Name _____ Class _____ Period _____

Popper

Lab 8.2

Purpose

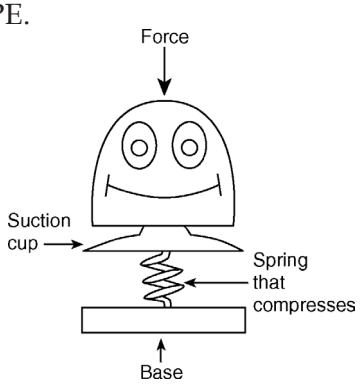
To investigate the relationship between kinetic energy and potential energy.

Required Equipment

- Assorted Poppers
- Meter Stick
- Balance

Discussion

The total mechanical energy of an object is the sum of its potential energy (PE) and its kinetic energy (KE). In the absence of friction, total energy is conserved. When a ball is shot straight up, the initial PE is defined to be zero and the KE = $(1/2)mv^2$, where m is the mass of the ball and v is the muzzle speed of the ball. When the ball reaches its maximum height, h, the final KE is zero and the PE = mgh, where g is the acceleration due to gravity. Conservation of energy gives that the initial KE is equal to the final PE.



The Setup

1. Obtain a popper from your instructor.
2. Find the mass of your popper in kilograms.

Mass of popper (kg): _____

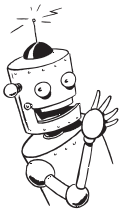
Jump Height

In this part of the activity you will be launching the popper vertically into the air and measuring its maximum height.

3. Devise a way of measuring the maximum height of the popper.
4. Depress the popper and perform a test run to see how high the popper will go.
5. When ready, carefully measure and record in data table A the maximum height the popper reaches.

Data Table A

Popper Color	Height (m)				Potential Energy (J)	Kinetic Energy (J)	Initial Velocity (m/s)
	trial #1	trial #2	trial #3	Ave Height			



Calculate Potential Energy

6. Using the formula bellow, calculate the maximum potential energy of the popper and record in data table A.

$$PE = mg\Delta h$$

Show your work:

Kinetic Energy

7. The kinetic energy was at a maximum as the popper let the table and then it's kinetic energy was converted into potential energy. From conservation of energy, the energy you start with is equal to the energy you end with; therefor, the kinetic energy at the popper is equal to the potential energy of the popper at its highest point. Record the kinetic energy in data table A

$$KE_i = PE_f$$

Calculating the Initial Velocity

8. Using the equation for kinetic energy, calculate the initial velocity of the popper as it left the table and record in data table A.

$$KE = \frac{mv^2}{2}$$

Show your work: