

1. How many atoms of nitrogen are in 6.022×10^{15} molecules of ammonium cyanide?
2. What is the mass of 5.29×10^{25} molecules of aspartame ($C_{14}H_{18}O_5N_2$)? Where have you seen this compound before?
3. What is the molar mass of sodium thiosulfate ($Na_2S_2O_3$), which is also known as "hypo" in the non-digital photographic processing industry?
4. If a ring is 58% gold and weighs 5.835 grams, how many atoms of gold are in the ring?
5. NutraSweet is 57.14% C, 6.16% H, 9.52% N, and 27.18% O. Calculate the empirical formula and, using the molar mass (294.30 g/mol), find the molecular formula.
6. How many molecules are in 100. milligrams of aspartame?
7. How many atoms of carbon are in 100. milligrams of aspartame?
8. What is the percentage mass of each element in dinitrogen tetrahydride (*aka* hydrazine)?
9. What is the mass % of carbon in benzene (C_6H_6)? in ammonium carbide?
10. A compound contains 40.0 percent carbon, 6.72 percent hydrogen, and 53.3 percent oxygen. What is its empirical formula? This compound has a molar mass of 180.2 grams per mole. What is its molecular formula?
11. A compound used as an industrial catalyst contains 23.3 percent cobalt, 25.3 percent molybdenum, with the remainder being chlorine. What is the empirical formula of this catalyst?
12. A compound called Cadinene contains 88.16 percent carbon and 11.84 percent hydrogen. Its molar mass is 204.34 grams per mole. What is the empirical formula for this compound? What is its molecular formula?
13. A compound called trimellitic acid contains 51.44 percent carbon, 2.88 percent hydrogen, and 45.68 percent oxygen. What is the empirical formula? The molar mass of trimellitic acid is 210.14 grams per mole. What is its molecular formula?
14. The nerve agent, Sarin, has a molar mass of 140.09 grams per mole, and a composition of 34.29% C, 7.20% H, 13.56% fluorine, 22.84% oxygen, with the remainder consisting of phosphorus. What is the empirical formula for this compound? What is its molecular formula?
15. A 4.159 gram sample of a substance is found to contain 2.233 grams of iron with the remainder being sulfur. What is the empirical formula for this compound?
16. A compound's empirical formula was found to be CH_2O and its molar mass was determined to be 240.8 grams/mol. What is the compound's molecular formula?