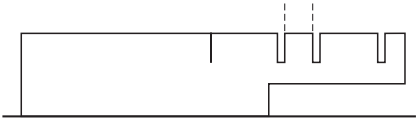
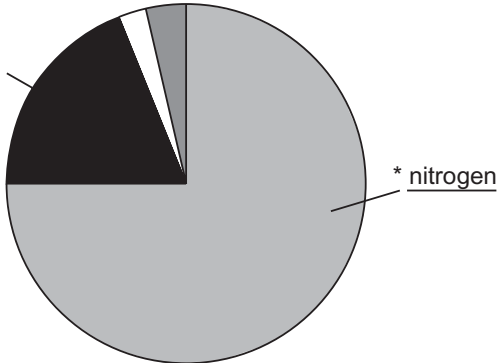


Tier 3–6 5–7	Q No 9 1			
Part	Mark	Answer	Accept	Additional guidance
a i 4/2e	1	* it is between 20 g and 40 g	accept a number greater than 20 and less than 40	'more than 20' or 'less than 40' are insufficient
a ii 4/2f	1	any one from * cut a slot between 20 and 40 * cut more slots	accept 'add a mark for 30' accept 'add more weights'	award a mark for an answer referring to cutting a slot for any mass between 20 g and 40 g
b i 4/2f	1	any one from * it is on the wrong side of the pivot * it would not make the scale tip	accept 'it is past the pivot line' accept 'the scale is supported on this side' accept 'it does not produce a clockwise moment'	award a mark for an answer indicating that it is on the wrong side of the pivot <i>do not accept</i> 'because the cardboard would tilt the other way' 'it would not work' is insufficient
b ii 4/2f	1	* a line drawn between the 40 g and 100 g slots 		accept answers which clearly indicate the correct position on the diagram the line must not touch the slots for 40 g or 100 g
Total	4			

Tier 3–6 5–7	Q No 10 2			
Part	Mark	Answer	Accept	Additional guidance
a 4/3j	1	* pluck them harder	accept 'make the strings vibrate more or move more'	<i>do not accept</i> 'make the strings vibrate more quickly'
b 4/3k	1	* The sound has a higher pitch. ✓		if more than one box is ticked, award no mark
c 4/3k	1	* the sound from the thicker string has a lower pitch or a lower frequency	accept 'it has a lower pitch or a lower frequency' accept 'the sound from the thicker string is louder' or 'it is louder'	answers must include a comparison 'it is lower' is insufficient
d i 4/3k	1	* the sound in A has a higher pitch or a higher frequency	accept 'it has a higher pitch or higher frequency'	answers must show a comparison 'the vibrations are quicker' is insufficient 'it is higher' is insufficient
d ii 4/3j	1	* the sound in A is louder	accept 'it is louder' accept 'the sound in C is quieter' accept 'it has a greater amplitude'	'the vibrations are stronger or of greater amplitude' is insufficient <i>do not accept</i> 'it is higher'
Total	5			

Tier 3–6 5–7	Q No 11 3		
Part	Mark	Answer	Additional guidance
a i 1/2i	1	* point plotted for (150, 1.5) to \pm half a small square	the anomalous point should be avoided the line need not be drawn through the origin
a ii 1/2j	1	* line of best fit	
b 1/2j	1	* point at (300, 3.8) circled	accept this result circled in the table
c i 1/2k	1	* a number from 640 to 660	consequential marking applies to both c i and c ii accept answers consistent with the graph drawn
c ii 1/2k	1	* a number from 0.4 to 0.6	
d 1/2n	1	any one from * the pattern is revealed or observed more easily * it tells you the pattern without working it out * it gives readings between the recorded readings * you can see if there are results that are wrong or do not fit the pattern	accept 'it allows you to see a pattern' accept 'you can tell the rule by looking at it' accept 'it is easier to make predictions' accept 'it shows better or more quickly the more mass the more weight' accept 'the data is continuous' <i>do not accept</i> 'it is more accurate or precise'
Total	6		

Tier 3–6 5–7	Q No 12 4		
Part	Mark	Answer	Additional guidance
a i 3/1d	1	any one from * iron * copper	accept 'calcium'
a ii 3/1d	1	any one from * sulphur * chlorine	accept 'oxygen' or 'carbon'
a iii 3/1e	1	any two from * calcium carbonate * calcium oxide * carbon dioxide * iron sulphide	answers may be in either order both answers are required for the mark accept 'copper chloride'
b 3/1e	1	any one from * the iron reacted or combined with sulphur * the sulphur had mass	accept 'the iron gained sulphur' or 'sulphur was added to the iron' accept 'the iron has joined with the sulphur' accept 'the sulphur weighed 0.8 g' <i>do not accept</i> 'iron has mixed with the sulphur' <i>do not accept</i> 'sulphur or iron added a new layer'
c 3/1f	1	* copper chloride	
Total	5		

Tier 3–6 5–7	Q No 13 5	Part	Mark	Answer	Accept	Additional guidance
		a 3/1g	2	 <p>* oxygen</p> <p>* nitrogen</p>		
		b 3/2c	1 1	* water vapour * condenses	accept 'vapour'	'water' or 'moisture' are insufficient
		c i 2/2k c ii 2/2j	1 1	* respiration * Air breathed out has more carbon dioxide and less oxygen than air breathed in. ✓		if more than one box is ticked, award no mark
		Total	6			

Tier 3–6 5–7	Q No 14 6												
Part	Mark	Answer	Additional guidance										
a i 2/3c	1	* magnesium											
a ii 2/3c	1	any one from * a potted plant has a limited amount of soil or minerals * less chance of minerals being returned to the soil by dying or decaying plants or by microbes or fungi or bacteria or worms * no room for roots to extend and find more minerals	accept the converse accept 'no room for roots to grow'										
b i 3/1c	3	* <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>mineral</th> <th>letter of fertiliser</th> </tr> </thead> <tbody> <tr> <td><i>magnesium</i></td> <td>B</td> </tr> <tr> <td><i>nitrogen</i></td> <td>A or C</td> </tr> <tr> <td><i>phosphorus</i></td> <td>D</td> </tr> <tr> <td><i>potassium</i></td> <td>C</td> </tr> </tbody> </table>	mineral	letter of fertiliser	<i>magnesium</i>	B	<i>nitrogen</i>	A or C	<i>phosphorus</i>	D	<i>potassium</i>	C	<p>accept 'Epsom Salts' or 'MgSO₄' or 'magnesium sulphate'</p> <p>accept 'A and C' or 'Easy Grow' or 'NH₄NO₃' or 'ammonium nitrate' or 'Saltpetre' or 'KNO₃' or 'potassium nitrate'</p> <p>accept 'Superphosphate' or 'Ca(H₂PO₄)₂'</p> <p>accept 'Saltpetre' or 'KNO₃' or 'potassium nitrate'</p>
mineral	letter of fertiliser												
<i>magnesium</i>	B												
<i>nitrogen</i>	A or C												
<i>phosphorus</i>	D												
<i>potassium</i>	C												
b ii 3/1f	1	* 3											
b iii 3/1f	1	* 9											
Total	7												

answers must indicate that the soil available to the potted plant is limited **or** may not be replenished
'the garden has more minerals' is insufficient
'lack of sunlight' is insufficient

if all four answers are correct, award three marks
if three answers are correct, award two marks
if one **or** two answers are correct, award one mark

Tier 3–6 5–7	Q No 15 7			
Part	Mark	Answer	Accept	Additional guidance
a 2/5e	1	any one from * it only eats other animals * it only eats meat or fish or flesh	accept 'predator' accept 'eats meat'	
b i 2/5c	1	any one from * it protects it * it stops it being damaged * it stops it drying out * it prevents infection * it keeps out disease organisms	accept 'it stops it being eaten' accept 'it keeps the contents in' accept 'it stops bacteria or viruses or germs getting in' accept 'it allows air or oxygen in or carbon dioxide out'	<i>do not accept</i> 'it keeps it warm'
b ii 3/3g	1	* it reacts with the carbonate	accept 'they react' or 'it reacts with it' accept 'acid reacts with the shell' accept 'it dissolves the shell' accept 'it erodes it' or 'wears it away'	
b iii 2/5c	1	any one from * makes it easier or quicker or easy to hatch or break out of the egg * makes the shell more porous	accept 'air or oxygen gets in easily' or 'more air gets in' accept 'carbon dioxide gets out more easily'	'easy or easier to break' is insufficient 'to allow for growth' is insufficient

Tier 3–6 5–7	Q No 15 7		
Part	Mark	Answer	Additional guidance
c i 1/2k	1	any one from * keep the eggs between 26°C and 30°C * keep the temperature at or below 30°C * keep the eggs at 26°C	'make it cooler' or 'use lower temperatures' are insufficient accept any temperature from 26°C to 30°C accept 'use the three lower temperatures' or 'the lower temperatures in the table'
c ii 1/2j	1	* between 32°C and 34°C ✓	if more than one box is ticked, award no mark
Total	6		

Tier 3–6 5–7	Q No 16 8			
Part	Mark	Answer	Accept	Additional guidance
a 1/2a	1	any one from * the distance the ruler dropped * where the hand grabbed the ruler	accept 'how far until they caught it' accept 'length or measurement on the ruler' accept 'where she caught it' accept 'mm' or 'cm'	'ruler' is insufficient 'length of ruler' is insufficient
b 1/2e	1	any one from * to avoid the effect of his own reaction time * the time is too short to measure with a stopwatch	accept 'he might stop the watch before or after she reacted' accept 'you cannot stop a stopwatch straightaway' accept 'it might be too fast for the stopwatch'	'the time keeper would not have been as accurate' is insufficient 'you can time incorrectly' is insufficient 'the ruler is more precise' is insufficient
c 1/2d	1	* pupils	accept 'pupil' or 'friend' or 'person' or 'human'	
d 1/2d	2	any two from * the position of the ruler above the hand * the way the ruler is released * the ruler * distance between finger and thumb * the conditions in the room * measure to same finger of catcher	accept 'height of ruler' accept 'the height it is dropped from' accept 'handedness' accept 'the same person dropping it' accept 'position of hand' or 'position of ruler' accept examples of possible distractions	'where he put his hand on the ruler' is insufficient
e 1/2h	1	* repeat the investigation or it	accept 'do more than one test with each person'	<i>do not accept</i> 'use more people'
Total	6			

Tier 5–7	Q No 9			
Part	Mark	Answer	Accept	Additional guidance
a i 4/5e	1	* kinetic	accept 'movement' or 'motion'	
a ii 4/5e	1	* sound	accept 'kinetic' or 'movement' or 'motion'	
b 4/5e	1	any one from * loud sounds dissipate more energy than quieter sounds * energy is transferred more quickly * more potential or kinetic energy is converted to sound	accept 'energy is used or needed more quickly' accept 'it is using more power' or 'more energy is transferred per second' accept 'more energy is converted to sound'	answers must refer to 'energy' or 'power' <i>do not accept</i> 'it uses more electricity'
c 4/5c 4/5e	1	any one from * solar energy or light energy is used * less energy is provided by or taken from the spring * energy is provided by the solar cell	accept 'the radio is run by sunlight or light' accept 'the light provides a second source of energy' accept 'the radio is run by the Sun' accept 'the radio has two sources of energy'	
d 4/5c BS/1c	1	any one from * batteries or mains electricity are not available * batteries or mains are not needed * people cannot afford batteries or mains electricity	accept 'the energy resource is free' accept 'they are cheap to run'	'they are cheap' is insufficient
Total	5			

Tier 5–7	Q No 10			
Part	Mark	Answer	Accept	Additional guidance
a i 4/2g	1	* 100	accept '200 ÷ 2.0'	
	1	* N/cm ²	accept '10 ⁶ N/m ² ' or '10 ⁶ Pa' for two marks	
a ii 4/2g	1	* 800	accept '100 × 8' accept the numerical answer to a i × 8	the unit is not required for the mark
b i 3/1b 4/2g	1	any one from * air or gas can be compressed * water or liquids cannot be compressed * gaps between particles of air or gas can be reduced	accept 'gases are easier to compress' accept 'atoms can be compressed together'	'air or gas provides less resistance' is insufficient
	b ii 4/2g	1	any one from * less force would be transmitted to the brakes * less pressure at B * piston B would not move	accept 'the brakes have less effect' accept 'less pressure could be produced' accept 'less or no resistance to the brakes' accept 'the air bubbles could be compressed'
Total	5			

Tier 5–7	Q No 11			
Part	Mark	Answer	Accept	Additional guidance
a 3/2f	1	any one from * it cools more slowly * large volume of magma * magma is insulated by rock * heat is transferred more slowly to rock than to air * lava cools more quickly	accept 'it cools slowly' or 'it is cooler above ground' accept 'there is a lot of it' accept 'magma is surrounded by rock' accept 'it is hotter underground'	
b i 3/2e	1	* crystals formed underground will be larger	accept the converse accept 'they will be larger'	
b ii 3/2e	1	any one from * magma cools more slowly than lava * lava cools more quickly than magma	accept 'magma cools slowly' accept 'lava cools quickly' accept 'there is no rock above the lava'	<i>do not accept 'bigger crystals cool more slowly'</i>
c i 3/2f	1	any one from * high temperatures * high pressure	accept 'heat' or 'hot' accept 'pressure'	
c ii 3/2f	1	* marble		
Total	5			

Tier 5–7	Q No 12			
Part	Mark	Answer	Accept	Additional guidance
a i 1/2e	1	any one from * the effect of adding no extra insulation to the windows and roof * it provides a baseline measure * the temperature without any effort to reduce the heat loss	accept 'effect of not adding insulation' accept 'as a comparison or control' accept 'how much energy is normally lost' accept 'how much heat single glazing keeps in' accept 'what would happen if we did nothing'	
a ii 1/2a	1	* double glazing <i>and</i> roof without insulation and a roof with insulation <i>and</i> single glazing		answers may be in either order both answers are required for the mark
b 1/1b	1	any one from * a longer time (roof insulation) to fall between two temperatures * smaller temperature fall (roof insulation) in a given time	accept 'slower heat loss for insulation' accept 'faster heat loss for double glazing' accept 'more heat loss for double glazing' accept 'roof insulation stays warmer than double glazing' accept 'if it is quicker for the house to reach a given temperature'	
c 1/2j	1 1	* both lines or curves starting from the same temperature, descending and approaching (not crossing) the room temperature line * the solid line or curve descending more steeply than the other		allow a difference of 5 small squares at the start accept correctly labelled curves which do not use solid and dotted lines as required by the question
Total	5			

Tier 5–7	Q No 13			
Part	Mark	Answer	Accept	Additional guidance
a 2/1c	1	any one from * it is streamlined * it has a pointed head * it does not have much cytoplasm	accept 'there are enzymes in the head'	<i>do not accept</i> 'it is slimline' 'its shape' is insufficient 'it has a nucleus' is insufficient as it is not a specific adaptation of a sperm cell
b i 2/1b	1	any one from * in the cytoplasm of the bacterium * in a nucleus or within a membrane in the cell from the intestine	accept 'the bacterium does not have a nucleus or nuclear membrane' accept 'in the bacterium it is not enclosed'	
b ii 2/1b 2/4a	1	any one from * it determines the characteristics of the cell * it transfers information	accept 'gives the cell instructions' accept 'it tells the cell what to do' accept 'to control the cell' accept 'allows the cell to reproduce'	
c 2/1c	1	any one from * it has a large surface area * the folds increase the surface		
d 2/1a	1	* they are independent cells or they do not work together or do not work in a group	accept 'each sperm cell is individual or works individually'	'the cells are not joined together' is insufficient
Total	5			

Tier 5–7	Q No 14			
Part	Mark	Answer	Accept	Additional guidance
a 2/3a 2/5b	3	any three from * plants or algae need light for photosynthesis * photosynthesis or algae or plants supply or produce oxygen * plants or animals need oxygen * photosynthesis supplies glucose or carbohydrate or biomass * carbon dioxide is produced by plants or animals	accept 'for photosynthesis' accept 'oxygen is used for respiration' accept 'glucose is a source of energy for the plant' accept 'the herbivores eat the plants' or 'animals eat plants' or 'snails eat plants'	
b 2/5b	1	any one from * materials can be recycled * makes nutrients available * makes minerals available		
c 2/2j	1	any one from * at 27°C the oxygen concentration would drop too low * at 15°C there is more oxygen	accept 'the higher the temperature the less oxygen is dissolved' accept 'at a higher temperature they would suffocate' accept 'the lower the temperature the more oxygen there is'	'there would be more oxygen' is insufficient
Total	5			