Basic Atomic Structure Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the basic building block of matter?

undefined. A) Molecule
undefined. B) Atom ✓
undefined. C) Compound
undefined. D) Element

The basic building block of matter is the atom.

Which of the following are components of an atom's nucleus?

undefined. A) Electrons
undefined. B) Protons ✓
undefined. C) Neutrons ✓
undefined. D) Photons

The nucleus of an atom contains protons and neutrons.

Define the term "atomic number" and explain its significance in identifying an element.

The atomic number is the number of protons in an atom and determines the element's identity.

List the charges associated with the following subatomic particles:

1. Proton:
Positive

2. Neutron:
Neutral

3. Electron:

Negative

Protons have a positive charge, neutrons have no charge, and electrons have a negative charge.

Which statement best describes isotopes?

undefined. A) Atoms with the same number of protons and electrons but different numbers of neutrons.
undefined. B) Atoms with the same number of neutrons but different numbers of protons.
undefined. C) Atoms with the same number of protons but different numbers of neutrons. ✓
undefined. D) Atoms with different numbers of protons and electrons.

Isotopes are atoms with the same number of protons but different numbers of neutrons.

Part 2: Application and Analysis

If an atom has an atomic number of 8 and a mass number of 16, how many neutrons does it have?

undefined. A) 6
undefined. B) 8 ✓
undefined. C) 10
undefined. D) 16

The atom has 8 neutrons.

Which of the following scenarios will result in the formation of a cation?

undefined. A) An atom gains an electron.
undefined. B) An atom loses an electron. ✓
undefined. C) An atom gains a proton.
undefined. D) An atom loses a neutron.

A cation is formed when an atom loses an electron.

Describe how the concept of isotopes is applied in carbon dating.

Carbon dating uses the decay of carbon-14 isotopes to estimate the age of organic materials.

Which of the following best explains why isotopes of the same element have different physical properties?

undefined. A) Different numbers of electrons
undefined. B) Different numbers of protons
undefined. C) Different numbers of neutrons ✓
undefined. D) Different electron configurations

Isotopes have different physical properties due to their different numbers of neutrons.

Analyze the following statements and select those that accurately describe the relationship between atomic number and chemical behavior.

undefined. A) Higher atomic numbers always mean more reactive elements.
undefined. B) Elements with similar atomic numbers often have similar chemical properties. ✓
undefined. C) The atomic number determines the number of electrons in a neutral atom. ✓
undefined. D) Elements with the same atomic number have identical chemical properties. ✓

The atomic number determines the number of electrons and influences chemical behavior.

Part 3: Evaluation and Creation

Which statement best evaluates the role of neutrons in the stability of an atom?

undefined. A) Neutrons have no effect on stability.
undefined. B) Neutrons increase the stability by balancing the charge.
undefined. C) Neutrons contribute to stability by adding mass without charge. ✓
undefined. D) Neutrons decrease stability by adding unnecessary mass.

Neutrons contribute to stability by adding mass without charge.

Propose a hypothetical element with an atomic number of 120. Which of the following properties might it exhibit based on periodic trends?

undefined. A) High reactivity ✓
undefined. B) Low melting point
undefined. C) Metallic characteristics ✓
undefined. D) Non-metallic characteristics

A hypothetical element with atomic number 120 might exhibit high reactivity and metallic characteristics.

Design an experiment to determine the isotope composition of a sample of an unknown element. Describe the steps and methods you would use.

An experiment could involve mass spectrometry to analyze the isotopic ratios in the sample.