

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. These skills include the ability to analyse a situation or issue, devise a plan for addressing this, carry out the plan and evaluate what has been done and achieved. During the evaluation, candidates are required to draw a conclusion about the outcome of the problem solving activity.

OUTCOMES

- 1 Analyse a straightforward situation or issue.
- 2 Plan, organise and carry out a straightforward task.
- 3 Review and evaluate a straightforward problem solving activity.

RECOMMENDED ENTRY

Wile entry is at the discretion of the centre, candidates would normally be expected to have attained Problem Solving (Access 3).

CREDIT VALUE

1 Credit at Intermediate 1.

CORE SKILLS

Information on the automatic certification of core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

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

- Problem Solving at Intermediate 1.

Administrative Information

Superclass: HB

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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 solving activity. A straightforward problem solving activity is one which is likely to involve:

- a familiar context
- analysis of a limited number of factors
- management of a straightforward task, with a limited number of steps.

OUTCOME 1

Analyse a straightforward situation or issue.

Performance Criteria

- a) Identify the main factors involved in the situation or issue.
- b) Select an overall approach to deal with the situation or issue.

Evidence Requirements

Oral and/or written evidence that the following analysis has been undertaken:

PC(a)

Evidence that the candidate has:

- identified at least three factors involved in the situation or issue. (These may be variables and/or the relationships between them.)

PC(b)

Evidence that the candidate has selected a suitable approach from at least three given obvious straightforward approaches.

National unit specification: statement of standards (cont)

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OUTCOME 2

Plan, organise and carry out a straightforward task.

Performance Criteria

- a) Develop a plan which incorporates the main factors.
- b) Identify and obtain resources to carry out the plan.
- c) Carry out the task effectively in terms of meeting the requirements of the plan.

Evidence Requirements

Evidence that the candidate has planned and organised a straightforward task as follows:

PC(a) and (b)

Oral and/or written evidence that the candidate has developed a plan consisting of a limited series of steps which should not overlap or be concurrent. The plan should identify resources, taken from a range of familiar resources.

Resources may be defined as any source materials, information, equipment, technology or facilities which may be used in carrying out the task.

PC(b) and (c)

Evidence of actual performance which shows that the candidate has decided how the task will be managed, and carried out the task, including obtaining and using the identified resources.

OUTCOME 3

Review and evaluate a straightforward problem solving activity.

Performance Criteria

- a) Identify the strengths and weaknesses of the strategy with reference to the supporting evidence.
- b) Draw a conclusion on the effectiveness of the solution to the activity.

Evidence Requirements

Oral and/or written evidence which shows that the candidate has reviewed and evaluated a straightforward problem solving activity.

PC(a)

Evidence that the candidate has identified the strengths and weaknesses of the strategy at all stages of the problem solving activity, clearly referring to the supporting evidence. Stages of the problem solving activity should include initial analysis of the situation, planning and organising the task, and the outcome of the activity.

National unit specification: statement of standards (cont)

UNIT Problem Solving (Intermediate 1)

PC(b)

Evidence that the candidate has drawn a valid conclusion based on consideration of the evidence. The conclusion may take the form of a suggestion for an alternative or modified strategy or plan, or involve making a prediction or forming a generalisation.

National unit specification: support notes

UNIT Problem Solving (Intermediate 1)

This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

GUIDANCE ON CONTENT AND CONTEXT

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.

National unit specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

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.

GUIDANCE ON TEACHING AND LEARNING APPROACHES

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. Where appropriate, 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.

National unit specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

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. The approach could be either an evaluation of the situation or issue or a strategy to deal with the situation or issue. An evaluation might include the candidates summarising, explaining, and/or drawing conclusions. A strategy might be a technique, a procedure or a course of action. 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

Limited number of factors:

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

Approaches available

(these are strategies to deal with the issue, candidates should select one):

1. Grow 3 sets of seeds at the same time, all under 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 2 sets of seeds at the same time, both under 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 2 sets of seeds at the same time, both under 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 3 sets of seeds at the same time, all under 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 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 either there are several obvious approaches available to the candidates or a known plan can be modified. The straightforward task should involve a limited number of variables 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, class or school library, equipment or accommodation. Resources might include sources of information, set procedures, people, equipment or physical resources. Candidates are expected to decide how the task will be managed: this could include allocation of tasks in a group context. 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:

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 of the strategy they have used to solve the problem, clearly referring to the supporting evidence. Then the candidates are expected to draw a conclusion.

When identifying the strengths and weaknesses of the strategy, 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 all factors were identified, effectiveness of strategy and planning, suitability of resources, appropriateness of outcome.

When drawing a conclusion, candidates should consider the evidence and seek a conclusion, for example, by suggesting an alternative or modification to the strategy or plan, or making a prediction, or forming a generalisation.

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

Where appropriate, 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.

National unit specification: support notes (cont)

UNIT Problem Solving (Intermediate 1)

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.

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 alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements* (SQA, 1998).

Core skills units
Problem Solving: progression chart

Appendix

	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