

Magnets, fields and electromagnets

Grade 8 science (Year 9 · Class 8) · Test answers (mark scheme)

The model answers show the expected scientific words. Marks are awarded for stating a correct fact and for giving a reason. Compare each answer with your own and check which mark points you missed.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS2-3, MS-PS2-5

Question 1 Poles (2 marks)

- a. They repel.
- b. They attract.

Marking: 1 mark each.

Question 2 Field lines (3 marks)

- a. From the north pole to the south pole.
- b. Point **X**. It is beside a pole, where the field lines are closest together; Z is far from the lines, so its field is weakest.

Marking: Part a: 1 mark. Part b: 1 mark for X, 1 mark for the reason about line spacing.

Question 3 Which are attracted? (2 marks)

- a. The **steel spoon and the nickel key**.
- b. Copper is not a magnetic material, so it is not attracted to a magnet.

Marking: 1 mark each part.

Question 4 The compass (3 marks)

- a. It can spin freely and is attracted and repelled by other magnets, as only a magnet can do.
- b. The Earth has a magnetic field like a giant bar magnet, and the needle lines up with it.
- c. The needle lines up with the field of the nearby magnet, which is stronger than the Earth's field there.

Marking: 1 mark per part.

Question 5 Stronger electromagnet (3 marks)

Add more turns of wire; increase the current (more cells or a bigger supply); put an iron core inside the coil.

Marking: 1 mark for each correct change.

Question 6 Clips and current (3 marks)

- a. The clips lifted are proportional to the current: they double when the current doubles.
- b. 1.6 A is $4 \times 0.4 \text{ A}$, so $4 \times 5 = \mathbf{20 \text{ clips}}$.
- c. Increase = $15 - 5 = 10$; $10 \div 5 \times 100 = \mathbf{200 \%}$.

Marking: 1 mark per part.

Question 7 Breaker's yard (2 marks)

It can be **switched off to release the load**, and its **strength can be changed** for light or heavy loads.

Marking: 1 mark for each reason.

Question 8 Cutting a magnet (2 marks)

Each piece has **a north pole and a south pole**. Each part of the magnet is itself a small magnet, so poles always come in pairs.

Marking: 1 mark for N and S on each piece, 1 mark for the explanation.