Potential and Kinetic Energy Review /21

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Gravitational Potential Energy**

* the energy **stored due to the height of an object**
* the energy (work) **required to lift an object to a certain height**
* **weight**, which is a force, is equal to **mass × acceleration due to gravity**

**EP = Fh**

**EP = mgh**

where: m = mass in kg

g = acceleration due to gravity = 9.81 m/s2

h = height in m

EP = gravitational potential energy in J

F = weight in N

## Example 1

What is the gravitational potential energy of a 63 kg base jumper on the edge of a cliff 450 m high?

## Example 2

How much work is done to lift a 5.0 kg hammer from the floor to a height of 2.0 m?

## Example 3

A student has a weight of 600 N. Calculate his potential energy if he climbs a ladder to a height of 3.5 m.

## Example 4

A crane uses 8.0 kJ of energy to lift a crate onto the roof of a building. If the crate has a mass of 125 kg, how high is the building?

**Kinetic Energy (EK)**

* energy of **motion**
* when potential energy is **released** it is converted into **kinetic energy**
* types:
  1. **mechanical EK**
  2. **thermal EK**
  3. **sound EK**
  4. **electrical EK**

EK = ½ mv2

where: m = mass in kg

v = speed in m/s

EK = kinetic energy in J

## Example 1

A skier has a mass of 79 kg and is moving at 12.3 m/s. What is her kinetic energy?

## Example 2

What is the speed of a 51.0 kg person who has 5500 J of kinetic energy?

## Example 3

Calculate the mass of a bullet that is traveling at 3.0 × 102 m/s and that has 2.0 kJ of energy.