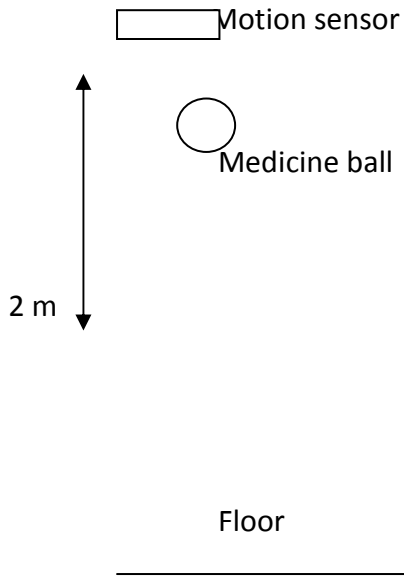
Conservation of Energy with the



1. Connect the motion sensor to your computer. Open the LoggerPro file called "cons of energy.cmbl" (available on Moodle https://courses.imsa.edu/mod/resource/view.php?id=21223). Place your hand on the face of the motion sensor and zero it.

2. Have one student hold the motion sensor 2 m above the floor pointed straight down. Have another student hold the medicine ball directly below the motion sensor. Click "collect" and drop the ball straight down.

3. Be sure the run is "good". There should be a linear portion of the velocity graph and a parabolic portion of the position graph. Highlight the linear portion of the velocity graph.

4. The corresponding data in the data table will be highlighted. Copy and paste this data into the appropriate cells of the self-check spreadsheet. https://courses.imsa.edu/mod/resource/view.php?id=21224 (NOTE that the column labeled "h-ball" is the height of the ball above the floor. NOTE ALSO that there are more rows on the self-check spreadsheet than you will need. Just ignore the blank rows.)

5. Record the mass of the medicine ball (printed on the ball) in the self-check spreadsheet.

6. Use Excel formulas to calculate the kinetic energy, the potential energy, and the total energy of the ball at each position.

7. On a single chart, graph the KE, PE and total energy versus height above the floor.

8. Describe the shape (linear, quadratic, etc) and trend (increasing, decreasing, etc.) for ALL three energy curves on your graph. Explain why each trend makes sense.

9. Do a linear curve fit for the PE curve. Compare the slope to the *weight* of the medicine ball. Explain why these are similar.

10. Paste in your Excel self-check spreadsheet cells and your graph below.