

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Sample Assessment Material

Time: 1 hour

Paper Reference

5BI1F/01

You do not need any other materials.

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 ►

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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 ☒.

Living with the cold

1 Polar bears are mammals that live in the Arctic.



Shutterstock

(a) (i) The temperature in the Arctic can be -40°C .
Look at the picture of the polar bear.

Explain how one feature of the polar bear helps it to survive in the Arctic.

(2)

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(ii) Polar bears belong to the phylum chordata.

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

All animals classified as chordata

(1)

- A** have wings
- B** have a spinal cord
- C** lay eggs
- D** have fur

(iii) Describe how polar bears get oxygen into their bloodstream.

(2)

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(b) (i) The binomial system of classification is a worldwide method of identifying animals and plants.

The binomial name for polar bears is *Ursus maritimus*.

Draw **two** straight lines to correctly match the genus and species of the polar bear with its binomial name.

(1)

classification

binomial name

genus ●

species ●

Ursus ●

bear ●

maritimus ●

(ii) The Pizzly bear has recently been discovered.
The Pizzly bear is a hybrid.
Describe how hybrids are produced.

(2)

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(Total for Question 1 = 8 marks)

Cystic fibrosis

2 About 8 000 people in the UK have the genetic condition called cystic fibrosis. People with cystic fibrosis may take tablets daily and receive regular treatment.

(a) (i) The gene that controls cystic fibrosis is found on chromosome 7. In which part of the cell is a chromosome found?

(1)

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

Genes exist in alternative forms called

(1)

- A alleles
- B chromosomes
- C daughter cells
- D DNA

(iii) State **two** symptoms of cystic fibrosis.

(2)

1

2

(b) Cystic fibrosis is caused by two recessive alleles.

This table shows the genotypes of Susan and Paul.

	Genotype
Susan	Cc
Paul	CC

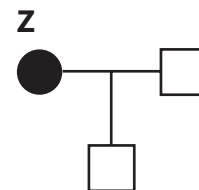
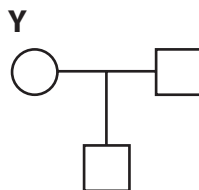
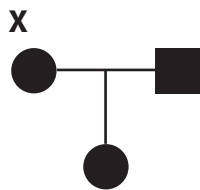
C – normal allele

c – cystic fibrosis allele

(i) What word is used to describe Susan's genotype (**Cc**)?

(1)

The diagrams below are called pedigree charts.
These can show the inheritance of genetic disorders.



key

= female without cystic fibrosis

= male without cystic fibrosis

= female with cystic fibrosis

= male with cystic fibrosis

(ii) Susan and Paul have a baby.

Look at the pedigree charts above. Which chart shows Susan and Paul's family tree?

(1)

(iii) Explain why Susan and Paul's baby does **not** have the genetic condition cystic fibrosis.

(2)

(Total for Question 2 = 8 marks)

Temperature regulation

- 3 Pavel investigated how his body temperature changed over one day. He used a digital thermometer like the one shown in the photograph to measure his body temperature and the room temperature every four hours.



He then compared his body temperature with the room temperature. His results are shown in the table.

Time (24-hour clock)	Body temperature (°C)	Room temperature (°C)
08:00	36.6	15.2
12:00 midday	37.4	23.7
16:00	37.6	24.4
20:00	37.3	22.6
00:00 midnight	36.8	12.1
04:00	36.2	12.0

(a) Use the information in the table to answer questions (i) and (ii).

- (i) Put a cross (☒) in the box next to your answer.

At what time was Pavel's body temperature at its highest?

(1)

- A 12:00 midday
- B 16:00
- C 20:00
- D 00:00 midnight

- (ii) What was the temperature difference between Pavel's body temperature and the room temperature at 04:00?

(1)

.....°C

(iii) Explain why Pavel used a digital thermometer instead of a glass thermometer.

(2)

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(iv) Explain why Pavel's body temperature did not vary as much as the room temperature.

(2)

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(b) When Pavel gets too hot he starts to sweat.

Describe how sweating helps to control Pavel's body temperature.

(2)

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(c) Explain how the body uses hair to regulate temperature.

(2)

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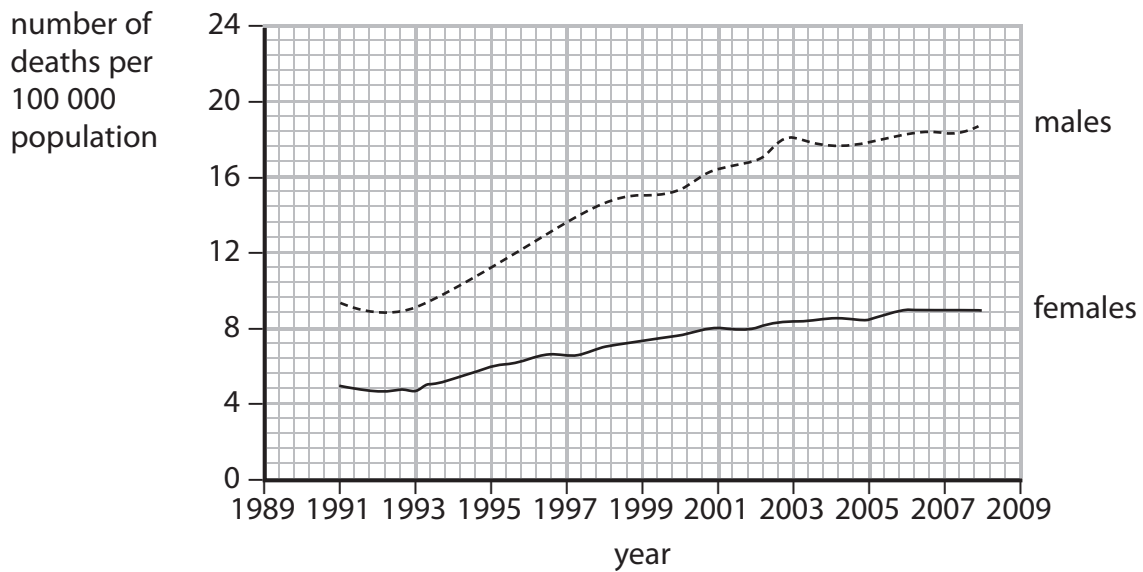
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(Total for Question 3 = 10 marks)

The dangers of alcohol

4 The graph shows how the number of deaths related to alcohol abuse in Britain changed between 1991 and 2008.



(a) (i) State the main trend shown in the graph for males between the years 1991 and 2008.

(1)

(ii) Use the graph to suggest the impact of alcohol abuse on healthcare services.

(1)

(iii) During 2001 there was a population of 20 million females in Britain.

Calculate the number of females who died due to alcohol abuse during 2001.
Show your working.

(3)

number of females =

(b) (i) One of the effects of alcoholism is cirrhosis of a body organ.

Put a cross (☒) in the box next to your answer.

Which body organ is affected by cirrhosis?

(1)

- A liver
- B lungs
- C pancreas
- D skin

(ii) Explain **one** effect of drinking alcohol that could cause a person driving a car to have an accident.

(2)

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(iii) Explain how drinking coffee containing caffeine may help when driving long distances.

(2)

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(Total for Question 4 = 10 marks)

Plant hormones

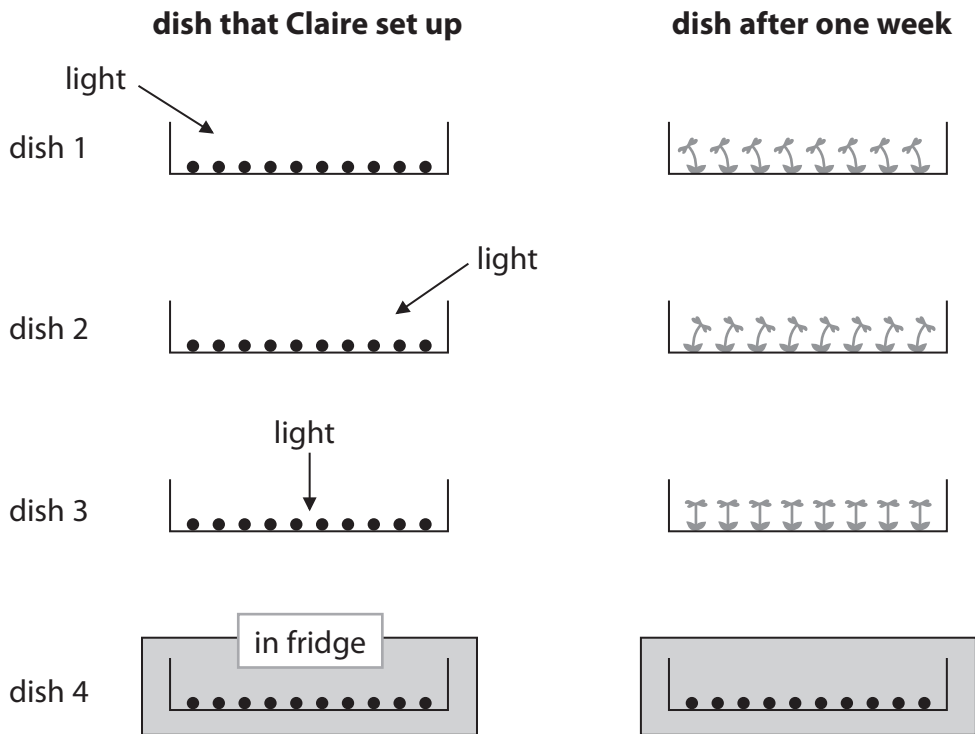
5 Claire carried out an investigation to find out how light affected the growth of seedlings.

She placed 10 cress seeds on damp filter paper in each of the dishes 1, 2, 3 and 4. Claire shone light onto dishes 1, 2 and 3 from different directions.

Dish 4 was kept in the fridge.

Claire left the dishes for one week.

The diagrams show the results of Claire's investigation.



(a) (i) Put a cross (☒) in the box next to your answer.

What is the name given to the seedlings' response to light?

(1)

- A geotropism
- B homeostasis
- C phototropism
- D respiration

(ii) Explain how the seedlings responded to the light.

(2)

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(iii) Explain why the seeds in dish 4 did not germinate.

(2)

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(b) (i) State **one** variable that Claire would have to control when carrying out this experiment.

(1)

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*(ii) Claire wrote a prediction before carrying out this experiment.
Claire's prediction was: 'All the seedlings will grow straight upwards.'

Explain why Claire's prediction was **not** correct.
Include the results for all four dishes in your explanation.

(6)

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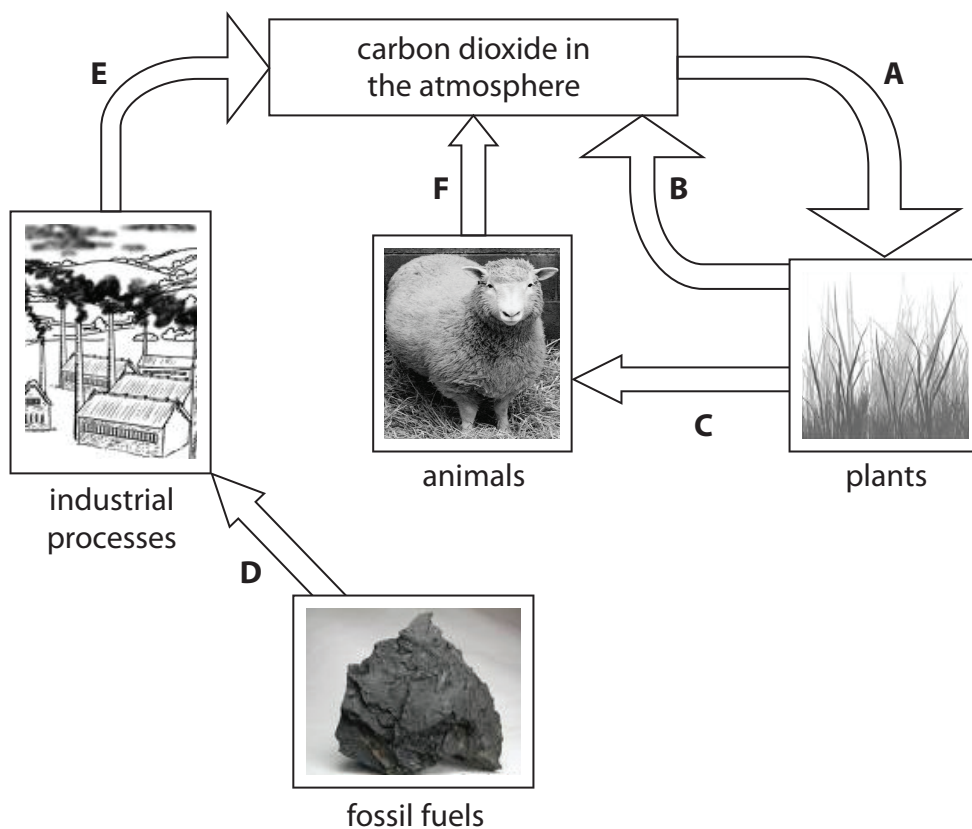
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(Total for Question 5 = 12 marks)

The carbon cycle

6 The diagram shows some of the different stages of the carbon cycle.



(a) Use the diagram to answer parts (i) and (ii).

(i) Put a cross (☒) in the box next to your answer.

Which letter represents photosynthesis?

(1)

- A
- B
- C
- D

(ii) What is the name of the process that letter **F** represents?

(1)

(b) Deforestation by humans is removing thousands of trees from the surface of the Earth every day.

Explain how continued deforestation is likely to affect the levels of carbon dioxide in the atmosphere.

(2)

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(c) Human population increase has also caused an increase in the levels of many other pollutants.

Explain how high levels of sulfur dioxide in the atmosphere can impact on the environment.

(2)

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*(d) Explain how the overuse of nitrate fertilisers can cause problems in the environment.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

Sample Mark Scheme

Unit B1: Influences on Life (Foundation Tier)

Question number	Answer	Acceptable answers	Mark
1(a)(i)	<p>an explanation linking a pair of the following:</p> <p>large/wide feet give larger surface area (1) (so) less pressure on the ice (1)</p> <p>thick fur (1) (so) insulated against the cold (1)</p> <p>white/translucent fur (1) (so) camouflaged from prey (1)</p> <p>small ears have less surface area (1) (so) lose less heat (1)</p>	<p>(so) less likely to break the ice (1)</p> <p>ignore references to predators</p>	(2)

Question number	Answer	Mark
1(a)(ii)	B	(1)

Question number	Answer	Mark
1(a)(iii)	<p>a description linking the following points:</p> <p>through lungs (1) by diffusion across a membrane (1)</p>	(2)

Question number	Answer	Mark
1(b)(i)	<p>both lines needed for 1 mark</p> <pre> graph LR G[genus] --> U[Ursus] S[species] --> M[maritimus] B[bear] </pre>	(1)

Question number	Answer	Acceptable answers	Mark
1(b)(ii)	A description including the following: the breeding/reproduction of mammals (1) from two different species (1)	Specific references to a male polar bear and female grizzly bear or vice versa (1)	(2)

TOTAL: 8 MARKS

Question number	Answer	Mark
2(a)(i)	nucleus	(1)

Question number	Answer	Mark
2(a)(ii)	A	(1)

Question number	Answer	Acceptable answers	Mark
2(a)(iii)	any two from the following: thick/sticky mucus in the lungs (1) thick/sticky mucus in the pancreas (1) thick/sticky mucus in the reproductive organs (1) short of breath/coughing (1)	lowered life expectancy/ underweight/increased infections	(2)

Question number	Answer	Acceptable answers	Mark
2(b)(i)	heterozygous	carrier	(1)

Question number	Answer	Mark
2(b)(ii)	Y	(1)

Question number	Answer	Acceptable answers	Mark
2(b)(iii)	an explanation linking the following: Paul is CC/homozygous (1) (so) baby must have inherited a C from Paul/baby does not have two recessive alleles required for CF (1)		(2)

TOTAL: 8 MARKS

Question number	Answer	Mark
3(a)(i)	B	(1)

Question number	Answer	Mark
3(a)(ii)	24.2	(1)

Question number	Answer	Acceptable answers	Mark
3(a)(iii)	<p>an explanation linking a pair of the following:</p> <p>easier to read (1) (so) less error in his results (1)</p> <p>reaches the final temperature more rapidly (1) (so) less error in his results (1)</p> <p>doesn't contain mercury (1) (so) safer to use (1)</p>	ignore more reliable	(2)

Question number	Answer	Acceptable answers	Mark
3(a)(iv)	<p>an explanation linking the following:</p> <p>internal temperature is controlled (1) (in order to) maintain a constant internal environment/homeostasis (1)</p>	<p>Pavel maintains (warm) body temperature</p> <p>by using respiration</p>	(2)

Question number	Answer	Acceptable answers	Mark
3(b)	<p>a description including the following in a logical order:</p> <p>sweat lies on the surface of hot skin and the water in the sweat evaporates (1)</p> <p>this takes heat from the skin, cooling the body (1)</p>	ignore just sweat produced	(2)

Question number	Answer	Acceptable answers	Mark
3(c)	an explanation linking the following: erector muscle raises the hair (1) to trap air near the skin to keep warm/for insulation (1) or erector muscle causes hair to lie flat (1) to reduce insulation from air (1)		(2)

TOTAL: 10 MARKS

Question number	Answer	Mark
4(a)(i)	an increase in the number of deaths attributed to alcohol	(1)

Question number	Answer	Acceptable answers	Mark
4(a)(ii)	any one from the following: increased number of people needing an organ transplant increase in alcohol-related accidents requiring medical treatment increase in the number of support groups needed for recovering alcoholics	increased cost because there are more people to treat increased number of accidents going to A&E	(1)

Question number	Answer	Acceptable answers	Mark
4(a)(iii)	correct reading from the graph: 8 correct calculation: 8×200 1 600	allow ecf if incorrect reading off the graph for 2 marks	(3)

Question number	Answer	Mark
4(b)(i)	A	(1)

Question number	Answer	Acceptable answers	Mark
4(b)(ii)	an explanation linking a pair of the following: it slows down reactions (1) (so) you don't brake fast enough/ increases thinking/stopping distances(1) blurred vision (1) (so) you can't see other things on the road (pedestrians, cars etc) (1) reduces hazard perception (1) (so) you think it's OK to go faster (1)		(2)

Question number	Answer	Acceptable answers	Mark
4(b)(iii)	an explanation linking the following: caffeine is a stimulant/increases activity at the synapses (1) (so) reduces reaction times/makes you more alert (1)	decreases thinking time (1)	(2)

TOTAL: 10 MARKS

Question number	Answer	Mark
5(a)(i)	C	(1)

Question number	Answer	Acceptable answers	Mark
5(a)(ii)	A explanation linking the following: grew towards the light (1) because of cell elongation in the side in shade (1)	accept references to the effects of auxin for 1 mark	(2)

Question number	Answer	Acceptable answers	Mark
5(a)(iii)	an explanation linking the following: the temperature was too low (1) (therefore) enzyme activity was too slow (1)	accept references to seeds requiring conditions needed for germination, for example moisture	(2)

Question number	Answer	Acceptable answers	Mark
5(b)(i)	accept any variable that needed to be controlled: <ul style="list-style-type: none"> • number of seeds • size of Petri dish • colour/wavelength of light • spacing of seeds • type of seed • volume of water added to each dish 		(1)

Question number	Indicative content	Mark
*5(b)(ii) QWC	<p>an explanation to include some of the following:</p> <ul style="list-style-type: none"> • dish 1 and dish 2 seedlings did not grow straight up • correct explanation of dish 1 seedlings including stem bending left towards the light due to auxin building up on shaded part of stem and cell elongation • correct explanation of dish 2 including stem bending right towards the light due to auxin building up on shaded part of stem and cell elongation • correct explanation of dish 3 including stem growing straight upwards towards the light • correct explanation of dish 4 including no germination so no response to light. 	(6)
Level	0	no rewardable material
1	1-2	<ul style="list-style-type: none"> • a limited explanation is given for one dish and its seedlings' response to light • limited scientific knowledge of phototropism • communicates ideas using simple language and little scientific terminology. Spelling, punctuation and grammar are used with little accuracy
2	3-4	<ul style="list-style-type: none"> • an explanation for two or three dishes and the seedlings' response to light • explanation of some of the scientific reasoning of phototropism • communicates ideas showing some evidence of clarity and organisation and uses some scientific terminology appropriately. Spelling, punctuation and grammar are used with some accuracy
3	5-6	<ul style="list-style-type: none"> • an explanation for all four dishes • scientific explanation including phototropism, auxins, cell elongation and germination requirements • communicates ideas clearly and uses scientific terminology appropriately. Spelling, punctuation and grammar are used with few errors

TOTAL: 12 MARKS

Question number	Answer	Mark
6(a)(i)	A	(1)

Question number	Answer	Acceptable answers	Mark
6(a)(ii)	respiration	death and decay	(1)

Question number	Answer	Acceptable answers	Mark
6(b)	<p>an explanation linking the following:</p> <p>the level of carbon dioxide increases (1)</p> <p>(as) less carbon dioxide is removed by photosynthesis (1)</p>	<p>(as) more carbon dioxide is produced as tree remains/stumps decay</p> <p>more carbon dioxide is produced when trees are burned</p>	(2)

Question number	Answer	Acceptable answers	Mark
6(c)	<p>an explanation linking the following points:</p> <p>sulfur dioxide combines with water in clouds/to form sulfuric acid/which falls as acid rain (1)</p> <p>(which can) lower the pH of soil and lakes and destroy habitats (1)</p>		(2)

Question number		Indicative content	Mark
*6(d) QWC		<p>an explanation of the problems associated with the build up of nitrates to include some of the following points:</p> <ul style="list-style-type: none"> • eutrophication • nitrates in water cause algal blooms/small plants grow rapidly • blocks out the sunlight • plants find it difficult to carry out photosynthesis • plants die • dead organisms are decomposed/broken down by microorganisms • micro-organisms require oxygen to carry out decomposition/respiration • less oxygen for other living organisms • fish and other organisms die • water becomes stagnant. 	(6)
Level	0	no rewardable material	
1	1-2	<ul style="list-style-type: none"> • a limited explanation is given of the possible problems caused by nitrates in water • there may be references to pollution, but no understanding of how nitrates affect plants and animals in water • communicates ideas using simple language and little scientific terminology. Spelling, punctuation and grammar are used with little accuracy 	
2	3-4	<ul style="list-style-type: none"> • a number of the consequences of a build up of nitrates are identified • there is some understanding shown of the sequence of events that lead to eutrophication • some of the steps may be missing; however, there is an attempt at a sequential order • communicates ideas showing some evidence of clarity and organisation and uses some scientific terminology appropriately. Spelling, punctuation and grammar are used with some accuracy 	
3	5-6	<ul style="list-style-type: none"> • most of the key consequences of a build up of nitrates in water are identified • there is a good understanding of the sequence of events that lead to eutrophication • communicates ideas clearly and uses scientific terminology appropriately. Spelling, punctuation and grammar are used with few errors 	

TOTAL: 12 MARKS

