



Higher
Course
Specification



Higher Chemistry Course Specification (C713 76)

Valid from August 2014

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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: Higher Chemistry

SCQF: level 6 (24 SCQF credit points)

Course code: C713 76

Mandatory Units

H4KH 76	Chemical Changes and Structure (Higher)	3 SCQF credit points
H4KK 76	Researching Chemistry (Higher)	3 SCQF credit points
H21J 76	Nature's Chemistry (Higher)	6 SCQF credit points
H21L 76	Chemistry in Society (Higher)	6 SCQF credit points

Course assessment **6 SCQF credit points**

This Course includes six SCQF credit points to allow additional time for preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment 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, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- ◆ National 5 Chemistry Course or relevant component Units

Progression

This Course or its Units may provide progression to:

- ◆ Advanced Higher Chemistry
- ◆ other qualifications in Chemistry or related areas
- ◆ further study, employment and/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.

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 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.

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

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 skills of scientific inquiry and investigation are 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 provides well-mapped concept and skills development pathways. The Course develops scientific understanding of issues relating to chemistry, and uses the

development of chemical theory to build an extensive set of skills for learners. Through application of a detailed knowledge and understanding of chemical concepts, in practical situations, learners develop an appreciation of the impact of chemistry on their everyday lives. The Course gives the opportunities for learners to develop the ability to think analytically, creatively and independently, and to make reasoned evaluations. By using the broad skills base and knowledge and understanding of detailed chemistry concepts, learners will become scientifically literate citizens.

It offers a broad, versatile and adaptable skills set which is valued in the workplace, and forms the basis for progress onto 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 for learners to:

- ◆ develop and apply knowledge and understanding of chemistry
- ◆ develop an understanding of chemistry's role in scientific issues and relevant applications of chemistry, including the impact these could make in society and the environment
- ◆ develop scientific inquiry and investigative skills
- ◆ develop scientific analytical thinking skills, including scientific evaluation, in a chemistry context
- ◆ develop the use of technology, equipment and materials, safely, in practical scientific activities, including using risk assessments
- ◆ develop planning skills
- ◆ develop problem solving skills in a chemistry context
- ◆ use and understand scientific literacy to communicate ideas and issues and to make scientifically informed choices
- ◆ develop the knowledge and skills for more advanced learning in chemistry
- ◆ develop skills of independent working

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 reflect critically on scientific and media reports. This will also equip learners to make their own reasoned decisions on many issues within a modern society where the body of scientific knowledge and its applications and implications are ever developing.

The Course content has been selected to allow learners to study key chemical areas within situations of personal relevance using up-to-date contexts. Skills of scientific investigation, communication skills, literacy and numeracy are all developed within the Course. The Units offer opportunities for collaborative and independent learning, set within familiar and unfamiliar contexts, and for high-quality experimental work.

Information about typical learners who might do the Course

The Course is suitable for learners who are secure in their attainment of National 5 Chemistry or an equivalent qualification. The Course may be suitable for those wishing to study chemistry for the first time.

This Course emphasises practical and experiential learning opportunities, with a strong 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

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. Each of the component Units is designed to provide progression to the Advanced Higher Chemistry Course.

Chemical Changes and Structure (Higher)

This Unit covers the knowledge and understanding of controlling reaction rates and periodic trends, and strengthens the learner's ability to make reasoned evaluations by recognising underlying patterns and principles. Learners will investigate collision theory and the use of catalysts in reactions. Learners will explore the concept of electro-negativity and intra-molecular and intermolecular forces. The connection between bonding and a material's physical properties is investigated.

Researching Chemistry (Higher)

This Unit covers the key skills necessary to undertake research in chemistry. Learners will research the relevance of chemical theory to everyday life by exploring the chemistry behind a topical issue. Learners will develop the key skills associated with collecting and synthesising information from a number of different sources. Equipped with the knowledge of common chemistry apparatus and techniques, they will plan and undertake a practical investigation related to a topical issue.

Nature's Chemistry (Higher)

This Unit covers the knowledge and understanding of organic chemistry within the context of the chemistry of food and the chemistry of everyday consumer products, soaps, detergents, fragrances and skincare. The relationship between the structure of organic compounds, their physical and chemical properties and their uses are investigated. Key functional groups and types of organic reaction are covered.

Chemistry in Society (Higher)

This Unit covers the knowledge and understanding of the principles of physical chemistry which allow a chemical process to be taken from the researcher's bench through to industrial production. Learners will calculate quantities of reagents and products, percentage yield and the atom economy of processes. They will develop skills to manipulate dynamic equilibria and predict enthalpy changes. Learners will investigate the ability of substances to act as oxidising or reducing agents and their use in analytical chemistry through the context of volumetric titrations. Learners will use analytical chemistry to determine the purity of reagents and products.

Conditions of award

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Skills, knowledge and understanding

Further information on the assessment of the skills, knowledge and understanding for the Course is given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section.

This includes:

- ◆ demonstrating knowledge and understanding of chemistry by making statements, describing information, providing explanations and integrating knowledge
- ◆ applying chemistry knowledge to new situations, analysing information and solving problems
- ◆ planning and designing experiments/practical investigations to test given hypothesis or to illustrate particular effects including safety measures.
- ◆ carrying out experiments/practical investigation safely, recording detailed observations and collecting data
- ◆ selecting information and presenting information appropriately in a variety of forms
- ◆ processing information (using calculations and units, where appropriate)
- ◆ making predictions and generalisations from evidence/information
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ evaluating experiments/practical investigations and suggesting improvements
- ◆ communicating findings/information effectively

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 Assessment Specification*, which provides 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.

Chemical Changes and Structure (Higher)

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

Researching Chemistry (Higher)

Learners who complete the Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding to research the underlying chemistry of a chosen topic
- ◆ apply skills of scientific inquiry to investigate, through experimentation, the underlying chemistry of a chosen topic

Nature's Chemistry (Higher)

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 (Higher)

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

Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must 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.

In the Higher Chemistry Course, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

Learners will draw on, extend and apply the skills they have learned during the Course. This will be assessed within a [question paper](#)² and an [assignment](#)³, requiring demonstration of the breadth of knowledge, skills and understanding acquired from across the Units and how they can be applied in unfamiliar contexts and/or integrated ways.

¹ Definitions can be found here: <http://www.sqa.org.uk/jargonbuster>

² See link above for definition.

³ See link above for definition.

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

It is expected that learners will develop broad, generic skills through this Course. The skills that learners will be expected to improve on and develop through the 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.

1 Literacy

1.2 Writing

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

5.5 Creating

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

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History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date
	2.0	Page 7 – the Skills, Knowledge and Understanding section has been rewritten to better explain what is required. Page 8 – the Researching Chemistry Unit Outcomes have changed: Outcome 3 has been removed.	Qualifications Development Manager	April 2014

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