

AP Physics: Tennis Ball Rebound Prediction

Challenge: Using your own data, create an equation that can be used to predict the rebound height of a tennis ball (first bounce) dropped from any given drop height.

Materials:

- Tennis ball
- Meter stick
- Video recording of some kind
- Computer with excel or some other graphing program
 - Would not use Google Sheets – cannot display a trendline equation

Data Collection:

- Using your meter stick against a flat, plain wall, drop the tennis ball from the heights below. Record the height of the first rebound bounce.
- Be consistent with your measurements – measure the same part of the tennis ball over and over again.
- Use a video recording device of some kind (phone, flip camera, etc....) to record the bounce. Eye-balling it is very difficult.
- Your measurements may be taken in centimeters.

Drop Height (cm)	Rebound Height (cm)
100	
90	
80	

**Continue in 10 cm increments down to 0 cm.

Data Representation/Creating your Equation:

- Using Excel or any other preferred graphing program, create a graph of your data with the drop height as the independent variable and rebound height as the dependent.
- Add a line of best fit (trendline). Determine what kind of line best fits your data.
- The equation for the line of best fit or at least the slope for the line of best fit should be used in your equation you create to predict the rebound height of the ball dropped from any initial height.
- As part of your data, print out the graph you have created with the equation shown
- Have your equation ready to go for next class period – I'll give you a random drop height to test!