Investigating Effect of Significant Resistance on a Falling Object

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1 Introduction

1.1 Purpose

Understand how resistance affects a falling object by comparing how a steel ball bearing falls in air and in water.

1.2 Hypothesis

As resistance increases, the net force on the ball bearing will decrease, as the resistance will work against the force of gravity.

1.3 Variables

Independent Variable

- Resistance

Dependent Variable

- Net force (F_{net})
    - Acceleration
    - Velocity

Controlled Variables

- Drop height in air
- Drop height in resistance medium
- Resistance medium
- Object mass+size

2 Materials

- 1.0 L H$_2$O
- 1 · 1.0 L graduated cylinder
- 1 · metre-stick
- 1 · scale
- 1 · timer
- 1 · ball bearing

3 Procedure

1. Measure, record mass and diameter of ball bearing
2. Suspend top of ball bearing from 100.0 cm
3. Drop ball, start timer
4. Stop timer when ball hits "ground"
5. Record time taken to fall
6. Repeat steps 3-6 as necessary for data collection
7. Fill graduated cylinder with 1.0 L water
8. Suspend top of ball bearing at surface of water
9. Drop ball, start timer
10. Stop timer when ball hits "ground"
11. Record time taken to fall
12. Repeat steps 8-12 as necessary for data collection

4 Data