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Cambridge International AS and A Level
Physics
Workbook

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How to use this book

A **Chapter outline** appears at the start of every chapter to set the scene and to help with navigation through the book

Chapter outline

- define and use distance, displacement, speed and velocity
- describe laboratory methods for determining speed
- draw and interpret displacement–time graphs
- distinguish between scalar and vector quantities, and give examples
- add and subtract vector quantities

A list of **Key terms** are defined and explained clearly at the start of each topic



KEY TERMS

resultant force: the single force acting on a body that has the same effect as the sum of all the forces acting on it

Equations: force = mass × acceleration; $F = ma$
 weight = mass × gravitational field strength; $W = mg$

Each **Exercise** in every chapter helps students to practise the necessary skills for studying Chemistry at AS and A Level

Exercise 3.3 Force, mass and acceleration

Force, mass and acceleration are linked by the equation $F = ma$. In this equation, F represents the resultant force acting on mass m . This exercise gives you practice using and rearranging this equation.

- 1 a A truck of mass 40 000 kg accelerates at 1.20 m s^{-2} .
 Calculate the resultant force acting on the truck. Give your answer in kilonewtons (kN).
- b Calculate the acceleration of a ball of mass 2.8 kg when a force of 48 N acts on it.
- c A spacecraft accelerates at 0.40 m s^{-2} when a force of 200 N acts on it. Calculate the mass of the spacecraft.

Detailed **Learning support** is provided throughout to help students to tackle the different exercises and build confidence to answer questions independently.



TIP

You may find it simplest to calculate the car's average speed.

Exam-style questions allow students to thoroughly prepare for examinations and check answers which are provided on the CD-ROM at the back of the book.

Exam-style questions

- 1 A bullet of mass 25 g is travelling at 450 m s^{-1} when it strikes the armour plating of a tank. It bounces back along the same path with a speed of 390 m s^{-1} .
 - a Calculate the change in momentum of the bullet.
 - b The time of impact of the bullet on the tank is 0.040 s. Calculate the average force that acts on the bullet in this time.
 - c State whether the impact is elastic or inelastic.
 - d Discuss how the principles of conservation of energy and momentum apply to this collision.

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