Motors and loudspeakers: two applications

Teacher / technician

YEAR 11 / LESSON 83 / 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: 6.12–6.14. Motor and loudspeaker applications of magnetic force.

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

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Unpowered models	Shared observation stations	1 motor; 1 loudspeaker
Diagram sets	1 per pair	15 sets
Booklets and rulers	1 per learner	30 of each

Immediate safety

Keep both models disconnected throughout. Do not dismantle speakers or touch sharp frames or exposed moving parts. Staff position the models. Keep magnets away from sensitive devices; offer diagrams. No loud sound or exposed powered rotor is used.

Preparation and delivery

Read alongside the student method

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1. Check model condition and remove all power connections. Use large original diagrams if internal parts cannot be seen safely.

2. Prepare the motor sequence with current arrows changing at each half-turn and a separate speaker cross-section.

Close of lesson

• Return diagrams and store disconnected models.

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 currents run in opposite directions in the same external field.
- The current direction in the coil.
- It keeps the turning effect in the same rotational sense.
- The alternating current direction.
- Frequency.
- Its coil is constrained to move back and forth with the cone.

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.