

Pushes, pulls and balanced forces

Grade 7 science (Year 8 · Class 7) · Test answers (mark scheme)

Model answers with the marks available. Award marks for correct subtraction of opposing forces and for the direction of the net force, not just the number.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS2-1, MS-PS2-2

Question 1 Contact forces (2 marks)

- a. **Contact.**
- b. **Non-contact.**

Marking: 1 mark each.

Question 2 Measuring force (2 marks)

The unit is the **newton (N)**. The instrument is a **spring scale (newton meter)**.

Marking: 1 mark for the unit; 1 mark for the instrument.

Question 3 A pushed box (3 marks)

- a. $12 - 5 = 7 \text{ N to the right.}$
- b. The forces are unbalanced, so the box **speeds up to the right.**

Marking: (a) 1 mark for subtracting, 1 for the answer with unit and direction; (b) 1 mark.

Question 4 Cyclist at steady speed (3 marks)

- a. **40 N** (friction and air resistance together).
- b. A steady speed means no change of motion, so the net force is zero. The backwards forces must therefore balance the 40 N forward force.

Marking: (a) 1 mark; (b) 1 mark for zero net force, 1 mark for balanced forces.

Question 5 Action and reaction (2 marks)

The barrier pushes back with **60 N** in the opposite direction, so the skater moves **away from the barrier.**

Marking: 1 mark for 60 N opposite; 1 mark for moving away.

Question 6 Drawing arrows (3 marks)

- a. $30 \div 5 = \mathbf{6\ cm.}$
- b. $2.5 \times 5 = \mathbf{12.5\ N.}$
- c. The direction in which the force acts.

Marking: 1 mark for each part.

Question 7 Rope pulled both ways (3 marks)

- a. $540 - 495 = \mathbf{45\ N\ to\ the\ left.}$
- b. **Team A**, because the net force acts towards them.

Marking: (a) 1 mark for subtracting, 1 for the answer; (b) 1 mark.

Question 8 Heavy or light (2 marks)

The net force is the same, but the heavy trolley has a larger mass. A larger mass is harder to accelerate, so its motion changes less.

Marking: 1 mark for the same force; 1 mark for larger mass changing less.