The Law of Conservation of Energy

1. Energy cannot be created or destroyed, but only transferred from one form to another without any loss.

2. The energy of any closed system always remains the same.

*These are just different ways of saying the same thing!

Mechanical Energy: The sum of kinetic and potential energies.

Mathematically: $E_T = E_g + E_K$

Where: E_T = Mechanical Energy (J)

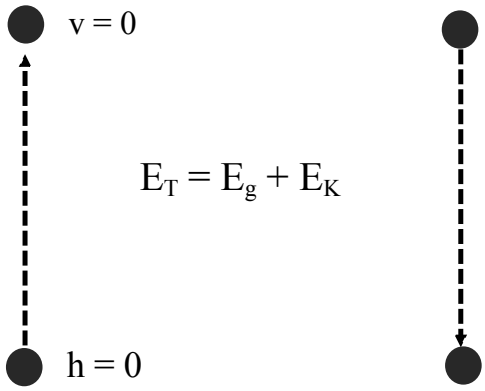
E_g = Gravitational Potential Energy (J)

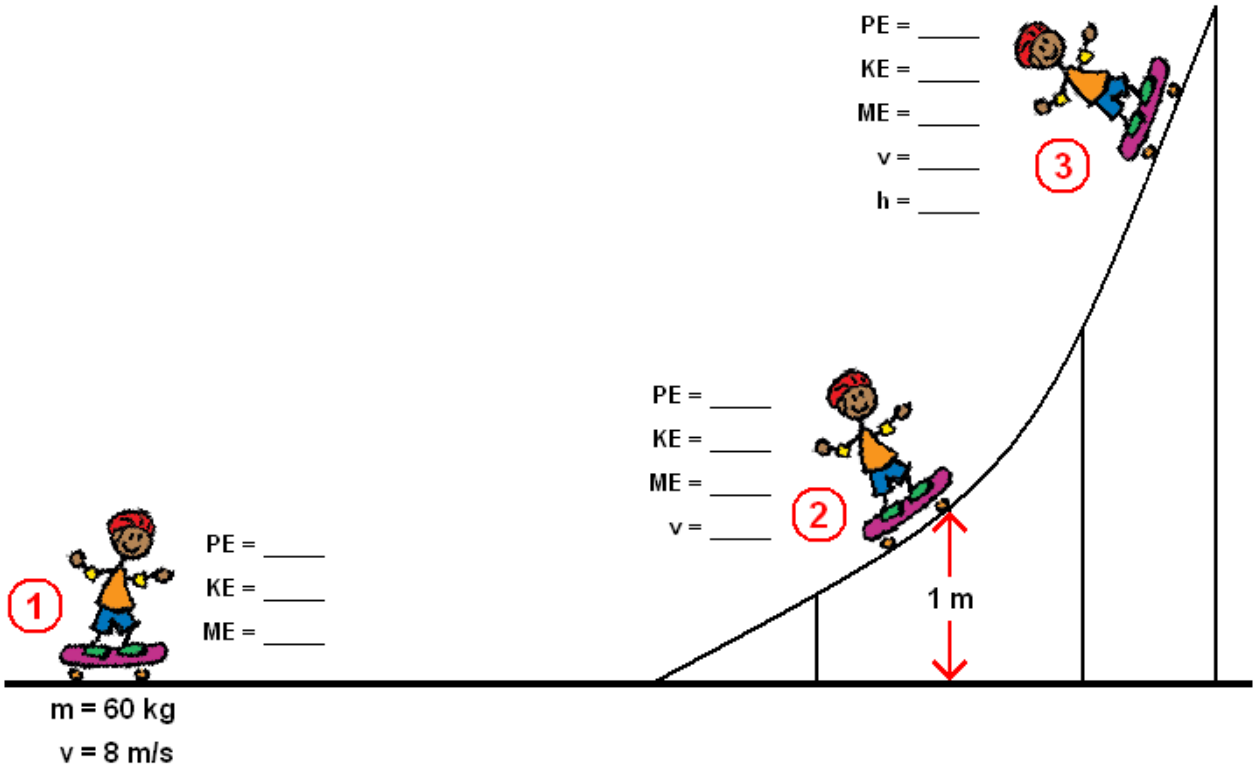
E_K = Kinetic Energy (J)

How does the law of conservation apply to Mechanical energy?

Since energy cannot be created or destroyed the mechanical energy of a system n remain constant.

For example, throwing a ball into the air.



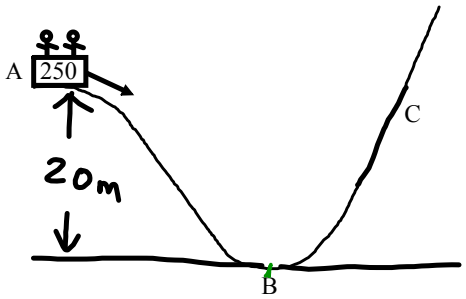

PE = _____
KE = _____
ME = _____
v = _____
h = _____
3
PE = _____
KE = _____
ME = _____
v = _____
2
1 m
1
PE = _____
KE = _____
ME = _____
m = 60 kg
v = 8 m/s

Ex 1: (Roller Coaster)
The roller coaster shown below has an initial velocity of 12.2 m/s and is at a height of 20 m above the ground. The combined mass of the cart and riders is 250 kg.

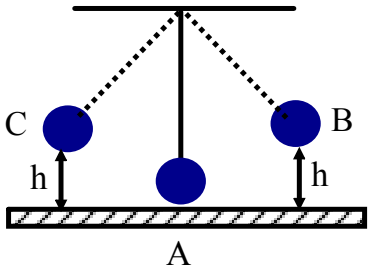
a) What is the total mechanical energy of the system?

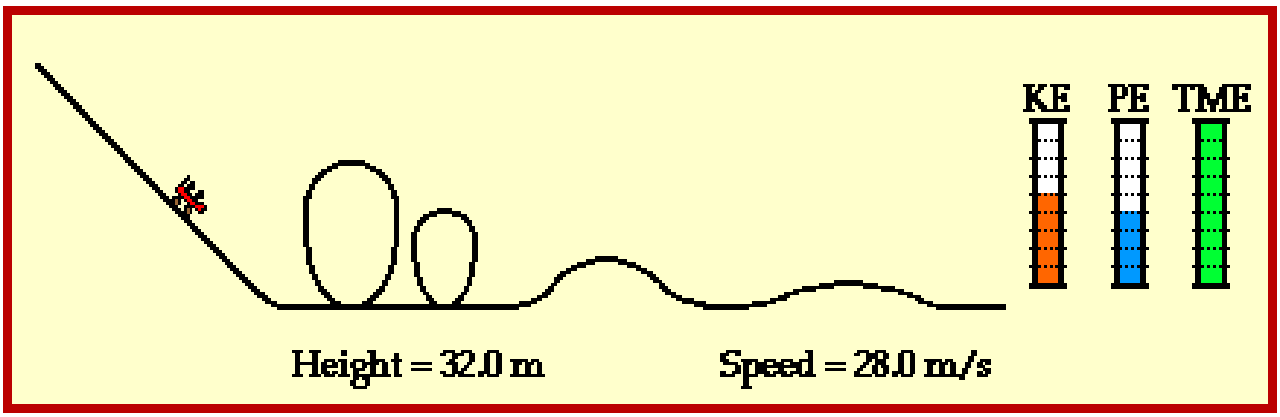
b) How fast is the cart going at point B?

c) How high up slope C will it go before it stops?

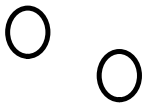


Ex 2: (Pendulum)
If a pendulum with a mass of 1.2 kg can reach a maximum height of 0.2 m, find it
maximum velocity




KE
PE
TME
Height = 32.0 m
Speed = 28.0 m/s

A 5.0g ping pong ball is dropped from a height of 2.0m. The ball loses 20% of its energy when it bounces. How high will it rise after the first bounce?



A child loses 15% of her energy as she comes down a slide that is 3.0m high. How fast is she going at the bottom?

An object loses 17% of its energy as it falls from a window 5.7m above the ground. What is its impact velocity?

Read p. 342 - 344

p. 348 #1
p. 374 #89, 90, 91, 92