

Molecular vs Empirical Formulas

Empirical formulas are the ratio of atoms in a molecule

Molecular formulas are the COMPLETE number of atoms in an element.

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Examples

Empirical formula of CH

This means that for every atom of carbon, there is one atom of hydrogen.

Molecular formulas with the same ratio -

acetylene - C_2H_2

benzene - C_6H_6

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Other examples of different compounds with the same empirical formula

ethylene C_2H_4

butene C_4H_8

cyclohexane C_6H_{12}

What is the common empirical formula?

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The empirical formula of hexane is C_3H_7 . Its molecular weight is 86.2 amu. What is the molecular formula of hexane?

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The compound ethylene glycol is often used as an antifreeze. It contains 38.7% carbon, 9.75% hydrogen, and the rest oxygen. The molecular weight of ethylene glycol is 62.07 g. What is the molecular formula of ethylene glycol?

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Simplifying ratios:

If you ever get a ratio like 0.137 : 0.343, divide all numbers by the smallest and determine the whole number ratio.

Remember: %'s are done by mass and ratios are done by mols.

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