Current and magnetic field direction

Teacher / technician

YEAR 11 / LESSON 81 / 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: 6.8. Current produces a magnetic field. Physics-only extension: 6.9P–6.10P electromagnets and field patterns.

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

Requisition • class of 30 observing one staff setup

Item	Per pair / setup	Class total
Complete staff circuit and compass	Shared demonstration	1 set
Field-model cards	1 set per pair	15 sets
Booklets	1 per learner	30

Immediate safety

Staff operate the circuit only. Keep conductors insulated and supported; switch off before changing connections. Limit each pulse to two seconds and stop if anything warms. No shorted cells, exposed mains, high-current coils or loose iron filings. Keep magnetic apparatus away from sensitive devices.

Preparation and delivery

Read alongside the student method

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1. Pilot at the stated limits and record the actual current. Select a suitable rated limiter and avoid a return lead close to the compass. If no clear deflection is obtained, use diagrams rather than increasing the limit.

2. Prepare separate Physics-only coil/solenoid tasks and the shared-course alternative. No additional coil is energised in this activity.

Close of lesson

- Open the switch, turn off the supply and return the compass and leads.

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

YEAR 11 / LESSON 81 / PHYSICS + SCIENCE (DOUBLE AWARD)

- Electric current.
- The wire’s field reverses.
- Its field would change the result.
- The wire’s current and field disappear; the compass responds mainly to Earth and other nearby fields.
- Conventional current direction for a straight wire.
- It strengthens the field and usually retains little magnetism after current is removed.

References and provenance

Pearson Physics specification

IOP: electromagnetism

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.