

SCIENCE  
**Fusion** Physical Science  
HOLT McDOUGAL

**PowerNotes**

**Unit 2 Lesson 1** Introduction to Energy

# Get Energized!

## What are two types of energy?

- **Energy** is the ability to cause change.
- Energy takes many different forms and causes many different effects.
- There are two general types of energy: kinetic energy and potential energy.



### What are two types of energy?

- **Kinetic energy** is the energy of an object that is due to motion. All moving objects have kinetic energy.
- The amount of kinetic energy an object has depends on its mass and speed.
- Kinetic energy increases as mass increases and as speed increases.



## What are two types of energy?

- **Potential energy** is the energy that an object has due to its position, condition, or chemical composition.
- Potential energy that is the result of an object's position is called gravitational potential energy.
- Gravitational potential energy increases as the object's height or mass increases.



## What are two types of energy?

- A change in the condition of an object affects its potential energy. Stretching a rubber band increases its potential energy.
- Chemical potential energy depends on chemical composition.
- As bonds break and new bonds form between atoms during a chemical change, energy can be released.



## Can objects have potential and kinetic energy at the same time?

- An object can have both potential and kinetic energy at the same time.
- A skater has kinetic energy as he moves down a ramp and potential energy due to his position on the ramp.



# In Perfect Form

## What forms can energy take?

- Kinetic energy and potential energy are two types of energy that can come in many different forms.
- Some common forms of energy include mechanical, sound, electromagnetic, electrical, chemical, thermal, and nuclear energy.
- Energy is expressed in joules (J).



## What forms can energy take?

- **Mechanical energy** is the sum of an object's kinetic energy and potential energy. It is the energy of position and motion.
- Sound energy is kinetic energy caused by the vibration of particles in a medium such as steel, water, or air.





## What forms can energy take?

- Electromagnetic energy is transmitted through space in the form of electromagnetic waves.
- These waves are caused by the vibration of electrically charged particles.
- Electromagnetic waves include visible light, X-rays, and microwaves.



## What forms can energy take?

- Electrical energy is the energy that results from the position or motion of charged particles.
- Chemical energy is a form of potential energy.
- The amount of chemical energy in a molecule depends on the kinds of atoms and their arrangement.



## What forms can energy take?

- The thermal energy of an object is the kinetic energy of its particles.
- The faster the molecules in an object move, and the more particles the object has, the more thermal energy it has.
- Heat is the energy transferred from an object at a higher temperature to an object at a lower temperature.



## What forms can energy take?

- The nucleus of an atom is the source of nuclear energy.
- When an atom's nucleus breaks apart, or when the nuclei of two small atoms join together, energy is released.



## What forms can energy take?

- What forms of energy can you identify in this pinball game?



# Space Weather and Technology

- Space weather includes any activity happening in space that might affect Earth's environment.
- Space weather can damage satellites and interrupt phone signals and signals to Global Positioning System (GPS) receivers.
- Auroras are caused by electrically charged particles of solar winds hitting Earth's magnetic field. They can interrupt airplane communications.



# Transformers

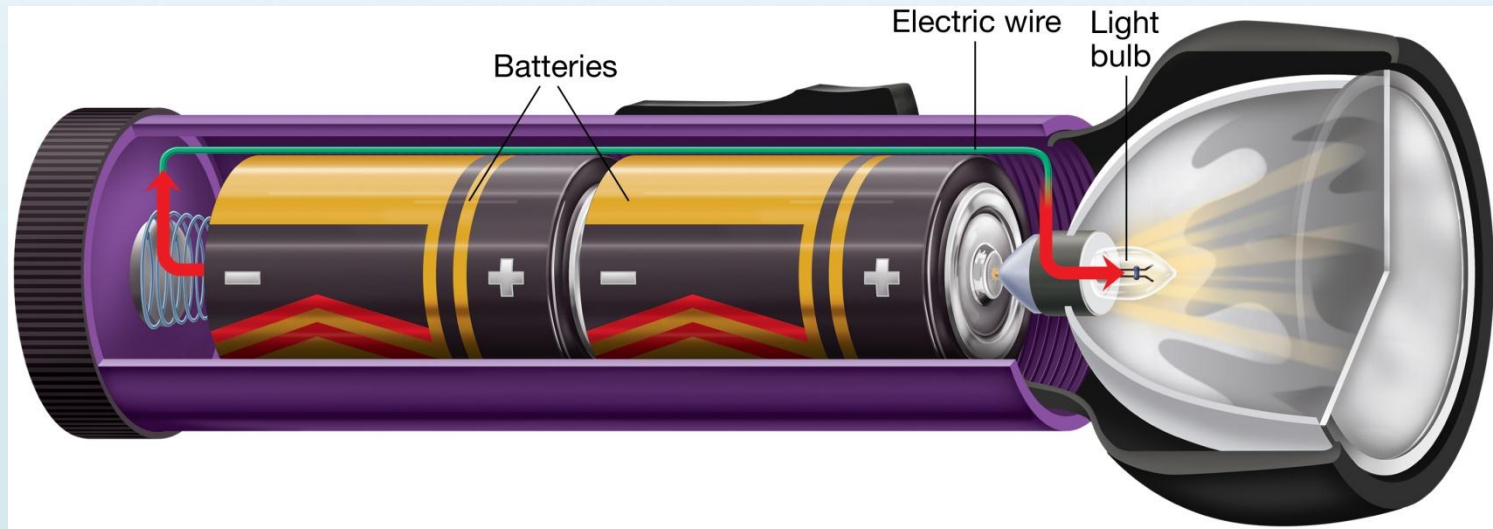
## What is an energy transformation?

- An **energy transformation** takes place when energy changes from one form into another form.
- Any form of energy can change into any other form of energy.
- Often, one form of energy changes into more than one form.



## What is an energy transformation?

- In a flashlight, chemical energy is transformed into electrical energy.
- The electrical energy is then transformed into light and thermal energy.





### Is energy conserved?

- A closed system is a group of objects that transfer energy only to one another. Energy is conserved in all closed systems.
- The **law of conservation of energy** states that energy cannot be created or destroyed. It can only change forms.
- All of the different forms of energy in a closed system always add up to the same total amount of energy.

