

Lab Experiment: Speed of Ball vs. Change in Height Name _____

Block _____ **Date** _____

Purpose: Determine the relationship between the change in height as a ball rolls down a ramp, and the speed of the ball as it leaves the ramp.

Materials: Include the materials you use, and how many or much of each one.

Procedure: (GENERAL)

Note: You will need to rewrite this procedure in your lab report, using numbered steps which direct the reader to do exactly what you did when you performed the lab.

You will also need to make a sketch of the setup for your experiment, so you can include a drawing of it in your lab report.

The ball will be released from a specific point low on the ramp. You will need to calculate or measure the change in height between the point at which the ball is released and the point at which the ramp ends. Measure the speed of the ball as it moves along the flat surface beyond the ramp. You will need to measure the speed of the ball from eight different heights on the ramp.

Data and Results:

The data are all the observations you make, and the numbers you measure, during the lab.

The results are any calculations or graphs you make from the data. In this lab, your results will include the table of speeds, and the graph of speed vs. height fallen. The table and the graph must be included in the lab report document (usually a Microsoft Word document.)

Conclusion:

- 1) Why are you able to include (0,0) on the graph of speed vs. height fallen?
- 2) What sort of best fit line would fit your data – a straight line, or a curve?
- 3) Use your best fit line or curve to interpolate one point which was not calculated directly from your data, and to extrapolate one point which was not calculated directly from your data.
- 4) Describe in one or two sentences the relationship between the speed and the height fallen.
- 5) Why would it not be realistic to extrapolate your data to predict the speed of a ball which had rolled down a ramp which was 100 meters long and 20 meters high?

Challenge/Bonus:

- 1) Make a separate table of the square of the speed. Graph v^2 vs. height fallen, and plot a best fit line.
- 2) Calculate the slope of the line, and figure out the equation which relates v and h .

Your lab report will be due Tuesday, September 22. The lab report must be in electronic format, which means you will need to use a computer here at school, at your public library, or at home to work on it. In addition to making one printout of the lab report, you will submit the lab report electronically on the Moodle website for Conceptual Physics B.