

Name _____

Elementary Exploration: Unraveling the Differences Among Elements

Open-Ended Response Answer Key

1. Understanding the toxicity of elements is crucial in ensuring the safety of products and the environment. For example, lead and mercury can be harmful when released into the environment, leading to health problems. Managing their disposal and exposure is essential. On the other hand, elements like iodine are essential for human health but can also be harmful in excess, highlighting the need for balance.
2. To determine the electron configuration of a new element, I would perform spectroscopic analysis and observe its behavior in chemical reactions. This information could reveal the arrangement of electrons in energy levels. Depending on its properties, the new element could find applications in various technologies, such as semiconductors or catalysts in industrial processes.
3. Elements can exist in different physical states at room temperature. For example, oxygen is a gas, mercury is a liquid, and sulfur is a solid. These states are influenced by the strength of intermolecular forces. Gases have weak forces, liquids have intermediate forces, and solids have strong forces. Factors like atomic size and molecular structure also play a role.
4. Isotopes of an element have different atomic masses because they contain different numbers of neutrons in their nuclei. For example, carbon-12 and carbon-14 are isotopes of carbon. This variation in atomic mass is important in fields like radiocarbon dating, where scientists use the ratio of isotopes to determine the age of organic materials.

