

STAAR Science Tutorial 13 **TEK 7.6B: Physical & Chemical Changes**

TEK 7.6B: Distinguish between physical and chemical changes in matter in the digestive system.

Physical Changes

- A **physical change** changes only the size, shape or state of matter of a substance without changing its identity or chemical formula.
- Examples of physical changes include cutting or folding paper, or chopping or sawing wood into smaller pieces. The identity of the substance (paper or wood) did not change, only the shape or size of the pieces.
- Changes in a substance's **state of matter** is a physical change. For example, when water (H_2O) freezes, changing from a liquid to a solid, or boils, changing from a liquid to a gas, the change is only physical, because the substance is still water.

Chemical Changes (Reactions)

- A **chemical change** is a reaction between two or more substances that produces new substances with properties different from the original substances.
- For example, when baking soda ($NaHCO_3$) is combined with vinegar ($HC_2H_3O_2$), three new substances are made: sodium acetate ($NaC_2H_3O_2$), carbon dioxide (CO_2) and water (H_2O).
- Another example is when an acid such as hydrochloric acid (HCl) reacts with a metal such as aluminum (Al). The result is hydrogen gas (H_2) and aluminum chloride ($AlCl_3$).

Physical & Chemical Changes in Digestion

- The digestive system in humans uses both physical and chemical changes to digest food.
- **Physical Changes**: In the **mouth**, teeth physically cut and grind food into smaller pieces during the process of chewing. In the **stomach**, food is mixed physically by the stomach's muscle contractions.
- **Chemical Changes**: In the **mouth**, **stomach** and **small intestines**, food is mixed with digestive **enzymes** which react with the food to break it into simpler substances.

- The salivary glands, liver and pancreas make digestive enzymes used in the mouth and small intestines.

Practice Questions

1. A _____ change changes only the size, shape or state of matter of a substance without changing its identity.
2. A _____ change produces new substances that are different from the original substances.
3. Examples of physical changes include _____ paper or _____ wood, and _____ or _____ water.
4. Examples of chemical changes include _____ wood or _____ food, and the reaction between an _____ and a _____.
5. In a human digestive system, chewing and stomach churning are _____ changes, while reactions with enzymes are _____ changes.