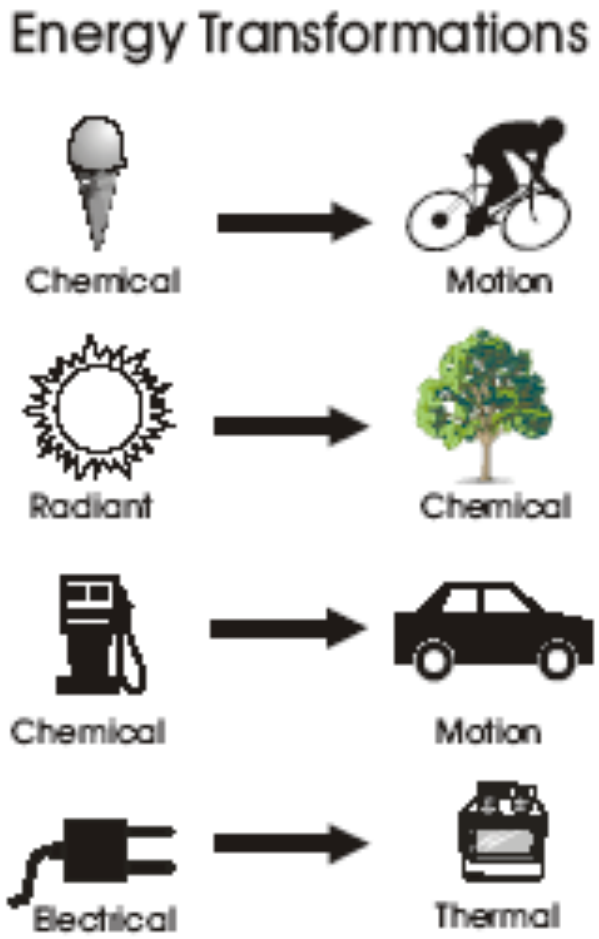
Conservation of Energy

Law of Conservation of Energy



- What you put in is what you get out
- Total energy is conserved

Practical Applications

- Gasoline converts to energy which moves the car
- A battery converts stored chemical energy to electrical energy
- Dams convert the kinetic energy of falling water into electrical energy

Can You Think of Other Examples?

Conservation of Mechanical Energy

$$\frac{1}{2}mv^2 + mgh = E$$

m = mass

v = velocity

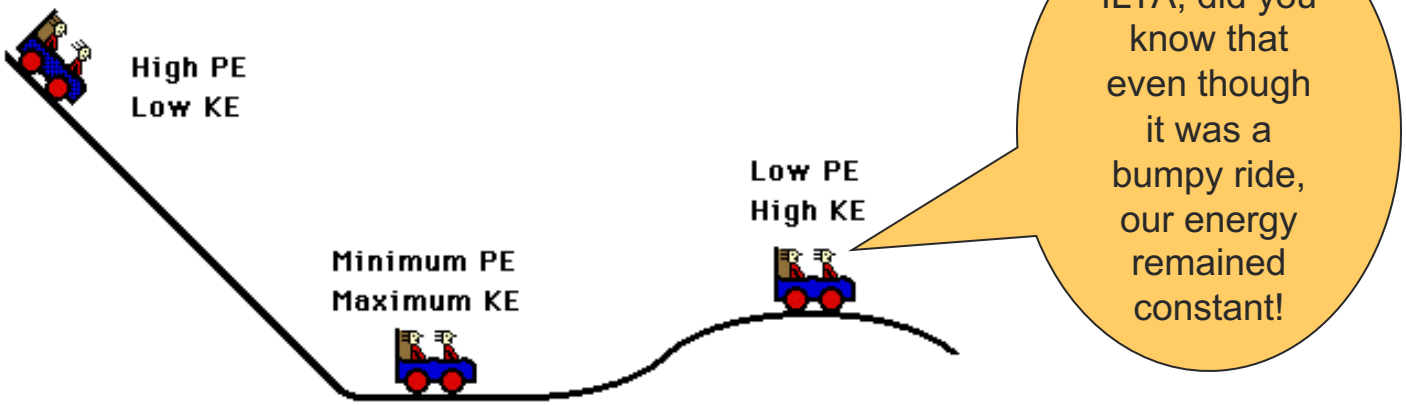
g = gravitational acceleration

h = height

Kinetic Energy

Potential Energy

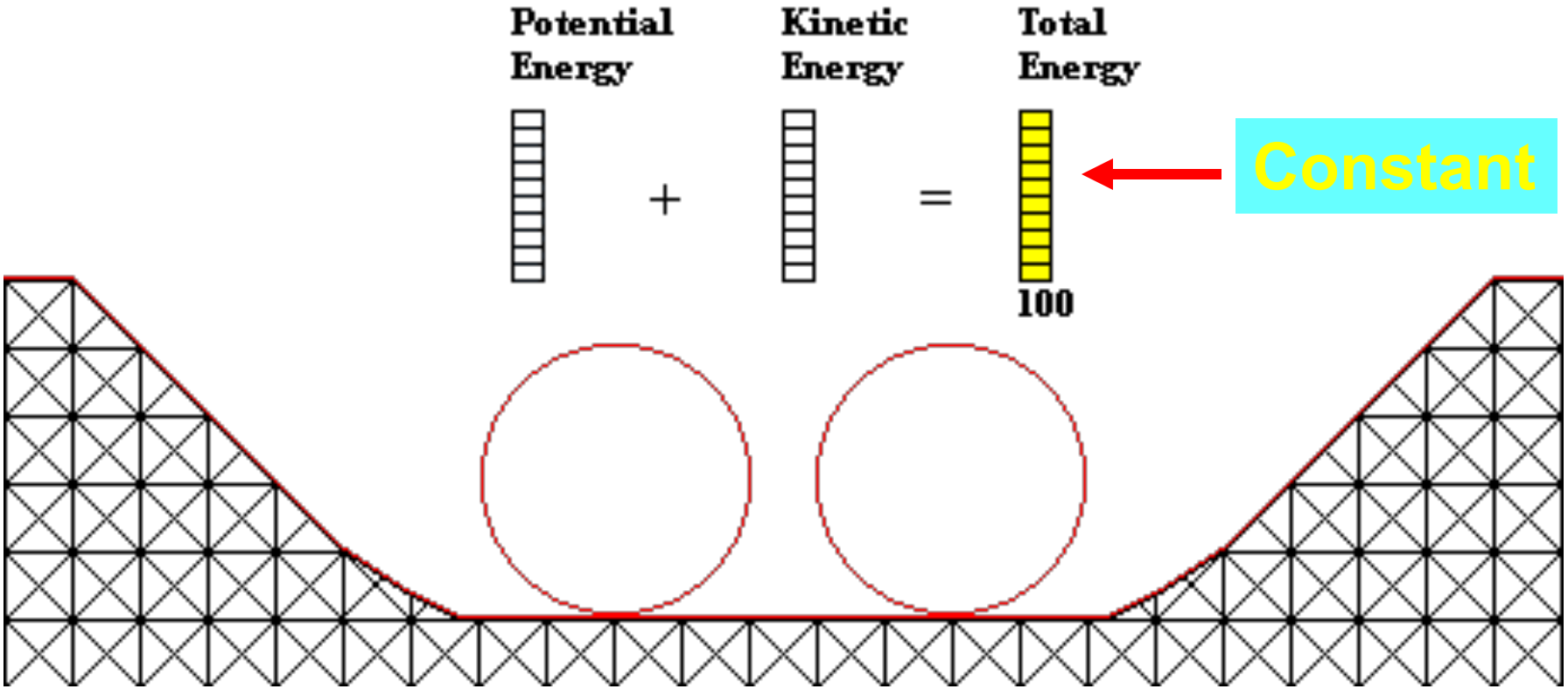
Total Energy



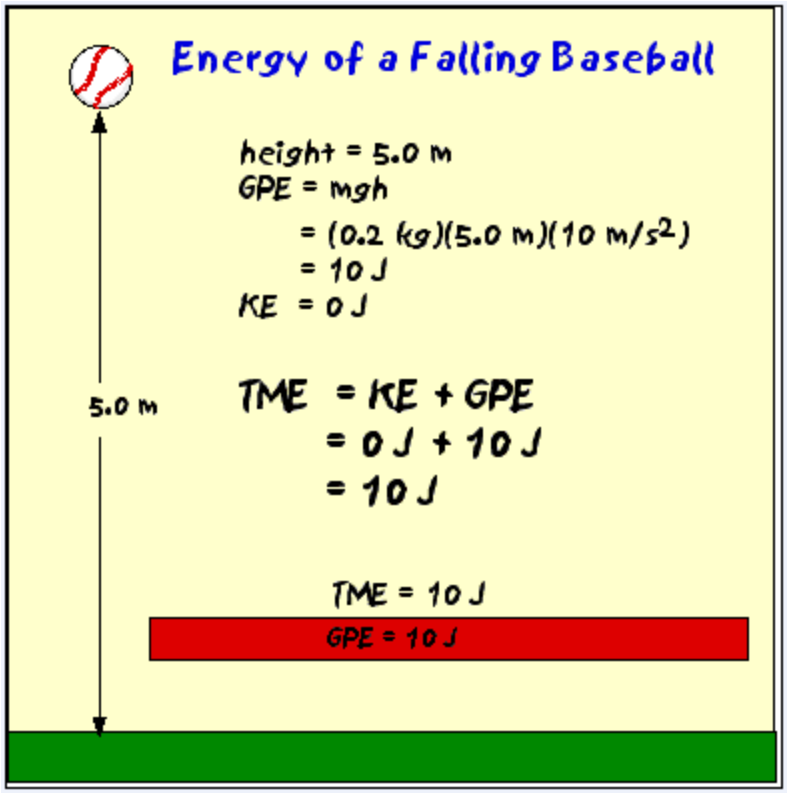
As a coaster car loses height, it gains speed; PE is transformed into KE. As a coaster car gains height it loses speed; KE is transformed into PE. The sum of the KE and PE is a constant.

Example of Conservation of Mechanical Energy

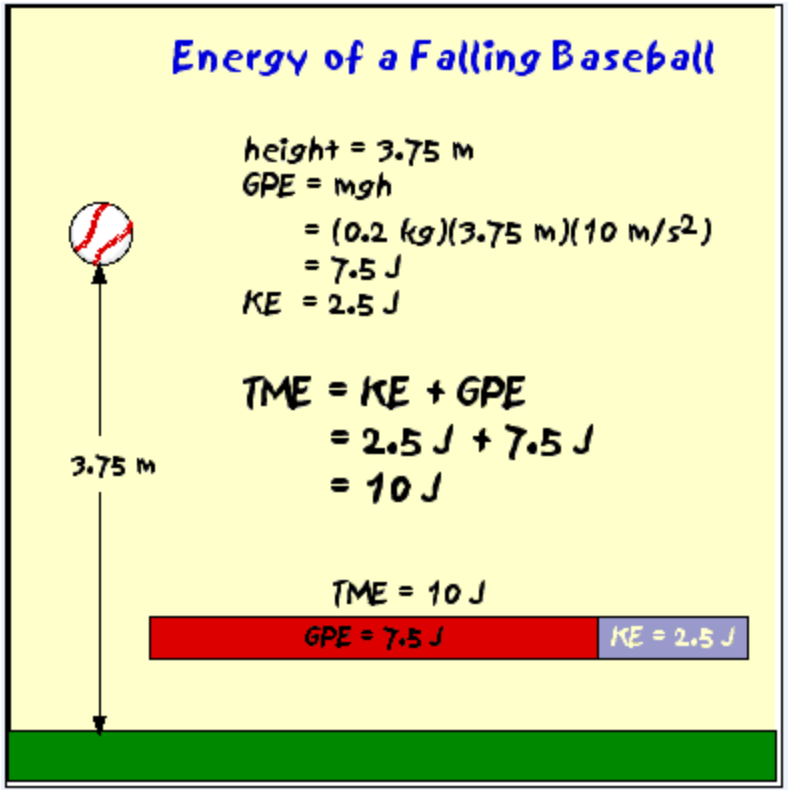
$$\frac{1}{2}mv^2 + mgh = E$$



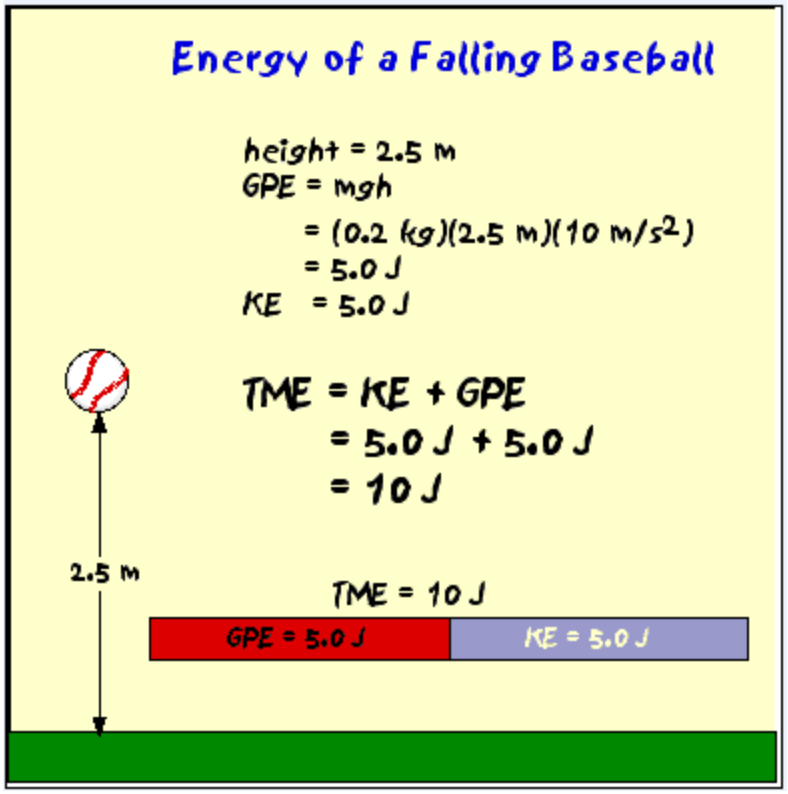
An Example


Energy of a Falling Baseball
height = 5.0 m
GPE = mgh
= (0.2 kg)(5.0 m)(10 m/s2)
= 10 J
KE = 0 J
5.0 m
TME = KE + GPE
= 0 J + 10 J
= 10 J
TME = 10 J
GPE = 10 J

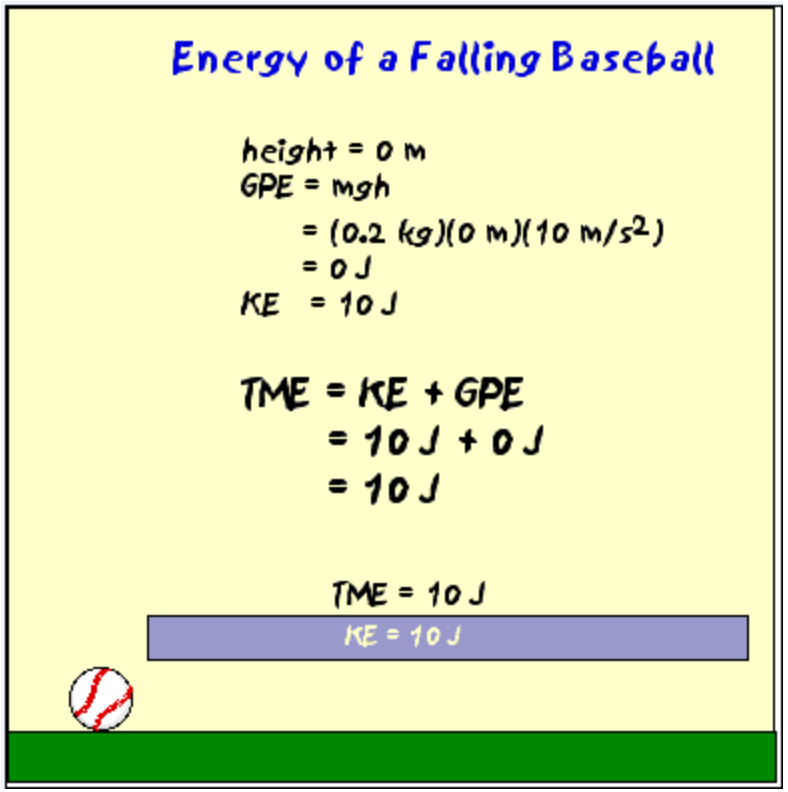
Another Example



Yet Another Example



Last Example



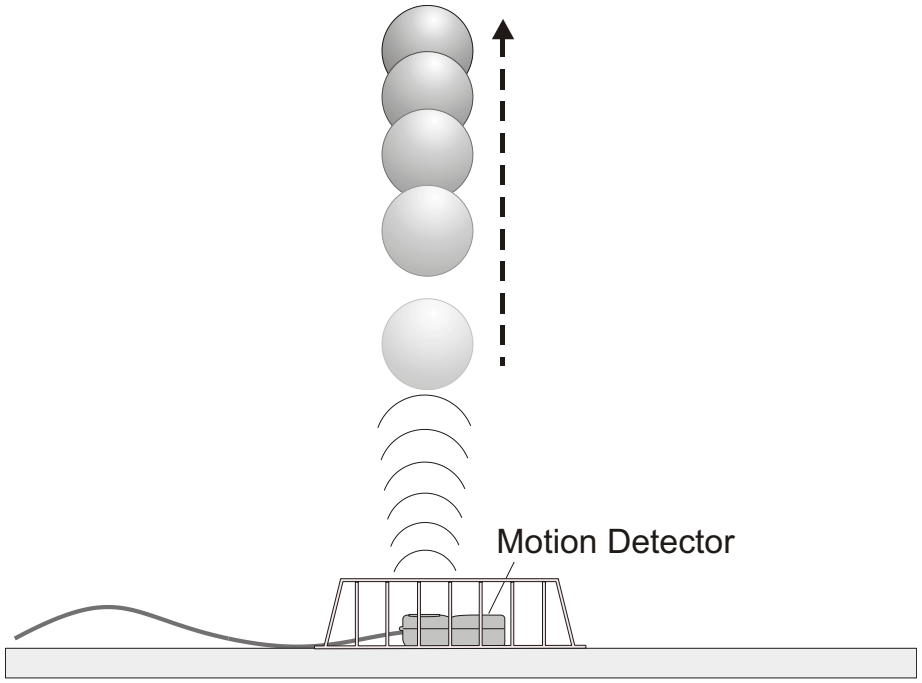
Conservation of Mechanical Energy using a Basketball

Instructional Objectives

- State the law of conservation of energy
- Define the components of Mechanical Energy
- Demonstrate the ability to solve problems using the law of conservation of energy

Lab Procedure

1. Place the motion detector on a flat surface, like in the diagram to the right
2. Toss a basketball above the ultrasonic sensor
3. The sensor will detect the position, velocity, and acceleration of the ball's flight



Lab Analysis

- Determine which line represents:
  - Kinetic energy
  - Potential energy
  - Total energy

References

- http://en.wikipedia.org/wiki/Conservation_of_energy
- http://www.slcc.edu/schools/hum_sci/physics/tutor/2210/potential_energy/
- Vernier Software and Technology