MR SULLY UNFOLDS PHYSICS ANSWERS

Magnets and magnetic fields

AQA 4.7.1
Magnetism · Paper 2
Foundation & Higher

Name _____ Class _____ Date _____

Magnets exert forces on each other and on magnetic materials, without touching. The region where this happens is a **magnetic field**.

KEY IDEAS

- Like poles repel; unlike poles attract. Magnetic materials: iron, steel, cobalt and nickel.
- A **permanent magnet** produces its own field. An **induced magnet** becomes magnetic only in a field, and always attracts.
- Field lines go from north to south and are closest together at the poles, where the field is strongest.

Section A · Recall

Grade 4–5

1 Name the four magnetic elements and alloys you need to know. [2]

Iron, steel, cobalt and nickel

2 What happens when two north poles are brought together? [1]

They repel.

3 Describe two differences between a permanent magnet and an induced magnet. [2]

A permanent magnet produces its own field; an induced magnet only becomes magnetic in a field.

An induced magnet always attracts and loses most of its magnetism when removed from the field.

Section B · Fields

Grade 5–6

4 Draw the magnetic field pattern around a bar magnet. Show the direction of the field. [3]



Lines from N to S (1); arrows correct (1); lines closer at the poles, not crossing (1).

5 Describe how to plot the magnetic field of a bar magnet using a small compass. [3]

Place the compass near the north pole and mark where the needle points.

Move the compass so its tail is at the mark; mark again and repeat.

Join the marks to make a field line; repeat from different starting points.

Section C · Stretch

Grade 7+

6 Explain why a compass needle points north, and what this tells us about the Earth. [3]

The compass needle is a small magnet,

which lines up with the Earth's magnetic field.

This is evidence that the Earth's core is magnetic.

Exam-style question

AQA style

7 A student holds an iron nail near a bar magnet. The nail attracts some paper clips.

a Explain why the nail can attract the paper clips. [2]

The nail becomes an induced magnet

because it is in the bar magnet's field.

b The bar magnet is removed. Describe and explain what happens to the paper clips. [2]

Most or all of the paper clips fall off,

because the nail loses most of its magnetism when removed from the field.

c State where the magnetic field of the bar magnet is strongest. [1]

At the poles

Total: _____ / 19

How confident am I?	Not yet	Nearly	Got it
I can describe permanent and induced magnets	☐	☐	☐
I can draw field lines around a bar magnet	☐	☐	☐
I can explain how a compass works	☐	☐	☐