KINETIC & POTENTIAL ENERGY LAB

Purpose:

- To use previous knowledge of velocity to perform kinetic energy calculations
- To practice using a triple beam balance.
- To practice making accurate measurements involving time.
- To make calculations of gravitational potential energy.
- To determine what affects GPE and KE more.

Part one: Potential Energy:

Potential Energy is the mechanical energy of position. In other words, potential energy is how much potential something has to do work. The formula used to measure P.E. is:

P.E. = Mass x G x Height

Think about this and take a guess: how would the potential energy of an object be different on the moon?

_____

Instructions: Determine the gravitational potential energy in each situation below:

Object	Mass (g)	Mass (kg)	Location	Height	P.E.
Paperback Book			On Floor		
Paperback Book			On Desk		
Paperback Book			On Top of Tallest Group Member's Head		
Agenda/ Planner			On Floor		
Agenda/ Planner			On Desk		
Agenda/ Planner			On Top of Tallest Group Member's Head		
Beaker			On Floor		
Beaker			On Desk		
Beaker			On Top of Tallest Group Member's Head		
Matchbox Car			On Floor		
Matchbox Car			On Desk		
Matchbox Car			On Top of Tallest Group Member's Head		

The higher an object is off of the ground, the more/less (circle one) potential energy it has.

Would a matchbox car have more/less (circle one) potential energy on the moon than it does on the earth? Explain:

Part two: Kinetic energy

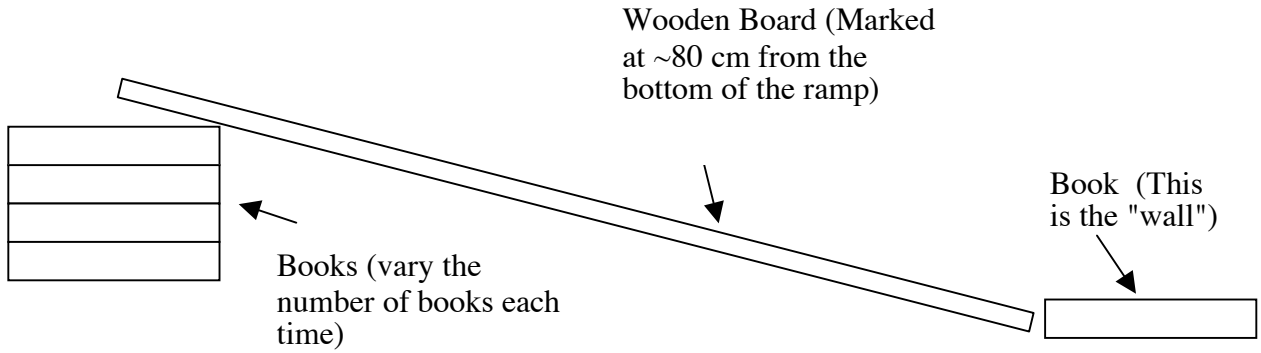
Kinetic Energy is the mechanical energy of motion. In other words, kinetic energy is how much work an object is currently doing. The formula for determining K.E. is:

$$\mathbf{K.E. = 1/2\ (m \times v^2)}$$

And the formula for measuring velocity/speed is:

$$\mathbf{V = D/T\ \ (D = distance\ (in\ meters);\ T = time\ (in\ seconds))}$$

You will set up a ramp similar to the one you set up in the second collision lab, except you will vary the height and angle of the ramp for each set of trials.



Fill in the data table on the following page to determine both the P.E. and K.E. for each situation. Remember, release the car with the front wheels a distance of 80 cm from the bottom each time you do a trial:

Experiment One: Ramp with Two Books:

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Experiment Two: Ramp with Three Books:

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Experiment Three: Ramp with Four Books:

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Experiment Four: Ramp with Five Books

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Wrap-up Questions:

1. The faster an object moves, the more _____ _____ it has.

2. The higher an object is off of the ground, the more _____ _____ it has.

3. Which has a greater effect on the kinetic energy of an object...mass or velocity? (circle one)

4. What scientific equipment do you need in order to calculate potential energy?

5. I did not ask you to measure the potential energy of the matchbox car in the second portion of the lab. Why wouldn't this have been an appropriate measurement?