National Unit Specification: general information

UNIT Problem Solving (Intermediate 1)

NUMBER D01E 10

COURSE

SUMMARY
This core skills Unit seeks to develop skills in solving straightforward problems. A straightforward problem involves a situation familiar to the candidate where he or she identifies at least three influences affecting the problem and then selects a suitable method to solve the problem. Solving the problem should involve at least three sequential steps. While tackling the problem, the candidate develops skills in analysing the problem, devising a plan to solve it, carrying out the plan and finally evaluating his or her success in solving the problem.

OUTCOMES
1. Analyse a straightforward problematic situation or issue.
2. Plan, organise and carry out a task in order to tackle the problem.
3. Review and evaluate success in tackling the problem.

RECOMMENDED ENTRY
Entry is at the discretion of the centre.

CREDIT VALUE
1 credit at Intermediate 1 (6 SCQF credit points at SCQF level 4*)

**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: HB

Publication date: March 2004

Source: Scottish Qualifications Authority

Version: 02

National Unit Specification: general information

CORE SKILLS

Information on the automatic certification of any core skills in this Unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, publication code BA0906).

The attainment of this Unit will lead to the automatic award of:

- Problem Solving at Intermediate 1

National Unit Specification: statement of standards

UNIT Problem Solving (Intermediate 1)

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 the Scottish Qualifications Authority.

Note on range for the Unit

At this level, candidates should be dealing with a straightforward problem. A straightforward problem is one, which involves:

- a situation familiar to the candidate
- analysis of at lease three influences affecting the problem that are identified by the candidate
- management by the candidate, who selects a method with at least three sequential steps which he or she then uses to solve the problem

OUTCOME 1

Analyse a straightforward problematic situation or issue.

Performance criteria

a) Identify the most important influences affecting the problem.
b) Select an overall approach to deal with the problem.

Evidence requirements

PC (a)

Oral and/or written evidence that the candidate has identified at least three influences which have an important effect on the problem.

PC (b)

Evidence that the candidate has chosen a suitable approach to solving this problem from a selection of approaches, each of which involves at least three sequential steps.

OUTCOME 2

Plan, organise and carry out a task in order to tackle the problem.

Performance criteria

a) Plan a task to tackle the problem consisting of a sequence of steps.
b) Identify and obtain resources needed for the task.
c) Carry out the task effectively, by using the resources and following the plan.

Evidence requirements

PCs (a) and (b)

Oral and/or written evidence that the candidate has planned a task consisting of at least three sequential steps. The plan should include resources, identified by the candidate from a range of familiar resources.

Resources may be any source materials, information, equipment, technology or facilities which will be used while carrying out the task.

National Unit Specification: statement of standards (cont)

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PCs (b) and (c)
Evidence of actual performance which shows that the candidate has decided how the task will be organised and has then carried out the task, including obtaining and using the identified resources.

OUTCOME 3
Review and evaluate success in tackling the problem.

Performance criteria
a) Identify the strengths and weaknesses of the plan used to tackle the problem.
b) Draw a conclusion about own effectiveness in solving this problem.

Evidence requirements
PC (a)
Oral and/or written evidence that the candidate has identified the strengths and weaknesses of the way he or she tackled the problem from start to finish, clearly referring to the supporting evidence and using some simple criteria provided by the teacher/lecturer. Criteria could include: how well the candidate analysed the problem, was the task well planned, how well was the task carried out.

PC (b)
Oral and/or written evidence that the candidate has drawn a valid conclusion based on evidence he or she has gathered. The conclusion may be a suggestion for an alternative or modified way of tackling the problem.

National Unit Specification: support notes

UNIT Problem Solving (Intermediate 1)

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

The content and context for this core skills Unit should be appropriate to the personal and vocational needs of the candidate.

Core skills Units are stated at five levels of attainment, with activities becoming progressively more demanding in breadth and depth, and in the extent of individual autonomy required. The appendix to this Unit shows the relationship between the levels in Problem Solving.

This Unit provides opportunities for the automatic certification of *Problem Solving* at Intermediate 1. Problem solving is a collective term for the abilities that people bring to bear in tackling a wide range of issues and problems in their daily lives. The core skill components identified within *Problem Solving* are Critical Thinking, Planning and Organising, and Reviewing and Evaluating. This *Problem Solving* Unit covers the core skill components in three outcomes.

Structure of National Units in Problem Solving Core Skills

Core skill component	Skill	Outcome
Critical Thinking	being able to analyse situations and suggest courses of action	1
Planning and Organising	being able to plan and organise work and carry it through to completion	2
Reviewing and Evaluating	being able to reflect on what has been done and to draw conclusions for the future	3

The Unit provides opportunities for candidates to develop skills in solving straightforward problems set in a familiar context.

The content and context for the Unit may be any familiar situation or issue that will interest candidates and allow them to demonstrate achievement as specified in the three outcomes. The range of contexts in which problem solving can be developed is very wide and may involve, for example: investigating; inventing; improving performance or learning; devising a study or other programme; or taking part in organising a placement, visit or other event. Such contexts can be found in virtually all curricular and vocational areas.

National Unit Specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The learning and teaching approaches should encourage candidates to identify evidence of their attainment in problem solving skills and to look for opportunities to transfer their skills to other situations in their overall curriculum and life. There should be a balance between teacher/lecturer exposition and candidates' experiential learning. Arrangements should be made to ensure that there are no artificial barriers to learning. The nature of the candidate's learning needs should be taken into account when planning learning experiences.

The three core skill components of Critical Thinking, Planning and Organising, and Reviewing and Evaluating can be seen as stages in the process of tackling issues and problems. Open-ended, investigative approaches to learning will support the development and application of these skills.

The core skill component of Critical Thinking at Intermediate 1 is about candidates being able to analyse a straightforward situation or issue.

At this level, the context should be familiar to the candidates. The activity should involve a limited number of variables with clear relationships between them.

Candidates are required to select an approach to deal with the situation or issue. At this stage, it may be useful to bear in mind that Outcome 3 requires the review and evaluation of a strategy.

At this level, there may be several obvious straightforward approaches, including making a simple modification to a known process.

Example:

Straightforward issue: investigating the effects of different fertilisers on the growth of seedlings

Influences

- requirements for normal healthy seedling growth - light, water, soil, warmth
- viable seed
- addition of Fertiliser A
- addition of Fertiliser B

Approaches available

(Candidates should select one):

1. Grow three sets of seeds at the same time, all under the same normal growing conditions, one set without fertiliser, one set with Fertiliser A, one set with Fertiliser B. Identify difference in growth of seedlings.
2. Grow two sets of seeds at the same time, both under the same normal growing conditions, except that the soil in one has a deficiency compensated for by Fertiliser A. Identify difference in growth of seedlings.
3. Grow two sets of seeds at the same time, both under the same normal growing conditions, except that the soil in one has a deficiency compensated for by Fertiliser B. Identify difference in growth of seedlings.
4. Grow three sets of seeds at the same time, all under the same normal growing conditions, except that the set supplied with Fertiliser A has a soil deficiency compensated for by Fertiliser A, and the set supplied with Fertiliser B has a soil deficiency compensated for by Fertiliser B. Identify difference in the growth of seedlings.

National Unit Specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

The core skill component of Planning and Organising at Intermediate 1 is about candidates having the ability to plan, organise and complete a straightforward task. The task should be straightforward in that there are several obvious approaches available to the candidates. The straightforward task should involve a limited number of influences on the problem with clear relationships between them.

The candidates are expected to develop a plan; identify and obtain resources to carry out the plan, and carry out the task. At this level, candidates are expected to develop a plan with a limited number of steps. 'Limited' in this sense is taken to be more than three steps, possibly three to five steps. The plan should consist of a linear sequence of steps, without branching. In other words, the steps should not overlap. When deciding on the actual number of steps it is useful to bear in mind that the more steps there are, the more likely the plan is to branch and this will complicate the task.

Candidates should identify and obtain resources from a range of familiar sources, for example, local college, school library, community or sports centre. Resources might include sources of information, set procedures, people, equipment or physical resources. Candidates are expected to decide how the task will be organised. Then they are expected to carry out and complete the task.

Example:

Straightforward task: investigate the effects of different fertilisers on the growth of seedlings

linear plan:(ie with sequential steps, no branching)
1. select approach to investigation
2. decide on method of measuring seedling growth
3. set up experiment
4. maintain growing conditions
5. measure and compare seedling growth

Identify and obtain resources:
- seeds, seed trays, soil, fertilisers
- site with normal growing conditions
- measuring devices
- recording materials

Carry out plan

Opportunities for developing Planning and Organising can occur in all curricular and vocational fields. In all cases, the development of Planning and Organising benefits from the use of open-ended approaches to learning. The teaching and learning approaches should encourage candidates to identify the evidence of their attainment and to look for opportunities to transfer their skills to other situations in their overall curriculum and life.

National Unit Specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

The core skill component of Reviewing and Evaluating at Intermediate 1 is about candidates having the ability to review and evaluate a straightforward problem solving activity.

A straightforward problem solving activity is one set in a familiar context involving a limited number of factors and straightforward task management. During the evaluation, candidates are expected to identify the strengths and weaknesses in the way they tackled the problem, clearly referring to the supporting evidence. Then the candidates are expected to draw a conclusion.

When identifying the strengths and weaknesses, candidates should include all the stages of the activity - analysing the situation, planning and organising the task, and the outcome of the activity. Identification of strengths and weaknesses could include whether the most important influences were identified, effectiveness of the approach to deal with the problem and planning, suitability of resources, success in solving the problem.

When drawing a conclusion, candidates should consider the evidence and seek a conclusion, for example, by suggesting an alternative or modified way of tackling the problem.

Example:

Straightforward problem solving activity: investigate the effects of different fertilisers on the growth of seedlings

Strengths and weaknesses of the plan:

- suitability of approach selected
- effectiveness of plan:
  Did the plan provide opportunities to investigate the effects of different fertilisers on the growth of seedlings?
- organisation of the task:
  Was it possible to maintain the growing conditions?
- suitability of chosen seeds and fertilisers

Conclusion:

- Suggestions for alternatives or modifications to the plan

National Unit Specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Arrangements should be made to ensure that there are no artificial barriers to assessment. The nature of candidates' special needs should be taken into account when selecting assessment instruments, and possibilities for alternative arrangements considered.

If this Unit is being used in conjunction with other Units or courses, evidence of attainment should be gathered, wherever possible, from naturally occurring activities within these.

A staff observation checklist should be used where the candidate generates evidence of problem solving activities outwith the centre. The checklist may usefully provide supporting evidence for any of the activities related to Outcomes 1 – 3 and should be used accordingly.

Where the Problem Solving Unit is being combined with another Unit to create an enhanced learning and teaching programme, care must be taken to ensure that all aspects of each Unit are covered and adequate time must be allowed for the coverage of both Units. Such a programme would create opportunities to consolidate the skills gained in this Unit.

Evidence should be indexed to the relevant outcome, performance criteria and evidence requirements of the *Problem Solving* Unit and should be collated and retained for assessment and moderation purposes.

Suggested assessment instruments

Outcome 1
All PCs. Response to a restricted response question for each performance criterion would be suitable. The response could be oral and/or written.

Outcome 2
PC (a), PC(b). Response to a restricted response question for each performance criterion would be suitable.
PC (b), PC (c). Video recording, or entries in a personal log of carrying out the task, would be suitable for recording performance evidence.

Outcome 3
All PCs. Response to a restricted response question for each performance criterion would be suitable. Supporting evidence may be in the form of indexed references in the candidate's log.

Information on suggested assessment instruments

restricted response question	candidate response should be more discursive than a short answer but not lengthy. Restricted responses typically would vary between a few sentences and a paragraph in length
log	candidate demonstrates outcome of learning in a particular context, entries in a log record evidence, noting aspects such as targets, dates when targets achieved, actions, contacts.

National Unit Specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

Certification of Critical Thinking, Planning and Organising, and Reviewing and Evaluating recognises that candidates have demonstrated an appropriate level of skill in a particular context and there is an implication that, in contexts that contain knowledge and understanding accessible to the candidate, transfer is reasonably likely. However, it must also be recognised that familiarity with a context influences the candidate's ability to develop and transfer the skill.

This core skill Unit is aided by National Assessment Bank materials which provide assessment materials exemplifying the evidence required for achievement of the core skill.

In cases where the candidate has had to complete a core skills Unit to meet the requirements of a Scottish Group Award, that Unit will be counted as a Unit credit within the Scottish Group Award as well as being counted towards meeting the core skills profile required.

SPECIAL NEEDS

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, publication code AA0645).

Core skills Units **Appendix**

Problem Solving: progression chart

	Access 2	Access 3	Intermediate 1	Intermediate 2	Higher
Nature of problem	Simple recurring problem solving activity	Simple problem solving activity	Straightforward problem solving activity	Non-routine problem solving activity	Complex problem solving activity
Critical Thinking	Analyse an identified familiar situation or issue	Analyse a simple situation or issue	Analyse a straightforward situation or issue	Analyse a non-routine situation or issue	Analyse a complex situation or issue
Planning and Organising	Plan, organise and carry out a familiar simple task	Plan, organise and carry out a simple task	Plan, organise and carry out a straightforward task	Plan, organise and carry out a non-routine task	Plan, organise and carry out a complex task
Reviewing and Evaluating	Review and evaluate a simple recurring problem solving activity	Review and evaluate a simple problem solving activity	Review and evaluate a straightforward problem solving activity	Review and evaluate a non-routine problem solving activity	Review and evaluate a complex problem solving activity