

These terms describe the **motion** of a body:

1. Stationary
2. Constant speed or velocity
3. Accelerating
4. Decelerating

Remember: **Velocity** is the speed in a specific **direction**.

Motion is described using distance-time graphs and velocity-time graphs. It is important to work out which type it is before you start to describe the graph as the shapes represent different things on each type. **Look for the labelling on the axes to help recognise the graph.**

Motion	Distance-time	Velocity-time
Stationary		
Constant speed		
Acceleration		
Deceleration		

Calculating speed (or velocity)

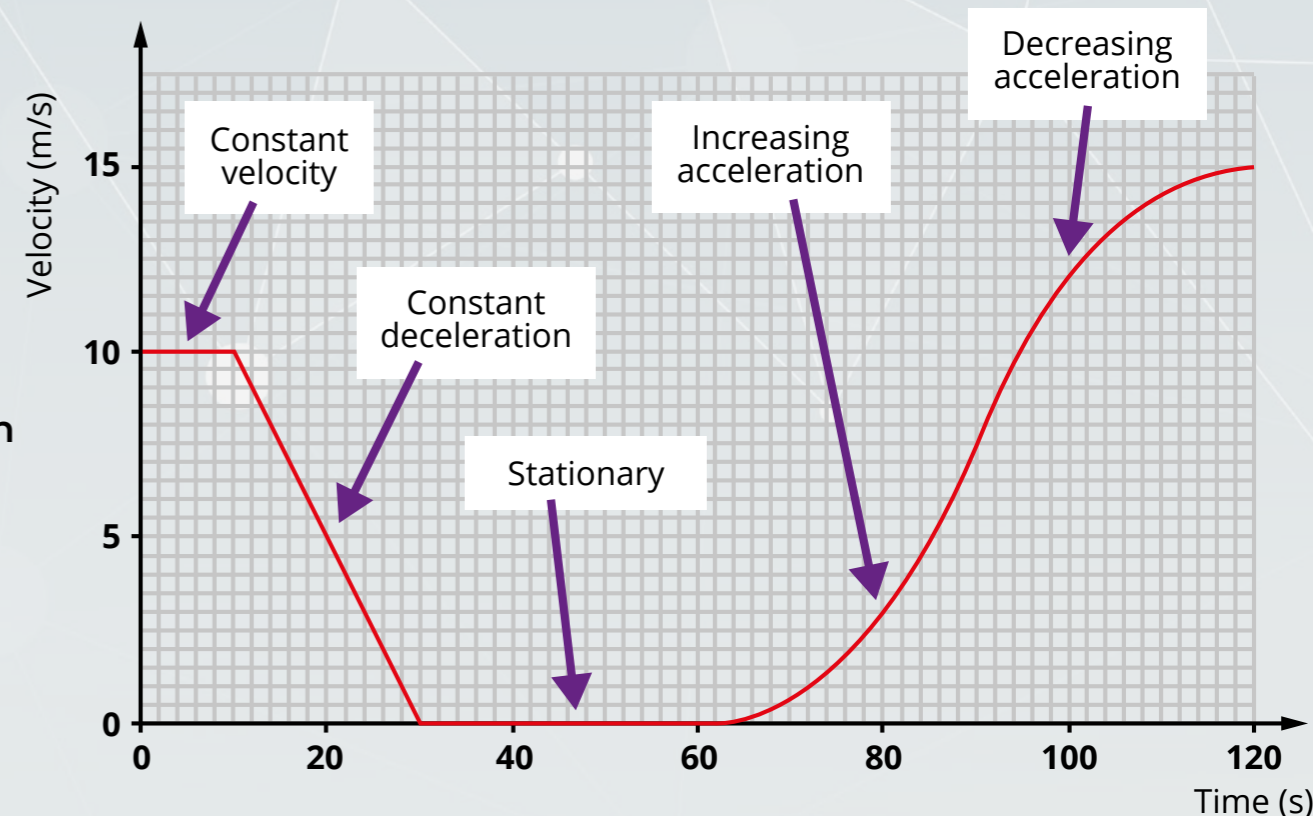
$$\text{Speed (m/s)} = \frac{\text{distance (m)}}{\text{time (s)}}$$

Calculating acceleration (or deceleration)

$$\text{Acceleration (m/s}^2\text{)} = \frac{\text{change in velocity (m/s)}}{\text{time (s)}}$$

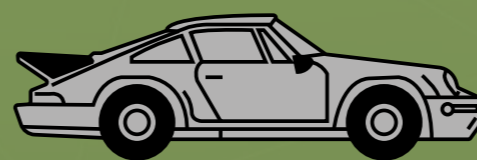
Using velocity-time graphs

The **acceleration** or **deceleration** can be calculated by calculating the **gradient of the line**.



The **distance** travelled can be calculated by calculating the **area under the line of the graph**.

Total stopping distance = Thinking distance + Braking distance



Thinking distance = 9m

distance = 14m

Car travelling at 13.5m/s (30mph) has a **total stopping distance of 23m**

This depends on the reaction time of the driver and is the **distance travelled between seeing the hazard and braking.**

This is the **distance the car travels whilst braking.**

Factors that affect the distance

- Speed
- Alcohol or drugs
- Tiredness
- Mobile phones

- Speed
- Road conditions (e.g. rain)
- Mass of the car
- Condition of the brakes
- Condition of the tyres