Calculating Potential Energy

OBJECTIVES

In this experiment, you will:

- Learn about different types of energy
- Calculate the potential energy of several hot wheels cars in different track scenarios.
- Practice drawing force diagrams
- Learn how much a Joule of energy is.

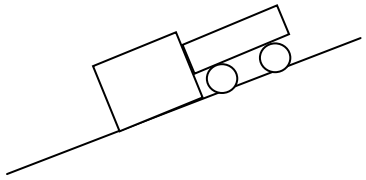
PRE-LAB QUESTIONS

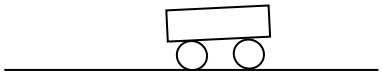
1. Watch the Eureka video on potential and kinetic energy. Write a definition for each below:

Potential energy:

Kinetic energy:

2. Observe the diagrams below. One car is sitting on a ramp and is being held in place by the block you see. Draw a force diagram for the car, showing all forces that would affect this car at rest, and the direction in which these forces would act. Do the same for the car on the flat ramp.





BACKGROUND

Potential energy describes the energy that is stored in an object due to its position. The formula for potential energy can be written one of two ways:

PE=Weight/Force x Height
(J) (N) (m)

PE=mass x g x height
(J) (kg) $9.8 m/s^2$ (m)

Weight in N

The force sensor measures weight in Newtons (N), and the digital scale measures mass in grams (g), which you can easily convert to kilograms (kg). You should be able to calculate potential energy using both of these formulas. We will use the second one in this lab.

PROCEDURE

1. Select 3 cars of different masses. Select one of those cars, and measure its mass in grams. Record this in the table below. Convert the mass to kilograms.
2. Measure the height of the car in cm at the 100 cm mark. You should measure this from the countertop to the car, as your teacher shows you. Record the height in the table below. Convert the height to meters.
3. Repeat steps 1-2 with the other 2 cars.
4. Put the car at the 60cm mark and repeat steps 1-3.
5. Put the car at the 20cm mark and repeat steps 1-3.

DATA

CAR #1	*MASS (G): _____*	*MASS (KG): _____*	
	HEIGHT (CM)	*HEIGHT (M)*	*POTENTIAL ENERGY (J)*
100CM MARK			
60CM MARK			
20CM MARK			
CAR #2	*MASS (G): _____*	*MASS (KG): _____*	
100CM MARK			
60CM MARK			
20 CM MARK			
CAR #3	*MASS (G): _____*	*MASS (KG): _____*	
100CM MARK			
60CM MARK			
20CM MARK			

QUESTIONS (PENCILS DOWN AND DISCUSS)

1. Which has a bigger effect on potential energy: mass or height? Why do you think so?
2. Think back to the penny drop Mythbusters we watched. Why would someone be concerned about being hit with a penny being dropped off of the Empire State Building in the first place?
3. How much is a Joule? Look at your calculated values for potential energy (in J) in the table above. Think of another object in the classroom at a specific height that you think might be one Joule of potential energy. Measure and show calculations to see if it is one Joule.