

New Specification



Rewarding Learning

General Certificate of Secondary Education
2012

Biology

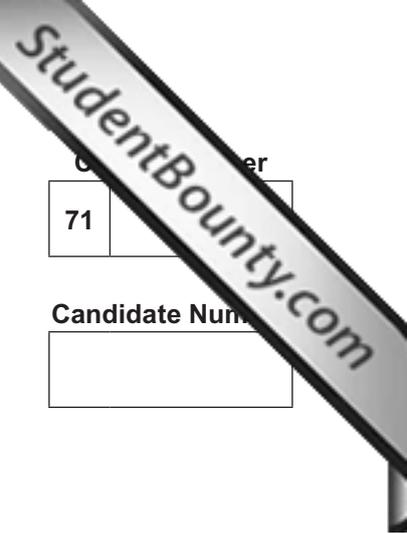
Unit 1

Higher

[GBY12]



WEDNESDAY 30 MAY, AFTERNOON



Centre Number
71

Candidate Number

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Use blue or black ink.

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

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

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in questions **4**, **7(c)** and **12(c)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Total Marks	
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7710

2 The nervous and hormonal systems carry information from one part of the body to another.

(a) Describe how the nervous and hormonal systems differ in the type of signal they use.

Nervous _____ [1]

Hormonal _____ [1]

(b) The table shows the relationship between the diameter of a neurone and the speed of conduction.

Organism	Neurone diameter/ μm	Speed of conduction/ m s^{-1}
Cat	1	3
Crab	30	5
Worm	50	30
Squid	500	35

(i) Describe the relationship between the diameter of a neurone and the speed of conduction.

_____ [1]

(ii) Suggest why the large diameter of the squid's neurones helps it to escape predation by whales.

_____ [1]

Examiner Only	
Marks	Remark

3 When investigating the energy requirements of boys and girls with a normal activity level, a scientist found the following table in a research document.

Age/years	Energy requirement/kJ per day	
	Boys	Girls
1–3	5 150	4 878
4–6	7 180	6 469
7–10	8 248	7 285
11–14	9 295	7 725
15–18	11 535	8 834

(a) What conclusions can be reached from these results?

[2]

(b) A thirteen year old boy with normal activity level has a daily energy intake of 9500 kJ.

Describe **two** ways the boy’s adult health may be affected by this daily energy intake.

[2]

(c) Explain why the energy requirements change when a woman becomes pregnant.

[1]

Examiner Only	
Marks	Remark

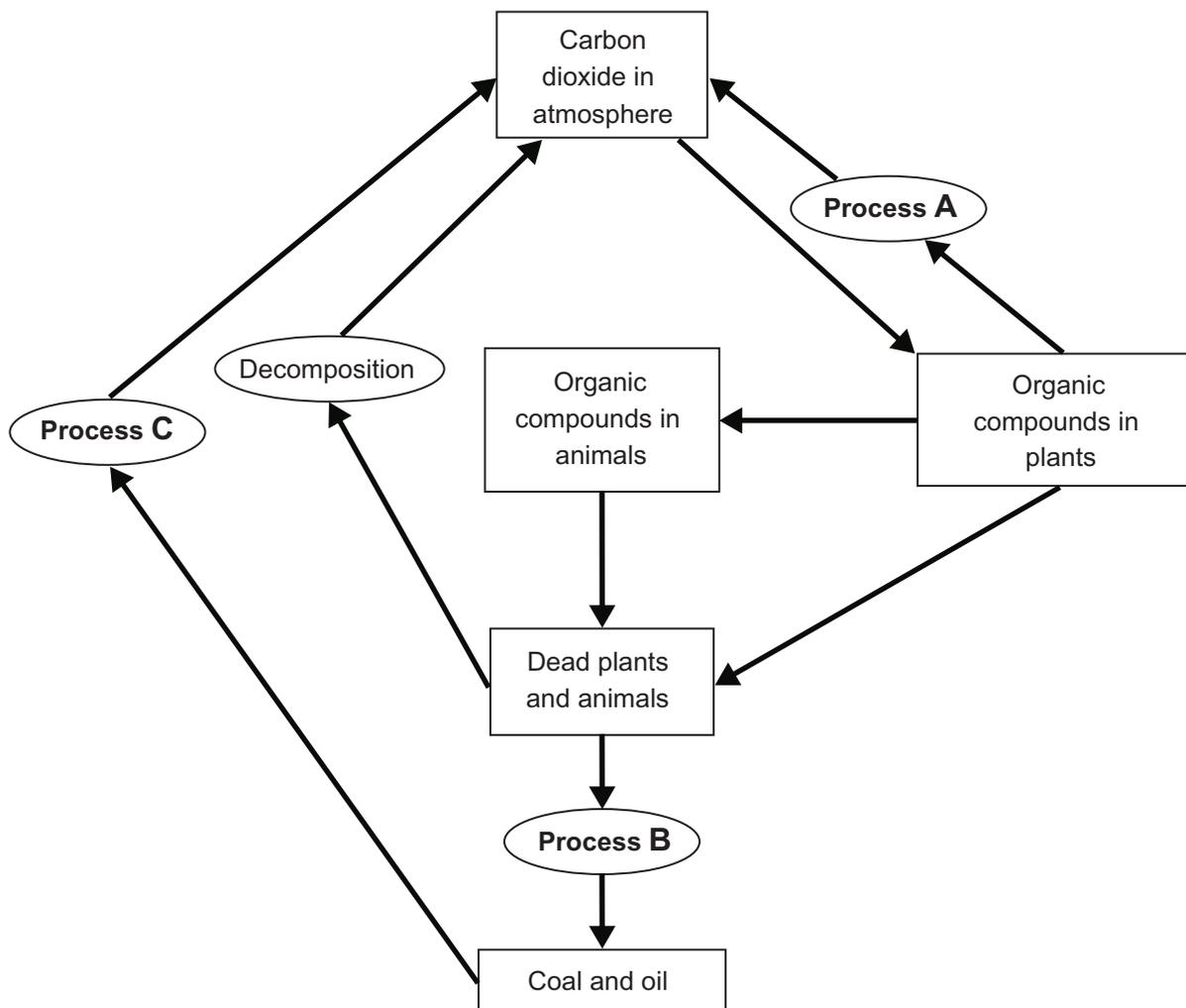
Human health can be affected by the quantity of food eaten, healthy food choices and infections by microorganisms.

(d) Give **one other** factor which affects human health.

_____ [1]

Examiner Only	
Marks	Remark

5 The diagram shows some of the processes of the carbon cycle.



(a) (i) Name processes A, B and C.

A _____ [1]

B _____ [1]

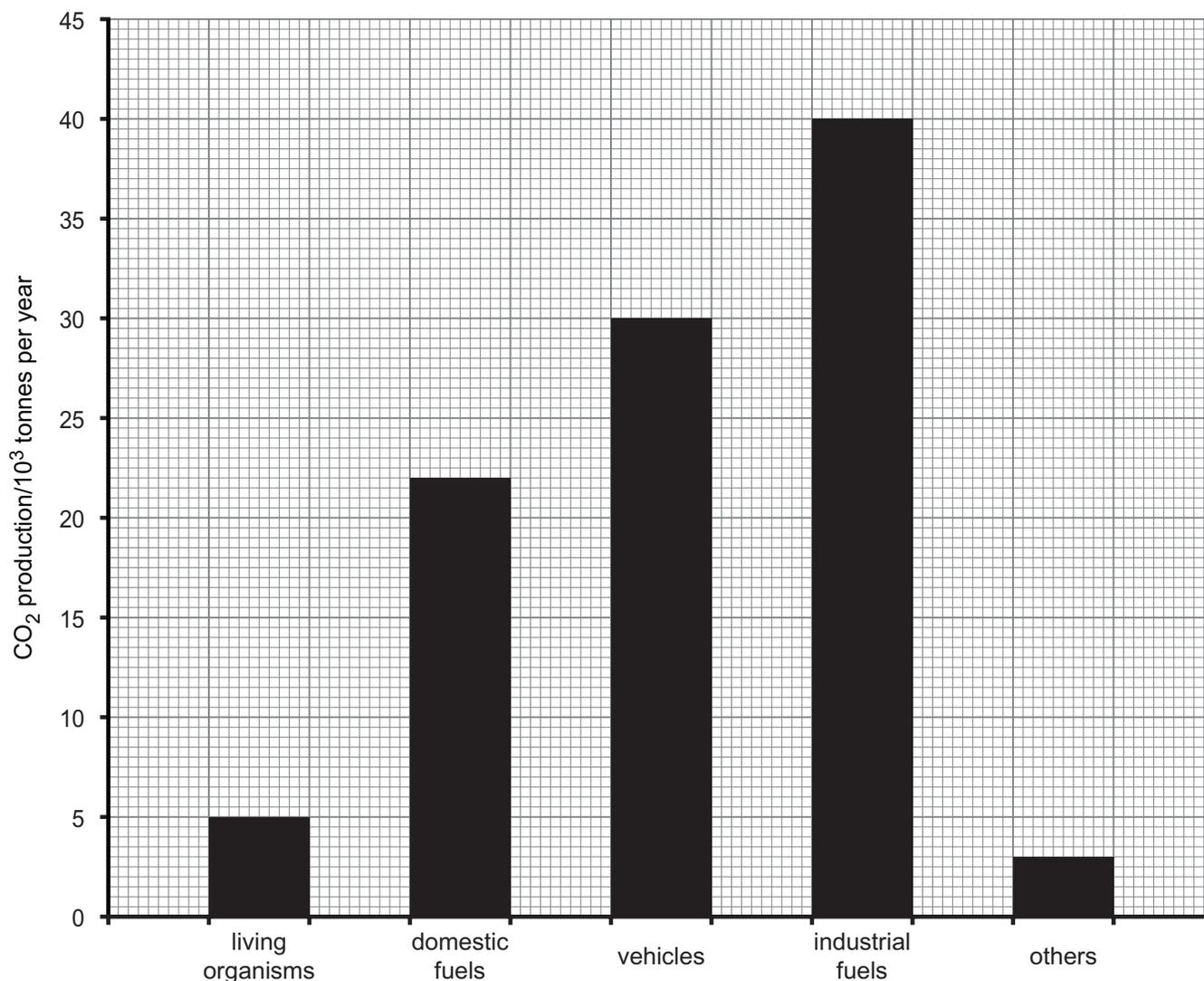
C _____ [1]

(ii) Name the only process which decreases the carbon dioxide in the atmosphere.

_____ [1]

Examiner Only	
Marks	Remark

(b) The graph shows the annual amount of carbon dioxide emissions produced by five different sources in a city.



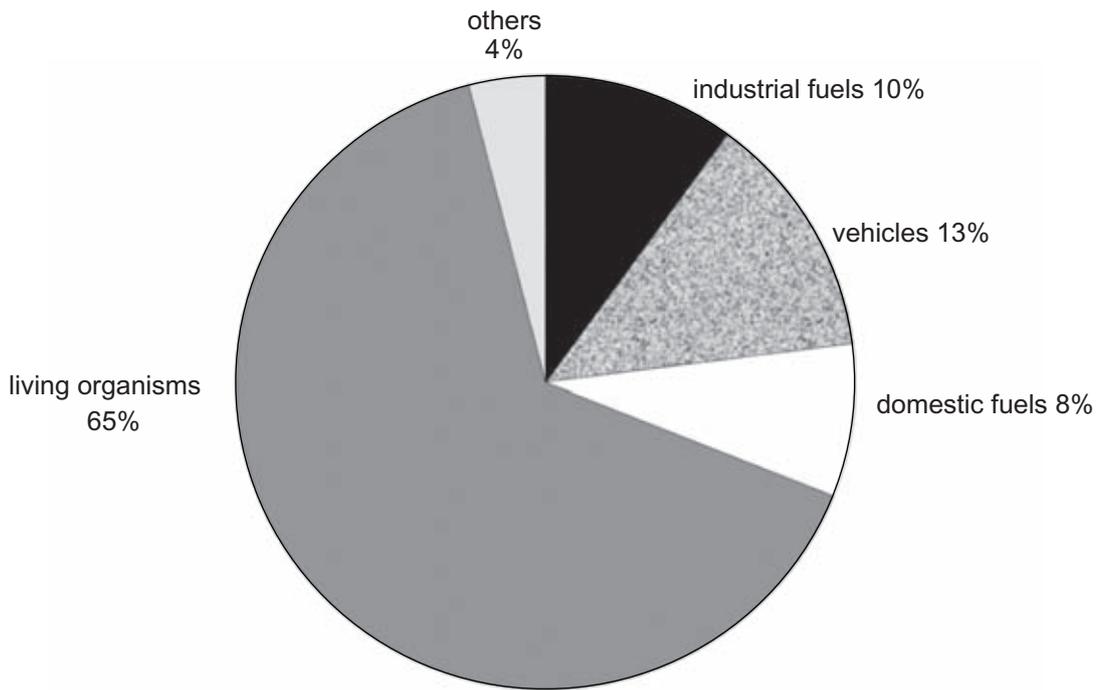
(i) Calculate the percentage of the total carbon dioxide emissions that is produced by domestic fuels.

Show your working.

Answer _____ [2]

Examiner Only	
Marks	Remark

The pie chart shows the annual amount of carbon dioxide produced by the same five sources in the countryside.



(ii) Explain **two** differences between the carbon dioxide produced in the city and the countryside.

[2]

Examiner Only	
Marks	Remark

6 Researchers may obtain human stem cells from embryos or adult sources. Stem cells can be cultured and used to produce tissues. It may then be possible to use these cultured cells to replace damaged tissues in people with certain diseases such as Parkinson's disease.

(a) What is a stem cell?

[2]

(b) Suggest **two** advantages of using embryonic rather than adult stem cells.

[2]

(c) Explain why some people object to human stem cell research for ethical reasons.

[3]

Parkinson's disease is caused by degeneration of tissue in the brain.

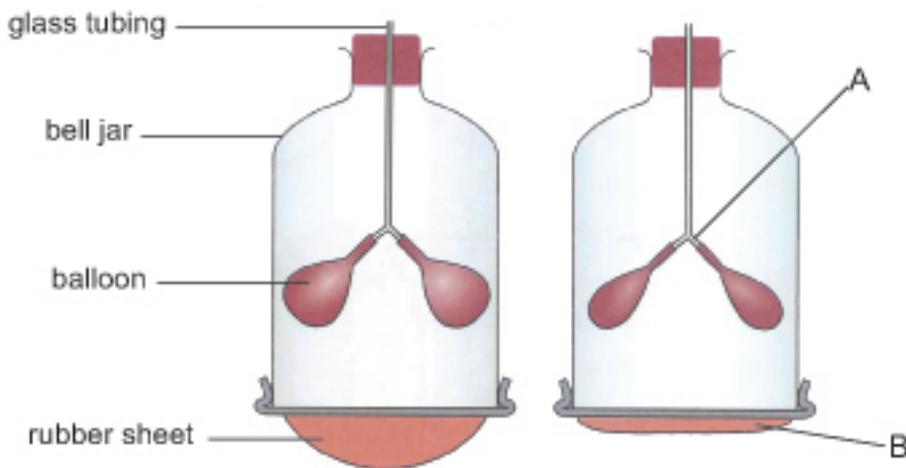
(d) Suggest what type of tissue researchers need to culture to help in the treatment of this disease.

[1]

Examiner Only	
Marks	Remark

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7 The diagram shows a lung model.



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(a) (i) Name the parts of the respiratory system represented by A and B.

A _____ [1]

B _____ [1]

(ii) Give **one** structure found in the respiratory system that is not represented in this lung model.

_____ [1]

(iii) Explain the changes in the bell jar which cause the balloon to inflate.

 _____ [2]

Examiner Only	
Marks	Remark

(b) Describe and explain how **two** named features of the respiratory system adapt it for efficient gas exchange.

1. _____

_____ [2]

2. _____

_____ [2]

The table shows the percentage of some gases in inhaled and exhaled air.

Gas	Inhaled air/%	Exhaled air/%
Oxygen	21	16
Carbon Dioxide	0.04	4
Nitrogen	78	78

(c) Describe and explain the differences in the composition of inhaled and exhaled air.

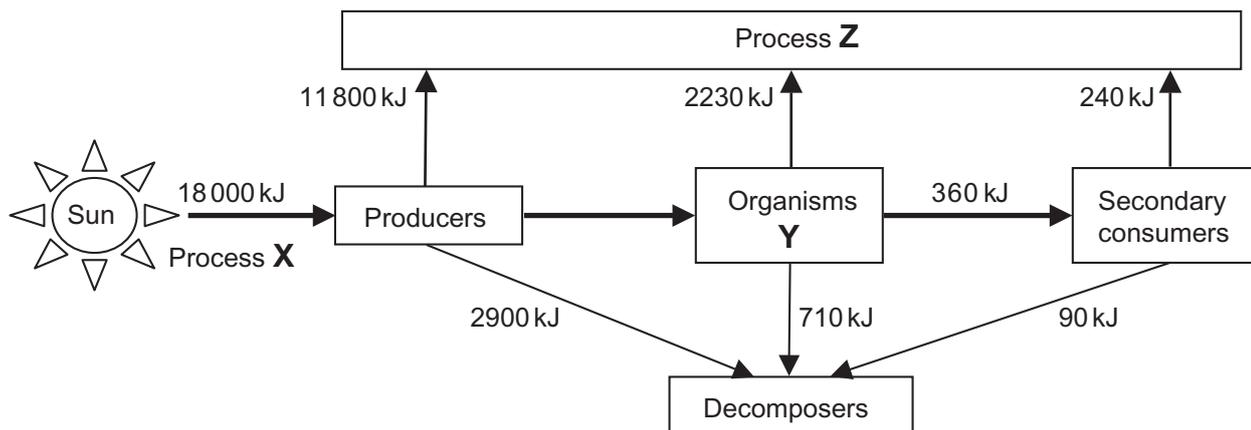
In this question, you will be assessed on your written communication skills, including the use of specialist scientific terms.

_____ [6]

Examiner Only	
Marks	Remark

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9 The diagram shows the energy flow in a food chain.



(a) Name process Z.

_____ [1]

(b) Give the term used to describe organisms Y.

_____ [1]

(c) (i) Calculate the amount of the energy passed from the producers to organisms Y.

Show your working.

Answer _____ [2]

One reason why this value is smaller than the energy absorbed by producers is because some of the energy passes to process Z.

(ii) Explain **two other** reasons why this value is smaller than the energy absorbed by producers.

 _____ [2]

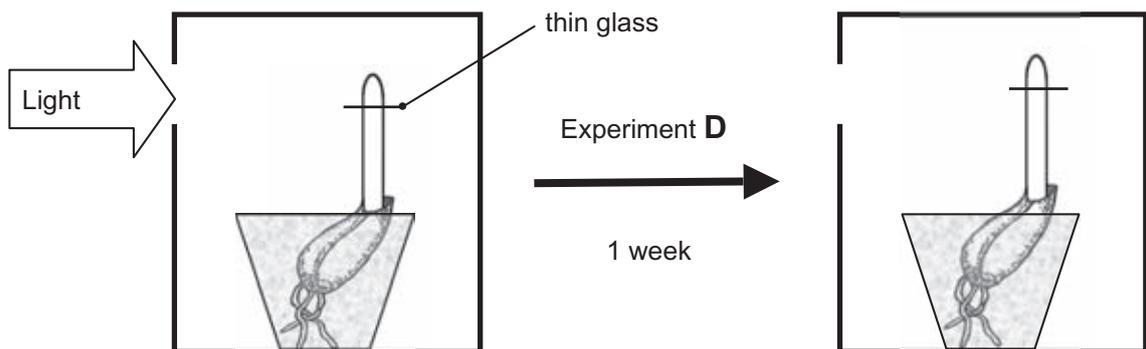
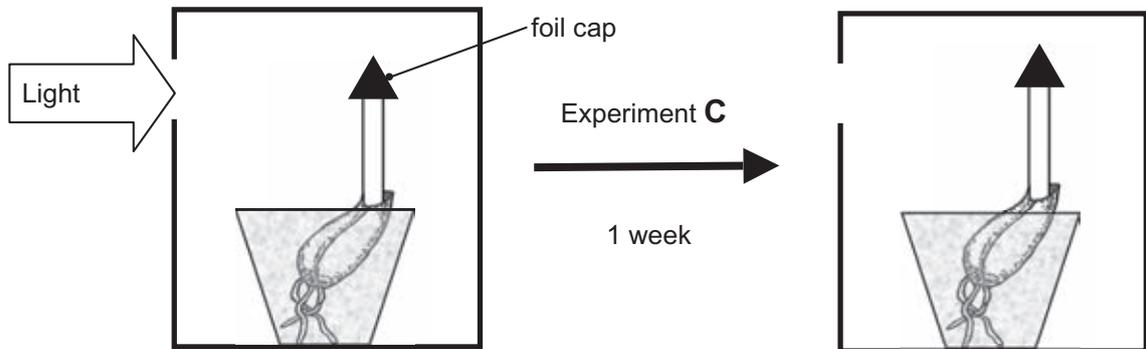
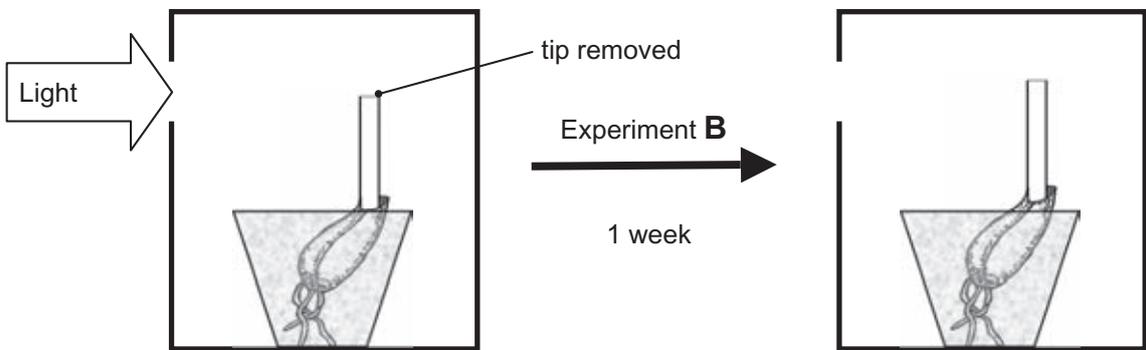
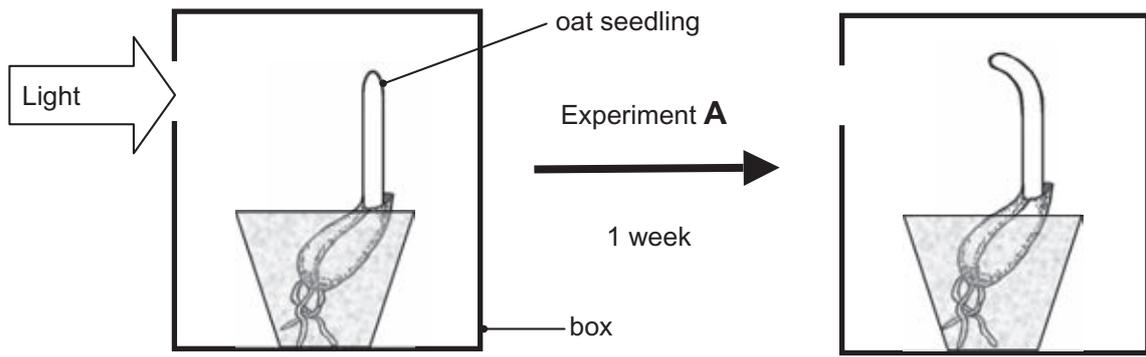
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(d) Use evidence from the diagram to help explain why this food chain has only three trophic levels.

[2]

Examiner Only	
Marks	Remark

10 The diagrams show experiments used to investigate the effect of one-sided light on the growth of oat seedlings.



Daniel has found many dandelions growing in his lawn and has been advised to spray selective weed killer. The broad leaves of the dandelion plants absorb the weed killer and the plants die. The grasses remain unharmed.

(d) Suggest why the selective weed killer kills only the dandelions.

[2]

Once the dandelions and other weeds had been killed Daniel noticed that the grass plants grew faster and produced more leaves.

(e) Suggest why the grass plants grew faster in the absence of weeds.

[2]

Plant hormones can also be used to stimulate all the fruit in an orchard to form at the same time.

(f) Suggest why this is economically useful for apple farmers.

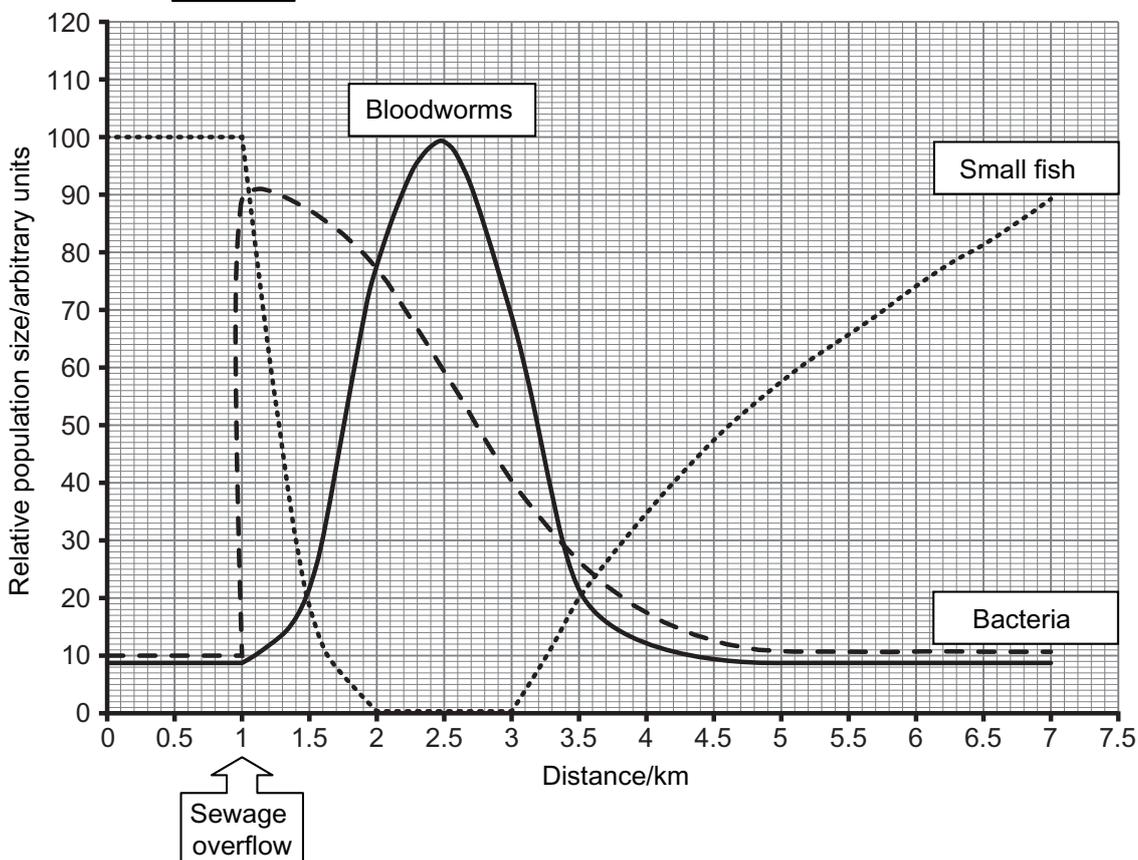
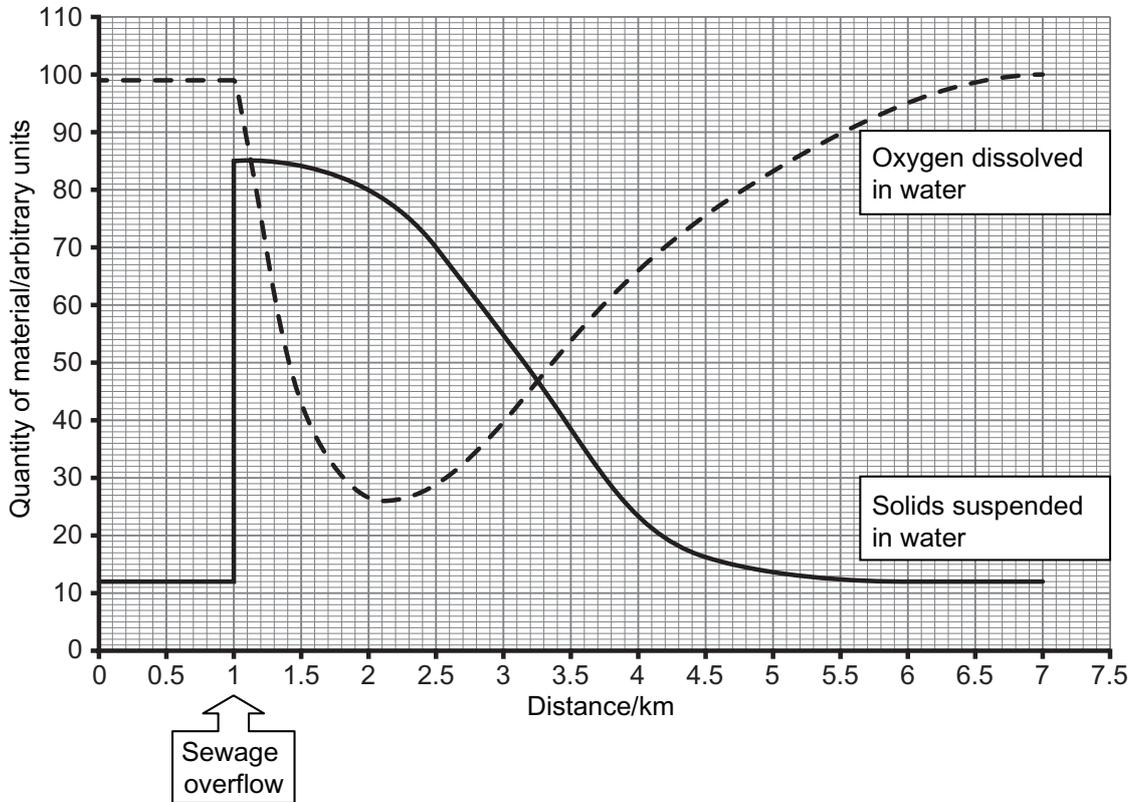
[2]

Examiner Only	
Marks	Remark

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12 During periods of heavy rain some sewage treatment plants overflow and release sewage directly into a river. The sewage released contains suspended solids which have a high concentration of nitrogen compounds. The graphs show changes which occur in a river when sewage is released into it.

Examiner Only	
Marks	Remark



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