



Chemistry Assignment (National 4)

SCQF: level 4 (6 SCQF credit points)

Unit code: H21M 74

Unit outline

This is the Added Value Unit in the National 4 Chemistry Course. The general aim of this Unit is to enable the learner to provide evidence of added value for the National 4 Chemistry Course through the successful completion of an assignment which will allow the learner to demonstrate breadth, challenge and/or application.

Learners will have the opportunity to demonstrate challenge and application in skills of scientific inquiry, investigation, analytical thinking and knowledge and understanding.

Learners will investigate a topical issue in chemistry using knowledge and skills selected from *Chemical Changes and Structure/Nature's Chemistry/Chemistry in Society* key areas.

Learners will use a variety of approaches and consider applications of chemistry and the impact on society/the environment. They will communicate information related to their method used or their record of process and findings, which will allow demonstration of scientific literacy skills.

Learners who complete this Unit will be able to:

- 1 Apply skills and knowledge to investigate a topical issue in chemistry and its impact on the environment/society

This Unit is a mandatory Unit of the National 4 Chemistry Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Course Support Notes*, which provide advice and guidance on delivery and assessment approaches. Exemplification of the standards in this Unit is given in *Unit Assessment Support*.

Recommended entry

Entry to this Unit is at the discretion of the centre. It is recommended that the learner should be in the process of completing, or have completed, the following Units in the National 4 Chemistry Course:

- ◆ Chemical Changes and Structure (National 4)
- ◆ Nature's Chemistry (National 4)
- ◆ Chemistry in Society (National 4)

Equality and inclusion

This Unit Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Course Support Notes*.

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

- 1 Apply skills and knowledge to investigate a topical issue in chemistry and its impact on the environment/society by:**
 - 1.1 Choosing, with justification, a relevant issue in chemistry
 - 1.2 Researching the issue
 - 1.3 Presenting appropriate information/data
 - 1.4 Explaining the impact, in terms of the chemistry involved
 - 1.5 Communicating the findings of the investigation

Evidence Requirements for the Unit

This Unit will be assessed through controlled assessment which meets the Evidence Requirements below.

The assessment method for this Unit will be an assignment in which the learner will draw on and apply the skills and knowledge they have learned during the Course. The assignment offers challenge by requiring skills, knowledge and understanding to be applied in a context that is one or more of the following:

- ◆ unfamiliar
- ◆ familiar but investigated in greater depth
- ◆ integrates a number of familiar contexts

The assignment involves research of a topical issue and communication of the findings. These may be carried out in two stages, Stage 1: a research stage and Stage 2: a communication stage, which may be carried out sequentially or concurrently.

The assignment is:

- ◆ set by centres within the SQA guidelines described below
- ◆ conducted under some supervision and control

Evidence will be internally marked by centre staff in line with SQA guidelines.

All assessment is subject to quality assurance by SQA.

Setting the assessment

The assignment will be set by centres within the following guidelines:

- ◆ Learners will select and investigate a topical issue from a key area of this Course.
- ◆ The topical issue could have either a positive or negative impact on the environment/society
- ◆ The assignment topic will be agreed between the learner and the teacher/lecturer.

Conducting the assessment

The assignment will be conducted under some supervision and control, as follows:

- ◆ It is recommended that learners will gather information over several weeks and no more than 8 hours should be spent on the whole Assignment
- ◆ During Stage 1: the research stage, learners may have access to a wide range of resources
- ◆ During Stage 2: the communication stage, learners should have access to the material they have generated in Stage 1: the research stage.
- ◆ The teacher/lecturer will provide overall guidelines for the assignment, which will lead the learner through the assignment in clear stages.
- ◆ The teacher/lecturer may also give learners support and guidance to help them progress through each stage of the assignment.

Judging the evidence

Evidence will be internally marked and verified by centre staff in line with SQA guidelines.

All assessment is subject to quality assurance by SQA.

Evidence can be drawn from a variety of sources and presented in a variety of formats. The table below describes the evidence for the Assessment Standards which require exemplification.

Assessment Standards	Evidence required
Choosing, with justification, a relevant issue in chemistry	A clear statement of the issue being investigated A brief statement on why the issue is relevant to the environment/society
Researching the issue	Selection/collection of appropriate information/data from at least two relevant sources.
Presenting appropriate information/data	Present gathered information/data in at least one format from: table, graph, chart, key, diagram, flow chart, or other appropriate formats
Explaining the impact, in terms of the chemistry involved	A description which includes the chemistry of the issue and an explanation of its impact on the environment/society
Communicating the findings of the investigation	The communication must be clear, concise, relevant and appropriately structured.

Re-assessment

In relation to Unit assessment, SQA's guidance on re-assessment for Units applies.

Further information is provided in the exemplification of assessment in *Unit Assessment Support*. Advice and guidance on possible approaches to assessment is provided in the *Course Support Notes*.

Development of skills for learning, skills for life and skills for work

Please refer to the *Course Specification* for information about skills for learning, skills for life and skills for work.

Further mandatory information on Course coverage for the National 4 Chemistry Course

The following gives details of mandatory skills, knowledge and understanding for the National 4 Chemistry Course. Assessment of this Added Value Unit will involve selecting appropriate skills, knowledge and understanding from those listed below, in line with the Evidence Requirements above. This list of skills, knowledge and understanding also provides the basis for the assessment of all of the Units in the Course.

The following gives details of the skills:

- ◆ demonstrating knowledge and understanding by making statements, describing information, providing explanations
- ◆ applying knowledge of chemistry to familiar situations, interpreting information and solving problems
- ◆ planning experiments to illustrate a particular effect, applying safety measures
- ◆ carrying out experimental procedures, safely, recording general observations and collecting data
- ◆ using information handling skills by selecting, presenting and processing information
- ◆ making generalisations based on evidence/information
- ◆ drawing valid conclusions and giving explanations supported by evidence
- ◆ suggesting improvements to experiments
- ◆ communicating findings/information

These skills will be assessed, across the Course, in the context of the key areas.

The following table provides further detail of the key areas for the National 4 Chemistry Course.

<p>Chemical Changes and Structure</p> <p>Rates of reaction Reactions monitored and graphs interpreted</p> <p>Atomic structure and bonding related to properties of materials Basic atomic structure including electron arrangement Covalent bonding as electron sharing and ionic bonding of electron transfer Physical properties of substances linked to bonding Chemical formulae of two element compounds Symbol equations from word equations State symbols</p> <p>Energy changes of chemical reactions Recognising and uses of exothermic and endothermic reactions</p> <p>Acids and bases The effect of soluble oxides on the pH of water Soluble oxides and their environmental impact of non-metal oxides Uses of acids in food and drink and their impact on health Selection of chemicals for salt formation</p>
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Nature's Chemistry

Fuels

Formation and extraction processes for crude oil
The use of fuels and their environmental impact on the carbon cycle
Alternative energy source including biomass

Hydrocarbons

The study of straight-chained: alkanes C1–C8, alkenes C2–C8
To include their physical, chemical properties, general formulae, structural formulae and uses
Unsaturated and saturated hydrocarbons

Everyday consumer products

Food

Alcoholic drinks sources and production
Units in drinks and health issues
Analysis of carbohydrates Benedict's and iodine solution
Solubility of carbohydrates
Competing demands for carbohydrates as food or fuel

Plants to products

Practical-based activity on products derived from plants which have enhanced everyday life

Chemistry in Society

Metals and alloys

Determination of the reactivity series using reactions of metals
Displacement reactions
Corrosion, physical and chemical protection of metals
Electrochemical series and electrochemical cells, voltage and electroplating
Extraction of metals related to their reactivity
Composition, uses and physical properties of alloys

Materials

Polymers, monomers, name of polymers, thermosoftening and thermosetting plastics, properties, uses and combustion of plastics, biodegradable plastics
Advantages and disadvantages of natural versus synthetic polymers
Ceramic materials properties and uses
Development of new materials, unique properties. reuse and recycle materials

Fertilisers

Plant nutrients, and elements, natural and synthetic fertiliser

Nuclear chemistry

Formation of elements and background radiation

Chemical analysis

Qualitative and quantitative analysis of the environment, including pH, and flame testing

Administrative information

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Superclass: RD

History of changes

Version	Description of change	Authorised by	Date
1.1	Evidence Requirements section: wording added to clarify assessment conditions; Further mandatory information section: amendment to wording to clarify skills list	Qualification Development Manager	June 2013

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