

Write your name here	
Surname	Other names
Centre Number	Candidate Number
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Edexcel GCE	
General Studies	
Advanced	
Unit 3: Change and Progress	
Monday 14 June 2010 – Morning Time: 1 hour 30 minutes	Paper Reference 6GS03/01
You must have: Insert (enclosed)	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions in Sections A and B and **one** question in Section C.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Do not return the insert with the question paper.

Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Quality of written communication will be taken into account in the marking of your answers
– *you should take particular care with your spelling, punctuation, grammar and clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Check your answers if you have time at the end.

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SECTION A

Answer ALL questions.

You should aim to spend no more than 30 minutes on this section.

Read Source 1 on the separate insert and then answer questions 1–6.

1 (a) Give two reasons why the government collects data from death certificates. (2)

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(b) What are the limitations of data collected from death certificates? (2)

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(Total for Question 1 = 4 marks)



2 Describe the trend in the graph showing MRSA as the underlying cause of death.

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(Total for Question 2 = 2 marks)

3 Explain the significance of the observation that the number of certificates mentioning *Staphylococcus aureus*, but not MRSA, has been constant from 1993–2007.

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(Total for Question 3 = 2 marks)

4 MRSA is often referred to as a “hospital-acquired” infection. Why are hospital-acquired infections of great concern to health services?

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(Total for Question 4 = 2 marks)



6 Progress in medicine can cause ethical, social or economic problems. How can such problems be avoided or minimised?

Lined writing area for the answer to question 6.



(Total for Question 6 = 14 marks)
includes 4 marks for Quality of Written Communication

TOTAL FOR SECTION A = 30 MARKS



SECTION B

Answer ALL questions.

You should aim to spend no more than 30 minutes on this section.

Read Source 2 on the separate insert and then answer questions 7–12.

7 What is meant by the term 'scientific method' (line 30)?

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(Total for Question 7 = 2 marks)

8 Give two statements, one from each of paragraphs 2 and 4 that support the writer's claim that Newton's comment to Hooke is a 'strangely modest and paradoxical one' (line 32).

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(Total for Question 8 = 2 marks)



9 Newton discovered that sunlight (white light) is a mixture of light of different colours that could be separated and recombined using prisms. The Impressionists discovered that the use of brush strokes of pure paint colour could produce the effect of movement and realism in their paintings.

How similar are scientific discoveries and artistic innovations?

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(Total for Question 9 = 3 marks)

10 Newton made use of an analogy in developing his scientific explanation of gravitation.

(a) Identify and explain this analogy.

(3)

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Lined writing area with horizontal dotted lines.



Blank lined area for writing.

TOTAL FOR SECTION C = 30 MARKS

TOTAL FOR PAPER = 90 MARKS



Edexcel GCE

General Studies

Advanced

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Insert

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Source material

Source 1

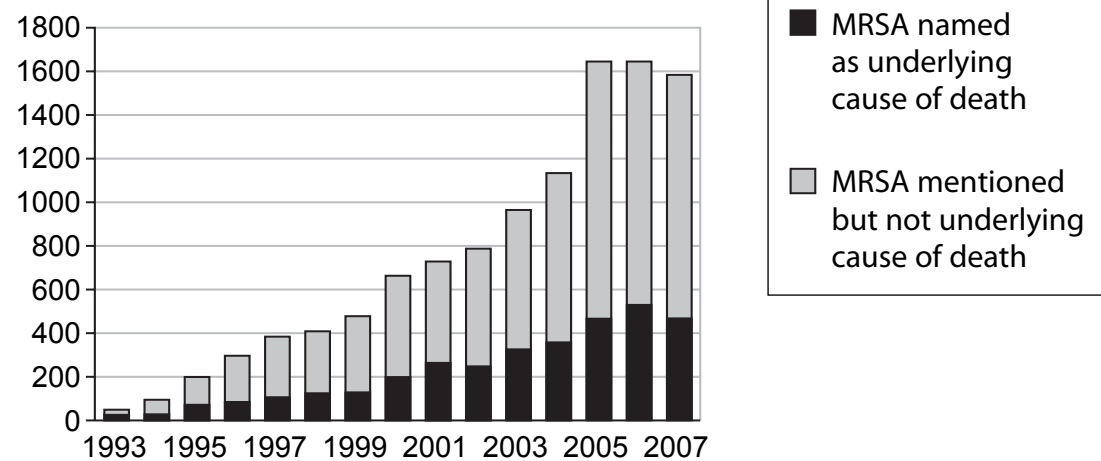
Superbugs

Deaths in the UK must be registered with the local Council. When registering a death, a certificate giving the cause of death must be signed by the attending doctor. Death certificates are an important source of data for recording changes in the virulence of certain bacterium, as the following example shows.

Staphylococcus aureus is a common bacterium which causes minor infections of the skin, but can also infect other tissues. It produces toxins that may circulate in the blood. For many years, antibiotics such as penicillin and meticillin have been used to treat these infections. However, in recent years a more virulent form of the bacterium, meticillin-resistant *Staphylococcus aureus* (MRSA), has developed. MRSA is resistant to the meticillin antibiotic.

The number of death certificates mentioning *Staphylococcus aureus* was relatively constant over the period 1993–2007. But the number of death certificates mentioning MRSA increased from 51 to 1,652 between 1993 and 2006. In recent years, the proportion of these deaths where MRSA was the underlying cause has stabilised at around one in three.

Number of deaths



Number of death certificates referring to MRSA, England and Wales

Most of the deaths involving MRSA were in the older age groups. Mortality rates in 2007 for deaths involving MRSA in the 85 and over age group were 767 and 337 deaths per million population for males and females respectively. In the under 45 age group, there was 1 death per million population for both males and females.

Source: adapted from Deaths; Office for National Statistics, 28 August 2008

Source 2

Standing on the shoulders of giants?

Sir Isaac Newton grew up lacking the homeliness of family. Newton's father had died just before he was born, his mother remarried, and he was brought up by his grandmother. He never related well to other people and what he achieved, he achieved on his own. He was constantly afraid that others would steal his ideas.

5 Although he was well trained in mathematics at school, he was not regarded as an outstanding student when he went to Cambridge. After he graduated in 1664, plague struck England and for two years he spent most of his time at home in Lincolnshire. As he acknowledged, this time was the most productive of his life for new work. His notebooks show that he proved most mathematical ideas for himself,
10 and he went on to make many more discoveries. He invented the mathematical technique of the calculus, but kept it as his secret tool and wrote out his results in conventional mathematical form. He spent much time in practical experimentation, and made highly original observations on the nature of light and colour.

The discovery for which he is most widely known, the universal law of gravitation,
15 was also made at this time. The Moon fascinated him. He reasoned that it circles the Earth because it is like a ball that has been thrown very hard. It is falling back to Earth, but is going so fast that it misses because the Earth is round. So the Moon stays in orbit. He realised that all bodies attract one another (the traditional apple falls to earth), but that the attraction is weaker the further they are apart. With these
20 ideas he calculated the force necessary to keep the Moon circling the Earth, and from that the time of orbit of the Moon. His first rough calculation was very close to the actual period of 27¼ days.

He kept things close to his chest however. Much of his brilliant work on optics was completed early in his career, but he did not publish it until 20 years later. He had a
25 bitter dispute with Robert Hooke about the originality of his ideas. He fought a long battle with the distinguished mathematician Leibniz about the calculus, because he could not believe that Leibniz had also discovered the technique independently.

Newton is widely regarded as the greatest scientist ever, because he was the first to show how natural phenomena could be explained by the use of the
30 scientific method. However, his comment in a letter to Robert Hooke in 1676 that "If I have seen further it is by standing on the shoulders of giants" is a strangely modest and paradoxical one.

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