

Name: _____

Date: _____

Lab – Projectile Motion – Effect of Mass

Objective: To use the horizontal speed of a ball leaving a ramp to predict where a ball will hit the floor.

Hypothesis: I predict the ball will hit the floor:

Trial 1 – _____ m away

Trial 2 – _____ m away

Trial 3 – _____ m away

Equipment:

ball ramp meterstick

Procedure:

1. Set up a ramp on a lab table making sure there is plenty of room for the ball to roll off the table and hit the floor.
2. Locate a position on the ramp. Mark it with tape and label it “predicted” so it can be certain that the release point is constant. Make sure the ball will roll across at least 20 cm of flat table before rolling off the table’s edge. Record the exact “ramp distance” below.
3. Obtain a ball. Record its mass in the table below.

For each ball:

4. Have a time keeper record the time it takes for the ball to travel from the bottom of the ramp to the edge of the table (the horizontal distance you measured before). Do not let the ball roll off the table.
5. Determine the vertical height the ball must fall to reach the floor.
6. Use this value to determine the time the ball spends in the air.
7. Finally, determine the horizontal distance the ball will travel. Measure this distance on the floor and mark it with tape. This is the predicted horizontal distance.
8. Roll the ball down the ramp from the release point marked in step 2. Mark the exact spot where it lands and label it “actual” because this is the actual horizontal range.
9. Repeat steps 4-8 two more times with balls of a different mass.

Data:

Mass of ball	_____	_____	_____
Ramp distance	_____	_____	_____
Time of ball rolling off table	_____	_____	_____
Horizontal speed	_____	_____	_____
Vertical distance ball will fall	_____	_____	_____
Time ball spends in the air	_____	_____	_____
Predicted range	_____	_____	_____
Actual horizontal range	_____	_____	_____

Analysis/Calculations:

Show the calculation for each trial:

1. Show how the horizontal speed was determined.
2. Show how the time spent in air was calculated.
3. Show how the predicted range was calculated.

Conclusion:

1. Describe in a paragraph what factors could cause the ball to have missed the mark.
2. Explain how the mass of the ball made a difference in your data.