

Lab 3: Momentum and Energy

Two-Dimensional Momentum Conservation

Consider the multiframe photograph of a collision of two billiard balls. Assume that the time interval between frames is 0.1 seconds. Do the measurements below reasonably carefully.

1. Choose a coordinate system. (A clever choice will make the problem a little easier.)
2. Determine the velocity vectors for each of the balls before and after the collision. Write the vector in component form.
3. Determine the momentum of the system before and after the collision. Write your answer in component form.
4. Is momentum conserved?

Roller Coasters

1. Take a look at the roller coaster apparatus. Answer the following questions before you start experimenting. Discuss as a group, and be sure to write down your hypotheses.
 - (a) At the end of which track will the ball be moving the fastest? Why?
 - (b) If a race were held, the ball in which track would get to the bottom the first? Why?
2. Now experiment and see if your hypotheses were correct. Discuss.

More Estimation Practice

Estimate the following quantities. Aim to get results accurate to within an order of magnitude (i.e., within roughly a power of ten.)

1. How many trucks cross from Canada into Maine every year?
2. How many piano tuners are there in the greater Boston area?
3. The total time, in years, that you have spent as a student in a classroom.