

Tier 3–6 5–7	Q No 8 1	Part	Mark	Answer	Accept	Additional Guidance
		a 2/2e	1	* As one muscle contracts, the other relaxes. ✓		if more than one box is ticked, award no mark
		b 1/2j 2/2i	2	any <b>two</b> from * she gets more air <b>or</b> oxygen  * it gets faster * it gets deeper	accept 'greater volume of air taken in <b>or</b> out' accept 'breathes out more carbon dioxide'  accept 'speeds up' <b>or</b> 'she takes more breaths' accept 'she takes bigger breaths'  accept, for one mark, 'she breathes more' if not given with 'it gets faster' or 'it gets deeper'	'she needs more oxygen' is insufficient 'shorter <b>or</b> heavier <b>or</b> louder <b>or</b> harder breaths' are insufficient 'it increases' is insufficient 'the volume of air in her lungs increases' is insufficient <i>do <b>not</b> accept 'the volume of her lungs increases'</i>
		c 2/2l	1	* muscle cells → bloodstream → lungs → windpipe → nose	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	if more than one box is ticked, award no mark
		<b>Total</b>	<b>4</b>			

Tier 3–6 5–7	Q No 9 2	Part	Mark	Answer	Accept	Additional Guidance
		<b>a</b> 3/3d	1	* lemonade	accept '4.4'	
		<b>b i</b> 3/3e 1/2k	1	any <b>one</b> from * it is less acidic  * its pH has increased	accept 'it is weaker' accept 'it decreases'  accept 'it has gone from 1.0 to 2.5'	do <b>not</b> accept 'it has become more alkaline'  do <b>not</b> accept 'it increased' do <b>not</b> accept 'the acidity changed by pH 1.5'
		<b>b ii</b> 3/3h 1/2k	1	any <b>one</b> from * ethanoic acid is less acidic than the hydrochloric acid * ethanoic acid has a higher pH * it has a pH of 3 compared with 1 * it is a weaker acid	accept the converse accept 'it is less acidic' accept 'partially neutralised'	'ethanoic acid is pH 3' is insufficient 'ethanoic acid is weak' is insufficient 'it is weaker' is insufficient
		<b>c i</b> 3/1f	1	* hydrogen		'H <sub>2</sub> ' or 'H' are insufficient
		<b>c ii</b> 3/1f	1 1	* sulphur * oxygen		answers can be in either order 'S' or 'O' or 'O <sub>2</sub> ' are insufficient
		<b>c iii</b> 3/1e	1	* 5		
		<b>Total</b>	<b>7</b>			

Tier 3–6 5–7	Q No 10 3	Part	Mark	Answer	Accept	Additional Guidance
		<b>a</b> 1/2m	1	any <b>one</b> from * leaves <b>or</b> stems damaged by strong currents  * roots could be pulled out	accept 'plants or seeds washed away' accept 'they cannot attach themselves to the water bed' accept 'leaves unable to float'	references to flowers are insufficient
		<b>b</b> 2/5c	1	any <b>one</b> from * there is insufficient light * the water is frozen  * less <b>or</b> no photosynthesis occurs	accept 'too little sunshine' accept 'leaves may be damaged by frost <b>or</b> snow <b>or</b> ice' accept 'the plant freezes' accept 'not enough energy to produce leaves'	<i>do not accept</i> 'no light' 'too cold' is insufficient
		<b>c i</b> 2/5c	1	any <b>one</b> from * large leaves * flexible stems * waxy leaves * the leaves <b>or</b> flowers are able to float * air in the leaves or stems * roots that cover a wide area	accept 'flat leaves' accept 'thin <b>or</b> long stems'  accept 'strong roots'	a mark may be awarded for part (ci) if the answer is given in part (cii)  'it <b>or</b> they can float' is insufficient
		<b>c ii</b> 2/5c	1	any <b>one</b> from * (large <b>or</b> floating leaves <b>or</b> thin <b>or</b> long stems) to collect sunlight * (large leaves <b>or</b> flexible stem <b>or</b> waxy leaves <b>or</b> air in the leaves) to make the leaves float * (thin <b>or</b> flexible stems) to allow the leaves to move * (floating flowers) for pollination * (roots that cover a wide area) to stop them being washed away	accept 'for photosynthesis'  accept '(strong roots) to hold it firmly in the ground'	answers must give a function for the adaptation given in part (ci) a mark may be awarded for part (cii) if the answer is given in part (ci)

Tier	Q No			
3–6	10			
5–7	3			
Part	Mark	Answer	Accept	Additional Guidance
<b>d</b> 2/5c	1	any <b>one</b> from * (easily) seen by bees <b>or</b> insects * attract bees <b>or</b> insects * provide a landing platform for insects * they are more likely to be pollinated above water than underwater * they produce more seeds because they are more likely to be pollinated * animals are attracted to spread the seeds * they produce lots of pollen	accept 'bees <b>or</b> insects can get to them'  accept 'flowers are above water where fish <b>or</b> water animals cannot eat them' accept 'they produce more seeds'	'they produce seeds' is insufficient
<b>e</b> 4/5f	1	any <b>one</b> from * leaves absorb the heat <b>or</b> light * less heat <b>or</b> light reaches the pond	accept 'leaves block <b>or</b> reflect the sunlight <b>or</b> heat' accept 'leaves shade the pond'	'lilies take the heat' is insufficient references to the Sun are insufficient
<b>Total</b>	<b>6</b>			

Tier 3–6 5–7	Q No 11 4	Part	Mark	Answer	Accept	Additional Guidance
		<b>a</b> 1/2a	1	any <b>one</b> from * the effect of temperature on the amount dough expanded * the effect of temperature on volume	accept 'the best temperature for dough to rise' accept 'the best temperature at which the yeast works'	<i>do not accept</i> 'the effect of temperature on how quickly dough rises' 'does heat affect the volume of the dough' is insufficient
		<b>b i</b> 1/2d	1	any <b>one</b> from * left it for 30 minutes * used the same starting volume <b>or</b> mass of dough * used the same amount of water (in the water bath)	accept 'length of time' accept 'used same amount of dough'  accept 'she did it at the same time' accept 'use the same size <b>or</b> type of measuring cylinder'	'same mixture' is insufficient  'use the same measuring cylinder' is insufficient
		<b>b ii</b> 1/2d	1	* the dough could contain a different amount of yeast <b>or</b> sugar <b>or</b> flour <b>or</b> water <b>or</b> ingredients	accept 'different doughs might rise differently' accept 'different doughs have different properties'	'it might have different ingredients' is insufficient

Tier	Q No			
3–6	11			
5–7	4			
Part	Mark	Answer	Accept	Additional Guidance
<b>c</b> 1/2j	1	* as the temperature increased, the volume of dough increased to 60°C	accept 'it increased up to a volume of 77 cm <sup>3</sup> '	'it increased' is insufficient the unit of measurement is required for the mark
	1	* it does not rise as much (at temperatures higher than 60°C)	accept 'it decreases (after 60°C)'  accept, for two marks, 'it has a maximum volume at 60°C'  accept, for two marks, 'it increased to 60°C, then decreased'  accept, for one mark, 'it increased then decreased'	
<b>d</b> 1/2l 1/2m	1	any <b>one</b> from * repeat the experiment without yeast in the mixture * change the amount of yeast	accept 'do it without yeast'  accept 'increase the amount of yeast'	<i>do not accept</i> 'use just yeast'
<b>Total</b>	<b>6</b>			

Tier 3–6 5–7	Q No 12 5	Part	Mark	Answer	Accept	Additional Guidance
a 4/1d 3/1d	1			* iron		
	1			* nothing happens  copper	accept 'nothing' <b>or</b> 'no force' <b>or</b> 'it does not attract or repel'	<b>both</b> answers are required for the mark
	1			* repel a magnet	accept 'move apart'	<b>both</b> answers are required for the mark <i>do not</i> accept 'magnetic'
b 4/1f	2			any <b>two</b> from * more turns in the coil * increase the current <b>or</b> voltage  * coils closer together	accept 'more coils' accept 'increase power' accept 'add more cells <b>or</b> batteries' accept 'use thicker wire' accept 'make the coils tighter'	'use another battery' is insufficient 'use more wire' is insufficient 'use less wire' is insufficient 'make the wire tighter' is insufficient  references to the iron rod are insufficient
<b>Total</b>	<b>5</b>					

Tier 3–6 5–7	Q No 13 6	Part	Mark	Answer	Accept	Additional Guidance
		<b>a</b> 1/1b	1	any <b>one</b> from * there is a colour change * a new metal is formed	accept 'it goes green <b>or</b> orange' accept 'the iron filings change colour'	'the colour' is insufficient
		<b>b i</b> 3/3b	1	* copper	accept 'Cu'	
		<b>b ii</b> 3/3b	1	* iron sulphate	accept 'FeSO <sub>4</sub> '	
		<b>b iii</b> 3/3b	1	* no ✓ any <b>one</b> from * iron is more reactive than copper * copper is less reactive than iron	accept 'iron is higher on the reactivity series' accept 'copper does not displace iron'	<b>both</b> an indication that the reaction does not happen and the explanation are required for the mark
		<b>c</b> 3/3c 1/2c	1	* calcium ✓ potassium ✓		if more than two boxes are ticked, award no mark <b>both</b> answers are required for the mark
		<b>Total</b>	<b>5</b>			



Tier 3–6 5–7	Q No 14 7	Part	Mark	Answer	Accept	Additional Guidance
		<b>a i</b> 4/4b 1/2j	1	* it orbits the Sun	accept 'it goes round the Sun'	'it has an orbit' is insufficient
		<b>a ii</b> 4/4b 1/2j	1	any <b>one</b> from * it is not in the same plane as the other planets * the orbit is out of line <b>or</b> at a different angle	accept 'it is not in line with the others' accept 'the orbit <b>or</b> it is tilted'	'it has a different orbit' is insufficient <i>do not accept</i> 'it is too small' as this is not shown in the diagram
		<b>b</b> 1/1a 1/2j	1	any <b>one</b> from * it has the smallest diameter * all the other planets are bigger	accept 'it is too small'	'it is very small' is insufficient
		<b>c</b> 4/4b	1	any <b>one</b> from * Charon is a moon <b>or</b> satellite * other planets have moons	accept 'it is a moon' accept 'the Earth <b>or</b> Saturn has a moon' accept 'moons do not orbit other moons' accept 'other planets have objects orbiting them'	'Charon orbits Pluto' is insufficient
		<b>d</b> 1/1a 1/2l	1	any <b>one</b> from * both planets and moons have atmospheres * whether or not it has an atmosphere does not make it a planet * there is no pattern in the atmospheres * some planets do not have atmospheres	accept 'Venus has an atmosphere and Mercury does not' accept 'Earth's moon does not have an atmosphere and Titan does' accept 'Titan has an atmosphere and so does Neptune'	

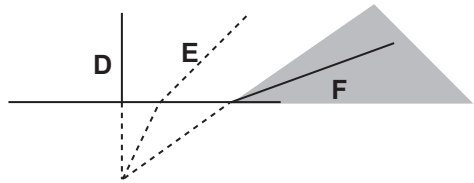
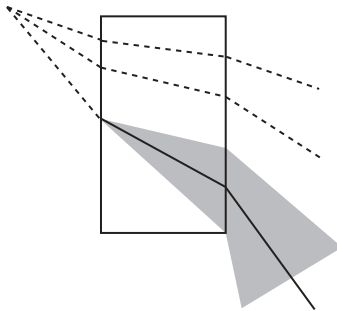
Tier	Q No			
3–6	14			
5–7	7			
Part	Mark	Answer	Accept	Additional Guidance
e 1/1c 1/2l	1	any <b>one</b> from * scientists cannot decide on what a planet is * if Pluto is a planet there could be more planets orbiting our Sun <b>or</b> in our solar system * there is evidence for and against Pluto being a planet	accept specific arguments for and against e.g. 'it goes around the Sun but it is too small'	'there are reasons for and against' is insufficient 'it has an atmosphere like the Moon but orbits the Sun' is insufficient as atmosphere is not sufficient to classify moons or planets
<b>Total</b>	<b>6</b>			

Tier 3–6 5–7	Q No 15 8	Part	Mark	Answer	Accept	Additional Guidance	
		<b>a</b> 1/2o 1/2j	2	<p><i>True False Cannot tell</i></p> <p>* <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/></p>			all <b>four</b> ticks are required for two marks any <b>two</b> or <b>three</b> correct ticks are required for one mark if more than one box is ticked in any row, do not give credit for that row
		<b>b i</b> 1/2e	1	<p>any <b>one</b> from</p> <p>* there are a large number of observations</p> <p>* the observations are made over a wide area</p>	<p>accept 'lots of people made observations'</p> <p>accept 'people see them in a lot of different places'</p> <p>accept 'you do not have to pay them'</p> <p>accept 'it makes it more reliable'</p> <p>accept 'people knew where to look for conkers'</p>		
		<b>b ii</b> 1/2e	1	<p>any <b>one</b> from</p> <p>* they are not spread uniformly over the country</p> <p>* the data is not representative of the conker tree population</p> <p>* the people may not know what a (ripe) conker looks like <b>or</b> whether a conker is ripe</p> <p>* the results may not be very reliable</p>	<p>accept 'they could count the same conker twice'</p> <p>accept 'people can make it up'</p> <p>accept 'people may not respond'</p>	if the response 'it makes it more reliable' is given in bi, do not credit 'it is less reliable' in bii unless they describe how it is more and less reliable	
		<b>c</b> 1/1a 1/2p	1	<p>* they would need to collect data each year <b>or</b> for more than one year</p>	accept 'repeat each year'	'repeat it' is insufficient	

Tier	Q No			
3–6	15			
5–7	8			
Part	Mark	Answer	Accept	Additional Guidance
<b>d</b> <i>1/2m</i>	1	any <b>one</b> from * it is warmer * there is more energy from the Sun	accept 'it is cooler in the north' accept 'the Sun is brighter'  accept 'they flower earlier'	'there is better weather in the south' is insufficient 'it is nearer the equator' is insufficient 'there is more sun' is insufficient as there are more hours of daylight in the north in summer  'they ripen faster' is insufficient
<b>Total</b>	<b>6</b>			

Tier 5–7	Q No 9	Answer	Accept	Additional Guidance
<b>a i</b> 1/2k	1	* a number from 8.0 to 8.2 s (inclusive)		
<b>a ii</b> 1/2k	1	* a number from 34 to 36 m (inclusive)		
<b>a iii</b> 1/2k	1	* 4 s	accept response in the range 3.7–4.3	
<b>b</b> 1/2j	1	* the slope or gradient is constant	accept 'it is a straight line' accept 'steady increase'	<i>do not accept</i> 'the line is flat'
<b>c i</b> 1/2i	1	* points (0, 0) and (15, 30) joined by a straight line	accept points drawn to $\pm 1$ mm	
<b>c ii</b> 1/2k 4/2a	1	* 50	accept ' $\frac{100}{2}$ '	
<b>Total</b>	<b>6</b>			

Tier 5–7	Q No 10			
Part	Mark	Answer	Accept	Additional Guidance
a 4/3d	1	* refraction <b>or</b> refracting		
b 4/3d	2	* a ray bending towards the normal at the first surface  * an emerging ray bending away from the normal at the second surface	accept a ray that is within the shaded area  accept an emerging ray that is within the shaded area	<b>both</b> sections of the ray must be straight and continuous ignore any arrows the emergent ray does not have to be parallel to the incident ray
c 4/3d	2	* a continuous straight line for ray D  * a continuous ray F that bends away from the normal	accept a ray drawn within the shaded area	ignore any arrows ignore any reflected rays do <b>not</b> accept an emergent ray that does not refract
<b>Total</b>	<b>5</b>			



Tier 5–7	Q No 11			
Part	Mark	Answer	Accept	Additional Guidance
<b>a</b> 2/2h	1	any <b>one</b> from * the placenta provides <b>or</b> passes oxygen <b>or</b> food <b>or</b> gets rid of waste * the foetus needs oxygen <b>or</b> food <b>or</b> to remove waste		accept responses that refer to a baby rather than a foetus 'the foetus needs blood from the placenta' is insufficient
	1	* as the foetus develops it needs more (food <b>or</b> oxygen from the placenta)	accept, for two marks, 'the placenta provides <b>more</b> oxygen <b>or</b> food <b>or</b> waste removal' accept, for two marks, 'the foetus needs <b>more</b> oxygen <b>or</b> food <b>or</b> waste removed as it grows'	'it needs <b>or</b> provides more oxygen' is insufficient as the meaning is ambiguous  a two mark answer must include one of the first two marking points and a reference to the foetus needing <b>more</b> food or oxygen from the placenta
<b>b</b> 2/2a	1	any <b>one</b> from * the number <b>or</b> mass of red blood cells increases * iron is needed for the formation of red blood cells	accept 'they need (to make) more red blood cells' accept 'for haemoglobin'	'the mass of blood increases' is insufficient 'the number of blood cells increases' is insufficient 'for red blood cells' is insufficient
<b>c</b> 2/2h	1	* placenta amniotic fluid		<b>both</b> answers are required for the mark 'umbilical cord' is insufficient answers may be in either order

Tier 5–7	Q No 11	Answer	Accept	Additional Guidance
<b>d i</b> 2/2h 2/2l	2	* windpipe lungs <i>mother's red blood cells</i> * placenta umbilical cord blood of foetus	accept 'umbilical' <b>or</b> 'cord' accept 'umbilical cord' and 'blood of foetus' in either order	all <b>five</b> answers are required for two marks award a mark for 'windpipe' and 'lungs' in the first places in the correct order award a mark for 'placenta', 'umbilical cord' and 'blood of foetus' in the last three places in an appropriate order
<b>d ii</b> 2/2h 2/2j	1	any <b>one</b> from * less oxygen passes through the placenta * less oxygen in the foetus' blood * smaller <b>or</b> brain damaged foetus * baby may be premature	accept 'the foetus' heart beat rises' <b>or</b> 'the foetus' blood pressure goes up' accept 'less oxygen in the mother's blood' accept 'less oxygen for the foetus'  accept 'the red blood cells of the foetus will contain carbon monoxide'	accept responses that refer to a baby rather than a foetus <i>do not accept</i> 'no oxygen'  <i>do not accept</i> 'only carbon monoxide passes through the placenta' 'it passes to the foetus' blood' is insufficient 'it poisons the foetus' is insufficient
<b>Total</b>	<b>7</b>			



**[Blank page]**

Tier 5–7	Q No 12	Answer	Accept	Additional Guidance
<b>a</b> 3/3e 3/1f	1	* carbon dioxide	accept 'CO <sub>2</sub> '	
<b>b</b> 1/2j	1	* between 0 s and 30 s ✓		if more than one box is ticked, award no mark
<b>c i</b> 1/2j	1	* any answer from 41 to 45		
<b>c ii</b> 3/2g	1	* 33 g	accept '176 – 129 – 14' accept '176 – 143'	<i>do not accept</i> incorrect calculations, e.g. '176 – 129 – 14 = 34'
<b>d</b> 3/3e BS/1c	1	* when the balls get wet the chemicals will react (and destroy the ball)	accept 'they are biodegradable' accept 'they will dissolve'  accept 'the products are harmless'	accept converse answers regarding normal golf balls
<b>e</b> 3/1f	1	* calcium citrate carbon dioxide	accept 'CO <sub>2</sub> '	<b>both</b> answers are required for the mark answers can be in either order
<b>Total</b>	<b>6</b>			

Tier 5–7	Q No 13			
Part	Mark	Answer	Accept	Additional Guidance
<b>a</b> 4/5a 4/5e	1	* chemical	accept 'potential' accept 'kinetic <b>or</b> movement'	
<b>b i</b> 4/5g 4/5e	1	* 50 J		
<b>b ii</b> 4/2d 4/5g	1	any <b>one</b> from * energy is transferred as heat * energy is transferred as sound * friction <b>or</b> air resistance slows it down	accept 'some energy <b>or</b> heat <b>or</b> sound is wasted'  accept 'as it is still falling, some is still gravitational'	'heat <b>or</b> sound <b>or</b> friction' are insufficient 'some of the energy is lost' is insufficient
<b>c</b> 4/2d 4/5g	2	any <b>two</b> from * lift it to a greater height * make the mass more streamlined <b>or</b> aerodynamic * push the mass down * put grease <b>or</b> oil on the rod (to decrease friction)	accept 'make the rod longer'  accept 'push it' accept 'make the rod smoother'  accept 'increase the mass'	'change the height <b>or</b> mass' is insufficient 'make the rod bigger' is insufficient 'drop it faster' is insufficient 'push the rod down' is insufficient 'use more force' is insufficient 'make the rod thinner' is insufficient

Tier 5–7	Q No 13			
Part	Mark	Answer	Accept	Additional Guidance
d 4/2g	1	* A  if you divide the force by a smaller area, the pressure will be larger	accept 'it has a smaller area (at that point)'  accept 'the force is more concentrated on a smaller area'	<b>both</b> blade A, and the correct explanation are required for the mark  'it is more pointed' <b>or</b> 'is it sharper' are insufficient 'force is more concentrated' is insufficient <i>do not accept</i> 'there will be more force' <i>do not accept</i> responses that refer to 'concentrated pressure'
<b>Total</b>	<b>6</b>			