Forces - Answers

Answer Key

Section A: Force Reasoning

1. In a vacuum there is no air resistance to slow the lighter object, so both fall at the same rate; in normal air, resistance affects the feather far more than the hammer
2. Their speed decreases sharply once the parachute opens, because it greatly increases air resistance
3. Accept a fair test description, e.g. dropping different shaped paper models from the same height and timing how long each takes to fall
4. Because water is denser than air, creating much more resistance against movement
5. A cyclist goes faster downhill because gravity works with their motion, while going uphill, gravity and friction both work against them

Section B: Applying Force Concepts

1. To reduce air resistance, allowing them to travel faster with less drag
2. The carpet creates more friction against the ball, slowing it down faster than the smooth floor would
3. A thin blade reduces the surface area in contact with the ice, reducing friction and allowing smoother gliding
4. Accept a fair test description, e.g. rolling an identical ball down a ramp onto each surface and measuring how far it travels
5. As the skydiver falls, gravity pulls them down while air resistance increases with speed until they reach a steady falling speed (terminal velocity); opening the parachute greatly increases air resistance, slowing their descent for a safe landing