

Average Atomic Mass Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the average atomic mass?

undefined. The mass of the most abundant isotope

undefined. The sum of the atomic masses of all isotopes

undefined. The weighted average of the atomic masses of an element's isotopes ✓

undefined. The mass of the heaviest isotope

The average atomic mass is the weighted average of the atomic masses of an element's isotopes.

Which of the following statements are true about isotopes?

undefined. Isotopes have the same number of protons. ✓

undefined. Isotopes have different numbers of neutrons. ✓

undefined. Isotopes have different atomic numbers.

undefined. Isotopes have the same atomic mass.

Isotopes have the same number of protons but different numbers of neutrons.

Explain why the average atomic mass of an element is not a whole number.

The average atomic mass is not a whole number because it is a weighted average based on the relative abundances of isotopes, which can lead to fractional values.

List two key factors that are considered when calculating the average atomic mass of an element.

1. Factor 1

Mass of each isotope

2. Factor 2

Relative abundance of each isotope

Key factors include the mass of each isotope and the relative abundance of each isotope.

Part 2: Comprehension

How is the relative abundance of an isotope expressed in calculations?

undefined. As a fraction ✓

undefined. As a percentage

undefined. As a decimal

undefined. As a whole number

The relative abundance of an isotope is expressed as a fraction in calculations.

Why is the average atomic mass closer to the mass of the most abundant isotope?

undefined. Because it has the highest atomic number

undefined. Because it is the heaviest isotope

undefined. Because it contributes more to the weighted average ✓

undefined. Because it is the only isotope present

The average atomic mass is closer to the mass of the most abundant isotope because it contributes more to the weighted average.

Describe how the concept of isotopes is crucial in determining the average atomic mass of an element.

Isotopes are crucial in determining the average atomic mass because they provide the different mass values that, when weighted by their abundances, yield the average.

Part 3: Application and Analysis

If an element has two isotopes with masses 10 amu (20% abundance) and 11 amu (80% abundance), what is its average atomic mass?

undefined. 10.2 amu

undefined. 10.8 amu ✓

undefined. 11.0 amu

undefined. 10.5 amu

The average atomic mass can be calculated using the weighted average formula, resulting in 10.8 amu.

Given the isotopes of chlorine, Cl-35 (75% abundance) and Cl-37 (25% abundance), which steps are involved in calculating the average atomic mass?

undefined. Convert percentages to decimals ✓

undefined. Multiply each isotope's mass by its abundance ✓

undefined. Add the products ✓

undefined. Divide by the number of isotopes

The steps include converting percentages to decimals, multiplying each isotope's mass by its abundance, and adding the products.

Calculate the average atomic mass of an element with isotopes of masses 12 amu (50% abundance) and 14 amu (50% abundance). Show your work.

The average atomic mass is calculated as $(12 \text{ amu} * 0.5) + (14 \text{ amu} * 0.5) = 13 \text{ amu}$.

Part 4: Evaluation and Creation

What does the average atomic mass tell us about the isotopic composition of an element?

undefined. The number of isotopes

undefined. The most common isotope

undefined. The relative abundance of isotopes ✓

undefined. The total number of neutrons

The average atomic mass indicates the relative abundance of isotopes within an element.

Which of the following factors could affect the average atomic mass of an element?

undefined. Changes in isotopic abundance ✓

undefined. Discovery of new isotopes ✓

undefined. Changes in atomic number

undefined. Variations in neutron number

Factors that could affect the average atomic mass include changes in isotopic abundance and the discovery of new isotopes.

If a new isotope of an element is discovered with a significantly different mass, what is the most likely effect on the average atomic mass?

undefined. It will decrease

undefined. It will increase

undefined. It will remain the same

undefined. It will become unpredictable ✓

The average atomic mass will likely change, either increasing or decreasing depending on the mass of the new isotope.

Evaluate the following scenarios and determine which could lead to a change in the average atomic mass of an element:

undefined. A change in isotopic abundance due to environmental factors ✓

undefined. The element being used in a nuclear reaction

undefined. The element forming a compound

undefined. A new isotope being artificially created ✓

Changes in isotopic abundance and the creation of new isotopes can lead to a change in average atomic mass.

Propose a method for determining the average atomic mass of an element with unknown isotopic abundances. Discuss the steps and tools you would use.

A method could involve mass spectrometry to measure isotopic masses and their relative abundances, followed by calculations to find the average atomic mass.