



Rewarding Learning

General Certificate of Secondary Education
2009–2010

Centre Number

71	
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Candidate Number

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Science: Single Award (Modular)

Human Activity and Health
Module 2

Higher Tier

[GSC22]



THURSDAY 25 FEBRUARY 2010, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	

Total Marks	
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- 1 Willow can be grown as a biofuel. It is very fast growing and can be harvested every three years. When growing, willow removes carbon dioxide from the air but when burnt, releases it back into the air and is described as being carbon neutral.

Use this information and your knowledge to answer the questions below.

- (a) Describe and explain why using willow as a biofuel is an example of sustainable development.

[2]

- (b) Suggest what is meant by the term **carbon neutral**.

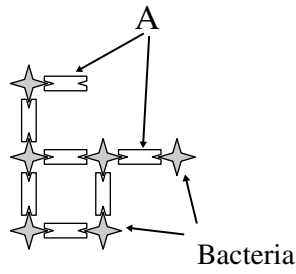
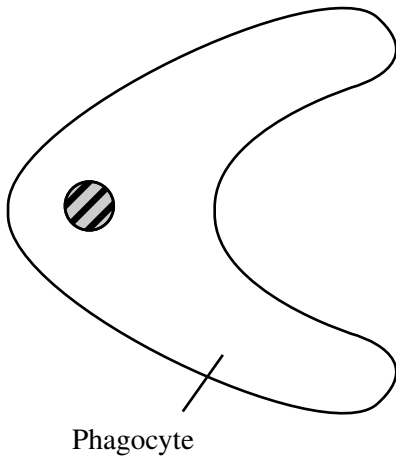
[2]

- (c) Suggest **one** advantage of using carbon neutral fuel sources.

[1]

Examiner Only	
Marks	Remark

- 2 (a) The following diagram shows a phagocyte about to engulf (destroy) a clump of bacteria.



- (i) Name the process described above.

_____ [1]

- (ii) Name the structures labelled A on the diagram.

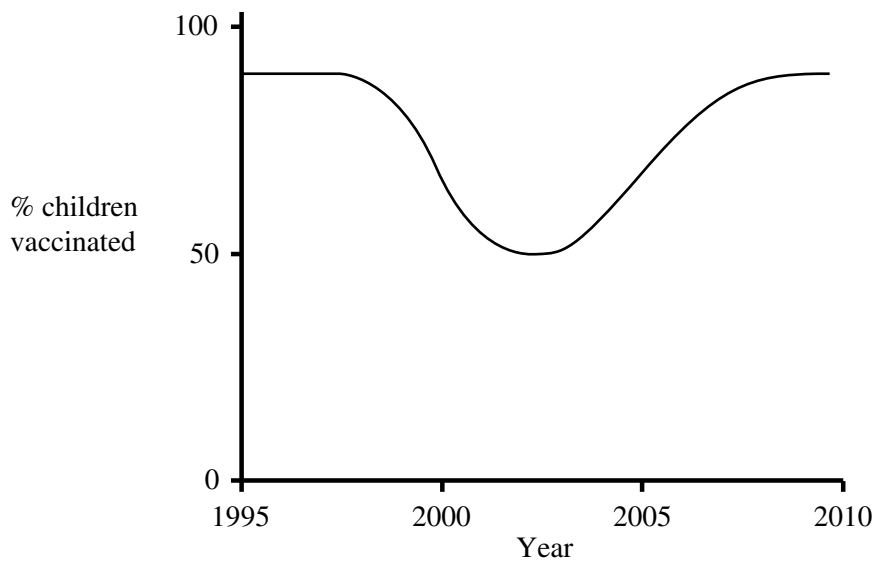
_____ [1]

- (iii) Use the diagram and your knowledge to describe how the body's defences caused the bacteria to form in a clump.

 _____ [3]

Examiner Only	
Marks	Remark

(b) The following graph shows how the percentage of children being vaccinated against MMR has changed over the last 15 years.



(i) Describe how the percentage of children being vaccinated against MMR has changed over the last 15 years. Explain why these changes took place.

[3]

(ii) Suggest **one** reason why it is unlikely that there will ever be 100% uptake with any vaccination programme.

[1]

Examiner Only	
Marks	Remark

- 3 (a) There are four types of human blood groups. A survey of 200 people in Belfast produced the following results.

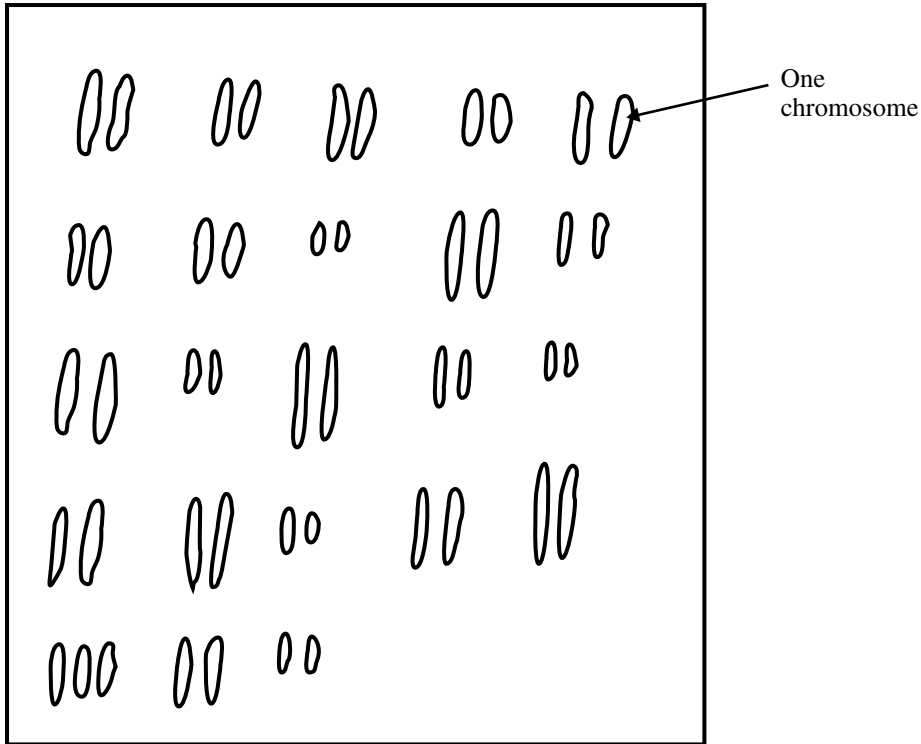
Blood group	Number of people
A	40
B	54
AB	66
O	

- (i) Complete the table to show the number of people who are blood group O. [1]

- (ii) Name the type of variation shown by human blood groups.
_____ [1]

Examiner Only	
Marks	Remark

(b) Mutations can cause harm to the cells of the body. The drawing below shows the chromosomes in John's body cells.



(i) Name the condition that John is suffering from.

_____ [1]

(ii) Skin cancer is caused by mutations in the cells of the skin. Explain what cancer is.

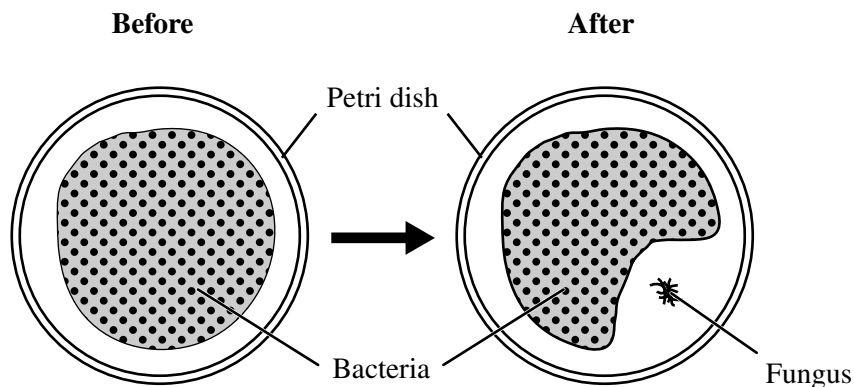
 _____ [2]

(iii) Name the environmental factor that causes skin cancer.

_____ [1]

Examiner Only	
Marks	Remark

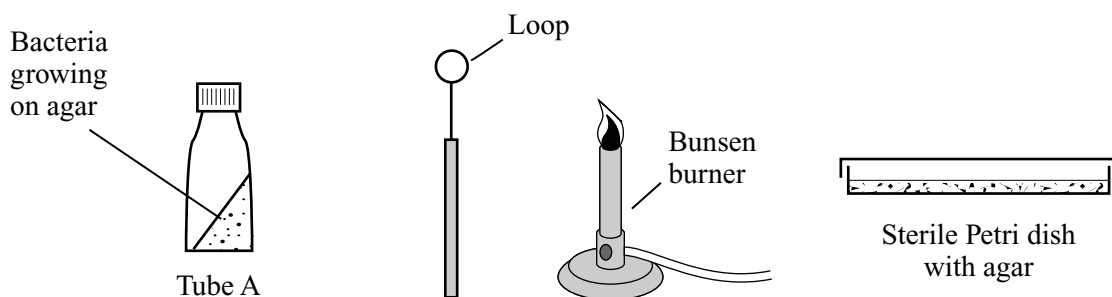
- 4 The following diagram shows what Alexander Fleming observed when an agar plate containing bacteria was contaminated by a fungus.



- (a) Describe fully what Fleming concluded from this observation.

[2]

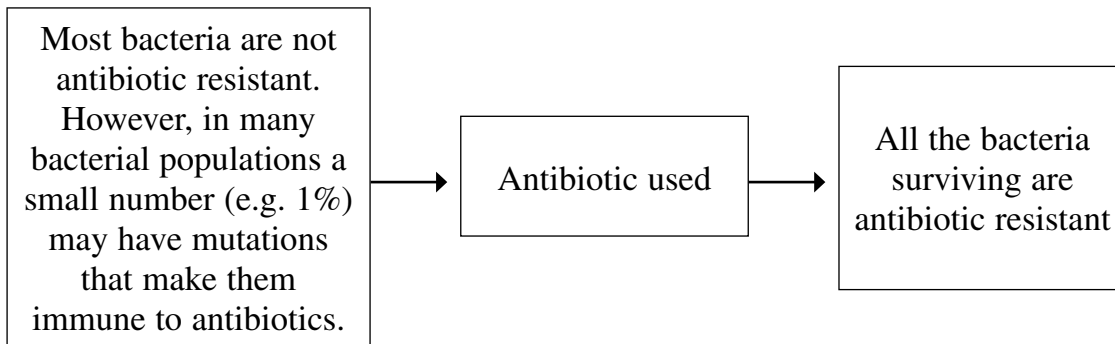
- (b) In a laboratory experiment Kathryn transferred bacteria from tube A to a Petri dish. She attempted to use aseptic techniques but her method was incorrect and produced contaminated results. Given below is an account of her method.



Kathryn removed the lid from the Petri dish and left it to one side. She then held the metal loop in the Bunsen flame for 30 seconds. While it was still hot she dipped it into tube A and transferred the bacteria, spreading it over the agar in the Petri dish. She replaced and sealed the lid on the Petri dish and incubated it at 20 °C for two weeks. When Kathryn opened the Petri dish she found that none of the bacteria from tube A had grown, but other types of microbes were growing on the agar.

Examiner Only	
Marks	Remark

5 (a) The following flow chart shows how antibiotic resistant bacteria develop.



(i) Use the information and your knowledge to explain how antibiotic resistance in bacteria demonstrates the processes of natural selection and evolution.

[3]

(ii) Name the scientist who proposed the theory of evolution.

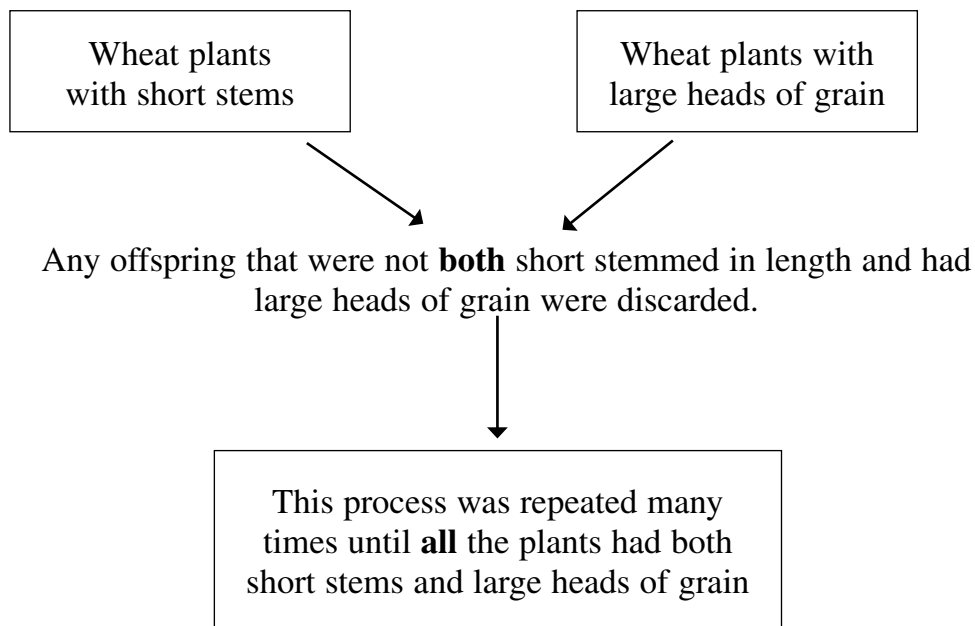
[1]

(iii) State **one** reason why the theory of evolution is so controversial.

[1]

Examiner Only	
Marks	Remark

(b) The following flow chart shows how modern wheat plants were produced from ancient varieties by cross breeding.



(i) Name the type of selection that has taken place in wheat.

_____ [1]

(ii) Describe and explain **one** advantage to the farmer of using modern wheat instead of the ancient varieties.

 _____ [2]

Examiner Only	
Marks	Remark

- 6 (a) Special Protection Areas (SPAs) are areas designated by European countries as being internationally important in the conservation of one or more bird species.

The sea cliffs of Rathlin Island and the surrounding marine environment is one of Northern Ireland's SPAs. The peregrine falcon is one species that this SPA is helping conserve. Peregrine falcons nest on the sea cliffs and they feed on ducks and other birds.



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- (i) Suggest **one** reason why the peregrine falcon was selected as a species to be conserved at the Rathlin Island SPA.

_____ [1]

- (ii) Suggest **one** reason why the rocky shore and sea surrounding the cliffs is also protected.

_____ [1]

- (iii) The cliffs at Rathlin Island are the nesting sites of many species of birds. Suggest one advantage to nesting on cliffs.

_____ [1]

- (b) The European Nitrates Directive is another measure designed to protect the environment. Describe and explain how it can help conserve biodiversity in rivers and lakes.

_____ [4]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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