

**What do you need to make a hot dog?**

bun + hot dog

Can we make an equation for the ingredients for a hot dog?

$$\text{Bu} + \text{Hd} \rightarrow \text{BuHd}$$

Dec 14-11:42 AM

**How many hot dogs can I make with the following ingredients?** 3 BuHd

What is limiting the number of hot dogs I can make? Bu - limiting reactant

What ingredient do I have extra of? Hd - excess reactant

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**Limiting Reactants**

Limiting reactant: the reactant that limits how much product can be produced

Excess reactant: the reactant that will have extra when the reaction is complete

Dec 15-3:01 PM

**Limiting Reactants:**

Na O      Cl ●      NaCl ○●

What is the limiting reactant? Na

What is in excess? Cl

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**Limiting Reactants:**

H<sub>2</sub> ○○      O<sub>2</sub> ●●      H<sub>2</sub>O ○●

What is the limiting reactant? O<sub>2</sub>

What is in excess? H<sub>2</sub>

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**Empirical and Molecular Formulas**

What's the difference between the following formulas:

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>      CH<sub>2</sub>O

↑      ↑

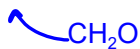
not simplified      simplified

molecular      empirical

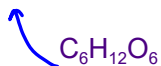
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## Empirical and Molecular Formulas

empirical formulas: elements are in the lowest ratio



multiples  
molecular formulas: elements are not in their lowest ratio



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## Practice

Determine which of the following are empirical formulas and which are molecular formulas. If it is in its molecular formula, change it to its empirical formula:

- $\text{H}_2\text{O}_2$  ~~Empirical~~  $\text{HO}$
- $\text{CaCl}_2$  Empirical
- $\text{WO}_2$  empirical
- $\text{C}_2\text{H}_6\text{O}_2$  Molecular  
 $\frac{1}{2} \frac{3}{2} \frac{1}{2}$   
 ~~$\text{C}_2\text{H}_6\text{O}_2$~~   
 $\text{CH}_3\text{O}$

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