Pages 34–35 Balanced and unbalanced forces

1 a FALSE

b TRUE

c TRUE

d FALSE

e TRUE

2 The chair is pushing up on the person sitting in it with an equal force acting in the opposite direction

3 a A

b B

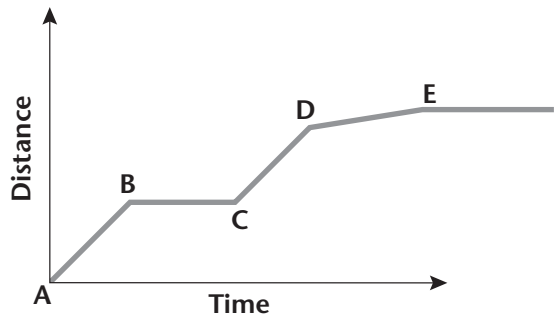
4 a B

b Because it has the greatest surface area *(1)* so that the force of the persons weight will be spread over the greatest possible area so will reduce the pressure *(1)* and reduce the risk of sinking into the ground

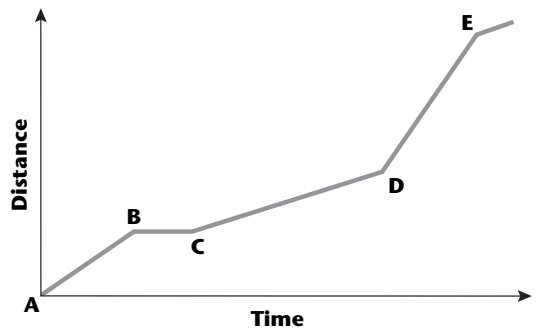
Pages 36–37 Speed and motion

1 a B and C

b



2



(5 marks in total, 1 for each section of the graph)

(1) = 1 mark

3

Speed	Distance	Time
50 km/h	250 km	5 h
15 m/s	1500 m	**100 s**
30 m/s	**9000 m**	300 s

(1 for each correct entry)

4 **a** 20 ÷ 40 = average speed = 0.5 miles per minute *or* 30 miles per hour

b 30 miles

Pages 38–39 Friction

1 **a** Box A *(1)* Box C *(1)*

b Box A would move to the left *(1)* Box C would move to the right *(1)*

c For the box to move the push force needs to be greater than the friction force

2 **a** Suitable friction from picture such as brakes, wheels on ground, etc.

b Suitable friction from picture such a where wheels meet axle, etc.

3 To reduce the friction between the moving parts *(1)* To prevent wear and tear *(1)* To reduce heating *(1)* *(Any 2, 1 mark each)*

4 Wear suitable clothing *(1)* Maintain streamlined position *(1)* Design of sleigh *(1)* *or* Any sensible suggestions *(1)* *(Any 3, 1 mark each)*

Pages 40–41 Streamlining and air resistance

1 Air resistance gets greater as you go faster

2 **a** To move quickly and easily through water as it is harder to move through water than through air

b Increases the top speed *(1)* which means that at any speed the force needed from the engine is less, so less fuel is used *(1)*

3 a Air resistance gets greater

b In all 4 diagrams, the downward arrow representing acceleration due to gravity should be the same

A The upward arrow is quite small as there is little air resistance

B Upward arrow is greater, almost as large as the downward force arrow as she nears terminal velocity

C Upward arrow increases a lot when the parachute is opened

D Upward arrow is greater still and equals the downward arrow as terminal velocity has been reached *(1 mark for each correct set of arrows)*

4 Terminal velocity

Pages 42–43 Gravity

1 10 newtons (10 N)

2 Towards the centre of the Earth (NOT downwards)

3

	On Earth	**In deep space**	**On the Moon**
Mass	**90 kg**	**90 kg**	90 kg
Weight	**900 N**	**0 N**	**150 N**

(1 mark for each correct entry)

4 a It would increase

b A larger planet has a larger gravitational force and as weight depends on mass and gravitational force *(1)* although his mass would stay the same, his weight would increase *(1)*

5 C

6 a Air resistance

b On the moon, there is no atmosphere so there is no air resistance

Pages 44–45 The Earth and beyond

1 The Moon orbits the Earth approximately once every **28 days**. The moon is a **non-luminous** object which we can see because it reflects the light from the Sun which is a **luminous** object.

The Earth orbits the Sun approximately once every **365 days**. This length of time gives us our **year**. The Earth is tilted on its axis so different parts of the Earth's surface face towards it at different times in its orbit around the Sun. This is what gives us **summer and winter**. The Earth also rotates on its own axis once every **24 hours** and this is what gives us **day and night**.

(1 mark for each correct choice)

2 **a** We can only see the part of the Moon that is facing towards the Sun *(1)* This changes as it orbits around the Earth *(1)*

b The Sun is much bigger than the Moon *(1)* but it is much much further away *(1)*

3 [Numbered list below is correct]

1 Mercury

3 Earth

4 Mars

5 Jupiter

7 Uranus

8 Neptune

9 Pluto

(1 mark for each correct answer)

4 **a**

The average distance from Venus to the Sun is…	150 million km
The average distance from Pluto to the Sun is…	0.38 million km
The average distance from Earth to the Moon is…	5900 million km
The average distance from Earth to the Sun is…	108 million km

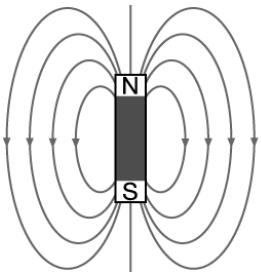
(1 mark for each correct line)

b The Sun

Pages 46–47 Magnetic forces

1 The suspended magnet will move away from one end of the piece of iron when it is brought close to it *(1)* because a magnet can attract an ordinary iron bar but it can only repel another magnet *(1)*

2



3 In an electromagnet, the magnetic field can be switched on and off, in a bar magnet it cannot be controlled in this way

4 Iron

5 **a** When the switch is pushed it completes the circuit and magnetises the iron core *(1)* This magnet attracts the iron bar in the door lock towards it so it moves to the left *(1)*

b When the switch is released, the core is no longer a magnet so the iron bar moves back to the right

c No

d The door lock only works because the electromagnet can attract the iron bar when the circuit is switched on *(1)* If the bolt was made of aluminium, which is not magnetic, this would not happen *(1)*