



National 4
Course
Specification



National 4 Chemistry Course Specification (C713 74)

Valid from August 2013

First edition: April 2012
Revised: June 2013, version 1.1

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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: National 4 Chemistry
SCQF: level 4 (24 SCQF credit points)
Course code: C713 74

Mandatory Units

H21G 74	Chemical Changes and Structure (National 4)	6 SCQF credit points
H21J 74	Nature's Chemistry (National 4)	6 SCQF credit points
H21L 74	Chemistry in Society (National 4)	6 SCQF credit points

Added Value Unit:

H21M74	Chemistry Assignment (National 4)	6 SCQF credit points
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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:

- ◆ National 3 Chemistry Course or relevant component Units

There may also be progression from National 3 Biology, National 3 Environmental Science, National 3 Physics, or National 3 Science Courses.

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 is given in the *Course Support Notes*.

Progression

This Course or its Units may provide progression to:

- ◆ other qualifications in Chemistry or related areas
- ◆ 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*.

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

Chemistry, the study of matter and its interactions, contributes essential knowledge and understanding across all aspects of our lives. Chemistry explains the links between the particulate nature of matter and the macroscopic properties of the world. Chemistry research and development is essential for the introduction of new products. The chemical industry is a major contributor to the economy of the country.

An experimental and investigative approach is used to develop knowledge and understanding of chemistry key areas.

The Course provides opportunities for learners to recognise the impact chemistry makes on developing sustainability, and its effects on the environment, on society and on the lives of themselves and others.

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.

Purpose and aims of the Course

The purpose of the Course is to develop learners' curiosity, interest and enthusiasm for chemistry in a range of contexts. The key skills of scientific inquiry and investigation are integrated and developed throughout the Course. The relevance of chemistry is highlighted by the study of the applications of chemistry in everyday contexts. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet.

The Course gives opportunities for learners to develop the ability to think analytically, creatively and independently, and to make evaluations. The Course covers a variety of

contexts relevant to chemistry's impact on the environment and society through the chemistry of the Earth's resources, the chemistry of everyday products and environmental analysis. The Course allows flexibility and personalisation by offering choice in the contexts studied.

The key areas of atomic structure, bonding and chemical equations are integrated throughout the Course.

It offers a broad, versatile and adaptable skill set which is valued in the workplace, and forms the basis for study of chemistry at a higher level, while also providing a knowledge base useful in the study of all of the sciences.

The main aims of this Course are to:

- ◆ develop and apply knowledge and understanding of chemistry
- ◆ develop an understanding of chemistry's role in scientific issues and relevant applications of chemistry in society and the environment
- ◆ develop scientific inquiry and investigative skills
- ◆ develop scientific analytical thinking skills in a chemistry context
- ◆ develop the use of technology, equipment and materials, safely, in practical scientific activities
- ◆ develop problem solving skills in a chemistry context
- ◆ use and understand scientific literacy, in everyday contexts, to communicate ideas and issues
- ◆ develop the knowledge and skills for more advanced learning in chemistry

The Course also serves to equip all learners with an understanding of the impact of chemistry on everyday life, and with the knowledge and skills to be able to evaluate media reports. This will also equip learners to make their own decisions on issues within a modern society where the body of scientific knowledge and its applications and implications are ever developing. By using the skills base and knowledge and understanding of chemistry, learners will become scientifically literate citizens.

Information about typical learners who might do the Course

The Course is suitable for learners who have experienced learning across the sciences experiences and outcomes. The Course may be suitable for those wishing to study chemistry for the first time.

This Course has a skills-based approach to learning. It takes account of the needs of all learners and provides sufficient flexibility to enable learners to achieve in different ways.

Chemistry Courses are offered from SCQF level 3 to SCQF level 7. Vertical progression is possible through these levels, while lateral progression is possible to other qualifications in the sciences. This Course can also assist entry to employment, training and further education.

Course structure and conditions of award

Course structure

The Course develops skills in a chemistry context. Learners will gain an understanding of chemistry, and develop this through a variety of approaches, including practical activities.

The Course has four mandatory Units including the Added Value Unit. The first three Units listed below are designed to provide progression to the corresponding Units at National 5.

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

Units can be taught sequentially or in parallel to each other. However, learning and teaching approaches should provide opportunities to integrate skills, where possible.

Chemical Changes and Structure (National 4)

In this Unit, learners will develop scientific skills and knowledge of the chemical reactions in our world. Through practical experience learners will investigate rates of reaction, energy changes of chemical reaction, and the reactions of acids and bases and their impact on the environment. Focusing on these reactions, learners will work towards the concept of chemical equations. Learners will research atomic structure and bonding related to properties of materials.

Nature's Chemistry (National 4)

In this Unit, learners will research the Earth's rich supply of natural resources which are used by each and every one of us. Learners will investigate how fossil fuels are extracted and processed for use. They will investigate: the chemistry of using fuels, their effect on the environment and the impact that renewable energy sources can have on this; plants as a source of fuels, carbohydrates and consumer products; and how chemists use plants in the development of products associated with everyday life.

Chemistry in Society (National 4)

In this Unit, learners will focus on the chemical reactions, properties and applications of metal and alloys. The chemistry of metals in chemical cells is explored. Through research, learners will compare and contrast the properties and applications of plastics and new materials. Learners will investigate the use of fertilisers, the formation of elements, and the presence of background radiation, and will research the use of chemical analysis for monitoring the environment.

Added Value Unit: Chemistry Assignment (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 National 4 Chemistry 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, knowledge and understanding

Full skills, knowledge and understanding for the Course will be given in the *Added Value Unit Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section. These include:

- ◆ 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

Skills, knowledge and understanding to be included in the Course will be appropriate to the SCQF level of the Course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level (www.sqa.org.uk/scqf).

Assessment

Information about assessment for the Course is included in the *Course Support Notes* and the *Added Value Unit Specification*.

Unit assessment

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

They can be assessed on an individual Unit basis or by using other approaches which combine the assessment for more than one Unit.

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:

Chemical Changes and Structure (National 4)

Learners who complete the Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

Nature's Chemistry (National 4)

Learners who complete the Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

Chemistry in Society (National 4)

Learners who complete the Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

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: <http://www.sqa.org.uk/sqa/58409.html>

In the National 4 Chemistry Course, the Added Value Unit will focus on challenge and application.

Learners will draw on and apply the skills and knowledge they have learned during the Course. They will carry out an in-depth investigation on an unfamiliar and/or integrated context. This will be assessed through an [assignment](#)².

² Definitions can be found here: <http://www.sqa.org.uk/sqa/58409.html>

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

It is expected that learners will develop broad, generic skills through this Unit. The skills that learners will be expected to improve on and develop through the Unit 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 Unit 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: June 2013 (version 1.1)

History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date
	1.1	Skills, knowledge and understanding section: amendment to wording to clarify activities	Qualification Development Manager	June 2013

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