

**SECTION**  
**1**

**Enrichment**

**Flow, Flow, Old Phlogiston!**

**Chapter**

**3**

Before Antoine Lavoisier developed the oxygen theory of burning and rusting, most scientists believed in the phlogiston (floh JIHS tuhn) theory. These two theories are briefly described below.

■ **Phlogiston Theory** Wood is made up of ash and a substance called phlogiston. When wood burns, it gives off phlogiston into the air, leaving the ash. Iron is made up of metallic ash (now called iron oxide) and phlogiston. When iron rusts, it gives off phlogiston into the air, leaving the metallic ash.

■ **Oxygen Theory** When wood burns, it combines with the oxygen in the air to form new substances—carbon dioxide, water, and ash. When iron rusts, it combines with the oxygen in the air to form a new substance, iron oxide. In both cases, the total mass of the original substance and the oxygen with which it combines with equals the total mass of the resulting substances.

1. Scientists tested the phlogiston and oxygen theories by burning wood in a closed container filled with either pure nitrogen or pure oxygen instead of air. (Air consists of 78% nitrogen, 21 percent oxygen, and 1 percent other gases.) The wood did not burn in nitrogen, but it burned vigorously in oxygen. Which theory do these results support? Explain.

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2. When iron rusts, the resulting substance has a greater mass than the original iron. With which theory does this result seem to agree? Explain.

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