5-Minute Refresher: Chemical Reactions

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Chemical Reactions – Key Ideas

- New substances are formed when other substances react chemically.
- New substances will have different properties from the original substances.
- Atoms from the original substance are combined and rearranged into new substances; the number of atoms stay the same.
- In any chemical process, the mass remains the same
- Examples of chemical reactions include photosynthesis, rust, curdled milk, baking brad, rotting fruit, and “air” in airbags.

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Chemical Reactions – Prior Knowledge

- Students will likely be familiar with some evidence of chemical reactions, such as the emission of a gas or a color change.
- Students may be familiar with chemical reactions in cooking from popular media shows.
- With some prompting, students might be able to categorize physical and chemical properties.
- Students will likely be familiar with states of matter.

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Chemical Reactions – Learning Objectives for Grades K-3

- A substance may change when heated or cooled.
- Changes can be reversible (melting).
- Changes can be irreversible (baking a cake).

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Chemical Reactions – Learning Objectives for Grades 4-6

- Energy is required for chemical reactions to take place.
- Some reactions release energy and others store energy.
- A new substance with different properties may be formed when two or more different substances are mixed.
- The total mass of the substances does not change during a reaction.

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Chemical Reactions – Common Misconceptions

- A chemical change is irreversible.
  - **Reality:** Although most chemical reactions are not reversible, there are some that are. For example, in hydrolysis, electricity can cause water molecules to break down.
- The atoms of chemical reactions create completely new atoms.
  - **Reality:** During chemical reactions, atoms are transformed but completely new atoms are not created.

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Chemical Reactions – Common Misconceptions

- In a chemical reaction, the product is a mixture of the substances.
  - **Reality:** A mixture can be reversed in a chemical reaction. The process involves a change in chemical bonds. This change may release or require energy.

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Chemical Reactions – Additional Information

Evaluating when a change is reversible or irreversible can be challenging. Being able to explain and identify these changes help us understand the world around us. To learn more about chemical reactions, have students investigate :

http://www.siemensscienceday.com/activities/before_and_after.cfm

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