New Specification

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

TUESDAY 15 MAY 2012, MORNING

MARK SCHEME

		AVAILABLE MARKS
1	**(a)** Any three from: • Large surface area • Moist • Thin/short diffusion distance/one cell thick • Good blood supply/capillary close to alveoli • Porous/permeable [3]	
	(b) B – less oxygen or more CO_2/B only 16% O_2 [1]	
	(c) to (provide) energy [1]	5
2	**(a)** destarch/remove all starch/show any starch found was produced during the experiment/use up starch [1]	
	(b) to kill them/stop reactions/remove waxy cuticle/stop photosynthesis/ stop respiration at both ends; stop resp. [1]	
	(c) leaf A is blue black; at both ends starch present; where covered/centre of leaf A is yellow/brown, no starch here; [3] Leaf B – yellow brown; as no CO_2 no photosynthesis/no starch made [2]	7
3	**(a)** **(i)** lipase [1]	
	(ii) lipid/oil/fat/substrate + enzyme (lipase) (both needed for mk) [1]	
	(iii) Any two from: • Volume of solution/fat/concentration/volume of water/amount substrate/amount of substances • Concentration of enzyme/volume of enzyme • At the required temperature BEFORE MIXING • pH [2]	
	(iv) fatty acids and glycerol [2]	

AVAILABLE MARKS

(v) Indicative content

- Enzyme 1 works best/has optimum temperature @ 30 °C;
- Enzyme 2 works best/has optimum temperature @ 40 °C;
- Enzyme 1 works fastest at all temperatures;
- Enzyme 2 very slow to break down fat @ 60 °C/only breaks down some fat @ 60 °C/within washing cycle;
- Because it is denatured;
- Enzyme 1 works slowest @ 60 °C;
- Because it is denatured; (only award denatured mark **once**)
- At low temperatures Enzyme 1/2/both enzymes work slowly;
- Because of fewer collisions/less kinetic energy/of the molecules
- Save energy/money using Enzyme 1;
- Enzyme 1 is more thermostable/Enzyme 2 less thermostable;

Response	**Mark**
Candidates must use appropriate specialist terms throughout using at least 5 of the above points to describe the properties of the two enzymes and explain with reasons which one should be added to washing powder. Candidates use good spelling, punctuation and grammar and the form and style are of a high standard.	[5-6]
Candidates must use some appropriate specialist terms throughout using at least 3 of the above points to describe the properties of the two enzymes and explain with reasons which one should be added to washing powder. Candidates use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3-4]
Candidates describe one or two of the properties of the enzymes or explain with a reason which one should be added to washing powder. They use limited spelling punctuation and grammar and they have made little use of specialist terms.	[1-2]
Response not worthy of credit	[0]

[6]

(b) **(i)** amylase [1]

(ii) amylase is substrate specific/lock + key/amylase is specific to starch/shapes are not complementary/active site doesn't match [1]

(iii) use Benedicts; + heat; [3]
blue to brick red (need both)

17

		AVAILABLE MARKS
4 **(a)** **(i)** phototropism/tropism [1]		
(ii) hormone [1]		
(b) unequal distribution of auxin/more auxin on shaded side/auxin moves away from light; causes more **elongation** of cells on side away from light/more growth/ faster growth. [2]		
(c) **(i)** insulin [1]		
(ii) liver [1]		
(iii) Insulin is carried in the blood/auxin is carried through cells/ diffuses [1]		7
5 **(a)** **(i)** (over time) level of CO_2 is rising/CO_2 increases [1]		
(ii) from graph 398–400 [1]		
(b) indicator (species) [1]		
(c) warmer waters; due to global warming/climate change OR colonisation introduced by man; explanation of how colonisation occurred e.g. boat/travel/drift [2]		
(d) **(i)** sun/sunlight [1]		
(ii) Any 2 from 3 minerals taken up by phytoplankton; used to produce amino acids/protein; growth; [2]		
(iii) [phytoplankton → herring] → [gulls; sea lions; humpback whales] *1 mk* *1 mk* if arrows missing or wrong direction max 1 [2]		
(iv) decrease in sea lions; because there is decrease in herrings/food [2]		12

		AVAILABLE MARKS
6	**(a)** CO_2/carbon dioxide; ⟶ O_2/oxygen [2]	
	(b) **(i)** x axis: colours as bars equal width and labelled; x axis: space between bars; correct scaling on y axis – more than half the axis used must start at 0 correct plots of bars [4]	
	(ii) adjust to the colour of light/ equilibrate/acclimatise to that colour/time for steady stream of bubbles [1]	
	(iii) any one from: • amount pondweed • concentration of carbonate in water/concentration of CO_2 • temperature (of water) • amount of water in beaker/solution • intensity of the light/same distance from light [1]	
	(iv) more gas bubbles produced/more O_2 produced; shows more photosynthesis; more yield/faster growth/bigger/more growth; [3]	11

AVAILABLE MARKS

7 **(a)** **(i)** more plant *species*/different types of plant/more variety of plants at area C than at A or B or converse
higher total % cover as you go inland; or converse (lowest % cover near sea) [2]

(ii) Any one from:
- too much wind at A/less wind at C
- lack soil/minerals at A/more at C
- lack fresh water at A/more at C
- soil pH at A different from C
- warmer inland
- too salty at A
- plants can be washed away by tides [1]

(b) Indicative content
- Use quadrat
- Identify plant species in each quadrat
- Use a key to identify species
- Estimate *% cover* for each plant species in each quadrat
- Carry out at three areas (or at A, B and C)/line transect/belt transect
- *Repeat* (for reliability)/use class results
- Describe how to measure a physical factor i.e. method wind gauge/anemometer/thermometer/temp probe/light meter/rain gauge/measuring cylinder/pH meter/pH probe/dry mass of soil
- Record/write down results
- Name a physical factor – wind/temp/light/water/pH /rain/soil factors

Response	Mark
Candidates must use appropriate specialist terms throughout, using at least 5 of the above points, to describe how they would have carried out this investigation and explain, in a logical sequence how the pupils would have obtained these results. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5-6]
Candidates must use some appropriate specialist terms, using 3 or 4 of the above points, to describe how they would have carried out this investigation and partially explain, in a logical sequence, how the pupils would have obtained these results. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3-4]
Candidates describe using 1 or 2 of the above points how they would have carried out this investigation or explain how the pupils would have obtained these results using some or all of the above points. However these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1-2]
Response not worthy of credit	[0]

[6]

(c) (i) more food/plants/species in area C/more cover provided by plants/further away from sea/tide/less salty/less wind/less chance of drying out [1]

(ii) plants have grown more/warmer/snails reproduced [1]

Total

AVAILABLE MARKS
11
70