Mapping magnetic fields with a compass

Teacher / technician

YEAR 11 / LESSON 80 / PHYSICS + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Record actual measurements separately from labelled practice examples.

Coverage and delivery

Shared Physics / Double Award: 6.4, 6.6, 6.7. Bar-magnet fields and approximately uniform fields.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, ten groups of three

Item	Per pair / setup	Class total
Bar magnets	2 per group	20
Plotting compass and nonmagnetic spacers	1 compass and spacer set per group	10 compasses; 10 sets
Paper and rulers	1 set per group	10 sets; 30 sheets
Booklets	1 per learner	30

Immediate safety

Use low-strength magnets and keep them apart under control to avoid pinching. Keep magnets away from sensitive devices and follow medical-device guidance. Do not use loose iron filings or powerful rare-earth magnets. Keep small compasses out of mouths.

Preparation and delivery

Read alongside the student method

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1. Check compass north-end markings away from the test magnets and choose a clear bench area. Secure the magnet gap with nonmagnetic spacers.

2. Demonstrate correct compass stepping and explain unreliable directions near cancellation. Do not force the expected pattern onto observations.

Close of lesson

• Return magnets and compasses to storage and retain labelled field maps.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- The north-seeking end.
- From north to south.
- Their fields alter the total local field.
- Approximately straight, parallel and evenly spaced lines.
- The net field is weak and other fields or friction become significant.
- No; they are a representation.

References and provenance

Pearson Physics specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.