

Energy

- ★ Energy is defined as the ability to do work or cause a change in the direction, speed, shape or temperature of an object
- ★ When the work is actually being done, we term the energy **kinetic**
- ★ When the work is waiting to be done, when there is the *potential* for work to be performed, we term the energy **potential**
- ★ The amount of kinetic energy or potential energy is measured in **joules (J)**

Potential Energy

- ★ An object can store energy as the result of its **position**
- ★ An **increase in the weight** of an object result in an increase in the potential energy
- ★ An **increase in the height** to which an object is raised will result in an increase in the potential energy
- ★ Once the object is dropped, the potential energy **begins to decrease** due to reduced height
- ★ But we also now see an increase in kinetic energy because the velocity is also increasing
- ★ Potential energy comes from work having been done on an object which was then stored
- ★ Potential energy is energy due to position or stored energy
- ★ Potential energy is also called gravitational potential energy
- ★ We can store energy in an object in two simple ways:
 - By lifting it up - here the stored energy is called **gravitational potential energy (GPE)**
 - By stretching or squashing it - this is called **elastic potential energy (EPE)**
- ★ Potential energy can be calculated mathematically:
POTENTIAL ENERGY = (WEIGHT) (HEIGHT)
- ★ **Example:** By stretching a rubber band, you give it potential energy. A book on a shelf has stored potential energy. A baseball in a glove has potential energy

Potential Energy often turns into Kinetic Energy

- ★ Some of the energy is wasted as heat and sound
- ★ The amount of kinetic energy at the end is always less than the amount of potential energy you had to start with

Kinetic Energy

- ★ Kinetic energy is the **energy of motion**
- ★ Moving objects have energy
- ★ Kinetic energy is measured by **how much is work done to put an object in motion or to rest** (to stop the object from moving)
- ★ Mass and velocity both affect kinetic energy
- ★ Velocity more significantly determines kinetic energy the faster an object moves, the more kinetic energy it has
- ★ Kinetic Energy can be calculated mathematically:
 $KINETIC\ ENERGY = 1/2 (MASS) (VELOCITY)^2$
- ★ **Example:** When you are running, walking, or jumping, your body is exhibiting kinetic energy.

Kinetic and Potential Energy

- ★ A waterfall has both kinetic and potential energy
- ★ The water at the top of the waterfall has stored potential energy
- ★ As the water leaves the top of the waterfall, the potential energy is changed into kinetic energy