# Velocity–time graphs: gradients and direction

Teacher / technician

YEAR 10 / LESSON 13 / 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: 1.6–1.8. Velocity, acceleration and graph gradients.

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 |
|---|---|---|
| Booklet/graph paper/ruler | 1 set per learner | 30 sets |
| Calculators | 1 per pair | 15 |

## Immediate safety

Written graph activity only; no moving vehicles or live road observations are required.

# Preparation and delivery

Read alongside the student method

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**1.** Provide graph axes with room below zero for the optional extension. Keep the main positive-velocity task distinct from the extension.

**2.** Ask pupils to show the two points used for each gradient and to convert change in velocity to acceleration units.

## Close of lesson

- Keep corrected graphs and return rulers.

## 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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- 2 m $s^{-2}$.
- Constant velocity of 8 m $s^{-1}$.
- −2 m $s^{-2}$.
- Only if the horizontal line is at zero velocity.
- Speed 4 m $s^{-1}$ in the negative direction.
- When velocity is positive, until it reaches zero.

## 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.