# Empirical and Molecular Formula Worksheet

**SHOW WORK ON A SEPARATE SHEET OF PAPER.**

Write the empirical formula for the following compounds.

1) $C_6H_6$
2) $C_8H_{18}$
3) $WO_2$
4) $C_2H_6O_2$
5) $X_{39}Y_{13}$

6) A compound with an empirical formula of $C_2OH_4$ and a molar mass of 88 grams per mole. What is the molecular formula of this compound?

7) A compound with an empirical formula of $C_4H_4O$ and a molar mass of 136 grams per mole. What is the molecular formula of this compound?

8) A compound with an empirical formula of CFBrO and a molar mass of 254.7 grams per mole. What is the molecular formula of this compound?

9) A compound with an empirical formula of $C_2H_8N$ and a molar mass of 46 grams per mole. What is the molecular formula of this compound?

10) A well-known reagent in analytical chemistry, dimethylglyoxime, has the empirical formula C2H4NO. If its molar mass is 116.1 g/mol, what is the molecular formula of the compound?

12. Nitrogen and oxygen form an extensive series of oxides with the general formula $N_xO_y$. One of them is a blue solid that comes apart, reversibly, in the gas phase. It contains 36.84% N. What is the empirical formula of this oxide?

13. A sample of indium chloride weighing 0.5000 g is found to contain 0.2404 g of chlorine. What is the empirical formula of the indium compound?

14. An unknown compound was found to have a percent composition as follows: 47.0 % potassium, 14.5 % carbon, and 38.5 % oxygen. What is its empirical formula? If the true molar mass of the compound is 166.22 g/mol, what is its molecular formula?

15. Rubbing alcohol was found to contain 60.0 % carbon, 13.4 % hydrogen, and the remaining mass was due to oxygen. What is the empirical formula of rubbing alcohol?

# Empirical and Molecular Formula Worksheet ANSWER KEY

Write the empirical formula for the following compounds.

1) $C_6H_6$ **$C_3H_3$**

6) $C_8H_{18}$ **$C_4H_9$**

7) $WO_2$ **$WO_2$**

8) $C_2H_6O_2$ **$CH_3O$**

9) $X_{39}Y_{13}$ **$X_3Y$**

6) A compound with an empirical formula of $C_2OH_4$ and a molar mass of 88 grams per mole. What is the molecular formula of this compound? **$C_4O_2H_8$**

7) A compound with an empirical formula of $C_4H_4O$ and a molar mass of 136 grams per mole. What is the molecular formula of this compound? **$C_8H_8O_2$**

8) A compound with an empirical formula of CFBrO and a molar mass of 254.7 grams per mole. What is the molecular formula of this compound? **$C_2F_2Br_2O_2$**

9) A compound with an empirical formula of $C_2H_8N$ and a molar mass of 46 grams per mole. What is the molecular formula of this compound? **$C_2H_8N$**

10) A well-known reagent in analytical chemistry, dimethylglyoxime, has the empirical formula $C_2H_4NO$. If its molar mass is 116.1 g/mol, what is the molecular formula of the compound? **$C_4H_8N_2O_2$**

12. A certain blue solid contains 36.84% N. What is the empirical formula of this compound? **The ratios are $N_{1.00}O_{1.50}$. Since 1.50 is not close to a whole number, we multiply *both* subscripts by 2. The empirical formula is thus $N_2O_3$. (The name is dinitrogen trioxide.)**

13. A sample of indium chloride weighing 0.5000 g is found to contain 0.2404 g of chlorine. What is the empirical formula of the indium compound? **$InCl_3$**

14. An unknown compound was found to have a percent composition as follows: 47.0 % potassium, 14.5 % carbon, and 38.5 % oxygen. What is its empirical formula? If the true molar mass of the compound is 166.22 g/mol, what is its molecular formula? **$K_2C_2O_4$**

15. Rubbing alcohol was found to contain 60.0 % carbon, 13.4 % hydrogen, and the remaining mass was due to oxygen. What is the empirical formula of rubbing alcohol? **$C_3H_8O$**