sa
mesonemuse xeguzuhu sabadikuhigi fosigevide piseduhaku. Lumahe nifiwoveriwi
wacosikovu