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Worksheet Counting Atoms Answer Key PDF

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Part 1: Building a Foundation

What is the basic unit of a chemical element?

undefined. A) Molecule

undefined. B) Atom ✓

undefined. C) Compound

undefined. D) Ion

The basic unit of a chemical element is an atom.

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

undefined. A) They represent molecules and compounds. ✓

undefined. B) They show the types of atoms present. ✓

undefined. C) They indicate the number of each type of atom. ✓

undefined. D) They describe the physical state of the compound.

Chemical formulas represent molecules and compounds, show types of atoms, and indicate the number of each type of atom.

Explain the role of subscripts in a chemical formula.

Subscripts indicate the number of atoms of each element in a compound.

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

1. What elements are in H_2O?

Hydrogen and Oxygen

2. How many hydrogen atoms are in H_2O?

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2

3. How many oxygen atoms are in H_2O?

1

H_2O contains 2 hydrogen atoms and 1 oxygen atom.

What does a coefficient in a chemical equation represent?

undefined. A) The type of element

undefined. B) The number of molecules ✓

undefined. C) The charge of the compound

undefined. D) The temperature of the reaction

A coefficient represents the number of molecules of a substance in a chemical equation.

Part 2: Comprehension and Application

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

undefined. A) 1

undefined. B) 2 ✓

undefined. C) 3

undefined. D) 4

There are 2 oxygen atoms in the formula $Ca(OH)_2$.

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

undefined. A) They indicate repeated groups of atoms. ✓

undefined. B) They do not affect the total atom count.

undefined. C) They are used to simplify complex formulas. ✓

undefined. D) They are multiplied by the subscript outside the parentheses. ✓

Parentheses indicate repeated groups of atoms and are multiplied by the subscript outside.

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

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To count the total atoms, consider the subscripts and the coefficients, including those in parentheses.

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

undefined. A) 12 ✓

undefined. B) 24

undefined. C) 6

undefined. D) 18

There are 12 hydrogen atoms in two molecules of glucose.

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

undefined. A) It contains two sodium atoms. ✓

undefined. B) It contains three oxygen atoms. ✓

undefined. C) It contains one carbon atom. ✓

undefined. D) It contains two carbon atoms.

Na_2CO_3 contains two sodium atoms, one carbon atom, and three oxygen atoms.

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

The total number of atoms in $3NH_4Cl$ is 15.

Part 3: Analysis, Evaluation, and Creation

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

undefined. A) 2 before Mg

undefined. B) NO_3

undefined. C) 2 after (NO_3) ✓

undefined. D) Mg

The part of the formula that indicates the number of nitrate groups is the 2 after (NO_3).

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

undefined. A) It contains six carbon atoms. ✓

undefined. B) It contains five hydrogen atoms. ✓

undefined. C) It contains one oxygen atom. ✓

undefined. D) It is an alcohol. ✓

C_6H_5OH contains six carbon atoms, five hydrogen atoms, and one oxygen atom.

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

K_3PO_4 contains 3 potassium atoms, 1 phosphorus atom, and 4 oxygen atoms.

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

undefined. A) H_2O

undefined. B) CO_2

undefined. C) CH_4

undefined. D) NH_3 ✓

NH_3 has the greatest number of total atoms.

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

undefined. A) It contains two iron atoms. ✓

undefined. B) It contains three sulfate groups. ✓

undefined. C) It contains four sulfur atoms. ✓

undefined. D) It contains twelve oxygen atoms. ✓

$Fe_2(SO_4)_3$ contains two iron atoms, three sulfate groups, four sulfur atoms, and 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.

The new compound should be a stable combination of the chosen elements, with a clear explanation of their proportions.

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