Science (National 4)

Draft National Course Specification

Valid from August 2013

This edition: April 2011, draft version 1.0

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

Contents

Course outline

Course title: Science (National 4)

SCQF: level 4 (24 SCQF credit points)

Course code: to be advised

Mandatory Units

Science: Fragile Earth (National 4) **6 SCQF credit points**

Science: Human Health (National 4) **6 SCQF credit points**

Science: Science at Work (National 4) **6 SCQF credit points**

Added Value Unit
Science (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:

- other SQA qualifications in Science 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* 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 science, 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, allowing them to develop important skills to become creative, inventive and enterprising. This will develop the science skills and knowledge needed across all sectors of society, while fostering an enjoyment of science and learning.

The Science Course should encourage resilience, which leads to becoming a confident individual. Successful learners in science think creatively, and analyse and solve problems. Science can produce responsible citizens through studying areas such as health, environment and sustainability.

The Course allows learners to understand and investigate the world in an engaging and enjoyable way. 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 in order to evaluate environmental and scientific issues, assess risk, and make informed decisions. This enables learners to develop an informed and ethical view of topical issues. Learners will develop their communication, collaborative working and leadership skills. They will 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, it is important that

everyone has an informed view of science and that more trained scientists will be required.

The Course offers a broad general approach to science and how it relates to the important issues of society.

The Course aims to develop scientific attitudes and understanding along with a learner's interest in, and enthusiasm for, all of the sciences. It aims to equip learners with the ability to understand and evaluate the scientific issues and claims that they will meet as citizens in a developing society. It covers major issues, where science impacts on society, by looking at the Fragile Earth, Human Health and Science at Work, through an extensive variety of relevant contexts. It provides a skills set for progressing to all of the science Courses at National 5.

The aims of this Course are to:

- develop scientific and analytical thinking skills
- develop understanding of scientific issues
- acquire and apply knowledge and understanding of scientific concepts
- develop understanding of the relevant applications of science 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 scientific context. In addition, learners will be able to develop a lifelong interest in science and will recognise the impact science makes on their lives, on the lives of others, on the environment and on society.

Through this Course, learners can 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 the Course, as it prepares them for further study of other science subjects.

This Course or its components may provide progression to:

- 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 develops skills in a scientific context and an application-led manner. Learners will gain knowledge and understanding of science and develop this through a variety of approaches, including practical activities.

By completing this Course, learners will develop important skills, attitudes and attributes related to science, including: developing scientific and analytical thinking skills in a science context; developing understanding of science issues; acquiring and applying knowledge and understanding of science concepts; and developing understanding of relevant applications of science 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. All the Units use a contextual basis for learning which allows the development of scientific and analytical thinking skills and the exploration of moral and ethical issues.

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.

Science: Fragile Earth (National 4)
In this Unit, learners will focus on energy, food, metals and water resources. Each will be investigated through activities related to their source or origin, production and/or extraction, use, conflicts, benefits and issues and possible solutions, including two local, national or global issues. Learners will gain an understanding of how science is involved in the cause, effect and resolution of environmental issues.

Science: Human Health (National 4)
In this Unit, learners will focus on how science helps us to maintain a healthy body. Learners will investigate what health is, including social, physical and mental health, threats to health, and health issues such as cancer, diabetes, obesity, alcoholism and allergies. They will also carry out scientific analysis of health claims and consider moral and ethical issues.

Science: Science at Work (National 4)
In this Unit, learners will investigate the principles and applications of telecommunications technology, and the source, production, use and issues of materials technologies, such as plastics, fibres, smart materials, alloys and cosmetics. Learners will also investigate risk and safety.

Science: 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 Science (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 science by making accurate statements
- applying basic scientific knowledge to straightforward situations, interpreting information and solving problems
- demonstrating basic understanding of science 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 simple 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 judgements are consistent and meet national standards.

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

Science: Fragile Earth (National 4)
Learners who complete this Unit will be able to:

- demonstrate planning, designing, carrying out and evaluating experimental procedures or investigations in the context of fragile Earth
- demonstrate skills of applying knowledge and understanding related to fragile Earth

Science: Human Health (National 4)
Learners who complete this Unit will be able to:

- demonstrate selecting, processing and presenting information in the context of human health
- demonstrate skills of applying knowledge and understanding related to human health

Science: Science at Work (National 4)
Learners who complete this Unit will be able to:

- demonstrate analysing and evaluating information, drawing conclusions, giving explanations and making predictions in the context of science at work
- demonstrate skills of applying knowledge and understanding related to science at work

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

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*.

[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

4 Employability, enterprise and citizenship
4.6 Citizenship

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