

New  
Specification



*Rewarding Learning*

General Certificate of Secondary Education  
2011–2012

---

**Double Award Science: Biology**

Unit B1

Higher Tier

[GSD12]

**TUESDAY 8 NOVEMBER 2011**

**9.30 am–10.30 am**

---

**MARK  
SCHEME**

		AVAILABLE MARKS	
1	(a) energy transport and agriculture	[1]	7
	(b) decreases from 1990–2006/increases from 2006 to 1990; exceptions transport and energy (need both);	[2]	
	(c) increased use of cars/increased energy consumption/removal of forests	[1]	
	(d) so that know what the levels are/see changes/so that can regulate/ to meet targets/global warming	[1]	
	(e) floods/coastal erosion/arctic ice melts/changing weather patterns; too hot/cold/too wet/drought/too stormy – for current plant growth	[1] [1]	
2	(a) Glucose; Energy	[2]	8
	(b) Apparatus assembled as in the drawing 1 mark for apparatus boiling tube, bung, delivery tube to test tube; (into liquid); 1 mark for oil either labelled or as layer (present) but not labelled; 1 mark for presence of liquid in right hand tube (needs to be connected);	[3]	
	(c) Lactic acid/lactate in muscle; Ethanol in yeast; Carbon dioxide in yeast/no carbon dioxide in the muscle	[3]	
3	(a) No naked flames/no Bunsen burner on/alcohol flammable	[1]	10
	(b) To soften the leaf/make less brittle (not remove alcohol on its own)	[1]	
	(c) Blue–black/blue/black (not purple, not purple/black)	[1]	
	(d) Used in respiration/provide energy/active transport; make cellulose/make protein/fat or oils/make chlorophyll not food	[2]	
	(e) (i) $\text{mm}^3 \text{CO}_2$ absorbed/ $\text{m}^2$ /plant or $\text{O}_2$ produced per unit time per plant or volume $\text{CO}_2$ absorbed/time or volume $\text{O}_2$ produced/time	[1]	
	(ii) Any <b>two</b> from: • B is more developed/older/mature/has been growing longer • Bigger leaves/larger surface area/taller/roots bigger • More light/more $\text{H}_2\text{O}$	[2]	
	(iii) Process controlled by enzymes; which are denatured at the higher temperatures (not killed)	[2]	

- 4 (a) (i) E2 [1]
- (ii) P1; and P4 [2]
- (iii) Lock and key [1]
- (b) Indicative content
- A – lipase has broken down fats/lipase reacts with fat;  
fatty acids produced;  
lower pH/acidic (**not** pH5 on its own)
- B – heat has denatured the enzyme/lipase (**not** killed enzyme);  
fats not broken down/no fatty acids produced;  
pH stays the same (**not allow** pH is neutral on its own) **not** pH7
- C – no lipase present/no enzymes present;  
fats not broken down/no fatty acid produced;  
pH stays the same as start – (but only award once in B or C **not both**) **not** pH7 [6]

Response	Mark
Candidates must use appropriate specialist terms throughout to describe the results they would expect and account for the results, using at least 5 of the above points in a logical sequence. 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 to describe the results they would expect and partially account for these results, using at least 3 of the above points in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
Candidates describe one of the results they would expect or account for one of these results, using at least one of the above points. However, these may not be 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

- (c) pH3/lower pH/more acidic;  
faster rate/more breakdown;  
larger surface area for enzyme; lipase action;  
award 1 mark for lipase but only if mentioned in connection with surface area; max. [3] [3]

AVAILABLE  
MARKS

13

- 5 (a) Any **three** from:
- Oxygen needed for respiration;
  - This provides energy;
  - For uptake against a concentration gradient/from low concentration to high concentration in plant;
  - By active transport.
- [3]
- (b) (i) 160 [1]
- (ii) Nitrate no longer limits crop growth/extra nitrate not needed;  
So is not being used by the crop/remains in the soil/not being taken up by roots; [2]
- (c) (i) Nitrification [1]
- (ii) Any **two** from:
- Leached/washed out by rain
  - Action of denitrifying bacteria/denitrification
  - That convert nitrate to nitrogen gas
- [2]
- 6 (a) (i) more species in quadrats in area A than B/more plants in A or B not decrease by 5 at a time [1]
- (ii) light/water levels/pH levels/type of soil/mineral levels/rain/temperature [1]

AVAILABLE  
MARKS

9

**(b)** Indicative content

- Set out (belt) transect/line/or put down tape measure;
- Use quadrats;
- Identify plant species;
- Use a key (to identify species);
- Count the number of (different) species in each quadrat;
- Repeat at (5 m) intervals across the transect;
- Work out the average/mean;
- Record/write results down;

Response	Mark
Candidates must use appropriate specialist terms throughout to describe how they would have carried out this investigation and explain how the pupils would have obtained these results, using at least 5 of the above points in a logical sequence. 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 throughout to describe how they would have carried out this investigation and partially explain how the pupils would have obtained these results, using at least 3 of the above points in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
Candidates describe how they would have carried out the investigation, using at least 1 of the above points. However, these may not be 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)** plants at bottom and widest bar labelled;  
rest in correct order and progressively smaller bars;  
allow one mark for all labels correct but triangle drawn.

[2]

**(d) (i)**  $\frac{15\,000 \times 100}{48\,000} = 0.3125$   
 $= 31.25\%$

[2]

**(ii)** Any **two** from:

- Movement;
- Excretion;
- Respiration;
- Egestion

[2]

- (iii)** Eaten by birds/badgers/foxes or passed to detritivores/  
decomposers/eaten by animals

[1]

AVAILABLE  
MARKS

15

7	(a) (i) Indicator species	[1]	<b>AVAILABLE MARKS</b>
	(ii) Can tolerate very low oxygen levels/respire anaerobically at low oxygen levels	[1]	
	(b) high sewage at A; because less oxygen; because decomposers (used up oxygen); Aquatic invertebrate die/animals die;	[3]	
	(c) Any <b>three</b> from: • Promotes growth of algae/algal blooms • Rapid death rate of algae due to shading/death of algae • Algae decomposed (by bacteria) • Uses up oxygen	[3]	
	<b>Total</b>		
			<b>70</b>