

Inert Inertia

Purpose To understand the basic concept of inertia

Background Sir Isaac Newton was an English physicist and mathematician who studied the properties of force and motion. He developed three laws of motion known as Newton's Laws. Newton's First Law of Motion states that an object at rest will remain at rest, and an object in motion will remain in motion at a constant velocity unless an unbalanced force acts upon it. This tendency of objects to either remain at rest or in motion is called inertia.

Materials

- 1-m wooden board
- various assortment of books
- medium-sized toy car
- 1 large washer
- meter stick
- science journal

- Procedure**
1. Stack two or three books on a flat surface and place one end of the board on top of the books to create a ramp so that one end is approximately 10 cm from the surface.
 2. Measure the height of the ramp and record in data chart.
 3. Use a thick book, like a dictionary, to form a wall at the bottom of the ramp. See diagram 1.
 4. Place the large washer on top of the car.
 5. Put the car at the top of the ramp and release it, making sure that you do not push the car.
 6. After the car hits the wall, measure the distance from the car to where the washer landed and record this distance in the data chart.
 7. Repeat steps 4-6 for two additional trials.
 8. Raise the ramp an additional 5 cm and record height in data chart.
 9. Repeat steps 4-7.
 10. Repeat steps 8-9 by raising the ramp again.
 11. Find the average distance (cm) that the washer traveled at each height.
 12. Discuss your findings and conclusions.

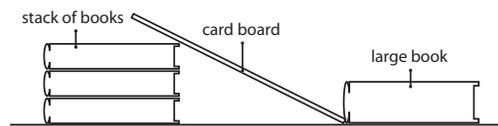


Diagram 1

Data Chart

WASHER WILL TRAVEL				
Height of Ramp (cm)	Distance Trial 1 (cm)	Distance Trial 2 (cm)	Distance Trial 3 (cm)	Average Distance (cm)

- Conclusion**
1. Describe what happened to the washer when the car hit the wall.
 2. Why do you think it happened?
 3. Explain the relationship between the height of the ramp and the distance the washer traveled.
 4. What is the relationship between inertia and the speed of the car at the bottom of the ramp?
 5. Define inertia in your own words.
 6. Explain how Jacob unfortunately encounters inertia on his scooter.
 7. Using what you now know about inertia, explain why it is necessary to wear seat belts in a vehicle.

Extension If the heights of the ramps were the same for all groups, have students share their data as a class and find a class average for each trial. Create a graph showing the relationship between the height of the ramp and the distance the washer traveled. Use washers of different weights and repeat experiment.

