

Substitute Guide: Interpreting Motion Graphs

Course: Physics (Grades 9–12) **Subject:** Science **Time:** ~50 min standard · ~90 min block Science

Learning goal (plain language)

Students learn to **read and interpret motion graphs** — a **position–time** graph (where the **slope is the velocity**) and a **velocity–time** graph (where the **slope is the acceleration** and the **area under the line is the displacement**). Working alone with a pencil (a calculator is allowed), students read values off two labeled graphs, compute an average velocity and an acceleration using $\text{speed} = \text{distance} \div \text{time}$ and $\text{acceleration} = \Delta v \div \Delta t$, match described motions to the correct graph, fix a common graph-reading error, and write an evidence-based explanation (CER). **You do not need a physics background to run this.** Everything students need is printed in their packet. This is a **paper** activity — no lab, no materials, no hazards.

Standards alignment

Framework: 19 TAC Chapter 112 (Physics). Knowledge & skills on **describing motion with graphs** and **calculating velocity and acceleration**.

- **Provisional — describing motion / graphs:** represent and interpret the motion of an object using position–time and velocity–time graphs, relating the slope of a line to velocity or acceleration.
- **Provisional — calculating velocity and acceleration:** calculate average velocity and acceleration from data or graphs using $\text{speed} = \text{distance} \div \text{time}$ and $\text{acceleration} = \text{change in velocity} \div \text{change in time}$, with correct units.

Provisional — pending educator verification against the current official TAC source. A specific section number is intentionally not asserted here; confirm the exact citation and student-expectation codes before use.

(Standards are paraphrased here, not quoted. Please confirm the section and wording against your official source. This packet does not claim formal alignment to the TEKS.)

Setup Before class (5 min)

- Count and hand out one **student packet** per student.
- Confirm each student has a **pencil**. A **calculator is allowed** but not needed — the numbers are simple ($\div 4$, $\div 3$, $\div 2$). No computers or lab items are required.
- Write the date on the board and remind students to fill in the name line.
- Keep the **answer key** with you — it is a separate file and is **not** in the student packet.

Materials What's needed

- Printed student packet (4–6 pages) per student.
- Pencil per student; a calculator is optional (allowed).
- This guide and the separate answer key (teacher only).
- No lab equipment, no chemicals, no safety hazards — this is a paper investigation.

Timing Suggested pacing — standard vs. block

Segment	Standard (~50 min)	Block (~90 min)	What students do
Start — Notice & Wonder	5 min	5 min	Q1–Q2 warm-up
Build — Read the science	8–12 min	12 min	Read reference, word bank, Graphs A & B; Q3
Apply — Use the graphs	20–25 min	25 min	Q4–Q9 (read values, average velocity, acceleration, match, error analysis)
Explain — CER	7–10 min	10 min	Q10 explanation (claim/evidence/reasoning)
Close — ACE	5 min	5 min	Articulate / Connect / Extend
Continue — early finishers	optional	+30 min	Sketch a graph; block adds computing displacement as area under Graph B

On a **standard ~50-minute** period, the core stops after the CER (Q10) and ACE; the early-finisher sketch is optional. On a **~90-minute block**, everyone also completes the block extension — computing Object B's total displacement as the area under the velocity–time graph (rectangles + a triangle), which comes to 180 m.

Script Read aloud to start

"Today's assignment is a paper science investigation called *Interpreting Motion Graphs*. You will work by yourself with just a pencil — a calculator is fine if you want one, but the math is simple. Nothing to build or mix, and no computer needed. First read the short reference and study the two graphs: Graph A shows an object's *position* over time, and Graph B shows an object's *velocity* over time. Then answer the questions in order; if one is tricky, skip it and come back. When you do math, always keep your units — meters, seconds, meters per second, and meters per second squared — and show your work. Write in complete sentences where it asks you to explain. You may quietly read a question aloud to yourself. Put your name, class period, and date at the top now. You have about 50 minutes (or the full block); raise your hand if you need help understanding a word."

Support When students ask for help

- **You may read any part aloud** to a student or the class.
- If they mix up the graphs, point to the **vertical axis label**: Graph A says "Position (m)," Graph B says "Velocity (m/s)." The slope means velocity on A and acceleration on B.
- For the calculations (Q5–Q7), remind them slope = rise ÷ run: velocity = $\Delta\text{position} \div \Delta\text{time}$; acceleration = $\Delta v \div \Delta t$. A calculator is allowed.
- Encourage the printed **sentence stems** for the CER (Q10) and ACE sections.
- Do **not** give answers; prompt with "What does the graph show at that time?" or "Which is steeper?"
- It is fine if a student cannot finish the optional early-finisher or block task.

Access Accommodations & language support

- **Read-aloud** of any passage or question is allowed for all students.
- Point students to the **sentence stems** and the **Word Bank** (definitions provided).
- Extended time is fine; the core can stop after Q10 if time runs short.
- Students may answer in phrases if writing full sentences is a barrier, as long as the idea is clear. Showing the rise-over-run step with units is enough for Q5–Q7.
- The packet is grayscale-safe — it prints and reads clearly in black and white; the graphs use gridlines and text labels, not color.

Tools Allowed & not allowed

Allowed: pencil, a **calculator**, the printed packet, quiet self-read-aloud. **Not needed / not allowed:** phones, computers, internet, lab materials. The math is simple enough to do by hand, so a calculator is a convenience, not a requirement.

Collect at the end: Collect every packet, whether finished or not, with names on them. Stack them for the teacher. Note on a sticky how far most students got and any questions that caused confusion.

Answer key: The **answer key is a separate file** (answerkey.html) and is for the teacher only. Please do not hand it to students.

Teacher follow-up (for the returning teacher)

Watch for two high-value misconceptions: students reading a *horizontal line on a position–time graph as constant speed* (it means stopped), and confusing *height on the graph with speed* when the real cue is the *steepness* (slope). A quick next-day discussion contrasting a position–time graph with a velocity–time graph — and tying slope to velocity (p–t) versus acceleration (v–t) — would reinforce this well. The slope calculations (Q5–Q7) show who can compute velocity and acceleration with units; the Q9 error-analysis and the CER (Q10) responses show who can distinguish position from velocity.

HS_PHYS_MotionGraphs_01 — Interpreting Motion Graphs Substitute Guide

Interpreting Motion Graphs

Course: Physics (Grades 9–12) **Subject:** Science **Time:** ~50 min standard · ~90 min block **Work mode:** Independent · pencil only Science

Start Here

This is a **paper investigation**. You will read two motion graphs, pull numbers off the axes, and use them to describe and calculate how objects move — all with a pencil. You do **not** need a lab, a computer, or any materials besides this packet, a pencil, and (if you like) a **calculator**. There are **no hazards** — nothing is measured, mixed, or built. Work by yourself. The arithmetic is chosen so you can do most of it by hand; a calculator is allowed but not required. Read values carefully off the graph gridlines, always keep your **units** (meters, seconds, m/s, m/s²), and write in complete sentences where you are asked to explain. If a question is hard, skip it, keep going, and come back. Reading a question quietly aloud to yourself is allowed and encouraged.

Start Notice & Wonder 5 min

Think about a car trip: sometimes the car is stopped at a light, sometimes it is cruising steadily, and sometimes it is speeding up. A graph can show all three.

1 Look ahead at **Graph A** (a position–time graph) on the next page. Without doing any math, write **one thing you notice** and **one thing you wonder** about how the line changes as time goes on.

2 On a graph of an object's position over time, what do you think a **flat (horizontal) line** means the object is doing? Give your best first idea — you will check it later.

Build Read the Science 8–12 min

Reading motion graphs: slope, area, and the formulas

Motion graphs turn a story of movement into a picture. Two kinds appear in this packet.

- **Position–time (p–t) graph:** time is on the horizontal axis, **position** (how far from a starting point, in meters) is on the vertical axis. The **slope** of the line equals the object's **velocity**. A **steeper** line means a **faster** speed; a **flat (horizontal)** line means the position is not changing — the object is **stopped** (velocity = 0). A line that slopes downward means the object is moving back toward the start.
- **Velocity–time (v–t) graph:** time is on the horizontal axis, **velocity** (in m/s) is on the vertical axis. Here the **slope** equals the **acceleration**. A flat line means constant velocity (zero acceleration); a line sloping up means speeding up. The **area under** the v–t line equals the **displacement** (how far the object traveled).

Slope = (change in the vertical value) ÷ (change in the horizontal value) = "rise over run." On a p–t graph, slope = **velocity**. On a v–t graph, slope = **acceleration**.

Speed formula: speed = distance ÷ time (units: m ÷ s = m/s). Average velocity over a segment uses the same idea: average velocity = (change in position) ÷ (change in time) = $\Delta\text{position} \div \Delta\text{time}$.

Acceleration formula: acceleration = (change in velocity) $\div$ (change in time) = $\Delta v \div \Delta t$ (units: (m/s) $\div$ s = m/s²).

Displacement from a v–t graph: displacement = area under the line. For a rectangle, area = velocity $\times$ time. For a triangle, area = $\frac{1}{2} \times \text{base} \times \text{height}$. Add the pieces together to get the total displacement (in meters).

Word Bank

position

where an object is, measured as its distance from a starting point (in meters, m).

velocity

how fast position is changing, with a direction (in m/s); the slope of a position–time graph.

acceleration

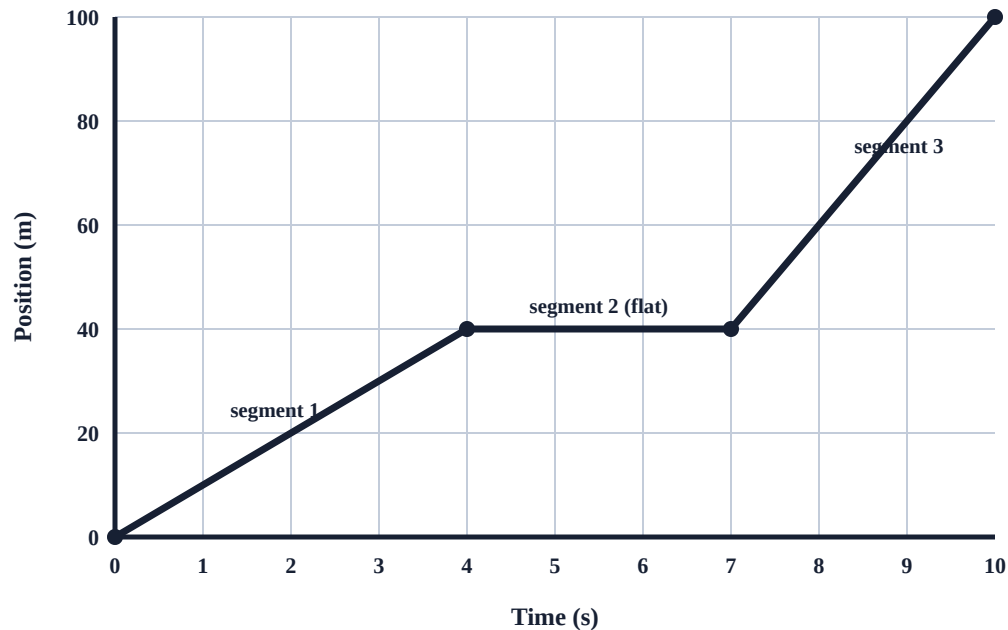
how fast velocity is changing (in m/s²); the slope of a velocity–time graph.

slope

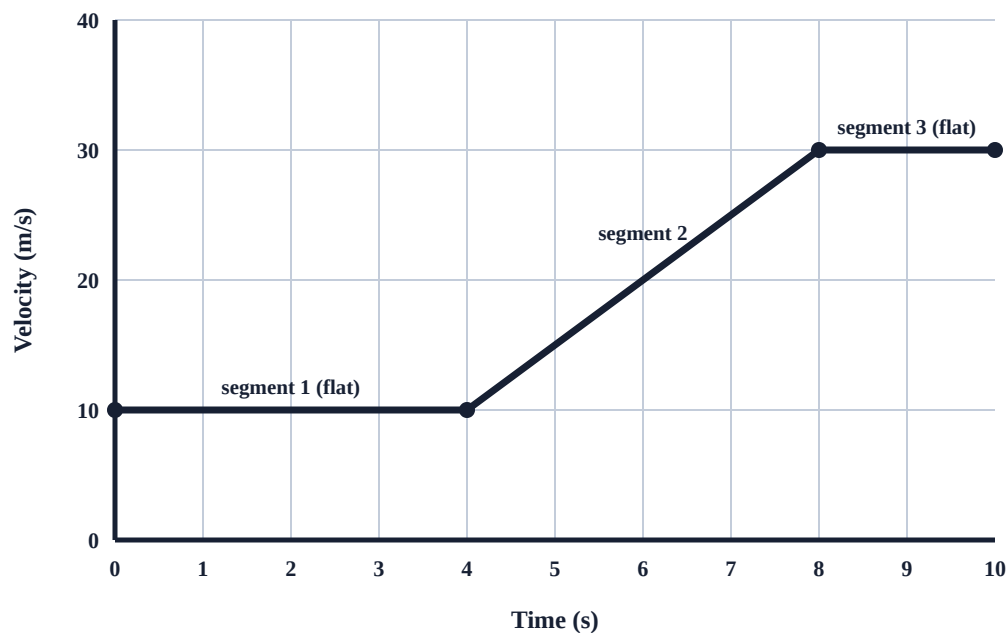
rise $\div$ run — the steepness of a line; equals velocity on a p–t graph and acceleration on a v–t graph.

displacement

the overall change in position (in meters); on a v–t graph it equals the area under the line.



Graph A. A **position–time** graph for **Object A**. Segment 1 (0–4 s) rises from 0 to 40 m; segment 2 (4–7 s) is flat at 40 m; segment 3 (7–10 s) rises from 40 to 100 m. The slope of each segment is the object's velocity there; the labels and gridlines — not color — carry the meaning, so the graph reads clearly in grayscale.



Graph B. A **velocity–time** graph for **Object B**. Segment 1 (0–4 s) is flat at 10 m/s; segment 2 (4–8 s) rises from 10 to 30 m/s; segment 3 (8–10 s) is flat at 30 m/s. On a v–t graph the slope of a segment is the acceleration, and the area under the line is the displacement.

3Using **Graph A**, describe in one sentence what Object A is doing during **segment 2** (from 4 s to 7 s), and say what the slope of that segment equals.

Apply Use the Graphs 20–25 min

Read values straight off the gridlines of Graph A and Graph B. Show your work and keep your **units** in every step. (These are original graphs for this packet.)

4**Read values off Graph A.** Fill in the position of Object A at each time.

- a) At $t = 0$ s, position = _____ m
- b) At $t = 4$ s, position = _____ m
- c) At $t = 7$ s, position = _____ m
- d) At $t = 10$ s, position = _____ m

5**Average velocity from a p–t segment.** Use Graph A, segment 1 (0 s to 4 s). Average velocity = (change in position) $\div$ (change in time). Show the formula, put in the numbers with units, and give the answer in m/s.

6**Compare two slopes on Graph A.** Find the average velocity of **segment 3** (7 s to 10 s) the same way, then state which is faster — segment 1 or segment 3 — and how you can tell from the **steepness** of the line.

7**Acceleration from a v–t segment.** Use Graph B, segment 2 (4 s to 8 s). Acceleration = $\Delta v \div \Delta t$ = (change in velocity) $\div$ (change in time). Show the formula, the numbers with units, and the answer in m/s^2 .

8**Match the motion to the graph.** Read each described motion and write **A** if it matches Graph A (position–time) or **B** if it matches Graph B (velocity–time). One statement is about a single segment; use the graphs to decide.

____ a) "The object is stopped for a while in the middle, then speeds up and covers ground faster than before." (Which graph shows a flat section, then a steeper rise?)

____ b) "The object moves at a steady 10 m/s, then steadily speeds up to 30 m/s, then holds 30 m/s." (Which graph shows velocity itself changing?)

9Error analysis — fix the mistake. A student looked at **Graph A** and wrote: "*During segment 2 (4 s to 7 s) the line is flat and high up on the graph, so the object must be moving very fast and steadily.*" This is wrong. In the box, explain **what the student confused** and give the **correct** interpretation of segment 2, including the velocity value.

Explain Claim–Evidence–Reasoning 7–10 min

Question 10. Using **Graph A**, write a short explanation describing Object A's motion over the full 10 seconds. Write a **claim** that states, in order, what the object does in each of the three segments; support it with **two pieces of evidence** (specific position and time values read from Graph A); then explain your **reasoning** using the idea that the slope of a position–time graph equals velocity.

Sentence stems you may use: "Object A first..., then..., and finally..." · "One piece of evidence is that at $t =$ ____ s the position is ____ m." · "A second piece of evidence is..." · "This shows the velocity because the slope of a position–time graph equals..."

Claim

Evidence (two pieces, with numbers from Graph A)

Reasoning

Close ACE Wrap-Up 5 min

Articulate

In your own words, explain what the **slope** of a line tells you on a position–time graph versus on a velocity–time graph.

Connect

Point to one segment of Graph A or Graph B where the object's velocity is **not changing**, and name the values that show it.

Extend

Describe a **new** real-life trip (walking, biking, driving) in three steps, and say what the shape of its position–time graph would look like for each step.

Continue Early Finisher & Block Extension optional · block ~+30 min

If you finish early (no new materials needed):

Sketch your own motion graph. On the back of this page, invent a short trip and draw its own **position–time** graph with a labeled time axis (seconds) and position axis (meters). Include at least one segment where the object is stopped (a flat line) and one segment that is steeper than another. Then write one sentence naming which segment is fastest and how the slope shows it.

Block-period extension — displacement as area under a v–t graph:

Using **Graph B**, find the **total displacement** of Object B over the full 10 s by calculating the **area under the line**. Break the area into pieces: segment 1 (0–4 s) is a rectangle; segment 2 (4–8 s) is a rectangle plus a triangle (velocity rises from 10 to 30 m/s); segment 3 (8–10 s) is a rectangle. Show the area of each piece with units (area = velocity $\times$ time for a rectangle; area = $\frac{1}{2} \times$ base $\times$ height for a triangle), then add them to get the total displacement in meters. Finally, state why the area under a v–t graph equals the distance the object traveled.

Turn in: Hand in this whole packet with your name, class period, and date filled in. Make sure questions 1–10 and the ACE box are answered. The early-finisher sketch and the block-period area calculation are optional but turn them in too if you did them.

HS_PHYS_MotionGraphs_01 — Interpreting Motion Graphs Student Packet



TEACHER ANSWER KEY FOLLOWS

Do not copy the pages after this divider for students.

Answer Key: Interpreting Motion Graphs

Course: Physics (Grades 9–12) **Subject:** Science **For teacher use only** Science

How to use this key

Answers are grouped by section and question number. Many items are open-ended; accept any response that shows correct reasoning even if the wording differs. All calculations are worked out in full with units. Notes flag where more than one answer is defensible and list common misconceptions to watch for. Estimated grading time: ~6–8 min per packet. A calculator is allowed, but every value here is doable by hand.

Start Notice & Wonder grade for effort · ~2 min

1 Notice/wonder about Graph A.

Full credit for any reasonable notice + wonder. **Ideal:** Notice — "the line goes up, then flattens out, then goes up more steeply." Wonder — "why is the last part steeper?" Accept any on-topic pair. *Science note (not required):* the changing steepness (slope) shows the object's velocity changing between segments.

2 What a flat line means on a position–time graph.

Accept any reasonable prior idea. **Target:** a horizontal (flat) line on a position–time graph means the position is **not changing**, so the object is **stopped** (velocity = 0). Do not penalize an incomplete first idea here — this is a warm-up, and Q9 revisits it directly.

Build Read the Science ~1 min

3 Graph A, segment 2 (4 s to 7 s).

During segment 2 the position stays at **40 m** — the line is flat — so Object A is **stopped (not moving)** from 4 s to 7 s. The slope of that segment is **0**, which equals a velocity of **0 m/s**. (Accept "at rest," "parked," "position not changing.")

Apply Use the Graphs ~3 min

4 Read values off Graph A.

- a) $t = 0 \text{ s} \rightarrow 0 \text{ m}$
- b) $t = 4 \text{ s} \rightarrow 40 \text{ m}$
- c) $t = 7 \text{ s} \rightarrow 40 \text{ m}$ (unchanged from $t = 4 \text{ s}$ — the flat segment)
- d) $t = 10 \text{ s} \rightarrow 100 \text{ m}$

5 Average velocity, Graph A segment 1 (0 s $\rightarrow$ 4 s) (worked).

average velocity = $\Delta\text{position} \div \Delta\text{time} = (40 \text{ m} - 0 \text{ m}) \div (4 \text{ s} - 0 \text{ s})$
 $= 40 \text{ m} \div 4 \text{ s} = 10 \text{ m/s}$.

(Full credit for the formula, correct substitution with units, and 10 m/s.)

6 Average velocity of segment 3 (7 s → 10 s) and which is faster (worked).

average velocity (seg 3) = $\Delta \text{position} \div \Delta \text{time} = (100 \text{ m} - 40 \text{ m}) \div (10 \text{ s} - 7 \text{ s})$
= $60 \text{ m} \div 3 \text{ s} = \mathbf{20 \text{ m/s}}$.

Segment 3 (20 m/s) is faster than segment 1 (10 m/s). You can tell because segment 3 is the **steeper** line — on a position–time graph a steeper slope means a greater velocity. *Defensible alternate:* a student who reports segment 3 is twice as fast (20 vs. 10 m/s) earns full credit.

7 Acceleration, Graph B segment 2 (4 s → 8 s) (worked).

acceleration = $\Delta v \div \Delta t = (30 \text{ m/s} - 10 \text{ m/s}) \div (8 \text{ s} - 4 \text{ s})$
= $20 \text{ m/s} \div 4 \text{ s} = \mathbf{5 \text{ m/s}^2}$.

(Full credit for the formula, correct substitution with units, and 5 m/s^2 . Accept $+5 \text{ m/s}^2$; the sign shows speeding up.)

8 Match the motion to the graph.

a) **A** — Graph A (position–time) shows a flat middle section (stopped, 4–7 s) followed by a steeper rise (segment 3), i.e., covering ground faster than before.

b) **B** — Graph B (velocity–time) is the one whose *velocity itself* changes: steady 10 m/s, then rising to 30 m/s, then steady 30 m/s. *Watch:* students who pick the wrong graph often confuse a rising position line with rising velocity; steer them to which axis says "velocity."

9 Error analysis — segment 2 of Graph A (fixed).

The mistake: the student confused a line that is **high on the graph** (a large *position* value) with a line that is **steep** (a large *velocity*), and read a flat line as "fast and steady."

Correct interpretation: in segment 2 the line is **horizontal at 40 m** from 4 s to 7 s. A flat line on a **position–time** graph means the position is **not changing**, so the slope is 0 and the object is **stopped** — velocity = **0 m/s**. Being "high up" (at 40 m) only tells you the object is 40 m from the start, not that it is moving fast. *Full credit* for naming the confusion (position/height vs. slope/velocity) and stating the object is stopped at 0 m/s.

Explain CER (Q10) ~2 min

10 Describe Object A's motion over 10 s.

Model answer. Claim: Object A first moves forward at a steady 10 m/s, then stops and stays still for a few seconds, and finally moves forward again even faster, at 20 m/s. Evidence: (1) From $t = 0 \text{ s}$ to $t = 4 \text{ s}$ the position rises from 0 m to 40 m. (2) From $t = 4 \text{ s}$ to $t = 7 \text{ s}$ the position stays at 40 m, and from $t = 7 \text{ s}$ to $t = 10 \text{ s}$ it rises from 40 m to 100 m. Reasoning: The slope of a position–time graph equals velocity. Segment 1's slope is $40 \text{ m} \div 4 \text{ s} = 10 \text{ m/s}$; the flat segment 2 has slope 0, so the object is stopped; segment 3's slope is $60 \text{ m} \div 3 \text{ s} = 20 \text{ m/s}$, the steepest, so it is the fastest part.

Defensible alternates: Accept any claim that names the three phases in order (move, stop, move faster) supported by two correct position–time readings and slope-based reasoning. A student may cite the 10 m/s and 20 m/s slopes directly as evidence.

CER scoring rubric (3 points)

Score	Claim	Evidence	Reasoning
3	Clear claim naming all three phases of Object A's motion in order (move, stop, move faster).	Two accurate position–time readings from Graph A (e.g., 0 m at 0 s and 40 m at 4 s; 40 m held to 7 s; 100 m at 10 s).	Correctly uses "slope of a p–t graph = velocity" to justify each phase, including flat = stopped and steeper = faster.

Score	Claim	Evidence	Reasoning
2	Claim stated, mostly clear; may miss one phase.	One solid reading, or two with a minor error.	Some correct slope-to-velocity linkage but incomplete or a small misconception.
1	Vague or partly correct claim.	Evidence weak, non-numeric, or not from Graph A.	Little or flawed reasoning; slope not tied to velocity.
0	No/incorrect claim.	No evidence.	No reasoning.

Close ACE ~1 min

ACE Articulate / Connect / Extend.

Articulate: accept any accurate statement, e.g., "on a position–time graph the slope is the velocity; on a velocity–time graph the slope is the acceleration."

Connect: a segment with constant velocity is Graph A segment 2 (flat at 40 m, velocity 0 m/s), or Graph B segment 1 (flat at 10 m/s) or segment 3 (flat at 30 m/s). The named values should match the flat line.

Extend: any coherent three-step trip with a matching p–t description (e.g., "walk steadily = straight rising line; wait at a corner = flat line; run = steeper rising line"). More than one answer is defensible.

Extend Early finisher & block extension (optional)

EF Sketch your own motion graph.

Reward a labeled position–time graph (time axis in seconds, position axis in meters) that includes at least one flat segment (stopped) and one segment visibly steeper than another, plus a sentence correctly identifying the steepest segment as the fastest and tying steepness to slope/velocity.

Block Displacement as area under Graph B (worked).

Total displacement = area under the v–t line, split into pieces:

- **Segment 1 (0–4 s):** rectangle = velocity $\times$ time = $10 \text{ m/s} \times 4 \text{ s} = 40 \text{ m}$.
- **Segment 2 (4–8 s):** velocity rises $10 \rightarrow 30 \text{ m/s}$ over 4 s.
rectangle (bottom) = $10 \text{ m/s} \times 4 \text{ s} = 40 \text{ m}$; triangle (top) = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4 \text{ s} \times (30 - 10) \text{ m/s} = \frac{1}{2} \times 4 \text{ s} \times 20 \text{ m/s} = 40 \text{ m}$.
segment 2 area = $40 \text{ m} + 40 \text{ m} = 80 \text{ m}$. (Equivalent: trapezoid = $\frac{1}{2} \times (10 + 30) \text{ m/s} \times 4 \text{ s} = 80 \text{ m}$.)
- **Segment 3 (8–10 s):** rectangle = $30 \text{ m/s} \times 2 \text{ s} = 60 \text{ m}$.

Total displacement = $40 \text{ m} + 80 \text{ m} + 60 \text{ m} = 180 \text{ m}$.

Why area = distance: velocity $\times$ time = distance for each thin strip of the graph; adding all the strips (the area under the line) adds up all the little distances, giving the total displacement. (Full credit for correct piece areas with units and a total of 180 m.)

Watch Common misconceptions

- **Confusing a position–time graph with a velocity–time graph.** On a p–t graph the slope is velocity; on a v–t graph the slope is acceleration and the *height* is velocity. Students often read Graph A's rising line as "velocity rising" — it is *position* rising. Always ask "what does the vertical axis say?"
- **"A horizontal line on a position–time graph means constant speed."** No — a flat line on a p–t graph means the position is not changing, so the object is **stopped** (velocity 0). A flat line means constant speed only on a v–t graph.
- **"Higher on the graph = faster."** Height on a p–t graph is *position* (how far from start), not speed. Speed is the **steepness** (slope). This is the exact error fixed in Q9.

- **"Steeper always means more of everything."** Steeper does mean faster on a p–t graph (greater velocity) and greater acceleration on a v–t graph — but students should name *which* quantity, and keep units straight (m/s vs. m/s²).
- **Dropping units.** Velocity is m/s, acceleration is m/s². Watch for answers like "5" without units in Q7, or mixing them up.

Teacher follow-up based on likely errors

If many students read Graph A's flat segment as "moving fast" (Q3, Q9), re-teach that on a position–time graph a flat line = stopped and steepness = velocity, using the board to contrast "high" with "steep." If the slope calculations in Q5–Q7 are shaky, model rise-over-run aloud with units ($\Delta\text{position} \div \Delta\text{time}$ for velocity; $\Delta v \div \Delta t$ for acceleration). If students pick the wrong graph in Q8, drill "read the vertical axis first." The Q9 error-analysis and the CER (Q10) responses show who can distinguish position from velocity — the highest-value idea to reinforce next class.

HS_PHYS_MotionGraphs_01 — Interpreting Motion Graphs Teacher Answer Key