

The Monkey and the Hunter

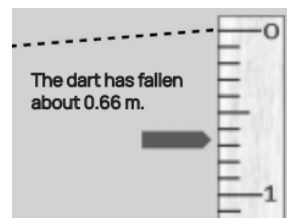
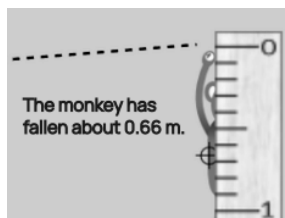
Part I: Introduction

In your web browser, navigate to www.gigaphysics.com, then select **The Monkey and the Hunter** lab. In this virtual lab, you will simulate a common laboratory demonstration in two-dimensional motion. You will fire your rifle at a monkey, while the monkey will start falling at the same time. (Don't worry. The "bullets" are only harmless foam darts, which also happen to be magically unaffected by air resistance.) As you explore how gravity affects your aim, you will gain an important insight into two-dimensional motion.

Part II: Measurements

Drag the rifle near the upper left of the lab area so that the rifle is firing roughly horizontally. Set the **Dart velocity** slider to something in the midrange (the exact value doesn't matter), and record this value for dart velocity in the table below.

Click the **Fire Dart** button. After the monkey has come to rest, move the **Elapsed time** slider anywhere you wish and record the time in the first free row of the table. Then drag the ruler into position to measure the vertical distance from the dotted line (the trajectory the dart would have taken if there were no gravity) to the dart, and enter it in the "Dart's fall" column of the table. Then measure the vertical distance the monkey has fallen by measuring from the end of the dotted line to the crosshairs on the monkey. Enter that value in the "Monkey's fall" column.



Rifle position: upper left		
Dart velocity:		
Time (s)	Distance dart dropped (m)	Distance monkey dropped (m)

Now move the **Elapsed time** slider to a different position, and again measure the dart's and the monkey's fall distances. Finally, finish the table by repeating these measurements for one more value of time.

Once you have completed the table on the previous page, click **Reset Monkey** to prepare for another trial. This time, drag the rifle to the lower center so that it is aiming upward toward the monkey. Then set the **Dart velocity** slider to a slowish velocity (again, the exact value doesn't matter.) Record the dart's velocity, and then fire the dart. Just as you did on the previous trial, measure and record the distance that the monkey and dart have fallen at three different times, and complete the chart at the top of the next page.

Rifle position: upper left		
Dart velocity:		
Time (s)	Distance dart dropped (m)	Distance monkey dropped (m)

Part III: Analysis and Conclusion

Can You Miss?

Now try different combinations of rifle position and velocity. See if you can find any combination that will cause you to miss the monkey. You don't have to measure any more distances, but use the space below to describe the combinations you tried, and whether any combination allowed you to miss the monkey (or at least miss the crosshairs).

Conclusion

Consider your attempts to miss the monkey, along with the measurements you took in Part II. Under what circumstances, if any, do you think it would be possible to miss the monkey? Most importantly, explain why you believe this is the case based on your measurements.
