Matter and Energy Transformations

What the reviewers found in
Biology: A Community Context (South-Western Educational Publishing, 1998)

The chief elements that make up the molecules of living things are carbon, oxygen, hydrogen, nitrogen, sulfur, phosphorus, calcium, sodium, potassium, and iron.

Carbon and hydrogen are common elements of [is in] living matter.

Food provides the molecules that serve as fuel and building materials for all organisms.

Plants break down the sugar molecules that they have synthesized into carbon dioxide and water, use them as building materials, or store them for later use.

Plants make sugar molecules from carbon dioxide (in the air) and water.

Other organisms break down the stored sugars or the body structures of the plants they eat (or animals they eat) into simpler substances, reassemble them into their own body structures, including some energy stores.

Other organisms break down the consumed body structures of the plants they eat [breaking down these sugars], releasing some of the energy as heat.

Plants get energy to grow and function by oxidizing the sugar molecules. Some of the energy is released as heat.

Plants transfer the energy from light into "energy-rich" sugar molecules.

As in physical systems Energy can only change from one form into another.

Within cells are specialized parts for the capture and release of energy.

Arrangements of atoms have chemical energy.

An especially important kind of reaction between substances involves combination of oxygen with something else—as in burning or rusting.

Most of what goes on in the universe involves some form of energy being transformed into another. Energy in the form of heat is almost always one of the products of an energy transformation.

Different amounts of energy are associated with different configurations of atoms and molecules. Some changes of configuration require an input of energy whereas others release energy.

Within cells are specialized parts for the capture and release of energy.

No matter how substances within a closed system interact with one another, or how they combine or break apart, the total mass of the system remains the same. The idea of atoms explains the conservation of matter: If the number of atoms stays the same no matter how they are rearranged, then their total mass stays the same.

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At each link in a food web, some energy is stored in newly made structures but much [energy] is dissipated into the environment as heat. Continual input of energy from sunlight keeps the process going.

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