Worksheet Counting Atoms

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Part 1: Building a Foundation

What is the basic unit of a chemical element?

Hint: Think about the smallest part of an element that retains its properties.

- ◯ A) Molecule
- ◯ B) Atom
- ◯ C) Compound
- ◯ D) Ion

Which of the following are true about chemical formulas? (Select all that apply)

Hint: Consider what information chemical formulas provide about substances.

- ☐ A) They represent molecules and compounds.
- ☐ B) They show the types of atoms present.
- ☐ C) They indicate the number of each type of atom.
- ☐ D) They describe the physical state of the compound.

Explain the role of subscripts in a chemical formula.

Hint: Think about how subscripts affect the interpretation of the formula.

List the elements present in the compound H_2O and their respective counts.

Hint: Identify the elements and how many of each are in the formula.

1. What elements are in H_2O?

2. How many hydrogen atoms are in H_2O?

3. How many oxygen atoms are in H_2O?

What does a coefficient in a chemical equation represent?

Hint: Consider what the number in front of a compound indicates.

- ◯ A) The type of element
- ◯ B) The number of molecules
- ◯ C) The charge of the compound
- ◯ D) The temperature of the reaction

Part 2: Comprehension and Application

In the formula $Ca(OH)_2$, how many oxygen atoms are present?

Hint: Count the number of oxygen atoms in the formula considering the parentheses.

- ◯ A) 1
- ◯ B) 2
- ◯ C) 3
- ◯ D) 4

Which statements are correct about parentheses in chemical formulas? (Select all that apply)

Hint: Think about how parentheses affect the interpretation of the formula.

- ☐ A) They indicate repeated groups of atoms.
- ☐ B) They do not affect the total atom count.
- ☐ C) They are used to simplify complex formulas.
- ☐ D) They are multiplied by the subscript outside the parentheses.

Describe how you would count the total number of atoms in the compound $Al_2(SO_4)_3$.

Hint: Consider how to break down the formula into its components.

If the chemical formula for glucose is $C_6H_{12}O_6$, how many hydrogen atoms are present in two molecules of glucose?

Hint: Multiply the number of hydrogen atoms in one molecule by two.

- ◯ A) 12
- ◯ B) 24
- ◯ C) 6
- ◯ D) 18

Consider the compound Na_2CO_3. Which of the following are true? (Select all that apply)

Hint: Analyze the formula to determine the number of each type of atom.

- ☐ A) It contains two sodium atoms.
- ☐ B) It contains three oxygen atoms.
- ☐ C) It contains one carbon atom.
- ☐ D) It contains two carbon atoms.

Calculate the total number of atoms in the compound $3NH_4Cl$.

Hint: Consider the coefficients and subscripts in the formula.

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Part 3: Analysis, Evaluation, and Creation

Which part of the formula $2Mg(NO_3)_2$ indicates the number of nitrate groups present?

Hint: Look for the part of the formula that is multiplied by a subscript.

- ◯ A) 2 before Mg
- ◯ B) NO_3
- ◯ C) 2 after (NO_3)
- ◯ D) Mg

Analyze the formula C_6H_5OH. Which statements are correct? (Select all that apply)

Hint: Consider the number of each type of atom in the formula.

- ☐ A) It contains six carbon atoms.
- ☐ B) It contains five hydrogen atoms.
- ☐ C) It contains one oxygen atom.
- ☐ D) It is an alcohol.

Break down the compound K_3PO_4 into its constituent elements and their respective counts.

Hint: Identify the elements and how many of each are in the formula.

Which of the following compounds has the greatest number of total atoms?

Hint: Count the total number of atoms in each compound.

- ◯ A) H_2O
- ◯ B) CO_2
- ◯ C) CH_4
- ◯ D) NH_3

Evaluate the following statements about the compound $Fe_2(SO_4)_3$. Which are true? (Select all that apply)

Hint: Analyze the formula to determine the number of each type of atom.

- [ ] A) It contains two iron atoms.
- [ ] B) It contains three sulfate groups.
- [ ] C) It contains four sulfur atoms.
- [ ] D) It contains twelve oxygen atoms.

Design a new compound using at least three different elements and provide its chemical formula. Explain the reasoning behind your choice of elements and their proportions.

Hint: Think about how different elements can combine to form a stable compound.