Name:_____
Date:_____
Class/Period:_____

Introduction

Energy comes in many forms, including those that we have discussed in class. Connecting these forms of energy is the concept of conservation of energy. Even though energy cannot be created or destroyed, it can be converted between the different types. In this lab, we will be doing just that as visualized by the use of a pogo stick.

Section 1: Finding k for the spring

Using Hooke's Law, determine the value of the pogo's spring constant (N/m). Discuss as a group how to perform this and run this by your teacher. Then write the approved procedure down here, along with your calculations.

Spring constant: k = _____ N/m

Section 2: Energy Determinations

In this section, group members will be divided into jobs. The "rider" will stand on the pogo, while two "boppers" will push the rider up and down. One or two other members "measurers" will take measurements that will allow you to calculate the potential energy stored in the pogo stick's spring. *You will find the percent energy converted from elastic potential energy to gravitational potential energy.*

Tips:

- The rider cannot help to lift the pogo. He/she should be deadweight.
- The boppers need not push hard. If they do, the pogo will bottom out and a loud click will be heard. If that happens results will not be accurate.
- The boppers should think of themselves as spotters that are keeping the rider vertical.
- The measurers need to position themselves so that their eyes are level with the collar of the pogo, but several feet back from the pogo.

Data

Collar location	Trial #1	Trial #2	Trial #3	Average
Uncompressed Height (m)				
Low (m)				
High (m)				

x = change in spring length = uncompressed height – low = _____ m

Δh = height gained after final compression = high – low = _____ m

Calculations

Potential energy stored in the spring ($U=1/2\ k\ x^2$)

Potential energy against gravity ($U_g=mg\Delta h$)

Percent energy convered (U_g/U_s x 100%)

Questions

1. When you calculated the percentage of energy converted, why was the answer not 100%?
2. If a squeaky pogo stick were oiled, what would happen to your results?
3. What would happen if you had different people be the rider without recalculating the spring constant? What would happen if the second person was heavier or lighter?
4. If a lab group allows the rider to jump freely on the pogo stick, they can get results of up to 600% How is that possible? *Hint: If this has happened, your lab group must redo their lab. See your teacher to reschedule a time.*