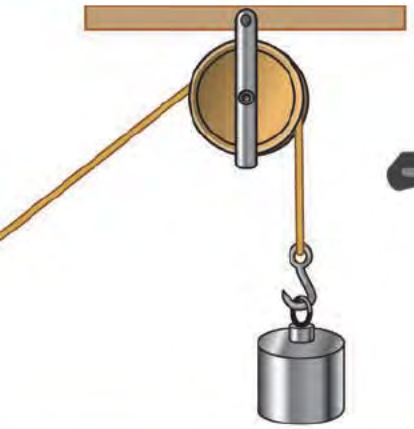
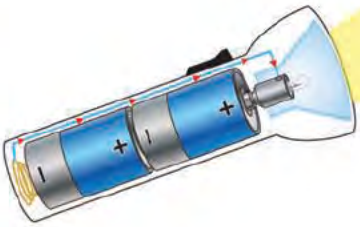
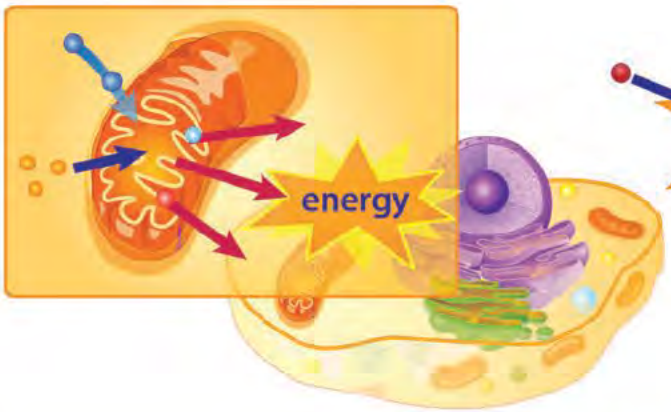
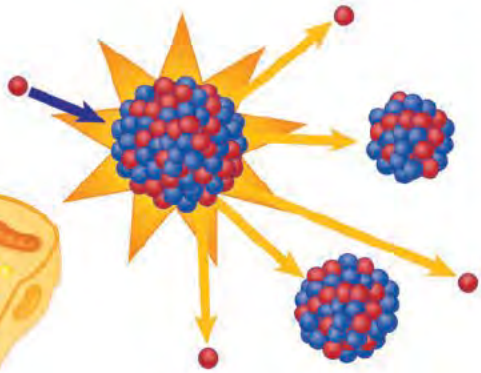
Energy: Forms & Changes
Learning Guide









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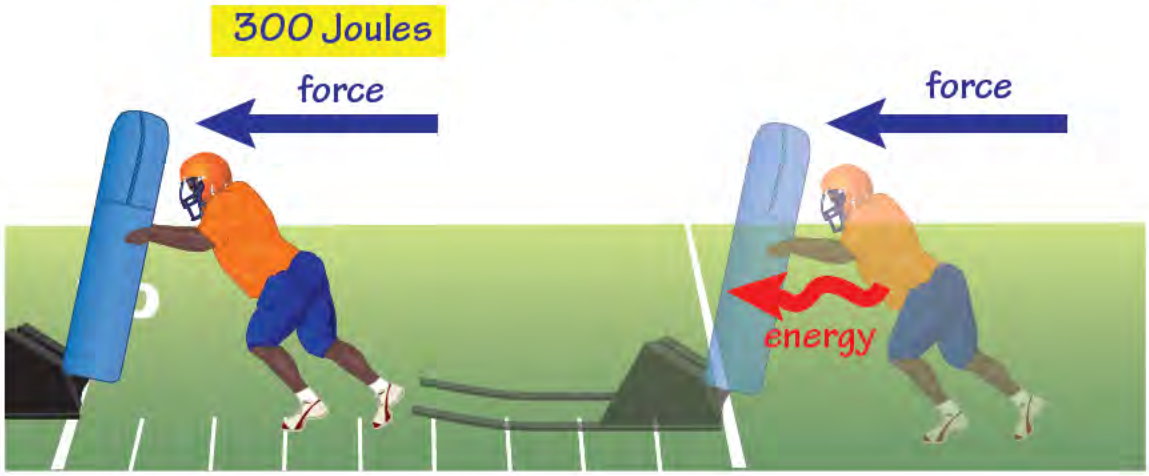
LESSON 1

INTRODUCTION TO ENERGY

What Is Energy?

Scientists define **energy** as the **ability to do work**. **Work** occurs when a force is exerted on an object and **causes the object to move**. In this example, the energy from the football player is transferred to the training equipment. The energy of an object is measured in **joules**.

energy = ability to do work



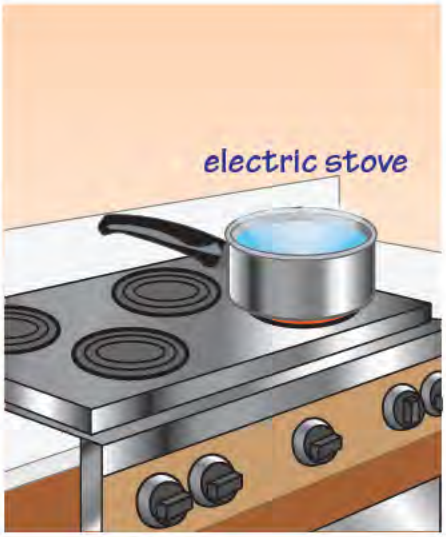
Energy, Work and Power

Power is the **rate at which work is done**, or **energy is transferred**. A lawn mower that can mow six lawns in an hour is more powerful than a lawn mower that can only mow two lawns in the same amount of time.

$$\text{power} = \frac{\text{work}}{\text{time}}$$

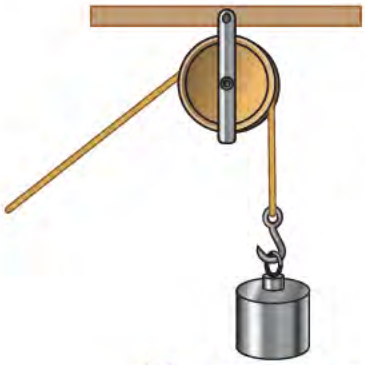
Similarly, a gas stove that boils water in four minutes transfers energy at a faster rate than an electric stove that boils water in seven minutes. The gas stove is more powerful than the electric stove. **Power** is measured in **joules per second**, or **watts**.

$$\text{power} = \frac{\text{joules}}{\text{second}} = \text{watts}$$



Types of Energy

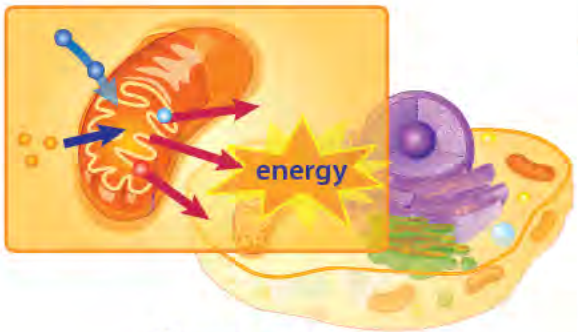
There are two types of energy, **potential** and **kinetic**. The energy that is stored or exists because of the **position of an object** is called **potential energy**. A soccer ball at rest, a parked car and a stretched rubber band are all objects that have **potential energy**. The energy of a **moving object** is called **kinetic energy**. Any object in motion has **kinetic energy**.



MECHANICAL

THERMAL

ELECTRICAL



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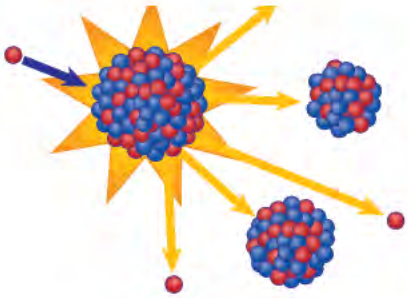

NUCLEAR

ELECTROMAGNETIC