



General Certificate of Secondary Education  
2010–2011

Centre Number

71

Candidate Number

**Science: Single Award (Modular)**  
Chemical Patterns and our Environment  
Module 3

Foundation Tier

[GSC31]



WEDNESDAY 23 FEBRUARY 2011, 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 eight** 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.  
A Data Leaflet is provided for use with this paper.

For Examiner's  
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total  
Marks

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- 1 (a) The list below shows some well known foods and methods of preserving them. Using lines, link each food to the most suitable method of preservation.

Food	Method of Preservation
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">fish fingers</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">drying</div>
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">tea leaves</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">canning</div>
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">baby onions</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">pickling in vinegar</div>
	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;">freezing</div>

[3]

- (b) Name two types of organisms which can cause food to go bad.

Choose from:

**bacteria      sugar      flu      fungi      salt**

\_\_\_\_\_ and \_\_\_\_\_ [2]

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Marks	Remark

- 2 The list below shows five chemicals and the hazard symbols on their container.

Ammonia solution



Ammonia



Ammonium dichromate



Ammonium nickel sulphate



Ammonium nitrate



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(a) From the **information given**:

(i) name a chemical which is explosive.

\_\_\_\_\_ [1]

(ii) name a chemical which is corrosive.

\_\_\_\_\_ [1]

(b) What type of hazard is shown for ammonium nickel sulphate?

\_\_\_\_\_ [1]

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Marks Remark

- (c) In the space below draw the hazard symbol you would find on a radioactive substance.



[1]

- (d) Many lorries carrying chemicals travel throughout Europe. Suggest why hazard symbols are used instead of words on these lorries.

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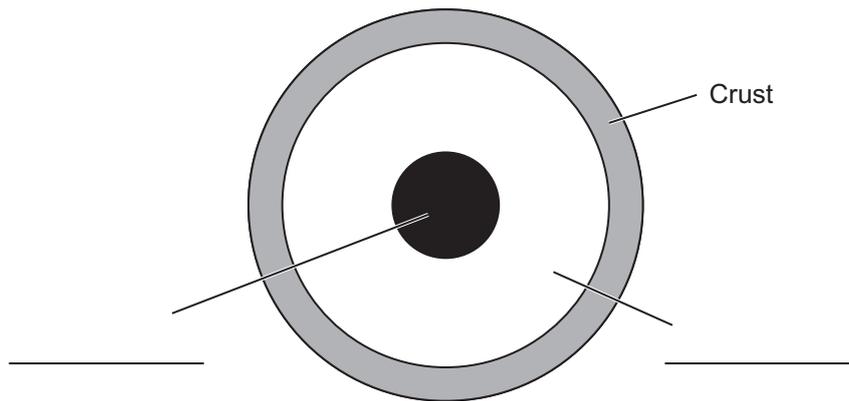
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[1]

Examiner Only	
Marks	Remark

3 (a) The Earth can be divided into three main layers.

Complete the labels on the diagram below.



[2]

(b) The Giant's Causeway is a famous tourist attraction in Northern Ireland. It is made up of columns of a rock called basalt, which was formed by volcanic activity.

Name the type of rock to which basalt belongs.

\_\_\_\_\_ [1]

(c) The White Rocks in County Antrim are made of limestone.

Name the type of rock to which limestone belongs.

\_\_\_\_\_ [1]

(d) The picture below shows a fossil in a piece of limestone.



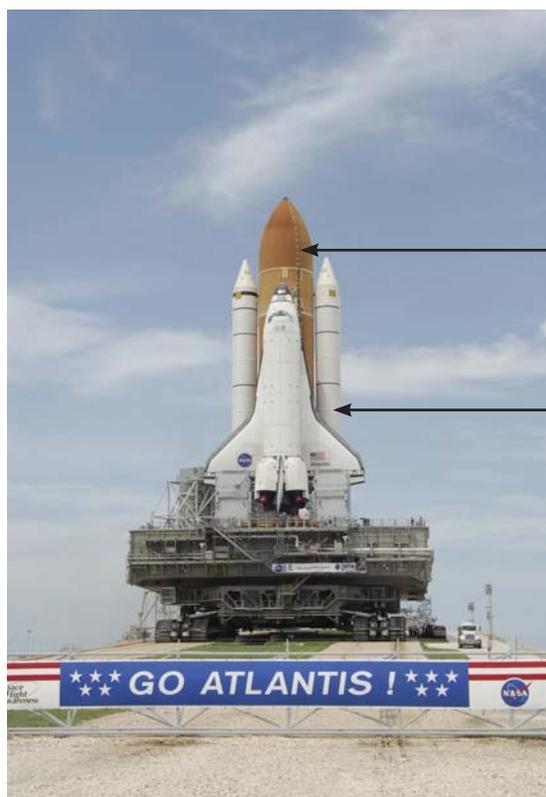
Ammonite fossil in limestone

What is a fossil?

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

4 The passage below has been taken from a newspaper article.



**Space Shuttle**

© NASA/Jack Pfaller

Nose cone

Fuel tank

The fuel to launch the space shuttle into space is placed in two tanks. One tank is filled with oxygen and the other is filled with hydrogen. When the fuel burns energy is released and water is formed.

The nose cone of the rocket is coated with a non-stick substance, which is made from fluorine.

(a) Name the **three** elements mentioned in the newspaper article.

\_\_\_\_\_ [3]

The non-stick substance is a compound.

(b) What is meant by the term **compound**?

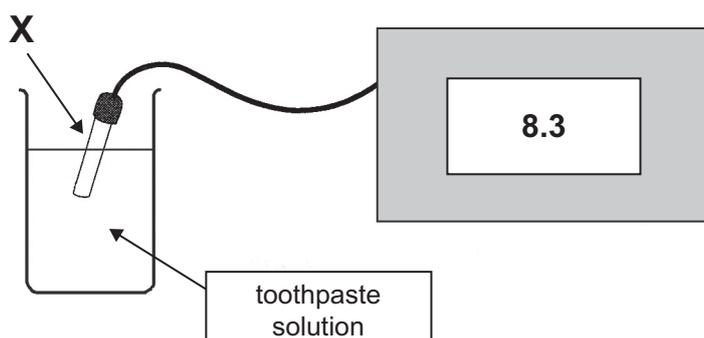
\_\_\_\_\_  
 \_\_\_\_\_ [2]

(c) What is the chemical formula for water? \_\_\_\_\_ [1]

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Marks Remark

- 5 The diagram below shows the apparatus used for measuring the pH of toothpaste.



- (a) Name the piece of apparatus labelled X.

\_\_\_\_\_ [1]

- (b) The reading on the meter shows a pH of 8.3.

What type of substance does this show toothpaste to be?

**Circle** the correct answer.

**alkaline**      **sweet**      **acidic**      **neutral**      [1]

- (c) Complete the following sentence.

Toothpaste is used to neutralise \_\_\_\_\_ in the mouth. [1]

- (d) Some plants contain dyes which change colour depending on the pH.

What general name is given to these types of dye?

\_\_\_\_\_ [1]

- (e) Describe the steps you would take to extract the dye from some red cabbage leaves.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [3]

Examiner Only

Marks Remark



- 7 Paul set up an experiment to investigate the reactions of metals with solutions of their salts.

In beaker A he put zinc into a solution of copper sulphate.

In beaker B he put iron into a solution of zinc sulphate.

He left the beakers to stand for 30 minutes.

Beaker	Colour at start	Colour after 30 minutes.
A	Solution – blue Metal – grey	Solution – _____ Metal – _____
B	Solution – colourless Metal – grey	Solution – _____ Metal – _____

- (a) Complete the table above to show the colours Paul observed after 30 minutes. [4]

- (b) What is the name given to this type of reaction?

Circle the correct answer.

Decomposition      Displacement      Combustion      [1]

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Marks	Remark

- 8 Mary carried out an experiment to find out how much magnesium oxide could be produced by heating 8.4 g of magnesium carbonate.

She heated the magnesium carbonate in a test tube with a Bunsen burner.

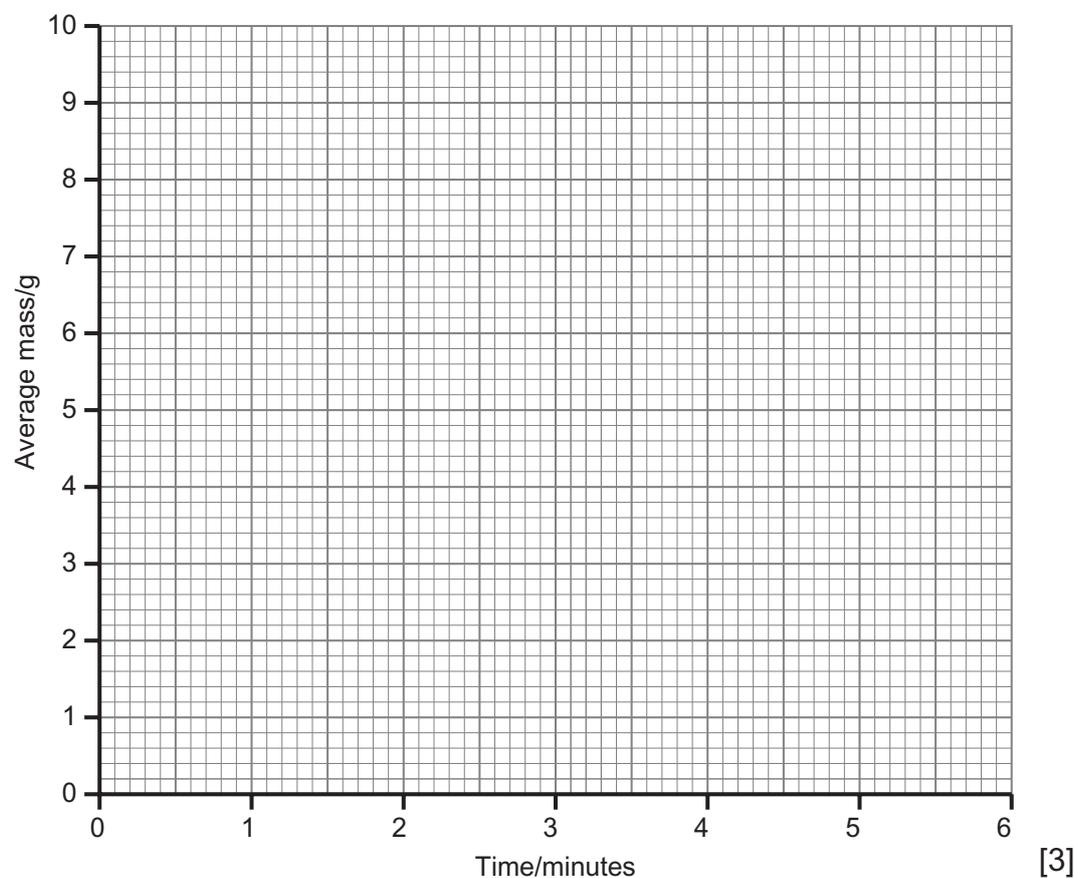
Mary then recorded the mass of the solid remaining in the test tube every minute.

She repeated the experiment with another 8.4 g of magnesium carbonate.

Her results are shown in the table below.

Time/ minutes	0	1	2	3	4	5	6
Mass/g (test 1)	8.4	7.1	6.3	5.3	4.3	3.9	3.9
Mass/g (test 2)	8.4	6.9	5.9	4.7	4.1	4.1	4.1
Average mass/g	8.4	7.0	6.1	5.0	4.2	4.0	4.0

- (a) On the grid below plot and draw a line graph of average mass against time.



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(b) Why did Mary do the experiment twice and calculate an average?

\_\_\_\_\_ [1]

(c) Give one safety precaution Mary would have taken.

\_\_\_\_\_ [1]

(d) The word equation for this reaction is given below.

magnesium carbonate  $\longrightarrow$  magnesium oxide + carbon dioxide

(i) What name is given to this type of chemical reaction?

\_\_\_\_\_ [2]

(ii) When 8.4 g of magnesium carbonate is heated, 4.0 g of magnesium oxide is left.

Calculate how much carbon dioxide has been given off.

Answer \_\_\_\_\_ g [1]

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**THIS IS THE END OF THE QUESTION PAPER**

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Marks	Remark

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