Chemical Properties and Changes

**Chemical properties** describe how substances can form new substances. Combustibility, for example, describes how well an object can burn. Wood burns well and turns into ashes and other substances. Can you think of a chemical property of the metal iron? Iron rusts, especially when left outdoors in wet weather. The ability to rust is a chemical property of iron. The metal silver does not rust, but eventually a darker substance called tarnish forms on its surface.

The chemical properties of copper cause it to become a blue-green color when it is exposed to air. A famous example of tarnished copper is the Statue of Liberty. The chemical properties of bronze are different. Some bronze objects tarnish to a dark brown color.

Chemical properties can be identified by the changes they produce. The change of one substance into another substance is called a chemical change. A piece of wood burning, an iron fence rusting, and a silver spoon tarnishing are all examples of chemical changes. A chemical change affects the substances involved in the change. During a chemical change, combinations of atoms in the original substances are rearranged to make new substances. For example, when rust forms on iron, the iron atoms combine with oxygen atoms in the air to form a new substance that is made of both iron and oxygen.

A chemical change is also involved when an antacid tablet is dropped into a glass of water. As the tablet dissolves, bubbles of gas appear. The water and the substances in the tablet react to form new substances. One of these substances is carbon dioxide gas, which forms the bubbles that you see.

Not all chemical changes are as destructive as burning, rusting, or tarnishing. Chemical changes are also involved in cooking. When you boil an egg, for example, the substances in the raw egg change into new substances as energy is added to the egg. When you eat the egg, further chemical changes take place as your body digests the egg. The process forms new molecules that your body then can use to function.

The only true indication of a chemical change is that a new substance has been formed. Sometimes, however, it is difficult to tell whether new substances have been formed or not. In many cases you have to judge which type of change has occurred only on the basis of your observations of the change and your previous experience. However, some common signs can suggest that a chemical change has occurred. You can use these signs to guide you as you try to classify a change that you are observing.