

## ***EXPERIMENT 7 SUPPLEMENTAL LAB***

### **Work & Energy**



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## ***Coefficient of Restitution***

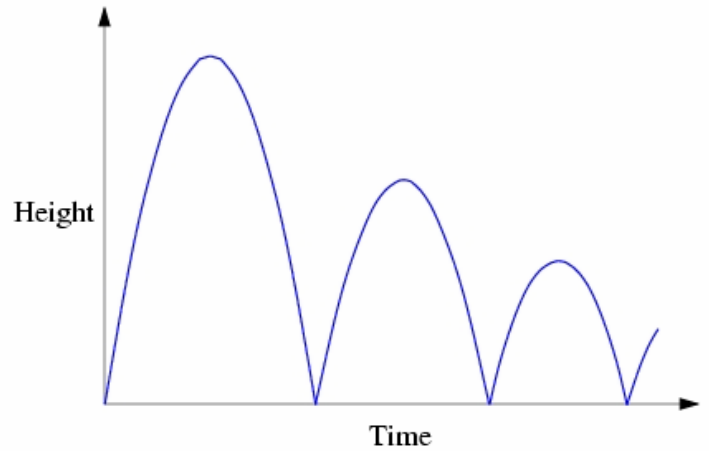
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The coefficient of restitution (COR) of an object represents the ratio of velocities before and after an impact. An object with a COR of 1 collides elastically, while an object with a COR of 0 will collide inelastically, effectively "stopping" at the surface with which it collides, not bouncing at all.

In this lab you will drop a ball and observe it bounce off your lab table. From energy conservation we know that as the ball falls it loses potential energy (height) and gains kinetic energy (speed). The coefficient of restitution

can be expressed as the ratio of the square root of the initial drop height to the rebound height:

$$COR = \sqrt{\frac{H_R}{H_D}} \quad \text{where } H_R = \text{rebound height and } H_D = \text{drop height}$$



### **Procedure:**

Select 2 balls provided by your lab instructor. Drop each ball 5 times (from the same initial height of 1 meter) and measure each rebound height using a meter stick. Record these measurements in the space below. Calculate the average rebound height and COR for each ball.

### **Questions:**

1. How did the coefficient of restitution compare for each ball?
2. Can an object have a COR of exactly 1? Why?
3. Energy is lost during each ball bounce. Where did it go?