# Motion: Chapter Introduction

**Class 9 Physics · Chapter: Motion**
🎬 **Video explanation (PrayogX reel):** https://www.instagram.com/reel/DfGnAGcjRzP/

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## 1. Are you really at rest?

Sitting on a chair you feel perfectly still. But the Earth spins (about 1,500 km/h at India's latitude) and goes round the Sun (about 1,07,000 km/h). Whether you are at rest or in motion depends on **what you compare with**.

**Rest or motion? It depends on the reference**



Relative to the chair: REST

Relative to the Sun: MOTION (~1,07,000 km/h)

Motion = change of position with time, measured from a reference point

## 2. What is motion?

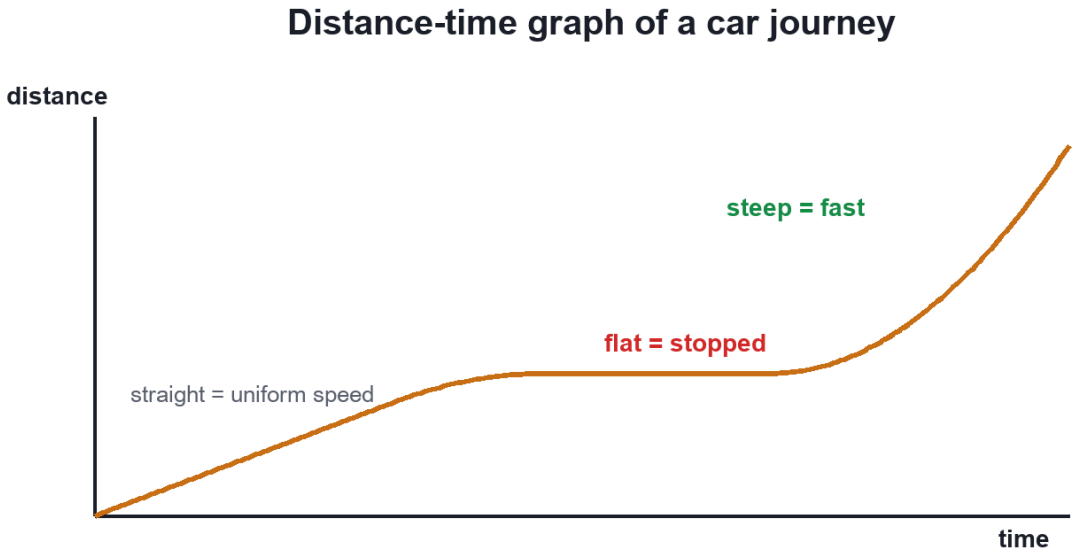
**An object is in motion when its position changes with time, relative to a reference point.**

| Term | Meaning |
|---|---|
| Reference point | The fixed point (origin) from which position is measured |
| Rest | Position does not change with time, relative to the reference point |
| Motion | Position changes with time, relative to the reference point |

## 3. The tools of this chapter

| Question | Tool |
|---|---|
| How far did it go? | Distance (path length) and Displacement (straight line, with direction) |
| How fast? | Speed (distance ÷ time) and Velocity (displacement ÷ time) |
| Is the speed changing? | Acceleration (change in velocity ÷ time) |
| The whole journey at a glance | Distance-time and velocity-time graphs |

# 4. The graph tells the story




- A straight sloping line: uniform speed.
- A flat line: the object is at rest (distance not changing).
- A line getting steeper: speeding up.

# 5. Key takeaways

- Motion is **relative**: always state the reference point.
- Motion = change of position with time.
- The chapter gives 4 tools: distance/displacement, speed/velocity, acceleration, graphs.

# Practice questions (CBSE style)

1. Define motion and rest. Why are they called relative terms? (2 marks)
2. A passenger sits in a moving train. Is she at rest or in motion? Explain with reference points. (2 marks)
3. What does a horizontal line on a distance-time graph show? (1 mark)

4. Name the quantity that tells how fast the velocity of a body changes. (1 mark)
5. Give one example each of a body at rest and in motion with respect to the same observer. (2 marks)

# Answer key with worked solutions

1. Motion: position changes with time; rest: position does not change, both relative to a reference point. They are relative because the answer depends on the chosen reference point.
2. At rest relative to the train (and her co-passengers); in motion relative to the platform or trees outside.
3. The body is at rest: its distance is not changing with time.
4. Acceleration.
5. For a person standing on a platform: a bench is at rest, a passing train is in motion.