

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Biology/Science

Unit B1: Influences on Life

Higher Tier

Additional Sample Assessment Material

Time: 1 hour

Paper Reference

5BI1H/01

You must have:

Calculator, Ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

S39587A

©2012 Edexcel Limited.

6/8/8/2/



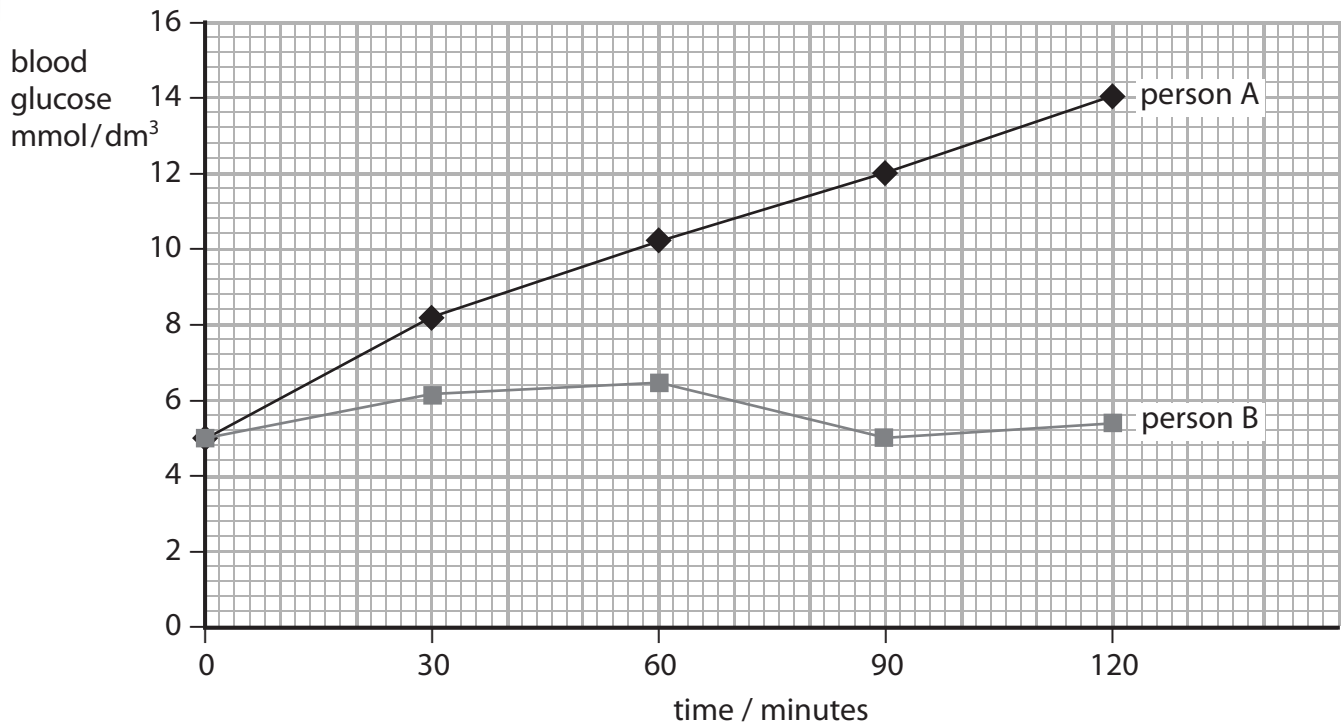
edexcel 
advancing learning, changing lives

Answer ALL questions

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Blood glucose regulation

1 (a) The graph shows the concentration of glucose in the blood of two people and how this changes over a two-hour period.



(i) Calculate the difference in the blood glucose concentration between person A and person B at 90 minutes.

(2)

answer = mmol/dm³

(ii) Using the information from the graph, describe the change in blood glucose concentration for person B during this two-hour period.

(2)

.....

.....

.....

.....



(iii) State which hormone a type 1 diabetic, such as person A, would use to control their blood glucose concentration.

(1)

(b) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Excess glucose is converted into glycogen in the

(1)

- A** brain
- B** kidney
- C** liver
- D** pancreas

(ii) Type 2 diabetics also have problems with blood glucose regulation.

Explain how type 2 diabetics control their blood glucose concentration.

(2)

(Total for Question 1 = 8 marks)



The herring gull

- 2 (a) Both white herring gulls and (Alaskan) lesser black backed gulls are found in Britain.
White herring gulls are unable to breed with (Alaskan) lesser black backed gulls.
White herring gulls can breed with American herring gulls.
American herring gulls can breed with (Alaskan) lesser black backed gulls.



white herring gull



(Alaskan) lesser black backed gull

- (i) This type of interbreeding between different species is known as (1)

- (ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

This interbreeding of gulls results in the creation of (1)

- A circular species
- B isolation
- C ring species
- D speciation

- (b) The binomial term for the white herring gull is *Larus argentatus*.

State the level of classification that *Larus* in the binomial name refers to. (1)



(c) Discuss how this interbreeding in gulls may make accurate classification difficult.

(2)

.....

.....

.....

.....

(d) Gulls belong to the phylum chordata.

Explain which features of gulls enable them to be classified in a vertebrate group.

(3)

.....

.....

.....

.....

.....

.....

.....

(Total for Question 2 = 8 marks)



Plant hormones

- 3 (a) Faiza investigated the effect of rooting powder on plant cuttings. She did not add rooting powder to one cutting. She treated two more plant cuttings with different concentrations of rooting powder. All three cuttings were then planted. The diagrams show the cuttings after they had been growing for five weeks.



no rooting powder

2% rooting powder

5% rooting powder

Describe the effect of rooting powder on the growth of these plant cuttings.

(2)

.....

.....

.....

.....



(b) Faiza measured the length of four individual roots from each of the plants treated with rooting powder.

Her results are shown in the table.

percentage rooting powder (%)	root length / cm				
	1	2	3	4	Mean
2	0.9	1.4	1.0	1.1	
5	2.3	2.5	1.3	3.1	2.3

(i) Calculate the mean root length for the 2% rooting powder. (1)

answer = cm

(ii) Compare the mean root length in 2% with the mean root length in 5% rooting powder. (1)

.....
.....

(c) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.
The response of roots to gravity is called (1)

- A gravitropism
- B homeostasis
- C photosynthesis
- D phototropism

(ii) Explain how roots respond to gravity. (2)

.....
.....
.....
.....



(d) Rooting powder contains plant hormones.
Plant hormones are used extensively in the food production industry.

Describe some benefits of using plant hormones, other than rooting powder, in the food production industry.

(3)

.....

.....

.....

.....

.....

.....

.....

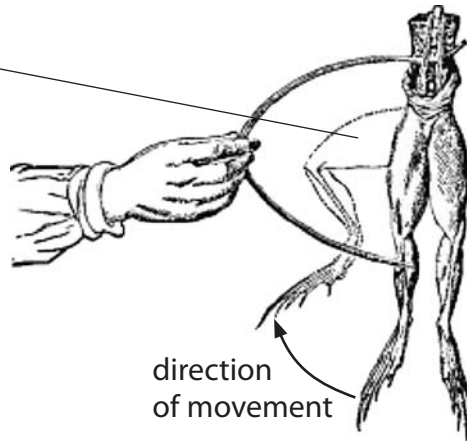
(Total for Question 3 = 10 marks)



Responses

- 4 (a) In 1790, Italian biologist Luigi Galvani experimented on dead frogs. He demonstrated that the frogs' legs moved when electricity was passed through them.

position of frog's leg after passing electricity through it



- (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The electrical impulses that made the frog's leg move passed through the

(1)

- A circulatory system
- B digestive system
- C endocrine system
- D nervous system

- (ii) Explain how passing electricity through the frog's leg caused it to move.

(2)

.....

.....

.....

.....



(iii) Explain how the structure of a sensory neurone maximises the speed of the impulse passing along it.

(2)

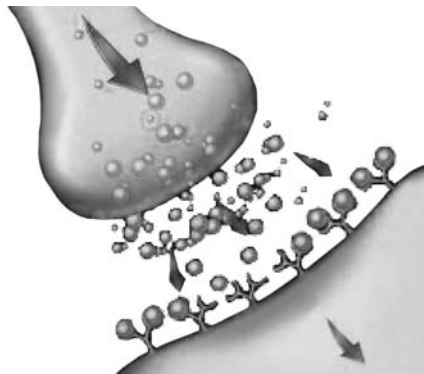
.....

.....

.....

.....

(b) The diagram shows a gap between two neurones.



(i) Give the name for the gap between two neurones.

(1)

.....

(ii) Describe how an impulse can continue to travel along a nerve pathway when there is a gap between two neurones.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 4 = 10 marks)



The spread of disease

5 Pathogens are microorganisms that cause disease.

(a) Draw **one** straight line from each disease to the type of pathogen that causes the disease.

(2)

disease	type of pathogen
athlete's foot	bacterium
	fungus
	protocist
	protozoan
cholera	virus

(b) Some diseases can be treated with antibacterial drugs.

Explain how an antibacterial drug may become ineffective over time.

(3)

.....

.....

.....

.....

.....

.....



(c) Complete the sentence by putting a cross (☒) in the box next to your answer.

Chemicals may prevent the entry of pathogens.

One chemical that prevents the entry of pathogens is

(1)

- A cilia
- B lysozyme
- C mucus
- D skin

*(d) Describe how different pathogens are spread within human populations.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 5 = 12 marks)



Inheritance

6 The peppered moth (*Biston betularia*) exists in dark and light forms.



Dark and light forms of the peppered moth

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Characteristics such as colour are coded for by alleles.

An allele is

(1)

- A a single chromosome
- B a single gene
- C an alternative form of the same chromosome
- D an alternative form of the same gene

(ii) The allele for the dark colour is **B** and is dominant.
The allele for the light colour is **b** and is recessive.

Complete the table to show all possible genotypes of dark moths.

(2)

possible genotypes of dark moths



(iii) Complete the Punnett square for a cross between a moth heterozygous for colour and a moth homozygous recessive for light colour.

(2)

(iv) Give the ratio of light to dark moths in the Punnett square in (a)(iii).

(1)



BLANK PAGE

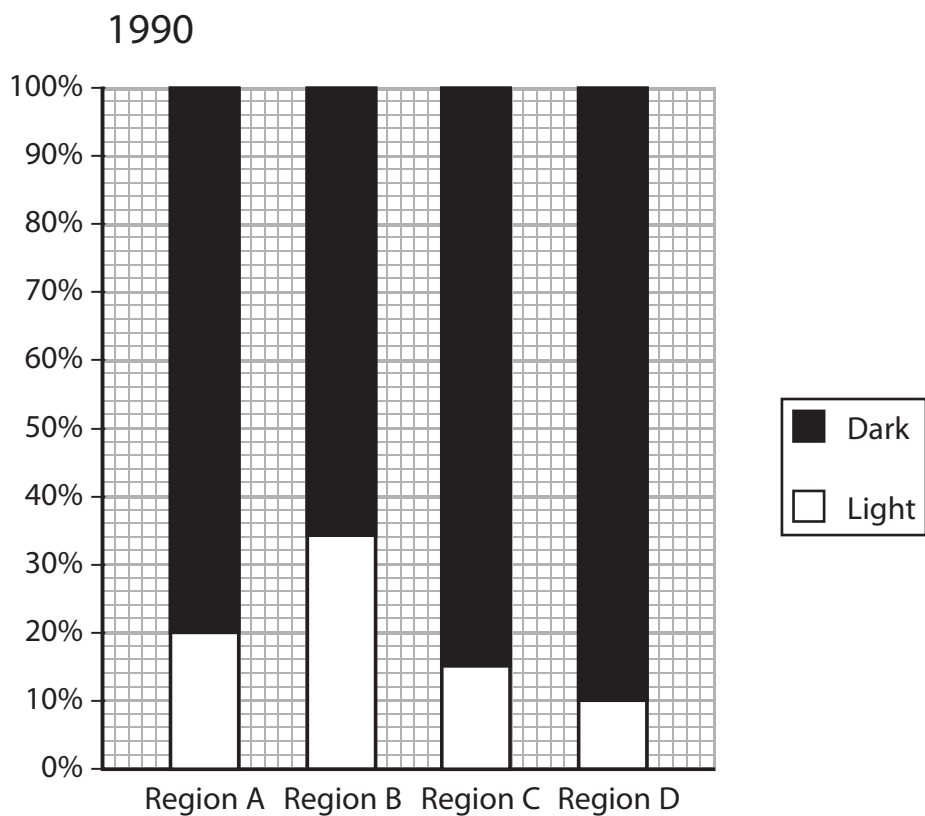
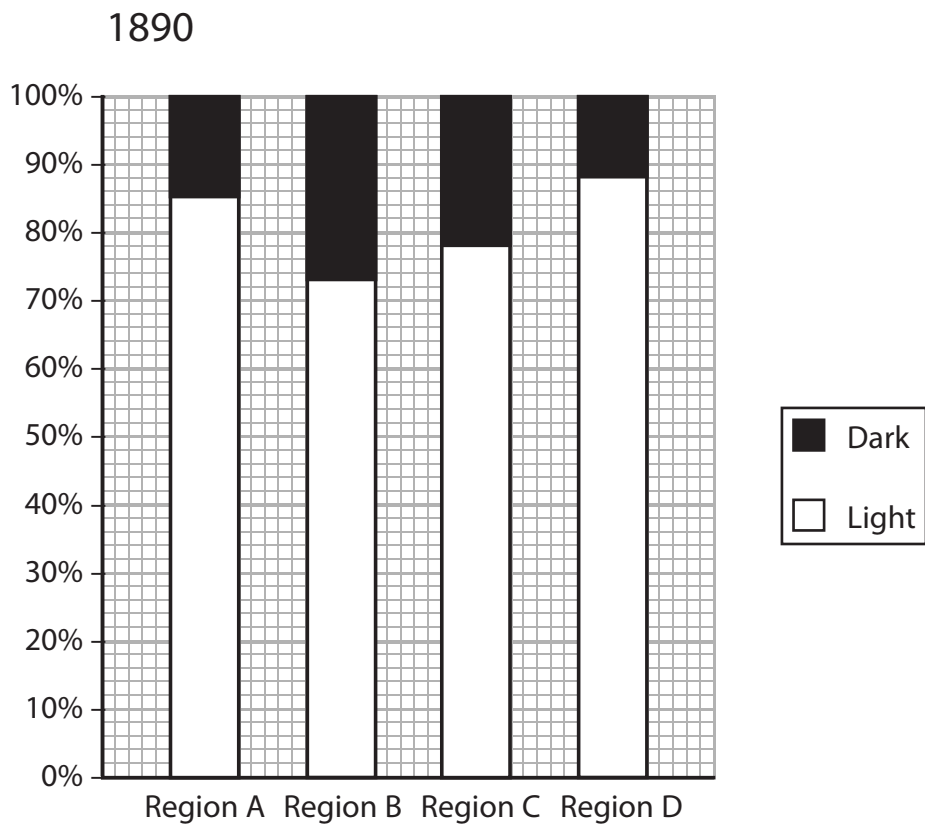
QUESTION 6 CONTINUES ON NEXT PAGE



*(b) Peppered moths can be eaten by birds.

In areas where there is pollution, trees are covered by dark sooty deposits.

The graphs show the percentages of dark and light coloured moths in the same four regions in 1890 and 1990.



Additional Sample Mark Scheme

GCSE Science 2011

GCSE

GCSE Biology (5BI1H/01)

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

General Information

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
eq	Indicates that credit should be given for other correct alternatives to a word or statement
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	correct readings from graph (1) 12 - 5 correct answer (1) = 7 (mmol/dm ³)		(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	A description including two of the following points <ul style="list-style-type: none"> • increases from 0 minutes to 60 minutes / peaks at 60 minutes • decrease between 60 and 90 minutes • increases between 90 and 120 minutes • some creditable data manipulation to show an {increase/decrease} between two time points 		(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	insulin		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	C		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	<p>An explanation linking of the following points in a logical order</p> <ul style="list-style-type: none"> • controlled through diet so glucose intake is reduced (1) • controlled through physical activity /exercise so excess glucose is used (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	hybridisation	Ignore references to interbreeding	(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	C		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)	Genus		(1)

Question Number	Answer	Acceptable answers	Mark
2(c)	<p>A discussion linking the following points in a logical order</p> <ul style="list-style-type: none"> classification is based on the premise that separate species do not interbreed (1) these gulls are interbreeding between species so a single classification of the species is not possible (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
2(d)	<p>An explanation linking the following points</p> <ul style="list-style-type: none"> method of obtaining oxygen through lungs (1) method of reproduction internal and laying eggs (1) homeothermic so can maintain internal temperature (1) 		(3)

Question Number	Answer	Acceptable answers	Mark
3(a)	<p>A description including two of the following points</p> <ul style="list-style-type: none"> • {more / bigger / longer} roots are grown in (2% / 5%) powder compared to no powder (1) • {bigger / taller} plants are grown in (2% / 5%) powder compared to no powder (1) • {more / bigger} leaves are grown in (2% / 5%) powder compared to no powder (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	= 1.1(cm)	Accept answer written in table	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	the mean value for 5% rooting powder shows a longer root than the mean value for 2% / ORA	Accept accurate interpretation of data	(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	A		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	<p>An explanation linking two of the following points</p> <ul style="list-style-type: none"> • roots bend towards gravity/roots bend downwards/grow down (1) • <u>auxin</u> distributed to lower side/underside of root (1) • auxin inhibits growth (causing this downward bend) (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
3(d)	<p>A description including the following points</p> <ul style="list-style-type: none"> • selective weed killers result in higher crop yield (1) • seedless fruit are more desirable to consumers / increase turnover (1) • fruit ripening can be controlled so less wastage / link to demand (1) 		(3)

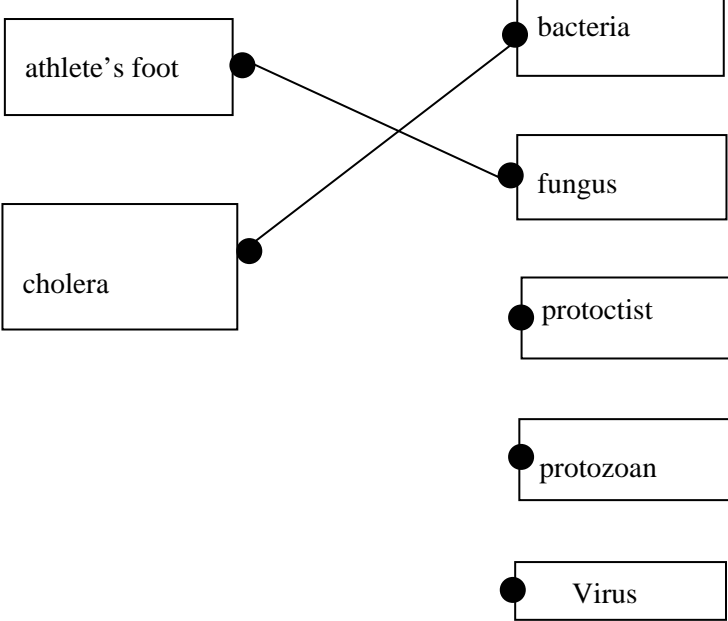
Question Number	Answer	Acceptable answers	Mark
4(a)(i)	D		(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	<p>An explanation linking the following points in a logical order</p> <ul style="list-style-type: none"> • electrical impulses passed along motor neurone (1) • causing the muscles to contract (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	<p>An explanation linking the following points in a logical order</p> <ul style="list-style-type: none"> • the myelin sheath (1) • insulates the sensory neurone which reduces loss of signal (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	synapse		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	<p>A description including the following points in a logical order</p> <ul style="list-style-type: none"> • the electrical impulse stimulates the release of a neurotransmitter at the synapse (1) • the neurotransmitter diffuses across the synapse (1) • (as a chemical messenger) which fits into the receiving neurone (1) • this stimulates an electrical impulse in the receiving neurone (1) 	<p>Accept chemical messenger for neurotransmitter</p> <p>Accept chemical messenger across the gap between neurones</p>	(4)

Question Number	Answer	Mark
5(a)	 <p>both lines needed for 2 marks</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)	<p>An explanation linking three of the following points</p> <ul style="list-style-type: none"> • to treat bacterial infection, antibiotics / antibacterial drug are used (1) • antibacterial drug / antibiotics may be {overused / misused} (1) • some bacteria resistant to the antibacterial drug may survive (1) • these resistant bacteria will produce resistant offspring (1) 		(3)

Question Number	Answer	Acceptable answers	Mark
5(c)	B		(1)

Question Number	Indicative Content		Mark
QWC	*5(d)	<p>A description of how pathogens are spread and how they enter the human body in a logical order</p> <ul style="list-style-type: none"> • cholera bacteria ingested through the drinking of 'dirty' water • <i>Salmonella</i> bacteria ingested through contaminated food products / spread by direct contact • influenza virus spread through droplet inhalation/airborne process • athlete's foot fungus spread by contact with fungal spores • HIV spread by exchange of contaminated body fluids • dysentery infection / bacteria spread through housefly vector • malaria protozoa spread by the <i>Anopheles</i> mosquito 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • few examples of pathogens are given and/or wrongly linked to their sources of infection or method of transmission • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • there are several examples of pathogens mentioned linked to their source of infection • there is a link to the method of transmission for each of the pathogen • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy 	
3	5 - 6	<ul style="list-style-type: none"> • the majority of the pathogens are mentioned and linked to their source of infection • the method of transmission is described accurately for each of the pathogens • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	D		(1)

Question Number	Answer	Acceptable answers	Mark						
6(a)(ii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">possible genotypes of black moths</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">BB</td> <td></td> </tr> <tr> <td style="text-align: center;">Bb</td> <td></td> </tr> </tbody> </table>	possible genotypes of black moths		BB		Bb		Accept any two of the genotypes in any order	(2)
possible genotypes of black moths									
BB									
Bb									

Question Number	Answer	Acceptable answers	Mark									
6(a)(iii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">B</td> <td style="text-align: center;">b</td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;">Bb</td> <td style="text-align: center;">bb</td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;">Bb</td> <td style="text-align: center;">bb</td> </tr> </table> <p>1 mark for correct parental gametes 1 mark for correct offspring</p>		B	b	b	Bb	bb	b	Bb	bb		(2)
	B	b										
b	Bb	bb										
b	Bb	bb										

Question Number	Answer	Acceptable answers	Mark
6(a)(iv)	2 : 2	e.c.f	(1)

Question Number		Indicative Content	Mark
QWC	*6(b)	<p>An explanation to include some of the following points</p> <ul style="list-style-type: none"> • More light moths than dark in 1890 • More dark moths than light in 1990 • There is less change in region B compared to the other regions • Correct reference to camouflage/ better adaptation • 1890 little pollution so light coloured trees • 1990 more pollution so dark coloured trees • Survival of the fittest / those seen by the birds more likely to be eaten • Those not eaten lived to breed • DNA / allele for dark colour passed on • Produced more dark coloured offspring 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • direct reading from the graph without full explanation • there is some reference to how the environment affects the numbers of different coloured moths • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • there is use of the graph and the candidate indicates a link between pollution and predation • answer may have sections missing with candidate correctly identifying the change in numbers of only one type of moth • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy 	
3	5 - 6	<ul style="list-style-type: none"> • most of the indicative content is included, explaining a clear link between pollution and predation rates for both types of moth. • answer is coherent without missing sections and information on survival of the fittest / natural selection is included • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	