



Chemistry (National 4)

Draft National Course Specification



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Please refer to the note of changes at the end of this Course Specification for details of changes from previous version (where applicable).

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Course outline

Course title:	Chemistry (National 4)
SCQF:	level 4 (24 SCQF credit points)
Course code:	to be advised

Mandatory Units

Chemistry: Atoms, Acids and Alkalis (National 4) **6 SCQF credit points**

Chemistry: Nature's Chemistry (National 4) **6 SCQF credit points**

Chemistry: Chemistry in Society (National 4) **6 SCQF credit points**

Added Value Unit

Chemistry (National 4) **6 SCQF credit points**

This Course includes six SCQF credit points for the assessment of added value in the Added Value Unit. Further information on this Unit is provided in the Assessment section.

Recommended entry

Entry to this Course is at the discretion of the centre. However, learners would normally be expected to have attained the skills and knowledge required by one or more of the following or by equivalent qualifications and/or experience:

- ◆ Biology (Access 3) Course or relevant component Units
- ◆ Chemistry (Access 3) Course or relevant component Units
- ◆ Environmental Science (Access 3) Course or relevant component Units
- ◆ Physics (Access 3) Course or relevant component Units
- ◆ Science (Access 3) Course or relevant component Units

In terms of prior learning and experience, relevant experiences and outcomes may also provide an appropriate basis for doing this Course. Further information on relevant experiences and outcomes will be given in the *Course Support Notes*.

Progression

This Course or its components may provide progression to:

- ◆ Chemistry (National 5)
- ◆ further study, employment or training

Further details are provided in the Rationale section.

Equality and inclusion

This Course 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* and the *Course Assessment Specification*.

Rationale

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide more time for learning, more focus on skills and applying learning, and scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

Through learning in chemistry, learners develop their interest in and understanding of the world in an engaging and enjoyable way. They engage in a wide range of investigative tasks which, while fostering an enjoyment of chemistry and learning, allow them to develop important skills to become creative, inventive and enterprising, in a world where the skills and knowledge developed in chemistry are needed across all sectors of society.

Chemistry Courses should encourage resilience, which leads to becoming a confident individual. Successful learners in chemistry think creatively, analyse and solve problems. Chemistry can produce responsible citizens through studying the impact it makes on developing sustainability, and its effect on the environment, society, and the lives of themselves and others.

The Course allows learners to understand and investigate the world. It develops learners' ability to think analytically, creatively and independently, and to make reasoned evaluations. The Course will allow opportunities for learners to acquire and apply knowledge to evaluate environmental and scientific issues, assess risk, and make informed decisions. This leads to the learner developing an informed and ethical view of topical issues. Learners will be able to develop their communication, collaborative working and leadership skills, and be able to apply critical thinking in new and unfamiliar contexts to solve problems.

Purpose and aims of the Course

Science is vital to everyday life and allows us to understand and shape the world in which we live and influence its future. Scientists play a key role in meeting society's needs in areas such as medicine, energy, industry, material development, the environment and sustainability. As the importance and application of science continues to grow and develop, more trained scientists will be required. It is also important that everyone has an informed view of science.

The Course is practical and experiential and develops scientific understanding of issues relating to chemistry. The Course will develop concepts within a reverse engineering process, where learners start with a product and work backwards to develop the underlying chemistry.

The Course is practical and develops learners' skills through the study of the applications of chemistry in an everyday context. By using a skills-based approach to developing knowledge and understanding of some basic chemistry concepts, learners will become scientifically literate citizens, able to evaluate the science-based claims which they will come across in a rapidly developing society.

The Course develops learners' interest in, and enthusiasm for, chemistry through a variety of contexts relevant to chemistry's impact on society, namely: utilising nature's resources, chemical analysis, and the development of new and novel applications. It offers a broad, versatile and adaptable skill set which is valued in the work place and forms the basis for progress onto Chemistry (National 5) while also providing a knowledge base which is useful for the study of all of the sciences.

The main aims of this Course are to:

- ◆ develop scientific and analytical thinking skills in a chemistry context
- ◆ develop problem solving skills in a chemistry context
- ◆ develop an understanding of chemistry's role in scientific issues
- ◆ acquire and apply knowledge and understanding of chemistry concepts
- ◆ develop understanding of how chemical products are formed
- ◆ develop understanding of relevant applications of chemistry in society

Information about typical learners who might do the Course

The Course provides opportunities for learners to become scientifically literate citizens, while developing their literacy and numeracy skills. It will also develop learners' investigative and experimental skills in a chemistry context. In addition, learners will recognise the impact chemistry makes on developing sustainability and its effect on the environment, society, and the lives of themselves and others. They will develop relevant skills for learning, for use in everyday life and in employment. Due to the inter-disciplinary nature of the sciences, learners will benefit from studying chemistry along with the other science subjects, as this enhances their skills, knowledge and understanding.

This Course or its components may provide progression to:

- ◆ Chemistry (National 5)
- ◆ National 4 or 5 in another science subject
- ◆ Skills for Work Courses (SCQF level 4 or 5)
- ◆ National Certificate Group Awards
- ◆ National Progression Awards (SCQF level 4 or 5)
- ◆ employment

Course structure and conditions of award

Course structure

The Course is practical and experiential, developing skills in a chemical context. Through a variety of real-life contexts, learners will acquire and apply knowledge and understanding of chemical concepts, and develop this through an application-led approach, including practical activities.

By completing this Course, learners will develop important and relevant skills, attitudes and attributes related to chemistry, including: developing scientific and analytical thinking skills in a chemistry context; developing an understanding of chemistry's role in scientific issues; acquiring and applying knowledge and understanding of chemistry concepts; developing understanding of how chemical products are formed; and developing understanding of relevant applications of chemistry in society.

In addition to developing specific scientific skills, in areas such as experimentation and investigation, learners will also gain valuable transferable skills, for learning, life and work, such as literacy, numeracy and communication.

The Course will develop concepts within a reverse engineering process, where learners start with a product and work backwards to develop the underlying chemistry. All Units will be practical, experiential and contextual. Through this process the concepts of sustainability, ethics and the balance between benefit and cost will be addressed.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a number of ways.

The Course has four mandatory Units totalling 24 SCQF credit points.

Chemistry: Atoms, Acids and Alkalis (National 4)

In this Unit, learners will use analytical techniques to develop skills and an awareness of ethical and environmental issues in a local and worldwide context. Learners will gain an understanding of how chemistry is involved in the cause, effect and resolution of these issues.

Chemistry: Nature's Chemistry (National 4)

In this Unit, learners will use everyday products such as cosmetics, fuel and food to develop skills and an understanding of the applications of chemistry to everyday life, while considering environmental and ethical implications.

Chemistry: Chemistry in Society (National 4)

In this Unit, learners will develop scientific and analytical thinking skills through investigating new materials and energy sources.

Chemistry: Added Value Unit (National 4)

In this Unit, learners will draw on and extend the skills they have learned from across the other Units, and demonstrate the breadth of knowledge and skills acquired, in unfamiliar contexts and/or integrated ways.

Conditions of award

To achieve the Chemistry (National 4) Course, learners must pass all of the required Units, including the Added Value Unit. The required Units are shown in the Course outline section.

National 4 Courses are not graded.

Skills and knowledge

Full skills and knowledge for the Course will be given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course includes:

- ◆ demonstrating basic knowledge of chemistry by making accurate statements
- ◆ applying basic chemistry knowledge to straightforward situations, interpreting information and solving problems
- ◆ demonstrating basic understanding of chemistry by providing explanations
- ◆ selecting relevant information from a variety of straightforward sources
- ◆ presenting information appropriately in a variety of straightforward forms
- ◆ processing basic information accurately, using calculations, where appropriate
- ◆ planning, designing and carrying out straightforward experimental procedures to test basic hypotheses or to illustrate effects
- ◆ evaluating straightforward experimental procedures
- ◆ drawing valid conclusions and giving basic explanations supported by evidence or justification
- ◆ making predictions and generalisations based on straightforward evidence/information

Assessment

Information about assessment for the Course will be included in the *Course Assessment Specification*, which will provide full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in the Unit Specification.

They can be assessed on a Unit-by-Unit basis or by combined assessment.

They will be assessed on a pass/fail basis within centres. SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgments are consistent and meet national standards.

The assessment of the Units in this Course will be as follows:

Chemistry: Atoms, Acids and Alkalis (National 4)

Learners who complete the Unit will be able to:

- ◆ demonstrate planning, designing, carrying out and evaluating experimental procedures or investigations in the context of the atoms, acids and alkalis
- ◆ demonstrate skills of applying knowledge and understanding related to atoms, acids and alkalis

Chemistry: Nature's Chemistry (National 4)

Learners who complete the Unit will be able to:

- ◆ demonstrate selecting, processing, presenting and evaluating information in the context of chemistry in nature
- ◆ demonstrate skills of applying knowledge and understanding related to nature's chemistry

Chemistry: Chemistry in Society (National 4)

Learners who complete the Unit will be able to:

- ◆ demonstrate analysing and evaluating information, drawing conclusions, giving explanations and making predictions in the context of chemistry in society
- ◆ demonstrate skills of applying knowledge and understanding related to chemistry in society

Added Value Unit

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 4, added value will be assessed in an Added Value Unit. The Added Value Unit will address the key purposes and aims of the Course as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge or application.

¹ Definitions can be found here: www.sqa.org.uk/sqa/45528.html

successful learner, confident individual, responsible citizen, effective contributor

In this Course, the Added Value Unit will focus on breadth and application.

Learners will draw on and extend the skills they have learned during the Course. This will be assessed through both a [project](#)² and a [test](#)³. These will offer opportunities to demonstrate the breadth of knowledge and skills acquired from across the other Units, in unfamiliar contexts and/or integrated ways.

Exemplification of possible assessment approaches for Units will be provided in the *National Assessment Resource*.

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² Definitions can be found here: www.sqa.org.uk/sqa/45528.html

³ See link above for definition.

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

(Note: The information given below reflects the initial thinking on significant opportunities for development of skills for learning, skills for life and skills for work. These may be subject to change as the development process progresses.)

It is expected that learners will also develop broad, generic skills through this Course. The skills that are likely to be appropriate for this Course are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Course where there are appropriate opportunities.

2 Numeracy

- 2.1 Number processes
- 2.2 Money, time and measurement
- 2.3 Information handling

5 Thinking skills

- 5.3 Applying
- 5.4 Analysing and evaluating

Amplification of these skills is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills will be appropriate to the level of the Course. Further information on building in skills for learning, skills for life and skills for work for the Course is given in the *Course Support Notes*.

Administrative information

Published: April 2011 (version 1.0)

Superclass: to be advised

History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date

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