Direct and alternating signals: reading an oscilloscope

Teacher / technician

YEAR 10 / LESSON 43 / PHYSICS + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. The oscilloscope records voltage. Current direction is inferred for a specified resistor; no direct mains measurement is performed.

Coverage and delivery

Shared Physics / Double Award: 2.6, 2.10, 2.11. Direct and alternating current.

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

Requisition • class of 30, one staff demonstration

Item	Per pair / setup	Class total
Oscilloscope and approved input leads	Staff demonstration	1 set
Cell and isolated signal generator	Staff demonstration	1 each
Booklets	1 per learner	30
Calculators	1 per pair	15

Immediate safety

Staff make all instrument connections. Use only the small cell and isolated low-voltage generator; never connect to mains outlets or exposed mains circuits. Check the oscilloscope input and common-earth arrangement before connecting equipment.

Preparation and delivery

Read alongside the student method

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1. Confirm instrument input ratings and grounding from its manual. Use a compatible isolated generator output and set at most 2 V peak.

2. Establish zero with DC coupling, then retain the reference while displaying the cell voltage. Choose clear scales for the actual signal; do not assume every instrument uses the same settings.

Close of lesson

• Staff disconnect signals and switch off instruments; return calculators.

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 10 / LESSON 43 / PHYSICS + SCIENCE (DOUBLE AWARD)

- Voltage, with the stated scale.
- To interpret polarity and magnitude relative to a known reference.
- 0.020 s.
- 50 Hz.
- No; only an isolated low-voltage source.
- Its resistance falls, so current increases if other conditions are fixed.

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.