Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_

**Inert Inertia**

**Purpose**: To understand the basic concept of inertia and Newton’s First Law of Motion.

**Background**: Sir Isaac Newton was an English physicist and mathematician who studied the properties of force and motion. He developed three laws of motion know 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 object to either remain at rest or in motion is called inertia.

**Procedure**:

1. Stack two 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 table.
3. Use a thick book to form a wall at the bottom of the ramp. See diagram 1.
4. Place the 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 the height in data table.
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 finding and conclusions.

**Data Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **WASHER WILL TRAVEL** | | | | |
| **Height of Ramp** | **Distance Trial 1** | **Distance Trial 2** | **Distance Trial 3** | **Average Distance** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**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. Using what you know about inertia, explain why it is necessary to wear seat belts in a vehicle.