AQA GCSE BIOLOGY (4401)

BIOLOGY



EXAM QUESTION PACK

UNIT B1 FOUNDATION TIER BL1FP PAPERS

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AQA

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Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
SCIENCE A
BIOLOGY

F

Foundation Tier Unit Biology B1

Tuesday 17 May 2016 Afternoon Time allowed: 1 hour

Materials
For this paper you must have:
- a ruler

You may use a calculator.

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8 should be answered in continuous prose.
  In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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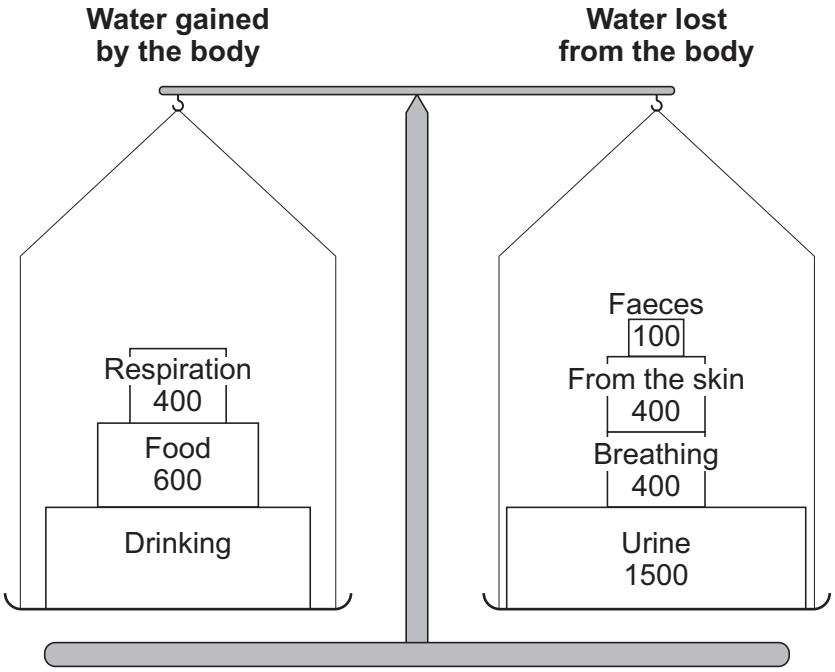
Do not write outside the box

Answer **all** questions in the spaces provided.

1 **Figure 1** shows the water balance for a person on a cold day.

The numbers show the volume of water, in cm^3, the person's body gained and lost.

Figure 1



1 (a) (i) How much water was lost from the body on the cold day?

[1 mark]

Draw a ring around the correct answer.

1800 cm^3 **2400 cm^3** **3300 cm^3**

1 (a) (ii) The volume of water gained by the body should balance the volume of water lost from the body.

How much water should the person have drunk to keep the balance?

[2 marks]

_____

_____

Volume of water = _____ cm^3

Do not write outside the box

1 (b) (i) Name the process by which water is lost from the skin.

[1 mark]

_____

1 (b) (ii) Why does the body need to lose water from the skin?

[1 mark]

_____

_____

1 (c) The next day was a hot day. The person gained the same volume of water and did the same activities.

1 (c) (i) What effect did the increase in temperature have on the volume of water the person lost?

[1 mark]

Tick (✓) **one** box.

Less water was lost through the skin. ☐

More water was lost through the skin. ☐

More water was lost in faeces. ☐

1 (c) (ii) What effect would the increase in temperature have on the volume of urine the person lost?

[1 mark]

Draw a ring around the correct answer.

decrease **increase** **no change**

7

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

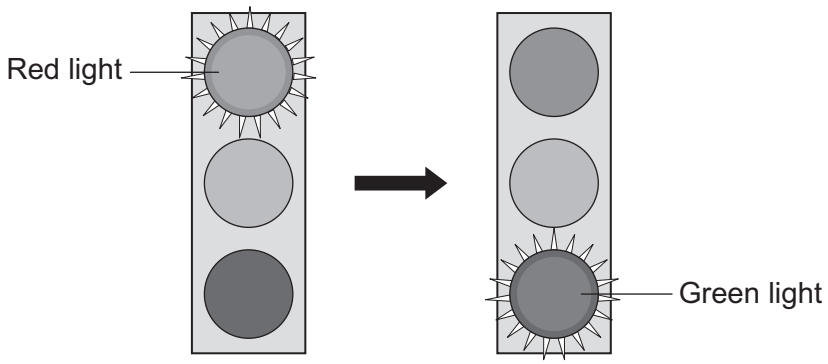
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2 Car drivers need quick reactions to avoid accidents.

A student uses a computer program to measure reaction time.
The computer screen shows a traffic light on red. The traffic light then changes to green.

Figure 2 shows the change the person sees on the computer screen.

Figure 2



When the traffic light changes to green the person has to click the computer mouse as quickly as possible.
The computer program works out the time taken to react to the light changing colour.

2 (a) Special cells detect the change in colour.

2 (a) (i) What word is used to describe special cells that detect a change in the environment?

[1 mark]

Draw a ring around the correct answer.

receptor cells **reflex cells** **stimulus cells**

2 (a) (ii) Where in the body are the special cells that detect the change in colour of the traffic lights?

[1 mark]

_____

2 (b) The student used the computer program on one computer to measure the reaction times of people of different ages.

2 (b) (i) Give **one** variable the student should control so that a fair comparison can be made between the people of different ages.

[1 mark]

_____

_____

Do not write outside the box

2 (b) (ii) The student did each measurement three times to calculate a mean value. **Table 1** shows the results.

Table 1

Age in years	Mean reaction time in milliseconds
15	242
30	
45	221
60	258
75	364
90	526

The reaction times for the 30-year-old person were **192**, **174** and **180** milliseconds.

Calculate the mean reaction time of the 30-year-old person.

[1 mark]

Mean reaction time = _____ milliseconds

2 (b) (iii) Which **one** of the following is an advantage of repeating each test three times and **not** doing the test just once?

[1 mark]

Tick (✓) **one** box.

Any anomalies can be identified. ☐

The results will be more precise. ☐

There will be no errors. ☐

Do not write outside the box

2 (b) (iv) Some people think that old people should **not** be allowed to drive a car.

Why is it more dangerous for old people to drive cars?

Use information from **Table 1** to support your answer.

[2 marks]

_____

_____

_____

_____

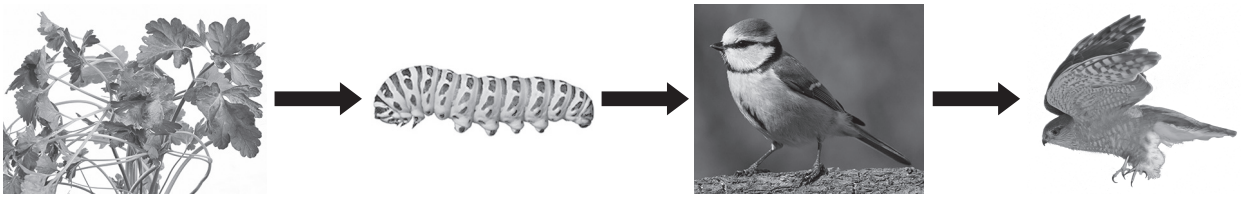
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3 **Figure 3** shows how energy and biomass pass along a food chain.

Figure 3



Parsley → Swallowtail caterpillar → Blue tit → Hawk

3 (a) The parsley shown in **Figure 3** carries out photosynthesis.

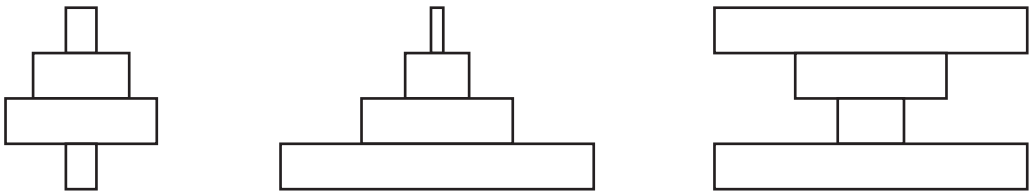
Why is photosynthesis important in the food chain?

[2 marks]

3 (b) Which diagram shows the pyramid of biomass for the food chain in **Figure 3**?

[1 mark]

Tick (✓) **one** box.





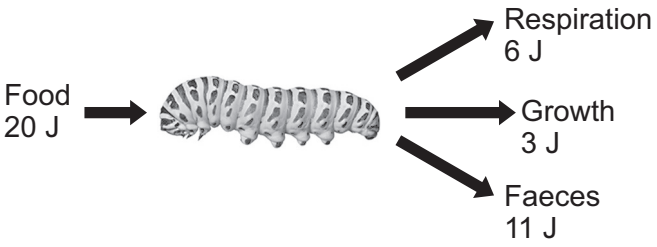




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3 (c) **Figure 4** shows the ways a swallowtail caterpillar transfers 20 J of energy from food.

Figure 4



What percentage of the energy in the caterpillar's food is used for growth?

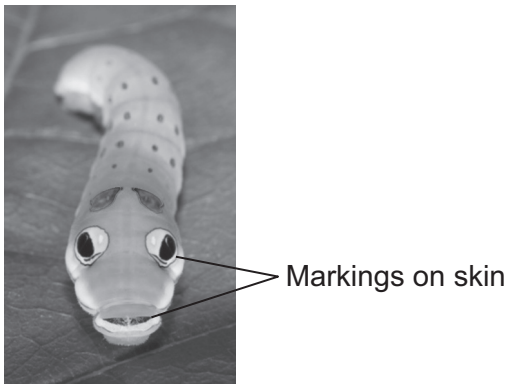
[2 marks]

Percentage = _____

3 (d) The organisms in the food chain are adapted for survival.

3 (d) (i) **Figure 5** shows a swallowtail caterpillar seen from the back.

Figure 5



Suggest how the swallowtail caterpillar shown in **Figure 5** is adapted to reduce the chance of being eaten by blue tits.

[2 marks]

Turn over ▶

Do not write outside the box

3 (d) (ii) **Figure 6** shows a hawk.

Figure 6



Suggest **two** ways that the hawk is adapted to catch and kill blue tits.

[2 marks]

1 _____

_____

2 _____

_____

9

Do not write outside the box

4 Hormones are involved in controlling the menstrual cycle and fertility.

4 (a) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

auxin	**follicle stimulating hormone (FSH)**	**thalidomide**

A hormone produced by the pituitary gland is _____ .

4 (a) (ii) Use the correct answer from the box to complete the sentence.

[1 mark]

luteinising hormone (LH)	**oestrogen**	**statin**

A hormone produced by the ovaries is _____ .

4 (b) (i) Why are fertility drugs given to some women?

[1 mark]

_____

_____

4 (b) (ii) A doctor injects fertility drugs into a woman. After the injection, the hormones travel to the woman's ovaries.

How do the hormones travel to the ovaries?

[1 mark]

Draw a ring around the correct answer.

through the bloodstream **through the neurones** **through the skin**

4 (c) Which **two** hormones are used in contraceptive pills?

[2 marks]

Tick (✓) **two** boxes.

FSH	☐	oestrogen	☐
LH	☐	progesterone	☐

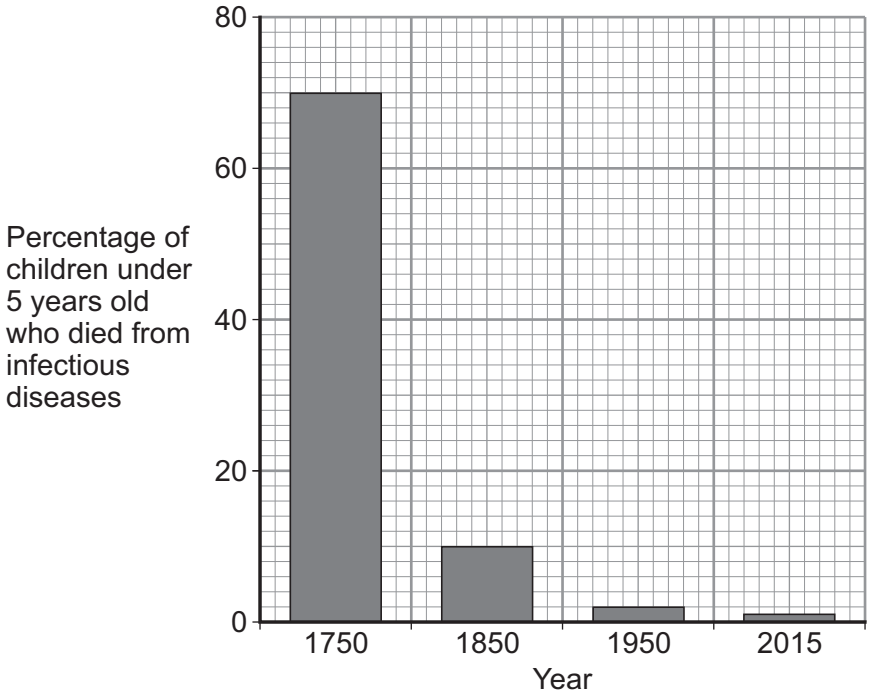
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Do not write outside the box

5 Pathogens are microorganisms that cause infectious diseases.

5 (a) **Figure 7** shows the percentage of children under 5 years old who died from infectious diseases, in the UK, in four different years.

Figure 7



5 (a) (i) In the 1840s Dr Semmelweis introduced a new idea into hospitals.
What was this idea?

[1 mark]

Tick (✓) **one** box.

hand-washing ☐

immunisation ☐

painkillers ☐

5 (a) (ii) Between 1750 and 1850 vaccinations were also developed.
What is in a vaccine?

[1 mark]

Tick (✓) **one** box.

large amounts of dead pathogens ☐

large amounts of live pathogens ☐

small amounts of dead pathogens ☐

Do not write outside the box

5 (a) (iii) The advances in medicine had an effect on death rate.

Describe the effect these advances had between 1750 and 1850.

To gain full marks you should include data from **Figure 7**.

[2 marks]

5 (b) Antibiotics were developed in the 1940s. Antibiotics kill bacteria.

5 (b) (i) Which **one** of the following is an antibiotic?

[1 mark]

Draw a ring around the correct answer.

cholesterol **penicillin** **thalidomide**

5 (b) (ii) The use of antibiotics has **not** reduced the death rate due to all diseases to zero.

Suggest **two** reasons why.

[2 marks]

1

2

5 (c) In school laboratories, bacteria should be grown at a maximum temperature of 25 °C.

Give **one** reason why companies testing new antibiotics grow bacteria at 37 °C.

[1 mark]

8

Do not write outside the box

6 Darwin's theory of natural selection states that all living things have evolved from simple life forms.

6 (a) Use the correct answer from the box to complete the sentence.

[1 mark]

three billion	**three million**	**three thousand**

Darwin's theory states that life began on Earth _____ years ago.

6 (b) Life evolved due to changes in genes. Changes in genes cause variation.

Complete the sentences.

[2 marks]

Changes in genes are called _____ .

Individuals with characteristics most suited to the environment are more likely to survive and _____ .

3

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Turn over for the next question

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7 Nicotine and alcohol are drugs that affect the brain.

7 (a) (i) What is the correct description of both nicotine and alcohol?

[1 mark]

Tick (✓) **one** box.

illegal, medical drugs ☐

illegal, recreational drugs ☐

legal, medical drugs ☐

legal, recreational drugs ☐

7 (a) (ii) Why do people find it difficult to stop smoking?

[1 mark]

_____

_____

7 (b) A drug company has developed a new drug which helps people to stop smoking.
The new drug prevents the feeling of pleasure caused by nicotine in the smoke.

The new drug is now being tested on rats which have been given a lot of alcohol to drink.
The company wants to find out if the drug can help people to stop drinking alcohol.

7 (b) (i) It is important that the tests on rats are done by an independent company.

What is meant by an independent company?

[1 mark]

_____

_____

Do not write outside the box

7 (b) (ii) Why is it important that the tests are done by an independent company?

[1 mark]

7 (b) (iii) Some scientists believe that the part of the brain sensitive to alcohol is the same as the part of the brain sensitive to nicotine.

Explain why the new drug might be useful for treating people who find it difficult to stop drinking alcohol.

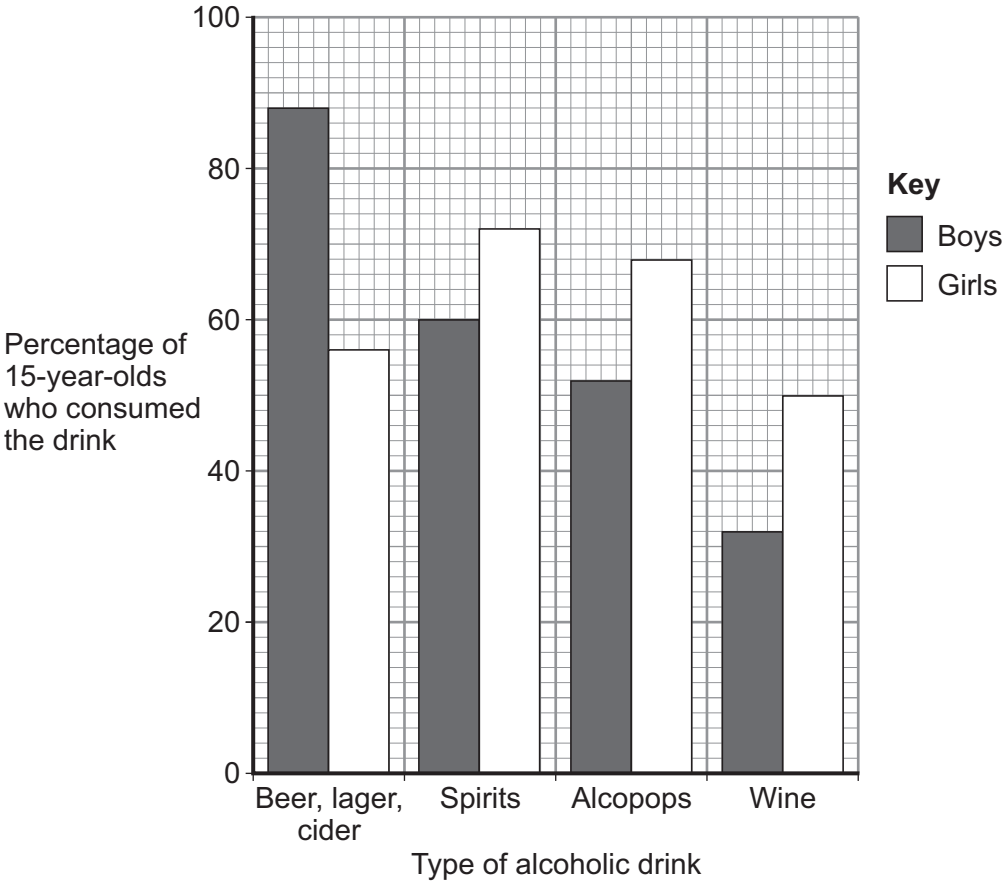
[2 marks]

Question 7 continues on the next page

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7 (c) **Figure 8** shows the results of a survey into the different types of alcoholic drinks consumed by one hundred 15-year-old boys and one hundred 15-year-old girls in the UK.

Figure 8



7 (c) (i) Describe the differences between the **types** of alcoholic drink consumed by boys and by girls.

Use **only** information from **Figure 8**.

[2 marks]

7 (c) (ii) A newspaper headline stated:

"All boys drink alcohol"

Use information from part **(c)** and **Figure 8** to give **one** reason why the newspaper headline may **not** be correct.

[1 mark]

9

Do not write outside the box

8 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Mineral ions are an important component of a healthy diet.

Describe how the other components of the diet are important in keeping us healthy.

In your answer you should refer to:

- the different components
- why we need each component.

[6 marks]

Extra space

6

Turn over for the next question

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9 Students investigated decomposition.

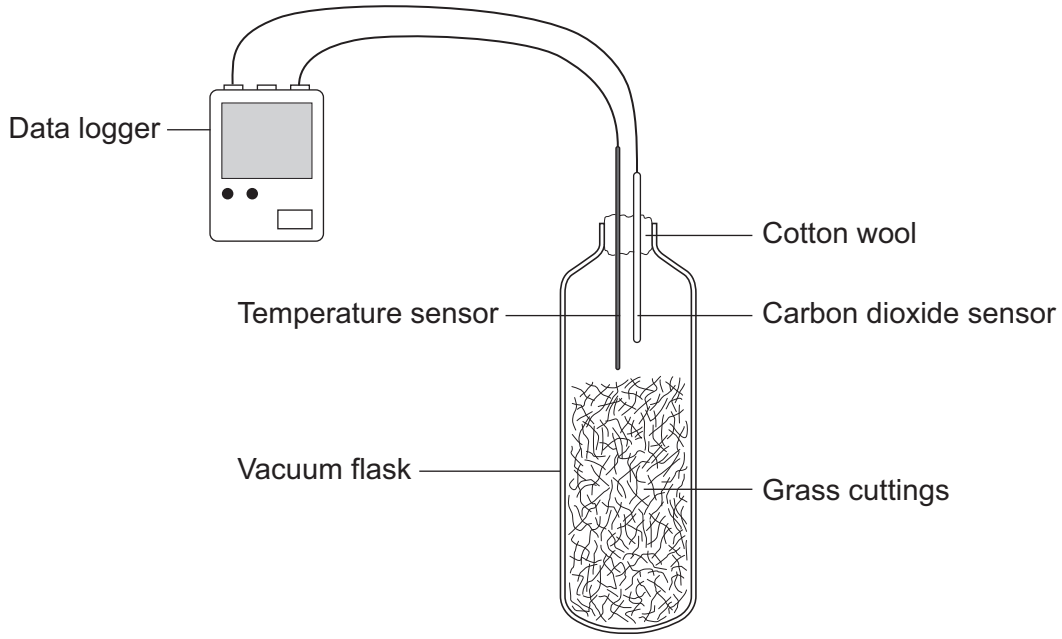
The students:

- put some decaying grass cuttings into a vacuum flask
- put a carbon dioxide sensor and a temperature sensor in the flask
- attached the sensors to a data logger
- closed the flask with cotton wool.

A vacuum flask was used to reduce the loss of thermal energy.

Figure 9 shows the investigation.

Figure 9



9 (a) Give **one** advantage of using a temperature sensor attached to a data logger instead of a thermometer.

[1 mark]

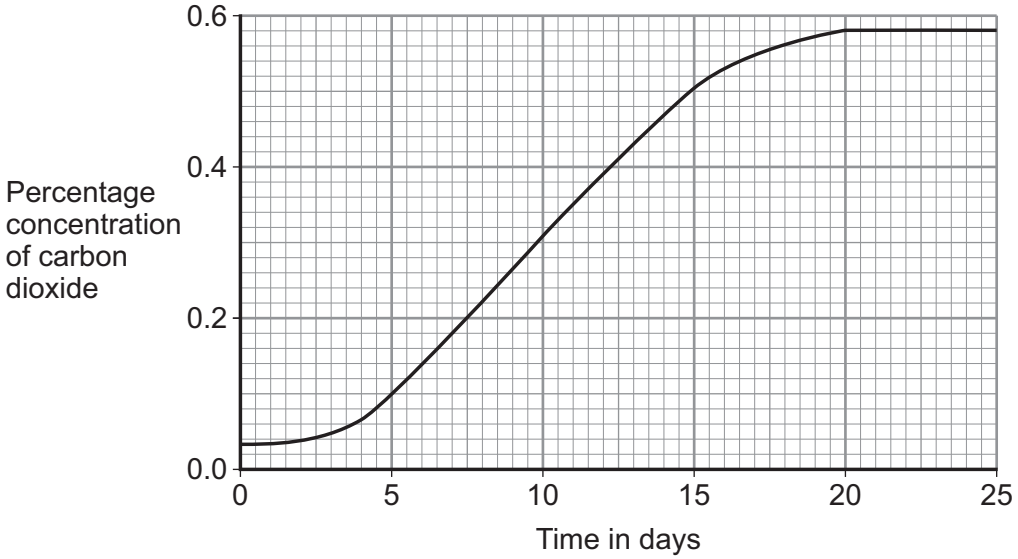
_____

_____

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9 (b) **Figure 10** shows the results from the data logger for carbon dioxide concentration in the flask for the next 25 days.

Figure 10



9 (b) (i) Why did the concentration of carbon dioxide in the flask increase?

[3 marks]

9 (b) (ii) Suggest what has happened in the flask to cause the carbon dioxide concentration to level off after 20 days.

[1 mark]

5

END OF QUESTIONS

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GCSE

Science A / Biology

BL1FP

Mark scheme

4405 / 4401

June 2016

Version 1.0 Final Mark Scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**.
Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

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Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation 'ecf' in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Accept / allow

Accept is used to indicate an equivalent answer to that given on the left-hand side of the mark scheme. Allow is used to denote lower-level responses that just gain credit.

3.9 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

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4. Quality of Written Communication and levels marking

In Question 8 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: Basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: Clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: Detailed

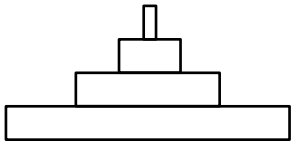
- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	2400 cm^3		1	AO2 1.2.2a
1(a)(ii)	1400 (cm^3)	allow **2** marks for ecf of correct answer to [answer given in (a)(i) – 1000] allow **1** mark for 2400 – (600 + 400) or equivalent with no or incorrect answer allow **1** mark for ecf of answer given in (a)(i) – 1000 or equivalent with no or incorrect answer	2	AO2 1.2.2a
1(b)(i)	sweat(ing)	allow evaporation allow perspiration	1	AO1 1.2.2a
1(b)(ii)	any **one** from: • for cooling • to maintain body temperature		1	AO1 1.2.2a
1(c)(i)	More water was lost through the skin.		1	AO2 1.2.2a
1(c)(ii)	decrease		1	AO2 1.2.2a
Total			**7**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	receptor cells		1	AO1 1.2.1b
2(a)(ii)	eye(s)	accept retina	1	AO1 1.2.1b
2(b)(i)	any **one** from: • gender / sex • quality of eyesight • eg of factor that might affect reaction times	 eg wearing glasses eg alcohol consumption / distractions / tiredness / health / time of day / amount of practice (at this test) do not allow time / age	1	AO3 1.2.1
2(b)(ii)	182	allow 182.0	1	AO2 1.2.1
2(b)(iii)	Any anomalies can be identified.		1	AO3 1.2.1
2(b)(iv)	reaction time (too) long **or** reactions (too) slow (so) more likely to have / cause an accident	allow reaction time (too) slow allow examples of data quoted **or** derived from Table1, eg (mean) reaction time for 90 year olds is 162 ms longer than for 75 year olds	1 1	AO3 1.2.1
Total			**7**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	any **two** from: • *idea of* absorption of light / energy • transfer to chemical energy • provides food / energy for animals / caterpillar • releases oxygen	allow produce sugars / glucose / starch / carbohydrate / food / biomass	2	AO1 1.5.1a
3(b)			1	AO2 1.5.1b/c
3(c)	15(%)	allow **1** mark for $\frac{3 \times 100}{20}$ with no answer or incorrect answer **or** allow **1** mark for 0.15	2	AO2 1.5.1c
3(d)(i)	any **two** from: • markings look like eyes / face / mouth of much larger animal • looks fierce / scary / dangerous • to frighten blue tit / bird	allow it looks like a snake max 1 if reference to camouflage	2	AO2/AO3 1.4.1d/g
3(d)(ii)	any **two** from: • sharp / long / big claws • sharp / hooked beak • large wings **or** flies quickly • good eyesight	ignore strong ignore strong / big allow streamlined / aerodynamic ignore powerful wings	2	AO2 1.4.1d/f
Total			**9**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	follicle stimulating hormone / FSH		1	AO1 1.2.2c/d
4(a)(ii)	oestrogen		1	AO1 1.2.2c/d
4(b)(i)	any **one** from: • to help them have a baby / get pregnant • to stimulate egg production / release / maturation • own levels of FSH / LH / hormone (too) low	ignore to make them fertile allow to increase hormone / FSH / LH levels do not allow to increase oestrogen levels	1	AO1 1.2.2e
4(b)(ii)	through the bloodstream		1	AO1 1.2.2b
4(c)	oestrogen progesterone		1 1	AO1 1.2.2e
Total			**6**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	hand-washing		1	AO1 1.1.2f
5(a)(ii)	small amounts of dead pathogens		1	AO1 1.1.2l
5(a)(iii)	decrease by 60 (%)	 allow from 70(%) to 10(%) allow other correct data treatment	1 1	AO2 1.1.2
5(b)(i)	penicillin		1	AO1 1.1.2h
5(b)(ii)	any **two** from: • antibiotics only kill bacteria • some bacteria are resistant (to antibiotics) • (correct) antibiotics not always used • deficiency disease(s) not caused by bacteria **or** cannot be treated by antibiotics • inherited disease(s) not caused by bacteria **or** cannot be treated by antibiotics • 'lifestyle' diseases not caused by bacteria **or** cannot be treated by antibiotics	 allow antibiotics do not kill viruses allow MRSA not killed by antibiotics allow course not completed eg heart disease / cancer if no other mark given allow **1** mark for not all diseases are caused by bacteria **or** some diseases are caused by viruses	2	AO2 / AO3 1.1.2h/i/j/k 1.1.1a/d
5(c)	bacteria grow faster	allow this is body temp (at which pathogens grow)	1	AO1 1.1.2o
Total			**8**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	three billion		1	AO1 1.8.1a
6(b)	mutation(s) breed / reproduce	in this order only allow pass on their genes	1 1	AO1 1.8.1e/f
Total			**3**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)(i)	legal, recreational drugs		1	AO1 1.3.1e
7(a)(ii)	any **one** from: • dependence / addiction • withdrawal (symptoms) or described	 allow reliance eg headache / sickness / nausea ignore side effects alone	1	AO1 1.3.1h
7(b)(i)	idea of not part of the drug company **or** it is another company	not biased can be accepted for either part bi or bii, but not both	1	AO2 1.3.1a
7(b)(ii)	idea of so they will not be biased	allow results will be trustworthy	1	AO3 1.3.1a
7(b)(iii)	no / reduced feeling of pleasure from alcohol (so) less likely to drink alcohol	allow brain less sensitive to alcohol allow so easier to stop (drinking alcohol)	1 1	AO3 1.3.1
7(c)(i)	higher % **or** more boys (than girls) drink beer / lager / cider higher % **or** more girls (than boys) drink spirits / alcopops / wine	allow boys drink more beer / lager / cider allow girls drink more spirits / alcopops / wine allow valid descriptions using % figures	1 1	AO2 1.3.1
7(c)(ii)	any **one** from: • only 100 boys were surveyed • only done on 15-year-olds • no data on the table about boys that don't drink alcohol • data only about UK • boys may have lied about alcohol consumption	 allow small sample may not be representative allow not done on all ages allow none of the bars are 100% or highest bar is 88%	1	AO3 1.3.1
Total			**9**	

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<table>
<tr><th>Question</th><th colspan="3">Answers</th><th>Extra information</th><th>Mark</th><th>AO / Spec. Ref.</th></tr>
<tr><td>8</td><td colspan="3">Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5.</td><td></td><td rowspan="4">6</td><td rowspan="4">AO1
1.1.1a/b/c</td></tr>
<tr><td>0 marks</td><td>Level 1 (1-2 marks)</td><td>Level 2 (3-4 marks)</td><td>Level 3 (5-6 marks)</td></tr>
<tr><td>No relevant content.</td><td>At least one component of the diet is given (C)
or
at least one reason why a component is required (R)
or
why a healthy diet is needed. (N)</td><td>Components of the diet are given (C)
and
for at least one of these components a reason why the component is required (R)
or
why a healthy diet is needed. (N)</td><td>Most components of the diet are given (C)
and
different reasons why components are required are given. (R)</td></tr>
<tr><td colspan="3">examples of biology points made in the response:
• (C) carbohydrate
• (C) protein
• (C) fat
• (R) (carbohydrate / protein / fat) for energy (release)
• (R) (carbohydrate / protein / fat) to build cells / growth / repair
• (C) vitamins
• (R) (vitamins) for healthy functioning of the body
• (N) (balanced diet) contains right balance of different foods to meet needs or avoid malnourishment or avoid under / over weight
• (N) (balanced diet) contains right amount of energy to meet needs</td><td>extra information:
allow other components and needs, eg (C) fibre / roughage; (R) prevent constipation / bowel cancer
(C) water; (R) transport / as solvent / part of cytoplasm / produce sweat
allow correctly named vitamin (C) with correct reason (R)
ignore ref to minerals / ions as a component of the diet and their use in the body</td></tr>
<tr><td>Total</td><td colspan="4"></td><td>6</td><td></td></tr>
</table>

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
9(a)	any **one** from: • continuous readings • do not need to be there • (more likely to be) accurate • reduces human error	 allow automatic readings allow greater resolution do **not** allow valid allow easier to read	1	AO3 1.6.2
9(b)(i)	microorganisms (microorganisms) respire respiration / decay / microorganisms releases carbon dioxide	allow microbes / bacteria / fungi / decomposers for microorganisms, throughout ignore carbon released	1 1 1	AO1 1.6.1a/b / 1.6.2a /1.5.1c
9(b)(ii)	all grass decomposed / decayed / rotted	allow idea that all microorganisms dead (due to accumulation of waste **or** lack of oxygen) allow lack of / no oxygen (for respiration of microorganisms)	1	AO3 1.6.1b
Total			**5**	

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2015

Science A
Unit Biology B1

BL1FP

F

Biology
Unit Biology B1

Friday 5 June 2015 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

A

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9(b) should be answered in continuous prose.
  In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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Answer **all** questions in the spaces provided.

1 Humans use the nervous system to react to changes in the environment.

1 (a) (i) Which word means a change in the environment?

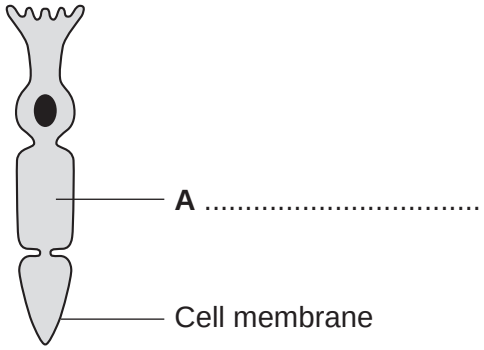
Draw a ring around the correct answer.

[1 mark]

neurone **reflex** **stimulus**

1 (a) (ii) **Figure 1** shows a light receptor cell.

Figure 1



Use the correct answer from the box to label part **A** on **Figure 1**.

[1 mark]

chloroplast	**cytoplasm**	**vacuole**

1 (b) **Figure 2** shows a boy riding a bicycle on a sunny day.

Figure 2



Do not write outside the box

1 (b) (i) Receptors in the boy's body detect changes in the environment.

Complete **Table 1** to show which organ of the body contains the receptors for each change in the environment.

[3 marks]

Table 1

Change in the environment	**Organ that contains the receptors**
Sound of traffic from behind him	
Flashing blue lights of a police car	
Cooler air temperature in the shadows	

1 (b) (ii) The boy's response to danger is to pull on the bicycle brakes.

Which type of effector causes this response?

Tick (✓) **one** box.

[1 mark]

A gland ☐

A muscle ☐

A synapse ☐

6

Turn over for the next question

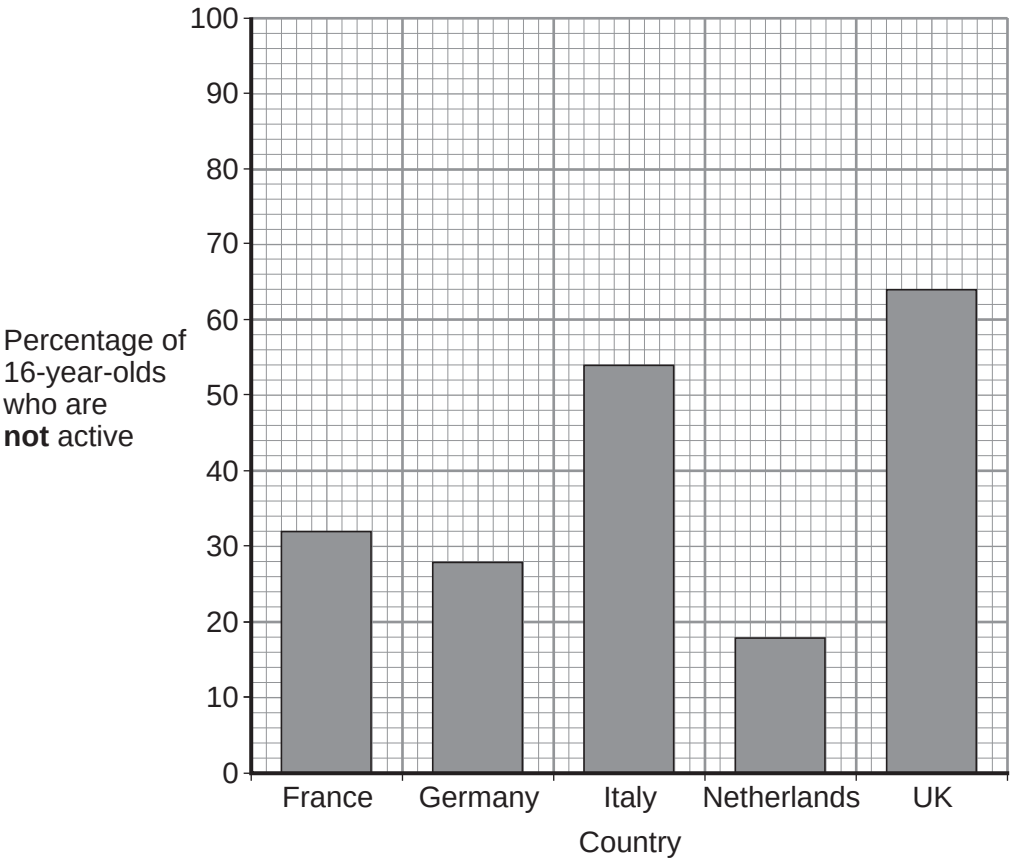
Do not write outside the box

2 Scientists investigated the effect of different factors on health.

2 (a) People who are **not** active may have health problems.

Figure 3 shows the percentage of 16-year-olds in some countries who are **not** active.

Figure 3



2 (a) (i) What percentage of 16-year-olds in the UK are **not** active?

[1 mark]

..... %

2 (a) (ii) What percentage of 16-year-olds in the UK are **active**?

[1 mark]

..... %

Do not write outside the box

2 (a) (iii) A newspaper headline states:

People in the UK are the laziest in the world.

Information in **Figure 3** does **not** support the newspaper headline.

Suggest **one** reason why the newspaper headline may be wrong.

[1 mark]

.....

.....

2 (b) Doctors gave a percentage rating to the health of 16-year-olds.
100% is perfect health.

Table 2 shows the amount of exercise 16-year-olds do and their health rating.

Table 2

Amount of exercise done in minutes every week	Health rating as %
Less than 30	72
90	76
180	82
300	92

What conclusion can be made about the effect of exercise on health?

Use information from **Table 2**.

[1 mark]

.....

.....

Question 2 continues on the next page

Do not write outside the box

2 (c) Inherited factors can also affect health.

Give **one** health problem that may be affected by the genes someone inherits.

Draw a ring around the correct answer.

[1 mark]

being malnourished	**having a high cholesterol level**	**having a deficiency disease**

2 (d) White blood cells are part of the immune system.

Use the correct answer from the box to complete each sentence.

antibiotics	**antibodies**	**pathogens**	**vaccines**

2 (d) (i) When we are ill, white blood cells produce ..... to kill microorganisms.

[1 mark]

2 (d) (ii) Many strains of bacteria, including MRSA, have developed resistance to drugs called ..... .

[1 mark]

7

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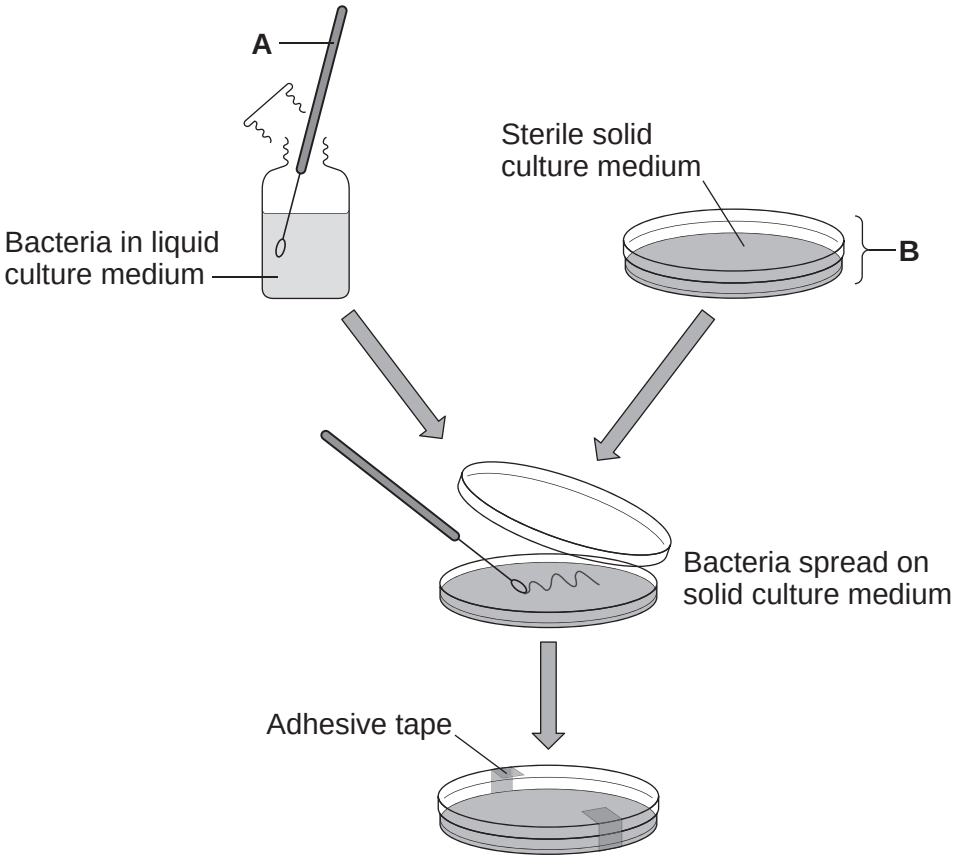
Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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3 **Figure 4** shows a method used to grow pure cultures of a bacterium.

Figure 4



3 (a) Name apparatus **A** and apparatus **B**.

[2 marks]

Apparatus **A** .....

Apparatus **B** .....

3 (b) (i) Why should apparatus **A** and apparatus **B** be sterilised before they are used?

[1 mark]

.....

.....

Do not write outside the box

3 (b) (ii) How should apparatus **A** be sterilised?

Tick (✓) **one** box.

[1 mark]

Using enzymes ☐

Using a flame ☐

In an incubator ☐

3 (b) (iii) Adhesive tape is used to secure the lid on apparatus **B**.

Give **one** reason why the lid of apparatus **B** should be securely taped in place.

[1 mark]

.....

.....

3 (c) What is the maximum temperature that should be used **in schools** to grow the bacteria in apparatus **B**?

Draw a ring around the correct answer.

[1 mark]

10 °C **25 °C** **50 °C**

6

Turn over for the next question

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4 Modern scientists use cloning techniques.

4 (a) Which **one** of the following is a method of producing cloned plants?

Tick (✓) **one** box.

[1 mark]

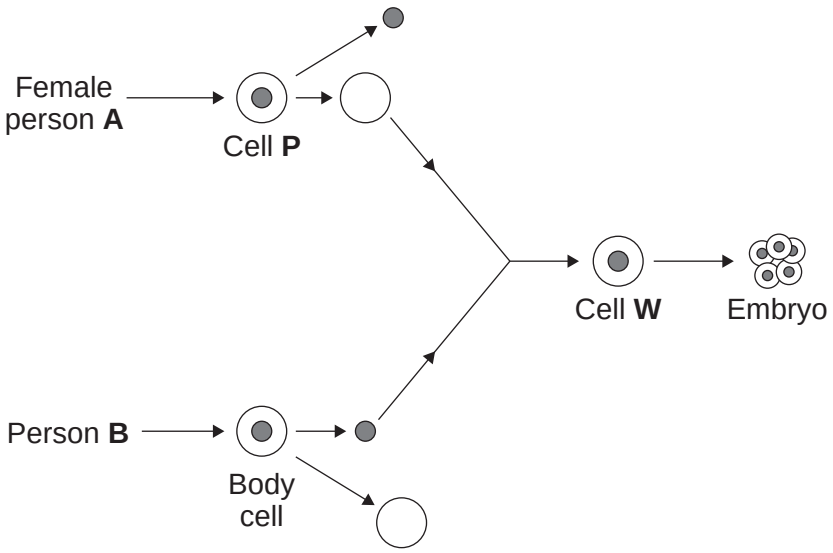
Joining male and female sex cells ☐

Taking cuttings from plants ☐

Transferring genes from one plant to another plant ☐

4 (b) **Figure 5** shows a method that could be used in the future to produce a human.

Figure 5



4 (b) (i) What is the name of the method shown in **Figure 5**?

Tick (✓) **one** box.

[1 mark]

Adult cell cloning ☐

Embryo transplant ☐

Tissue culture ☐

Do not write outside the box

4 (b) (ii) What type of cell is cell **P**?

Draw a ring around the correct answer.

[1 mark]

an egg cell **a skin cell** **a sperm cell**

4 (b) (iii) Use the correct answer from the box to complete the sentence.

[1 mark]

cell membrane	**cytoplasm**	**nucleus**

The ..... of cell **P** is removed and is discarded.

4 (b) (iv) Use the correct answer from the box to complete the sentence.

[1 mark]

an electric shock	**enzymes**	**hormones**

To make cell **W** divide to form an embryo, the cell must be treated with

..... .

4 (b) (v) The embryo must be placed in an adult female to develop into a child.

Where, in the adult female, should the embryo be placed?

[1 mark]

.....

4 (c) Some children have kidney disease. Kidney disease cannot be cured.
In the future, scientists could make a healthy clone of a child with kidney disease.
One kidney could then be transplanted from the cloned child into the child with kidney disease. The cloned child would still live with only one remaining kidney.

Suggest **two** reasons why people might disagree with cloning a child to get a kidney for transplanting.

[2 marks]

1 .....

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2 .....

.....

8

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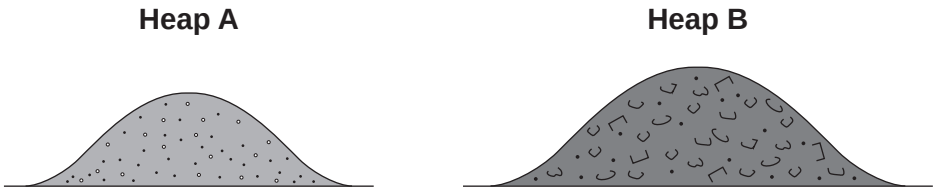
5 A gardener investigates if turning over the waste in a compost heap makes the waste decay more quickly.

The gardener:

- makes two separate heaps of garden waste, heap **A** and heap **B**
- turns over the material in heap **A** every 2 weeks
- does **not** turn over the material in heap **B**
- estimates the amount of decay in the two heaps after 6 months.

Figure 6 shows the two heaps of garden waste at the beginning of the investigation.

Figure 6



5 (a) Suggest **two** factors, other than time, the gardener should control to make the investigation fair.

[2 marks]

1 .....

.....

2 .....

.....

5 (b) Name **one** type of living thing that causes decay.

[1 mark]

.....

Do not write outside the box

5 (c) **Table 3** shows the gardener's results.

Table 3

Compost heap	Estimated amount of decay
A	A lot
B	Very little

5 (c) (i) Why does turning over the material in heap **A** make the material decay more quickly?

[1 mark]

.....

.....

5 (c) (ii) The gardener puts decayed material around his plants to help them grow.

Suggest why the plants in a woodland grow well each year **without** material from compost heaps being added.

[2 marks]

.....

.....

.....

.....

6

Turn over for the next question

Do not write outside the box

6 (a) Which term describes organisms that can tolerate very hot or very cold places?

Draw a ring around the correct answer.

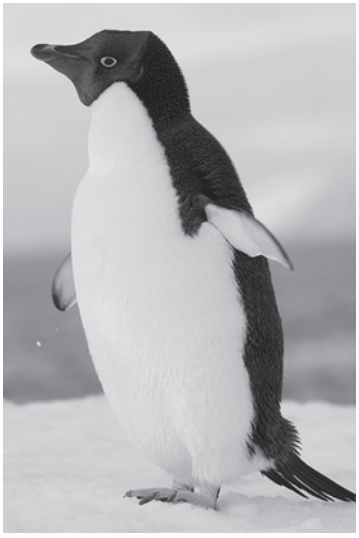
[1 mark]

an environmental species	**an extremophile species**	**an indicator species**

6 (b) **Figure 7** shows photographs of an Adelie penguin and a chinstrap penguin. Adelie penguins and chinstrap penguins live in the Antarctic at temperatures below 0 °C.

Figure 7

Adelie penguin



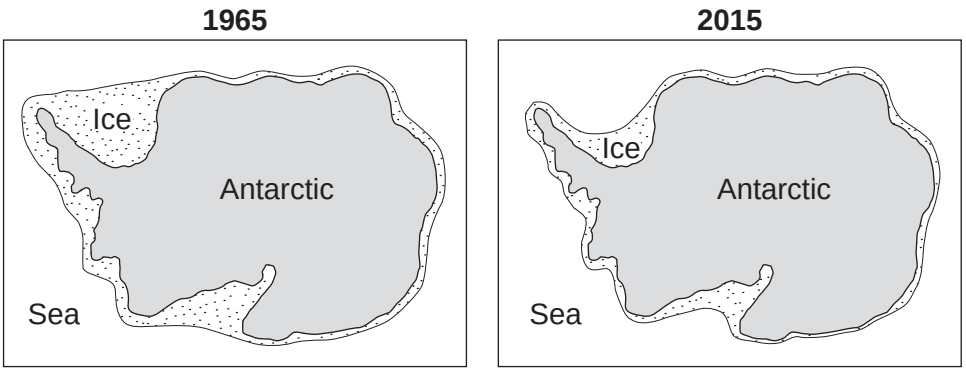
Chinstrap penguin



Adelie penguins spend most of their time on the ice around the Antarctic.
Chinstrap penguins live mainly in the sea around the ice.
Since 1965 the number of Adelie penguins has **decreased** by 6 million.

Figure 8 shows changes to the ice around the Antarctic over the past 50 years.

Figure 8



Do not write outside the box

6 (b) (i) Use information from **Figure 8** to explain why the number of Adelie penguins has decreased since 1965.

[2 marks]

.....

.....

.....

.....

.....

.....

6 (b) (ii) Suggest what has happened to the number of chinstrap penguins since 1965.

Draw a ring around your answer. **increase / decrease**

Give a reason for your answer.

[1 mark]

.....

.....

6 (c) The number of penguins can be used to monitor changes in temperature of the environment.

Temperature readings could also be taken using a thermometer.

What is the advantage of using penguins, instead of a thermometer, to monitor changes in temperature of the environment?

Tick (✓) **one** box.

[1 mark]

Living organisms show long-term changes. ☐

Thermometers cannot measure temperatures below 0 °C. ☐

Thermometers do not give accurate readings. ☐

5

Do not write outside the box

7 In the 1800s, Charles Darwin visited the Galapagos Islands.
On the islands he found many different species of bird called finches.
Darwin thought that all the different finch species had evolved from one species of finch that had reached the islands many years before.

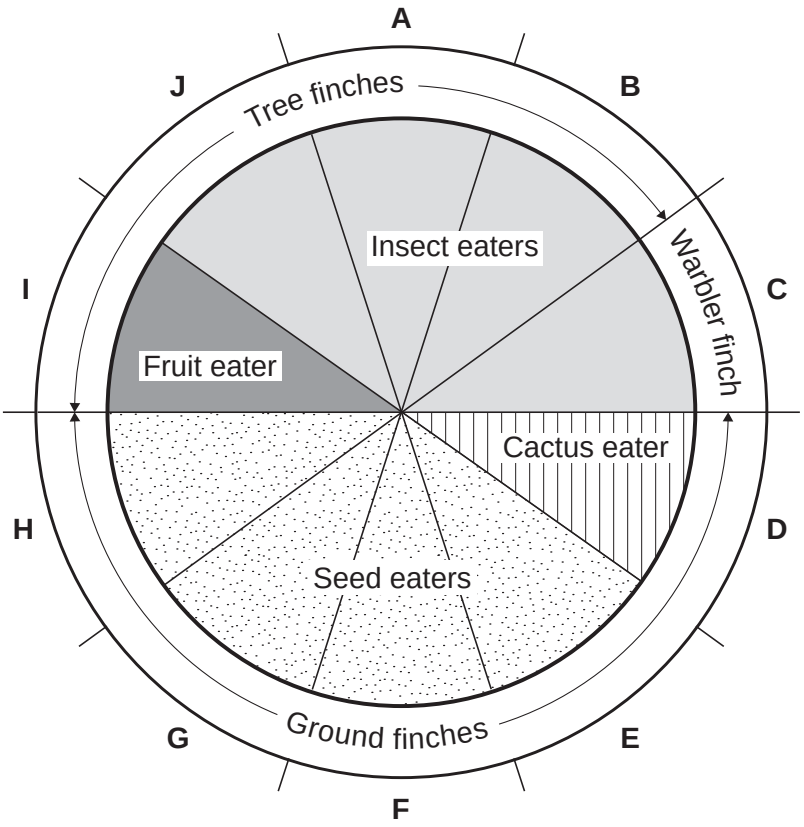
7 (a) Complete the following sentence.

[1 mark]

Darwin suggested the theory of evolution by natural ..... .

7 (b) **Figure 9** shows information about ten species of finch, **A – J**.

Figure 9



7 (b) (i) How many of the species of finch eat insects?

Draw a ring around the correct answer.

[1 mark]

4 **5** **6**

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7 (b) (ii) Describe finch species **G**.

Use **only** information from **Figure 9**.

[2 marks]

.....

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.....

7 (c) When Darwin returned to the UK very few people believed his theory of evolution.

A different scientist suggested that the changes that occur in an organism during its lifetime can be inherited by its offspring.

What was the name of this scientist?

Tick (✓) **one** box.

[1 mark]

Lamarck ☐

Mendel ☐

Semmelweis ☐

5

Turn over for the next question

Do not write outside the box

8 Many people in the UK take sleeping pills.

8 (a) The drug thalidomide was developed as a sleeping pill in the 1950s.
In the 1960s thalidomide was banned.
Recently thalidomide has been used to treat other diseases.

Name **one** disease thalidomide is used to treat now.

[1 mark]

.....

8 (b) **Table 4** shows information about the development of a new sleeping pill.

Table 4

Type of test or trial	Preclinical	Clinical phase 1	Clinical phase 2	Clinical phase 3
Tested or trialled on	Cells, tissues or animals	20–100 healthy volunteers	100–500 volunteer patients	1000–5000 volunteer patients
Number of compounds tested	>10 000	5–10	2–3	1 (new sleeping pill)
Time taken for test or trial in years	1–4	2–4	1–3	2–4

8 (b) (i) What is the shortest time taken to develop a new sleeping pill?

[1 mark]

..... years

8 (b) (ii) What is the **range** for the number of volunteers needed to complete all the clinical trials for the new sleeping pill?

[1 mark]

.....

8 (c) Drugs are trialled to check for side effects on people.

Give **one** other reason why drugs are trialled.

[1 mark]

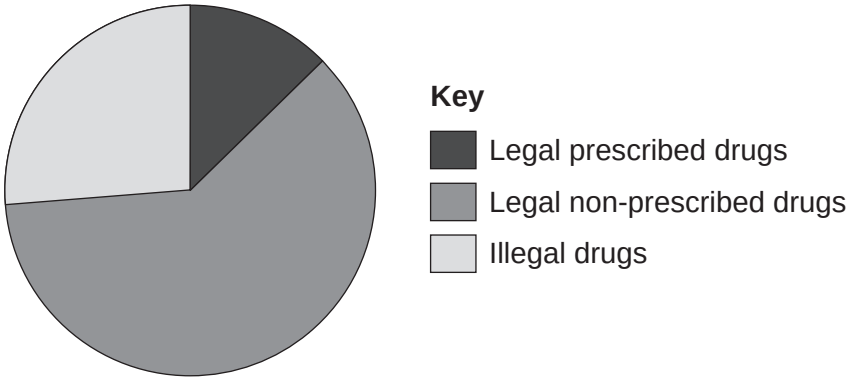
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8 (d) **Figure 10** shows the impact on the health of the population caused by drugs from different sources.

Figure 10



8 (d) (i) Legal non-prescribed drugs have a greater impact on the health of the population than illegal drugs.

Suggest **two** reasons why.

[2 marks]

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8 (d) (ii) Drugs change chemical processes in a person's body.

Why is it difficult for a person to stop taking certain drugs?

[1 mark]

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.....

7

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9 Gardeners sometimes use weed killers to control the growth of plants.

9 (a) A gardener wanted to get rid of daisy plants growing in a lawn.

The gardener investigated the use of a weed killer.

The gardener:

- recorded the number of daisy plants growing in different 10 m^2 areas of the lawn
- made solutions of the weed killer (each solution had a different concentration)
- put 5 dm^3 of each solution on different 10 m^2 areas of the lawn
- recorded the number of daisy plants growing in each area after 2 weeks.

Table 5 shows the results.

Table 5

Concentration of weed killer in arbitrary units	Number of daisy plants per 10 m^2	
	Before using weed killer	2 weeks after using weed killer
0 (water)	8	8
20	6	8
40	9	6
60	5	2
80	4	0
100	8	0

9 (a) (i) To make the investigation fair, the gardener controlled some variables.

Give **one** variable the gardener controlled in the investigation.

[1 mark]

.....

.....

9 (a) (ii) The gardener decided that the result for a concentration of 20 arbitrary units of weed killer was anomalous.

Suggest why the gardener decided this result was anomalous.

[1 mark]

.....

.....

Do not write outside the box

9 (a) (iii) Why did the gardener put 0 arbitrary units of weed killer on one area of the lawn?

[1 mark]

.....

.....

9 (a) (iv) The gardener concluded that the best concentration of weed killer to use all over a lawn is 100 arbitrary units.

Suggest why the gardener cannot be sure about this conclusion.

[1 mark]

.....

.....

Question 9 continues on the next page

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9 (b) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Plants respond to different environmental factors.

Describe how different environmental factors affect:

- the direction of growth of roots
- the direction of growth of shoots.

In your answer you should refer to the role of plant hormones.

Do **not** refer to the artificial use of plant hormones by gardeners or scientists.

[6 marks]

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Extra space .....

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10

END OF QUESTIONS

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Question 6, Figure 7: Chinstrap penguin © Theo Allofs/Corbis

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GCSE

Science A / Biology

BL1FP

Mark scheme

4405 / 4401
June 2015

Version/Stage: 1.0 Final

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from aqa.org.uk

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

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Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 9(b) students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	stimulus		1	AO1 1.2.1b
1(a)(ii)	cytoplasm		1	AO1 1.2.1c
1(b)(i)		in this order only		AO2
	ear(s)		1	1.2.1b
	eye(s)	accept retina	1	
	skin	ignore extra detail	1	
1(b)(ii)	A muscle		1	AO2 1.2.1e
Total			**6**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	64		1	AO2 1.1
2(a)(ii)	36	allow e.c.f from (a)(i) i.e. 100 – answer given in (a)(i)	1	AO2 1.1
2(a)(iii)	any **one** from: • only considers 16-year-olds • only about some / 5 countries	ignore lack of evidence allow does not refer to all ages allow does not refer to all countries	1	AO3 1.1
2(b)	the more exercise done the healthier a person is	allow the more exercise done the higher the health rating allow the less exercise done the lower the health rating	1	AO3 1.1.1e
2(c)	having a high cholesterol level		1	AO1 1.1.1d
2(d)(i)	antibodies		1	AO1 1.1.2c/d/e
2(d)(ii)	antibiotics		1	AO1 1.1.2i
Total			**7**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	A (inoculating / wire) loop B Petri dish	 allow (agar) plate ignore ref to culture medium	1 1	AO1 1.1.2m
3(b)(i)	to kill (unwanted) bacteria / microorganisms /microbes	allow fungi ignore viruses / germs	1	AO1 1.1.2m
3(b)(ii)	Using a flame		1	AO1 1.1.2m
3(b)(iii)	any **one** from: • so bacteria / microorganisms / microbes / pathogens / fungi (growing in dish) do not get out • so bacteria / microorganisms / microbes / pathogens / fungi (from the air) do not get in	ignore reference to gases ignore viruses / germs ignore viruses / germs	1	AO1 1.1.2m
3(c)	25 °C		1	AO1 1.1.2 n
Total			**6**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	Taking cuttings from plants		1	AO1 1.7.2a/b
4(b)(i)	Adult cell cloning		1	AO2 1.7.2c
4(b)(ii)	an egg cell		1	AO2 1.7.2c
4(b)(iii)	nucleus		1	AO1 1.7.2c
4(b)(iv)	an electric shock		1	AO1 1.7.2c
4(b)(v)	uterus / womb	accept phonetic spelling	1	AO1 1.7.2c
4(c)	any **two** from: • unethical / immoral • cloned child would have to give up a kidney • possible operation complications	 allow 'rights' of the cloned child allow against religious teachings allow illegal allow parents may not want another child allow a long time to wait (for the kidney)	2	AO3 1.7
Total			**8**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	any **two** from: • amount of waste on each heap • (type of) materials on each heap • put heaps in same (environmental) conditions	 allow size of heap if neither marking points one or two awarded, allow **1** mark for same waste eg keep at same (outside) temperature allow put in same place	2	AO3 1.6.1
5(b)	microorganisms / microbes / bacteria / fungi / decomposers	ignore detritivores / examples (such as worms, maggots, insects) ignore pathogens / germs do **not** allow viruses	1	AO1 1.6.1b
5(c)(i)	oxygen / air added (when turning over)	allow idea that decay will be aerobic allow bacteria / microorganisms need oxygen / air allow (microorganisms) respire faster	1	AO2 1.6.1b
5(c)(ii)	any **two** from: • dead leaves / fruit / plants (fall off / onto the ground) • (fallen dead leaves / fruit / plants) decay • minerals / ions / nutrients are recycled / released	ignore references to carbon dioxide allow animal waste **or** dead animals	2	AO2 / AO3 1.6.1d
Total			**6**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	an extremophile species		1	AO1 1.4.1e
6(b)(i)	smaller ice area (so) less habitat	allow smaller amount of ice allow less ice allow fewer places to live / nest	1 1	AO2 1.4.2a/b
6(b)(ii)	**either** increase as more sea to live in **or** as less competition for food **or** decrease as less space (ice) to lay eggs **or** predators more likely to eat them	there is no mark for increase / decrease alone. The mark is for an appropriate reason linked to increase / decrease if increase / decrease not ringed the mark may be awarded if it is clear in the explanation which is intended	1	AO3 1.4.2a/b
6(c)	Living organisms show long-term changes.		1	AO3 1.4.2d
Total			**5**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)	selection		1	AO1 1.8.1a
7(b)(i)	4		1	AO2 1.8
7(b)(ii)	ground finch / lives on the ground (only) eats seeds	allow eg eats seeds on / from the ground for **2** marks	1 1	AO2 1.8
7(c)	Lamarck		1	AO1 1.8.1c
Total			**5**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
8(a)	leprosy	allow bone / blood cancer ignore cancer	1	AO1 1.3.1d
8(b)(i)	6 / six		1	AO2 1.3.1a
8(b)(ii)	from 1120 to 5600	allow from 5600 to 1120 allow 4480 (alone)	1	AO2 1.3.1a
8(c)	any **one** from: • (test for) toxicity • (test for) dosage • (test for) efficacy	ignore side effects, eg allergies ignore safety / harm unqualified allow poisonous allow idea of amount allow to see if it works allow to check for interaction with other drugs	1	AO1 1.3.1b
8(d)(i)	any **two** from: • more people take / use legal / non-prescribed drugs • legal / non-prescribed drugs are (more) readily available • alcohol causes liver/brain damage **or** tobacco causes cancer	ignore reference to cost / addiction allow harmful effects of other named legal non-prescribed drugs	2	AO1 / AO3 1.3.1g
8(d)(ii)	addiction / dependency	allow withdrawal or examples of symptoms of withdrawal (if attempting to stop)	1	AO1 1.3.1h
Total			**7**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
9(a)(i)	any **one** from: • (same) (type of) weed killer • (same) volume / 5dm^3 of solution used (on each area) • effect on daisies (not other weeds / plants) • (same) area / 10m^2 • (same) time **or** (effect after) two weeks	ignore references to same lawn / weather / soil, which are not given in the question. allow amount of solution used do **not** allow amount / volume / concentration of weed killer do **not** allow number of daisy plants	1	AO2 1.2.3d
9(a)(ii)	more (daisies) growing after use of weed killer **or** after two weeks	allow it does not fit pattern (of other results)	1	AO3 1.2.3d
9(a)(iii)	any **one** from: • as a control • to compare (to the other areas) • to check other factor(s) are not affecting the results / daisies	ignore to see if it / water has an effect do **not** allow as a control variable	1	AO2 1.2.3d
9(a)(iv)	80 (arbitrary units of weed killer) also killed all the daisies	allow ref to possible experimental design flaws such as 'only tested once' or 'not repeated' or 'different number of daisies in each area at first' allow idea that other weed species may not respond in the same way as daisies allow idea that 100 (units) may also kill wanted species / grass	1	AO3 1.2.3d

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Question	Answers	Extra information	Mark	AO / Spec. Ref
9(b)			6	AO1 1.2.3a/b/c

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content.	Reference to at least one environmental factor plants respond to **or** at least one response **or** a named hormone	Reference to at least one environmental factor plants respond to **and** at least one associated response **or** reference to a named hormone **and** at least one associated response	Reference to at least one environmental factor plants respond to **and** at least one associated response **and** reference to a named hormone

examples of biology points made in the response:	**extra information**
environmental factors	
• light	allow phototropism
• (direction of the force of) gravity	allow gravi/geotropism
• moisture / water	allow hydrotropism
effects on direction of growth	
• shoots grow upwards	allow reference to 'positive' and 'negative' in terms of tropisms as indicating direction of growth
• shoots grow towards light	
• shoots grow against (the force of) gravity	
• roots grow downwards	
• roots grow towards moisture	
• roots grow towards (the force of) gravity	
hormone	
• reference to auxin	allow other named hormone(s)
• unequal distribution of hormone causes unequal growth (rates)	allow higher concentration of hormone causes faster growth in shoots allow higher concentration of hormone causes slower growth in roots

Total		10

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
TOTAL	

AQA

General Certificate of Secondary Education
Foundation Tier
June 2014

Science A
Unit Biology B1

BL1FP

F

Biology
Unit Biology B1

Friday 6 June 2014 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

A

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9 should be answered in continuous prose.
  In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

There are no questions printed on this page

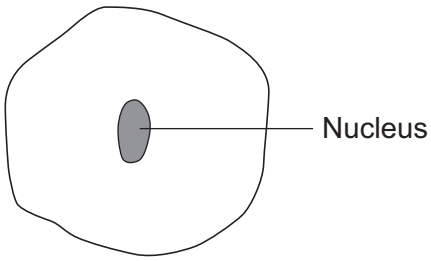
DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not write outside the box

Answer **all** questions in the spaces provided.

1 **Figure 1** shows a cell.

Figure 1



1 (a) Draw a ring around the correct answer to complete each sentence.

1 (a) (i) In the nucleus of a cell, genes are part of

chromosomes.
membranes.
receptors.

[1 mark]

1 (a) (ii) Different genes control different

characteristics
gametes
nuclei

of an organism.

[1 mark]

1 (a) (iii) Studying the similarities and differences between organisms allows us to

classify
clone
grow

the organisms.

[1 mark]

1 (b) Complete the following sentence.

[1 mark]

Living things can be grouped into animals, microorganisms and ..... .

4

Turn over ▶

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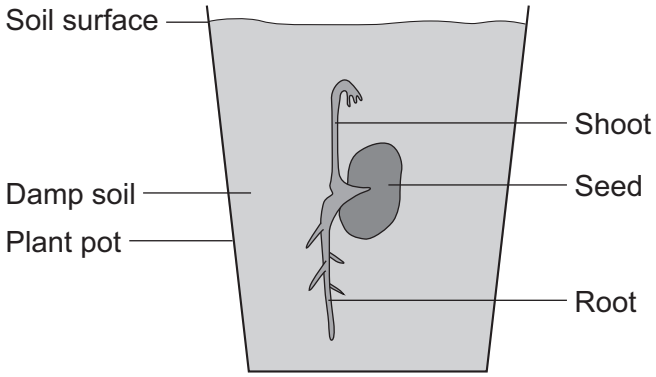
2 A student investigated growth in plants.

The student:

- planted a seed in damp soil in a plant pot
- put the plant pot in a dark cupboard.

Figure 2 shows the result after 5 days.

Figure 2



2 (a) Draw a ring around the correct answer to complete each sentence.

2 (a) (i) After the 5 days, the root had grown

away from water.

in the direction of the force of gravity.

towards light.

[1 mark]

2 (a) (ii) After the 5 days, the shoot had grown

against the force of gravity.

away from light.

towards water.

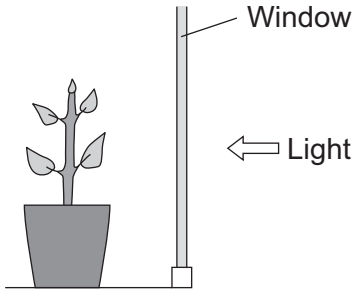
[1 mark]

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2 (b) After the plant had grown, the student put the plant pot by a window with lots of light.

Figure 3 shows this.

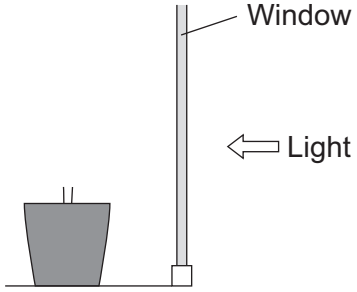
Figure 3



2 (b) (i) Complete **Figure 4** to show the appearance of the student's plant after 20 days by the window.

[1 mark]

Figure 4



2 (b) (ii) Explain the advantage to the plant of growing in the way that you have drawn in part **(b)(i)**.

[2 marks]

.....

.....

.....

.....

5

Turn over ▶

Do not write outside the box

3 A healthy diet contains the right balance of different foods and the right amount of energy.

3 (a) An unbalanced diet can lead to health problems.

One problem caused by an unbalanced diet is being overweight.

Name **one** health problem, other than being overweight, that is linked to an unbalanced diet.

[1 mark]

.....

3 (b) Sugar is a type of carbohydrate.

3 (b) (i) Eating too much sugar can make a person overweight.

Suggest why.

[1 mark]

.....

.....

3 (b) (ii) Which other substance in food is linked to people being overweight?

Draw a ring around the correct answer.

[1 mark]

fat **mineral ions** **vitamins**

Do not write outside the box

3 (c) Sugar substitutes taste sweet.
Taking sugar substitutes helps to reduce the chance of becoming overweight.

Table 1 gives information about four sugar substitutes, **A**, **B**, **C** and **D**.

Table 1

Sugar substitute	Number of times sweeter than sugar	Effects on health
A	x 200	Harmful to some people
B	x 250	Not known
C	x 600	Not known
D	x 500	None

3 (c) (i) Which sugar substitute, **A**, **B**, **C** or **D**, is the sweetest?

[1 mark]

3 (c) (ii) A person is advised to use sugar substitute **D** and **not** sugar substitutes **A**, **B** or **C**.

Suggest a reason why.

[1 mark]

.....

.....

3 (c) (iii) A food has a sugar substitute in it.

Why must it say on the packet which sugar substitute it is?

[1 mark]

.....

.....

6

Do not write outside the box

4 Drugs affect the human body.

4 (a) Draw **one** line from each drug to the correct information about the drug.

[4 marks]

Drug	Information
Cannabis	Used to boost heart rate
Steroid	Used to treat leprosy
Stimulant	May cause mental illness in some people
Thalidomide	Used to increase muscle growth
	Used to treat measles

4 (b) New drugs must be tested and trialled before being used.

4 (b) (i) New drugs are tested in a laboratory before they are trialled on people.

What are new drugs tested on in a laboratory?

[1 mark]

.....

Do not write outside the box

4 (b) (ii) Why is it important that drugs are trialled before doctors give them to patients?

Tick (✓) **two** boxes.

[2 marks]

- To check that the drug works ☐
- To check the cost of the drug ☐
- To find out if the drug is legal ☐
- To find the best dose to use ☐

4 (b) (iii) In a double blind drug trial, only some people know which patients have been given the drug.

Who knows which patients have been given the drug?

Tick (✓) **one** box.

[1 mark]

- The patient and the doctor ☐
- Only the doctor ☐
- Only scientists at the drug company ☐

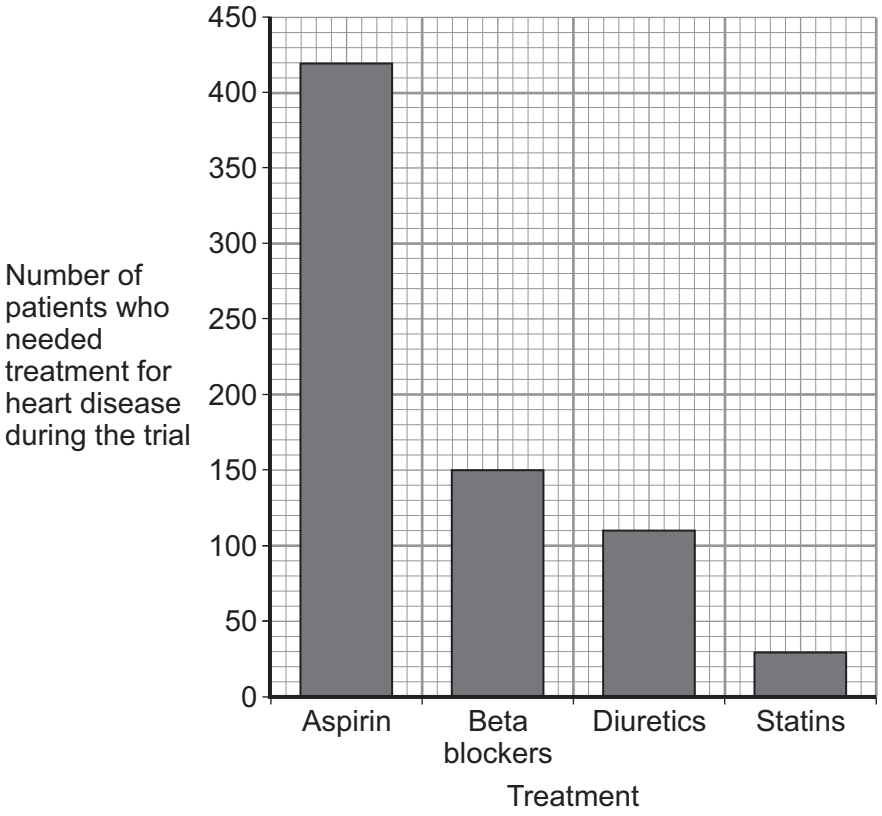
Question 4 continues on the next page

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4 (c) Doctors trialled four different treatments for reducing the risk of heart disease. Each treatment was trialled on the same number of patients for 5 years. The patients did **not** have heart disease at the start of the trial.

Figure 5 shows the results.

Figure 5



4 (c) (i) How many patients who took aspirin needed treatment for heart disease during the trial?

[1 mark]

Number of patients = ...

4 (c) (ii) Based **only** on the evidence in **Figure 5**, which would be the best treatment to reduce the risk of developing heart disease?

[1 mark]

.....

4 (c) (iii) Suggest **one** other factor that a doctor might consider before deciding which treatment to use for a patient.

[1 mark]

.....

11

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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5 Most cows produce milk with a fat content of 3.4%.

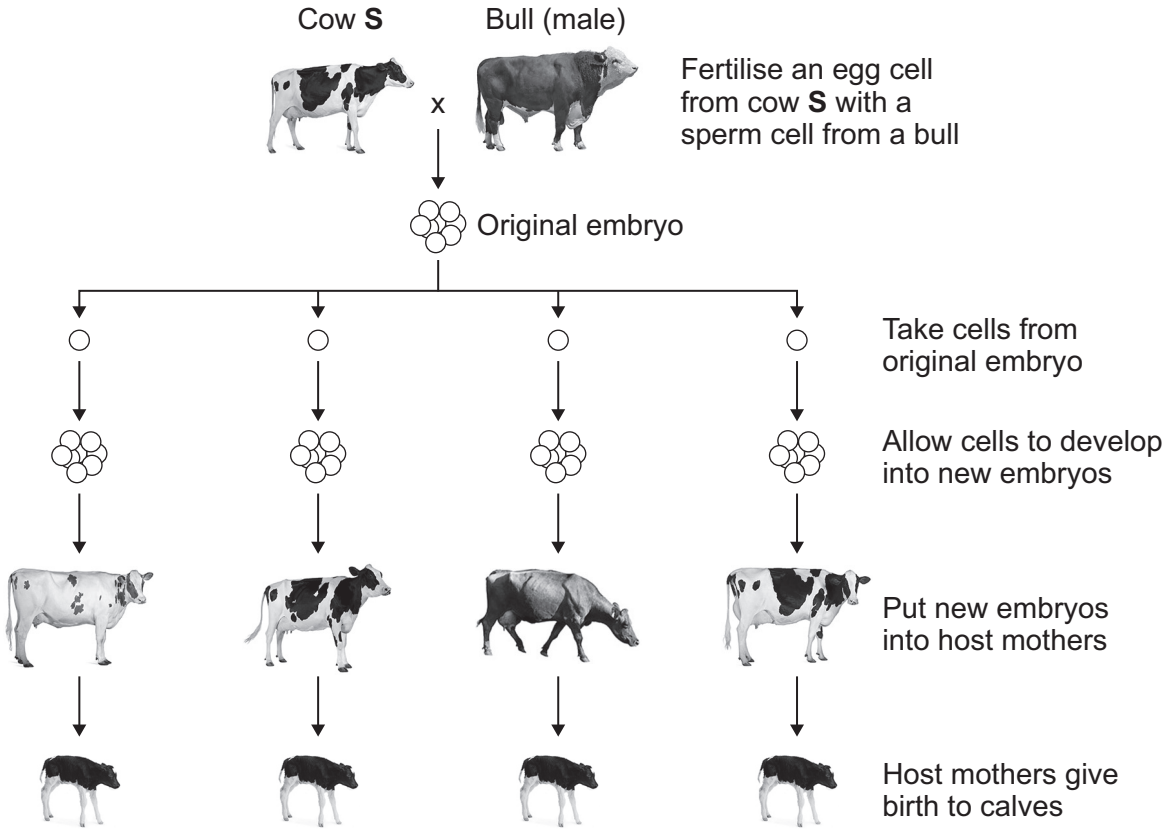
Cow **S** produces milk with a fat content of 1.2%.

Only cow **S** has the gene to produce this low-fat milk.

5 (a) A farmer plans to develop more cows like cow **S**.

Figure 6 shows how the farmer plans to do this.

Figure 6



5 (a) (i) An egg cell from cow **S** is fertilised by a sperm cell from a bull. This is part of sexual reproduction.

What is the scientific name for sex cells such as egg cells and sperm cells?

[1 mark]

.....

Do not write outside the box

5 (a) (ii) After fertilisation, cells are taken from the original embryo.

These cells develop into new embryos.

Which part of the host mother's body should each new embryo be put into?

[1 mark]

.....

5 (b) (i) The calves born to all of the host mothers are genetically identical to each other.

Draw a ring around the correct answer to complete the sentence.

[1 mark]

The calves are genetically identical to each other because

they

are formed from the same original embryo.
have the same host mother.
have the same two parents.

5 (b) (ii) What term is used to describe the method of producing calves shown in **Figure 6**?

Tick (✓) **one** box.

[1 mark]

Adult cell cloning ☐

Embryo transplantation ☐

Genetic modification ☐

5 (b) (iii) Why are the calves born to the host mothers **not** genetically identical to cow **S**?

[1 mark]

.....

.....

5

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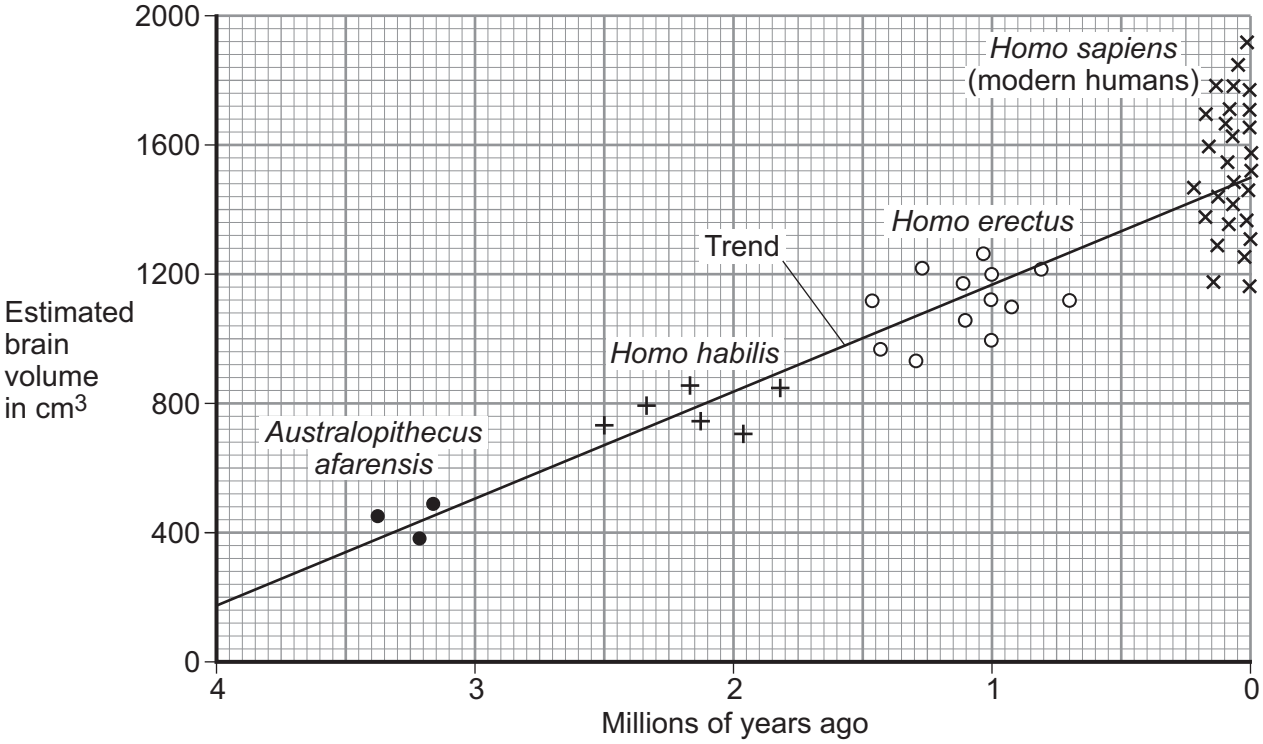
6 This question is about evolution in humans.

Figure 7 shows:

- the estimated brain volume of different species of humans
- the time when the different species existed on Earth.

The data is plotted for modern humans (*Homo sapiens*) and for three types of extinct ancestors of humans.

Figure 7



Key
Each point plotted on the graph shows the estimate for one human.

6 (a) (i) As humans evolved, their brain volume changed.

What has happened to human brain volume over the past 4 million years?

[1 mark]

.....

.....

Do not write outside the box

6 (a) (ii) Why is the evidence for estimated brain volume for *Homo sapiens* stronger than the evidence for *Australopithecus afarensis*?

[1 mark]

.....

.....

6 (b) In a book, the brain volume of a different species, *Australopithecus africanus*, is stated to be about 600 cm^3.

Use evidence from **Figure 7** to estimate when *Australopithecus africanus* lived on Earth.

[1 mark]

Estimate = ... million years ago

6 (c) Scientists believe that modern humans evolved by natural selection from *Australopithecus afarensis*.

6 (c) (i) Complete the following sentence.

[1 mark]

In the nineteenth century, the scientist who suggested the theory of evolution by natural selection was Charles ..... .

6 (c) (ii) In the nineteenth century, many people did **not** accept this scientist's theory.

Give **one** reason why.

[1 mark]

.....

.....

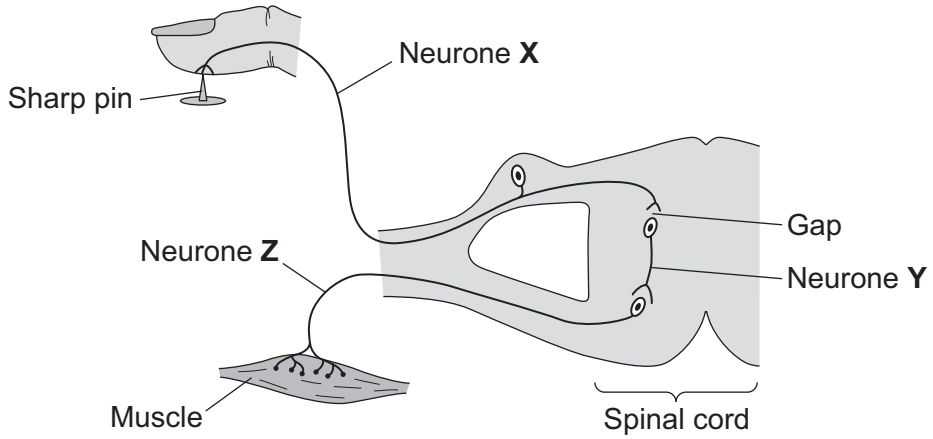
5

Turn over for the next question

Do not write outside the box

7 **Figure 8** shows the pathway for a simple reflex action.

Figure 8



7 (a) What type of neurone is neurone **X**?

Draw a ring around the correct answer.

[1 mark]

motor neurone **relay neurone** **sensory neurone**

7 (b) There is a gap between neurone **X** and neurone **Y**.

7 (b) (i) What word is used to describe a gap between two neurones?

Draw a ring around the correct answer.

[1 mark]

effector **receptor** **synapse**

7 (b) (ii) Draw a ring around the correct answer to complete the sentence.

[1 mark]

Information passes across the gap as

- a chemical.
- an electrical impulse.
- pressure.

Do not write outside the box

7 (c) Describe what happens to the muscle when it receives an impulse from neurone **Z**. How does this reflex action help the body?

[2 marks]

What happens to the muscle .....

.....

How this helps the body .....

.....

5

Turn over for the next question

Do not write outside the box

8 Food chains show the flow of energy through the organisms in a habitat.

8 (a) **Figure 9** shows a food chain.

Figure 9

grass ⟶ **sheep** ⟶ **human**

The biomass in each stage of the food chain changes as food passes along the food chain.

Draw a pyramid of biomass for this food chain.

Label the pyramid.

[2 marks]

Do not write outside the box

8 (b) **Table 2** shows three food chains, **A**, **B** and **C**.

Table 2

	Food chain
A	plants → sheep → human
B	plants → grasshoppers → frogs → trout → human
C	plants → human

8 (b) (i) In which food chain, **A**, **B** or **C**, will the greatest proportion of biomass and energy of the plants be passed to humans? ☐

[1 mark]

8 (b) (ii) Give reasons why the food chain that you chose in part **(b)(i)** passes on the greatest proportion of biomass and energy to humans.

[3 marks]

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Turn over for the next question

Do not write outside the box

9 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Animals and plants have features (adaptations) that allow them to survive in the conditions in which they normally live.

Describe how animals and plants are adapted to survive in dry conditions such as deserts.

For each adaptation that you give, describe how the adaptation helps the animal or plant to survive in dry conditions.

To obtain full marks you should refer to **both** animals and plants.

[6 marks]

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Extra space .....

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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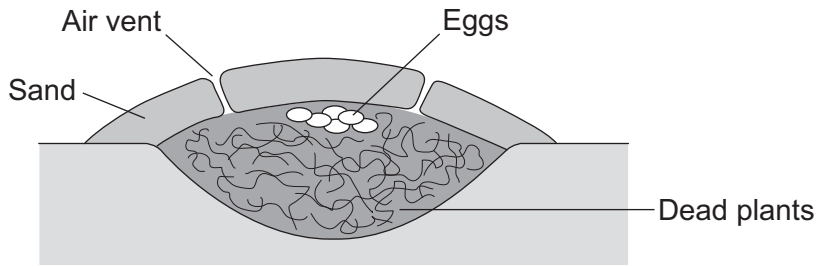
10 Most birds sit on their eggs to keep them warm until they hatch.

Megapode birds:

- dig a large hole in sand
- fill the hole with dead plants
- lay their eggs on top of the dead plants
- cover the surface with a thick layer of sand.

Figure 10 shows a megapode bird's nest.

Figure 10



10 (a) The dead plants in the nest decay. The decaying process helps to keep the eggs warm for many weeks.

Suggest how.

[3 marks]

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Do not write outside the box

10 (b) (i) Megapode birds open and close the air vents of the nest at different times of the day.

Suggest reasons why it is necessary to open and close the air vents.

[3 marks]

.....

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.....

10 (b) (ii) The sex of a megapode bird that hatches from an egg depends on the temperature at which the egg was kept.

Use this information to suggest why it is important for megapode birds to control the temperature of their nests.

[1 mark]

.....

.....

7

END OF QUESTIONS

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There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

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AQA Qualifications

GCSE

SCIENCE A / BIOLOGY

BL1FP

Mark scheme

4405 / 4401

June 2014

Version: 1.0 Final

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from aqa.org.uk

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

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Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 9 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question	Answers	Extra information	Mark	AO / spec ref.
1(a)(i)	Chromosomes		1	AO1 1.7.1b
1(a)(ii)	Characteristics		1	AO1 1.7.1b
1(a)(iii)	Classify		1	AO1 1.8.1d
1(b)	Plants	ignore algae	1	AO1 1.8.1d
Total			**4**	

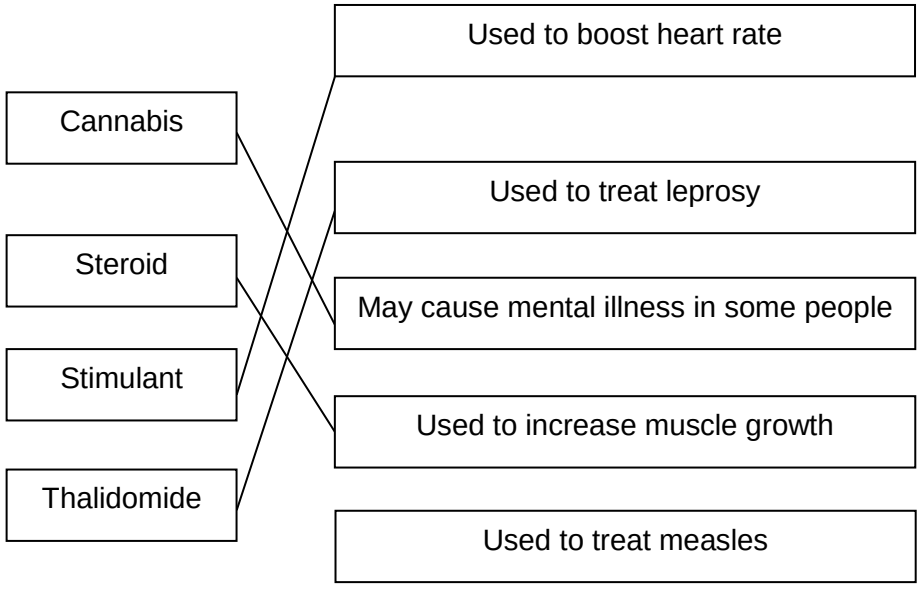
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Question	Answers	Extra information	Mark	AO / spec ref.
2(a)(i)	in the direction of the force of gravity		1	AO2 1.2.3a
2(a)(ii)	against the force of gravity		1	AO2 1.2.3a
2(b)(i)	diagram completed to show stem bending / leaning towards the window	the bend / lean can be at / from any point above pot level ignore any leaves	1	AO2 1.2.3a
2(b)(ii)	more light (for leaves) more photosynthesis / biomass / glucose	ignore heat ref to 'more' needed once only, eg 'more light for photosynthesis' = 2 marks if no other marks given allow 1 mark for 'to get light for photosynthesis'	1 1	AO1/ AO2 1.4.1a, b
Total			**5**	

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Question	Answers	Extra information	Mark	AO / spec. ref
3(a)	(Type 2) diabetes / heart disease / deficiency disease / named	allow a relevant health problem ignore obesity **or** over / under weight / anorexia	1	AO1 1.1.1a
3(b)(i)	provides more (energy / sugar) than is used	idea of sugar being high in / having a lot of energy eg contains a lot of calories allow it is turned to fat **or** stored (as fat)	1	AO2 1.1.1a, b
3(b)(ii)	fat		1	AO1 1.1.1a
3(c)(i)	C		1	AO3 1.1.1
3(c)(ii)	no health problems	allow as others (may) have (possible) health problems ignore reference to sweetness	1	AO3 1.1.1
3(c)(iii)	idea of informed choice	eg in case you have health problems / allergies allow legal requirement ignore diabetes	1	AO3 1.1.1
Total			**6**	

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Question	Answers	Extra information	Mark	AO / spec ref.
4(a)	 extra line from any drug cancels that mark		4	AO1 1.3.1d,f,i
4(b)(i)	any **one** from: • (live) animals • cells • tissues	accept named examples, eg mice ignore people / volunteers do **not** allow plants	1	AO1 1.3.1b
4(b)(ii)	to check that the drug works to find the best dose to use		1 1	AO1 1.3.1b
4(b)(iii)	only scientists at the drug company		1	AO2 1.3.1b
4(c)(i)	420		1	AO2 1.3.1
4(c)(ii)	statin(s)		1	AO3 1.3.1
4(c)(iii)	any **one** from: • side effects • other medication • other (medical) conditions	allow cost allow patient choice allow family history **or** age	1	AO3 1.3.1
Total			**11**	

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Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	gamete(s)	ignore reproductive cells	1	AO1 1.7.2a
5(a)(ii)	womb / uterus	allow phonetic spellings	1	AO1 1.7.2c
5(b)(i)	are formed from the same original embryo		1	AO2 1.7.2c
5(b)(ii)	embryo transplantation		1	AO1 1.7.2c
5(b)(iii)	any **one** from: • (calves will have some) genes / DNA from bull / sperm • idea that sexual reproduction produces variation	allow not all genes from the cow allow may be male allow idea that gene for low fat milk may not be passed on	1	AO2 1.7.2a
Total			**5**	

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Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	(volume) increases (with time)	ignore numbers	1	AO2 1.8.1
6(a)(ii)	there is more evidence / specimens / results (for Homo sapiens)	allow examples of this, eg more / better fossils allow converse if clearly referring to Australopithecus ignore reference to being 'more recent'	1	AO3 1.8.1
6(b)	2.5 – 3.15 (million years ago)	accept any number in range	1	AO3 1.8.1
6(c)(i)	Darwin		1	AO1 1.8.1a
6(c)(ii)	any **one** from: • they believed in other theories • insufficient evidence • no proof • genes / mechanism of inheritance not known / discovered	 allow they believe that God made all life ignore 'no evidence' allow not enough proof	1	AO1 1.8.1b
Total			**5**	

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Question	Answers	Extra information	Mark	AO / spec ref.
7(a)	sensory neurone		1	AO1 1.2.1e
7(b)(i)	synapse		1	AO1 1.2.1e
7(b)(ii)	a chemical		1	AO1 1.2.1e
7(c)	(What happens to the muscle) any **one** from: • contraction / contracts • gets shorter (How this helps the body) idea of protection for body (from damage / pain)	mark both parts of the question together ignore relaxation / relaxes / tenses eg moves finger / arm away (from pin / stimulus / source of pain)	 1 1	AO1 / AO2 1.2.1e
Total			**5**	

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Question	Answers	Extra information	Mark	AO / spec ref.
8(a)	3-layered triangular pyramid	as blocks or layered triangle, ignore (small) gaps between layers	1	AO2 1.5.1b
	(pyramid) labelled in food chain order	all three labels are required for **2** marks the pyramid must be fully correct	1	
8(b)(i)	C		1	AO3 1.5.1c
8(b)(ii)	shortest **or** fewest stages / transfers / (trophic) levels	allow only if (b)(i) is C or blank	1	AO1 / AO2 1.5.1c
	less losses in waste / faeces / urine / CO_2 / excretion	allow smaller amount uneaten	1	
	less loss in respiration / heat / movement	allow less lost keeping warm do **not** allow energy for respiration do **not** allow respiration makes energy	1	
		allow less loss (of biomass / energy) **or** less transfer (of biomass / energy) to surroundings if neither 2nd nor 3rd point given, for **1** mark		
Total			**6**	

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<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / spec ref.</th></tr>
<tr><td>9</td><td colspan="2">Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a ‘best-fit’ approach to the marking.</td><td>6</td><td>AO1
1.4.1d,f</td></tr>
<tr><td>0 marks</td><td>Level 1 (1-2 marks)</td><td>Level 2 (3-4 marks)</td><td>Level 3 (5-6 marks)</td><td></td></tr>
<tr><td>No relevant content.</td><td>At least one way in which animals and / or plants are adapted to survive.</td><td>A description of ways in which animals and / or plants are adapted and an attempt to link at least one adaptation to how it increases the chance of survival.</td><td>A description of ways in which animals and plants are adapted and a description of how at least one adaptation increases the chance of survival.</td><td></td></tr>
<tr><td colspan="2">examples of biology points made in the response:
(animals)
• (A) change / decrease in surface area / example
○ (decrease in surface area which) reduces area from which sweat / water may be lost
• (A) hump with fat / fat stores
○ (fat in hump) to convert to water (via respiration)
• (A) long eyelashes
○ (long eyelashes) to keep (wind-blown) dust out of eyes
• (A) nocturnal / ‘keep out of the sun’
○ reduce sweat loss (in heat of the day)

(plants)
• (A) decrease in surface area
• (A) leaves are spikes
○ (reduced area / leaves are spikes) reduces water loss / transpiration / evaporation
• (A) long / wide spread / extensive roots
○ (long / wide spread /extensive roots) to absorb (more) water
• (A) fleshy / thick stem
○ (fleshy / thick stem) to store water</td><td colspan="2">extra information
allow adaptations of specific animals to living in specified dry conditions, eg a desert
• (A) change / increase in surface area / example
○ (increase in surface area which) increases area heat may be lost from (by radiation)
• (A) changes to thickness of insulating coat
○ (thicker coat on upper surface) increases insulation from sun’s heat
• (A) thin (layer) / reduced amount of body fat
○ (reduced amount of body fat which) reduces insulating layer
• (A) wide feet
○ (wide feet) to reduce pressure / spread weight / prevent sinking

allow adaptations of specific plants to living in specified dry conditions, eg a desert
• (A) thick wax
○ (thick wax) to reduce evaporation / water loss / transpiration
• (A) few(er) stomata
○ (few stomata) to reduce evaporation / water loss / transpiration</td><td></td></tr>
<tr><td>Total</td><td></td><td></td><td>6</td><td></td></tr>
</table>

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Question	Answers	Extra information	Mark	AO / spec ref.
10(a)	microorganisms	allow microbes / bacteria / fungi / decomposers	1	AO1 / AO2 1.6.1b
	(microorganisms) respire	do **not** allow dead plants respire	1	
	(respiration / decay / microorganisms) releases (thermal) energy / 'heat'	ignore produce 'heat' do **not** allow produce energy do **not** allow dead plants release 'heat'	1	
10(b)(i)	any **three** from: • (opening) allows oxygen in		3	AO1 / AO2 / AO3
	• microorganisms / eggs need oxygen	allow air for oxygen		1.6.1b, c, 1.6.2
	• oxygen needed for respiration			
	• (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs)	allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given		
	• (opening) allows energy / 'heat' to escape	if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating **and** close at night to prevent it getting too cold		
	• (closing) retains energy / 'heat' if too cool / at night			
	• (closing) retains moisture	allow (opening) releases moisture		
10(b)(ii)	any **one** from: • maintains sex balance	e.g. equal / best / correct numbers of male and female	1	AO3 1.6.1
	• (survival of species depends on there being) males and females in population	allow so the offspring are not all the same sex		
Total			**7**	

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
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7	
8	
9	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2013

Science A

Unit Biology B1

BL1FP

F

Biology

Unit Biology B1

Wednesday 5 June 2013 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9 should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

Answer **all** questions in the spaces provided.

1 The photograph shows an athlete at the start of a race.



1 (a) The athlete's sense organs contain special cells.
These special cells detect changes in the environment.

1 (a) (i) **List A** shows changes in the environment.

List B shows some of the athlete's sense organs.

Draw **one** line from each change in the environment in **List A** to the sense organ detecting the change in **List B**.

List A **Change in the environment**	**List B** **Sense organ**
Sight of the finishing line	Ear
Sound of the starting gun	Nose
Pressure of the ground on the fingers	Eye
	Skin

(3 marks)

Do not write outside the box

1 (a) (ii) Which cells detect changes in the environment?

Tick (✓) **one** box.

Gland cells ☐

Muscle cells ☐

Receptor cells ☐

(1 mark)

1 (b) During the race, the concentration of sugar in the athlete's blood decreases.

Why?

.....

.....

(1 mark)

1 (c) Some athletes use anabolic steroids to improve performance.

1 (c) (i) Draw a ring around the correct answer to complete the sentence.

Anabolic steroids increase

- breathing rate.
- growth of muscles.
- heart rate.

(1 mark)

1 (c) (ii) Sporting regulations ban the use of anabolic steroids.

Suggest **one** reason why.

.....

.....

(1 mark)

7

Turn over ▶

Do not write outside the box

2 Many organisms are adapted to avoid being eaten.

2 (a) The photograph shows a gecko on a leafy branch.



The gecko is adapted to avoid being eaten by predators.

Explain how.

.....

.....

.....

.....

(2 marks)

2 (b) Ants can give a painful bite.

The photograph shows a type of ant living on acacia trees.

Acacia trees have thorns on their branches.



Do not write outside the box

2 (b) (i) Predators are less likely to eat ants living on acacia trees than ants living on the ground.

Suggest why.

.....

.....

(1 mark)

2 (b) (ii) Giraffes eat the leaves of acacia trees.

Giraffes do **not** eat the leaves of acacia trees that have ants living on them.

Suggest why.

.....

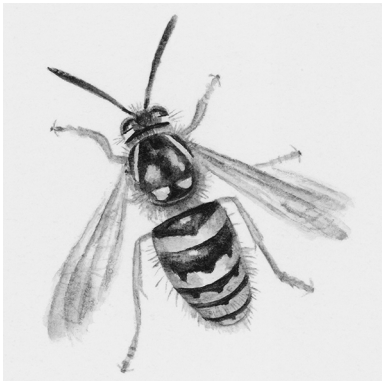
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(1 mark)

2 (c) The photographs show a wasp and a hoverfly.

The wasp and the hoverfly both have black and yellow stripes.

Wasp



Hoverfly



Wasps have stings, but hoverflies do **not**.

The stripes on the hoverfly help the hoverfly to avoid being eaten by predators.

Explain why.

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.....

.....

(2 marks)

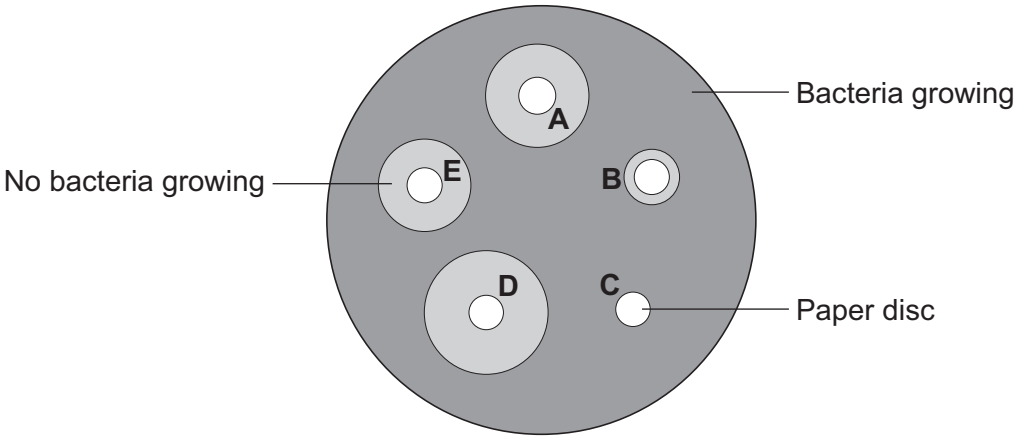
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Do not write outside the box

3 Students in a school investigated the effect of five different antibiotics, **A**, **B**, **C**, **D** and **E**, on one type of bacterium.

The students:
- grew the bacteria on agar jelly in a Petri dish
- soaked separate paper discs in each of the antibiotics
- put the paper discs onto the bacteria in the Petri dish
- put the Petri dish into an incubator.

The diagram shows what the Petri dish looked like after 3 days.



3 (a) (i) What is the maximum temperature the incubator should be set at in the school?

Draw a ring around your answer.

10°C **25°C** **50°C**

(1 mark)

3 (a) (ii) Draw a ring around the correct answer to complete the sentence.

The incubator should **not** be set at a higher temperature because the higher

temperature might help the growth of

pathogens.
toxins.
viruses.

(1 mark)

Do not write outside the box

3 (b) Which antibiotic, **A**, **B**, **C**, **D** or **E**, would be best to treat a disease caused by this type of bacterium?

Write your answer in the box. ☐

Give the reason for your answer.

.....

.....

(2 marks)

3 (c) Antibiotics **cannot** be used to treat diseases caused by viruses.

Why?

Tick (✓) **one** box.

Viruses are not pathogens ☐

There are too many different types of virus ☐

Viruses live inside cells ☐

(1 mark)

5

Turn over for the next question

Do not write outside the box

4 There are two forms of peppered moth, dark and pale.
Birds eat the moths when the moths are resting on tree bark.

Pollution in the atmosphere may:
- kill lichens living on tree bark
- make the bark of trees go black.

4 (a) Draw a ring around the correct answer to complete the sentence.

Lichens are very sensitive to air pollution caused by

carbon dioxide.

nitrogen.

sulfur dioxide.

(1 mark)

4 (b) The photographs show the two forms of peppered moth, on tree bark.



Tree bark covered with lichens

Tree bark made black by pollution

Do not write outside the box

4 (b) (i) The dark form of the peppered moth was produced by a change in the genetic material of a pale moth.

Use **one** word from the box to complete the sentence.

characteristic	**clone**	**mutation**

A change in genetic material is called a ..... .

(1 mark)

4 (b) (ii) In the 19th century, pollution made the bark of many trees go black.

Explain why:
- the population of the pale form of the moth in forests decreased
- the population of the dark form of the moth in forests increased.

.....

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(3 marks)

Question 4 continues on the next page

Do not write outside the box

4 (c) (i) The larvae (young) of the peppered moths eat the leaves of birch trees.

The diagram shows the food chain:

birch trees → peppered moth larvae → birds

Draw a pyramid of biomass for this food chain.

Label the pyramid.

(2 marks)

4 (c) (ii) Which **two** reasons explain the shape of the pyramid you drew in part **(c)(i)**?

Tick (✓) **two** boxes.

Some material is lost in waste from the birds ☐

The trees are much larger than peppered moth larvae ☐

Peppered moth larvae do not eat all the leaves from the trees ☐

The trees do not use all of the Sun's energy ☐

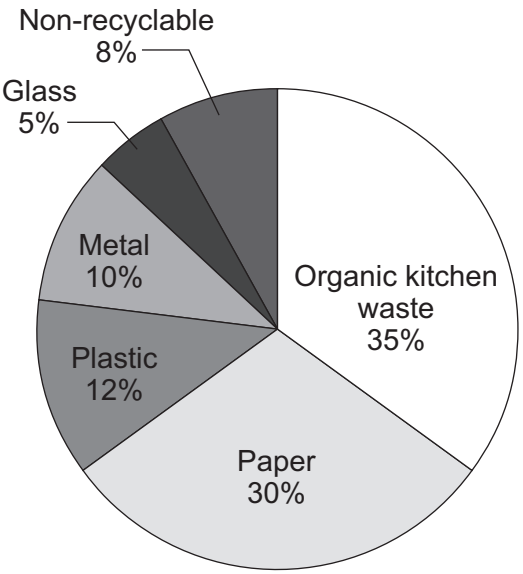
(2 marks)

9

Do not write outside the box

5 This question is about recycling.

The pie chart shows the different types of waste from an average household in England.



5 (a) In 2010, councils in England collected 23 million tonnes of waste from households.
Most of the waste was put into landfill sites.
Councils pay to use landfill sites.

Organic kitchen waste can be put onto compost heaps.

Calculate the mass of organic kitchen waste from households that could have been put onto compost heaps in 2010.

.....

.....

Answer = ... million tonnes
(2 marks)

5 (b) Some householders put organic kitchen waste onto their compost heaps.

5 (b) (i) Suggest **one** advantage of this to the council.

.....

.....
(1 mark)

5 (b) (ii) Suggest **one** advantage of this to the householder.

.....

.....
(1 mark)

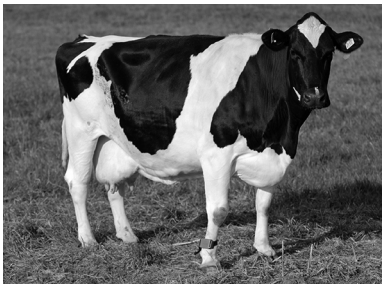
4

Turn over ▶

Do not write outside the box

6 The photographs show two breeds of cow.

Friesian cow



Jersey cow



In parts **(a)** and **(b)** draw a ring around the correct answer to complete each sentence.

6 (a) Cows produce their young (calves) by

asexual reproduction.

cloning.

sexual reproduction.

(1 mark)

6 (b) Cows and their calves have many similar characteristics.

6 (b) (i) The information for characteristics is carried by

clones.

embryos.

genes.

(1 mark)

6 (b) (ii) The information for characteristics is passed to the next generation in cells

called

body cells.

gametes.

neurones.

(1 mark)

Do not write outside the box

6 (c) Friesian and Jersey cows can both be used for meat or to produce milk.

The information shows features of Friesian and Jersey cows.

Friesian cows	Jersey cows
Body mass up to 600 kg	Body mass up to 400 kg
Milk contains 3.4% protein	Milk contains 3.8% protein
Can be milked for 325 days after giving birth	Can be milked for 250 days after giving birth
Produce no milk for 55 days before having a calf	Produce no milk for 45 days before having a calf
Produce > 30 litres of milk per day	Produce < 30 litres of milk per day

Use **only** the information above to answer these questions.

In your answers you must make comparisons between the two breeds of cow.

6 (c) (i) Give **two** advantages of a farmer keeping Friesian cows and **not** Jersey cows.

1 .....

.....

2 .....

.....

(2 marks)

6 (c) (ii) Give **two** advantages of a farmer keeping Jersey cows and **not** Friesian cows.

1 .....

.....

2 .....

.....

(2 marks)

Question 6 continues on the next page

Do not write outside the box

6 (d) Cow's milk is different from human milk. Cow's milk should **not** be given to young human babies.

Scientists in China have *genetically engineered* cows to produce human milk. Milk from these cows can be fed to young human babies.

6 (d) (i) What is *genetic engineering*?

Tick (✓) **one** box.

Genes from one organism are transferred to a different organism ☐

Cells are separated from an embryo and are transferred to host mothers ☐

The nucleus from a body cell is transferred to an egg cell ☐

(1 mark)

6 (d) (ii) Some people are worried about using milk from genetically engineered cows, to feed human babies.

Give **one** reason why.

.....

.....

(1 mark)

9

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Turn over for the next question

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not write outside the box

7 In the 1800s, many women died from disease after giving birth.

Dr Semmelweis compared the death rates of women in two hospital wards, **Ward A** and **Ward B**.

Table 1 shows some of the results.

Table 1

Year	Percentage (%) of women who died	
	Ward A	**Ward B**
1834	7.7	7.4
1836	7.5	7.8
1844	8.4	2.1
1846	11.3	2.8

Before 1840
Doctors and nurses worked in **Ward A** and in **Ward B**.
The doctors often worked in other wards with patients who had diseases.
The doctors did **not** wash their hands.

After 1840
Doctors only worked in **Ward A** and **not** in **Ward B**.
Only nurses worked in **Ward B**.
The nurses did **not** work in other wards with patients who had diseases.

7 (a) (i) Look at the data for **Ward A** and **Ward B** after 1840.

Describe the effect on death rate of having **only** nurses working in **Ward B** and **not** doctors.

To gain full marks you must refer to the data in **Table 1**.

.....

.....

.....

.....

(2 marks)

Do not write outside the box

7 (a) (ii) Suggest an explanation for the difference you described in part **(a)(i)**.

.....

.....

.....

.....

(2 marks)

7 (b) In 1847, Dr Semmelweis told the doctors to wash their hands each time before they began to work in **Ward A**.

Table 2 shows the death rates in the two wards, after 1847.

Table 2

Year	Percentage (%) of women who died	
	Ward A	Ward B
1848	2.7	2.8
1849	2.0	1.9

Dr Semmelweis was right to tell the doctors to wash their hands.

What evidence is there to support Dr Semmelweis telling the doctors to wash their hands?

Use information from **Table 1** and **Table 2** in your answer.

.....

.....

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(3 marks)

Question 7 continues on the next page

Do not write outside the box

7 (c) In modern hospitals less than 0.1% of women die from disease after giving birth.

Medical understanding has improved since the 1850s to reduce the death rate.

Other than improvements in hygiene, give **two** reasons for the low death rate from infectious diseases in modern hospitals.

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(2 marks)

9

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Turn over for the next question

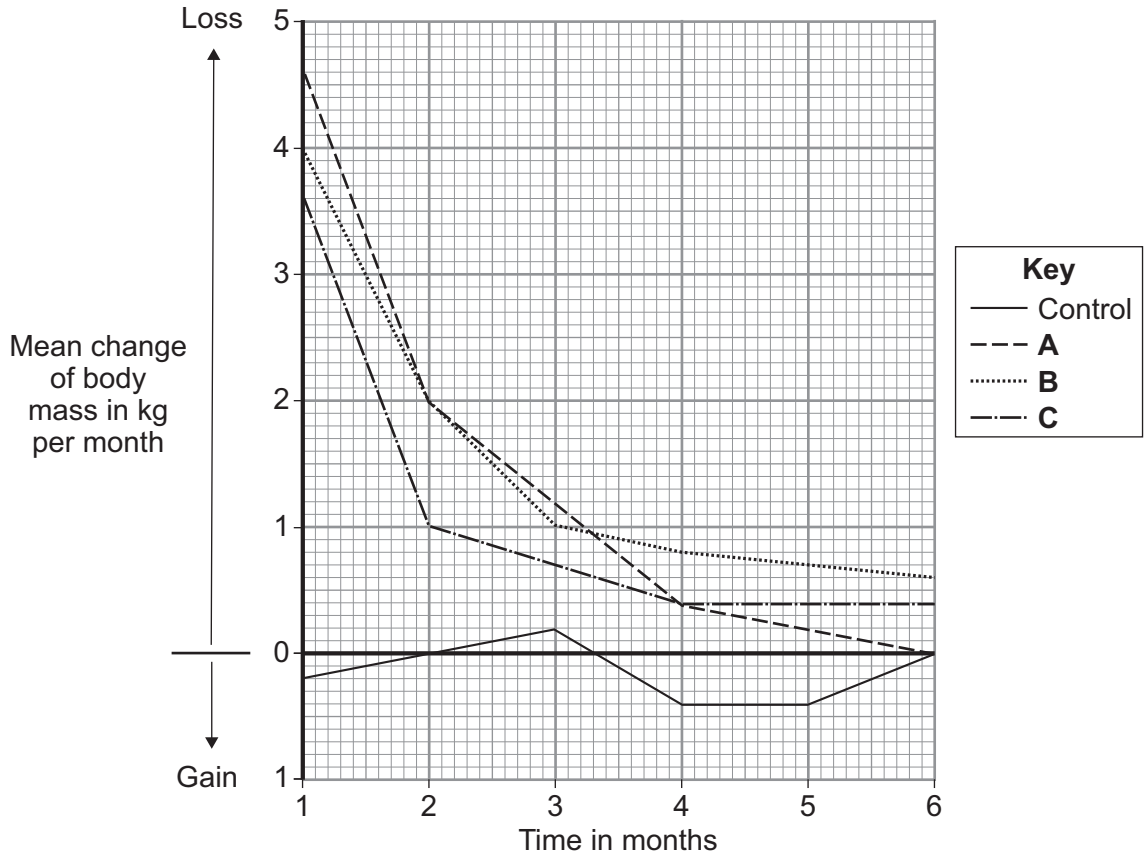
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ANSWER IN THE SPACES PROVIDED

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8 Scientists investigated the effectiveness of three slimming programmes, **A**, **B** and **C**.

The scientists recorded the body mass of four groups of volunteers each month for 6 months. Three of the groups were each given a different slimming programme. The fourth group was a control group.

The graph shows the mean change of body mass each month for all four groups.



8 (a) (i) What should the control group eat?

.....

.....

(1 mark)

8 (a) (ii) Why did the scientists include a control group in this study?

.....

.....

(1 mark)

Do not write outside the box

8 (b) (i) The three groups of volunteers using the slimming programmes each showed a similar pattern of body mass loss over the 6 months.

Describe this pattern.

.....

.....

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(2 marks)

8 (b) (ii) All the slimming programmes seemed to be effective.

How does the information in the graph show this?

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.....

(1 mark)

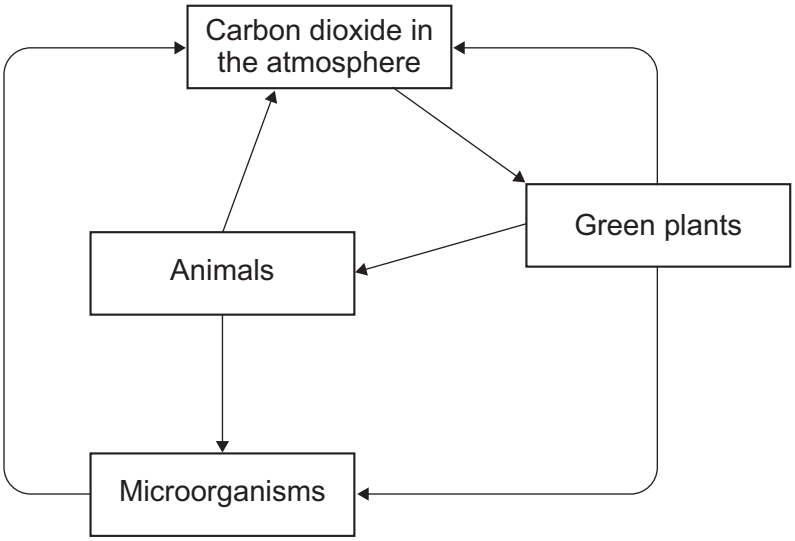
5

Turn over for the next question

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9 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

The diagram shows part of the carbon cycle.



Describe how living things are involved in the constant cycling of carbon.

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(6 marks)

6

END OF QUESTIONS

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Version 1.0



General Certificate of Secondary Education
June 2013

Science A / Biology BL1FP

(Specification 4405 / 4401)

Unit 1: Biology 1

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; e.g. allow smooth / free movement.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

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Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

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Quality of Written Communication and levels marking

In Question 9 candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

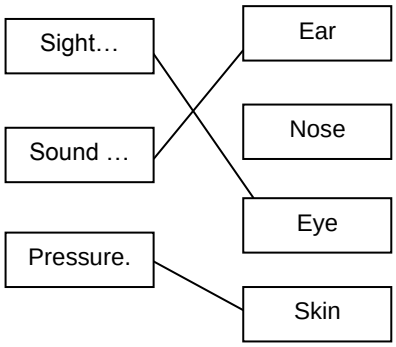
- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question 1

question	answers	extra information	Mark
1(a)(i)		**1** mark for each line do **not** award a mark for a 'change' that has two lines	3
1(a)(ii)	receptor cells		1
1(b)	used to provide (extra) energy	allow (more) used in respiration allow suitable reference to muscles do **not** accept used for sweat	1
1(c)(i)	growth of muscles		1
1(c)(ii)	(these drugs have) possible side / harmful effects **or** answers that refer to 'fairness of competition' e.g. cheating		1
Total			**7**

Question 2

question	Answers	extra information	Mark
2(a)	looks like a leaf		1
	so predator less likely to / won't see it		1
		allow 'camouflage' as alternative to either point	
2(b)(i)	thorns (of acacia tree) hurt (predators)	allow idea that fewer animals / predators live in trees **or** ground living animals can't reach them (in the trees)	1
2(b)(ii)	(giraffe) avoids being bitten by ants	allow ants are poisonous / have unpleasant taste	1
2(c)	looks like / mimics a wasp **or** has warning colouration		1
	so predators think it has a sting		1
Total			**6**

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Question 3

question	answers	extra information	Mark
3(a)(i)	25 °C		1
3(a)(ii)	pathogens		1
3(b)	**D** more / most bacteria killed	 accept biggest area / ring where no bacteria are growing	1 1
3(c)	viruses live inside cells		1
Total			**5**

Question 4

question	answers	extra information	Mark
4(a)	sulfur dioxide		1
4(b)(i)	mutation		1
4(b)(ii)	pale form now (more) easily seen (by predators) **or** dark form now less easily seen (by predators) so pale form (more) likely to be eaten **or** dark form less likely to be eaten so dark form (more likely to) breed / pass on genes **or** pale form less likely to breed / pass on genes	accept ref to camouflage	1 1 1
4(c)(i)	pyramid of three layers of diminishing size three labels in food chain order	either way up award 2 marks only if the pyramid is correctly labelled accept trees / birch accept (peppered) moth(s) / larvae	1 1
4(c)(ii)	some material is lost in waste from the birds peppered moth larvae do not eat all the leaves from the trees		1 1
Total			**9**

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Question 5

question	answers	extra information	Mark
5(a)	8.05 / 8.1 / 8	correct answer with or without working gains **2** marks allow **1** mark for 8.0 **or** 8.10 allow 35/100 x 23 (million) for **1** mark if no answer or incorrect answer allow **1** mark for 805 **or** 8 050 000	2
5(b)(i)	any **one** from: • less landfill sites used • less cost (of landfill sites) / saves money • less effort / cost to collect	allow less to collect	1
5(b)(ii)	compost can be used on garden	allow idea of compost can be used to help plant growth **or** compost provides minerals / named **or** compost improves the soil	1
Total			**4**

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Question 6

question	answers	extra information	Mark
6(a)	sexual reproduction		1
6(b)(i)	genes		1
6(b)(ii)	gametes		1
6(c)(i)	any **two** from: • more meat (per cow) • more milk each day • can be milked for more time after giving birth / greater proportion of time	answers must be comparative ignore bigger unqualified accept '(produce) more milk', for **1** mark, if neither more milk each day nor can be milked for more time after giving birth are given	2
6(c)(ii)	(milk contains) more protein less time before having a calf when no milk produced	answers must be comparative	1 1
6(d)(i)	genes from one organism are transferred to a different organism		1
6(d)(ii)	(possible) harm to babies' long term health	allow don't know long-term / side effects (on baby) accept idea that there may be other things in (genetically engineered) cow's milk that might harm babies' health e.g. bacteria ignore ethical / religious arguments	1
Total			**9**

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Question 7

question	answers	extra information	Mark
7(a)(i)	lower percentage (of women) who died	allow fewer (women) died	1
	numerical reference to a pair of figures to show this	allow any difference in a pair of figures	1
7(a)(ii)	doctors were not transferring	ignore reference to nurses	1
	pathogens / bacteria / viruses / microorganisms / microbes	allow fungi ignore disease / germs / infection	1
7(b)	any **three** from: • lower percentage of patients died (when doctors washed hands or in ward A) • large decrease or reference to proportional decrease • little / no difference / similar to ward B • continued drop (in ward A)	allow fewer for lower percentage ignore raw data	3
7(c)	any **two** from: • better understanding / knowledge of immunity • better / new drugs • sterilisation of equipment **or** isolation of patients **or** some infectious diseases wiped out **or** earlier identification / treatment of infections	accept ref to immunisation / vaccination accept examples, e.g. antibiotics / penicillin (discovered) allow better / new medicines ignore references to general hygiene	2
Total			**9**

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Question 8

question	answers	extra information	Mark
8(a)(i)	idea of 'normal' food / diet	e.g. 'the same as usual' or 'the same as before' allow balanced diet allow none of the slimming programmes ignore healthy diet	1
8(a)(ii)	for comparison	accept to show the test is valid allow to show the effect of the slimming programmes allow to see if the slimming programmes work ignore idea of fair test / reliable do **not** allow accurate / precise	1
8(b)(i)	(at first) large / rapid (loss / change of body mass) then small (loss / change) / levelling off	accept 'loss of mass decreased' for **2** marks	1 1
8(b)(ii)	all lost body mass (compared to the control group)		1
Total			**5**

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Question 9

question	Answers	extra information	Mark
9	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5.		6

0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	For at least one process **either** the organism that carries it out **or** the carbon compound used **or** the carbon compound produced is described **or** for at least one organism **either** the carbon compound it uses **or** the carbon compound it produces is described **or** at least one process is named	For some processes (at least one of which is named) **either** the organisms involved **or** the carbon compounds used **or** the carbon compounds produced are described	For at least one named process an organism **and** either the carbon compound used for the process **or** the carbon compound produced by the process are described **and** for other processes (at least one of which is named) **either** the organism **or** the carbon compounds used **or** the carbon compounds produced are described (as in Level 2)

examples of biology points made in the response:

- (green) plants photosynthesise
- photosynthesis takes in carbon dioxide
- (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose)
- animals eat (green) plants (and other animals)
- (green) plants respire
- animals respire
- respiration releases carbon dioxide
- (green) plants and animals die
- microorganisms decay / decompose / rot / break down / feed on dead organisms
- microorganisms respire

Total			**6**

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
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4	
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7	
8	
9	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
January 2013

Science A
Unit Biology B1

BL1FP

F

Biology
Unit Biology B1

Wednesday 9 January 2013 9.00 am to 10.00 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9(a) should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

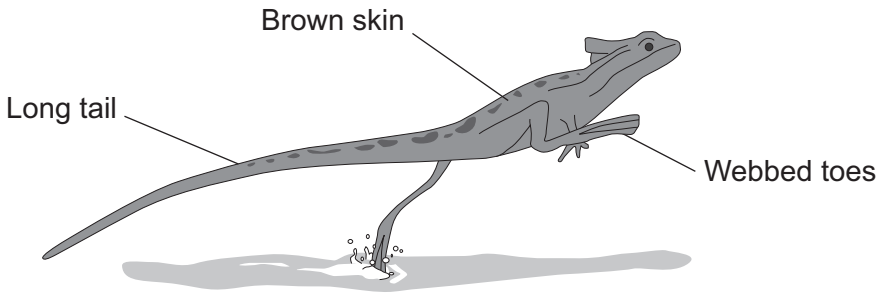
Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

Answer **all** questions in the spaces provided.

1 The picture shows a basilisk lizard. Some of the adaptations of the lizard are labelled.



Basilisk lizards are often found resting on branches of trees that grow next to water. Basilisk lizards can run across the surface of the water.

1 (a) Draw **one** line from each adaptation of the lizard to the advantage of the adaptation.

Adaptation	**Advantage**
Toes on the back feet are webbed	For camouflage on branches of trees
Long tail	Helps the lizard to balance when running
Brown skin	Warning colours to deter predators
	Increases surface area in contact with the water

(3 marks)

Do not write outside the box

1 (b) Suggest **one** advantage to the basilisk lizard of being able to run across the surface of the water.

.....

.....

(1 mark)

1 (c) Animals, such as lizards, compete with each other.

Give **two** factors that animals compete for.

Tick (✓) **two** boxes.

Oxygen ☐

Food ☐

Territory ☐

Light ☐

(2 marks)

6

Turn over for the next question

Do not write outside the box

2 The body controls internal conditions.

2 (a) Use words from the box to complete the sentences about water loss from the body.

kidneys	**liver**	**lungs**	**skin**

2 (a) (i) Water is lost in sweat via the ..... .

(1 mark)

2 (a) (ii) Water is lost in urine via the ..... .

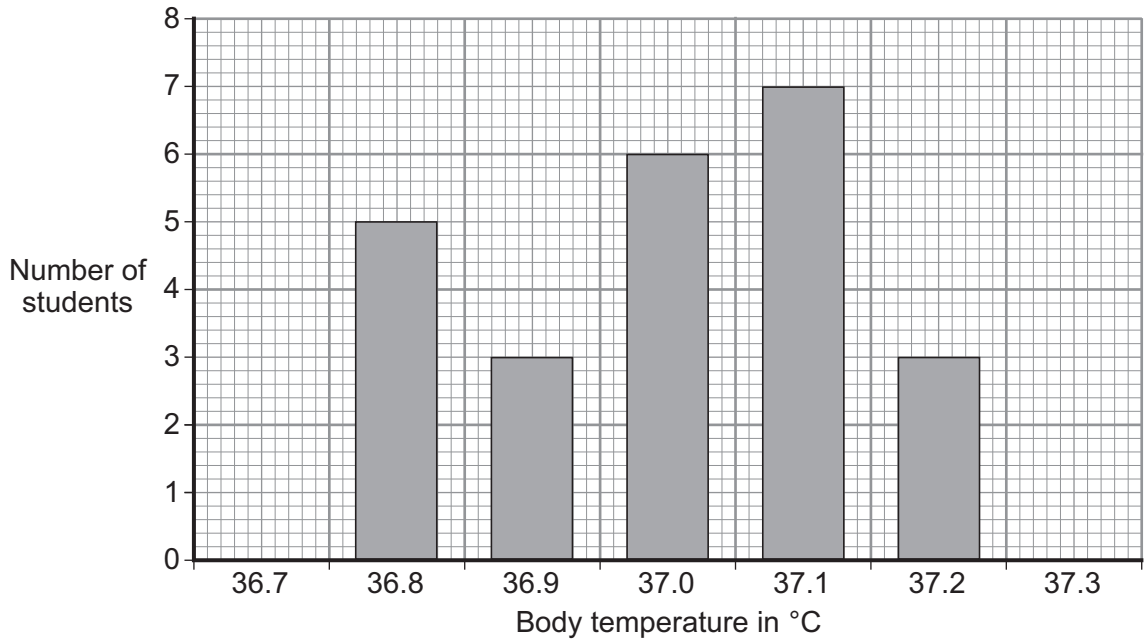
(1 mark)

2 (a) (iii) Water is lost in the breath via the ..... .

(1 mark)

2 (b) Students investigated body temperature in the class.

The bar chart shows the results.



Do not write outside the box

2 (b) (i) One student used the bar chart to calculate the mean body temperature of the class. The student calculated the mean body temperature as 37.0 °C.

How did the student use the bar chart to calculate the mean?

.....

.....

.....

.....

(2 marks)

2 (b) (ii) How many students had a body temperature higher than the mean of 37.0 °C?

.....

(1 mark)

2 (b) (iii) Body temperature must be kept within a narrow range.

Why?

.....

.....

(1 mark)

7

Turn over for the next question

Do not write outside the box

3 Viruses and bacteria cause diseases in humans.

3 (a) Draw a ring around the correct word to complete the sentence.

Organisms that cause disease are called

algae.

pathogens.

vaccines.

(1 mark)

3 (b) In August 2011 the United Nations gave a warning that there was a new strain of the bird flu virus in China.

Bird flu may kill humans. The new strain of the bird flu virus could cause a *pandemic* very quickly.

3 (b) (i) What is a *pandemic*?

Tick (✓) **one** box.

A disease affecting the people all over one country. ☐

A disease affecting hundreds of people. ☐

A disease affecting people in many countries. ☐

(1 mark)

3 (b) (ii) The swine flu virus is carried by pigs.

The bird flu virus is likely to spread much more quickly than the swine flu virus.

Suggest **one** reason why.

.....

.....

(1 mark)

Do not write outside the box

3 (c) This notice is from a doctor's surgery.

Unfortunately, antibiotics will NOT get rid of your flu.

3 (c) (i) Why will antibiotics **not** get rid of flu?

.....

.....

(1 mark)

3 (c) (ii) The symptoms of flu include a sore throat and aching muscles.

What would a doctor give to a patient to relieve the symptoms of flu?

.....

(1 mark)

3 (c) (iii) It is important that antibiotics are **not** overused.

Explain why.

Use words from the box to complete the sentence.

antibody	**bacteria**	**immune**	**resistant**	**viruses**

Overuse of antibiotics might speed up the development

of ..... strains of ..... .

(2 marks)

7

Do not write outside the box

4 Students tested eight different foods, **A** – **H**, for carbohydrate, fat and protein.

The table shows the students' results.

Food	Carbohydrate	Fat	Protein
A	✗	✓	✓
B	✗	✓	✓
C	✓	✓	✓
D	✓	✗	✓
E	✗	✗	✗
F	✓	✗	✗
G	✓	✗	✗
H	✓	✗	✓

Key
✓ = present
✗ = not present

4 (a) (i) How many of the foods contained **only** carbohydrate?

.....

(1 mark)

4 (a) (ii) Which of the foods contained carbohydrate **and** fat **and** protein?

Tick (✓) **one** box.

B, **C** and **D** only ☐

B and **D** only ☐

C only ☐

(1 mark)

Do not write outside the box

4 (b) A person's diet should contain carbohydrate **and** fat **and** protein.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

4 (c) As well as carbohydrate, fat and protein, the body also needs vitamins and mineral ions.

4 (c) (i) Why does the body need vitamins and mineral ions?

.....

(1 mark)

4 (c) (ii) Draw a ring around the correct answer to complete the sentence.

Compared to the mass of carbohydrates, the body needs | a greater / a smaller / the same | mass of vitamins and mineral ions.

(1 mark)

6

Turn over for the next question

Do not write outside the box

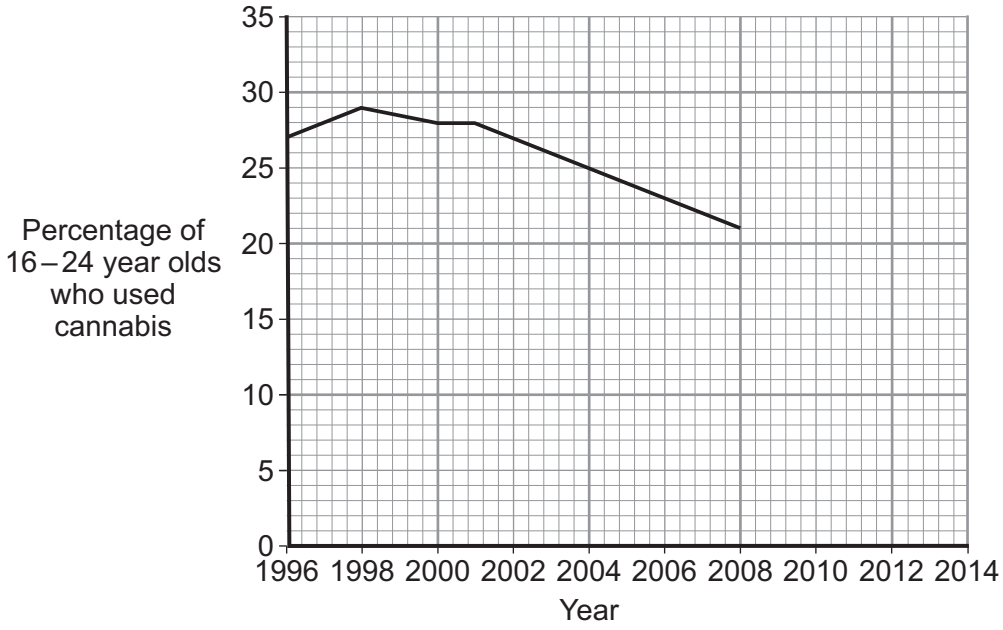
5 Cannabis is an illegal drug.

5 (a) What type of illness might be caused by smoking cannabis regularly?

.....

(1 mark)

5 (b) The graph shows the use of cannabis by 16 – 24 year olds in the UK between 1996 and 2008.



5 (b) (i) Use the graph to predict the percentage of 16 – 24 year olds who will use cannabis in 2014.

Show your working **on the graph**.

Percentage = ...

(2 marks)

Do not write outside the box

5 (b) (ii) Illegal drugs are classified as Class A, Class B or Class C.
Class C drugs are the least dangerous.

In 2004, the government changed the classification of cannabis from Class B to Class C.

In 2009, the government changed the classification of cannabis back from Class C to Class B.

Do you think that changing the classification of cannabis back to a Class B drug will reduce the percentage of 16 – 24 year olds who use cannabis?

Use evidence from the graph to explain your answer.

.....

.....

.....

.....

.....

.....

(2 marks)

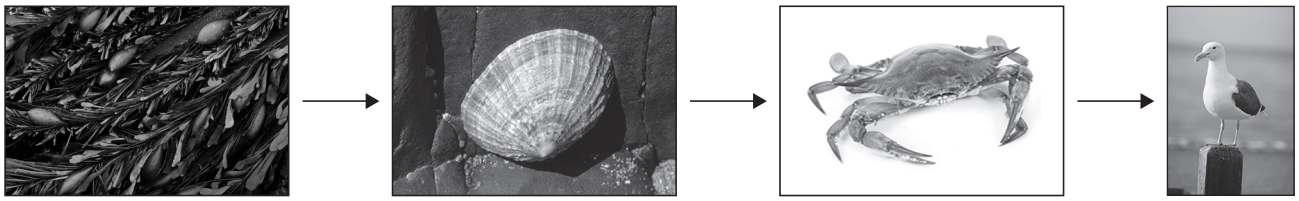
5

Turn over for the next question

Do not write outside the box

6 The photographs show a food chain from a seashore. The photographs are **not** to the same scale.

Seaweed → Limpet → Crab → Gull



Students estimated the population and biomass of each of the organisms on part of a seashore.

The table shows the students' results.

Organism	Population	Mean mass of one organism in grams	Biomass of population in grams
Seaweed	50	4000	200 000
Limpet	1200	30	36 000
Crab	100	90	9 000
Gull	2	900	

6 (a) (i) Use the data in the table to calculate the biomass of the gull population.

.....

.....

Biomass = ... g

(1 mark)

Do not write outside the box

6 (a) (ii) Draw a pyramid of biomass for this food chain.

Label the pyramid.

(2 marks)

6 (b) The biomass of the crab population is much less than the biomass of the limpet population.

Suggest **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

5

Turn over for the next question

Do not write outside the box

7 (a) Complete the sentences about evolution.

Draw a ring around the correct answer to complete each sentence.

7 (a) (i) Darwin suggested the theory of evolution by

artificial
natural
asexual

selection.

(1 mark)

7 (a) (ii) Darwin's theory of evolution says that all species of living things have evolved from

artificial
complex
simple

life forms.

(1 mark)

7 (a) (iii) Most scientists believe that life first developed about

three billion
three million
three thousand

years ago.

(1 mark)

7 (b) Darwin's theory of evolution was only slowly accepted by other people.

Give **two** reasons why.

1 .....

.....

2 .....

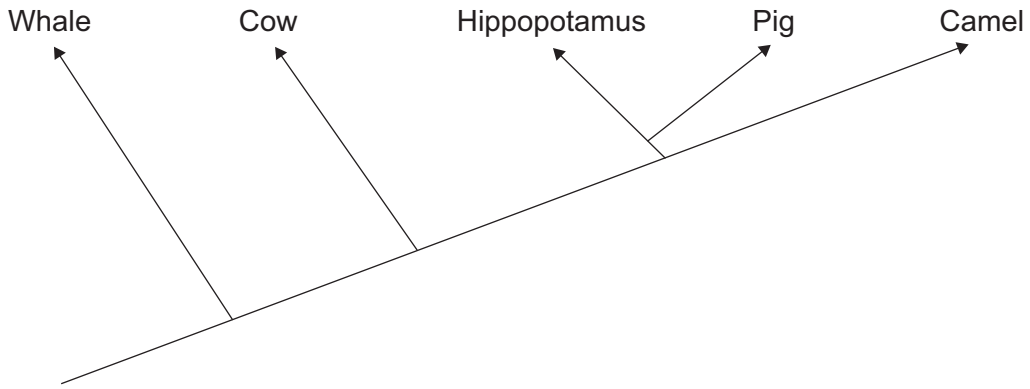
.....

(2 marks)

Do not write outside the box

7 (c) **Diagram 1** shows one model of the relationship between some animals.

Diagram 1



7 (c) (i) Complete the sentence.

The model shown in **Diagram 1** is an evolutionary ..... .

(1 mark)

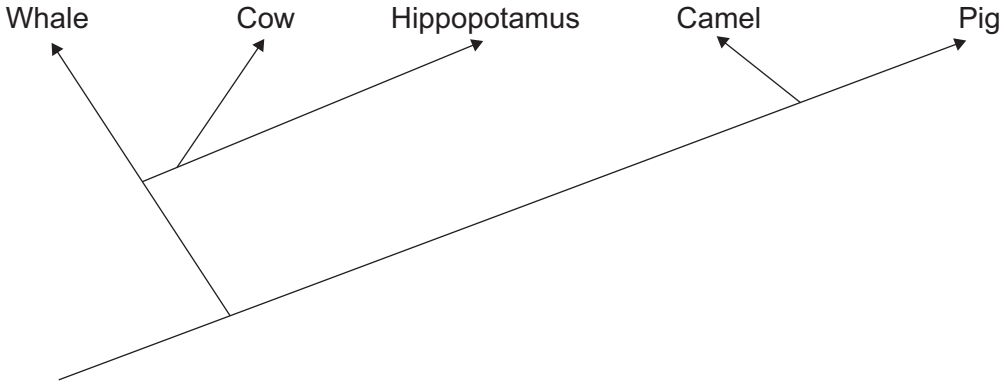
7 (c) (ii) Which **two** of the animals in **Diagram 1** are most closely related?

..... and .....

(1 mark)

7 (c) (iii) **Diagram 2** shows a more recent model of the relationship between the animals.

Diagram 2



Suggest **one** reason why scientists have changed the model of the relationships between the animals shown in the diagram.

Draw a ring around the correct answer.

more powerful computers | **new evidence from fossils** | **new species discovered**

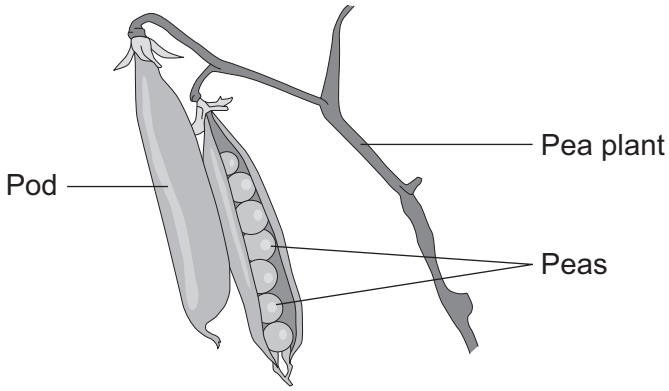
(1 mark)

8

Turn over ▶

Do not write outside the box

8 Peas grow in pods on pea plants.



A gardener grew four varieties of pea plants, **A**, **B**, **C** and **D**, in his garden.
The gardener counted the number of peas in each pod growing on each plant.

The table shows his results.

Variety	Range of number of peas in each pod	Mean number of peas in each pod
A	2–6	4
B	3–7	5
C	3–8	6
D	6–8	7

8 (a) Give **one** environmental factor and **one other** factor that might affect the number of peas in a pod.

Environmental factor .....

Other factor .....

(2 marks)

Do not write outside the box

8 (b) The gardener thinks that he will get the largest mass of peas from his garden if he grows variety **D**.

Why is the gardener **not** correct?

Suggest **one** reason.

.....

.....

(1 mark)

8 (c) It is important that carbon is cycled through living things.

After he has picked the peas, the gardener puts the dead pea plants onto a compost heap.

Over the next few months, the carbon in the carbon compounds from the pea plants is returned to the air.

Describe how.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

7

Turn over for the next question

Do not write outside the box

9 A student is given a tube containing a liquid nutrient medium. The medium contains one type of bacterium.

9 (a) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

The student is told to grow some of the bacteria on agar jelly in a Petri dish.

Describe how the student should prepare an uncontaminated culture of the bacterium in the Petri dish.

You should explain the reasons for each of the steps you describe.

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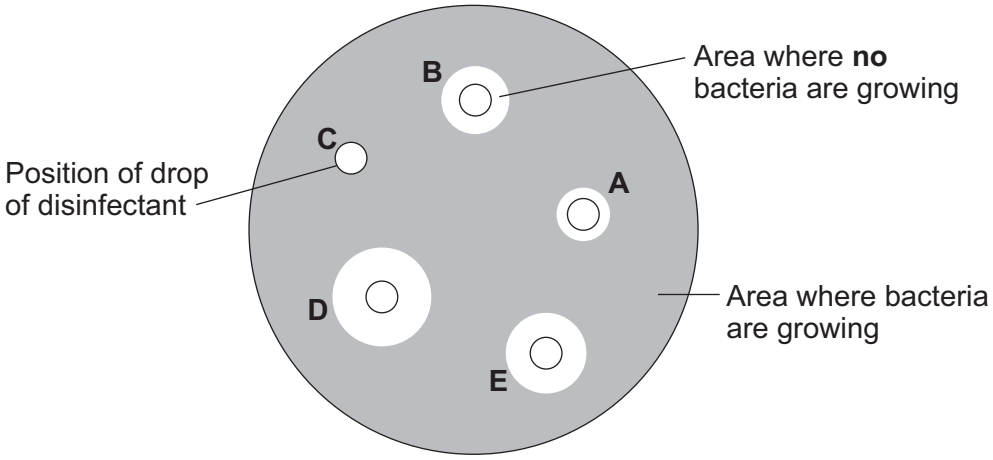
.....

(6 marks)

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9 (b) After the culture had been prepared, the student added one drop of each of five disinfectants, **A**, **B**, **C**, **D** and **E**, onto the culture.

The diagram shows the appearance of the Petri dish 3 days later.



9 (b) (i) There are areas on the agar jelly where **no** bacteria are growing.

Why?

.....

.....

(1 mark)

9 (b) (ii) The student concluded that disinfectant **D** would be the best for using around the home.

Give **one** reason why the student might be correct.

.....

.....

.....

Give **one** reason why the student might **not** be correct.

.....

.....

.....

(2 marks)

9

END OF QUESTIONS

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Version 1.0



General Certificate of Secondary Education
January 2013

Science A / Biology BL1FP

(Specification 4405 / 4401)

Unit: Biology 1

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

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Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

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Quality of Written Communication and levels marking

In Question 9(a) students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

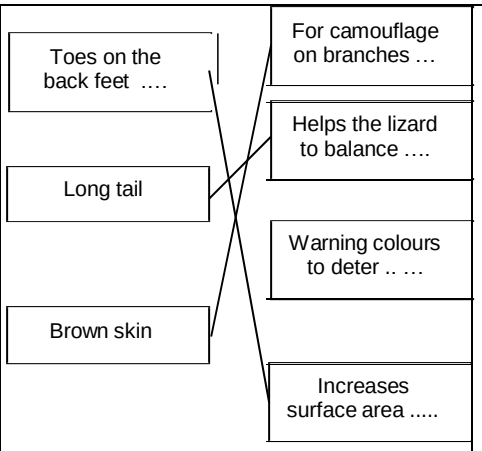
Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question 1

question	answers	extra information	mark
1(a)		one mark for each line do **not** award mark for an adaptation if lines are drawn from it to more than one advantage	3
1(b)	escape (predators)	accept faster than swimming allow chase prey allow it stops them from drowning	1
1(c)	food territory	deduct **one** mark for each tick in excess of two	1 1
Total			**6**

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Question 2

question	answers	extra information	mark
2(a)(i)	skin		1
2(a)(ii)	kidneys	accept kidney	1
2(a)(iii)	lungs	accept lung	1
2(b)(i)	multiply temperature by number of students at that temperature and add them up divide by number of students	allow (36.8×5) + (36.9×3) + (37.0×6) + (37.1×7) + (37.2×3) allow 888 allow divide by 24	1 1
2(b)(ii)	10 / ten		1
2(b)(iii)	so enzymes work (well)	ignore death / overheating / hypothermia allow body reactions work (well)	1
Total			**7**

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Question 3

question	answers	extra information	mark
3(a)	pathogens		1
3(b)(i)	A disease affecting people in many countries		1
3(b)(ii)	birds fly / migrate OR human contact with birds more likely OR there are more birds (than pigs)	accept converse birds not contained / difficult to control movement	1
3(c)(i)	antibiotics (only) kill bacteria OR antibiotics don't kill viruses	ignore flu is caused by a virus unqualified ignore virus resistant / immune	1
3(c)(ii)	painkillers	accept any correct named painkiller, eg aspirin or paracetamol allow antivirals / Tamiflu ignore medicine / tablets	1
3(c)(iii)	resistant bacteria	in this order	1 1
Total			**7**

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BL1FP

Question 4

question	answers	extra information	mark
4(a)(i)	2 / two	allow F and G	1
4(a)(ii)	**C** only		1
4(b)	any **two** from: • balanced diet / otherwise malnourished • (release) energy • build cells / growth / repair	ignore reference to health / strength or allow: • carbohydrates for energy (1) • fat for energy / insulation (1) • protein for growth / repair (1)	2
4(c)(i)	health	do **not** allow energy / insulation / growth / repair allow reference to specific function of vitamin or ion, eg prevent scurvy / harden bones allow to prevent deficiency diseases ignore strength / fitness / prevent diseases	1
4(c)(ii)	a smaller		1
Total			**6**

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Question 5

question	answers	extra information	mark
5(a)	mental (illness)	accept specific mental illnesses such as depression, paranoia schizophrenia or dementia allow brain damage do **not** accept cancer	1
5(b)(i)	evidence on graph of attempt to continue line from 2001 to 2014 15	range at 2014 from 13 to 16 inclusive accept any value between 13 and 16 consistent with attempt at straight line if there is no line accept only 15	1 1
5(b)(ii)	no because changing to Class C did not affect trend OR trend / use already falling before the change OR use higher when class B	only award this mark if there is an attempt at an explanation	1 1
Total			**5**

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Question 6

question	answers	extra information	mark
6(a)(i)	1800(g)		1
6(a)(ii)	triangular pyramid with four layers correctly labelled in order of food chain	accept ecf from (a)(i) allow inverted pyramid	1 1
6(b)	any **two** from: • (lost as) crab faeces / not all digested • (lost as) crab urine / urea • loss of carbon dioxide by crab • not all the limpet is eaten eg don't eat the shell • not **all** limpets are eaten (by crabs)	allow waste / excretion for **one** mark if neither faeces nor urine are given accept (lost via) respiration allow not enough crabs to eat **all** the limpets / the limpet population ignore energy losses, such as movement	2
Total			**5**

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Question 7

question	answers	extra information	mark
7(a)(i)	natural		1
7(a)(ii)	simple		1
7(a)(iii)	three billion		1
7(b)	any **two** from: • reference to religion • insufficient evidence / couldn't prove it / no proof • mechanism of inheritance / variation not known • reference to other theories • reference to Darwin's status	ignore no evidence allow genes / DNA not known about	2
7(c)(i)	tree		1
7(c)(ii)	hippopotamus **and** pig	both required, either order allow hippo	1
7(c)(iii)	new evidence from fossils		1
Total			**8**

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Question 8

question	answers	extra information	mark
8(a)	any correct named physical environmental condition, e.g. light / water / rain / temperature / minerals / nutrients / space (between plants)	ignore carbon dioxide / climate / weather / sun / pollution	1
	genes / inheritance OR any correct named biotic factor e.g. predation / disease	ignore 'variety'	1
8(b)	mass of crop also depends on number of pods (per plant) / size / mass of each pea	ignore number of plants	1
8(c)	microorganisms / bacteria / fungi / decomposers / detritus feeders / named		1
	decompose / rot / break down / decay / digest	ignore feed / eat	1
	(these organisms) respire	do **not** allow respiration by pea (plants)	1
	(decay / respiration / microorganisms etc) releases carbon dioxide	do **not** allow combustion / fossilisation	1
Total			**7**

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Question 9

question	answers	extra information	mark
9(a)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		6

0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	There is a brief description of at least one of the stages (pre-inoculation, inoculation, post-inoculation).	There is a simple description of at least two stages and an explanation of at least one of them.	There is a clear description of all three stages and an explanation of at least two of them.

examples of biology points made in the response:

Pre-inoculation

- Petri dish and agar sterilised before use
- to kill unwanted bacteria
- inoculating loop passed through flame / sterile swab
- to sterilise / kill (other) bacteria

Inoculation

- loop/swab used to spread/streak bacterium onto agar

Allow other correct methods, eg bacterial lawns

- lid of Petri dish opened as little as possible
- to prevent microbes from air entering

Post-inoculation

- sealed with tape
- to prevent microbes from air entering
- incubate
- to allow growth of bacteria

Question 9 continues on the next page

BL1FP
Question 9 continued

question	answers	extra information	mark
9(b)(i)	bacteria killed / destroyed	ignore fights / attacks / stops growth / got rid of	1
9(b)(ii)	*Might be correct* largest area / space where no bacteria are growing *Might not be correct* (need more evidence as) D may be harmful to people / animals / surfaces **or** may work differently with different bacteria **or** disinfectants may be different concentrations **or** may not last as long	allow most bacteria killed ignore ref to cost / dangerous or harmful unqualified ignore different amounts of disinfectant unless reference to different drop size ignore take longer to work allow reference to anomalous result or not repeated	1 1
Total			**9**

UMS Conversion Calculator: www.aqa.org.uk/umsconversion

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2012

Science A

Unit Biology B1

BL1FP

F

Biology

Unit Biology B1

Tuesday 12 June 2012 9.00 am to 10.00 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8 should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

Answer **all** questions in the spaces provided.

1 The nervous system allows humans to react to their surroundings.

1 (a) Sense organs have receptors. Receptors detect *changes in the environment*.

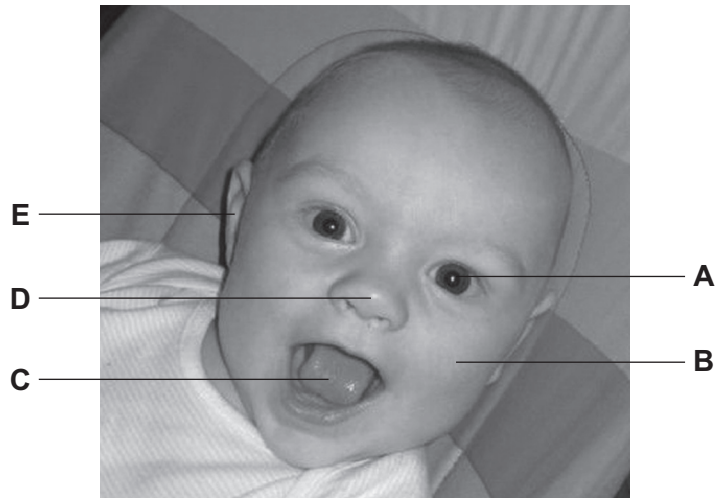
Which word describes *a change in the environment*?

Draw a ring around **one** answer.

an effector **a neurone** **a stimulus**

(1 mark)

1 (b) The photograph shows a baby.
Labels **A**, **B**, **C**, **D** and **E** show some of the baby's sense organs.



Answer each question by writing **one** letter, **A**, **B**, **C**, **D** or **E**, in each box.

1 (b) (i) Which sense organ has receptors sensitive to light? ☐

(1 mark)

1 (b) (ii) Which **two** sense organs have receptors sensitive to chemicals?

☐ and ☐

(2 marks)

1 (b) (iii) Which sense organ has receptors sensitive to changes in the baby's position? ☐

(1 mark)

Do not write outside the box

1 (c) Information from sense organ **A** is passed along nerve cells.
The information is coordinated to produce a response.

Which organ in the body coordinates the information?

.....

(1 mark)

6

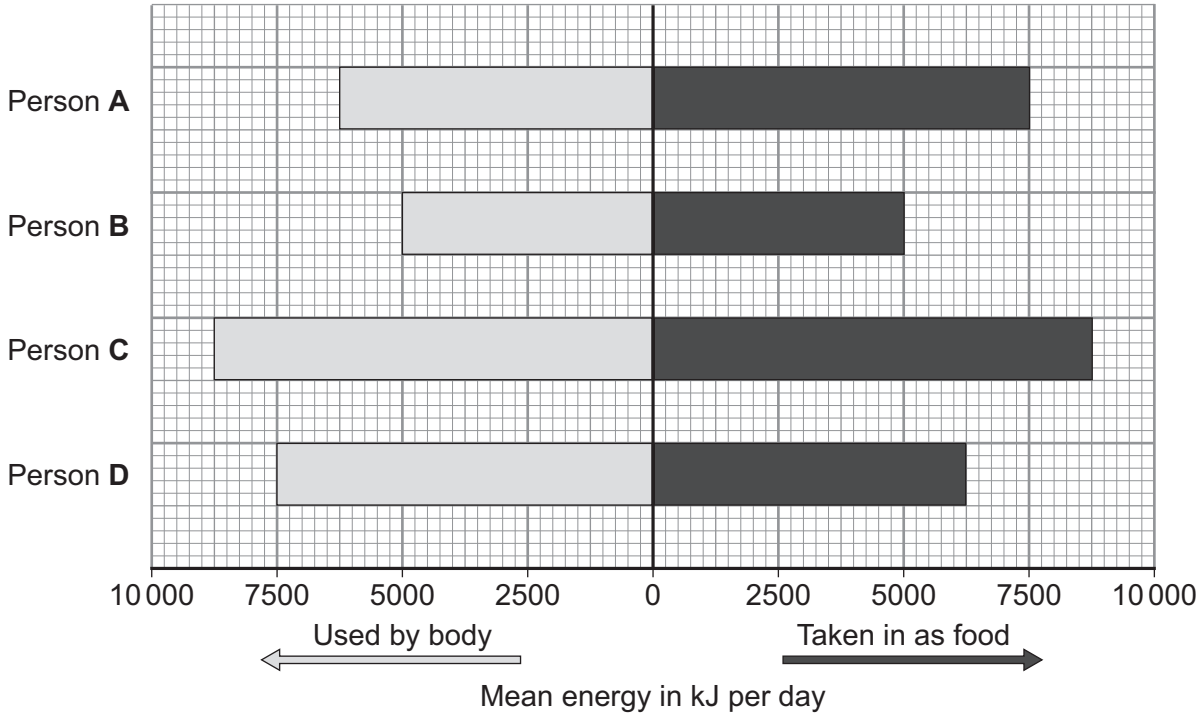
Turn over for the next question

Do not write outside the box

2 Scientists measured the amount of energy used by four people, **A**, **B**, **C** and **D**.

The scientists also measured the amount of energy taken in as food by each person.

The chart shows the scientists' results.



2 (a) (i) What was the mean amount of energy used by **D**?

..... kJ per day
(1 mark)

2 (a) (ii) The amount of energy used by **D** is different from the amounts of energy used by **A**, **B** and **C**.

Suggest **two** reasons why.

.....

.....

.....

.....
(2 marks)

Do not write outside the box

2 (b) The data in the bar chart was collected over twelve months.

Which person, **A**, **B**, **C** or **D**, would gain body mass over the twelve months?

Give a reason for your answer.

.....

.....

.....

.....

(2 marks)

2 (c) In the UK many people are obese.
Doctors advise obese people to lose mass.

Suggest **two** different ways an obese person could lose mass.

.....

.....

.....

.....

(2 marks)

7

Turn over for the next question

Do not write outside the box

3 Green plants are found at the start of all food chains.

3 (a) Complete the sentences.

3 (a) (i) The source of energy for green plants is radiation from the ..... .

(1 mark)

3 (a) (ii) Green plants absorb some of the light energy that reaches them for a process called ..... .

(1 mark)

3 (b) Draw a ring around the correct answer to complete each sentence.

3 (b) (i) This process transfers light energy into

chemical
sound
electrical

energy.

(1 mark)

3 (b) (ii) The process uses the gas

carbon dioxide.
oxygen.
water.

(1 mark)

3 (b) (iii) The process produces carbon-containing compounds called

carbohydrates.
minerals.
salts.

(1 mark)

Do not write outside the box

3 (c) The amount of living material (biomass) at each stage in a food chain is less than at the previous stage.

The diagram shows a food chain.

oak tree ⟶ **caterpillar** ⟶ **blue-tit** ⟶ **hawk**

Give **two** ways in which biomass is lost in this food chain.

Tick (✓) **two** boxes.

As carbon dioxide from the caterpillar ☐

As food eaten by the hawk ☐

As oxygen from the oak tree ☐

As faeces (droppings) from the blue-tit ☐

(2 marks)

7

Turn over for the next question

Do not write outside the box

4 When animals die, they usually fall to the ground and decay.
In 1977 the body of a baby mammoth was discovered.
The baby mammoth died 40 000 years ago and its body froze in ice.

The picture shows the mammoth.



© Ria Novosti/Science Photo Library

4 (a) Explain why the body of the baby mammoth did **not** decay.

.....

.....

.....

.....

(2 marks)

Do not write outside the box

4 (b) Mammoths are closely related to modern elephants.
The pictures show these two animals.

What scientists think a mammoth looked like



© Christian Darkin/Science Photo Library

Modern elephant



Mammoths are *extinct*. What does *extinct* mean?

.....

.....

(1 mark)

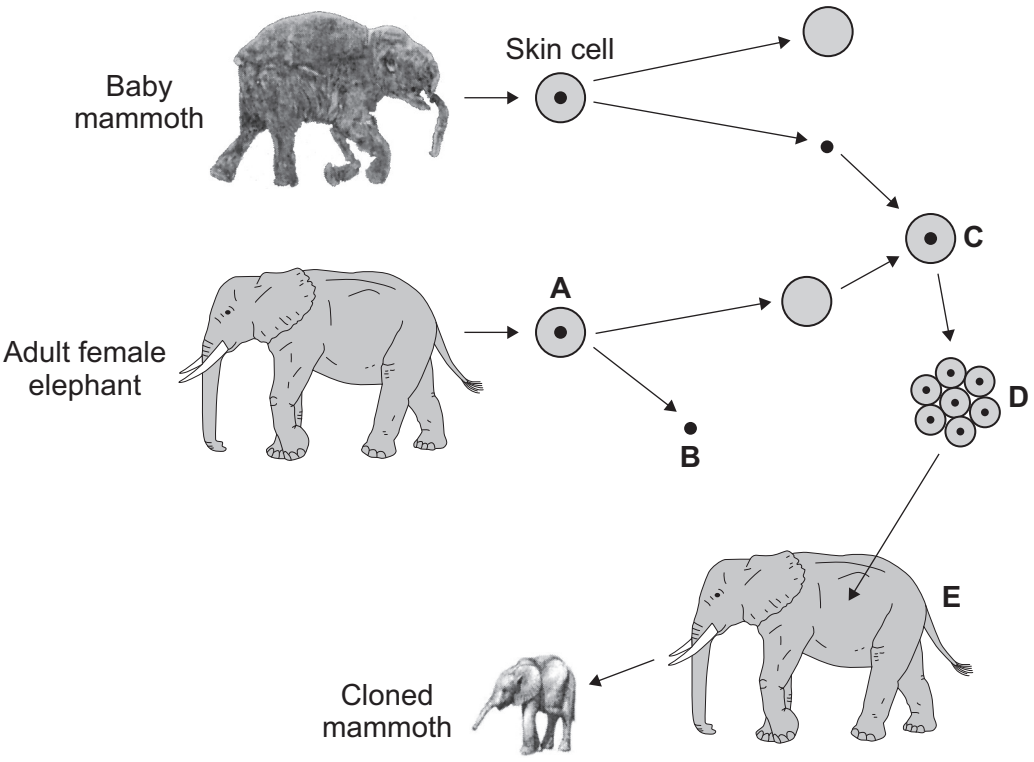
Question 4 continues on the next page

Do not write outside the box

4 (c) Scientists believe they may be able to use adult cell cloning to recreate a living mammoth.

The scientists will use a skin cell from the baby mammoth.

The diagrams show how the skin cell will be used.



In each question, draw a ring around the correct answer.

4 (c) (i) What type of cell is cell **A**?

skin cell **egg cell** **sperm cell**

(1 mark)

4 (c) (ii) Part **B** is removed from cell **A**.

What part of the cell is part **B**?

nucleus **cytoplasm** **cell membrane**

(1 mark)

Do not write outside the box

4 (c) (iii) After cell **C** is formed, it divides into embryo cells.

What is done to cell **C** to make it divide?

Cell **C** is

- treated with enzymes.
- mixed with sperm cells.
- given an electric shock.

(1 mark)

4 (c) (iv) The embryo cells form a ball of cells. The ball of cells will be put into female elephant, **E**.

Which part of elephant **E** is the ball of cells put into?

womb **stomach** **ovary**

(1 mark)

4 (d) The scientists expect any offspring of the adult cell cloning to look like a mammoth and **not** like an elephant.

Why?

.....

.....

(1 mark)

8

Turn over for the next question

Do not write outside the box

5 Thalidomide is a drug that was developed in the 1950s.
In the 1950s some pregnant women took thalidomide to prevent morning sickness during pregnancy.

Today, thalidomide is **not** used to prevent morning sickness.

5 (a) (i) Give **one** medical use of thalidomide, today.

.....

.....

(1 mark)

5 (a) (ii) Today, before a woman is given thalidomide, she is

- checked to see if she is pregnant
- told to use two different methods of contraception at the same time.

Give the reason why:

the woman is checked to see if she is pregnant

.....

.....

the woman is told to use two different methods of contraception at the same time

.....

.....

(2 marks)

5 (b) The information is about two types of contraceptive pill used by women.

Combined pill

- contains two hormones
- is taken for 21 days, then no pills are taken for 7 days
- > 99 % effective at preventing pregnancy
- increases chance of headaches
- increases chance of breast cancer
- decreases chance of cancer of the ovary

Mini-pill

- contains one hormone
- must be taken at the same time every day
- < 99 % effective at preventing pregnancy
- increases chance of breast cancer

Do not write outside the box

5 (b) (i) Which **two** hormones does the combined pill contain?

Draw a ring around **two** answers.

LH **oestrogen** **progesterone** **FSH**

(2 marks)

5 (b) (ii) Give **two** advantages of taking the combined pill and **not** the mini-pill.

.....

.....

.....

.....

(2 marks)

5 (b) (iii) Give **one** advantage of taking the mini-pill and **not** the combined pill.

.....

.....

(1 mark)

8

Turn over for the next question

Do not write outside the box

6 Insecticides are chemicals which kill insects.
Insecticides may be sprayed onto crops to increase crop yield.

6 (a) Killing insects on crops increases crop yield.

Suggest why.

.....

.....

(1 mark)

6 (b) A microorganism contains a gene which causes the production of an insect poison.

Scientists transferred the gene for production of the insect poison into wheat plants.
This makes genetically modified (GM) wheat.

The scientists:

- grew wheat plants with the insect poison gene in fields and in greenhouses
- grew wheat plants without the insect poison gene in fields and in greenhouses
- measured the crop yield of the wheat plants.

The bar chart shows the results.



6 (b) (i) What was the yield of the wheat with the insect poison gene grown in greenhouses?

..... arbitrary units
(1 mark)

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Do not write outside the box

6 (b) (ii) The yield from wheat without the insect poison gene grown in greenhouses was different from the yield you gave in **(b)(i)**.

Describe this difference in yield.

.....

.....

.....

.....

(2 marks)

6 (b) (iii) Look again at the bar chart.

What advice would you give to a farmer about the type of wheat to grow in fields?

Give a reason for your answer.

.....

.....

.....

.....

(2 marks)

6 (c) Some people are concerned about the use of GM crops.

Why?

.....

.....

.....

.....

.....

(2 marks)

8

Do not write outside the box

7 Scientists at a drug company developed a new pain-killing drug, drug **X**.

7 (a) Painkillers do **not** cure infectious diseases.

Why?

.....

(1 mark)

7 (b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**. In their investigation the scientists:

- chose 600 volunteers. The volunteers were all in pain
- gave 200 of the volunteers a standard dose of drug **A**
- gave 200 of the volunteers a standard dose of drug **B**
- gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

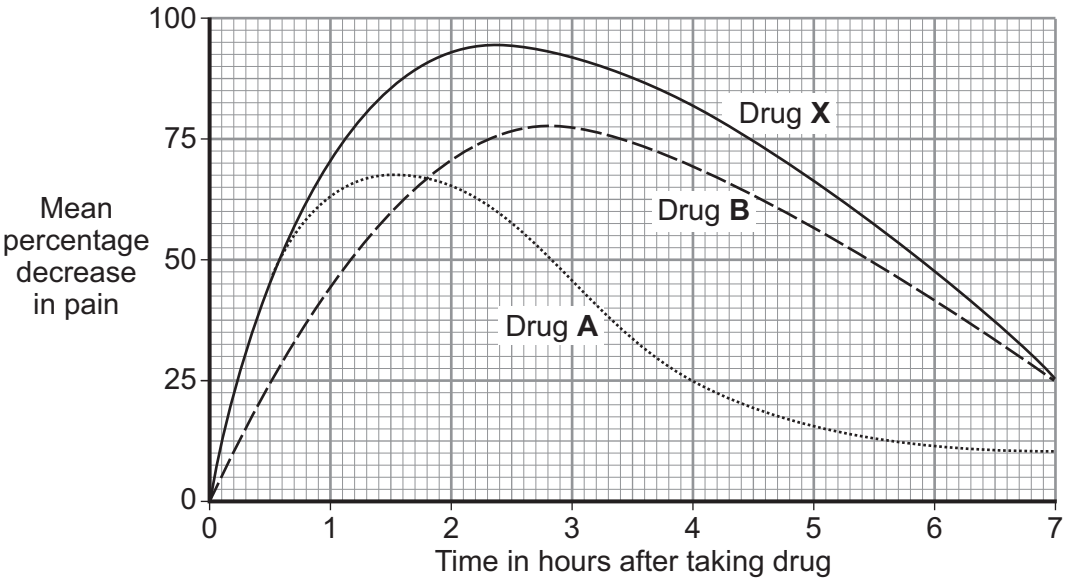
Suggest **two** of the factors that should be matched.

.....

.....

(2 marks)

7 (c) The graph shows the results of the investigation.



Do not write outside the box

7 (c) (i) How much pain did the volunteers still feel, four hours after taking drug **A**?

..... percent
(1 mark)

7 (c) (ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

.....

.....
(1 mark)

7 (c) (iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

.....

.....

.....

.....
(2 marks)

7 (d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

.....

.....

.....

.....

.....

.....

.....
(3 marks)

10

Do not write outside the box

8 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate*.

Plants and animals have become adapted in many different ways to reduce the risk of being eaten by predators.

Describe these adaptations.

Give examples of animals and plants adapted in the ways you describe.

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(6 marks)

6

END OF QUESTIONS

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Version : 10/08/2012



General Certificate of Secondary Education

Science A 4405 / Biology 4401

BL1FP Unit Biology 1

Mark Scheme

2012 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Quality of Written Communication and levels marking

In Question 8 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: Basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: Clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: Detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question 1

question	answers	extra information	mark
1 (a)	a stimulus		1
1 (b)(i)	**A**		1
1 (b)(ii)	**C** **D**	either order	1 1
1 (b)(iii)	**E**		1
1 (c)	brain	allow spinal cord / CNS / central nervous system do **not** allow spine	1
Total			**6**

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Question 2

question	answers	extra information	mark
2 (a)(i)	7500	ignore units	1
2 (a)(ii)	any **two** from: (differences in) • age • gender / sex • activity / amount of exercise • metabolism / metabolic rate • genetic differences • body weight / mass / size / physique • pregnancy • proportion of muscle to fat	if examples given they must be correct allow job / lifestyle ignore fitness / health / medication allow BMR allow BMI	2
2 (b)	**A** more energy taken in than used	if box empty, allow in explanation accept more food taken in than used allow correct numbers if comparative ignore incorrect numbers if comparison correct	1 1

Question 2 continues on the next page . . .

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Question 2 continued

question	answers	extra information	mark
2 (c)	eat less (food / carbohydrates / fat / calories)	accept a medical treatment such as gastric band / slimming pills / liposuction ignore balanced / healthy / diet allow go to weight watchers etc. ignore burn off more	1
	exercise (more) **or** go to the gym		1
Total			**7**

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Question 3

question	answers	extra information	mark
3 (a)(i)	sun	ignore light apply list principle	1
3 (a)(ii)	photosynthesis	apply list principle allow approximate spelling do **not** accept phototropism	1
3 (b)(i)	chemical		1
3 (b)(ii)	carbon dioxide		1
3 (b)(iii)	carbohydrates		1
3 (c)	As carbon dioxide from the caterpillar As faeces (droppings) from the blue-tit	if more than 2 boxes ticked deduct one mark for each additional incorrect box	1 1
Total			**7**

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Question 4

question	answers	extra information	mark
4 (a)	too cold / very cold **or** oxygen / microbes cannot reach it	allow not enough energy / heat / warmth ignore frozen	1
	for microorganisms / microbes / bacteria / fungi / enzyme / reaction (to work)	ignore other consumers	1
4 (b)	no longer exist **or** no more left **or** died out / all died	ignore died unqualified	1
4 (c)(i)	egg cell		1
4 (c)(ii)	nucleus		1
4 (c)(iii)	given an electric shock		1
4 (c)(iv)	womb		1
4 (d)	has mammoth genes / chromosomes	accept genetic information / DNA / alleles / nucleus accept converse	1
Total			**8**

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Question 5

question	answers	extra information	mark
5 (a)(i)	any **one** from: • as a sleeping pill • treating leprosy	ignore cancer / AIDS do **not** accept morning sickness	1
5 (a)(ii)	thalidomide causes birth defects / abnormalities / described to be (more) sure of not getting pregnant	in this order ignore kill / harm / damage baby allow to be certain there is no baby **or** in case one doesn't work	1 1
5 (b)(i)	oestrogen progesterone		1 1
5 (b)(ii)	any **two** from: • reduce chances of <u>ovarian</u> cancer • <u>more</u> effective (in preventing pregnancy) • no pills (to remember) for 7 days (out of every 28) • doesn't have to be taken at the same time every day	allow only taken for 21 days (out of 28)	2
5 (b)(iii)	less chance of headaches **or** less chance of forgetting	ignore won't get headaches allow lower dose of hormone allow fewer side effects ignore only contains one hormone	1
Total			**8**

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Question 6

question	answers	extra information	mark
6 (a)	insects don't eat / damage crop	allow idea of insects carrying plant disease	1
6 (b)(i)	60		1
6 (b)(ii)	lower (yield)	accept 'higher' if answer clearly refers to wheat with transferred gene allow yield is only 52 **or** goes down to 52	1
	by 8 (arbitrary units)	accept ecf from (b)(i) for **2** marks	1
6 (b)(iii)	grow / use wheat without insect poison (gene)		1
	higher yield (in fields)	accept bigger crop / more wheat ignore grows better	1
6 (c)		ignore unnatural / unethical / against religion unqualified	
	(concerned about)	accept specific examples given	
	effect on populations of (wild) flowers / insects	ignore harms the environment	1
	effect of eating GM crops on human health	allow harmful to humans if eaten	1
Total			**8**

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Question 7

question	answers	extra information	mark
7 (a)	don't kill pathogens / bacteria / viruses / microbes / microorganisms	allow don't contain antibiotics ignore antibodies / attack / fight allow only treat symptoms / pain ignore kill disease / germs	1
7 (b)	any **two** from: • age • gender • extent / severity of pain **or** how long had pain before trial • type of pain / illness / site of pain • (body) mass / weight / height • other medical issues / drugs taken / health / fitness • ethnicity	accept 'the pain' for **1** mark, if neither extent or type given ignore pain threshold allow body size / physique	2
7 (c)(i)	75	ignore calculations / %	1
7 (c)(ii)	faster pain relief / decrease	allow pain relief sooner **or** it works quicker **or** more pain relief at start / in first 1 / $1\frac{3}{4}$ hours	1
7 (c)(iii)	decrease of pain higher / more decrease of pain is longer lasting	ignore more effective unless qualified by time >$1\frac{3}{4}$ hours allow effect lasts longer	1 1

Question 7 continues on the next page . . .

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BL1FP

Question 7 continued

question	answers	extra information	mark
7 (d)	any **three** from: **(Yes because)** • rapid pain relief (from A) • long lasting pain relief (from B) • and it costs less • the sum of the pain relief (from A + B) is greater (than X) **(No because)** • drug X gives more pain relief • (A + B / they) might interact with each other • could result in overdose • could be more / new side effects	ignore yes or no if neither points gained allow (more) dangerous	3
Total			**10**

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Question 8

question	information			mark
8	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2, and apply a 'best-fit' approach to the marking.			6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**	
No relevant content.	There is at least one example of an adaptation of either an animal **or** a plant. However it may not be clear how the adaptation helps the organism to avoid being eaten.	There is a description of an adaptation of at least one animal **and** at least one plant. It is clear how at least one of these adaptations helps the organism to avoid being eaten.	There are clear and detailed descriptions of a range of adaptations of named animals **and** named plants. It is clear how most of these adaptations help the organisms to avoid being eaten.	
examples of clear and detailed biology points made in response: • **camouflage** – the method of camouflage should be described plus a statement that the predator is less likely to see the prey • **mimicry / warning colouration** – the method should be described plus a statement that the predator is likely to confuse the prey with e.g. a poisonous organism • **thorns / prickles / spines / horns** – a statement that these are sharp and are likely to hurt a predator • **long limbs / streamlining** – a statement that these increase speed and make it more likely that prey will outrun predator • **bad taste** / **poison** – a statement that predator will find this unpleasant and 'spit out' prey / not attack same prey again • **large ears / position of eyes** – a statement that predators will be detected earlier so the prey can escape sooner				
Total				**6**

UMS Conversion Calculator www.aqa.org.uk/umsconversion

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
January 2012

Science A
Unit Biology B1

BL1FP

F

Biology
Unit Biology B1

Thursday 12 January 2012 9.00 am to 10.00 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 7(b) should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

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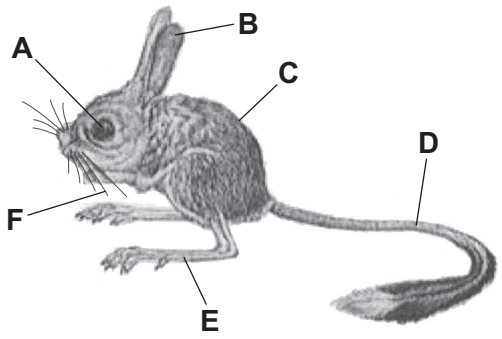
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ANSWER IN THE SPACES PROVIDED

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Answer **all** questions in the spaces provided.

1 The drawing shows a jerboa. Jerboas live in sandy deserts.



Jerboas sleep in underground holes during the hot day and come out during the cold night.

The jerboa's main food is small insects which run across the surface of the sand.

For each question write the correct letter in the box.

Which structure, **A**, **B**, **C**, **D**, **E** or **F**:

1 (a) helps to insulate the jerboa ☐

(1 mark)

1 (b) helps the jerboa to detect insects on a dark night ☐

(1 mark)

1 (c) helps the jerboa to hop quickly to catch an insect ☐

(1 mark)

1 (d) helps the jerboa to keep its balance when hopping ☐

(1 mark)

1 (e) helps the jerboa to know the width of its underground hole in the dark? ☐

(1 mark)

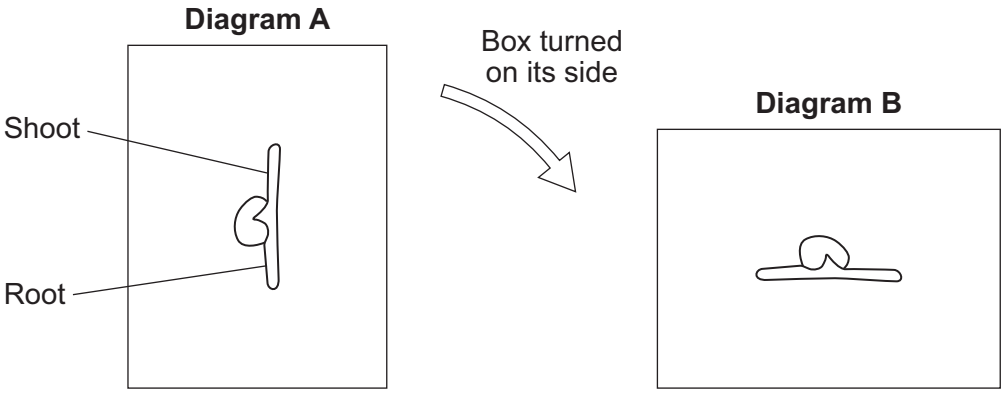
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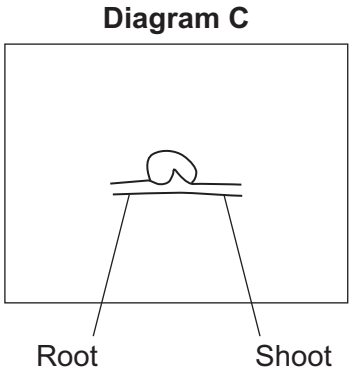
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2 A student investigated growth responses in plants.

The student grew a bean seed in a box filled with moist soil, as shown in **Diagram A**. After the seed had started to grow, the box was turned onto its side and placed in a dark room, as shown in **Diagram B**.



2 (a) Complete **Diagram C** to show what the root and shoot will look like three days later.



(2 marks)

2 (b) Draw a ring around the correct answer to complete the sentence.

The results of the investigation show that the root is sensitive to

light.
moisture.
gravity.

(1 mark)

Do not write outside the box

2 (c) A hormone in the plant causes the growth responses.

What is the name of this hormone?

Tick (✓) **one** box.

Auxin ☐

Statin ☐

Steroid ☐

(1 mark)

2 (d) Gardeners can use some plant hormones as weed killers.

2 (d) (i) Give **one different** use of plant hormones by gardeners.

.....

.....

(1 mark)

2 (d) (ii) Selective weed killers only kill some plants in a garden.

Killing weeds in a garden reduces competition between plants.

Give **three** factors that plants compete for.

1 .....

2 .....

3 .....

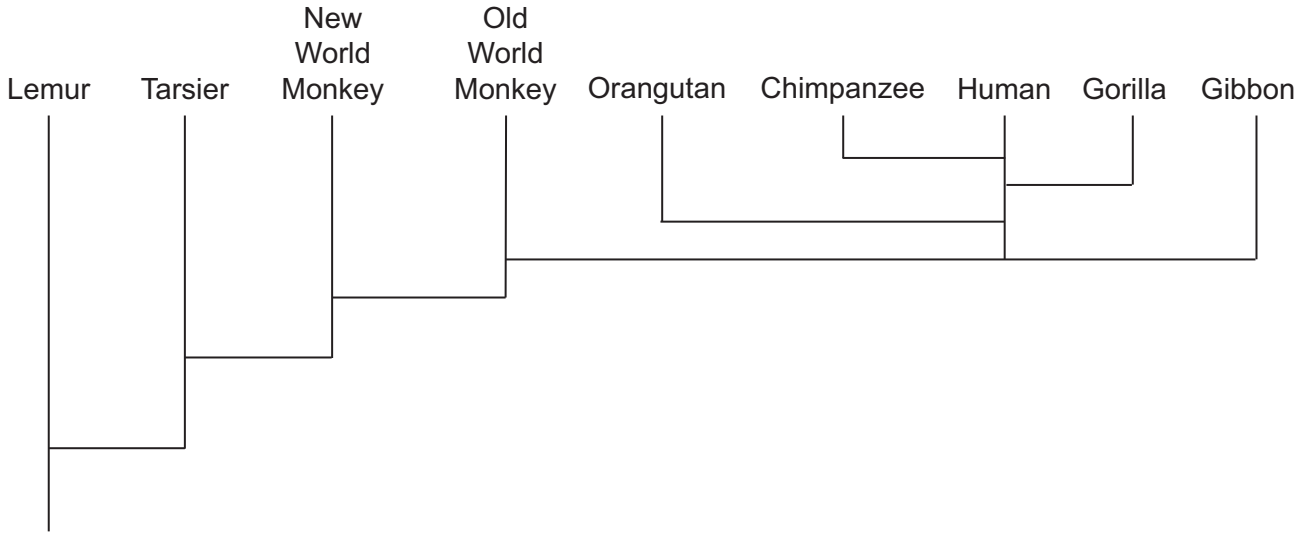
(3 marks)

8

Turn over for the next question

Do not write outside the box

3 The diagram shows the evolution of a group called the primates.



3 (a) Which primate evolved first?

.....

(1 mark)

3 (b) Name **two** primates that developed most recently from the same common ancestor as humans.

1 .....

2 .....

(2 marks)

3 (c) (i) The theory of evolution by natural selection was suggested in the 1800s.

Which scientist suggested this theory?

.....

(1 mark)

Do not write outside the box

3 (c) (ii) Use words from the box to complete the passage about natural selection.

evolution	**environment**	**generation**
mutate	**survive**	**variation**

Individual organisms of a species may show a wide range of

..... because of differences in their genes.

Individuals with characteristics most suited to the .....

are more likely to ..... and breed successfully.

The genes that have helped these individuals to survive are then passed on to the

next ..... .

(4 marks)

8

Turn over for the next question

Do not write outside the box

4 The table is from a packet of biscuits.

Average values	Per 100 g	Per biscuit	UK guideline daily amounts	
			Adults	Children (5 – 10 years)
Energy	1974 kJ	446 kJ	8500 kJ	7500 kJ
Protein	7.1 g	1.1 g	45 g	24 g
Carbohydrate	62.8 g	9.3 g	230 g	220 g
Fat	21.3 g	3.2 g	70 g	70 g
Sodium	3.6 g	0.5 g	2.4 g	1.4 g

One day a ten-year-old child ate a whole packet of the biscuits.
The biscuits in the pack had a mass of 400 g.

4 (a) (i) How many grams of carbohydrate did the child eat?

.....

.....

Number of grams .....

(2 marks)

4 (a) (ii) The amount of carbohydrate you calculated in part (a)(i) was more than the UK guideline daily amount for the child.

How much more?

.....

.....

Number of grams .....

(1 mark)

4 (b) Give **two** possible health effects on the child of eating so many biscuits every day.

1 .....

2 .....

(2 marks)

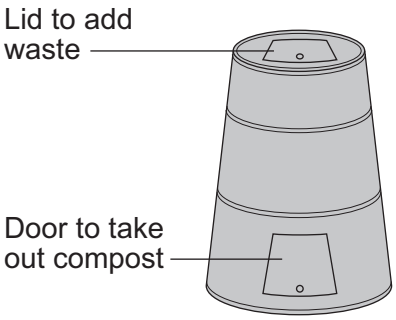
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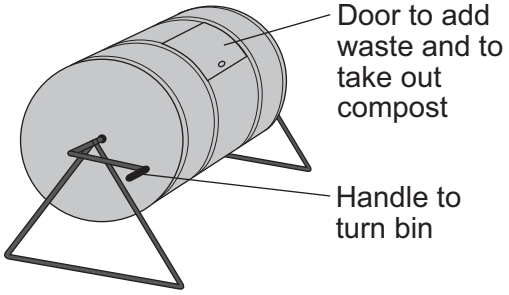
5 Garden waste can be recycled.
One way of recycling garden waste is to use a compost bin.

The diagram shows two types of compost bin.
Each bin can contain the same amount of waste.

Fixed compost bin



Tumbler compost bin



Information about the compost bins is given below.

Fixed compost bin

- Compost can be taken out after two years.
- The bin costs about £40.
- The bin takes up an area of 1 m^2.

Tumbler compost bin

- The bin is turned twice a day using the handle.
- Six weeks later compost can be taken out.
- The bin costs about £80.
- The bin takes up an area of 2 m^2.

5 (a) A gardener is buying a compost bin.

5 (a) (i) Give **one** advantage to the gardener of buying a tumbler compost bin and not a fixed compost bin.

.....

.....

(1 mark)

5 (a) (ii) Give **two** advantages to the gardener of buying a fixed compost bin and not a tumbler compost bin.

1 .....

2 .....

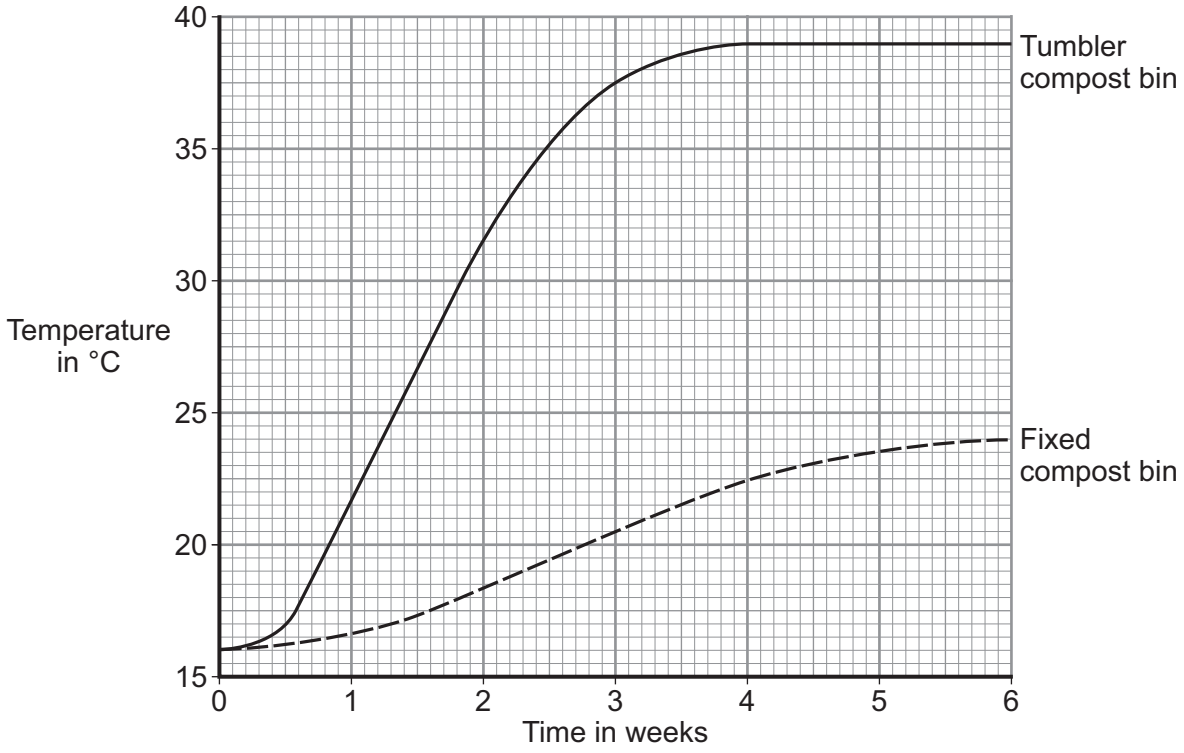
(2 marks)

Question 5 continues on the next page

Turn over ▶

Do not write outside the box

5 (b) The same amounts of waste were added to the two types of bin.
The graph shows the temperature in the bins in the first six weeks after the waste was added.



5 (b) (i) Give **two** differences between the results for the tumbler compost bin and the fixed compost bin.

1 .....

.....

2 .....

.....

(2 marks)

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Do not write outside the box

5 (b) (ii) Complete the sentences.

The waste is converted into compost by organisms

called ..... .

The conversion of waste into compost works best in warm, moist

and ..... conditions.

(2 marks)

5 (b) (iii) There was a big difference in the final temperatures in the two bins.

Suggest an explanation for this temperature difference.

.....

.....

.....

.....

(2 marks)

9

Turn over for the next question

Do not write outside the box

6 Nicotine is a drug in tobacco smoke. Smoking tobacco is harmful.

6 (a) (i) Many smokers find it difficult to stop smoking.

Complete the sentence.

It is difficult to stop smoking because nicotine is very ..... .

(1 mark)

6 (a) (ii) Nicotine affects synapses in the brain.

What is a synapse?

.....

.....

(1 mark)

6 (b) A drug company has developed a new drug, Drug **A**, to help people stop smoking.

Doctors tested the drug in a double-blind trial with over 2000 volunteers who were smokers.

The volunteers wanted to stop smoking.

The volunteers were divided into three groups. Each volunteer took a tablet once a day for 12 weeks:

- group 1 took Drug **A**
- group 2 took Drug **B** (a drug already in use to stop people smoking)
- group 3 took a placebo.

The smoking habits of each group were recorded for a year.

6 (b) (i) What is a placebo?

.....

(1 mark)

6 (b) (ii) Why is a placebo group used in drug trials?

.....

.....

(1 mark)

Do not write outside the box

6 (b) (iii) Which people knew what was in each tablet, in this trial?

Tick (✓) **one** box.

Both doctors and volunteers ☐

Doctors but not volunteers ☐

Neither doctors nor volunteers ☐

(1 mark)

6 (b) (iv) It is important that the three groups of volunteers should be similar.

Give **two** factors that should be similar in the groups of volunteers.

1 .....

2 .....

(2 marks)

6 (c) The table shows the results of the trials.

Tablet	Percentage of volunteers who had stopped smoking	
	After 12 weeks	After 1 year
Drug **A**	44	23
Drug **B**	30	15
Placebo	18	10

A doctor looked at the results of the tests.

The doctor suggested that a smoker who wanted to give up smoking should use Drug **A**.

Why?

.....

.....

(1 mark)

8

Turn over ▶

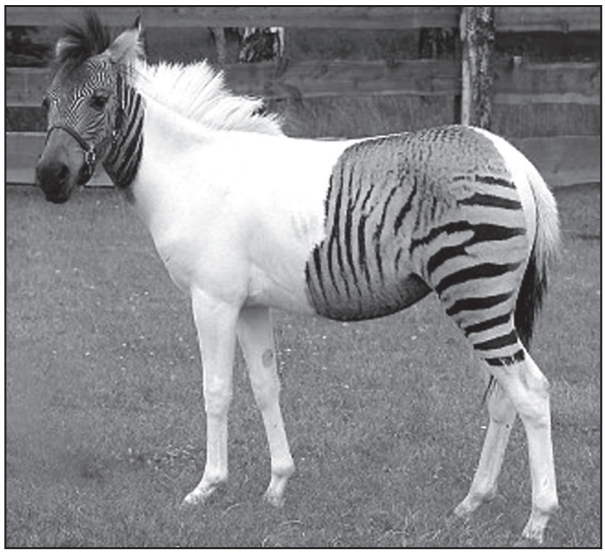
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7 The photograph shows a zorse.



A zorse is a cross between a male zebra and a female horse.
The zorse has characteristics of both parents.

7 (a) The zorse was produced by *sexual reproduction*.

7 (a) (i) What is *sexual reproduction*?

.....

.....

(1 mark)

7 (a) (ii) The zorse has characteristics of a zebra and a horse.

Why?

.....

.....

.....

.....

(2 marks)

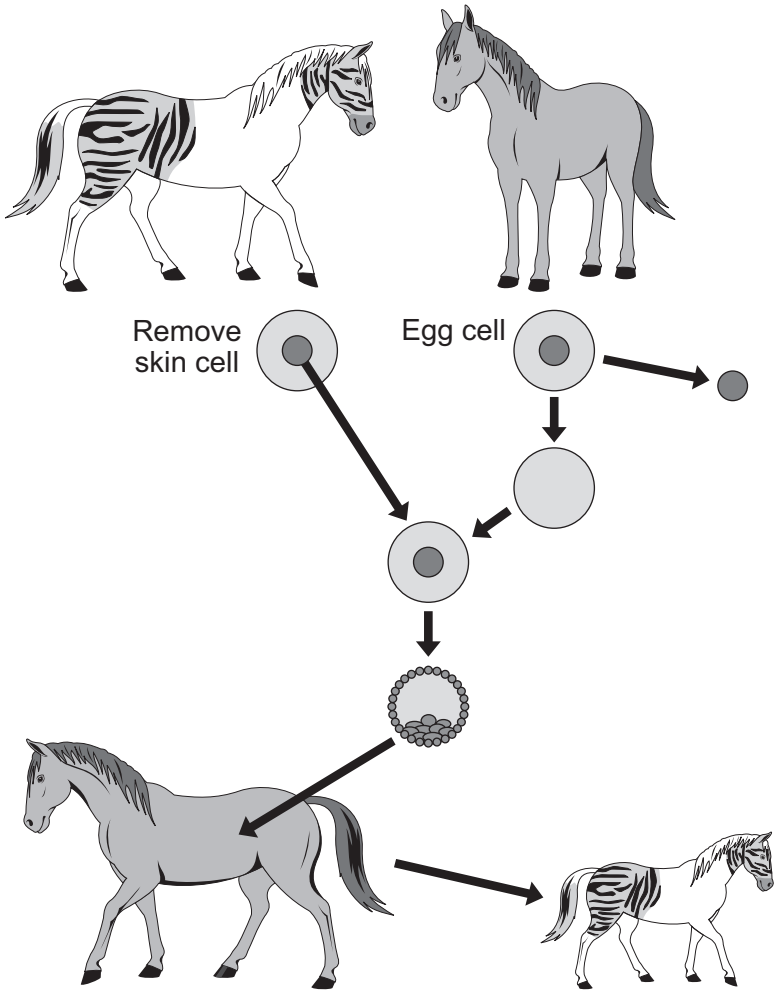
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7 (b) Zorses are **not** able to breed.
Scientists could produce more zorses from this zorse by adult cell cloning.

The diagram shows how the scientists might clone a zorse.



Do not write outside the box

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Use information from the diagram and your own knowledge to describe how adult cell cloning could be used to clone a zorse.

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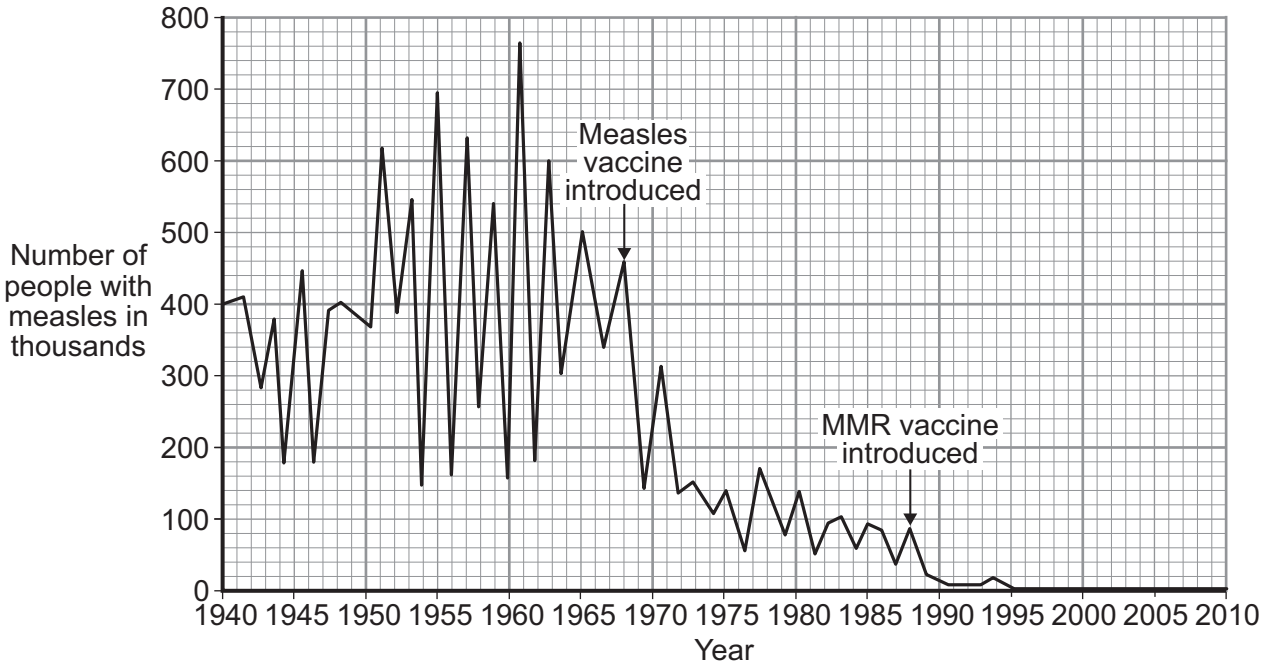
(6 marks)

9

Turn over for the next question

Do not write outside the box

8 The graph shows the number of people with measles in the UK between 1940 and 2010.



8 (a) Compare how effective introducing the measles vaccine was with introducing the MMR vaccine.

Use data from the graph.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

Do not write outside the box

8 (b) The MMR vaccine was introduced in 1988.

Other than measles, which **two** diseases does the MMR vaccine protect against?

1 ..... 2 .....

(2 marks)

8 (c) To immunise someone against measles, a small quantity of the inactive measles pathogen is injected into the body.

Describe what happens in the body after immunisation to stop a person catching measles in the future.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

8

END OF QUESTIONS

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Version : 07/03/2012

General Certificate of Secondary Education

Science A 4405 / Biology 4401

BL1FP Unit Biology 1

Mark Scheme

2012 examination – January series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Quality of Written Communication and levels marking

In Question 7(b) students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: Basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: Clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: Detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question 1

question	answers	extra information	mark
1(a)	C		1
1(b)	B		1
1(c)	E		1
1(d)	D		1
1(e)	F		1
Total			**5**

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Question 2

question	answers	extra information	mark
2(a)	diagram to show root growing down	allow single lines **or** not attached **or** open ends for both marks all branches must go down	1
	diagram to show shoot growing up	all branches must go up	1
2(b)	gravity		1
2(c)	Auxin		1
2(d)(i)	rooting / cuttings	accept other suggestions, eg fruit set / ripening do **not** accept weed killers	1
2(d)(ii)	any **three** from: • light • water / moisture • nutrients / ions / minerals • space / area	 ignore sun / energy accept one named mineral ignore nutrition / food ignore soil / land / territory / volume ignore reference to gases	3
Total			**8**

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Question 3

question	answers	extra information	mark
3(a)	lemur(s)		1
3(b)	gorilla(s)	in either order	1
	chimpanzee(s)	accept chimps	1
3(c)(i)	(Charles) Darwin	accept (Alfred) Wallace if first name given it must be correct	1
3(c)(ii)	variation	in this order	1
	environment	allow phonetic spellings	1
	survive		1
	generation		1
Total			**8**

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Question 4

question	answers	extra information	mark
4(a)(i)	251.2	award **2** marks for correct answer, irrespective of working. if incorrect or no answer 62.8 x 4 or equivalent gains **1** mark	2
4(a)(ii)	31.2	allow ecf from (a)(i); answer to (a)(i) – 220	1
4(b)	any **two** from: • overweight / obesity **or** increased BMI • (Type 2) diabetes • high blood pressure • cardiovascular / heart disease **or** heart problems **or** disease of blood vessels **or** clogged arteries • high cholesterol • arthritis / worn joints • tooth decay	 allow get fat ignore get heavier allow high blood sugar	2
Total			**5**

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Question 5

question	answers	extra information	mark
5(a)(i)	(compost produced) quicker / faster / takes less time	it = tumbler bin answers should be comparative eg **only** 6 weeks = 1 mark 6 weeks = 0 marks	1
5(a)(ii)	any **two** from: • takes less space • cheaper (to buy) • don't need to turn / rotate it	it = fixed bin references to space and cost should be comparative do **not** accept unqualified data	2
5(b)(i)	any **two** from: • faster rise (in tumbler) • higher (in tumbler) **or** 2 correct number readings • levels off (in tumbler) **or** continues to rise in fixed	it = tumbler bin ignore eg faster compost	2
5(b)(ii)	microorganisms / microbes / decomposers aerobic	allow bacteria / fungi / detritus feeders / worms / other named examples of detritus feeders / mould allow air(y) allow oxygen(ated)	1 1

Question 5 continues on the next page . . .

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Question 5 continued

question	answers	extra information	mark
5(b)(iii)	faster respiration / decay / **or** microorganisms / microbes / decomposers work faster (in tumbler)	allow converse allow bacteria / fungi / mould	1
	so more heat produced (in tumbler) **OR** more air / more oxygen(ation) (in tumbler) (1) so more respiration / faster decay / bacteria work faster (in tumbler) (1)	ignore heat produced by friction	1
Total			**9**

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BL1FP

Question 6

question	answers	extra information	mark
6(a)(i)	addictive	allow addicting / addict / addicted / addiction or similar allow phonetic spelling do **not** accept **/** additive / addition	1
6(a)(ii)	junction / gap / space between neurones	allow nerve cells / nerves for neurones allow idea where neurones / nerve cells / nerves meet / join	1
6(b)(i)	tablet with no drug	accept answers that convey this idea eg fake / dummy / sugar pill allow injection with no drug ignore drugs that don't work.	1
6(b)(ii)	for comparison	accept to see if drug / it works allow to see psychological effect **or** make sure, it is not all in the mind allow as a control ignore 'to make test fair / unbiased'	1
6(b)(iii)	Neither doctors nor volunteers		1

Question 6 continues on the next page . . .

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BL1FP

Question 6 continued

question	answers	extra information	mark
6(b)(iv)	any **two** from: • age (range) • sex / gender (mix) • previous smoking habits **or** eg number smoked (before trial) **or** length of time smoked • number in the group • other drugs being taken **or** general health **or** height / weight / BMI / lifestyle / fitness	ignore factors already controlled ignore reference to all smokers **or** all want to give up	2
6(c)	higher percentage / number of smokers who had stopped smoking (than Drug B)	answers must refer to data and be comparative allow best results / most effective ignore best drug unqualified ignore references to 12 weeks / 1 year	1
Total			**8**

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Question 7

question	answers	extra information	mark
7(a)(i)	fusion / joining / combining of gametes / egg **and** sperm / sex cells	accept fertilisation allow fusion / joining / combining DNA from two parents ignore meeting / coming together / mixing of gametes etc	1
7(a)(ii)	(mixture of) genes / DNA / genetic information / chromosomes from both parents / horse **and** zebra	ignore nucleus / inherited information but allow second mark if given dependent on sensible attempt at 1st mark	1 1

Question 7 continues on the next page . . .

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Question 7 continued

7(b)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2, and apply a 'best-fit' approach to the marking.		
0 marks	**Level 1 (1–2 marks)**	**Level 2 (3–4 marks)**	**Level 3 (5–6 marks)**
No relevant content	There is simple description of the early stages of adult cell cloning. However there is little other detail and the description may be confused or inaccurate.	There is an almost complete description of the early stages of the process and description of some aspects of the later stages. The description may show some confusion or inaccuracies.	There is a clear, detailed and accurate description of all the major points of how adult cell cloning is carried out.
Examples of Biology points made in the response could include: • skin cell from zorse • (unfertilised) egg cell from horse • remove nucleus from egg cell • take nucleus from skin cell • put into (empty) egg cell • (then give) electric shock • (causes) egg cell divides / embryo formed • (then) place (embryo) in womb / uterus			6

Total			**9**

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Question 8

question	answers	extra information	mark
8(a)	both lead to reduction / fall (in measles cases)	can be implied	1
	measles vaccine caused a big drop **or** correct use of figures		1
	MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures.		1
8(b)	mump(s)	either order	1
	rubella / german measles	allow phonetic spelling	1
8(c)	white blood cells	allow lymphocytes / leucocytes ignore memory cells	1
	(wbc) produce antibodies	ignore antitoxins / antigens / antibiotics / engulfing	1
	in future / if re-infected antibody production rapid / fast(er) / quick(er)	allow ecf from antitoxins / antigens / antibiotics ignore engulfing ignore reference to specificity	1
Total			**8**

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