OCR
RECOGNISING ACHIEVEMENT

SPECIMEN

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**TWENTY FIRST CENTURY SCIENCE** **A144**

**SCIENCE A**

Unit A144 (Controlled Assessment)

# Case Study

# Information for teachers

This is the only task available as Specimen Assessment Materials for the Case Study element of Science A (Unit A144). For actual examination series, three tasks will be available.

Marks from this specimen task must not be submitted to OCR.

There is one document provided for candidates for each Case Study task:

- News Sheet – a collection of several articles about a topical issue in science, which will form the basis of the Case Study. It should be issued to candidates at the start of the task.

# Information for teachers

Specimen controlled assessment task for the Case Study:

**Air pollution and health**

These notes provide background information for the preparation of candidates for this task and advice on the assessment of the Case Study report.

Reference should also be made to Section 5 of the specification for Science A and the *Guide for controlled assessment for GCSE Twenty First Century Science*.

# General guidance for teachers

Task setting is under high control. Tasks are therefore set by OCR. Case Study tasks offer opportunities for contextualisation to take account of local circumstances including topical issues and the needs of candidates. However, assessments must be based on the published marking criteria (within Section 5 of the specifications). If there is any doubt about whether a contextualised task still sufficiently matches the criteria, centres should seek confirmation from OCR that the task is still valid.

# Preparation of candidates

It is expected that before candidates attempt this controlled assessment task they will have received general preparation in their lessons. Learning activities to develop the relevant skills should have been provided and the broad requirements of the assessment made clear to candidates.

Ideas about air quality are introduced in specification Module C1: Air Quality, and provide the scientific background that candidates will need to have covered before starting the Case Study controlled assessment. The final section of module B2: Keeping healthy deals with the problems of tracking down causes of non-infectious health conditions and may also provide a relevant scientific background.

# Assessment of the quality of written communication (QWC)

The quality of written communication is assessed in Strand B of this controlled assessment task. Candidates should be advised that their quality of written communication will be assessed. Further information about the assessment of QWC may be found in the specification.

# Summary of the News Sheet for teachers

The News Sheet provides opportunities to remind candidates about aspects of IaS4 and the importance of considering the nature and apparent motivation of sources, and information about the amount and quality of evidence available to support their views. It also introduces at least two different views about the topic and provides some basic evidence which weaker candidates can include in their study.

The News Sheet contains short articles which have been adapted from published material. The articles given show two different theories about causes of asthma. They can be used to emphasise the purpose of the study as a comparison of opposing views to see which seems to have most scientific support. There are also other items which illustrate different types of sources, so that issues of status and perceived reliability can be raised.

The News Sheet contains two main articles. One introduces the theory that pollution from motor vehicles is a cause of asthma and of asthma attacks. The other introduces an alternative theory that modern living styles, in particular fitted carpets, are a more important cause.

*Study proves the cause of asthma.* Here there is some evidence about the scale and quality of the research. Pollution from vehicles is claimed to have an important effect. Many would take issue with the use of the word “proves” in the title (IaS 2 and IaS3). This article mentions action by car-makers and/or the government which might reduce pollution, providing an opportunity to remind candidates that once they are sure about causes, they should make suggestions for reducing pollution problems.

*Carpets to blame for asthma.* This article describes another possible asthma “trigger”. It refers to a number of organisations which support the claim, but includes little direct evidence. This article refers to the importance of personal life-style choices in reducing the likelihood of becoming asthmatic, reminding candidates that they should think about their own actions, as well as those of others.

There are also some shorter items:

*School science as ‘Media Slave’ is* an example of a claim by a pressure group.

*Protect your health from urban smog* is an advertisement from a manufacturer who would profit from the belief that traffic fumes are a major cause of asthma attacks.

*News Flash* is a BBC report of a small-scale study based on measurements of unspecified pollutants, but the findings suggest no link between these pollutants and levels of asthma symptoms.

An entry from an individual blogger, which reminds students of how some pollutants get into the air, an important part of the science background to the topic.

Source references to the original articles are given but teachers should note that they have been heavily modified from the original sources and that web-sites change frequently. If students wish to include content from these articles in their case-study, they should be advised to identify them by the title of the article and “from the news sheet”.

Finally, there is some basic background science which is relevant to the topic.

*How big a problem is asthma?* with the cartoon, gives information about the scale of the problem, showing that it is an important health issue and affects many children as well as adults.

*Breathe easy* gives candidates some basic information on mechanisms of breathing. This provides an opportunity to remind them that breathing allows gases or small particles in the air to enter the body, and possibly the blood stream, where they may cause a variety of symptoms.

*Breathe difficult* introduces asthma as an allergic condition affecting the lungs, which means it may be affected by pollution in the air. Discussion may raise other conditions which affect the lungs, and a case study of how one of these is affected by air quality would be valid, but information is much more readily found about asthma than about any other conditions.

General discussion of the news-sheet should lead to discussions with individual candidates about their choice of title for their individual study.

# Guidance on assessment

All assessment of the Case Study task is based on the final report submitted by the candidates.

The marking procedure and marking criteria are described in detail within Section 5 of the specifications. Marking decisions should be recorded on the respective cover sheets (available to download from www.ocr.org.uk and included in the *Guide for controlled assessment for GCSE Twenty First Century Science*). Candidates’ reports should be annotated to show how marks have been awarded in relation to the marking criteria.

# Additional guidance on marking criteria

### Strand B

In this strand, the mark descriptors relate to how well relevant science knowledge is used to explain the topic or to analyse and interpret scientific evidence which underpins claims. Thus, it

is necessary to think first about what science knowledge or principles are available to candidates, then use the mark descriptors in relation to this, since different candidates may have chosen different questions to study. For marking strand B, the first stage is therefore to identify the science knowledge and principles which will be relevant to the particular Case Study. Once the relevant body of information is established, the mark descriptors can be interpreted in relation to it.

For example, for the question is 'Does pollution from vehicles cause asthma?' it would be helpful for the candidate to communicate knowledge about asthma and the relevant pollutants. This would include the following.

Asthma is an allergic condition

- characterised by inflammation and narrowing of air-tubes in the lungs
- causing difficulty in breathing
- which can lead to panic attacks
- and may be fatal.

Initial sensitisation may be caused by any of many 'triggers', many of which are airborne. Once the condition is established, the severity of the symptoms varies widely, with intermittent 'attacks' which are often triggered by external factors (including very cold air). It is very difficult to decide whether a given 'trigger' *causes* asthma in previously unaffected persons, increasing the number of sufferers, or whether it simply affects known sufferers, increasing the frequency and severity of attacks. Candidates should include information to help judge the severity of the problem, eg numbers affected, number of deaths, etc.

The pollutants present in car exhausts include carbon monoxide and dioxide, nitrogen oxides, partially combusted hydrocarbons, particulate matter. Secondary pollutants formed include ozone and photochemical smog.

**Strand C**

For strand C, the framework for applying the mark descriptors is defined by the particular sources and information which the candidate has used in the study. Marking should reflect the quality of decision-making in relation to the information which has been used.

**Strand C Aspect (b)**

This is a very complex area. There is no single, common cause of asthma, and the list of substances or conditions which can act as 'triggers' for attacks is very long and varied. Thus, the conclusions reached by different candidates will not all be the same. Marks awarded should be based on how well the conclusion is linked to the evidence seen by the candidate, ie there is no single 'right' answer.

Suggestions for recommendations will clearly depend on the conclusion reached. However, realistic suggestions are usually based on the 'ALARA' principle, rather than the precautionary principle. It is not possible to totally avoid any exposure to air pollution. Practical solutions are related to reducing pollution, eg electric powered cars, wider use of public transport, diverting traffic from town centres etc and involve governments, manufacturers and individuals.