

Counting Atoms Worksheet Questions and Answers PDF

Counting Atoms Worksheet Questions And Answers PDF

Disclaimer: The counting atoms worksheet questions and answers pdf was generated with the help of StudyBlaze AI. Please be aware that AI can make mistakes. Please consult your teacher if you're unsure about your solution or think there might have been a mistake. Or reach out directly to the StudyBlaze team at max@studyblaze.io.

Part 1: Building a Foundation

What does the subscript '2' indicate in the chemical formula H_2O ?

Hint: Think about what the subscript represents in a chemical formula.

- A) Two molecules of water
- B) Two atoms of hydrogen ✓
- C) Two atoms of oxygen
- D) Two moles of water

■ The subscript '2' indicates that there are two atoms of hydrogen in the molecule.

Which of the following are polyatomic ions?

Hint: Recall the definitions of polyatomic ions.

- A) NO_3^- ✓
- B) Cl^-
- C) SO_4^{2-} ✓
- D) H_2O

■ Polyatomic ions are ions that consist of more than one atom. NO_3^- and SO_4^{2-} are examples.

Explain the role of coefficients in a chemical equation and how they differ from subscripts.

Hint: Consider how coefficients affect the number of molecules in a reaction.

Coefficients indicate the number of molecules or moles of a substance, while subscripts indicate the number of atoms in a molecule.

List the chemical symbols for the following elements:

Hint: Think about the periodic table.

1. Oxygen

| O

2. Sodium

| Na

3. Carbon

| C

4. Iron

| Fe

The chemical symbols for the elements are O for Oxygen, Na for Sodium, C for Carbon, and Fe for Iron.

Part 2: Understanding and Interpretation

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

Hint: Consider how the parentheses affect the count of atoms.

- A) 1
- B) 2 ✓
- C) 3
- D) 4

There are 2 oxygen atoms present in the formula $\text{Ca}(\text{OH})_2$.

Which statements are true about the formula $2\text{H}_2\text{O}$?

Hint: Think about what the coefficients and subscripts indicate.

- A) It contains two molecules of water. ✓
- B) It contains four hydrogen atoms in total. ✓
- C) It contains two oxygen atoms in total. ✓
- D) It represents two moles of water.

The formula $2\text{H}_2\text{O}$ indicates that there are two molecules of water, which means four hydrogen atoms and two oxygen atoms in total.

Describe how parentheses are used in chemical formulas and provide an example.

Hint: Consider how parentheses group atoms in a formula.

Parentheses are used to group atoms in a formula, indicating that the atoms within the parentheses are treated as a unit. For example, in $\text{Ca}(\text{OH})_2$, the OH group is treated as one unit.

Part 3: Application and Analysis

If you have 3 moles of $\text{Al}_2(\text{SO}_4)_3$, how many sulfur atoms do you have in total?

Hint: Consider how to calculate the total number of sulfur atoms from the formula.

- A) 3
 B) 6
 C) 9 ✓
 D) 12

There are 9 sulfur atoms in total from 3 moles of $\text{Al}_2(\text{SO}_4)_3$.

Given the reaction: $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, which of the following are true?

Hint: Analyze the reactants and products in the reaction.

- A) The reaction produces two molecules of water. ✓
 B) Four hydrogen atoms are consumed. ✓
 C) Two oxygen atoms are consumed. ✓
 D) The total number of oxygen atoms remains the same.

The reaction produces two molecules of water, consumes four hydrogen atoms, and two oxygen atoms.

Calculate the total number of atoms in one molecule of $\text{C}_6\text{H}_{12}\text{O}_6$ and explain your process.

Hint: Consider how to count the atoms based on the subscripts.

In one molecule of $C_6H_{12}O_6$, there are 6 carbon atoms, 12 hydrogen atoms, and 6 oxygen atoms, totaling 24 atoms.

Which of the following correctly describes the composition of $(NH_4)_2CO_3$?

Hint: Analyze the subscripts and coefficients in the formula.

- A) 2 nitrogen, 8 hydrogen, 1 carbon, 3 oxygen ✓
- B) 1 nitrogen, 4 hydrogen, 1 carbon, 3 oxygen
- C) 2 nitrogen, 4 hydrogen, 1 carbon, 3 oxygen
- D) 2 nitrogen, 8 hydrogen, 2 carbon, 3 oxygen

The correct composition is 2 nitrogen, 8 hydrogen, 1 carbon, and 3 oxygen.

Part 4: Evaluation and Creation

Evaluate the following statements about chemical reactions. Which are true?

Hint: Consider the principles of chemical reactions.

- A) Atoms are rearranged during a chemical reaction. ✓
- B) The total mass of reactants equals the total mass of products. ✓
- C) New atoms are created in a chemical reaction.
- D) Chemical reactions can change the type of atoms present.

Atoms are rearranged during a chemical reaction, and the total mass of reactants equals the total mass of products.

Explain how the law of conservation of mass applies to the chemical equation: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$.

Hint: Consider the number of atoms on both sides of the equation.

The law of conservation of mass states that matter cannot be created or destroyed. In the equation, the number of atoms of each element is the same on both sides.

Design a simple experiment to demonstrate the conservation of mass using household materials. Describe the materials, procedure, and expected outcome.

Hint: Think about a reaction that can be easily observed.

An example experiment could involve mixing vinegar and baking soda in a closed container to observe gas production while measuring the mass before and after the reaction.