CHAPTER 5 Content Outline for Teaching

Energy

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

Section 1 What is energy?

A. **Energy** is the ability to cause change.

B. Energy from motion is **kinetic energy.**
   1. Kinetic energy increases as an object moves faster.
   2. Kinetic energy increases as the mass of an object increases.

C. Energy stored in an object due to its position is **potential energy.**

D. Energy comes in different forms.
   1. Energy that increases as temperature increases is **thermal energy.**
   2. **Chemical energy**—energy stored in chemical bonds
   3. **Radiant energy**—light energy
   4. Energy from electricity is **electrical energy.**
   5. The nucleus of an atom contains **nuclear energy**.

Discussion Question

How do kinetic energy and potential energy differ? Kinetic energy comes from motion; potential energy is stored energy from an object's position.

END

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Section 2 Energy Transformations

A. Energy is constantly changing from one form to another.

B. **Law of conservation of energy**—energy is never created or destroyed; it merely changes form

C. Energy can be transferred from kinetic to potential energy and back to kinetic.

D. Machines transform energy from one form to another.

1. Chemical energy can be transferred to kinetic, radiant, thermal, or electrical energy.
2. Electrical energy can be transformed to kinetic, chemical, electrical, or thermal energy.
3. Unlike other forms of energy, thermal energy is not easy to store.

E. A **turbine**'s kinetic energy is converted to electrical energy by a **generator** at a power plant.

Discussion Question

What form of energy is the most difficult to store? Thermal energy

END

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Section 3 Sources of Energy

A. Energy comes from either the Sun or from radioactive atoms in Earth.

B. Fossil fuels include oil, natural gas, and coal.
   1. Fossil fuels contain chemical energy from the Sun's radiant energy via photosynthesis.
   2. **Nonrenewable resources** such as fossil fuels are used up faster than they can be replaced.

C. Nuclear energy comes from the nuclei of uranium atoms.

D. Hydroelectricity from the potential energy of water is a **renewable resource.**

E. **Alternative resources** of energy may be safer for people and the environment.
   1. Solar energy can be captured in thermal collectors or **photovoltaic** collectors.
   2. Geothermal energy—thermal energy contained in hot magma
   3. Windmills can generate electricity without polluting the environment.

F. Conserving energy will help prevent energy shortages and allow fossil fuels to last longer.

Discussion Question

Why is it important to conserve energy? To prevent energy shortages and to stretch fossil fuel supplies

END