Magnetism and motors: review

Student activity • observation and reasoning

YEAR 11 / LESSON 84 / PHYSICS + SCIENCE (DOUBLE AWARD)

The question

Can each magnetic explanation identify the field, current and force correctly?

Correct original diagrams and consolidate shared-course magnetism with a separately labelled electromagnet extension.

Equipment

- Booklet, pencil, ruler and original diagrams

Paper-based review. No magnets, live circuits, sound sources or moving apparatus are required.

Course coverage: Shared Physics / Double Award: Review of 6.2–6.8 and 6.12–6.14; Physics-only extensions identified separately.

Plan, model or apparatus sketch

Draw labelled magnetic-field, current and force arrows where relevant.

Method and reasoning

Read the whole sequence before starting

YEAR 11 / LESSON 84 / PHYSICS + SCIENCE (DOUBLE AWARD)

1. Draw a bar magnet’s external field with arrows and place a compass at one point. Label the direction of its north-seeking end.

2. Classify iron, steel, copper and wood by likely classroom magnetic behaviour. Distinguish an induced magnet from a permanent magnet.

3. Explain why current in a wire can deflect a nearby compass and why reversing current changes the field direction.

4. Use a wire with field to the right and conventional current into the page. Predict the force using the left-hand rule and explain the result.

5. Compare a motor and loudspeaker, including the role of changing current. Physics-only extension: add an insulated coil and soft iron core electromagnet model; Double Award students instead correct a second motor diagram.

6. Write corrections in a different colour, with a reason for each. Keep measured evidence from earlier practicals separate from these models.

Cleanup

- Keep corrections for revision.

Record your evidence

Blank spaces are for your own work

YEAR 11 / LESSON 84 / PHYSICS + SCIENCE (DOUBLE AWARD)

Reference and task data

All tasks are original learning questions, not an official assessment. In the specified motor-effect diagram the force is downwards. Course-only extensions are optional for the shared-course route.

Task	Initial response	Correction and reason
Field pattern		
Materials		
Current field		
Motor / speaker		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

YEAR 11 / LESSON 84 / PHYSICS + SCIENCE (DOUBLE AWARD)

1. Which way do external bar-magnet field arrows point?

2. What aligns a compass?

3. Name a suitable soft magnetic core.

4. Predict force for rightward field and current into the page.

5. What does a motor commutator do?

6. How does a speaker cone move?