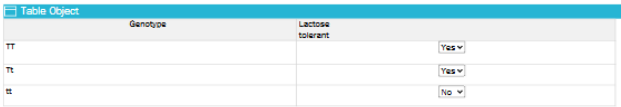
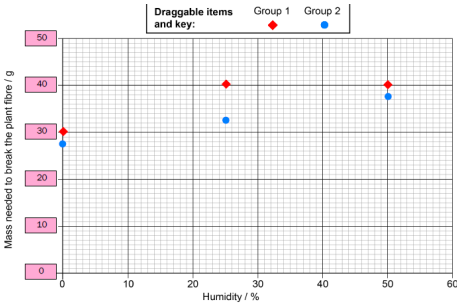


Question	Answers	Notes	Total	Crit.	
1	a	Knee			
	b	Bicep	<i>Accept ankle or knuckle</i>	1	A
	c	<p>Accept any two from the list, [max 2]</p> <ul style="list-style-type: none"> one muscle contracts while the other extends X (Bicep) contracts or shortens and to flex or bend the arm Y (Tricep) contracts or shortens and to extend or straighten the arm 		1	A
	d	<p>Accept any reasonable similarity, for example [max 1]</p> <ul style="list-style-type: none"> produce energy or ATP use glucose <p>Accept any reasonable difference, for example [max 1]</p> <ul style="list-style-type: none"> aerobic requires oxygen / anaerobic does not waste products are different (water and CO₂ or lactic acid) anaerobic releases less energy 	<i>Do not accept ethanol</i>	2	A
	e	<p>Protection: Accept any reasonable function, for example [max 1]</p> <ul style="list-style-type: none"> protect the organs (hard) bones of the skeleton reduce the risk of injury on impact <p>Blood cell production: Accept any reasonable function, for example [max 1]</p> <ul style="list-style-type: none"> (long) bones contain bone marrow (long) bones produce stem cells 	<p><i>Accept named examples</i></p> <p><i>Accept named examples</i></p> <p><i>Do not accept mineral storage</i></p>	2	A

2	a	<p>Accept any two reasonable benefits, for example [max 2]</p> <ul style="list-style-type: none"> • slows ripening • prevents microbe growth or keeps food safe to eat for longer • reduces waste or extends shelf-life 	WTTE	2	A
	b	<p>(This temperature range) reduces or stops microorganism activity or reproduction</p> <p>Does not freeze (at this temperature range)</p> <p>One correct justification, [max 1]</p> <ul style="list-style-type: none"> • slows deterioration of food • prevents ice damage or freezer burn or changes in appearance 	<p><i>Do not accept "kills"</i></p> <p>WTTE</p>	3	A
	c	<p>(Bacteria has) decreased in volume or shrunk or shrivelled</p> <p>Water has left or (bacteria is) dehydrated</p> <p>By osmosis</p>	<p><i>Do not accept references to salt moving</i></p> <p><i>Accept a correct description of osmosis if not named</i></p>	3	A

3	a	Speed up reactions or biological catalyst Build up molecules or break down molecules	<i>Accept specific examples</i>	2	A
	b	 <p>All correct</p>	<i>A selection must be made in all boxes Incorrect use of "gene" is a CON, award 0</i>	1	A
	c	The (observable) characteristics of an organism (resulting from the expression of genes)	<i>Incorrect use of "gene" is a CON, award 0</i>	1	A
	d	<p>Similarity, [max 1]</p> <ul style="list-style-type: none"> highest levels directly after birth both decrease (after birth) <p>Justification, [max 1]</p> <ul style="list-style-type: none"> maternal milk is primary food source decrease as transition to other food sources <p>Difference, [max 1]</p> <ul style="list-style-type: none"> production is much higher in pigs pigs level off later than rats production decreases at a faster rate or earlier in pigs <p>Justification, [max 1]</p> <ul style="list-style-type: none"> consume more lactose or pigs are bigger than rats rats transition to other foods earlier than pigs pigs and rats mature at different rates 		4	A
	e	The higher the % lactose tolerance, the higher the milk consumption	<i>ORA Do not accept linear or proportional</i>	1	A
	f	<p>Accept any reasonable suggestion, for example [max 1]</p> <ul style="list-style-type: none"> data not available for all countries correlation does not guarantee causation people choose not to drink milk for reasons other than lactose intolerance data is from one year or one source only 		1	A

4	a	How does the humidity affect the mass needed to break the fibre?		1	B
	b	Independent variable: humidity Dependent variable: mass and needed to break the fibre	<i>Do not accept strength</i>	2	B
	c	Accept any two reasonable control variables, for example [max 2] <ul style="list-style-type: none"> • diameter of fibre • storage or room temperature • length of fibre • age of plant • storage time • type of plant 	<i>Do not accept increments of mass</i> <i>Accept length of time masses are hung on fibres</i> <i>Do not accept use the same fibre</i>	2	B
	d	The DV is only affected by the IV	WTTE	1	B
	e	Greater range of data Better for identifying a pattern or Repeats Can repeat to give an average, identify anomalous data	WTTE	2	C

<p>f</p>	 <p>Equal increments on Y axis scale</p> <p>Three points plotted correctly</p> <p>All six points plotted correctly</p> <p>Data points matching the key</p>	<p><i>Ignore the key for mp 2</i></p> <p><i>Ignore the key for mp 3</i></p> <p><i>Only award mp 4 if at least three points are correctly plotted</i></p>	<p>4</p>	<p>C</p>
<p>g</p>	<p>Group 1: increases <i>and</i> then plateaus</p> <p>Group 2: Increases <i>and</i> linear</p>	<p>WTTE</p>	<p>2</p>	<p>C</p>
<p>h</p>	<p>Natural variation in fibre strength or fibres come from a different plant</p> <p>Less precise equipment gave less valid outcome</p>	<p>WTTE</p>	<p>2</p>	<p>C</p>

5	a	95 (micrometres) ± 5	<i>Ignore incorrect units</i>	1	C
	b	Candidate's value from part (a) – 80 $\left(\frac{\text{Difference}}{80}\right) \times 100$ Evidence of calculation rounded to nearest %	<i>ECF from part (a)</i> <i>Award third marking point for any correctly rounded percentage if calculation is seen</i>	3	C
	c	Any two increases in size from the list, [max 2] <ul style="list-style-type: none"> • cells or vacuoles • cell walls • gaps or lamella Water enters the fibres or cells by osmosis or diffusion (as humidity increases) larger difference between cell and environment or (as humidity increases) more rapid entry of water (into the cell)		4	C
	d	Accept any reasonable suggestion, for example [max 1] <ul style="list-style-type: none"> • (change in) mass • length in other planes or 3 dimensions • measure the increase of the labelled parts of the diagram Accept any correctly linked justification, for example [max 1] <ul style="list-style-type: none"> • to calculate the % water absorbed • to calculate (increase in) volume (rather than length) • to see if all parts increased at the same rate or find out where the water had gone 		2	C

6	a	<p>Accept any CV from the list, [max 1]</p> <ul style="list-style-type: none"> • volume of NaOH • fibres immersed in same chemical or NaOH • initial fibre length or diameter • type of fibre (agave) 		1	B
	b	<p>So the method could be repeated or Compared with other processes or Because time in the solution might affect the results or Time (in solution) is a control variable</p>	WTTE	1	C
	c	<p>Accept any three points from the following, [max 3]</p> <ul style="list-style-type: none"> • identify the alkali (as NaOH) • include a reference to direction of change of IV • include a possible range of IV concentrations • specify fibres are agave • specify what will be measured 	<p>Accept aspects of a re-written hypothesis</p> <p>Do not accept include adding scientific justification as an improvement</p>	3	B
	d	<p>First marking point: Hypothesis is valid or partially valid and as the extension increases from 0-2 or 5% (NaOH)</p> <p>Second marking point linked to hypothesis being invalid:</p> <ul style="list-style-type: none"> • between 2 or 5 – 10% the extension decreases • above 10% as there is no clear increase or decrease despite the change in concentration 	<p>WTTE</p> <p>Accept reference to a plateau, do not accept constant</p>	2	C

7

	1 mark	2 marks	3 marks	4 marks
RQ	A simple RQ	RQ linked to % fibre and length		
V	IV as fibre % <i>or</i> DV as length <i>or</i> one CV is identified	IV as fibre % <i>and</i> DV as length <i>and</i> one CV is identified	IV as fibre % <i>and</i> DV as length <i>and</i> two CV are identified	
E	Equipment for basic set up <i>or</i> equipment to measure length (stretch)	Equipment for basic set up <i>and</i> equipment to measure length (stretch)		
M	Attempt at a method but detail is insufficient to collect relevant data	Detail of method is incomplete but some relevant data could be collected	Detail of method is sufficient to follow and similar data could be collected	Detail of method is sufficient to repeat the experiment
D	Plans to repeat at least three trials <i>or</i> to collect data for at least five fibre %	Plans to repeat at least three trials <i>and</i> collect data for at least five stated fibre %	Plans to repeat at least three trials <i>and</i> collect data for at least five stated fibre % <i>and</i> including 0% and 20% fibre	
S	A relevant comment about safety e.g. taking care with heavy masses, breaking ropes			

15

B

8	a	Transpiration		1	A
	b	Fewer bees will mean there is less pollination of the flowers This may reduce the population of plants (which will) result in less food being available (for consumers) Link to how biodiversity is reduced	<i>Accept references to plant reproduction</i>	4	D
	c	Individual: Action Correctly linked justification Difficulty linked to action Government: Action Correctly linked justification Difficulty linked to action Simple conclusion Further justification of conclusion drawing on both individual and government		8	D

	1 mark	2 marks	3 marks	4 marks
Environmental	States one environmental aspect for green roofs or one for solar panels	States one environmental aspect for green roofs and one for solar panels or states two environmental aspects for green roofs or solar panels	States one environmental aspect for green roofs and one for solar panels and with further justification of one aspect	States one environmental aspect for green roofs and one for solar panels and with further justification for both aspects
Economic	States one economic aspect for green roofs or one for solar panels	States one economic aspect for green roofs and one for solar panels or states two economic aspects for green roofs or solar panels	States one economic aspect for green roofs and one for solar panels and with further justification of one aspect	States one economic aspect for green roofs and one for solar panels and with further justification for both aspects
Biosolar	Solar panels work more efficiently or more efficient use of space	Solar panels work more efficiently when cooled by plants or more efficient use of space by combining two purposes		
Location	States a reasonable factor	States a reasonable factor with justification		
Conclusion	Gives a concluding statement			