

## National Unit Specification: General Information

**UNIT** Problem Solving (Intermediate 2)

**NUMBER** D01E 11

### COURSE

### SUMMARY

This core skills unit seeks to develop skills in solving non-routine problems. These 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 will be required to draw conclusions about the outcome of the problem solving activity and justify these conclusions.

### OUTCOMES

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

### RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained Problem Solving (Intermediate 1)

### CREDIT VALUE

1 Credit at Intermediate 2.

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## Administrative Information

**Superclass:** HB

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## **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 2.

## National unit specification: statement of standards

**UNIT**            Problem Solving (Intermediate 2)

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 non-routine problem solving activity.

A non-routine problem solving activity is one which is likely to involve:

- an unfamiliar context with clear relationships between factors to be analysed
- OR
- a familiar context where relationships between factors need to be clarified
  - management of a non-routine task, which may require a plan involving branching ie. more than one strand of activity.

### **OUTCOME 1**

Analyse a non-routine situation or issue.

#### **Performance Criteria**

- a) Identify the critical factors involved in the situation or issue.
- b) Assess the relevance of these factors to the situation or issue.
- c) Develop 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 critical factors involved in the situation or issue
  - identified the relationships between the factors.
- (Factors may be variables and/or constraints which affect the situation or issue).

##### **PC(b)**

Evidence that a minimum of three critical factors have been assessed in terms of their relevance to the situation or issue.

##### **PC(c)**

Evidence that the candidate has developed an approach to deal with the situation or issue.

## **National unit specification: statement of standards (cont)**

**UNIT**            Problem Solving (Intermediate 2)

### **OUTCOME 2**

Plan, organise and carry out a non-routine task.

#### **Performance Criteria**

- a)     Develop a plan which incorporates at least four factors.
- b)     Identify and obtain resources.
- c)     Carry out the task, meeting all the requirements of the plan.

#### **Evidence Requirements**

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

##### **PC(a) and (b)**

Oral and/or written evidence that the candidate has developed a plan, which may involve branching (more than one strand) and including at least four factors. The plan should identify resources allocated to appropriate stages of the task. Resources should include at least two unfamiliar resources and may require some searching.

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 that the candidate has decided how the task will be managed and carried out and completed the task, including obtaining and using the identified resources.

### **OUTCOME 3**

Review and evaluate a non-routine problem solving activity.

#### **Performance Criteria**

- a)     Identify relevant and sufficient criteria on which to base the evaluation.
- b)     Gather relevant evidence to support evaluation.
- c)     Evaluate the effectiveness of the strategy used, explaining the relevance of the evidence.
- d)     Draw conclusions on the effectiveness of the strategy.
- e)     Justify conclusions with reference to the evidence.

## **National unit specification: statement of standards (cont)**

**UNIT**            Problem Solving (Intermediate 2)

### **Evidence Requirements**

Oral and/or written evidence that the candidate has reviewed and evaluated a non-routine problem solving activity as described in PCs (a)-(e). The candidate must evaluate all stages of the problem solving activity, including initial analysis of the situation, planning and organising the task, and the outcome of the activity.

For PC (c), candidates must explain the relevance of the evidence to the evaluation criteria. This explanation must go beyond a mere re-statement of the evidence.

## National unit specification: support notes

### UNIT Problem Solving (Intermediate 2)

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 2. 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 non-routine problems. The problems are considered 'non-routine' because they involve situations or issues where the relationship between variables is either clear in an unfamiliar context or needs to be clarified in a familiar context.

## **National unit specification: support notes (cont)**

### **UNIT**            Problem Solving (Intermediate 2)

The context should 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 2)

**The core skill component of Critical Thinking at Intermediate 2** is about candidates being able to analyse a non-routine situation or issue.

Candidates are required to identify the factors involved in the situation or issue. Factors should include the variables and the relationships between them. Candidates should assess the relevance of these factors to the situation or issue. Once the relevance of the factors is decided, candidates should develop 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 level, candidates may devise a new approach or select and/or modify a standard existing approach.

### **Example:**

#### **Non-routine situation: devising a study programme**

##### *Factors*

- availability of teacher/lecturers
- duration of the study programme
- purpose
- subjects which will be studied
- length of study periods
- deadlines

##### *Approach to devising study programme:*

1. decide purpose of the programme
2. identify and prioritise subjects to be included in the programme
3. prepare a time-line to include duration of the programme, allocation of time to each subject, interim deadlines, final deadline
4. prepare a study programme

## National unit specification: support notes (cont)

**UNIT**            Problem Solving (Intermediate 2)

**The core skill component of Planning and Organising at Intermediate 2** is about candidates having the ability to plan, organise and complete a non-routine task. The task should be non-routine in that it involves relationships that are either clear in an unfamiliar context or unfamiliar in a familiar context.

The candidates are expected to develop a plan, identify and obtain resources to carry out the plan, and to carry out the task. At this level, the plan could include branching, with more than one strand of activity running at the same time.

Candidates should identify and obtain resources from a range which includes unfamiliar resources and possibly requires search. 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:**

#### **Non-routine task: devising a study programme**

##### *Plan*

- 1        identify purpose of study programme
- 2(a)    identify and prioritise component subjects
- 2 (b)    decide availability of teacher/lecturers
- 3        prepare a time-line - duration of plan, start and finish dates
- 4(a)    allocate time to subjects
- 4(b)    explore study venues
- 5        prepare study timetable

##### *Identify and obtain resources*

- information on accessibility of component subject materials
- information on availability of teacher/lecturers
- information on deadlines, availability of study time
- information on study venue or venues

##### *Carry out plan*

Opportunities for developing Planning and Organising can occur in all curricular and vocational areas. 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 2)

**The core skill component of Reviewing and Evaluating at Intermediate 2** is about candidates having the ability to review and evaluate a non-routine problem solving activity. A non-routine problem solving activity is set either in a unfamiliar context with clear relationships between the variables or in a familiar context where relationships need to be clarified and where the plan may involve more than one strand and less familiar resources.

Candidates are expected to evaluate the effectiveness of the strategy based on evidence they have gathered from all stages of the activity - analysing the situation, planning and organising the task, and the outcome of the activity. They should include an assessment or explanation of the relevance of the evidence that goes beyond a mere restatement of the evidence. At this level, candidates may devise their own criteria for evaluation or select from a range provided or adopt/adapt a set of established criteria.

Finally, the candidates should draw conclusions and justify them with reference to the evidence. When drawing conclusions, candidates may suggest alternative or modified strategies or further work, or make a prediction, or form a generalisation. These conclusions must be appropriate and supported by the evidence.

### **Example:**

#### **Non-routine problem solving activity: to devise a study programme**

##### *Criteria chosen for evaluation*

- comparison with previous study programmes:  
did it compare favourably?  
did the plan provide opportunities to achieve the learning?
- organisation of the task:  
was the timetable workable?
- interpersonal skills:  
did the plan allow effective input from teacher/lecturers and others supporting the study programme?

##### *Evidence relating to evaluation criteria*

- evidence generated according to the individual candidate's programme of study

##### *Conclusion*

- suggestions for alternative or modified strategies, further work, predictions or generalisations

## **National unit specification: support notes (cont)**

**UNIT**            Problem Solving (Intermediate 2)

### **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 should be 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 units and courses.

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.

#### **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 2)

### 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.

<b>Information on suggested assessment instruments</b>	
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**

	<b>Access 2</b>	<b>Access 3</b>	<b>Intermediate 1</b>	<b>Intermediate 2</b>	<b>Higher</b>
<b>Nature of problem</b>	Simple recurring problem solving activity	Simple problem solving activity	Straightforward problem solving activity	Non-routine problem solving activity	Complex problem solving activity
<b>Critical Thinking</b>	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
<b>Planning and Organising</b>	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
<b>Reviewing and Evaluating</b>	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