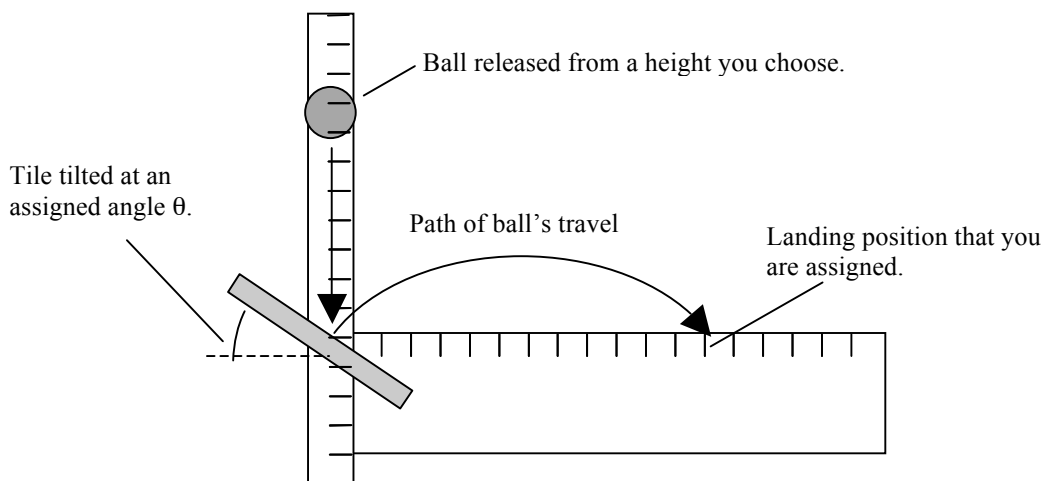# Lab: Catch the Ball, part 2   AP Physics
Coefficient of Restitution

Background
The Bouncing Ball Apparatus consists of a ceramic tile that may be tilted at any desired angle relative to the horizontal. A ball dropped from a given height will hit the tilted tile and bounce off at an angle, landing some horizontal distance away from the original impact point.

Ball released from a height you choose.

Tile tilted at an assigned angle θ.

Path of ball's travel

Landing position that you are assigned.

A schematic diagram of the Bouncing Ball Apparatus is shown here.

Problem
Based on research you perform and the description of the apparatus, devise:
1. a method for measuring the elasticity (specifically, the coefficient of restitution) of any given ball in general, and
2. a method for calculating *where*, horizontally, a ball bounced off "The Bouncing Ball Apparatus" will land.

You'll test your methods in class by:
1. receiving a randomly selected ball and testing it to determine its elasticity (using methods developed above).
2. receiving a randomly selected tile angle and distance and calculating what height you think the ball should be released from to land at that distance.
3. testing your solution with an actual bouncing ball apparatus.

Structure of Report
1. Name, Date, Names of Lab Partners, Name of Assignment
2. Purpose: State the task you are assigned
3. Materials: List the materials used
4. Procedure: Write a summary of the procedure you've created to solve this problem. This procedure should probably have two parts: one for finding the elasticity of the ball, and one for solving the specific "Bouncing Ball Apparatus" problem.
5. Data: Record ALL values that you measured. In a separate data table, record all values that you calculated.
6. Calculations: Show how you calculated any values that appeared in the calculations table above.
7. Conclusion/Analysis: State your results first, in one or two sentences. Then briefly discuss possible sources of error based on their likely effect on your data, including percentage error if appropriate.