DROPPED BALL MINI PROJECT

Each group will turn in one Microsoft Word (or equivalent) document containing an energy model of a dropped ball along with some extra details (see What to Include in the Document).

Read through the following: Your primary goal is to find the energy of a ball being dropped from rest, at three different points during the fall:

A. At rest, at its highest point, at the beginning of the fall
B. Roughly halfway down
C. At its fastest point, just before the ball hits the ground

You will need to make the following measurements:

- Record the mass of the ball
- Drop a bouncy ball from rest from a certain initial height and record its position and velocity with the green Motion Detector. The Motion Detector tells you the position of the top of the ball. You may need to take this data multiple times if the ball leaves the field of the motion detector. Do NOT put the motion detector too close to the ball at any time (within 0.2m) or your data will be ALL WRONG.
- The height of the Motion Detector above the ground.

You will need the following equations

- Gravitational Energy: $E_g = mgh$
- h = (height of the Motion Detector above ground) - (position data from Motion Detector)
- Kinetic Energy: $E_k = \frac{1}{2}mv^2$

The indicators are given in equation form for Eg, and Ek, meaning you can calculate them exactly for different times if you know the variables in the equation at those times.

****

What to Include in the Document:

1. The mass of the ball.
2. Draw and label an energy pie chart for each of the 3 instants in time above (A, B, C). Divide the total energy (the entire circle) into proportionate segments where each segment is one of the energy types mentioned above (Eg, Ek). Proportion the slices of the pie by what percentage each energy type is of the total energy - this means, if there is 0J of a specific energy type you do not need to include a segment or label for it (you will start with Ek = 0J).
   a. For each of the 3 pie charts (A, B, C), write the numerical value for each of the non-zero energy types in Joules.
   b. For each of the 3 pie charts (A, B, C), write the specific numerical value for the height in meters (m) and speed in meters/second (m/s)
   c. For each of the 3 pie charts (A, B, C), next to the label for each pie chart, write the system's total energy in Joules (the sum of Eg and Ek).