Learning Target (S5P1): I can read passages about chemical and physical changes and use the information gathered to answer multiple choice comprehension questions.

FSI Reading for Meaning: Chemical vs. Physical Changes

Matter is anything that has mass and takes up space. Scientists study matter by observing how it changes. Changes in matter can be grouped into two main categories: **physical changes** and **chemical changes**. Understanding the difference between these two types of changes helps scientists explain what happens to matter during everyday events.

A **physical change** happens when the form, size, shape, or state of matter changes, but the substance itself remains the same. No new substance is created. For example, when ice melts into water, the matter changes from a solid to a liquid, but it is still water. Tearing paper, crushing a can, or dissolving sugar in water are also physical changes. In many physical changes, the process can be reversed.

A **chemical change** occurs when one or more substances react and form a **new substance** with different properties. These changes often cannot be reversed easily. Signs of a chemical change may include a change in color, production of gas, formation of a solid (precipitate), release of energy such as heat or light, or a change in odor. Rust forming on iron and baking a cake are examples of chemical changes.

Sometimes it can be challenging to decide whether a change is physical or chemical. Scientists look for evidence of new substances forming. For example, when vinegar reacts with baking soda, bubbles form as gas is released. This gas did not exist before the reaction, so it is a chemical change. In contrast, when salt dissolves in water, no new substance is created, and the salt can be recovered by evaporating the water, making it a physical change.

By observing changes carefully and gathering evidence, scientists can classify changes in matter and better understand how materials behave in different situations.

1. Which observation provides the strongest evidence that a chemical change has occurred? (DOK 3)

A. A solid changes shape
B. A substance changes color and releases gas
C. A liquid freezes into a solid
D. A material is cut into smaller pieces

2. Which examples show chemical changes? (DOK 3) ***(Select all that apply.)***

A. Iron rusting
B. Ice melting
C. Baking a cake
D. Tearing paper
E. Vinegar reacting with baking soda

3. Why is dissolving sugar in water considered a physical change? (DOK 3)

A. The sugar disappears completely
B. Heat is released during the process
C. A new substance is formed
D. The sugar can be recovered by evaporating the water

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4. A student heats a metal spoon until it glows red, then lets it cool. Which explanation best describes the change? (DOK 4)

A. A chemical change because light was released
B. A physical change because the metal stayed the same substance
C. A chemical change because the spoon changed color
D. A physical change because heat caused a reaction

5. Which observations are signs of a chemical change? (DOK 3) ***(Select all that apply.)***

A. Formation of bubbles
B. Change in size
C. Release of heat or light
D. Change in state
E. New odor forming

6. Which scenario best shows evidence-based reasoning for identifying a chemical change? (DOK 4)

A. A student says it is chemical because it looks different
B. A student says it is physical because it happened quickly
C. A student observes gas formation and cannot reverse the change
D. A student observes melting and freezing

7. Which change would be hardest to reverse? (DOK 3)

A. Melting wax B. Crushing a soda can C. Freezing water D. Burning wood

8. A scientist is testing changes to determine which are physical. Which evidence would support a physical change? (DOK 4) ***(Select all that apply.)***

A. No new substance forms
B. The change can be reversed
C. Gas is released
D. The material keeps the same chemical properties

9. Why is baking a cake considered a chemical change? (DOK 3)

A. The ingredients change shape
B. Heat is added to the mixture
C. New substances with new properties are formed
D. The cake cools after baking

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10. Which conclusion is best supported by the passage? (DOK 4)

A. All changes that involve heat are chemical
B. Physical changes always happen faster than chemical changes
C. Chemical changes can be identified by evidence of new substances
D. Physical changes are more important than chemical changes

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