

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education  
Foundation Tier  
January 2012

## Science A

### Unit Biology B1

## 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.

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

BL1FP  
**F**



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BL1FP

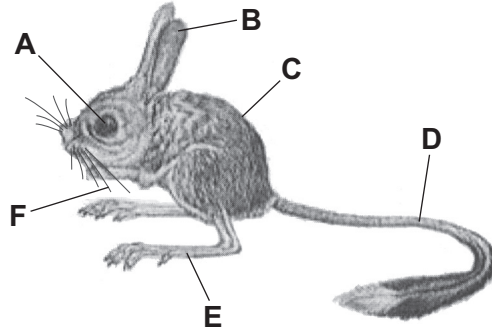
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ANSWER IN THE SPACES PROVIDED**



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)

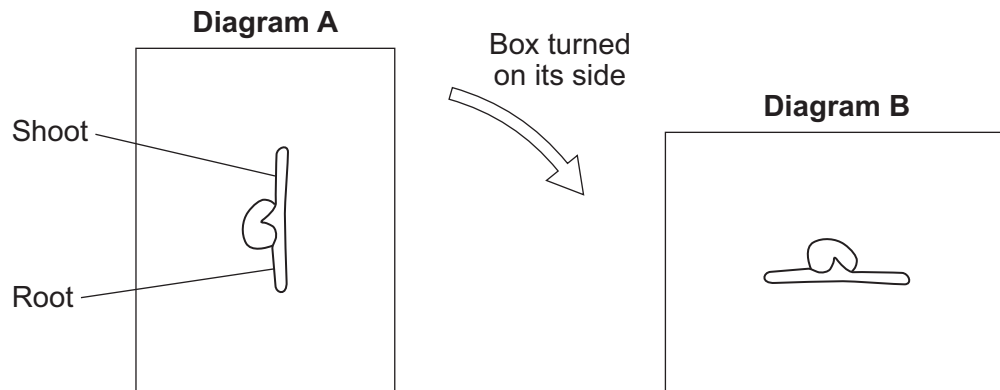
- 1 (e)** helps the jerboa to know the width of its underground hole in the dark?

(1 mark)

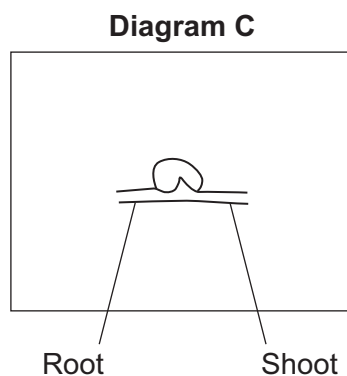


- 2 A student investigated growth responses in plants.

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)



**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)

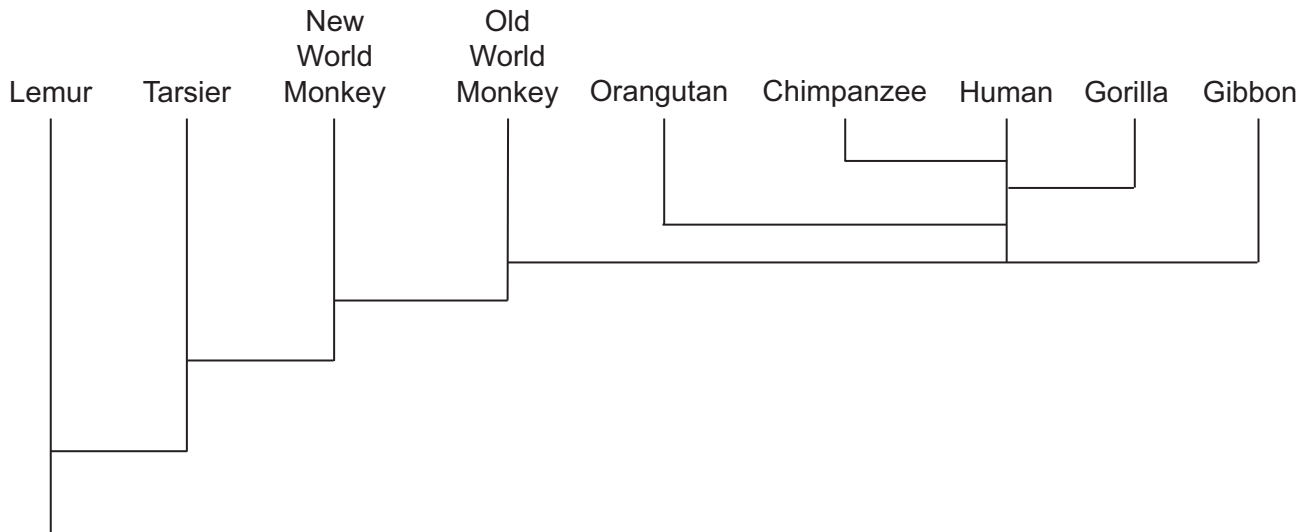
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**Turn over for the next question**

**Turn over ►**



- 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)



**3 (c) (ii)** Use words from the box to complete the passage about natural selection.

<b>evolution</b>	<b>environment</b>	<b>generation</b>
<b>mutate</b>	<b>survive</b>	<b>variation</b>

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**

**Turn over ►**



- 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.

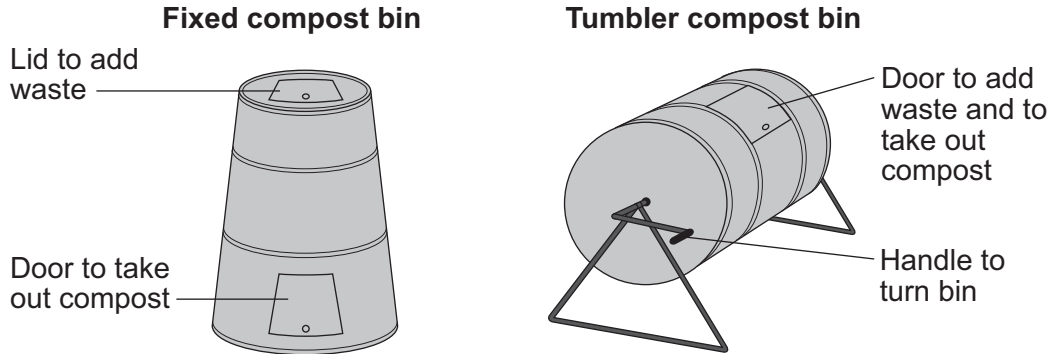
1 .....  
 2 .....  
 (2 marks)





- 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.



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  $1 \text{ m}^2$ .

**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  $2 \text{ m}^2$ .

- 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 .....

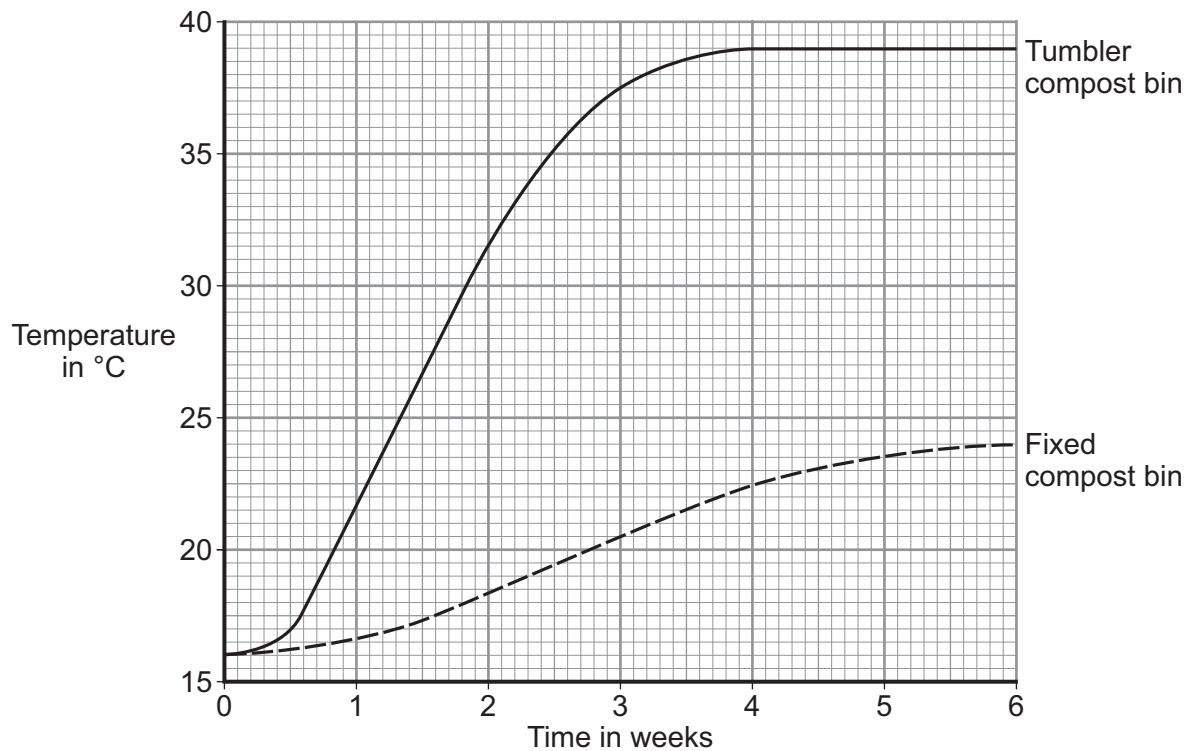
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**Question 5 continues on the next page**

**Turn over ►**



- 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)



**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
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**Turn over for the next question**

**Turn over ►**



**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)



**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 <b>A</b>	44	23
Drug <b>B</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)

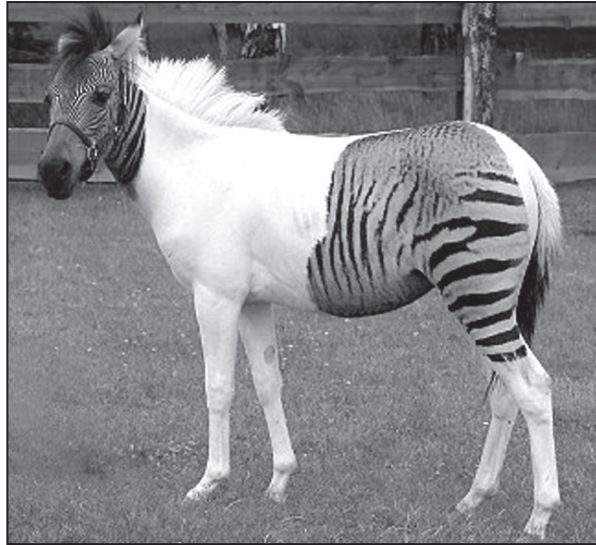


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- 7 The photograph shows a zorse.



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)

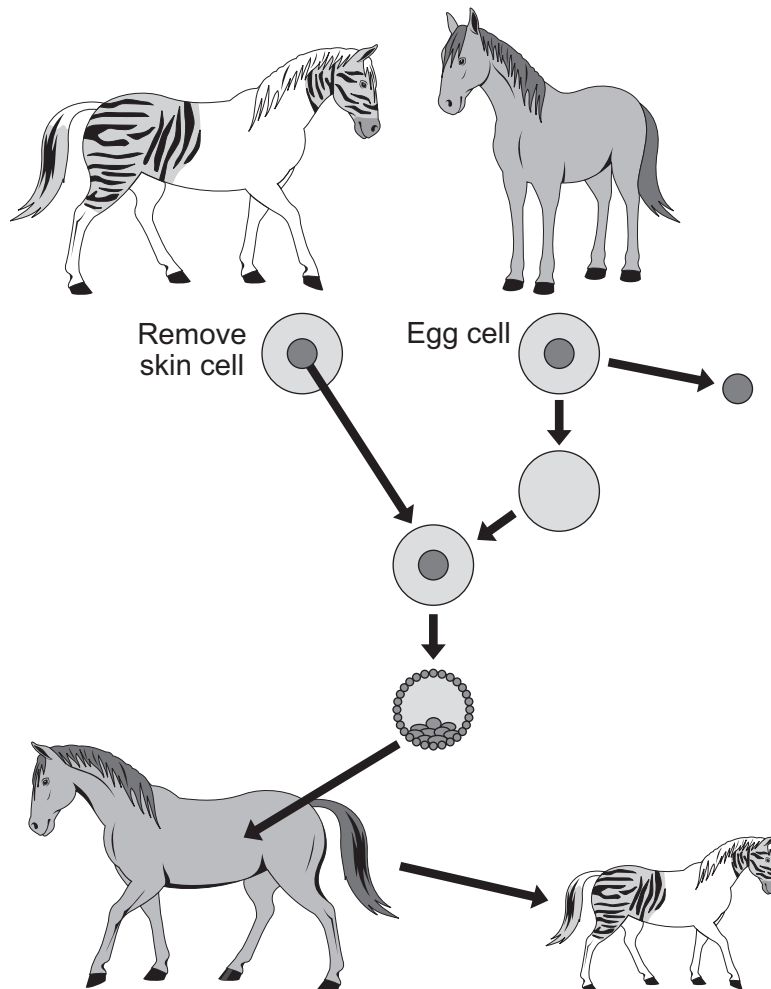
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- 7 (b) Zorses are **not** able to breed.  
Scientists could produce more zorses from this zorse by adult cell cloning.

The diagram shows how the scientists might clone a zorse.





*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)

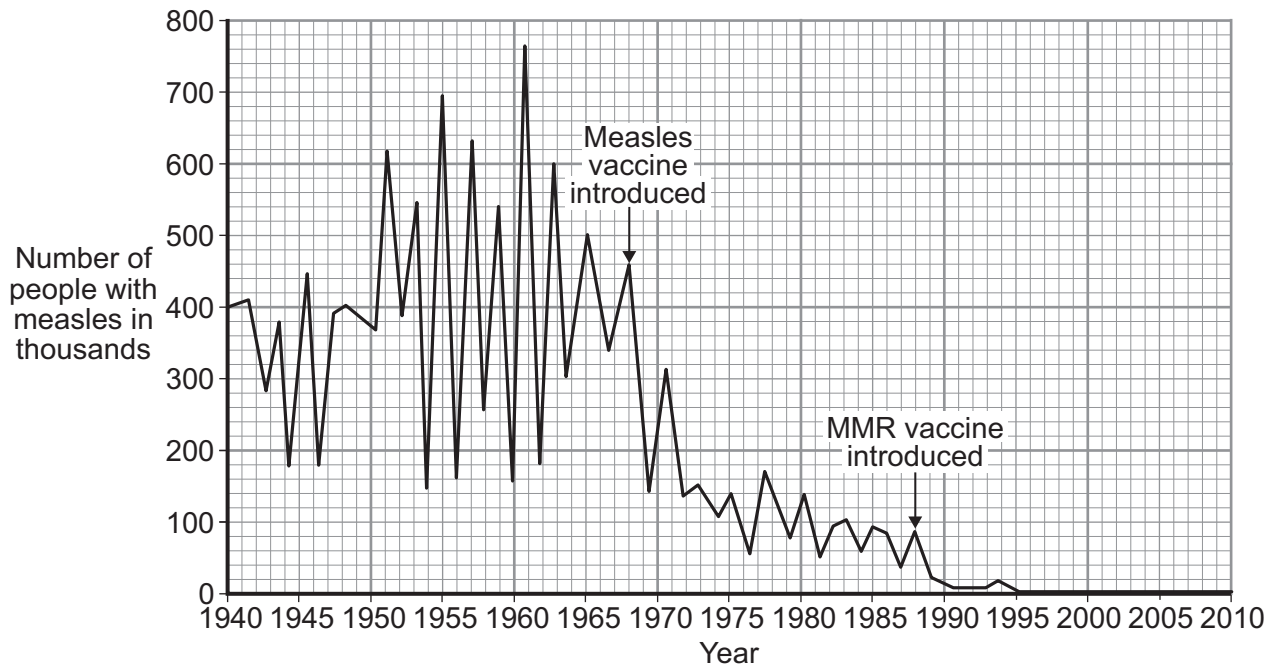
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**Turn over for the next question**

**Turn over ►**



- 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)



**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.

.....

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(3 marks)

8

**END OF QUESTIONS**



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