

Demonstration 1

Falling Feather

The velocity of an object moving through air is impeded by the air resistance. At low velocities the resistance is normally insignificant; at high velocities the retarding force can be important as in aerodynamics. All moving bodies feel a certain resistance however, as evidenced by watching a feather or a piece of paper fall to the ground. This effect can be demonstrated by observing an object falling a fixed distance in both atmosphere and vacuum. To demonstrate, a 'light' feather and a 'heavy' piece of metal are dropped simultaneously in the vacuum jar which is alternately at atmosphere and low pressure. The feather, being of smaller mass will not fall as quickly as the piece of metal in air whereas in the evacuated vacuum jar, when the retarding force due to the presence of air is removed, they will fall at the same rate.

Practical Points

- The metal is magnetic and is suspended on the inner topside of the vacuum jar using a magnet. The feather is partially sandwiched between the metal and the inner face of the vacuum jar.
- The feather should be extremely light to enhance the effect since the distance that the objects fall is not very great. Down feathers work best.
- Do not sandwich the feather completely between the metal and vacuum jar face - they might stick together thus nulling the effect. Remove the magnet quickly when demonstrating.

Discussion:

Discuss the effect of the mass of the falling body on its drop time. Distinguish between total force and force per unit area (why does a parachute work?)

