Distance–time graphs: walking and waiting

Teacher / technician

YEAR 10 / LESSON 1 / 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: 1.1, 1.3, 1.4. Distance–time graphs and average speed.

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

Requisition • class of 30, five groups of six using one lane in turn

Item	Per pair / setup	Class total
Booklets and graph paper	1 of each per learner	30 of each
Measuring tape and flat markers	Shared lane	1 tape; 5 markers
Stopwatches	Shared lane	4
Rulers	1 per learner	30

Immediate safety

Walk only on a clear, level, dry lane. Do not race, obstruct exits or leave loose tape across the route. Observers stand to the side. Anyone can choose a timing or plotting role without walking.

Preparation and delivery

Read alongside the student method

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1. Measure and mark the 8 m lane; check stopping space and access before pupils arrive. Use five groups of six, one group at a time.

2. Prepare 30 booklets/graph sheets and four stopwatches. Demonstrate synchronised starts and safe marker positions.

3. Give the paused walk an extra arrival/departure record at 4 m. Keep cumulative distance distinct from position. Use the labelled practice table if the walking route is unavailable.

Close of lesson

• Collect markers and tape, return stopwatches and leave the route clear.

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 cumulative distance is unchanged: the walker is stationary.
- 8/13 = 0.62 m s^{-1} to two significant figures.
- The same distance takes a longer total time.
- No. Position or distance from the start can decrease; cumulative path length cannot.
- They record cumulative times at separate fixed distances in one run.
- Human response time and judging the marker crossing; repeats do not remove every systematic bias.

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.