

NRG lab

Purpose: To investigate the relationship between the kinetic energy and the gravitational potential energy of a bouncing ball.

Set-up: For this lab you will need to set up a motion detector with your GLX interface. Configure the Data Studio display appropriately; think about what information you need to calculate an object's gravitational potential energy **and** kinetic energy. You will also need to obtain a large bouncy ball.

Data Collection: Have one group member hold the motion detector in the air so that it is aimed at the floor. Have another group member drop the ball so that it falls directly underneath the motion detector. Your third group member should start and stop the data collection. Do a couple of test trials to improve your technique; also try the different beam settings on the motion detector (cart or person) and determine which gives the best result.

Your goal is to obtain the best graph(s) possible for the entire motion of the ball from the time it drops until it comes to rest, or at least 4 complete bounces.

Once you have a quality graph (graphs), use it (them) to determine the kinetic energy and gravitational potential energy at five points during the bounce. Those points could be: one third of the way to the top of the bounce; two thirds of the way to the top of the bounce; at the top of the bounce; one third of the way back down; and two thirds of the way back down.

Record these energy values in a clearly labeled and easy to understand data table. Report this same data for a total of three (3) consecutive bounces.

Discussion:

Describe what happens to the potential energy and kinetic energy of the ball as it goes through one bounce.

What happens to the total energy of the ball as it goes through one bounce? Include data for at least one bounce to support your claim; be sure to reference the data and describe what it shows. It is not enough to simply provide a table or list some numbers!

What happens to the total energy of the ball from one bounce to the next? Why do you think this happens? Again, include data for at least two consecutive bounces to support your claims, be sure to reference the data and describe what it shows. It is not enough to simply provide a table or list some numbers!