

# Year 7 Science knowledge organiser: P2 Energy

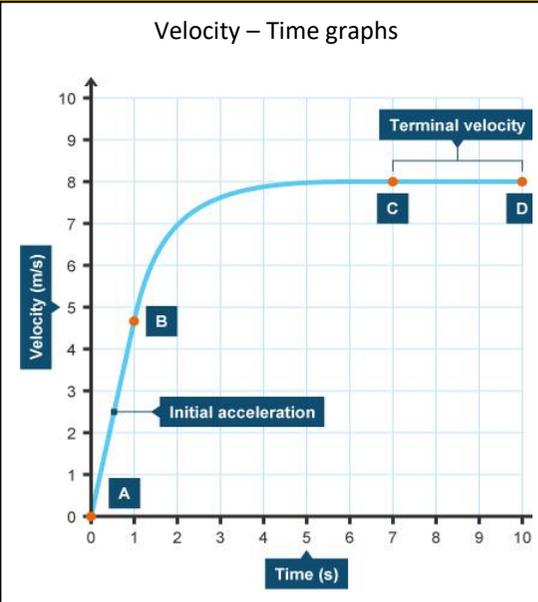
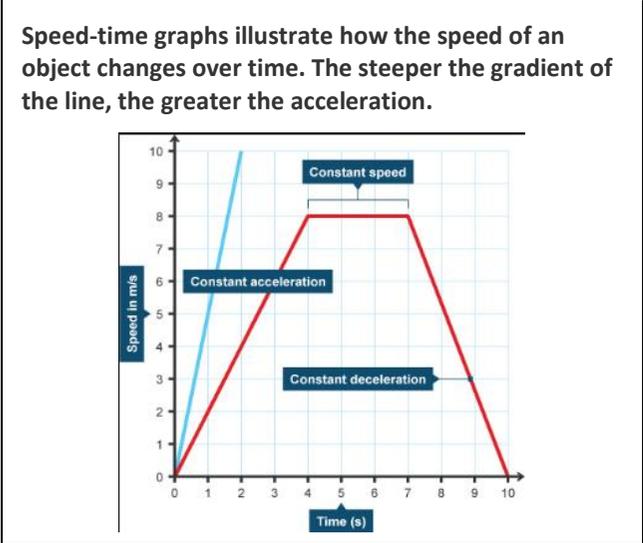
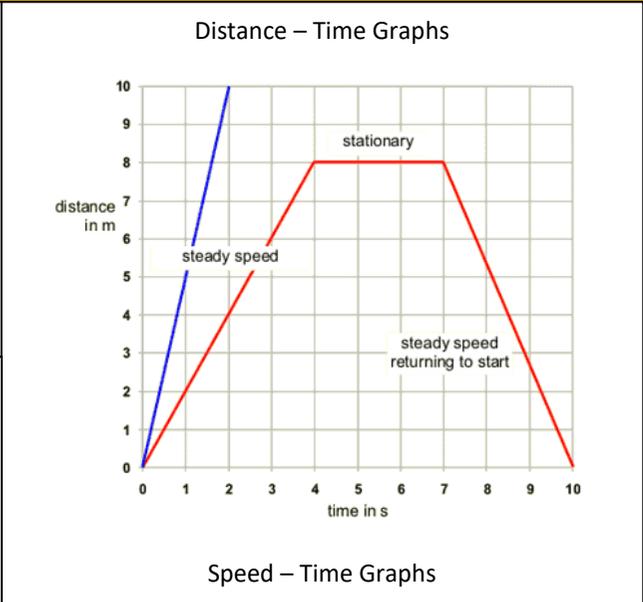
**Overview of topic:** This unit explored speed, acceleration and how these relate to time and forces. If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction. A straight line on a distance-time graph shows constant speed, a curving line shows acceleration. The higher the speed of an object, the shorter the time taken for a journey. This section will explore: Speed, distance time; Distance time graphs; Acceleration; Speed time graphs; Terminal velocity; Braking distances and safety.

## Key content/ ideas/ concepts Keywords/ Glossary

Calculating Speed

Calculating Acceleration

Velocity is speed in a particular direction. An object accelerates if its velocity changes.



**Stopping distance = thinking distance + braking distance**

Thinking distance can be increased by: greater speed, tiredness, alcohol and drugs, distractions

Braking distance can be increased by: greater speed, poor road conditions (icy, wet), car conditions (bald tyres, poor brakes, full of people)

The stopping distance is much **further** for **faster** speeds. Therefore: keep your **distance** from the car in front, especially if the road conditions are poor, Keep to the speed limit.

**Acceleration**- how quickly speed increases

**Deceleration** – how quickly speed decreases

**Speed** – a measure of how far something has travelled in a particular time e.g. metres per second

**Average speed** – total distance travelled divided by the total time taken to complete a journey.

**Relative motion** – when an object's speed is relative to the observer's speed.

**Instantaneous speed** – the speed an object is travelling at a particular moment

**Velocity** – the speed of something in a particular direction

**Terminal Velocity** – the maximum velocity achieved when opposite forces are balanced

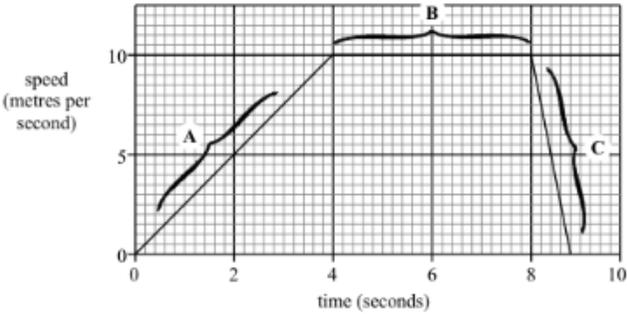
**Stopping Distance** – the total distance it takes for a car to stop.

**Thinking Distance** – the distance travelled in between the driver realising they need to brake and actually braking.

**Braking Distance** - the distance taken to stop once the brakes are applied.

**Wider reading**  
**BBC Bitesize**  
**CGP books**

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Self-Quiz Questions	Self-Quiz Questions	Challenge Self-Quiz Quizzing
1. Define Speed	1. Define relative motion	1. John cycled at a speed of 5km/h and the journey took 2 hours. How far did John cycle?
2. How do you calculate speed?	2. How do you calculate distance?	2. Calculate the speed: Sound travelling 1 km in 2.94 s. Give your answer in m/s.
3. How do you calculate acceleration?	3. How do you calculate change in speed?	3. Using the graph in Q5, calculate the acceleration of the runner during the first four seconds.
4. Draw a distance-time graph	4. Describe what each part of the distance-time graph mean	4. Name the differences between a distance-time graph and a speed-time graph
5. Draw a speed-time graph	5. Describe what each part of the speed-time graph mean	5. The graph shows the speed of a runner during an indoor 60 metres race. Describe what is happening at A, B and C 
6. Define terminal velocity	6. Describe where terminal velocity would be found on a velocity-time graph	6. A parachutist has jumped out of an aeroplane. Explain when the parachutist will reach terminal velocity
7. Define stopping distance	7. How do you calculate stopping distance?	 <p>7. Calculate the total stopping distance of the car.</p>
8. Define braking distance	8. Name 3 things that will affect your braking distance	8. A car is travelling on an icy road, describe and explain what might happen to the car when the brakes are applied.
9. Define thinking distance	9. Name 3 things that will affect your thinking distance	9. Explain how the factors that affect thinking distance and braking distance affect stopping distance.
10. Name 2 things that a driver can do to keep safe on the road	10. Describe the difference between instantaneous speed and average speed	10. Explain why the braking distance would change on a wet road.
Total score	Total score	Total score

## **Year 7 Science knowledge organiser: P2 Energy**