

Conservation of Mechanical Energy

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

What is your vertical distance from the table to the flat part of the ramp?

Kinematics

Complete the data table below. h_1 is the height through which the sphere descends while on the ramp.

Table 1

| Position | h_1 (cm) | Horizontal Distance d (cm) | | | | v_{kine} (cm/s) |
|----------|---------------|---------------------------------|---------|---------|---------|-----------------------------|
| | | Trial 1 | Trial 2 | Trial 3 | Average | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

Energy

Complete the data table below using the same values of h_1 as in Table 1.

Table 2

| Position | h_1 (cm) | v_{energy} (cm/s) |
|-----------------|----------------------------------|--|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

Comparison

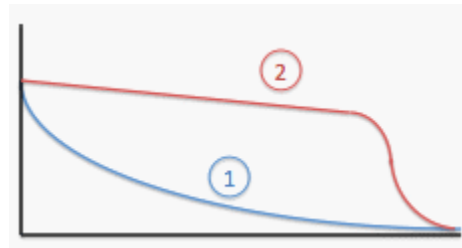
The following questions relate to the questions in the conclusion section of the lab instructions.

What are some of the sources of uncertainty in this lab that could have contributed to a discrepancy in the two data sets or to one or both of the calculations being too high or low? Specify which calculation method each source of uncertainty would contribute to, and whether it would tend to make the calculation too low or too high.

Considering all the sources of uncertainty you identified above, which method of calculation do you feel is likely to give a more accurate result? Consider how many sources of uncertainty each method might have and the magnitude of those uncertainties in your conclusion.

Questions

Consider a situation in which this experiment was redone using the two tracks in the figure labeled as tracks 1 (blue) and 2 (red). Assume the diagram is drawn to scale.



- (a) If a ball were released from the top (left side) of tracks 1 and 2 simultaneously, which ball would reach the end of the track first? Why?
- (b) Compare the speed a ball would have at the end of track 1 vs. at the end of track 2. Explain your answer.

- (c) Air resistance is a velocity-dependent force; that is, it gets stronger as objects move more quickly through the air. With this in mind, what would change about the answer to part (b) if a lightweight wooden ball were used instead of a heavy steel ball? Why?