OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



MARK SCHEME

B4.4 HOW IS PLANT GROWTH CONTROLLED? (FOUNDATION)

SCORE	PERCENTAGE
/19	%

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Question			Answer/Indicative content	Marks	Guidance
1			**Level 3 (5-6 marks)** Identifies some problems with experimental design **AND** suggests improvements directly linked to the problem. Quality of written communication does not impede communication of the science at this level **Level 2 (3-4 marks)** Identifies some problems with experimental design **and** suggests improvements, unlinked. Quality of written communication partly impedes communication of the science at this level **Level 1 (1-2 marks)** Identifies either a problem **OR** an improvement. Quality of written communication impedes communication of the science at this level **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit	6	**This question is targeted at grades up to C** **Indicative scientific points may include** Problem / Improvement Only 5 cress seedlings used / Increase the number of cress seedlings Light is from other sources / Use a box with light from one direction only / Shine a light from other areas / grow in a dark room Could be due to 5 days may not be long enough / Try light source from other angles to see if results are similar / Extend experiment beyond 5 days No repeats carried out / Repeat experiment One seedling did not grow towards the light / Repeat experiment Some blocked from light / lit from front / ensure evenly / lamp (from side) Idea that sunlight can damage plants / Use fixed light source **Examiner's Comments** Candidates were given a description of an experiment on the effect of light on shoot growth and were asked to suggest improvements. Use smaller plants near eachother / Use seedlings all the same size

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					problems and solutions in the experimental design. Many candidates did not realise the purpose of the experiment, so suggested measures to get the cress seedlings to grow upright. Others suggested problems which were not visible in the diagram, such as lack of water. Higher scoring candidates related the improvements to the problems identified.
			Total	6	
2			Plants are able to get **more** light (1) so they can photosynthesise / make glucose / make sugar (1)	2	**ignore** nearer the sun / get more sun / attracts sunlight **accept** make starch / make food **accept** reverse arguments **Examiner's Comments** Candidates who did not state that the phototropic response enables the plant to get MORE sunlight failed to score the first mark – the second was available for correct reference to photosynthesis or making food.
			Total	2	

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Question			Answer/Indicative content	Marks	Guidance
3			**Level 3 (5–6 marks)** Response gives a full and detailed account of the method, and compares expected results. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Response includes both an account of a workable method **and** some basic indication of expected results. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Response includes a basic explanation of either a workable method or expected results. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to EIndicative** • put a hole in the side of one of the boxes • remove the lid from the other box / put a large hole in the top of the other box • record the appearance of the cress seedlings before • check to make sure that they are growing with straight stems • put one pot of cress seedlings in one of the boxes and the other pot in the second box • turn on the two lamps • shine light in the side of one of the boxes • shine light from the top of the second box • controlling other factors • monitor room temperature in and outside the boxes • make sure that the pots of cress seedlings are kept moist **For results** • after a suitable time • record the appearance of the cress seedlings after • check to see if they have continued to grow with straight stems or have curved • count the numbers of straight / curved seedlings in each pot • check to see if the curved seedlings are growing towards the side source of light • check to see if the straight seedlings are in the box with the overhead light source • plot or tabulate the results to show a comparison. **Use the L1, L2, L3 annotations in Scoris;** **do not use ticks.** **Examiner's Comments**

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Question			Answer/Indicative content	Marks	Guidance
					A six-mark extended-writing question. Examiners were pleased to see the inventiveness and variety of uses candidates came up with for the given equipment, and some of the best answers were a real pleasure to read. On the other hand, there were too many candidates who gave only a bare response about the expected outcome, e.g. “The cress will grow towards the light” without giving any of the required detail of how the equipment might be used in a controlled experiment.
			Total	6	
4	a		<table><tr><td>Root growth requires lower concentration of hormone than shoot growth</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>The hormone causes a greater rate of shoot growth than root growth.</td><td>✓</td></tr></table>	2	Examiner's Comments This part was very well answered.
	b		Phototropism;	1	Examiner's Comments Candidates were required to recall of the term phototropism as opposed to photosynthesis.
	c		~~Light needed for photosynthesis;~~ Makes food;	~~2~~	Examiner's Comments This question showed that it was challenging to link the idea that light energy is needed for photosynthesis to the idea that this would lead to the plant producing more food or glucose.
			~~Total~~	~~5~~	

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