

Magnets, fields and electromagnets

Grade 8 science (Year 9 · Class 8) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test has eight questions on poles, magnetic fields, compasses and electromagnets, worth 20 marks. Use the correct scientific words and show your reasoning. No calculator is needed for most parts.

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

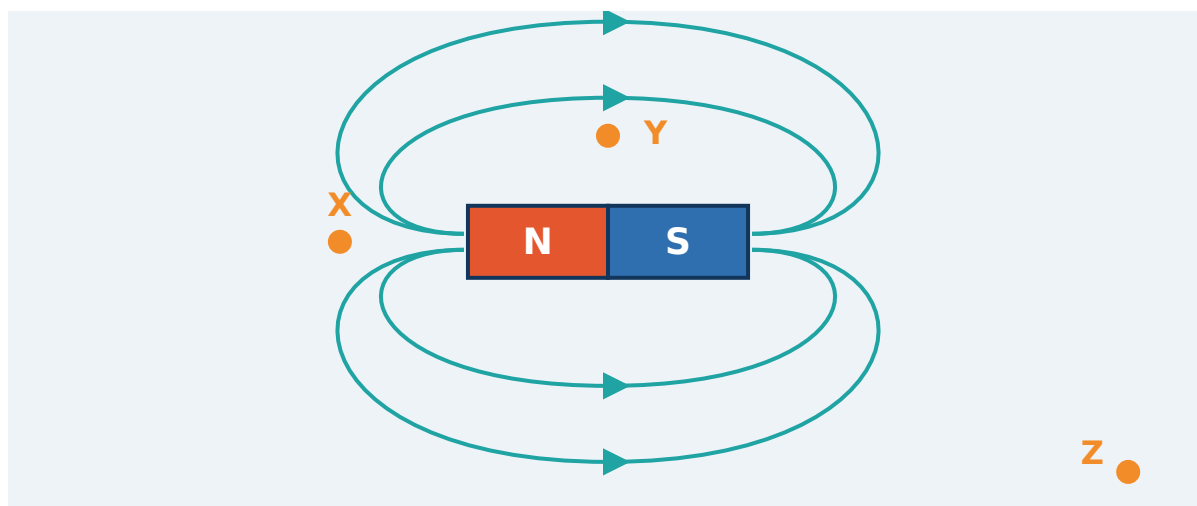
Time: 40 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Poles (2 marks)

- Predict what happens when two north poles are placed close together. (1 mark)
- Predict what happens when a north pole is placed close to a south pole. (1 mark)

Question 2 Field lines (3 marks)

The figure shows the field around a bar magnet.



Magnet field with three points.

- State the direction of the field lines outside the magnet. (1 mark)
- Which of X, Y and Z has the strongest field? Explain how you can tell. (2 marks)

Question 3 Which are attracted? (2 marks)

A magnet is held above these items: a steel spoon, a copper pipe, a nickel key, a glass bead.

- a. List the items attracted by the magnet. (1 mark)
- b. Explain why the copper pipe is not attracted. (1 mark)

Question 4 The compass (3 marks)

- a. Explain why a compass needle is itself a magnet. (1 mark)
- b. Explain why the needle points north when it is far from other magnets. (1 mark)
- c. A compass is placed next to a bar magnet and the needle turns. Explain why. (1 mark)

Question 5 Stronger electromagnet (3 marks)

Describe three changes that make an electromagnet stronger. (3 marks)

Question 6 Clips and current (3 marks)

An electromagnet lifts clips as the current changes: 0.4 A lifts 5 clips; 0.8 A lifts 10 clips; 1.2 A lifts 15 clips.

- a. Describe the pattern. (1 mark)
- b. Predict the clips lifted at 1.6 A. (1 mark)
- c. Calculate the percentage increase in clips from 0.4 A to 1.2 A. (1 mark)

Question 7 Breaker's yard (2 marks)

A recycling plant uses an electromagnet to move steel sheets. Give two reasons why an electromagnet is more useful than a permanent magnet. (2 marks)

Question 8 Cutting a magnet (2 marks)

A bar magnet is cut into two pieces. State the poles of each piece and explain the result. (2 marks)