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 2014

Science B

SCB1FP

Unit 1 My World

F

Friday 6 June 2014 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

A

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.

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

1 (a) Plants and animals need a number of things to survive.

1 (a) (i) Tick (✓) **two** things that plants need to survive.

[2 marks]

	Tick (✓)
Food	
Light	
Soil	
Water	

1 (a) (ii) Tick (✓) **two** things that land animals need to survive.

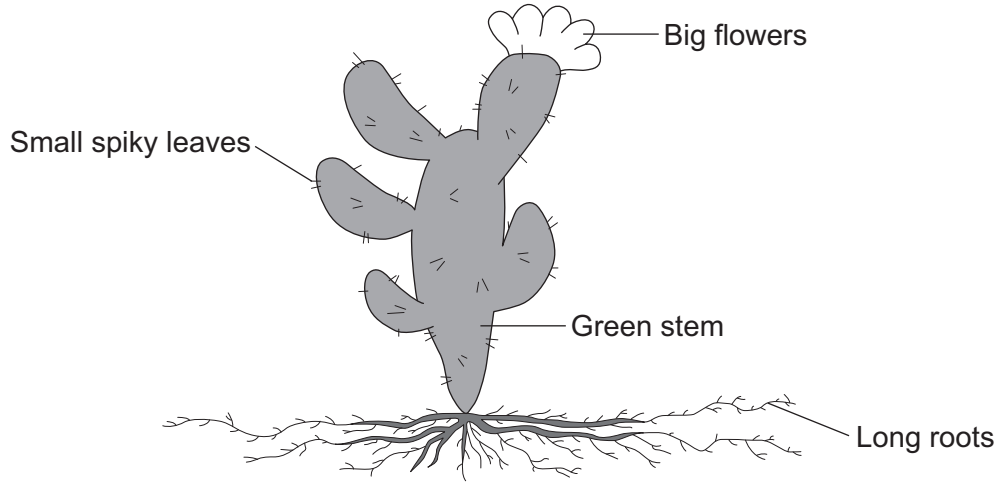
[2 marks]

	Tick (✓)
Clothes	
Food	
Light	
Shelter	

1 (b) Plants and animals have a number of adaptations to help them to survive.

1 (b) (i) **Figure 1** shows a cactus plant that lives in very dry conditions.

Figure 1



Tick (✓) **two** adaptations that cactus plants have to survive in very dry conditions.

[2 marks]

	Tick (✓)
Big flowers	
Long roots	
Long stem	
Small spiky leaves	

Question 1 continues on the next page

1 (b) (ii) **Figure 2** shows an Arctic fox that lives in very cold conditions.

Figure 2

Give **two** adaptations that animals, like the Arctic fox, have to help them to survive when conditions get very cold.

[2 marks]

1 .....

2 .....

8

2 Scientists suggest theories to try to explain the changes that they observe.

Draw **one** line from each observation or theory to the correct name given to the observation or theory.

[3 marks]

Observation or theory	Name
The change in the frequency of a wave when an object moves towards you	The Big Bang
The movement of the black lines in the spectrum of light from a distant star	The Doppler effect
The theory that the universe began from a very small initial point	The electromagnetic spectrum
	The red-shift

3

Turn over for the next question

3 (a) Plants and animals have changed gradually over millions of years.

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

[3 marks]

cells	**characteristics**	**evolution**
extinction	**genes**	**natural selection**

The features that plants and animals inherit are caused by their ..... .

Only plants and animals with the best features are chosen to survive. This process is called ..... .

The features of plants and animals have gradually changed over millions of years.

This gradual change is called ..... .

3 (b) (i) Living organisms are sorted into groups.

What is the name of the process of sorting living organisms into groups?

Draw a ring around the correct answer.

[1 mark]

classification **diversification** **sorting**

3 (b) (ii) There are five large groups of organisms, including plants and animals.

What is the name of the five large groups of organisms?

Draw a ring around the correct answer.

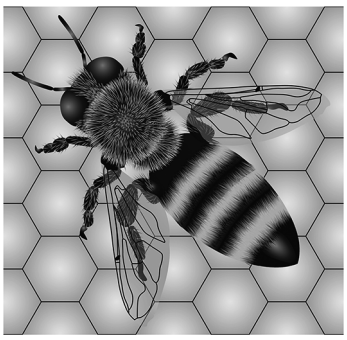
[1 mark]

families **kingdoms** **species**

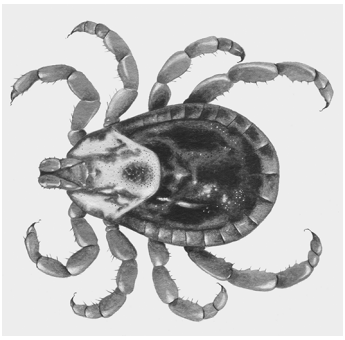
3 (c) **Figure 3** shows three different animals.

Figure 3

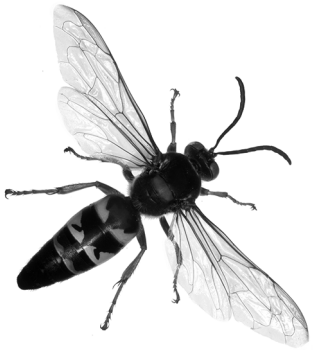
A



B



C



Use **Figure 3** to suggest why **A** is more closely related to **C** than to **B**.

[4 marks]

.....

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.....

.....

.....

9

4 Iron is extracted from rocks which have iron oxide in them.

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

4 (a) (i) Rocks which have a lot of iron oxide in them are called

elements.

fossil fuels.

ores.

[1 mark]

4 (a) (ii) Iron oxide is

a compound.

an element.

a mixture.

[1 mark]

4 (a) (iii) Iron metal is

a compound.

an element.

a mixture.

[1 mark]

4 (b) Read the information in the box about the extraction of iron.

> Iron is extracted from iron oxide by heating iron oxide with coke (carbon) in a furnace.
>
> Coke (carbon) is heated and carbon dioxide is made when the coke (carbon) reacts with oxygen. More coke (carbon) then reacts with carbon dioxide to make carbon monoxide.
>
> Carbon monoxide then reacts with iron oxide in the furnace.

Complete the word equations for the reactions that happen in the furnace.

Use the information in the box.

[3 marks]

carbon + ... ⟶ carbon dioxide

carbon dioxide + ... ⟶ carbon monoxide

carbon monoxide + ... ⟶ ..... + carbon dioxide

4 (c) (i) Lead can be extracted from lead oxide by heating lead oxide with carbon.

When 223 g of lead oxide reacts with 6 g of carbon, 22 g of carbon dioxide is produced.

This is the word equation for the reaction.

lead oxide	+ carbon	⟶	lead	+ carbon dioxide
223 g	+ 6 g	⟶	? g	+ 22 g

Calculate the mass of lead extracted.

[2 marks]

.....

.....

.....

Mass of lead extracted = ... g

4 (c) (ii) A student was asked to investigate if changing the mass of carbon had any effect on the mass of lead extracted.

He always used the same mass of lead oxide but changed the mass of carbon each time.

His results are shown in **Table 1**.

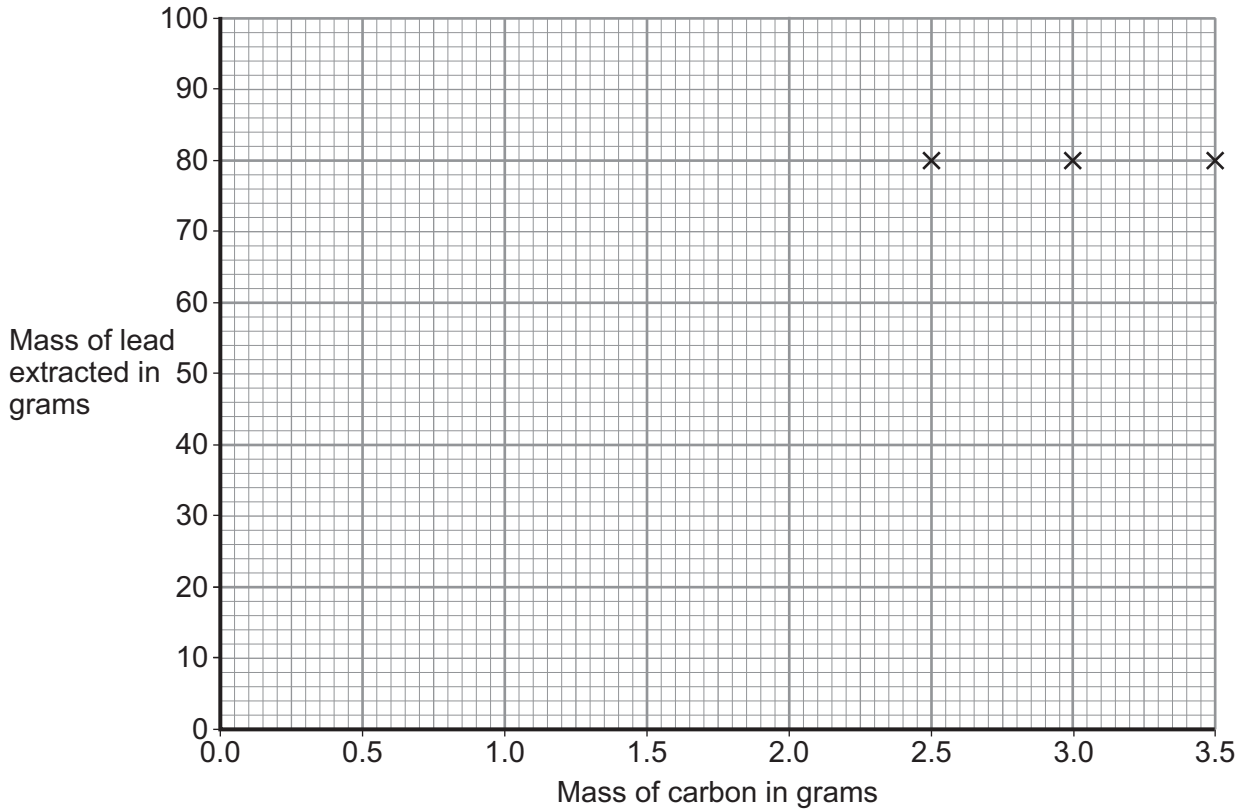
Table 1

Mass of carbon used in grams	Mass of lead extracted in grams
0.5	16
1.0	32
1.5	48
2.0	64
2.5	80
3.0	80
3.5	80

Complete the graph (**Figure 4**) by plotting the missing points using the data shown in **Table 1**.

[2 marks]

Figure 4



4 (c) (iii) How does changing the mass of carbon affect the mass of lead extracted?

[2 marks]

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12

Turn over ▶

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ANSWER IN THE SPACES PROVIDED

5 A student is growing cabbages in a garden.

There are a lot of snails eating the cabbages.

The student saw a bird eat a snail.

The student drew a food chain.

5 (a) (i) In the space below each plant or animal, write whether it is a **consumer** or a **producer**.

[2 marks]

cabbage ⟶ snail ⟶ bird

....

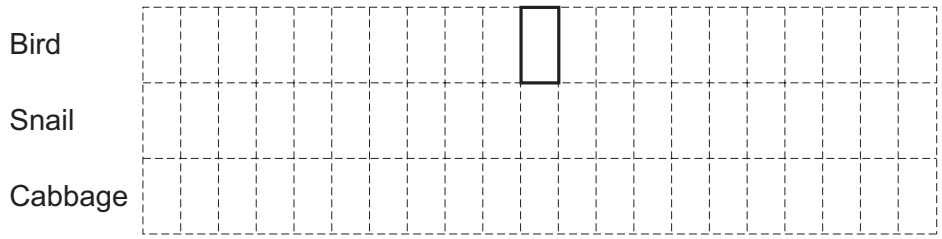
5 (a) (ii) The student estimated that the mass of the bird was 100 g, the total mass of the snails was 500 g and the total mass of the cabbages was 1900 g.

Complete the pyramid of biomass (**Figure 5**) for the food chain, using the values given.

The bird has been done for you.

[3 marks]

Figure 5



5 (a) (iii) Biomass decreases at each stage of the food chain because biomass is broken down to release energy for the organism.

Give the name of the process that releases energy from biomass.

[1 mark]

.....

5 (b) The student did an investigation to estimate the total number of snails in the garden.

Figure 6

The student collected as many snails as she could find in the garden.

She counted the snails and put a dot of white paint on their shells (**Figure 6**). She then released the snails back into the garden.

One week later she collected as many snails as she could find in the garden.

Her results are shown in **Table 2**.

Table 2

	Total number of snails collected	**Number of snails with marked shells**
First collection	60	
Second collection	30	18

5 (b) (i) Calculate the total number of snails in the garden.

Use the equation to help you.

$$\text{Total number of snails} = \frac{\text{Total number of snails in the first collection} \times \text{Total number of snails in the second collection}}{\text{The number of snails with marked shells in the second collection}}$$

[2 marks]

.....

.....

.....

.....

Total number of snails = ...

5 (b) (ii) Suggest why putting white dots on snails might affect the number of snails collected and change the total number of snails calculated.

[1 mark]

.....

9

Turn over for the next question

6 Astronomers use telescopes to observe the universe.

Telescopes can be used to detect different types of electromagnetic radiation on the Earth's surface.

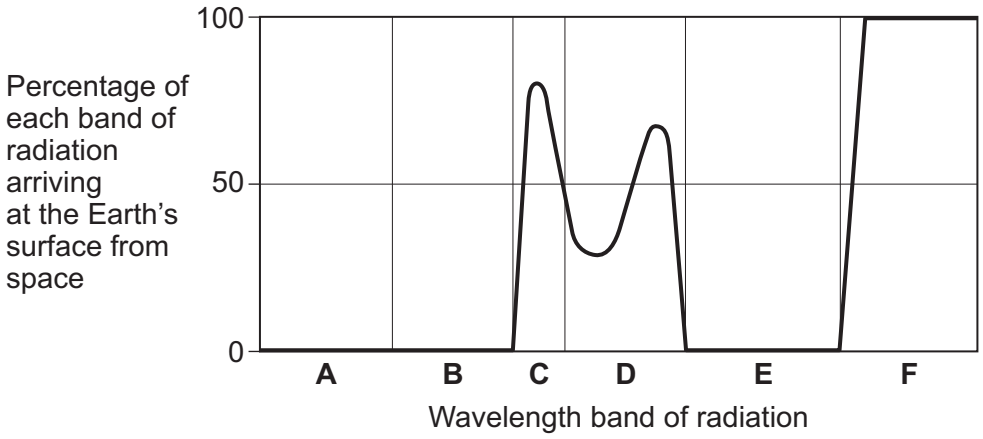
Table 3 shows the wavelength of types of radiation divided into bands.

Table 3

Type of radiation	Wavelength band of radiation
X-rays	A
Ultra-violet	B
Visible light	C
Infrared	D
Far infrared	E
Radio waves	F

Figure 7 shows the percentage of each band of radiation arriving at the Earth's surface from space.

Figure 7



6 (a) (i) **Name** the types of radiation that **are not** detected by telescopes on the Earth's surface.

Use the information given in **Table 3** and **Figure 7**.

[2 marks]

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6 (a) (ii) Explain your answer to part **(a)(i)**.

[2 marks]

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6 (b) Name the type of radiation that **can** be detected equally well on the Earth's surface and in space.

[1 mark]

.....

6 (c) Suggest **two** advantages of using telescopes on the Earth's surface instead of in space.

[2 marks]

1 .....

2 .....

7

Turn over for the next question

7 Scientists think that the Earth formed about 4.5 billion years ago.

7 (a) During the first billion years that the Earth existed, the surface of the Earth was different from the present surface.

Give **two** ways in which the surface of the Earth was different during the first billion years.

[2 marks]

1 .....

.....

2 .....

.....

7 (b) (i) How was the Earth's atmosphere formed during the first billion years that the Earth existed?

[1 mark]

.....

7 (b) (ii) During the first billion years that the Earth existed, the atmosphere was different from the atmosphere today.

Give **two** ways in which the atmosphere was different.

[2 marks]

1 .....

2 .....

7 (b) (iii) The Earth's early atmosphere was changed by the development of plant life.

What was the change to the Earth's early atmosphere caused by plants?

[1 mark]

.....

6

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

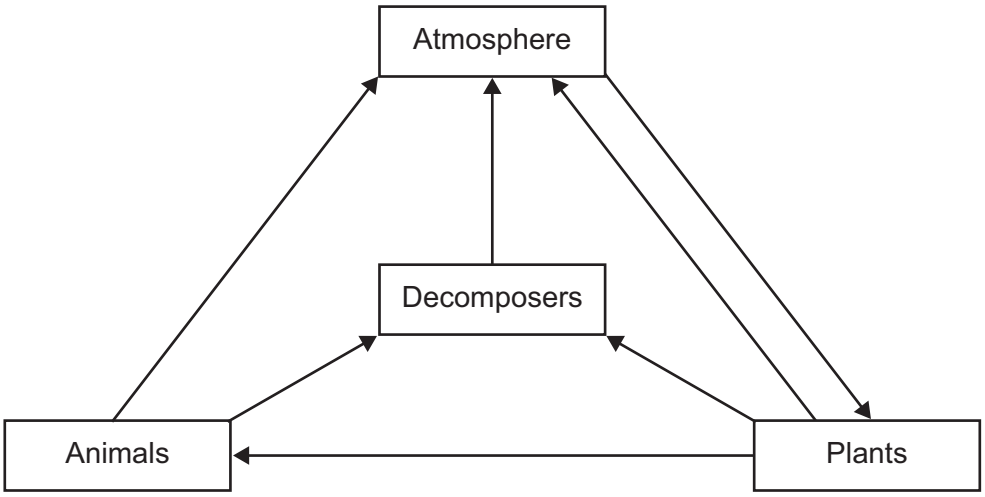
8 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

All living organisms need carbon-containing compounds.

The carbon in these compounds is recycled all the time.

Figure 8 shows how carbon is recycled all the time (the carbon cycle).

Figure 8



Describe how carbon is recycled.

In your answer you should:

- name the processes involved
- describe how plants and animals and decomposers get their carbon-containing compounds
- describe how living organisms return carbon to the environment.

[6 marks]

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Extra space .....

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6

END OF QUESTIONS

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