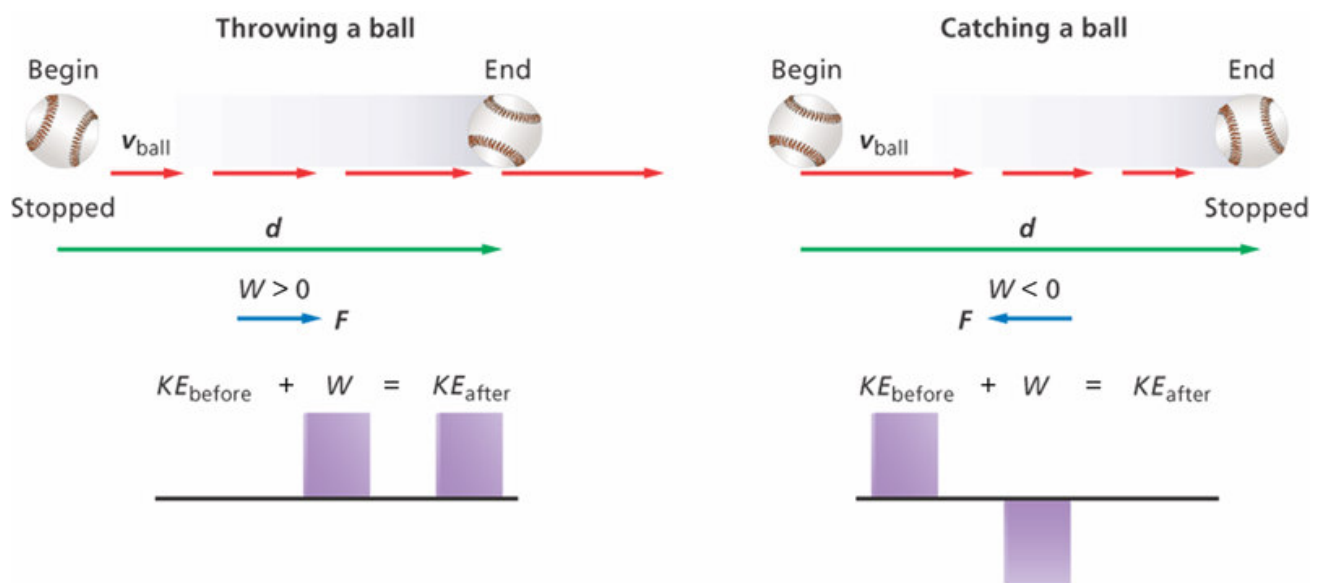


Chapter 11.1 Notes: *The Many Forms of Energy*



1. Key points:

- Energy is a property of an object that can change the object's position, motion, or its environment.
- When work is done on a system, the energy of that system changes
- Work-energy theorem: ($F\Delta d = \Delta E$)
 - *the net work done on an object is equal to its change in kinetic energy*
 - *if positive (+), then KE increases; if negative (-), the KE decreases*



- Work generally falls into 2 categories
 - Work done to change speed ($work = \Delta KE$)
 - Work done against another force ($work = \Delta PE$)

2. What is kinetic energy (KE)?

- Kinetic energy is energy in the form of motion
 - If mass is 2x → **KE** is 2x
 - If velocity is 2x → **KE** is 4x

$$KE = \frac{1}{2}mv^2$$

3. What is potential energy (PE)?

- Potential energy is **stored** energy
- Depends directly on its **POSITION** or **STATE** (*chemical, elastic, spring, etc*)
- If an object moves away from Earth, energy is stored in the system as a result of the gravitational force between the object and Earth...
- Depends on object's weight ($F_g = mg$) and distance away (h)
- **Gravitational potential energy** $PE = mgh$
- **Work** measures changes in potential energy

$$\text{work} = \Delta PE = PE_f - PE_i$$

- Must be measured from an arbitrary **REFERENCE LEVEL** (where PE is defined to be zero, usually Earth's surface)

