

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
TWENTY FIRST CENTURY SCIENCE  
SCIENCE A**

**A214/01**

Unit 4: Ideas in Context (Foundation Tier)

**Friday 27 May 2011  
Morning**

**Duration: 45 minutes**

Candidates answer on the question paper.  
A calculator may be used for this paper.

**OCR supplied materials:**

- Insert (inserted)

**Other materials required:**

- Pencil
- Ruler (cm/mm)




Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- The insert will be found in the centre of this document.
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **40**.
-  Where you see this icon you will be awarded a mark for the quality of written communication in your answer.
- This document consists of **8** pages. Any blank pages are indicated.

Answer **all** the questions.

**1 This question is based on the article ‘Are organic foods better for us?’.**

**(a)** Many people buy organic food because they believe that it is more nutritious.

**(i)** People may have other reasons to buy organic food.

Give two **other** reasons that are mentioned in the article.

1 .....

2 .....

**[2]**

**(ii)** The level of nutrients in foods may vary for a number of reasons.

State one factor mentioned in the article that may cause the level to vary.

..... **[1]**

**(b)** The article describes a study carried out for the Food Standards Agency (FSA).

**(i)** What does the article say about the job of the Food Standards Agency?

.....

..... **[1]**

**(ii)** In 2009 the FSA made a study of the nutritional value of organically grown food.

What was the conclusion of this study?

.....

..... **[1]**

**(iii)** There is more phosphorus in organic food. Phosphorus is a mineral needed in the diet.

How does the FSA explain that this extra phosphorus does not make organic food more nutritious?

.....

..... **[1]**

(c) Farmers using intensive farming methods spray crops with pesticides to control insect pests.

(i) The FSA says it is safe to eat food from crops sprayed with pesticides.

Give two reasons to explain why.

1 .....

.....

2 .....

.....

[2]

(ii) Farmers who grow organic vegetables use different methods to control insect pests.

One method is to use **natural predators**.

Explain how this method works.

.....

.....

..... [2]

(d) Look at the table of results showing vitamin C content in tomatoes.

(i) What is the range for the vitamin C content of the **organically** grown tomatoes?

range = ..... to ..... mg/100g [1]

(ii) When calculating the best estimate for the intensively grown tomatoes the scientists ignored the value for one sample.

Which sample did the scientists ignore?

Explain why.

sample .....

explanation .....

..... [2]

[Total: 13]

2 This question is based on the article ‘Methane from the Arctic’.

(a) Professor Walter did her research in Alaska. Similar research was done in northern Russia.

(i) What is the correct term for repeating another scientist’s experiment?

Put a ring around the correct term.

copying      peer review      replication

[1]

(ii) Scientists think that it is important to repeat an experiment that someone else has done.

Explain why.

.....  
..... [1]

(b) (i) Describe how methane is made in Arctic lakes. Use the article to help you.

.....  
..... [2]

(ii) Explain how carbon dioxide and methane cause global warming.

Your answer should refer to

- the effect of greenhouse gases on radiation
- the source of the radiation.

.....  
.....  
.....  
..... [2]

(c) The article states that the carbon dioxide level changed from 280 ppm to 387 ppm.

This is an increase of 107 ppm, which is nearly 40%.

Calculate the actual percentage increase.

percentage increase = ..... % [2]

- (d) The article states that ‘... the consequences of continued global warming will be severe.’

Write down one consequence of continued global warming, and explain why it will have a severe effect.

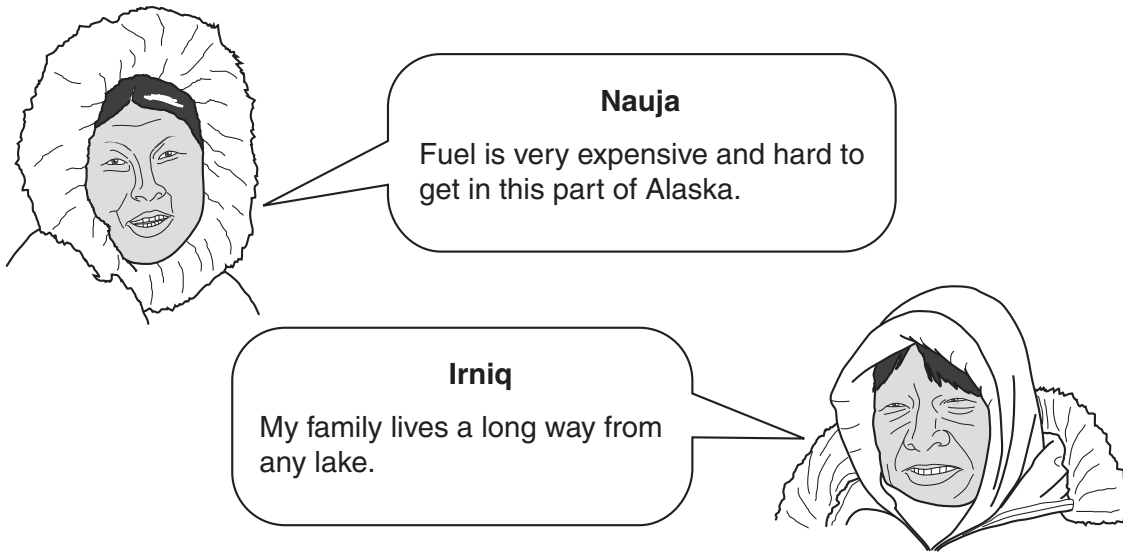
consequence .....

why it will be severe .....

..... [2]

- (e) The article suggests that methane from the lakes can be collected and used as a fuel.

This is what two people who live in the Arctic say.



Use what these people say, together with information from the article, to write down the advantages and disadvantages of using Arctic methane as a fuel.



One mark is for considering both sides of the argument.

.....  
.....  
.....  
..... [2+1]

- (f) One suggestion to keep the permafrost frozen is to introduce herds of grazing animals.

This idea is being tested in northern Russia.

Use the article to name one animal being tried out for this job.

..... [1]

[Total: 14]

Turn over

**3 This question is based on the article “‘Pump head’ syndrome”.**

Heart-lung machines take over the function of the heart and lungs when heart surgery is carried out.

**(a)** Write down **one** thing that the machine does to the blood.

.....  
..... [1]

**(b)** Some scientists believe that heart-lung machines cause ‘pump head’ syndrome.

**(i)** Write down **one** symptom of ‘pump head’ syndrome.

.....  
..... [1]

**(ii)** Describe the data in **Part A** that made these scientists believe that heart-lung machines cause ‘pump head’ syndrome.

.....  
..... [1]

**(c)** Some scientists think that the data in **Part A** is flawed.

Use the information from **Part B** to suggest two reasons why the data is flawed.

1 .....

2 .....

[2]

**(d)** **Part C** describes the study carried out by Ola Selnes.

152 patients had surgery using a heart-lung machine.  
In the previous study 42% of patients developed ‘pump head’ syndrome.  
If this result was repeated in Professor Selnes’ study, how many of the 152 patients would develop ‘pump head’ syndrome?

Show your working.

answer = ..... [2]

(e) All the patients in the study in **Part C** were tested for up to six years after treatment.

Explain why.

.....  
..... [1]

(f) Write down the conclusion of Ola Selnes' study.

.....  
..... [1]

(g) State two lifestyle factors that can contribute to heart disease.

1 .....  
2 ..... [2]

(h) The new findings will have to be **peer reviewed**.

Explain what is meant by peer review.

.....  
..... [2]

[Total: 13]

**END OF QUESTION PAPER**

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