RECOGNISING ACHIEVEMENT

Model Assignment

Specimen Internal Assessment Material

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

SPECIMEN INTERNAL ASSESSMENT MATERIAL – THIS VERSION SHOULD NOT BE USED FOR LIVE ASSESSMENT

Please note:

This OCR model assignment is to be used to provide evidence for the unit identified above. Alternatively, centres may 'tailor' or modify the assignment within permitted parameters (see Information for Teachers). It is the centre's responsibility to ensure that any modifications made to this assignment allow learners to show that they can meet all of the learning outcomes and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

INSTRUCTIONS TO TEACHERS

The OCR administrative codes associated with this unit are:

- Unit entry code R071
- Certification code J815

The accreditation numbers associated with this unit are:

- Unit reference number R/503/6259
- Qualification reference 600/4790/2

Duration: Approximately 21 hours over 3 modules

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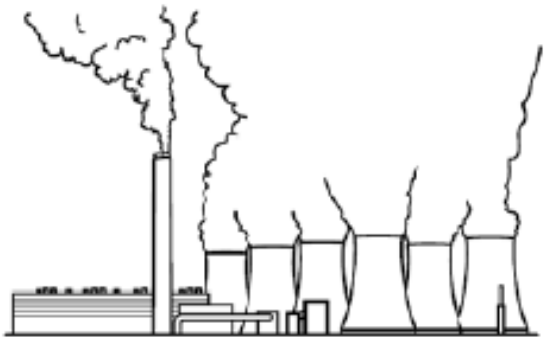
(Note: Files from OCR will be made available to centres via the OCR Website/Interchange for download by the centres. Full details will be available in time for first teaching. Centres will be required to give learners access to them and give them instructions as to how to access them).

Read through all of the parts of each assignment carefully, so that you know what you will need to do to complete them.

Task 1 – Analytical task: Choosing an energy supply

Demand for electricity is increasing. Planners need to consider possible ways of supplying energy to a new community. The community will be built on the west coast of England.



A public enquiry will be held to collect evidence to help choose one energy supply scheme.

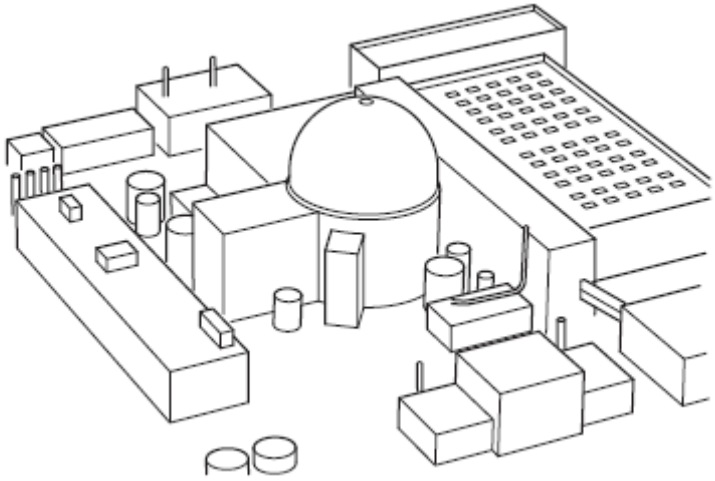
You will present evidence to the enquiry. You will represent an interest group at the enquiry, and provide support for their opinions.

You need to produce material which presents an analysis of the advantages and disadvantages of possible **different** energy supply schemes.

Your evidence should include quantitative as well as qualitative information.

Task 2 – Research report: Nuclear radiation – the benefits, drawbacks and risks

Stories in the media about nuclear radiation are often misleading and alarmist.
Following the crisis at the Fukushima plant in Japan, there are calls for nuclear power generation to be stopped.



Nuclear ionising radiation has a range of uses. It is not just used for power generation.

Produce briefing material for journalists to explain why nuclear ionising radiation is used **despite** the associated risks.

Your evidence should include quantitative as well as qualitative information.

Task 3 – Practical procedures: Measuring the efficiency of a small electrical immersion heater

You will be given a small electrical immersion heater. The heater can be used to heat water in a suitable container.

You should set up a circuit so that you can measure the voltage across and current in the heater. You should calculate the energy transferred to the heater when heating some water.

By taking measurements of the temperature of the water as it heats up, you can calculate the energy transferred to the water.

From these two energy measurements, you will be able to calculate the efficiency of the heater.

Information for Teachers

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

Module 1: Using energy

Teacher guidance on using this assignment (Module 1)

1 General

There are 3 assessment tasks:

Task 1 – Analytical task: Choosing an energy supply

Task 2 – Research report: Nuclear radiation – the benefits, drawbacks and risks

Task 3 – Practical procedures: Measuring the efficiency of a small electrical immersion Heater.

2 Before carrying out this assignment

2.1 When the skills, knowledge and understanding identified in the specification have been taught, learners should be given the assessment tasks to complete. Each task is relevant to a particular Learning Outcome, so tasks may be presented to learners when they are judged to be ready to undertake them; they do not all need to be left until the end of the module.

2.2 From their learning for LO1, learners will understand the personal and social (including political) choices that must be made in supplying electricity to people's homes, the factors to consider in making such choices and the social, economic and environmental effects of such decision making and how these decisions are made in the UK.

From their learning for LO2, learners will understand the risks and benefits of using nuclear radiation, the different types of radiation and how their properties make them useful in different ways. They will understand how risk can be evaluated.

From their learning for LO3, learners will know how to set up electrical circuits and take measurements of voltage and current and to use these measurements to calculate resistance, power and energy transferred when materials are heated and so calculate the efficiency of energy transfer.

3 When completing the assignment and producing evidence

3.1 Learners may work individually or in groups for Task 1. Each learner or group of learners should represent an interest group at the enquiry and present evidence on the advantages and disadvantages of different schemes from the point of view of the interest group represented. If working in groups, the contribution of each learner must be clear, either in their work or by using witness statements. There are many opportunities in the task to make creative use of ICT, in producing documents, videos etc., including the visualisation of quantitative data on the efficiency of energy transfer, but teachers and learners should be aware of the marking criteria so that learners' work can be assessed against the criteria and that marks are not limited by the media used.

Task 1 is expected to take 3 hours.

3.2 In Task 2 learners produce briefing material and there are opportunities in this task for learners to use ICT in producing visual imagery to illustrate their work, but teachers and

learners should be aware of the marking criteria so that learners' work can be assessed against the criteria and that marks are not limited by the media used.

Task 2 is expected to take 2 hours.

3.3 For Task 3, learners will need to select appropriate equipment and techniques to obtain data which can then be analysed to reach conclusions. Learners may need to work in groups to undertake these tasks, but the contribution of each learner must be clear, either in their work or by using witness statements.

Task 3 is expected to take 2 hours.

Evidence summary

When completing these assignments it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive.

Task	**What do learners need to produce (evidence)**
Task 1	Material is likely to be in a variety of forms to meet the requirements of presenting a range of different types of evidence, including graphical presentations of quantitative information, pictures etc. and could include the use of ICT, posters and videos, as well as answers to possible questions from the enquiry.
Task 2	Material could be in the form of a PowerPoint presentation or a short video, an article (for a magazine) or a leaflet.
Task 3	Witness statements of learners' ability to select and set up equipment. Written record of the measurements taken and the calculations necessary to derive the outcomes required.

Apparatus and materials for the practical procedures

Measuring the efficiency of a small electrical immersion heater

- Immersion heater, 12 V 50 W or equivalent
- Thermometer -10°C to 110°C
- Aluminium container
- Measuring cylinder
- Digital or domestic balance (+/- 2g)
- Stopwatch or stopclock
- Low voltage power supply or transformer (to supply 5A [dependant upon type of immersion heater used]) set to 12 V
- dc ammeter (0 - 10A)
- dc voltmeter (0 - 20V)
- Crocodile clips and 5 leads
- Heat proof gloves

Model Assignment: Learner Information

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

Module 2: Keeping healthy

Your tasks

(Note: Files from OCR will be made available to centres via the OCR Website/Interchange for download by the centres. Full details will be available in time for first teaching. Centres will be required to give learners access to them and give them instructions as to how to access them).

Read through all of the parts of each assignment carefully, so that you know what you will need to do to complete them.

Task 4 – Case study: Designing a health education programme

The bosses of a company are concerned that employees are taking too much time off because of illness.

Design a health education programme for a group of staff who work in a particular role in the company.

Your health education programme should include quantitative as well as qualitative information.

Task 5 – Case study: The benefits and risks of medical treatment

New developments in healthcare include new drugs and instruments for diagnosis and treatment, including gene therapies and stem cell technologies.

For patients in hospital, these new developments can be worrying.

You should produce materials to reassure worried patients. These materials should help them make informed judgments about whether or not to have the treatment suggested for them. You should consider:

- the benefits and risks of a treatment, with quantitative data
- how a new treatment is tested before it is used on patients.

Task 6 – Practical procedures: Measuring the environmental effects of human activity

Ecologists record and monitor ecosystems. They make measurements of:

- the physical factors of the ecosystem
- the plants and animals that live in the ecosystem.

and consider how these change over time. This information is especially important in ecosystems that are affected by human activity.

Carry out an ecological survey of a location that has been affected in some way by human activities and produce a short Environmental Report for your local council.

You will need to:

- decide what measurements and samples to take, and what apparatus you will need
- collect an appropriate range of biotic and abiotic data
- make an evaluation of the impact of human activity.

Information for Teachers

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

Module 2: Keeping healthy

Teacher guidance on using this assignment (Module 2)

1 General

There are 3 assessment tasks:

Task 4 – Case study: Designing a health education programme

Task 5 – Case study: The benefits and risks of medical treatment

Task 6 – Practical procedures: Measuring the environmental effects of human activity.

2 Before carrying out this assignment

2.1 When the skills, knowledge and understanding identified in the specification have been taught, learners should be given the assessment tasks to complete. Each task is relevant to a particular Learning Outcome, so tasks may be presented to learners when they are judged to be ready to undertake them; they do not all need to be left until the end of the module.

2.2 From their learning for LO4, learners will understand the impact of different factors on health, how health can be improved and how threats to health can be addressed.

From their learning for LO5, learners will understand the risks and benefits of medical treatments and how risks can be reduced. They will have had experience of developing materials which explain risks and benefits to a lay audience or client group.

From their learning for LO6, learners will have used different sampling techniques and biotic and abiotic indicators to assess the health of different environments. They will know how to collect and display data to demonstrate differences between environments and to interpret data to show the interdependence of organisms.

3 When completing the assignment and producing evidence

3.1 Learners should work individually on Tasks 4 and 5. There are many opportunities in the tasks to make creative use of ICT, in producing documents, videos etc. but teachers and learners should be aware of the marking criteria so that learners' work can be assessed against the criteria and that marks are not limited by the media used.

Task 4 is expected to take 3 hours. Task 5 is expected to take 2 hours.

3.2 In Task 6, learners will need to select appropriate measures and the materials and equipment to obtain data which can then be analysed to show the effects of human activity. Learners may need to work in groups to undertake this task, so that sufficient data can be collected, but the contribution of each learner must be clear, either in their work or by using witness statements.

Task 6 is expected to take 2 hours.

Evidence summary

When completing this assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive.

Task	What do learners need to produce (evidence)
Task 4	Material is likely to be in a variety of forms to meet the requirements of presenting a range of different types of information to the workforce, including graphical presentations of quantitative information, pictures etc. and could include the use of ICT, posters and videos, as well as answers to possible questions.
Task 5	Material could be in the form of a leaflet, poster or a short video which could be shown to patients.
Task 6	Witness statements of learners' ability to select appropriate methods, carry out sampling techniques, identify organisms and carry out testing. Record of the data collected and the calculations necessary to derive the outcomes required.

Apparatus and materials for the practical procedures

Measuring the environmental effects of human activity

The apparatus needed will depend upon the environments available to learners but learners may require:

- Sweep nets or pond dipping nets
- Wire quadrats
- Tape measures
- Books or identification charts to identify the species they will encounter
- Pit fall traps
- Means of taking samples of soil or water, and/or of undertaking measurements (such as pH, light levels, compaction of ground, air pollution, aspect or temperature) on site
- Soil sieves and other resources for testing samples in the laboratory (such as for pH and nitrogen levels.

Model Assignment: Learner Information

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

Module 3: Materials for a purpose

Your tasks

(Note: Files from OCR will be made available to centres via the OCR Website/Interchange for download by the centres. Full details will be available in time for first teaching. Centres will be required to give learners access to them and give them instructions as to how to access them).

Read through all of the parts of each assignment carefully, so that you know what you will need to do to complete them.

Task 7 – Analytical report: the environmental impact of materials used in house building

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The increasing population of the UK creates a demand for new housing.
Materials for the construction of new houses are made from natural materials.
The production of these materials has an impact on the environment.

You should identify a range of materials used in the construction of a new house.
You should analyse the environmental impact of the production of the materials from natural resources.

Your report should include quantitative as well as qualitative information.

Task 8 – Research report: How the properties of materials used in manufacturing a car are determined by structure and bonding

Manufacturing a complex product, such as a car, uses a range of different materials. These materials are selected because of their properties.

You should identify a range of solid materials used in a manufacturing a car.
You should explain why they are used and how the structure and bonding of these materials makes them suitable.

Your report should include quantitative as well as qualitative information.

Task 9 – Practical procedures: Measuring the properties of materials

Before manufacturers can decide whether to use a material in a product, they need to know what properties the material has.

You should carry out scientific tests on a range of materials used for a particular purpose to decide which is the best to use. You should consider:

- what equipment to use and how to set it up;
- what measurements to take and how to record them;
- how to process and display the data to identify any trends or patterns;
- which material is the best to use.

Information for Teachers

OCR Level 1/2 Cambridge National Certificate in Science

R071: How scientific ideas have an impact on our lives

Module 3: Materials for a purpose

Teacher guidance on using this assignment (Module 3)

1 General

There are 3 assessment tasks:

Task 7 – Analytical report: the environmental impact of materials used in house building

Task 8 – Research report: How the properties of materials used in manufacturing a car are determined by structure and bonding

Task 9 – Practical procedures: Measuring the properties of materials.

2 Before carrying out this assignment

2.1 When the skills, knowledge and understanding identified in the specification have been taught, learners should be given the assessment tasks to complete. Each task is relevant to a particular Learning Outcome, so tasks may be presented to learners when they are judged to be ready to undertake them; they do not all need to be left until the end of the module.

2.2 From their learning for LO7, learners will understand how materials we use in familiar products are made from natural resources, the impact of these manufacturing processes on the environment, the chemical reactions involved, the conditions required, the yields produced and the quantities of materials and energy needed.

From their learning for LO8, learners will understand how the properties of materials are determined by their chemical structures and how these properties influence how materials are used.

From their learning for LO9, learners will know how to use a range of methods for measuring the properties of materials and how to collect and display data to demonstrate differences between materials and to interpret data to show how materials are suited to different uses.

3 When completing the assignment and producing evidence

3.1 Learners should work individually on Task 7.

Task 7 is expected to take 3 hours.

3.2 In Task 8 there are opportunities for learners to use ICT in producing visual imagery to illustrate their work, but teachers and learners should be aware of the marking criteria so that learners' work can be assessed against the criteria and that marks are not limited by the media used.

Task 8 is expected to take 2 hours.

3.3 In Task 9, learners may need to work in groups to undertake this task, so that sufficient data can be collected, but the contribution of each learner must be clear, either in their work or by using witness statements.

Task 9 is expected to take 2 hours.

Evidence summary

When completing this assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive.

Task	What do learners need to produce (evidence)
Task 7	Material is likely to be in the form of a written report but may include flow diagrams of production processes, chemical equations and data on production quantities, yields and energy budgets.
Task 8	Material is likely to be in the form of a written report but may include photographs or drawings, diagrams of molecular structures and data on the properties of materials and on the performance of the components identified.
Task 9	Witness statements of learners' ability to select appropriate scientific equipment and set it up to measure the properties of materials. Record of the data collected, and the processing of the data to identify trends or patterns.

Apparatus and materials for the practical procedures

Measuring the properties of materials

The resources learners need will depend upon the properties to be tested, for example hardness, elasticity, strength, stiffness, plasticity etc., but learners may need:

- Thermometers
- Newton meters
- Access to digital balances
- Masses and hangers
- Stands and clamps
- Rulers
- Stopwatches or clocks

General guidance on using this assignment (Modules 1, 2 and 3)

1 General guidance

1.1 OCR assignments are available to download free of charge from our website: www.ocr.org.uk

1.2 OCR assignments are intended to be used for summative assessment of learners. The OCR specification for this qualification gives more information on the arrangements for assessing internally assessed units.

1.3 This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge, understanding and skills of the unit.

2 Before carrying out this assignment

2.1 Learners should be provided with a copy of the *Information for Learners* section of this assignment.

2.2 Learners will not need to carry out any preparations prior to undertaking the assessment tasks, such as collating resources to use in the assessment.

2.3 We have estimated that it will take approximately 21 hours to complete all tasks. These timings are for guidance only but should be used by the teacher to give learners an indication of how long to spend on each task. Centres can decide how the time can be allocated between each part or individual task in the assessment. Centres are also permitted to spread the overall assessment time across several sessions and therefore it is permissible for evidence to be produced over several sessions.

2.4 It is expected that before learners attempt assignment tasks, they will have received general preparation in their lessons. For the practical procedures, the details of practical techniques, the development of skills associated with these techniques, and the methods and choice of equipment for the task should be covered when teaching the particular part(s) of the specification which the assignment relates to, and should be completed prior to undertaking the task.

2.5 Learners should be made aware of the health and safety issues associated with the practical tasks.

2.6 Learners should also be made aware of the marking criteria for each task.

3 When completing the assignment and producing evidence

3.1 Each learner must produce individual and authentic evidence for each task within the assignment, though when undertaking practical work, learners may work in groups, as specified for the tasks concerned.

3.2 Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them and giving general feedback that enables the learner to take the initiative in making improvements, rather than detailing what amendments should be made. However, where more specific support is provided so that learners are able to make progress with the task or to ensure safety, this must be reflected in the marks awarded. It is not acceptable for teachers/deliverers to provide answers or to work through answers in detail.

3.3 For the practical procedures, teachers are responsible for ensuring appropriate health and safety procedures and all appropriate steps taken to reduce risks are carried out, including a risk assessment for the task, prior to learners attempting the practical work. It is the centre's responsibility to ensure the safety of all learners involved in any investigation.

The work of individual learners may be informed by working with others but each must provide an individual response. Learners should be made aware of the time allowed for carrying out this part of the task. Learners' access to resources is determined by those available to the centre.

3.4 We have specified what evidence the learner is expected to produce, but it is important to note that if it is possible to generate the evidence in a variety of formats, then the learner is free to use the format that is most appropriate for them. The section *Evidence Summary* for each module will guide you on evidence and formats for evidence. Centres must advise learners as to the most appropriate format of evidence. Format must not be confused with the content or the type of datafile to be produced. Guidance on suitable formats of the evidence is provided in the *Evidence Summary*.

4 Presentation of work for marking and moderation

4.1 Centres wishing to produce digital evidence in the form of an e-portfolio should refer to the appendix in the specification on guidance for the production of electronic assessment. *(Note to Ofqual reviewer, the arrangements for electronic evidence will be available in time for first teaching).*

4.2 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, treasury tag.

5 Scope of permitted model assignment modification

The model assignment is very self-contained in its present form. The set of tasks form a coherent whole addressing all the learning outcomes and allowing access to the full range of marks.

You **must not** change the following:

• the learning outcomes

• the marking criteria

• the requirements for supervision and authentication as described in the specification (section 'The internally assessed units').

Permitted changes

The model assignment can be modified in terms of the areas described below at the permission of OCR but centres must be sure that learners still have the opportunity to cover all of the learning outcomes and to access the full range of marks:

• The learner's assignment, which can be contextualised or amended to suit local needs (for example, the location and type of community could be changed for the LO1 task).

• To allow for differences in the materials, equipment and facilities at different centres (for example the power rating of the immersion heater for the LO1 task).

OCR has ensured that in the language used and the tasks and scenario provided we have avoided discrimination, bias and stereotyping and support equality and diversity. In the development of qualifications and assessments we use the guidance given in the Ofqual publication *Fair access by design,* notably this includes:

- using language and layout in assessment materials that does not present barriers to learners
- using stimulus and source materials in assessment materials (where appropriate) that do not present barriers to learners.

If centres wish to adapt the model assignment we strongly advise that staff responsible for modifying the model assignment and quality assuring it refer to the publication *Fair access by design*.

If modifications are made to the model assignment, whether to just the scenario or to both the scenario and individual tasks, it is up to the centre to ensure that all learning outcomes can be met and that learners can access the full range of marks.