

Tier 3–6 5–7	Q No 9 1		
Part	Mark	Answer	Additional guidance
<b>a</b> 2/5b	2	any <b>two</b> from * less <b>or</b> no food * fewer <b>or</b> no places to nest <b>or</b> shelter  * less <b>or</b> no cover	Accept accept 'trees are producers' accept 'they have lost their home' accept 'their habitat is destroyed' accept 'they cannot hide from predators'
<b>b</b> 2/3a	1	any <b>one</b> from * more light * more water * more space * more nutrients	accept references to nutrients from trees left to rot accept 'photosynthesis can take place'
	1	* more photosynthesis can take place	
<b>c</b> 2/3c	1	any <b>one</b> from * to replace minerals <b>or</b> nitrates that have been removed (by plants) * plants absorb the minerals <b>or</b> nitrates * plants need minerals <b>or</b> nitrates to grow  * minerals <b>or</b> nitrates <b>or</b> they are plant nutrients	Accept accept 'minerals <b>or</b> nitrates get washed out of the soil'  accept 'so that plants can grow' accept 'plants can grow more'

Tier 3–6 5–7	Q No 9 1			
Part	Mark	Answer	Accept	Additional guidance
<b>d</b> 2/5a 2/5b	2	any <b>two</b> from * to provide food for animals * to provide shelter <b>or</b> nesting sites <b>or</b> habitats for birds <b>or</b> animals * trees absorb carbon dioxide * trees produce oxygen * the roots bind soil <b>or</b> prevent soil washing away	accept 'to provide homes for animals'  accept 'provides trees to be cut down in the future' accept 'they need trees for paper' <b>or</b> 'to get paper'	'it is good for the environment' is insufficient 'to help animals <b>or</b> birds survive' is insufficient
<b>Total</b>	<b>7</b>			

Tier 3–6 5–7	Q No 10 2			
Part	Mark	Answer	Accept	Additional guidance
<b>a i</b> 1/2k	1	* United States	accept 'US' <b>or</b> 'USA' accept 'America' accept lower case letters for 'US'	
<b>a ii</b> 1/2j	1	* the less starch eaten, the more people get cancer	accept the converse  accept 'starch helps to prevent cancer' accept 'you should eat a lot of starch'	<i>do not accept</i> 'people with cancer eat less starch'  'eat starch' is insufficient
<b>b i</b> 2/2a	1 1	* bread ✓ * pasta ✓		if more than two boxes are ticked, deduct one mark for each incorrect tick minimum mark zero
<b>b ii</b> 2/2c	1	* fibre ✓		if more than one box is ticked, award no mark
<b>Total</b>	<b>5</b>			

Tier 3–6 5–7	Q No 11 3		
Part	Mark	Answer	Additional guidance
<b>a</b> 2/2e	1	* The biceps contracts and the triceps relaxes. ✓	if more than one box is ticked, award no mark
<b>b</b> 2/2e	1	* to allow movement <b>or</b> bending	accept 'otherwise they would snap' 'to allow our arms to stretch' is insufficient
<b>c i</b> 2/2e	1	any <b>one</b> from * for smooth movement * to avoid <b>or</b> reduce friction * to prevent bones rubbing together <b>or</b> wearing down * to lubricate the joint	accept 'to protect the bones' accept 'to absorb shocks' 'so you can move <b>or</b> bend' is insufficient 'for protection' is insufficient
<b>c ii</b> 2/2e	1	any <b>one</b> from * the bones would rub together <b>or</b> wear down * pain * stiffness * movement would be difficult	accept 'more friction' accept 'arthritis' accept 'you cannot move <b>or</b> bend' 'friction' is insufficient <i>do not accept</i> 'the arm will not work'
<b>Total</b>	<b>4</b>		

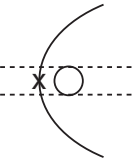
Tier 3–6 5–7	Q No 12 4		
Part	Mark	Answer	Accept Additional guidance
<b>a</b> 3/1d	1	* steel	do <b>not</b> accept 'stainless steel' do <b>not</b> accept 'carbon'
<b>b</b> 3/1d	1	* brass * solder	answers may be in either order <b>both</b> answers are required for the mark
<b>c</b> 1/2j	1	* 80	accept '100 – 20'
<b>d i</b> 3/3a	1	* it does not contain iron	accept 'it does not contain steel' accept 'only iron rusts' <b>or</b> 'only steel rusts' accept 'it is made of tin, copper and zinc'
<b>d ii</b> 3/3a	1	* oxygen	accept 'O <sub>2</sub> '
<b>Total</b>	<b>5</b>		

Tier 3–6 5–7	Q No 13 5			
Part	Mark	Answer	Accept	Additional guidance
a i 3/1h	1	* pale blue yellow red		answers may be in any order <b>all three</b> answers are required for the mark <i>do not accept</i> 'blue' for 'pale blue'
a ii 3/1h	1	* 2 because there are two spots on the paper	accept 'there are two colours from the green ink' accept 'because they are straight up from the green ink' accept 'it has dark blue and yellow' accept 'it shows two'	<b>both</b> the answer and the correct explanation are required for the mark
a iii 3/1h	1	* pencil any <b>one</b> from * because ink from the felt-tip pen is soluble <b>or</b> will dissolve in water * because pencil will not spread out <b>or</b> dissolve <b>or</b> run <b>or</b> smudge	accept 'the ink will also produce colours'  accept 'the ink expands'	<b>both</b> the answer and the correct explanation are required for the mark 'the pencil has no ink in it' is insufficient
b 3/2b	1	any <b>one</b> from * the ink would not dissolve in water  * the ink would dissolve in ethanol * ethanol is a solvent for the ink	accept 'the ink was water resistant <b>or</b> permanent <b>or</b> waterproof'  accept 'ethanol is a suitable solvent' accept 'ethanol can absorb the ink' accept 'ethanol washes out the ink' accept 'some substances will dissolve in one solvent but not another'	
<b>Total</b>	<b>4</b>			

Tier 3–6 5–7	Q No 14 6			
Part	Mark	Answer	Accept	Additional guidance
<b>a</b> 1/2d	1	any <b>one</b> from * they left the cloth in water for 30 minutes * they soaked the cloth for the same time	accept 'cloth in both bowls was egg-stained'	
<b>b</b> 1/2p	2	any <b>two</b> from * same cloth(s) in each bowl * same size fabric * same level of staining on cloth * same amount of each powder * same volume of water added * same temperature of water added * same pH of solutions  * repeat the test * stir <b>or</b> agitate the cloth * measure the water  * vary the amount of powder * time how long it takes for the stain to go * vary the amount of egg stain	accept 'same amount of egg' <b>or</b> 'same size stain'  accept 'use egg-stained cloth in water'  accept 'measure the powder'  accept 'longer time'  accept 'do it at different temperatures' accept 'use different washing powders'	<b>ways of improving the investigation may be:</b> <b>(i) a control</b>  <b>(ii) improved reliability</b> <b>(iii) improved procedure</b>  <b>(iv) extend the independent variable</b>  <i>do not accept</i> 'use different stains'
<b>c</b> 1/2a	1	any <b>one</b> from * whether the cloths are stained or not * level of staining <b>or</b> time taken to remove stain	accept 'how much egg is left on cloths' accept 'which cloth was the cleaner <b>or</b> cleanest'	'the cloth' <b>or</b> 'the stain' are insufficient
<b>Total</b>	<b>4</b>			

Tier 3–6 5–7	Q No 15 7		
Part	Mark	Answer	Accept Additional guidance
4/3a 4/4a 4/4c	1  1  1  1	<p>* A ship going out to sea goes out of sight.</p> <p>* We have day and night.</p> <p>* We have summer and winter.</p> <p>* One year on Earth is 365 days.</p>	<p>The Earth spins on its axis.</p> <p>The Earth is a sphere.</p> <p>The Earth orbits the Sun and the Earth's axis is tilted.</p> <p>Gravity attracts objects towards the Earth.</p> <p>The Earth orbits the Sun.</p> <p>if more than one line is drawn from an observation, award no mark for that observation</p>
<b>Total</b>	<b>4</b>		



Tier 3–6 5–7	Q No 16 8			
Part	Mark	Answer	Accept	Additional guidance
a 4/2b	1	* Mars	accept '6 kg'	do <b>not</b> accept '24 N'
b 4/2b	1	any <b>one</b> from * 4 kg weighs more on Earth * the weight of the object is greater on Earth	accept the converse accept the converse accept 'Earth is 40 N and Venus is 36 N' accept 'Earth is 40 and Venus is 36' accept 'more newtons on Earth' <b>or</b> 'less newtons on Venus' accept 'there is a greater force on Earth'	'different weights' is insufficient do <b>not</b> accept 'it has more mass on the Earth'
c 4/2b	1 1	* less (than) <b>or</b> smaller (than) <b>or</b> lower (than) * the same (as) <b>or</b> equal (to)		answers must be in the correct order
d i 4/4b	1	* the greater the distance the greater the time for one orbit	accept 'it increases'	
d ii 1/2j 4/4b	1	* an answer from 1.6 to 6 inclusive		
e 4/4c	1	* 		award a mark for X marked on the orbit within the tolerances shown
<b>Total</b>	<b>7</b>			

Tier 3–6 5–7	Q No 17 9	Part	Mark	Answer	Accept	Additional guidance
		<b>a</b> 4/2d	1	* B		
		<b>b i</b> 4/2c	1	* A and C	accept 'lift and weight'	answers may be in either order <b>both</b> letters are required for the mark
		<b>b ii</b> 4/2c	1	* D and B	accept A and C	answers may be in either order <b>both</b> letters are required for the mark
		<b>c i</b> 4/2c	1	* Force D is greater than force B. ✓		if more than one box is ticked, award no mark
		<b>c ii</b> 4/2c	1	* Force A is greater than force C. ✓		if more than one box is ticked, award no mark
		<b>Total</b>	<b>5</b>			

Tier 5–7	Q No 10														
Part	Mark	Answer	Accept Additional guidance												
<b>a i</b> 2/1c	1	* oviduct <b>or</b> fallopian tube													
<b>a ii</b> 2/1c	1	* cilia move in a wave <b>or</b> from side to side	accept 'they waft <b>or</b> carry it along' accept 'the hairs move it along' accept 'the hairs <b>or</b> cilia waft <b>or</b> move'  'the hairs' <b>or</b> 'the cilia' are insufficient												
<b>b i</b> 2/2h	1	* <i>embryo</i> : stage 3 <i>foetus</i> : stage 4	accept '3' accept '4'  <b>both</b> answers are required for the mark												
<b>b ii</b> 2/2h	1	* uterus	accept 'womb'												
<b>c i</b> 2/4a	2	any <b>two</b> from * a reference to genes <b>or</b> genetic material <b>or</b> DNA <b>or</b> chromosomes * it has a different combination (of genes) * it is made from an egg and sperm * (it gets genetic information) from both parents	accept for one mark 'to be the same as someone else you need exactly the same genes'  accept for two marks 'it only has half the DNA <b>or</b> chromosomes from each parent'												
<b>c ii</b> 2/4a	1	<table border="1"> <thead> <tr> <th>human characteristic</th> <th>inherited only</th> <th>inherited and affected by environmental conditions</th> </tr> </thead> <tbody> <tr> <td>eye colour</td> <td>✓</td> <td></td> </tr> <tr> <td>skin colour</td> <td></td> <td>✓</td> </tr> <tr> <td>weight</td> <td></td> <td>✓</td> </tr> </tbody> </table>	human characteristic	inherited only	inherited and affected by environmental conditions	eye colour	✓		skin colour		✓	weight		✓	<b>all three</b> ticks are required for the mark if there is more than one tick in any row, award no mark
human characteristic	inherited only	inherited and affected by environmental conditions													
eye colour	✓														
skin colour		✓													
weight		✓													
<b>Total</b>	<b>7</b>														

Tier 5–7	Q No 11			
Part	Mark	Answer	Accept	Additional guidance
		<p><b>markers should read the answers to parts a and b before marking this question</b></p> <p><b>parts a and b should be marked together</b></p>		
<b>a</b> 1/2d	1	* temperature of the water	accept 'temperature' accept 'room temperature'	<i>do not accept</i> responses that describe rates of heating
	1	any <b>one</b> from * rate of evaporation * time taken for all the water to evaporate * volume <b>or</b> mass <b>or</b> amount of water lost in a fixed time	accept 'the time for it to evaporate' accept 'measure how much water is left after a certain time'	answers must refer to both time taken and amount of water lost 'time taken' is insufficient
	1	any <b>one</b> from * starting volume of water  * shape of container * same ambient conditions	accept 'the amount of water' accept a specified volume of water  accept 'room temperature' if the independent variable is 'water temperature'	'same heater' and 'same starting measurement' are insufficient
<b>b</b> 1/2i	1	* a column <b>or</b> row indicating temperature <b>and</b> a column <b>or</b> row indicating time <b>or</b> volume lost <b>or</b> volume remaining	accept a column <b>or</b> row indicating 'rate of evaporation' accept 'amount lost' <b>or</b> 'amount remaining'	<b>both</b> headings are required for the mark the units of measurement are not necessary for the mark the second column <b>or</b> row should be consistent with the dependent variable identified in part <b>a</b> ignore other columns in the table
<b>Total</b>	<b>4</b>			

Tier 5–7	Q No 12																							
Part	Mark	Answer	Accept	Additional guidance																				
<b>a</b> 3/3c	1	*		award one mark for each correct row																				
	1	*																						
	1	*																						
		<table border="1"> <thead> <tr> <th></th> <th>copper</th> <th>iron</th> <th>magnesium</th> <th>zinc</th> </tr> </thead> <tbody> <tr> <td>calcium nitrate</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>copper nitrate</td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>iron nitrate</td> <td>X</td> <td></td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>			copper	iron	magnesium	zinc	calcium nitrate	X	X	X	X	copper nitrate		✓	✓	✓	iron nitrate	X		✓	✓	
	copper	iron	magnesium	zinc																				
calcium nitrate	X	X	X	X																				
copper nitrate		✓	✓	✓																				
iron nitrate	X		✓	✓																				
<b>b</b> 3/3a 3/3e	2	*	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 40%;">calcium carbonate + hydrochloric acid</div> <div style="border: 1px solid black; padding: 5px; width: 40%;">no reaction</div> </div>	if all three answers are correct, award two marks if one <b>or</b> two answers are correct, award one mark if more than one line is drawn from a pair of reactants, award no credit for that pair																				
			<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 40%;">magnesium + hydrochloric acid</div> <div style="border: 1px solid black; padding: 5px; width: 40%;">a chloride, carbon dioxide and water are formed</div> </div>																					
			<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 40%;">copper + hydrochloric acid</div> <div style="border: 1px solid black; padding: 5px; width: 40%;">a chloride and hydrogen are formed</div> </div>																					
<b>Total</b>	<b>5</b>																							

Tier 5–7	Q No 13			
Part	Mark	Answer	Accept	Additional guidance
<b>a</b> 3/1b	1	any <b>one</b> from * liquids <b>or</b> they take up less space * liquids <b>or</b> they are denser	accept 'particles are closer together in a liquid' accept 'particles are further apart in a gas'	<i>do not accept</i> 'liquids are heavier' 'liquids are easier to transport' is insufficient
<b>b</b> 3/1e	1	* there is no oxygen in space	accept 'there is no air in space' accept 'space is a vacuum'	
<b>c</b> 3/1e	1	any <b>one</b> from * the weight of the fuel decreases * there is less fuel on board * fuel is being used up  * water is released	accept 'hydrogen and oxygen <b>or</b> oxygen is being used up' accept 'waste gas is given off'	'gravity gets weaker' is insufficient
<b>d i</b> 1/2k	1	* 27 * 16.5	accept a number from 16.3 to 16.7	<b>both</b> answers are required for the mark
<b>d ii</b> 4/2c	1	* 10.5	accept the difference between the numbers given in <b>d i</b>	consequential marking applies
<b>d iii</b> 4/2c	1	any <b>one</b> from * up to 10 seconds the weight is greater than the (upward) force * after 10 seconds there is a resultant <b>or</b> net (upward) force * after 10 seconds the (upward) force is greater than the weight	accept the converse	<b>answers must be in terms of a comparison</b> 'it does not have a great enough upward force' is insufficient 'at 10 seconds the forces are equal' is insufficient
<b>Total</b>	<b>6</b>			

Tier 5–7	Q No 14			
Part	Mark	Answer	Accept	Additional guidance
<b>a</b> 1/2i	1	* X-axis: mass of magnesium (g) Y-axis: mass of magnesium oxide (g)		<b>both</b> labels are required for the mark units are required for the mark pupils can gain credit for correct responses to other parts if the axes are wrongly labelled <b>or</b> magnesium is on the Y-axis and magnesium oxide is on the X-axis scale need not begin at zero
	1	* reasonable scales	accept a scale of 1 g <b>or</b> 2 g per 5 small squares	
	1	* reasonably accurate plotting of all points	all points plotted to $\pm 1$ small square	
	1	* a line of best fit drawn		
<b>b i</b> 1/2n <b>b ii</b> 1/2n	1	* E		pupils can gain credit for a response which suggests they should predict the correct value from the pattern <b>or</b> ignore the anomalous results <b>or</b> repeat the reading
	1	any <b>one</b> from * ignore it in drawing the line of best fit * they could predict the figure from the line of best fit * they should repeat the reading	accept 'ignore it' accept 'they could use the graph line'  accept 'check it'	
<b>c</b> 1/2l	1	* a number from 11 to 13	accept a value consistent with the line of best fit	the unit is not required for the mark

Tier 5–7	Q No 14		
Part	Mark	Answer	Accept Additional guidance
d 1/2k	1	any <b>one</b> from * the greater the mass of magnesium burned the greater the mass of oxide formed * the magnesium and oxygen react in fixed proportions * the mass of magnesium oxide formed is proportional to the mass of magnesium burned * the greater the mass of magnesium the greater the mass of oxygen that combines with it	
<b>Total</b>	<b>8</b>		