

Activity

Measuring the Effects of Air Resistance

Lab Preview

Directions: Answer these questions before you begin the Activity.

- Why is the symbol for a sharp object included in the safety precautions for this activity?

- What are the ways in which you are permitted to change the shape of your last piece of paper?

If you dropped a bowling ball and a feather from the same height on the Moon, they would both hit the surface at the same time. All objects dropped on Earth are attracted to the ground with the same acceleration. But on Earth, a bowling ball and feather will not hit the ground at the same time. Air resistance slows the feather down.

What You'll Investigate

How does air resistance affect the acceleration of falling objects?

Materials

meterstick
masking tape
paper (4 sheets of equal size)
stopwatch
scissors

Goals

- Measure the effect of air resistance on sheets of paper with different shapes.
- Design and create a shape from a piece of paper that maximizes air resistance.

Safety Precautions

Procedure

- Measure a height of 2.5 m on the wall and mark the height with a piece of masking tape.
- Have one group member drop the flat sheet of paper from the 2.5-m mark. Use the stopwatch to time how long it takes for the paper to reach the ground. Record your time in Table 1.

- Crumple a sheet of paper into a loose ball and repeat step 2.
- Crumple a sheet of paper into a tight ball and repeat step 2.
- Use scissors to shape a piece of paper so that it will fall slowly. You may cut, tear, or fold your paper into any design you choose.

Data and Observations

Table 1

| Effects of Air Resistance | |
|---------------------------|------|
| Paper type | Time |
| Flat paper | |
| Loosely crumpled paper | |
| Tightly crumpled paper | |
| Your paper design | |

Activity (continued)**Conclude and Apply**

1. **Compare** the falling times of the different sheets of paper.

2. **Infer** the relationship between the falling time and the acceleration of each sheet of paper.

3. **Explain** why the different-shaped papers fell at different speeds.

4. **Explain** how your design maximized the effect of air resistance on your paper's gravitational acceleration.

5. **Infer** why a sky diver will fall in a spread-eagle position before opening her parachute.

Communicating Your Data

Compare your paper design with the designs created by your classmates. As a class, compile a list of characteristics that increase air resistance.