



National Unit Specification: general information

UNIT Mathematics for Science (SCQF level 5)

CODE F3T8 11

SUMMARY

This Unit is intended primarily for those candidates who wish to develop their knowledge and understanding of mathematics at SCQF level 5 with a view to supporting and underpinning their studies in Science. In such cases, delivery of the Unit should be set within the context of the award to which it contributes. The Unit is designed to develop aspects of the candidate's skills in statistics, algebra, and graphical work and to apply these skills in an appropriate scientific context. It is envisaged that the content of each Outcome is delivered and assessed with specific reference to the candidate's scientific studies, where appropriate.

OUTCOMES

- 1 Calculate and interpret simple statistical measures in scientific contexts.
- 2 Simplify algebraic expressions involving brackets, fractions and indices in scientific contexts
- 3 Use straight line graphs in scientific contexts.
- 4 Evaluate and transpose simple scientific formulae.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ Standard Grade Mathematics at General level
- ◆ Mathematics Intermediate 1 Course
- ◆ Numeracy Intermediate 1 Unit

Administrative Information

Superclass: RB

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National Unit Specification: general information (cont)

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CREDIT VALUE

1 credit at NQ level 5 (6 SCQF credit points at SCQF level 5*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

CORE SKILLS

There are opportunities to develop the Core Skill of *Numeracy* at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

National Unit Specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME 1

Calculate and interpret simple statistical measures in scientific contexts.

Performance Criteria

- (a) Calculate correctly the mean or mode or median for given data.
- (b) Interpret correctly the results for mean or mode or median in relation to given data.
- (c) Calculate correctly the range and standard deviation for given data.
- (c) Interpret correctly the results for range and standard deviation in relation to given data.

OUTCOME 2

Simplify algebraic expressions involving brackets, fractions and indices in scientific contexts.

Performance Criteria

- (a) Simplify correctly algebraic expressions involving brackets.
- (b) Simplify correctly algebraic expressions involving fractions.
- (c) Simplify correctly algebraic expressions involving indices: positive or negative or fractional.

OUTCOME 3

Use straight line graphs in scientific contexts.

Performance Criteria

- (a) Given a straight line graph, state correctly its equation.
- (b) Given a straight line equation, sketch its graph correctly.
- (c) Plot suitable given data correctly to obtain a graph with line of best fit.
- (d) Given a graph with line of best fit, use it correctly to obtain a predicted value for one variable given a value for the other variable.

National Unit Specification: statement of standards (cont)

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OUTCOME 4

Evaluate and transpose simple scientific formulae.

Performance Criteria

- (a) Evaluate correctly scientific formulae involving addition or subtraction or multiplication or division of terms, and combinations of these operations.
- (b) Evaluate correctly scientific formulae involving simple powers: squares or square roots or cubes or cube roots.
- (c) Transpose correctly scientific formulae involving addition or subtraction or multiplication or division of terms, and combinations of these operations.
- (d) Transpose correctly scientific formulae involving simple powers: squares or square roots or cubes or cube roots.

EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

Evidence should be produced under closed-book, supervised conditions in response to an appropriate set of questions. The evidence may be gathered:

- ◆ in a single, end-of-Unit assessment
- or*
- ◆ on an Outcome by Outcome basis
- or*
- ◆ by a combination of Outcomes

The total time allowed for the assessment(s) should not exceed two hours.

Candidates should be given access to calculators and an appropriate formula sheet. Sufficient working must be shown to demonstrate the method of solution.

Sampling of content may be appropriate, but assessment questions must be constructed to enable evidence to be produced which demonstrates achievement of all Outcomes and Performance Criteria.

Where reassessment is needed, a different set of questions must be used on each assessment occasion.

The Assessment Support Pack for this Unit provides sample assessment material and marking information. Centres wishing to develop their own assessments must refer to the Assessment Support Pack to ensure a comparable standard.

National Unit Specification: support notes

UNIT Mathematics for Science (SCQF level 5)

This part of the Unit Specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit is a mandatory Unit of the National Certificate Group Award in Applied Sciences, but can also be a free-standing Unit. This Unit aims to build on and extend the candidate's mathematical knowledge and skills.

It is envisaged that the content of this Unit is delivered in a scientific context appropriate to the candidate, whether as a mandatory Unit of the Group Award or as a free-standing Unit.

Applying the mathematical skills of the Unit in meaningful scientific scenarios will enable the candidate to appreciate that those skills are essential tools to support and underpin scientific studies.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Due to the essentially progressive nature of mathematics learning and teaching, every opportunity should be taken to revise and consolidate prior knowledge. For example: for Outcome 2, clarification of basic algebraic notation would be an appropriate lead-in.

Delivery of the Unit can be an appropriate mixture of lecturer-led/student-centred activities; individual/group work; classroom/workshop assignments. Use of online resources could be included to support and underpin learning.

The sensible and correct use of calculators should be demonstrated and encouraged where appropriate. At the same time, candidates should be guided and encouraged to identify when working without a calculator is more appropriate.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

This Unit will develop skills in *Using Number* and *Using Graphical Information* at SCQF level 5.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Candidates will benefit from the incorporation of formative assessments into the learning and teaching process.

Achievement of this Unit requires the Evidence Requirements for each Outcome to be met. A candidate who does not initially achieve the specified standard can have a further opportunity, attempting only the Outcome(s) not previously achieved.

National Unit Specification: support notes (cont)

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Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).