

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE  
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU  
Tystysgrif Gyffredinol Addysg Uwchradd

235/01

SCIENCE

FOUNDATION TIER (Grades G-C)

BIOLOGY 1

P.M. TUESDAY, 16 January 2007

(45 minutes)

<b>For Examiner's use only</b>	
<b>Total Marks</b>	

### ADDITIONAL MATERIALS

In addition to this paper you may require a calculator.

### INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

### INFORMATION FOR CANDIDATES

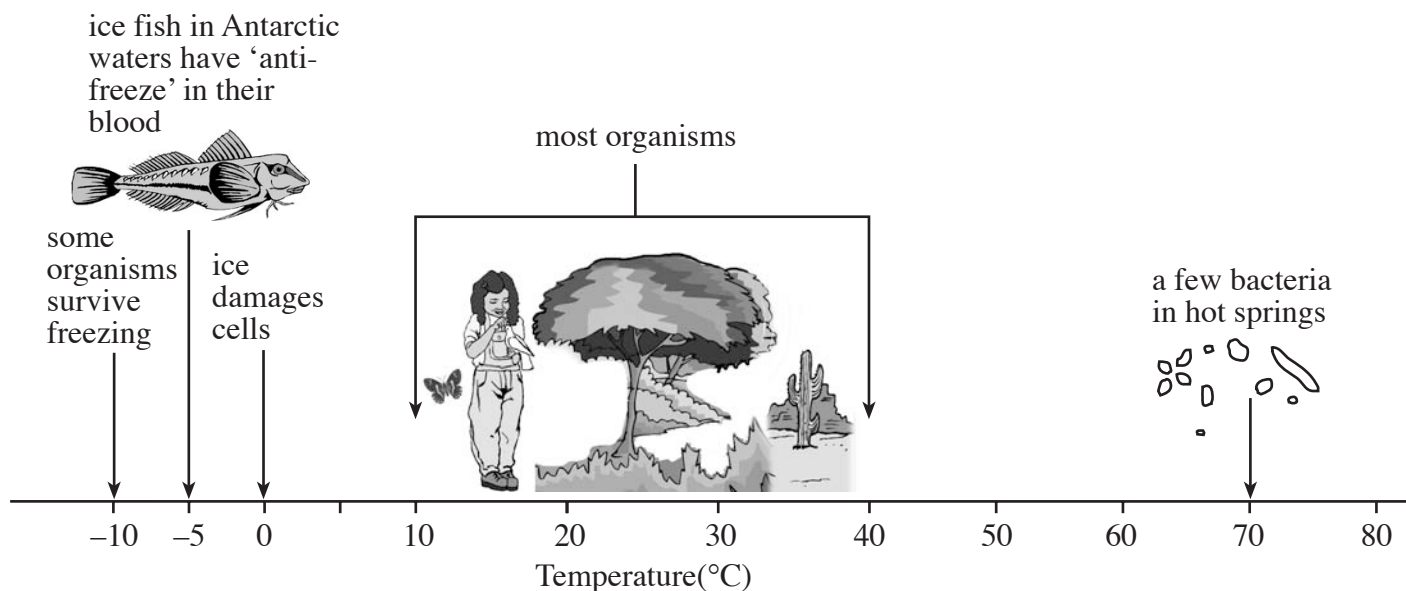
The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

Answer **all** questions.

1. The diagram below shows the temperature at which organisms live.



Answer the following questions by using the information in the diagram.

(a) Between which temperatures do most organisms live? [1]

..... °C and ..... °C

(b) At what temperature will cells be damaged? [1]

..... °C

(c) Why can some fish survive at  $-5^{\circ}\text{C}$ ? [1]

.....

2. Read the information given below **very carefully**.

Orchards of orange trees in California were being attacked by an insect pest which had been accidentally introduced from Australia.

The pest soon occurred in very large numbers.

In Australia these pests were fed upon by a small ladybird.

This small ladybird was not found in California so they were collected in Australia and released in California.

Within two years the numbers of the insect pest were brought under control and the orange orchards were saved.

Answer the following questions using the information given above.

- (a) (i) Why did the insect become a pest in California? [1]

.....

- (ii) Why was it not a pest in Australia? [1]

.....

- (b) At first the ladybirds increased in number very rapidly. Suggest a reason why this occurred. [1]

.....

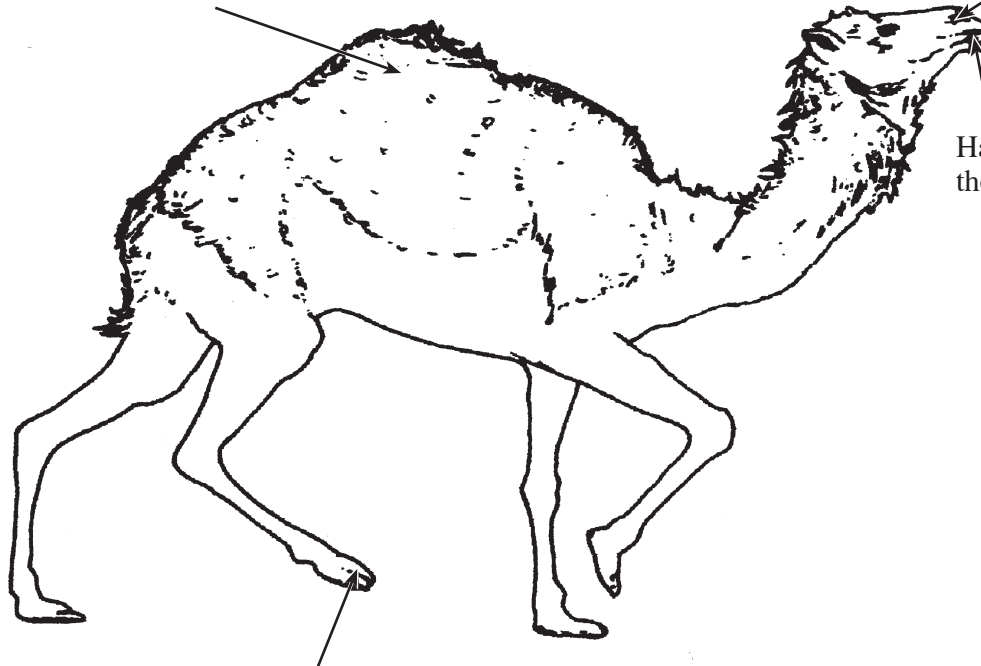
- (c) The number of ladybirds eventually decreased **naturally**. Suggest a reason for this happening. [1]

.....

3. Read all the information carefully.

A camel lives in the desert which is very hot and dry during the day and very cold at night.  
The only food is thorny desert plants.  
A camel produces dry dung and it sweats very little.  
The diagram below shows some other ways that a camel is adapted for life in the desert.

Fat stored in hump as food reserve.  
Fat broken down into energy and water.  
Can go for long time without food and water.



Nostrils which can be closed in sand storms

Hard mouth – can eat thorny desert plants

Web of tissue between toes – prevents sinking in sand

Use the information above to answer the following questions:

(a) State **two** reasons why it is difficult for animals to live in the desert. [2]

(i) .....

(ii) .....

(b) State **one** way in which a camel reduces the loss of water from its body. [1]

.....

(c) State **one** reason why the hump of a camel is important. [1]

.....

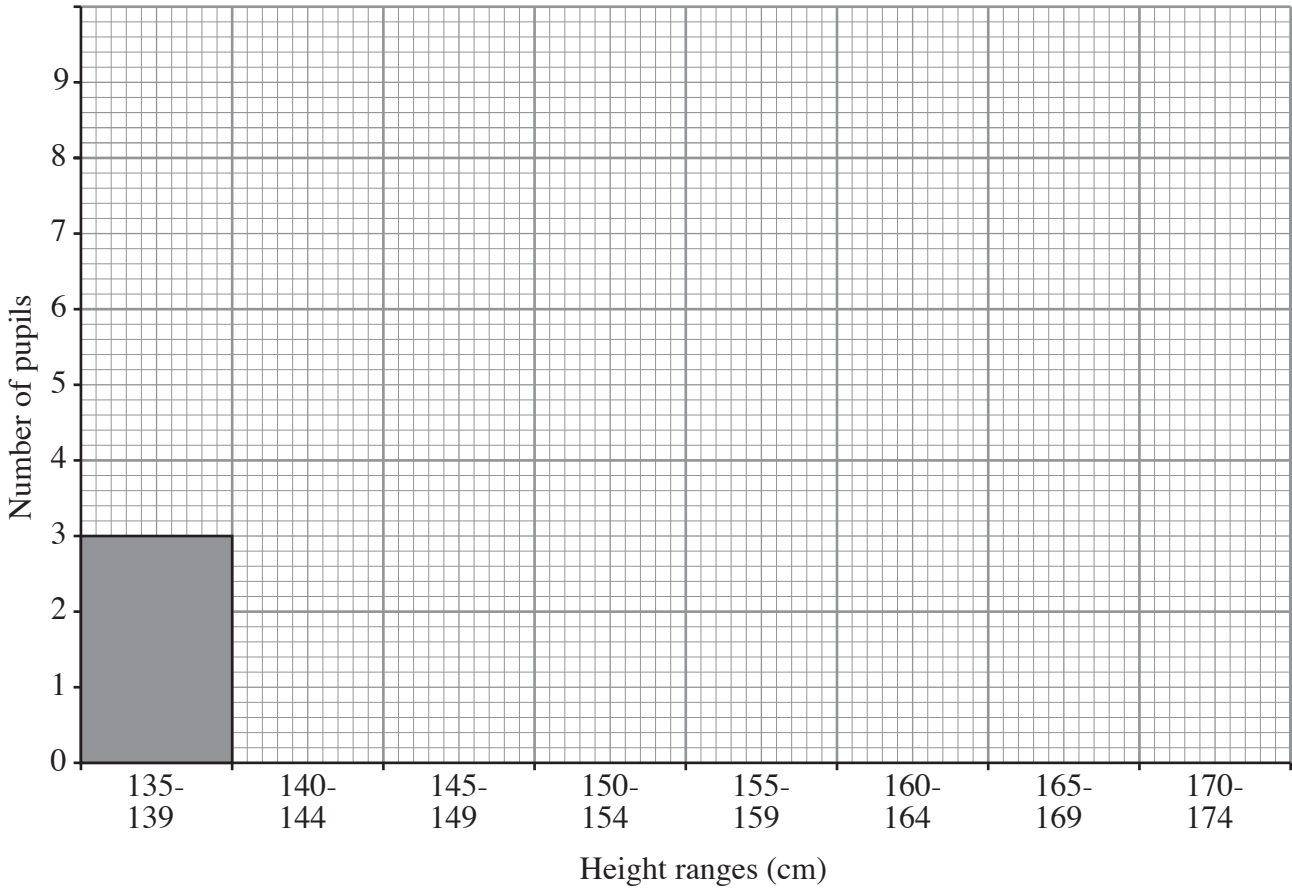
(d) State how a camel is adapted to [1]

(i) move over sand; .....

(ii) survive sand storms. ....

4. The variation in the height of pupils in a class was investigated. The results are shown in the table below.

<i>Height (cm)</i>	137	143	145	146	148	150	158	160	172
<i>Number of pupils</i>	3	5	3	3	2	10	3	2	1



- (a) Plot the results in the table onto the grid as a bar chart. The first has been done for you. [3]
- (b) At which height are
- (i) the greatest number of pupils? ..... cm [1]
  - (ii) the least number of pupils? ..... cm [1]
- (c) What is the total number of pupils in the class? ..... [1]
- (d) Give **two** reasons why pupils were of different heights. [2]
- (i) .....
  - (ii) .....

5. (a) Use some of the following to complete the information given below: [2]

nerves, receptor, impulses.

Sense organs are groups of ..... cells.

They respond to stimuli and pass this information as ..... to the brain.

(b) Name **two** stimuli which are received by sense organs. [2]

(i) .....

(ii) .....

(c) (i) Complete the statement below by using **two** of the following words: [2]

slow, protective, dangerous, fast.

Reflex actions are ..... and .....

(ii) Name **one** reflex action. [1]

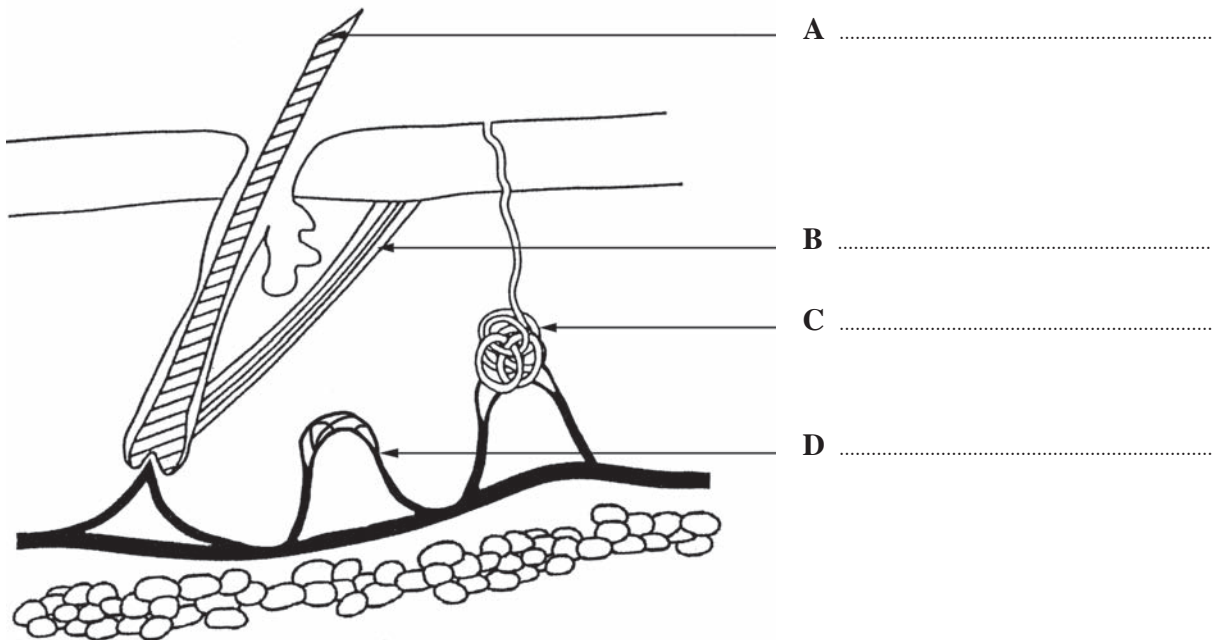
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6. The diagram below shows a vertical section through the skin.

(a) Label parts **A** to **D** on the diagram using some of the following:

sweat pore, sweat gland, hair, erector muscle, blood capillary.

[4]



(b) During exercise the body temperature rises above normal. When this occurs:

(i) what happens to each of parts **A** and **D**? [2]

Part **A** .....

Part **D** .....

(ii) how does this help in reducing body temperature? [2]

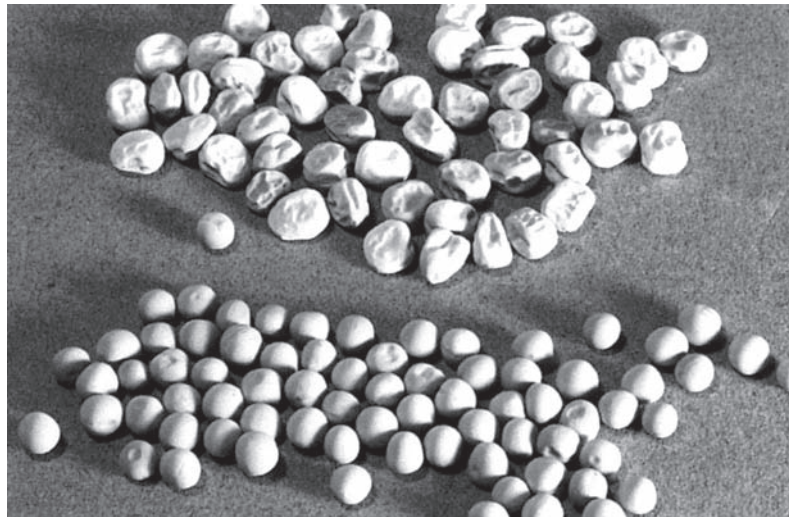
Part **A** .....

Part **D** .....

7. Gregor Mendel made important discoveries on how characteristics or traits are passed from parents to offspring.

In one of his experiments he crossed pea plants that produced seeds with round coats with plants that produced seeds with wrinkled coats.

Seeds with wrinkled coats



Seeds with round coats

*R. W. Van Norman/Visuals Unlimited*

The result of this cross were plants (F1) that only produced round coated seeds. Mendel explained this by saying that pea plants passed on **factors** (alleles) from one generation to the next. He also said that the factor for round seeds is dominant over the factor for wrinkled seeds.

Use the information in the passage and your knowledge to answer the following questions.

(a) (i) Complete the following to show how the F1 plants were produced in Mendel's experiment.

**R** = allele for round seeds  
**r** = allele for wrinkled seeds

Phenotype of parents

Round

×

Wrinkled

Genotype of parents

**RR**

**rr**



Gametes

.....

.....

[1]



- (ii) Complete the Punnett square to show the genotypes produced in this cross. [2]

F1

<i>gametes</i>		

- (b) (i) Mendel then crossed two of these F1 plants together. Draw your own Punnett square and complete it to show the genotypes of the offspring that would be produced. [2]

- (ii) What is the ratio of round to wrinkled seeds produced above? [1]

..... round: ..... wrinkled

- (iii) When Mendel carried out the cross shown on pages 8 and 9 he repeated the experiment hundreds of times. These are some of the results he obtained:

<i>Experiment number</i>	<i>Number of seeds obtained</i>	
	<i>Round</i>	<i>Wrinkled</i>
1	27	8
2	24	7
3	32	11
4	74	24
5	17	6

How do the results of Mendel's experiments compare to your answer in (b)(ii) on page 9? [1]

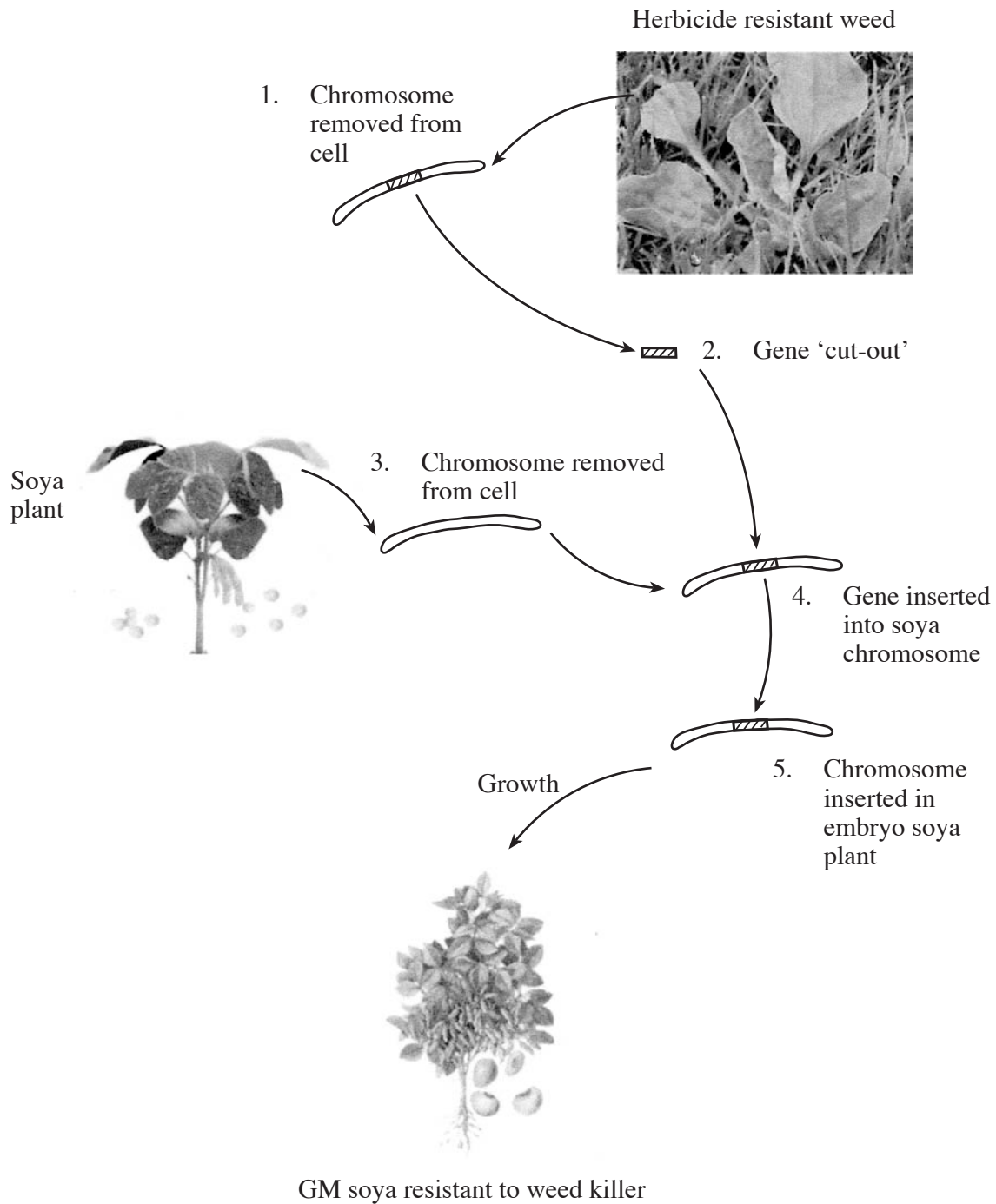
- (iv) Why did Mendel repeat this experiment hundreds of times? [1]

- (c) Why was the importance of Mendel's discovery about inheritance not recognised until long after his death? [1]

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8. Weeds compete with crops for water, sunlight and space. They therefore reduce crop quality and deposit weed seeds in crops.

The diagram below (not drawn to scale) shows how soya bean plants have been genetically modified (GM) so that they are resistant to a herbicide (weedkiller) called 'Roundup'.



(a) (i) Which gene was removed from the weed? [1]

.....

(ii) State why the GM soya plant develops resistance to the weedkiller 'Roundup'. [1]

.....

(b) Suggest **two** possible advantages that a farmer gets from growing a soya bean crop genetically modified for herbicide resistance. [2]

I. ....

II. ....

(c) In 1999 the UK government asked researchers to investigate how growing GM herbicide resistant crops might affect farmland wildlife.  
The research involved investigating and reporting on 266 field trials in the UK.  
In 2003 the researchers reported that there were differences in the abundance of wildlife between GM and non-GM crops.

Compared to the numbers found in the non-GM crop, the researchers found the following:

		<i>Numbers compared to crops not genetically modified</i>		
<i>GM crop plant</i>		<i>GM winter rape</i>	<i>GM beet</i>	<i>GM maize</i>
<i>Wildlife</i>				
Bees and butterflies		fewer	fewer	more
Springtails (soil insects)		more	more	more

(i) In March 2004 the UK government announced that two of the above crops would not be grown in the UK in the near future. Suggest which **two** crops they are: [1]

..... and .....

(ii) State the reason for the government's decision. [1]

.....

.....