4th Grade Science

Week 5

Your Week at a Glance
• How Matter Changes • NGSSS: SC.4.P.9.1

Student Name:_____

Teacher Name:_____

School: _____

Name _____ Date _____

SC.4.P.9.1 Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.

How Matter Changes

Physical Changes

Matter can undergo physical changes as well as chemical changes. A **physical change** is a change in which a new substance is not formed. You can sand a rough wooden board with sandpaper. The board has a new texture, but it is still wood. The dust produced is simply tiny pieces of wood. This change does not make a new substance. You can tear paper, paint a wall, or cut a piece of fruit. These are all physical changes.

Chemical Changes

A **chemical change** is a change in which one or more substances are changed into entirely new substances. There are certain clues that tell you a chemical change may have occurred. If a change results in an odor, the change may be a chemical change that gave off a gas. If the change results in a change in color, the change many be a chemical change. If energy, such as heat or light, is given off, the change may be chemical.

Burning, rusting, and decay are common types of chemical changes that you may notice in daily life. Some changes to food made during cooking or baking are also chemical changes.

Burning

Burning is a common, and very useful, chemical change. For example, when you place wood in a fire, the wood heats up and burns. Substances that make up the wood combine with oxygen in the air. New substances form: ash, smoke, and gas. Gasoline is burned in a car's engine to make the car move, and coal is burned in a power plant to produce electricity.

Cooking and Baking

Cooking and baking provide many examples of useful chemical changes. Cooking an egg causes chemical reactions that change the color and texture of the egg.

Heating bread dough causes it to form a golden crust, and changes its texture. Heat a slice of that bread in a toaster, and additional chemical changes turn it a darker brown. Cake batter, when heated in the oven, turns into cake. When vegetables or meat are grilled, browning on the surface shows that a chemical change took place. The cooked foods may give off a pleasant smell—another clue a chemical change took place!

Name _____ Date _____

Rusting

Have you ever noticed a reddish brown substance on an old can, nail, or car? This substance is rust. Rust forms when iron is in the presence of water. Iron reacts with oxygen in the water to form a new substance.

Decay

Decay, or rot, occurs when organic materials—remains of plants and animals—begin to break down, or decompose. Bacteria and fungi are tiny organisms that cause decay. In nature, many of these tiny organisms can be found in soil.

Most of the new substances that form when materials decay go back into the soil. They can be used to provide nutrients for new plants. As the decaying materials break down and form new substances, they release a gas. This gas has a strong odor. A compost pile is full of plant matter that is decaying. It may smell funny, but the compost is great for the garden!

You might have seen decay in your own kitchen. Have you ever seen blue, green, or white fuzzy mold on bread, cheese, fruits, or vegetables? Mold is a fungus that causes decay. Decaying foods often have a stinky odor. The fuzz you see and the gas you smell show that new substances are forming.

Student-Response Activity

❶ Describe how to cook a food you enjoy, such as hamburgers, pizza, or muffins. Identify one physical change that takes place as this food is prepared. Identify one chemical change that takes place as this food is prepared. Explain your answer.

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Name _____ Date _____

❷ For each process identify an example of the chemical change that takes place.

Process	Example of Chemical Change
Burning	
Decay	
Rusting	
Cooking	

❸ What are some signs of decay? Is decay a physical or chemical change? Explain your answer.

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❹ Explain the difference between a physical change and a chemical change. What are signs of each change?

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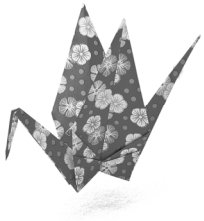
Benchmark Assessment SC.4.P.9.1

Fill in the letter of the best choice.

1. Which shows a chemical change?
   - Ⓐ cutting carrots into pieces
   - Ⓑ mixing sugar with water
   - Ⓒ baking cookies in the oven
   - Ⓓ freezing water into ice cubes

2. Which is a clue a chemical change has taken place?
   - Ⓕ change in shape
   - Ⓖ change in smell
   - Ⓗ change in mass
   - Ⓘ change in volume

3. Dina made this object.



Which is correct?

- Ⓐ This object is the result of a physical change, because a new substance was produced.
- Ⓑ This object is the result of a chemical change, because a new substance was produced.
- Ⓒ This object is the result of a physical change, because a new substance was not produced.
- Ⓓ This object is the result of a chemical change, because a new substance was not produced.

4. Which chemical change takes place in a pile of dead plant matter?
   - Ⓕ burning
   - Ⓖ cooking
   - Ⓗ decaying
   - Ⓘ rusting

5. Which substance is produced when a metal object turns orange-brown?
   - Ⓐ iron
   - Ⓑ oxygen
   - Ⓒ rust
   - Ⓓ water