

Chapter 9

Energy: Forms and Changes

Section 3:
Conservation of
Energy

The background of the slide features a stylized illustration of three high-voltage power transmission towers. The towers are dark green and have a lattice structure. They are connected by several black power lines that stretch across the scene. The background is a gradient of colors, transitioning from a dark purple at the top to a bright orange and yellow at the bottom, suggesting a sunset or sunrise. A large, bright sun is visible in the lower center. Several blue lightning bolts are scattered across the sky, adding a dynamic element to the scene.



Essential Questions

- How is energy conserved in a closed system?
- What is the law of conservation of energy?
- What are some examples of how thermal energy is always a result of energy conversion?
- Why is perpetual motion impossible?



The Law of Conservation of Energy

- Energy can be neither created nor destroyed by ordinary means.
 - It can only be converted from one form to another.
 - If energy seems to disappear, then scientists look for it – leading to many important discoveries.



Where Does the Energy Go?

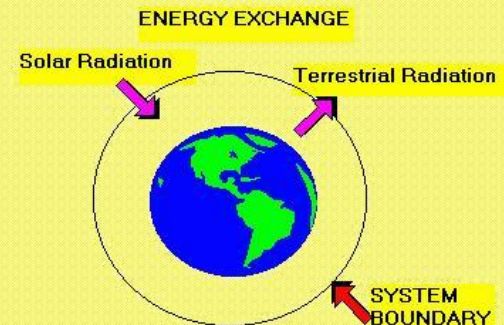
- Energy can not be lost.
- Roller coaster example: Some of the potential and kinetic energy is released as thermal energy because of FRICTION

A Closed System

- A closed system – a group of objects that transfer energy only to each other
- If all types of energy are added up, you can see none is lost, just changed

CLOSED SYSTEM

Example: The Earth





Law of Conservation of Energy

- Energy cannot be created or destroyed.
- The total amount of energy in a closed system is always the same.
- Any number of conversions could take place, though.



Thermal Energy

- Any time an energy conversion takes place, **some is converted to thermal energy**. This is why there is no such thing as perpetual motion.
- **This thermal energy is due to FRICTION.**

Energy Efficiency

- Energy efficiency is a comparison before and after conversion
- Energy conversions that waste less energy are efficient
- Aerodynamic cars are an example

