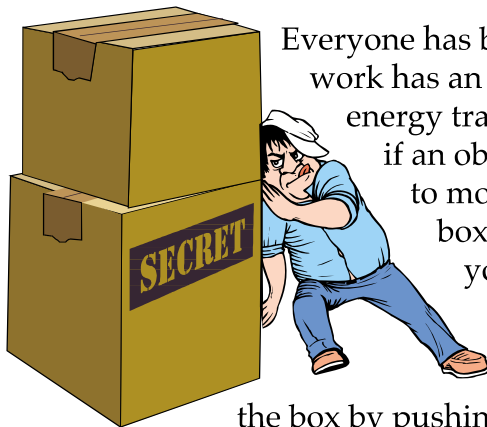


## Introduction

In this unit, you will begin to learn about physics. Physics is the study of how matter and energy are related.

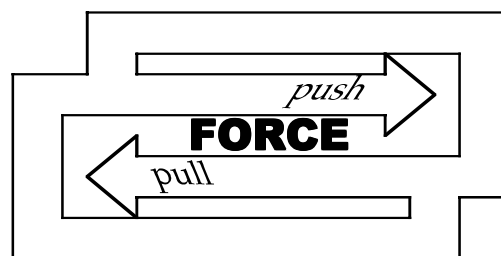
## Energy, Work, Force, and Power

What is energy? Look around you. Many things move. A door opens, the hands on the clock move, and a person jogs down the sidewalk. What makes them move? Energy! **Energy** can be defined as the ability to do work or cause change. Energy often produces motion.



Everyone has been told to “get to work.” In science, work has an important meaning. **Work** is the result of energy transferred to an object. Work is done only if an object moves. Imagine that you were told to move a large box. You push and pull the box for an hour, and it does not move. Have you done any work? No, because the box did not move.

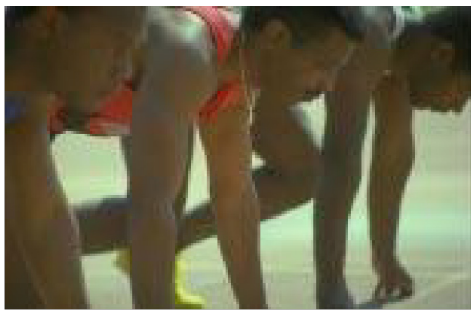
Think about the box. You tried to move the box by pushing and pulling. You used **force**. Force is either a push or a pull. Lifting is a form of pulling. It is difficult to think of a force that cannot be called a push or a pull.



**Power** is another measure that is related to energy, work, and force. Power is the amount of work that can be done in a given amount of time. The faster work is done, the greater the power. You probably have heard the term “horsepower.” It refers to the amount of work an average horse can do. This work was compared to the power of the steam engine. Today, it is common for the power of engines to be measured in horsepower.

## Potential and Kinetic Energy

There are two basic kinds of energy—potential and kinetic. Potential means stored. **Potential energy** is energy that has not been released. It is energy that is waiting to be used. A stretched rubber band has potential energy. A brick placed on the edge of a window sill has potential energy. What happens if the rubber band is snapped or the brick falls? The potential energy of the objects is changed into kinetic energy.



*Potential Energy*



**Kinetic energy** is the energy of motion. All moving objects have kinetic energy. If a moving object is stopped, its kinetic energy is made zero.

The object may then have potential energy.



*Kinetic Energy*



### Summary

Energy is the ability to do work. Work is done if an object moves. The push or pull on an object is defined as force. Power tells how much work can be done in a certain amount of time. Potential energy is energy at rest or waiting to be used. When an object is moving, it has kinetic energy. Energy can change back and forth between potential and kinetic energy.