Science in Society   SCIS4

Unit 4   Case Study

Tuesday 26 June 2012   9.00 am to 10.30 am

For this paper you must have:
- a 12-page answer book
- a copy of Pre-released source material (Sources A–E).

Time allowed
- 1 hour 30 minutes

Instructions
- Use black ink or black ball-point pen.
- Write the information required on the front of your answer book. The **Examining Body** for this paper is AQA. The **Paper Reference** is SCIS4.
- Answer **all** questions.
- Write your answers in continuous prose.
- Use your own words, rather than simply repeating those used in the sources, to show your understanding of the points being made.

Information
- The additional source material (**Source F**) is printed on page 5 of this booklet.
- The maximum mark for this paper is 60 (36 marks for Section A, 24 marks for Section B).
- You may use a calculator.
- You will be marked on your ability to:
  – use good English
  – organise information clearly
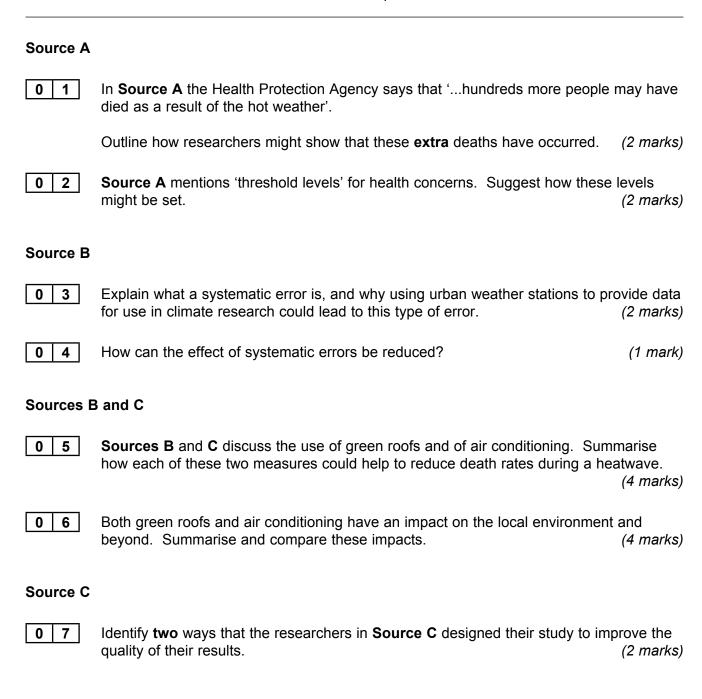 – use specialist vocabulary where appropriate.

Advice
- Section A: Questions testing your appreciation and understanding of the Case Study Source Material on the subject of trees and air temperatures.
- Section B: Questions that ask you to demonstrate your ability to construct an appropriate explanation for a given audience, and seek your argued opinion on an issue raised by the Case Study material.

SCIS4

Section A

Answer **all** of the questions.

Source A

| 0 | 1 | In **Source A** the Health Protection Agency says that '...hundreds more people may have died as a result of the hot weather'.

Outline how researchers might show that these **extra** deaths have occurred. *(2 marks)*

| 0 | 2 | **Source A** mentions 'threshold levels' for health concerns. Suggest how these levels might be set. *(2 marks)*

Source B

| 0 | 3 | Explain what a systematic error is, and why using urban weather stations to provide data for use in climate research could lead to this type of error. *(2 marks)*

| 0 | 4 | How can the effect of systematic errors be reduced? *(1 mark)*

Sources B and C

| 0 | 5 | **Sources B** and **C** discuss the use of green roofs and of air conditioning. Summarise how each of these two measures could help to reduce death rates during a heatwave.
(4 marks)

| 0 | 6 | Both green roofs and air conditioning have an impact on the local environment and beyond. Summarise and compare these impacts. *(4 marks)*

Source C

| 0 | 7 | Identify **two** ways that the researchers in **Source C** designed their study to improve the quality of their results. *(2 marks)*

Source D

| 0 | 8 | Using information from **Source D** discuss why computer modelling and experimental research are **both** useful in measuring how effective vegetation is for cooling a city.
(4 marks)

Source E

0 9 Use **Source E** to explain what a systematic review is, and why they are useful. *(2 marks)*

1 0 Figure 3 in **Source E** summarises the results of the 26 studies reviewed. What does a positive value on the x-axis show? *(1 mark)*

1 1 From Figure 3 in **Source E** identify **two** studies from which we cannot conclude that there is a difference between park and urban. *(1 mark)*

1 2 In **Source E** the opening paragraph of section 4 'Overview of studies', and section 5 'Discussion on the strength of evidence', highlight a number of limitations in the studies included in the review.

Identify **two** of the limitations and suggest why they might reduce the usefulness of the data. *(4 marks)*

Source F

1 3 Identify **two** environmental benefits of street trees claimed by **Source F**. *(2 marks)*

1 4 **Source F** mentions a number of methods that 'Trees for Cities' are using to consult people about the 'street tree' programme. Suggest **one** advantage and **one** disadvantage of one of the methods used to collect the data. *(2 marks)*

1 5 Although the 'street tree' programme is supported by scientific evidence, other factors may have played a role in the decision to implement the programme. Outline other factors that decision makers, such as the Mayor of London, may have taken into account when deciding to fund the 'street tree' programme. *(3 marks)*

Turn over for the next question

Section B

Answer **both** questions.

---

1 6 Although cities and the surrounding countryside receive the same solar radiation, the temperature in the city is typically 4°C higher than the countryside. This urban heat island effect happens both by day and by night.

Source D was written for a professional science audience to describe the research being carried out into the urban heat island effect.

Explain the *urban heat island effect* in detail, in language suitable for an AS Science in Society student.

You may find both **Source B** and **Source D** helpful in your answer.   *(12 marks)*

1 7 A local council has decided to follow London's lead in planting large numbers of street trees. However, the local newspaper is conducting a campaign against this on grounds of both the cost of planting and the cost of cleaning up fallen leaves.

Write an article for the newspaper **supporting** the council and explaining why the benefits of trees go well beyond improving the look and feel of a neighbourhood.
          (12 marks)

END OF QUESTIONS

Source F

Extract of Press release from Mayor of London's Press Office, 2 December 2010

9 500 of Boris's street trees take root

24 London boroughs are set to enjoy the leafy shoots of 4 500 new street trees this winter, thanks to funding from the Mayor of London, Boris Johnson. This will bring the total number of trees funded by the Mayor since he was elected to over 9 500, well on track to meet his target of planting 10 000 street trees by March 2012.

Now in its third year, the Mayor's street tree programme has already given money to plant more than 5000 street trees across London in areas identified as being most in need of them.

In addition to improving the look and feel of a neighbourhood, street trees offer a range of benefits such as attracting wildlife, providing shade, helping to improve local air quality and reducing flood risk.

The Mayor's milestone also coincides with the launch today (2 December) of Defra's new national programme - the Big Tree Plant - to support tree planting across the UK, in the same way the Mayor is doing in London.

The Mayor, Boris Johnson said: 'Thanks to these trees, streets across London are leafier, more pleasant places to live in. It is superb news that we are firmly on track, and actually ahead of schedule, to meet my target of 10 000 new street trees by 2012.'

The Mayor's programme asks that funding recipients work with the community to identify areas where local people most want trees. Newham Council will be consulting local residents and schools, including providing questionnaires to enable them to get involved in choosing which species of trees are planted.

The charity, Trees for Cities, is working in partnership with a number of boroughs to plant new street trees and will be consulting widely through door-to-door home visits, letters, questionnaires and interactive workshops with local people and community groups.

London is a very green city compared to other world cities, two-thirds of the capital's land area is green space and water and the Mayor's street tree and parks programmes are helping to make London greener still. This benefits both Londoners' quality of life as well as helping tackle issues such as climate change. About 1.75 million Londoners live in areas that are more than 1 km from a nature or wildlife spot - this was a factor in choosing which areas are being given priority for street trees. The Mayor wants the new trees to be planted in 40 residential areas where few street trees exist and which would most benefit from them.

END OF SOURCE F

There are no questions printed on this page

There are no questions printed on this page

There are no questions printed on this page