



General Certificate of Education
Advanced Level Examination
January 2013

General Studies (Specification A)

GENA4/PM

Unit 4 A2 Science and Society

Case Study Source Material

For use with **Section A**

- The material consists of five sources (A, B, C, D and E) on the subject of **new inventions, their implications and the challenges of putting them into practice**. These extracts are being given to you in advance of the Unit 4 examination to enable you to study the content and approach of each extract, and to consider issues which they raise, in preparation for the questions based on this material in Section A.
- A further Section A source (F) will be provided in the examination paper.
- Your teachers **are** permitted to discuss the material with you before the examination.
- You may write notes in this copy of the Source Material, but you will not be allowed to bring this copy, or any other notes you may have made, into the examination room. You will be provided with a clean copy of the Source Material at the start of the Unit 4 examination.
- You are not required to carry out any further study of the material than is necessary for you to gain an understanding of the detail that it contains and to consider the issues that are raised. It is suggested that three hours' detailed study is required for this purpose.
- In the examination room you are advised to spend approximately one hour and fifteen minutes reading a previously unseen extract and answering a range of Section A questions based on all the source material.

Source A: (Figures 1–7)

Figure 1 – A history of video surveillance in England



Image: © Dan De Kleined/Alamy

- 1913 : Surreptitious photography of imprisoned suffragettes begins.
- 1949 : Publication of George Orwell's *1984*, which is set in London.
- 1960 : Police use two temporary cameras in Trafalgar Square to monitor crowds watching the Thai royal family and on Guy Fawkes Day.
- 1961 : Installation of video surveillance at a London Transport station.
- 1967 : Photoscan markets video surveillance systems to retail outlets as a means of catching and deterring shoplifters.
- 1969 : Police install permanent cameras in Grosvenor Square, Whitehall and Parliament Square. Total number of cameras nationally : 67.
- 1975 : Installation of video surveillance systems in four London Underground stations, and video surveillance at soccer matches begins.
- 1989 : Liberty publishes *Who's watching you? Video surveillance in public places*.
- 1992 : Use of speed cameras begins on national road network.
- 1994 : Home Office publishes *CCTV: Looking Out for You*. Prime Minister John Major states: "I have no doubt we will hear some protest about a threat to civil liberties. Well, I have no sympathy whatsoever for so-called liberties of that kind."
- 1996 : Video surveillance used in all of England's major city centres except Leeds.
- 1997 : First police use of surveillance cameras for reading, recognising and tracing car registration numbers.

Source: www.notbored.org/england-history.html

Figure 2 – CCTV in London

(a) CCTV success in 2010

- 2512 wanted people, including suspected murderers and rapists, have been successfully identified by London's Metropolitan Police using CCTV in 2010.
- In 2010, specialist teams of video ID investigators identified 574 robbery suspects, 427 people wanted for burglary, 199 for grievous bodily harm, and 23 suspected sex offenders. The overall figure marks a 25% increase on 2009.
- The majority of CCTV cameras in London are privately owned, usually by businesses, with the remaining cameras belonging to public bodies such as local councils, road safety partnerships and the police.
- Co-ordinator Detective Chief Inspector Mick Neville said: "CCTV is important in the fight against crime as it helps to tell us what actually occurred. While DNA or fingerprints will show the suspect being at the scene, CCTV will show the crime happening."

Source: adapted from: Metropolitan Police Service, 'CCTV success in 2010'
© Metropolitan Police Authority 2010

(b) London Olympics 2012: one big party or one big prison?



Security Fence: The 17.5 km fence around the Olympic Stadium has 900 day and night vision cameras and is topped with many strands of 5000 volt electrified wire. It gives the feeling of a prison rather than of a party venue. © Richard Baker/Alamy

Turn over ►

Figure 3 – Councils ‘spending £315m on CCTV’

- According to figures released under the Freedom of Information Act, councils spent at least £315 million on installing and operating CCTV cameras between 2007/8 and 2009/10, according to campaigners.
- Birmingham City Council, home of the controversial Project Champion scheme which saw more than 200 surveillance cameras installed in two largely Muslim neighbourhoods, topped the list of council big spenders with £10.5 million on CCTV alone, Big Brother Watch said.
- West Midlands Police apologised over the Project Champion scheme. Chief Constable Chris Sims admitted that the force had got the balance between counter-terrorism and excessive intrusion into people’s lives “so wrong”.
- The Birmingham scheme was organised through an initiative involving West Midlands Police, Birmingham City Council and other agencies. The partnership has acknowledged that it should have been more explicit about the role of the city’s Counter Terrorism Unit in setting up the 218 cameras which, like the car number plate recognition scheme, were marketed to locals as a general crime prevention measure.

Councils spending the most on CCTV between 2007 and 2009

(More than 80 councils did not respond to the Freedom of Information Act request and 15 said that they did not operate any public-facing CCTV cameras.)

Councils	Amount spent
Birmingham	£10.47 million
Sandwell (West Midlands)	£ 5.35 million
Leeds	£ 3.83 million
Edinburgh	£ 3.60 million
Hounslow (Outer London)	£ 3.57 million

Source: adapted from WESLEY JOHNSON, ‘Councils spending £315m on CCTV’,
The Independent, 30 November 2010
www.independent.co.uk

Figure 4 – CCTV images

(a) Our protection



© Thinkstock

(b) Statutes of liberty



© Tony Kyriacou/Rex Features

Figure 5 – Crime data

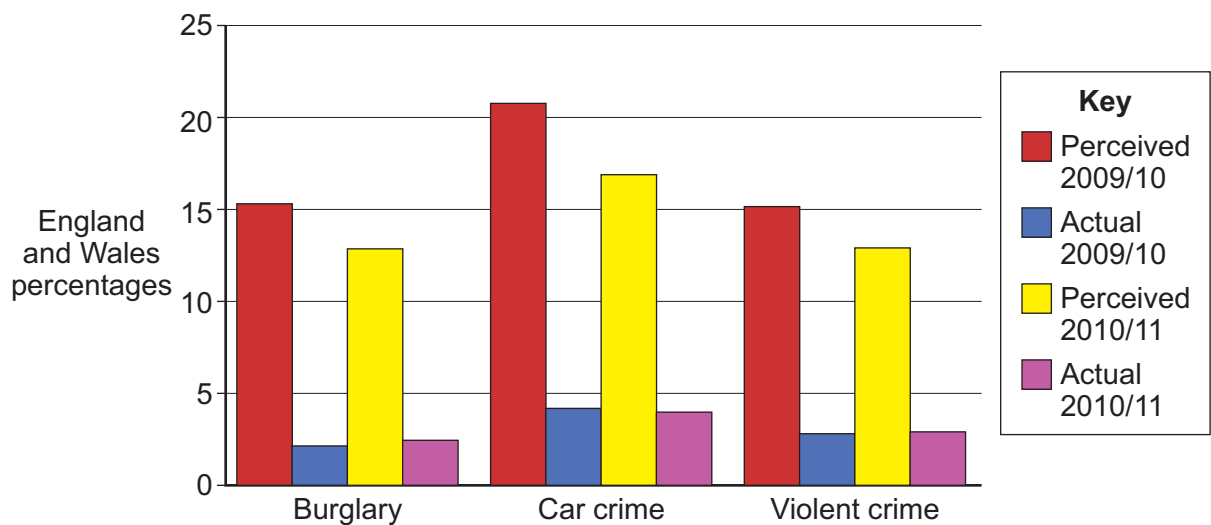
(a) Fixed penalties for motoring offences detected by cameras

England and Wales

Year	Speeding offences	Traffic light offences	All offences
2000	599	52	651
2001	878	46	924
2002	1135	71	1206
2003	1670	115	1785
2004	1787	113	1900
2005	1824	124	1948
2006	1689	120	1809
2007	1296	109	1405
2008	1048	100	1148
2009	935	92	1027

All figures for offences are in thousands

(b) Perceived and actual likelihood of being a victim of crime: by crime type



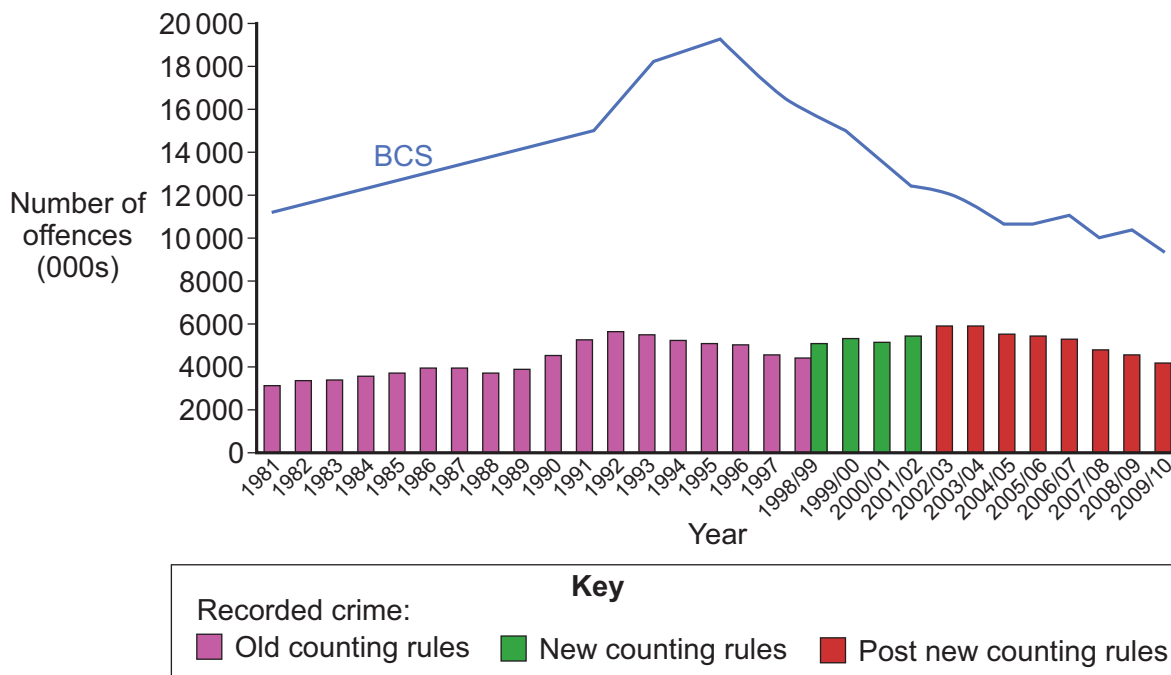
Source: adapted from LOUISE CLARK, 'Crime and Justice: Social Trends 41' – Office for Online Statistics
© Crown Copyright

Figure 6 – Measuring levels of crime

There are two main sources of official statistics on crime: the police recorded series and the British Crime Survey (BCS).

- (1) The BCS is a nationally representative sample survey based on more than 45 000 respondents from the population resident in households in England and Wales. As a household survey, the BCS does not cover all offences or all population groups.
- (2) Police recorded crime has a wider coverage; it does not include crimes not reported to the police.

Trends in recorded crime and the BCS 1981 – 2009/10



Source: adapted from JOHN FLATLEY et al., 'Crime in England and Wales 2009/10 – Office Statistical Bulletin', *Home Office Statistical Bulletin July 2010*

Source A continues on the next page

Figure 7 – Common misconceptions about CCTV challenged

- 4.2 million CCTV cameras? That's what we've been told but new research paints a different picture.
- To claim that we have more CCTV cameras than any other country assumes that we know how many there are in every other country. Until now, we didn't even have a reliable estimate of camera numbers in this country.
- The supposed Orwellian society that we live in makes an interesting story, so it's unsurprising that the media continue to use an outdated and discredited figure of 4.2 million without question.
- The 4.2 million figure was produced by Michael McCahill and Clive Norris in 2003 and was based on counting, estimating and extrapolation calculations in parts of London. An estimate of 1 CCTV camera for every 14 residents in London was extrapolated across the whole of the UK, giving a final figure of 4.285 million CCTV cameras.
- Another statement frequently quoted is that 'the average Briton is caught on security cameras 300 times a day' – a figure produced by Garry Armstrong and Clive Norris in 1999, based on the fictional journey of a fictional character as he travels round London on one day.
- Developing a more accurate estimate of the number of CCTV cameras in the UK is not easy, particularly as there is no requirement to give notification of the installation of a CCTV camera.
- In a police CCTV mapping exercise, the figures for Cheshire were extrapolated to indicate a total of 1.7 million CCTV cameras across the UK.
- In a further exercise to calculate how many times an average person was caught on a security camera every day, Cheshire police found that, on average, this was 68 times, rather than the 300 calculated by Armstrong and Norris.

Source: GRAEME GERRARD*, *ACPO: The Police Chiefs' Blog*, 3 March 2011
www.acpo.police.uk/ThePoliceChiefsBlog/GraemeGerrardsCCTVblog

*Graeme Gerrard is Deputy Chief Constable of Cheshire and lead officer on CCTV for the Association of Chief Police Officers (ACPO).

Source B: Technology is key as car crime hits the skids

The motor industry believes it is winning the war against car crime, with figures showing that, in 2010, 107 000 vehicles were stolen, compared with an annual 600 000 that were stolen 20 years ago. The thief with a coathanger, screwdriver, or “slim jim” is a thing of the past, thanks to improved security features. But fitting immobilisers, compulsory on new cars since 1997, has led to an increase in house burglaries solely to get car keys. The modern thief is more likely to be equipped with a laptop, as professionals turn to technology to outwit manufacturers.



Simply hiding or not leaving your valuables in your car is the best prevention

© Flying Colours Ltd/Getty Images



Wheel locks – not as strong as you might think

© Greg Balfour Evans/Alamy



It is possible to steal some late-model cars with a laptop

© Jochen Tack/Alamy

The reduction in car thefts was “due to the incredible improvements to a raft of security systems including alarms, locks, immobilisers, toughened glass and tracking devices,” said Andrew Miller, director of research at the motor insurance repair research centre. Innovations mean opportunist thieves need the keys to start car engines (though a determined thief can sometimes get round this) and “hotwiring” is no longer possible except on much older models.

Turn over ►

20% (20 000) of cars stolen in 2010 had keys taken in burglaries, according to police figures. According to Detective Chief Inspector Mark Hooper of the Vehicle Crime Intelligence Service (VCIS), burglars are now “more brazen”. Where once a fishing rod through the letter box was common, “now they’ll walk into the back of the house while you’re watching telly”.

Criminologists point to the drop in joyriding. “You can’t simply joyride a car now by touching wires together, and they attribute about 65% of the reduction to the fact that joyriding has been boshed,” added Hooper.

There are also ways round security. Keys can be copied, cars can be towed or put on trailers and engine control units can be by-passed. Another trick is electronic manipulation of passive or smart keys that open the car from a distance. A study at Zurich University found that such keys, even inside a house, could be abused if they were within 9 metres of the front door.

“It’s fast-time stuff. Within eight hours the cars will be in a container, within 24 to 72 hours on a boat. Gone. And they’ll earn a lot of money for someone in Karachi, Tanzania or Durban. They’re turning up all over the world and someone is making a lot of money,” said DCI Hooper.

But everyday vehicles remain most at risk according to the VCIS. Statistics show that the builder’s favourite load lugger, the Ford Transit van, was top of the list in the first quarter of 2011. It is irresistible because there are so many, its spares are worth a lot on the black market, and there is a potential store of tools in the back.

Phil Everitt, chief executive of the Society of Motor Manufacturers and Traders, said the industry had to continue to outwit criminals and that linking technologies within the car to communication technologies outside was the way forward.

“There are crash avoidance systems, stability control systems and sat-nav GPS systems; that kind of technology could potentially be linked to the owner’s mobile, to the police, but also to other vehicles and other infrastructure which would allow things like automatic number plate recognition. If we can find a way to link them together, it will allow us to make it much more difficult for vehicles to be removed, and to be removed from the country.”

Source: adapted from CAROLINE DAVIES, ‘Technology is key as car crime hits the skids’,
The Guardian, 17 June 2011
© Guardian News and Media Ltd

Source C: Battle against polio is almost won, says Gates.

Polio could be eradicated in the next two to four years, the billionaire philanthropist Bill Gates predicted yesterday as he appealed to world leaders attending a global vaccine summit in London to commit extra funding to protect the world's poorest children.

If achieved, one of the most dreaded diseases of the 20th century, which crippled thousands of children in Britain and worldwide, could become the second to be consigned to the history books, after smallpox was eradicated in 1979.

Mr Gates was answering questions from the public in a phone-in organised by Save the Children in advance of today's summit meeting of the Global Alliance for Vaccines and Immunisation (GAVI), which is seeking to raise an extra £2.3 billion to save four million lives over the next five years.

David Cameron has pledged to raise the UK's contribution to the Alliance and defended the decision against critics in his own party, including Liam Fox, the Defence Secretary, who have argued that to raise overseas aid at a time of domestic austerity could lead to legal challenges.

Even sceptics about the value of aid admit that vaccination is one of the best and most cost-effective ways of protecting children. It is estimated that the lives of 20 million children have been saved over the past two decades. Mr Gates has pledged \$10bn of his personal fortune to what he has termed the "decade of vaccines". But he knows that persuading parents of the benefits of vaccination is difficult in the face of cultural opposition, scares about vaccine safety and when the only "gain" is the absence of disease.

The polio virus was identified in 1840. Major epidemics began to occur in Europe in the 1880s, spreading later to the USA and the rest of the world, sparking a race to develop a vaccine in the 1940s and 1950s. By 2000, only a few hundred cases were occurring each year worldwide and today the disease is endemic in just four countries – India, Pakistan, Afghanistan and Nigeria.

Countries with most unvaccinated children

India	9 107 580
Nigeria	3 526 980
Pakistan	810 450
Indonesia	751 320
Congo	673 900
Ethiopia	657 720
China	548 820
Uganda	540 720
Chad	391 160
Kenya	382 500

Great progress has been made in India. In Nigeria, polio had been on the brink of eradication in 2003 when a rumour spread that the vaccination caused sterility in women and was part of a plot to eliminate Muslims. "Leaders spoke out and we got a turn around – but a scare like this is a problem we are always worried about," Gates said.

After polio, malaria could be the next disease in the global vaccine community's sights. A vaccine providing 60% protection is in final trials and there was a "realistic" prospect of its being available within three years. "Then we will have to raise more money to make sure every kid gets it," Mr Gates added, signalling another challenge for GAVI.

Turn over ►

GAVI is a vaccine-buying alliance representing governments, the pharmaceutical industry and organisations such as UNICEF. It is estimated to have enabled the vaccination of 288 million children in the decade since it was established, and to have averted five million deaths by persuading drugs companies to lower prices for poor countries.

Source: adapted from, JEREMY LAURANCE, 'Battle against polio is almost won, says Gates',
The Independent, 13 June 2011
www.independent.co.uk

Source D: The MMR controversy

Research published in 1998 by the UK's Dr Andrew Wakefield has made some parents fear having their children vaccinated. The research tenuously linked the MMR (measles, mumps and rubella) vaccine to the development of autism.

Because of fear and ignorance, the rate of vaccination in different countries varies and a number of different countries are suffering negative side-effects from publicity surrounding Dr Wakefield's research. In a *Sunday Times* article in 2009 ("*MMR doctor Andrew Wakefield fixed data on autism*"), Brian Deer reported that after the publication of the Wakefield paper – and the subsequent reporting of the results in mainstream media – rates of inoculation in the UK fell from 92% to 80%.

"Populations acquire 'herd immunity' from measles when more than 95% of people have been vaccinated. Last week, official government figures showed that 1348 confirmed cases of measles in England and Wales were reported in 2008, compared with 56 in 1998," writes Mr Deer.

However, research by Dr Wakefield and his team has been found to be wrong. The respected British medical journal, *The Lancet*, where the research was first published, took the unusual step of officially retracting the paper in February 2010.

The retraction followed the ruling of the UK's General Medical Council (GMC) that Dr Wakefield and two colleagues were guilty of a range of serious breaches in a 'fitness to practise' case. The GMC wrote that Dr Wakefield acted "dishonestly and irresponsibly" and has been found to have acted with "callous disregard" for the children involved in his study.

Dr Wakefield's original research was based on only 12 children, and although the original paper did not directly claim that the combination vaccine caused the disorder, he suggested at a press conference that parents should consider using single vaccines for measles, mumps and rubella.

What was not known at the time was that Dr Wakefield had been receiving payments to find a link between the MMR vaccine and autism from a British legal team hoping to sue the vaccine manufacturers. Dr Wakefield had filed for a patent on a single measles vaccine that would benefit if the triple vaccine were discredited. Dr Wakefield knew about test results that contradicted his theory but did not publish them.

Since 1998, there have been many large studies undertaken around the world, which have all failed to find a link between the MMR vaccine and autism. Unfortunately, many medical professionals say the damage has been done. Although the research has been disproven, people are groundlessly suspicious of the vaccine. In turn this has led to a resurgence of disease in our community, and with it, unnecessary illness, permanent complications and even death. Lack of confidence in the vaccine has directly damaged public health.

Dr David Elliman, Consultant in Community Health at the Great Ormond Street Hospital for Children, said that "to be fair to *The Lancet*, they did publish a commentary at the time urging caution, that wasn't picked up. I think that the reality of the world today is that academic papers on major public health issues do not remain the property of academia. Therefore, it is incumbent on us all in science, in journals, and in the media to be very certain of the strength of a study before rushing to publish, and to be aware of the potential effects."

Source: adapted from *Science Learning*, © The Science Learning Hub, University of Waikato, New Zealand
www.sciencelearn.org.nz/News-Events/News-Archive/2010

Source E: Dyson calls for incentives to innovate

The company founded by the inventor Sir James Dyson has joined BAE Systems and Rolls-Royce in urging the government to boost industrial research and education, amid signs that efforts to rebalance the economy towards manufacturing are faltering.

Dyson called for more incentives to generate new business ideas as it reported an 8% increase in annual profits to £206m last year, on revenues that rose 15% to £770m. Martin McCourt, Dyson chief executive, said the company's export-driven success – it sells 80% of its appliances abroad – could be replicated at other businesses if the government were more supportive.



James Dyson, inventor of the Dyson vacuum cleaner

© Getty Images

“We are constantly doing whatever we can to pressure the government to offer more incentives to encourage businesses such as ours to invest in ideas,” McCourt said. “We just need to offer some relief, better tax credits, and give companies some kind of incentive. That’s the key to keeping manufacturing businesses successful on the world stage.”

Last month, the boss of Britain’s largest manufacturer, the defence company BAE Systems, warned that the government couldn’t “stand still” on investment in research and development and education, amid fears that the Ministry of Defence’s Research and Development (R&D) spending will be cut. According to the Office for National Statistics, manufacturing output fell 0.4% in June compared with the previous month.

Dyson spent £45m on R&D in 2010, and in 2009 it filed the second-highest number of patents in the UK after Rolls-Royce. Dyson assembles its products in Malaysia and Singapore but employs 550 engineers at its Wiltshire R&D centre for what McCourt called “the most vital stage” for any manufacturing business.

Dyson’s airblade hand dryers are available in 34 countries including China and Romania, while sales of its air multiplier fan are up 150% in Japan. The company leads the cylinder vacuum cleaner market in Britain, France, Switzerland, Belgium, Ireland and Spain.

Amid warnings of an engineer skills shortage, McCourt added that he would like “more evidence” of the government’s commitment to skilled jobs. “The encouragement has to start in the school system.”

A government spokesperson said: “We are introducing measures to give companies a reduced rate of tax on profits arising from patents. We are also increasing the amount of support for small and medium-sized businesses through the research and development tax credit, making it one of the most generous measures of its kind worldwide. The technology strategy board also invests around £300m annually in innovative technology businesses.”

Source: adapted from DAN MILMO, ‘Dyson calls for incentives to innovate as it reports profits up 8%’,
The Guardian, 16 August 2011
© Guardian News and Media Ltd

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