Correspondence to the National Science Education Standards (NSES)

This unit relates to the following NSES physical science content standards in grades 5-8:

Properties and Changes of Properties in Matter

- "A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of sample."
- "Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties."
- Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced."

Transfer of Energy

- "Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of the chemical. Energy is transferred in many ways."
- "Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature."
- Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced."

This unit relates to the following NSES physical science content standards in grades 9-12:

Conservation of Energy and the Increase in Disorder

- "The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiation, and in many other ways. However, it can never be destroyed."
- "Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion."
- Everything tends to become less organized and less orderly over time. Thus, in all energy transfers, the overall effect is that the energy is spread out uniformly. Examples are the transfer of energy from hotter to cooler objects by conduction, radiation, or convection and the warming of our surroundings when we burn fuels."

Interaction of Energy and Matter

- "In some materials, such as metals, electrons flow easily, whereas in insulating materials such as glass they can hardly flow at all."