Reading Science

Name: _____ Date: _____

Creating New Substances

1 We have learned that all matter has properties. Many of the properties we can observe with our senses. We can see the shape and color. We can feel the texture. Other properties we can measure. We can find the length or mass of an object. We can take the temperature.

2 The properties of matter also allow us to change the matter. When we change matter, the result can be a physical change or a chemical change. Matter that undergoes a physical change may be folded, cut, torn, or crumpled, but it is still the same matter. A piece of paper folded into a paper airplane, cut into paper dolls, torn into pieces, or crumpled before going in the trash is still paper. The matter's shape may be changed. A ball of clay that has been molded into the shape of a horse is still clay. A **physical change** is a change that does not result in a new substance.

3 When a **chemical change** takes place, the result is a new substance, and the change cannot be reversed. That same piece of paper that was folded, cut, torn, and crumpled but still remained paper will undergo a chemical change if we put a flame to it. The paper burns, heat and some light are produced, and it changes into ash. We have a new substance and cannot return it to the original matter. The clay shaped into a horse will have a chemical change if it is fired in a kiln, or pottery oven. If you dropped the unfired clay, it would flatten out on contact, a physical change. If you dropped the horse after it is fired, it would shatter into pieces because it had changed chemically due to the heat. The chemical change has changed the properties of the matter. Clay smashes; a ceramic horse crashes.

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4 The addition of heat isn't the only way to cause a chemical change. Exposing some materials to the oxygen in the air will cause a chemical change that is called **oxidation** in some forms of matter and **rusting** in others. Have you ever peeled a banana or cut into pieces an apple or a white potato? Did you notice anything changing as the food sat out for a while? The surfaces exposed to the air turned brown. This is called oxidation, and it is a chemical reaction to oxygen. Possibly you forgot and left an iron tool such as a screwdriver or a hammer, or even a handful of iron nails, outside for several days. When you remembered to bring it in, you may have noticed a reddish-brown material covering the surface, possibly even flaking off the item. A property of some metals is that they chemically react when exposed to oxygen and moisture and will rust. If allowed to continue rusting, the matter can disappear completely.

5 There is a third chemical change that can take place, and it is called **decaying**. This chemical change takes place when plant or animal materials decompose, or rot. If a tree falls in the woods and remains there untouched, it will go through the chemical change of decaying, slowly breaking down and disappearing into the soil. Composting is a recycling process that relies on decaying to make the chemical changes needed to turn vegetable tops, fruit peelings, and grass clippings into compost.

6 Chemical changes are taking place around us all the time. When you helped prepare a meal, you relied on the chemical change from heating to cook you food. The logs you placed on the fire went through a chemical change, producing heat and light and leaving ashes when the fire went out. See how many chemical changes you can observe.

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1. Why did the author write this article?
   A. To entertain the reader with stories about smashing clay horses
   B. To persuade the reader to start composting
   C. To inform the reader about chemical changes
   D. To warn the reader about leaving tools outside to rust

2. Which of the following is NOT an example of a chemical change?
   A. Decaying
   B. Rusting
   C. Cutting
   D. Burning

3. What is the purpose of paragraph 5?
   A. To explain the chemical change that takes place during oxidation
   B. To explain how heat causes chemical change to matter
   C. To explain the difference between physical and chemical changes
   D. To explain the chemical change that takes place during decaying

4. Another word for oxidation is—
   A. decaying.
   B. rusting.
   C. cutting.
   D. burning.

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5 Which activity uses a chemical change?

A. Frying eggs and bacon

B. Folding the sheets and towels

C. Boiling water

D. Melting ice cubes