

Name: _____

20 Pts.

Chemistry Honors Worksheet: Formulas of a Compound

- _____ The subscripts in a chemical formula represent the ratio of (moles / mass) in a compound
 - _____ Which compound has the greatest percentage of carbon? (CO, CO₂, PbCO₃)
 - _____ What is the empirical formula of a compound that contains 0.2 moles of C and 0.8 moles of H
 - _____ Calculate the molecular mass of a compound if 0.02461 moles has a mass of 2.05 g.
 - _____ The % composition of an empirical formula is (more / less / the same) than/as its molecular formula.
 - _____ How many moles of V are indicated in one mole of the compound V(C₂O₄)₂?
 - _____ A beaker of water contains 2×10^{24} atoms of H, how many atoms of O are also in the beaker?
 - _____ 1 mole of a molecular compound has a mass of 165 grams. How many molecules are there?
 - _____ Fool's Gold is iron pyrite, FeS. What is the percentage of gold in a 1.0 gram sample of fool's gold?
- The pesticide DDT has been banned in the United States since 1962. This compound has a formula C₁₄H₉Cl₅. Answer all questions referring to DDT. Note: Use 35.5 g/mol for Cl
 - _____ Is this compound ionic or molecular?
 - _____ How many molecules of DDT are in a 6.1×10^{-6} g sample?
 - _____ How many atoms of H are in 2.00 mg of DDT?
 - _____ How many grams of Cl are contained in 10.0 grams of DDT?
 - _____ If a sample 5.04×10^{21} atoms of H, how many atoms of C would there also be?
 - _____ How many atoms of C are in a 25.0 mg of DDT?
- A compound of tantalum, Ta, and oxygen was produced in a lab by heating tantalum in a crucible. The data was collected:

Mass of crucible:	24.22 g
Mass of crucible and tantalum:	26.14 g
Mass of crucible and tantalum oxide:	26.56 g

 - Calculate the percent composition of the compound.
 - What is the empirical formula of this compound?
 - Is this compound ionic or covalent? _____
 - Name this compound: _____ * Need Roman Numerals!!!
- Determine the empirical formula of the following compounds:
 - 63.0g Rb, 5.90g O
 - 4.95mg Th, 1.37mg S
 - 2.13g Na, 2.32g As, 1.98g O
 - 32.8% Cr, 67.2% Cl
 - 58.0% Rb, 9.50%N, 32.5% O

5. A 2.500 gram compound was found that contained only phosphorous and oxygen. The sample contained 1.0918 grams of phosphorous and has a molecular mass of 284 g/mol. Calculate the empirical and molecular formula.

6. A sample of ethylene glycol, antifreeze coolant, was found to contain 99.7 mg of C, 279 mL of H₂ gas at STP and 93 mL of O₂ gas at STP. If the molecular mass is 62 g/mol determine the empirical and molecular formula of ethylene glycol.

7. Caffeine, which occurs in coffee, tea, and kola, is a stimulant for the central nervous system. A 1.261 gram sample of pure caffeine contains 0.624 grams C, 0.065 grams H, 0.364 grams N, and the rest is O. What is the empirical formula of caffeine?

8. Butane gas contains only C and H. If the compound is 82.8% C, what is the empirical formula of the compound? If its molecular mass is 58 g/mol what is the molecular formula?

9. A compound contains 1.4211 grams of C, 2.950 L of H₂ gas at STP, and 0.4211 grams of S. What is the empirical formula of this compound?

10. Chloral hydrate is a drug that is used as a sedative and a hypnotic. It is used in detective stories to make a Mickey Finn. A Mickey is slipped into an unsuspecting victims drink to knock them out. The compound contains 14.5% C, 1.81% H, 64.4% Cl, and 19.3% O by mass. Determine the empirical and molecular formula of this compound if the molecular mass is 166 g/mol.

11. The molecular mass of petroleum is 114 g/mol. If a sample of fuel contains 21.05 grams of carbon and 44.24 dm³ of H₂ gas at STP, determine its molecular and empirical formula.

12. An oxide of nitrogen contains 100.0 L of H₂ gas and 50.0 L of O₂ gas at 25°C and 2.3 atm pressure. What is the empirical formula of the compound?