Motion review: choosing the right calculation

Student activity • observation and reasoning

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The question

Can you choose a calculation from the quantity shown on the axes?

Use earlier walking and trolley evidence, then complete original practice tasks without confusing a graph's height, gradient and area.

Equipment

• Previous walking/trolley records, booklet, graph paper and ruler

Desk-based review only. Do not repeat trolley runs or walk in corridors during this activity.

Course coverage: Shared Physics / Double Award: Review of 1.3–1.9. Graphs, speed and acceleration.

Plan, model or apparatus sketch

Draw a labelled setup or force diagram; include the measured quantities.

Method and reasoning

Read the whole sequence before starting

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1. Retrieve your Lesson 1 walking graph and Lesson 2 trolley record. Label the axes, units and whether each value is a measurement or a model.

2. Make a comparison table: distance–time gradient gives speed; velocity–time gradient gives acceleration; velocity–time signed area gives displacement.

3. Solve these practice tasks: 15 m travelled in 12 s; velocity changing from 3 to 9 m s^{-1} in 4 s; constant 6 m s^{-1} for 5 s.

4. Sketch a journey with motion, a pause and resumed motion on a cumulative distance–time graph, then sketch a compatible velocity–time graph.

5. Evaluate a claim that three repeated stopwatch readings eliminate all timing errors. Distinguish random variation from a consistent bias.

6. Correct your six answers using the staff guidance after attempting them. Name one specific misconception and write a fresh example that avoids it.

Cleanup

- Return shared evidence packs and keep corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

The numerical tasks are invented practice examples. Earlier class records retain their actual values and uncertainties; do not replace them with ideal straight lines and call them measurements. A cumulative distance–time graph never slopes downward, whereas a position–time graph can.

Task / graph	Calculation / evidence	Meaning / correction
Speed task		
Acceleration task		
Graph comparison		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Find the average speed for 15 m in 12 s.

2. Find acceleration from 3 to 9 m s^{-1} in 4 s.

3. Find distance at 6 m s^{-1} for 5 s.

4. What does a flat distance–time graph mean?

5. What does a flat nonzero velocity–time graph mean?

6. Do repeats remove a consistent timing bias?