Induction and generation: review

Student activity • observation and reasoning

YEAR 11 / LESSON 89 / PHYSICS + SCIENCE (DOUBLE AWARD)

The question

Can you distinguish a motor, a generator and a transformer?

Review changing magnetic fields and energy transfer with course-specific extension questions.

Equipment

- Booklet, pencil, ruler and calculator

Desk-based review only. No powered coils, generators, transformers or strong magnets are required.

Course coverage: Shared Physics / Double Award: Shared 6.15–6.16; Physics-only transformer extension 6.17P–6.20P.

Plan, model or apparatus sketch

Draw labelled coils, field directions, motion and circuit connections as relevant.

Method and reasoning

Read the whole sequence before starting

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1. Draw a magnet and coil and explain why holding the magnet still differs from moving it into the coil.

2. Predict changes to an induced pulse when motion reverses, motion becomes faster, or the pole is reversed. State what is held constant.

3. Draw a rotating-coil generator and label mechanical input and electrical output. Contrast the energy transfer with a motor.

4. Explain why a generator's alternating output changes sign during rotation. Keep the waveform graph distinct from the physical shape of a field line.

5. Physics-only extension: draw a transformer and calculate the ideal output for 4.0 V input with 200 primary and 100 secondary turns. Double Award alternative: explain two ways to increase a generator's induced voltage.

6. Check the guidance and write a correction explaining the difference between a magnetic field and a changing field linkage.

Cleanup

- Keep corrections for revision.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Original review tasks, not measurements. The transformer extension gives 2.0 V in the ideal model. Shared-course students complete generator reasoning instead.

Task	Initial response	Correction
Moving magnet		
Generator		
Motor comparison		
Course extension / alternative		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Does a stationary magnet produce sustained induced voltage?

2. What changes on reversing motion?

3. How does faster comparable motion affect the pulse?

4. What is a generator's useful energy transfer?

5. How is a motor different?

6. Extension: calculate the stated transformer output.