

Speed and Acceleration Lab

Name: _____

Speed is defined as the distance an object travels per unit time. Speed can be expressed as km/hr, m/s and so on. In most cases, moving objects do not travel at a constant speed. The speed of an object usually increases and decreases as it moves. Therefore, the average speed is used to describe the motion. Average speed is a ratio between the total distance and the total time that the object travelled.

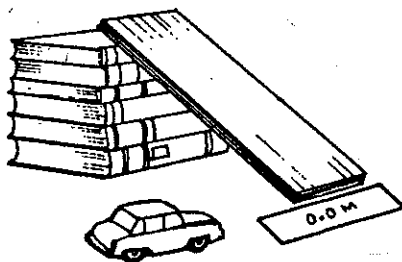
Acceleration is the rate at which an object's speed changes over time. You can express acceleration as meters per second per second or m/s^2 . The unit represents the change in meters per second each second.

Problem: Does mass affect acceleration?

Equipment: Stack of books, wood ramp, tape, time piece, meter stick, golf ball, tennis ball, and wood ball.

Procedure:

1. Mass each of the three balls using the electronic balance. Record the masses below.
2. Clear a 6 meter runway. At one end of the runway set up a launching ramp as shown below.



3. Place a masking tape marker where the ramp touches the floor. Label this marker 0 m. Place similar markers at 1m, 2m, 3m, 4m, 5m, and 6m.
4. Practice launching the balls down the ramp several times. Add or remove books to be sure the balls complete the entire distance.
5. Measure the time it takes for the wooden ball to pass each marker. Record the time in the table. Repeat this process two more time with the wooden ball and record.
6. Repeat this for the golf ball and tennis ball. Record your results in the tables.

Data

Wooden ball Mass = _____

Trial	1m	2m	3m	4m	5m
1					
2					
3					
Average					
Average speed					

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Golf ball Mass = _____

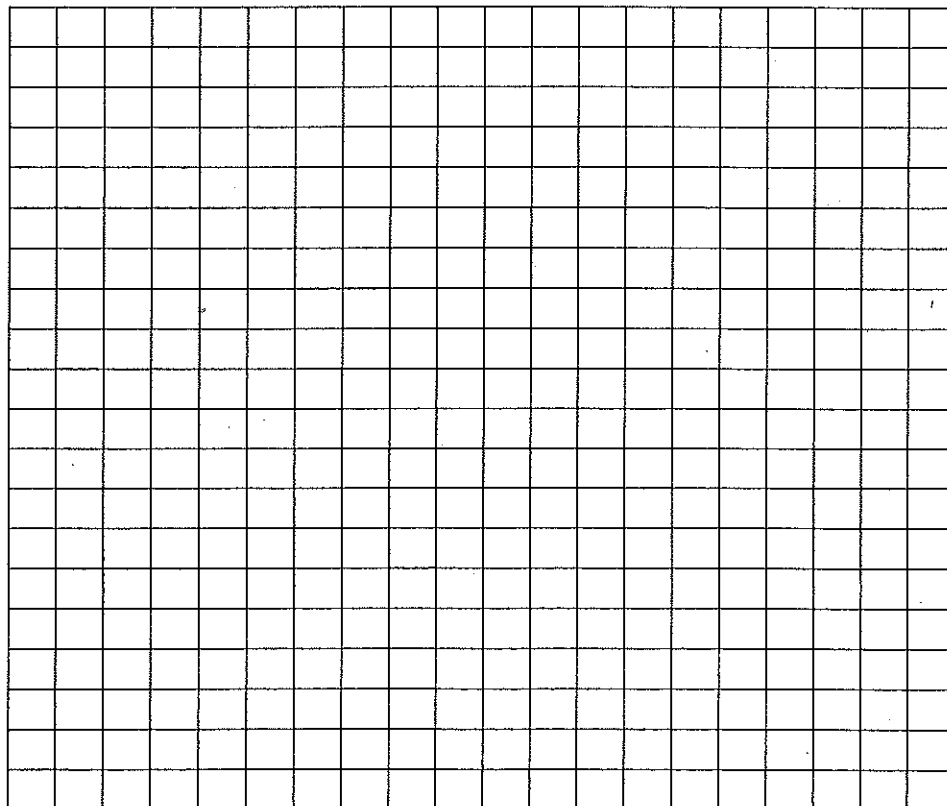
Trial	1m	2m	3m	4m	5m
1					
2					
3					
Average					
Average speed					

Tennis Ball Mass = _____

Trial	1m	2m	3m	4m	5m
1					
2					
3					
Average					
Average speed					

Analysis

Graph the average speed for each of the three balls. Make sure you label each axis, name the graph, and include a key.



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Questions

1. Describe the motion of the ball as it moves across the floor.
2. Did the balls travel at a constant speed?
3. How could you change this experiment to make the balls slow down faster?
4. How could you change this experiment to make the balls accelerate at a faster rate?
5. How did the mass of the balls affect its speed?
6. Did the size of the ball affect the speed? Explain.
7. How did the mass of the ball affect the acceleration? Explain.
8. Based on your graph, which of the three balls had the fastest negative acceleration?
9. Based on your graph, which of the three balls had the slowest negative acceleration?