



National Unit Specification: general information

UNIT Science: Investigation Skills (SCQF level 5)

CODE F3TB 11

SUMMARY

This Unit will be suitable for candidates who wish to gain experience in carrying out a science investigation. It gives candidates an introduction to devising a strategy to test a particular hypothesis using practical procedures. The results of the investigation are then interpreted and reported.

OUTCOMES

- 1 Plan a science investigation to test a hypothesis.
- 2 Test the scientific hypothesis in accordance with the plan.
- 3 Analyse the results of the test.

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:

- ◆ Unit Science Practical Skills at SCQF level 4
- ◆ Standard Grade General in Biology, Chemistry, Physics or Science at General level
- ◆ Intermediate 1 Units in Biology, Chemistry or Physics

CREDIT VALUE

0.5 credits at Intermediate 2 (3 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.*

Administrative Information

Superclass: RA

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National Unit Specification: general information (cont)

UNIT Science: Investigation Skills (SCQF level 5)

CORE SKILLS

This Unit contains signposting for the Core Skills *Information Technology, Problem Solving, Written Communication* and *Numeracy* (Using Number).

National Unit Specification: statement of standards

UNIT Science: Investigation Skills (SCQF level 5)

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

Plan a science investigation to test a hypothesis.

Performance Criteria

- (a) Identify an appropriate hypothesis to be investigated.
- (b) Identify the relevant factors which must be taken into account during the investigation.
- (c) Identify the methods to use in order to test the hypothesis.
- (d) Identify the equipment and tasks needed to test the hypothesis.

OUTCOME 2

Test the scientific hypothesis in accordance with the plan.

Performance Criteria

- (a) Carry out the tasks in accordance with the plan following the methods identified.
- (b) Use the identified equipment appropriately throughout the investigation.
- (c) Record valid results of the test in an appropriate format.
- (d) Follow safe and hygienic practices throughout.

OUTCOME 3

Analyse the results of the test.

Performance Criteria

- (a) State valid conclusions based on the experimental results.
- (b) Evaluate the hypothesis in light of these conclusions.
- (c) Evaluate the success of the investigation plan.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

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

Written and/or oral evidence is required for Outcomes 1, 2 PC (c) and 3. It would be appropriate for this evidence to be in the form of a structured scientific report of the investigation which includes the following sections: aims, equipment, methods, readings and results, conclusions and evaluation. Candidates should be given a suitable template to help them produce their evidence. This evidence will be produced by candidates on their own at appropriate points throughout the Unit.

Performance evidence supported by an assessor observation checklist is required for Outcome 2 PC(a), (b) and (d). This evidence should be produced under controlled supervised conditions when the candidate is testing **one** hypothesis.

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

National Unit Specification: support notes

UNIT Science: Investigation Skills (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 20 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit is a mandatory Unit in the National Certificate in Applied Sciences at SCQF level 5 but it can also be taken as a free standing Unit. This Unit will complement practical Intermediate 2 Units in Biology, Biotechnology, Chemistry and Physics.

The Unit can be offered in the context of biology, chemistry, physics or general science and can be integrated with the teaching of any Intermediate 1 or 2 Units in the sciences which involve practical work in the laboratory.

The Unit develops the skills required for scientific enquiry — planning, carrying out the experimental investigation and the analysis of the results obtained to develop conclusions. The evaluation of the investigation is also tackled. The development of these skills enhances further study in the Sciences particularly regarding the Experimental Procedures Units at Higher level, the Investigation Units at Advanced Higher and the Graded Units at Higher National level.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The learning and teaching of this Unit is likely to be most effective when the concepts and principles for this Unit are set within the context of the teaching and learning of other Intermediate 2 Units in the science catalogue. If this Unit is being taken as part of the Group Award the learning, teaching and assessment could be integrated with any of the Intermediate 2 Science Units which involve experimental work in the laboratory

Working in groups and class discussions may help to identify hypotheses and realistic equipment for the testing however each candidate must carry out their own investigation and produce their own evidence. It is recommended that the selection of the hypothesis and methodology for testing is checked by the lecturer/teacher before the candidate progresses to the experimental testing to ensure realistic aims have been set. Class discussion may also help individual candidates to evaluate the success of their investigation. It would be helpful to explain the structure of a scientific report fully to candidates before the investigation is tackled. The template can act as an aide memoire. The use of ICT in the production of any report should be encouraged.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

This Unit provides the candidate with the opportunity to develop Core Skills *Information Technology*, *Problem Solving*, *Written Communication* and *Numeracy*.

Candidates will be able to develop Core Skills *Critical Thinking*, *Planning and Organising* and *Reviewing* and *Evaluating* in carrying out the scientific investigation.

Further development of the Core Skills *Written Communication* and *Information Technology* can be achieved in the completion of the investigative report.

National Unit Specification: support notes (cont)

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Please note: there may be further opportunities to develop the Core Skill of *Numeracy* (Using number) when carrying out simple numerical calculations especially in the chemistry and physics contexts.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

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)*.

During the work of the Unit candidates should have several opportunities to practise their skills. The assessment for this Unit may be integrated with that required for an Intermediate 2 Unit in Biology, Chemistry or Physics in the mandatory section of the National Certificate in Applied Sciences at SCQF level 5. It is recommended that the assessor checks the achievement of Outcome 1 before the candidate progresses to Outcomes 2 and 3. This will ensure that the candidate has chosen a hypothesis which can be tested effectively. The use of a template for a scientific report could act as an aide memoire for candidates and ensure that evidence for all Performance Criteria is addressed

It is recommended that the teacher/lecturer assesses the candidate at the stage when they are showing consistent competence in a given task.

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).