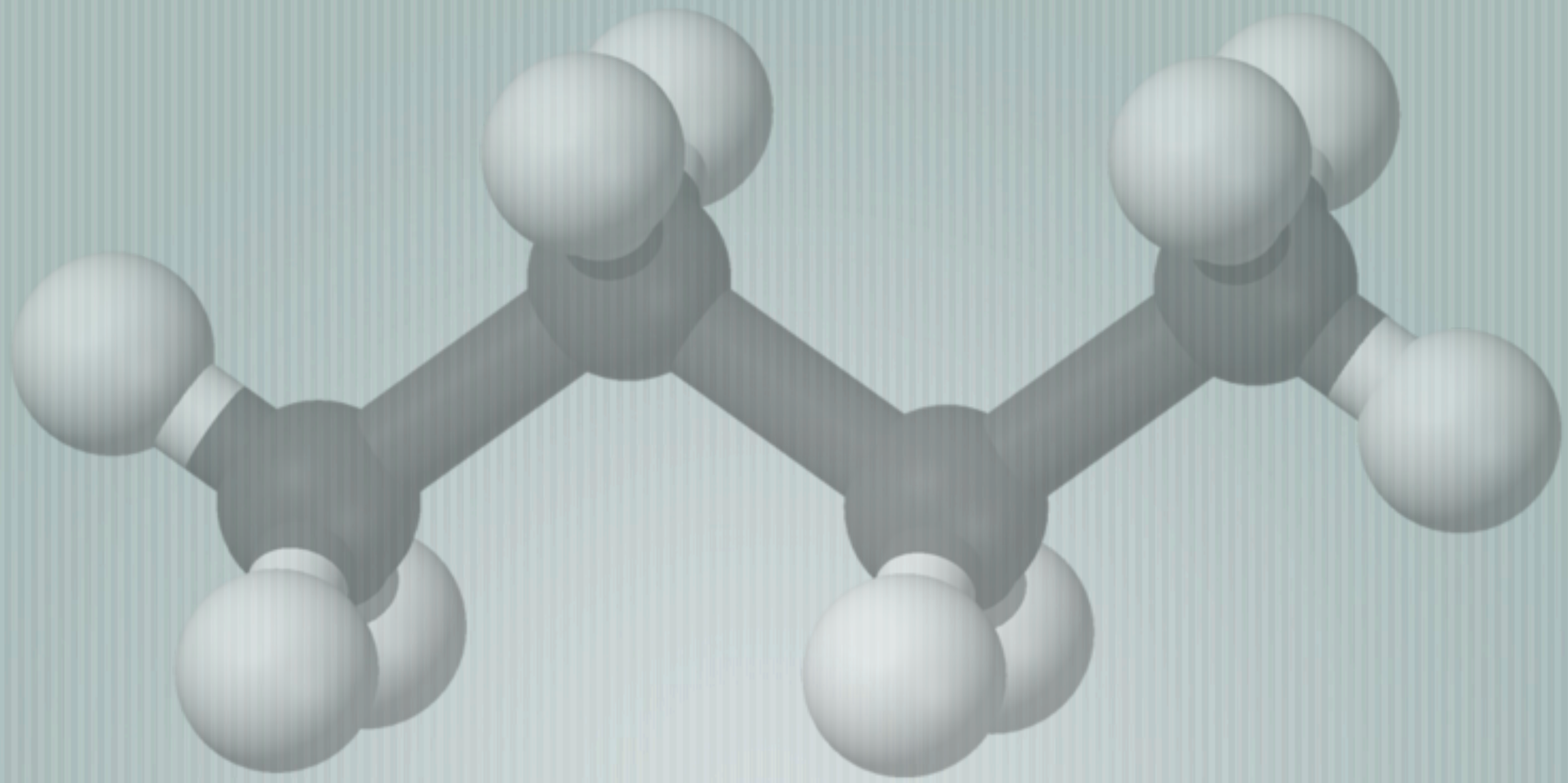
Converting Empirical Formulae to Molecular Formulae

Empirical vs. Molecular Formulae



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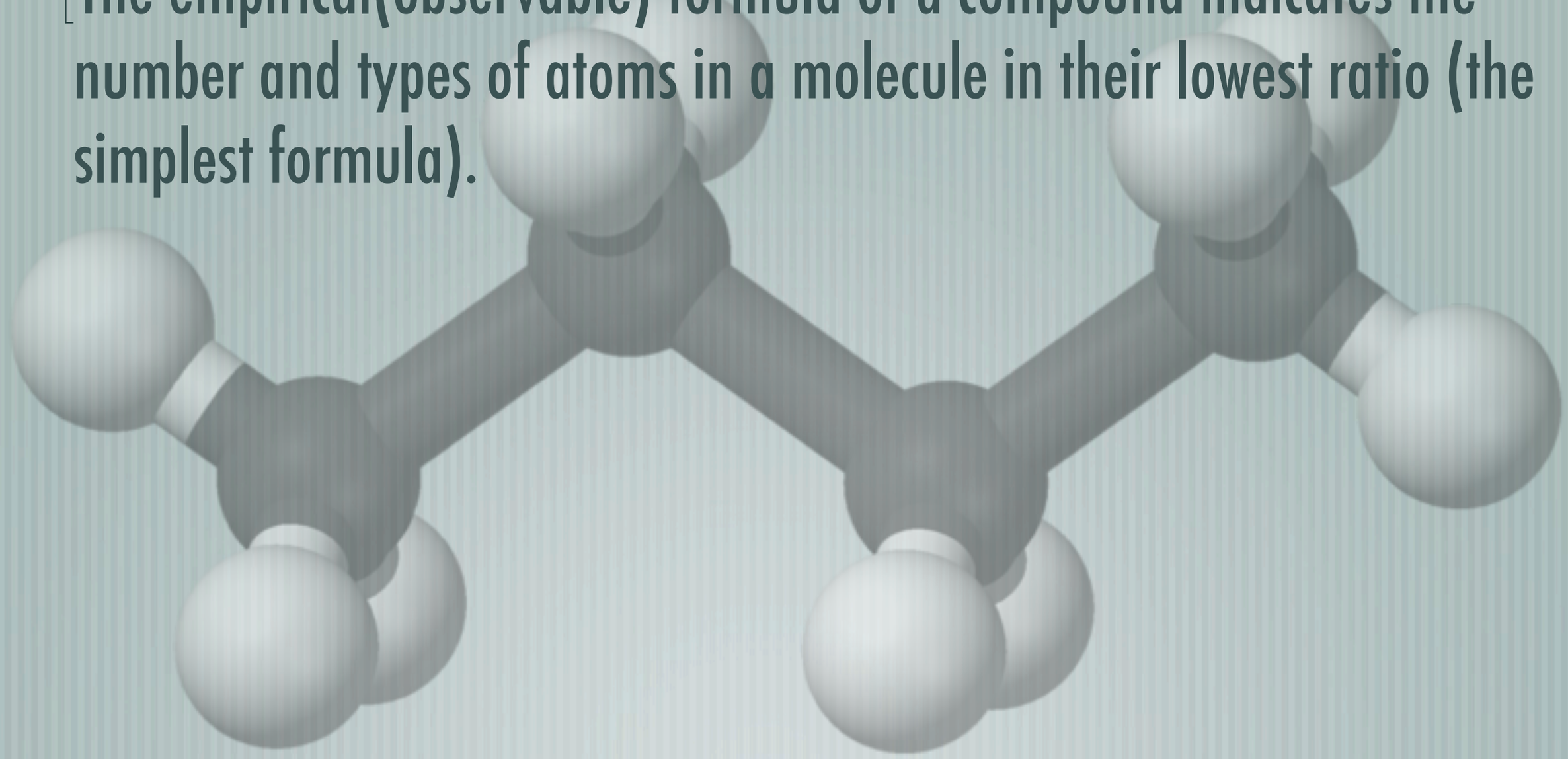

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- The empirical formula can always be determined from the molecular formula, but the molecular formula cannot always be determined from the empirical formula.

Empirical vs. Molecular Formulae

Compound	Molecular Formula	Empirical Formula
Ethene		
Dinitrogen Pentoxide		
Glucose		
Hydrogen Peroxide		
Carbon Dioxide		
Dinitrogen Tetroxide		
Hexane		

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Ethene	C_2H_6	
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Hydrogen Peroxide		
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Hexane		

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Carbon Dioxide		
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Dinitrogen Tetroxide	N_2O_4	
Hexane		

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You now have the subscripts for the Empirical formula.

Converting Percent yield to Empirical Formulae

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Interpreting the Results of an Elemental Analysis

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4) Multiply each of the subscripts in the empirical formulae times the quotient.

5) You cannot reduce the molecular formula.

Determining Empirical Formulae of Antifreeze

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To determine the empirical formula of a compound you must first know the % composition of the elements in the compound. Antifreeze, composed of C,H,O, has the composition by mass of: 38.7% Carbon, 9.7% Hydrogen and 51.6% Oxygen.

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Using dimensional analysis convert these masses of elements to moles of elements. Your masses are your givens and your conversion factor will be 1mole/molar mass of element

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Moles to Empirical Formula

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note: Don't write 1's in subscripts except here.

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  Molar mass = 62.06 g/mol

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  62.06 g/mole ÷ 31.03 g/mole = 2

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$C_1H_3O_1 \times 2 = C_2H_6O_2$

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Antifreeze molecule (ethylene glycol)

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