

PHYSICS · CHAPTER 2

Motion in a Straight Line

A 1-page guide for parents · 90-second read.

EXPECTED MARKS

7 marks

TIME TO MASTER

8-10 hrs

HELPLINE

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WHAT THIS CHAPTER IS, IN PLAIN ENGLISH

This chapter is the foundation of all of mechanics — how an object's position changes with time when it moves along a single line (like a car on a straight road, or a ball dropped from a window). Your child is learning the difference between everyday words and physics words: 'distance' (the total ground covered) is not the same as 'displacement' (the straight-line gap from start to end). 'Speed' (how fast) is not the same as 'velocity' (how fast plus in which direction). They will also learn three master equations — $v=u+at$, $s=ut+(1/2)at^2$, and $v^2=u^2+2as$ — that together can solve almost any straight-line motion problem if you can identify which three of the five quantities (u , v , a , s , t) are given. The chapter ends with free fall under gravity and reading motion graphs. This chapter is heavily numerical and rewards practice; concepts are simple but sign conventions trip many students.

5 QUESTIONS TO ASK YOUR CHILD

- Tell me, in your own words, the difference between distance and displacement. Can displacement be zero when distance is not?
- What is the difference between speed and velocity? Why do we say velocity is a vector?
- Write down the three equations of motion from memory. Which one would you use if u , a , and t are given and you need to find s ?
- If a ball is thrown straight up, what is its acceleration at the highest point? (Trick question — answer: g downward, not zero.)
- Show me one solved free-fall numerical from your notebook. Walk me through every step including the sign convention.

WEAK-SPOT INDICATORS

- Cannot distinguish distance from displacement in a round-trip word problem — flag this immediately.
- Adds $(u+v)/2$ to find average velocity for ANY problem, instead of only uniformly accelerated motion.
- Says acceleration is zero at the highest point of a vertical throw — classic misconception, redo the topic.
- Cannot read slope of $x-t$ graph as velocity or area under $v-t$ as displacement.
- Forgets units (m , m/s , m/s^2) or direction in final answers — board examiners penalise this every time.

WHEN TO WORRY — AND WHAT TO DO

If your child cannot solve a single free-fall problem after 1 week of practice, or confuses distance with displacement repeatedly, request a one-on-one revision session with the faculty — these concepts cascade into all of mechanics.

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