

## Notes: Empirical Formulas

What is the molecular formula?

- A molecular formula is considered the \_\_\_\_\_ of a molecule.
- You are familiar with many examples. For example, water is \_\_\_\_\_, carbon dioxide is \_\_\_\_\_, and ammonium sulfate is \_\_\_\_\_.

▶ What is the molecular formula of hydrogen peroxide?

▶ So, what does this formula really tell you about the compound?

This formula indicates that each hydrogen peroxide molecule consists of

\_\_\_\_\_ hydrogen atoms and \_\_\_\_\_ oxygen atoms in a \_\_\_\_\_ ratio.

▶ What is an empirical formula?

- An \_\_\_\_\_ is slightly different than the molecular formulas you are used to working with in class.
- A formula that gives the \_\_\_\_\_ **whole-number ratio** of atoms in a compound.

▶ Why are empirical formulas important?

- Chemists trying to determine the \_\_\_\_\_ of an unknown substance usually determine a compound's empirical formula.
- This helps the chemist write the \_\_\_\_\_ formula.

▶ O.K. How do I figure out empirical formulas if I've been given the molecular formula?

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► What are some examples?

Molecular Formula	Empirical Formula
$\text{H}_2\text{O}_2$	
$\text{H}_2\text{O}$	
$\text{N}_2\text{O}_4$	
$\text{C}_6\text{H}_{12}\text{O}_6$	

► How do I solve these problems if I'm not given the molecular formula?

- You use MATH!
- You follow these FOUR steps.

**Step 1:** \_\_\_\_\_.

- If percentages are given, assume that the total mass is 100 grams so that the \_\_\_\_\_.

**Step 2:** \_\_\_\_\_.

**Step 3:** \_\_\_\_\_.

**Step 4:** \_\_\_\_\_.

- Round to the nearest whole number.

-OR-

- Multiply all ratios by an integer to get whole numbers.