

# Problem Solving

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## Tutor Guide

[HIGHER]

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**Acknowledgements**

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## **UNIT Problem Solving (Higher)**

### **General information**

#### **Course summary**

This core skills unit seeks to develop skills in solving complex problems. These include the ability to analyse a complex 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 and make recommendations.

#### **Outcomes**

1. Analyse a complex situation or issue.
2. Plan, organise and carry out a complex task.
3. Review and evaluate a complex 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 2).

#### **Credit value**

1 Credit at Higher.

#### **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 Higher.

## Statement of standards

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 the range for the unit

At this level, candidates should be dealing with a complex problem solving activity.

A complex problem solving activity is one which is likely to involve:

- an unfamiliar context
- analysis of complex or unfamiliar variables and clarification of the relationships between these
- management of a complex task involving a large number of variables. This task may require a plan which involves branching, i.e. more than one strand of activity. The plan may also involve opportunities to review and adjust the initial strategy.

### OUTCOME 1: Analyse a complex situation or issue

#### Performance criteria

- a) Identify the critical factors involved in a complex situation or issue.
- b) Assess the relevance of these factors to the complex situation or issue.
- c) Develop an approach to deal with the complex situation or issue.
- d) Justify the proposed approach with specific reference to all critical factors.

#### Evidence requirements

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

##### PC (a)

Evidence that the candidate has:

- identified at least four critical factors involved in the situation or issue
- identified the relationships between factors. (Factors may be variables and/or any constraints which affect the situation or issue.)

##### PC (b)

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

**PC (c)**

Evidence that the candidate has developed an approach by:  
either

- evaluating the situation or issue, summarising, explaining and/or drawing conclusions
- or
- developing a strategy to deal with the situation or issue.

**PC (d)**

Evidence that the candidate has justified the strategy/approach developed. The justification should make specific reference to the critical factors or evidence involved, such as resources and time available. Alternatively, the justification may involve comparison with other possible approaches.

At this level, candidates may devise a new approach or select and/or modify a standard existing approach.

**OUTCOME 2: Plan, organise and carry out a complex 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 complex task as follows:

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

Oral and/or written evidence that the candidate has developed a plan for carrying out a complex task. The task should be undertaken in an unfamiliar context and include a minimum of four factors, with unfamiliar relationships between these 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 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 complex problem solving activity****Performance criteria**

- a) Identify relevant and sufficient criteria on which to base evaluation.
- b) Identify, gather and collate relevant evidence to support evaluation.
- c) Evaluate effectiveness of strategy or strategies used, explaining the relevance of the evidence.
- d) Evaluate the effectiveness of the strategy or strategies in terms of the original brief.
- e) Draw conclusions with recommendations.
- f) Justify conclusions and recommendations.

**Evidence requirements**

Oral and/or written evidence which shows that the candidate has reviewed and evaluated a complex problem solving activity as described in PCs (a) – (f).

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. The evaluation should include reference to any modifications to the strategy during the course of the activity or to alternative strategies considered. Reference to the original brief should be clear.

For PC (e), the candidate must draw valid conclusions about the effectiveness of the strategy. In drawing conclusions, all of the evidence should be considered coherently, with no major aspect omitted.

For PC (f), the candidate must make recommendations related to the problem solving activity. The full set of conclusions should be drawn on in making recommendations for one or more of the following:

- improvement to a product, process, system or event
- possible use of an alternative strategy
- additional evidence gathering
- further investigation
- further work.

## Introduction to the unit

There are no formal entry requirements for this unit. Access to the unit is at the discretion of the centre.

### Outcomes

Problem Solving has three components:

- *Critical Thinking*: the ability to analyse and reason in order to make decisions.
- *Planning and Organising*: the ability to create clear plans for the completion of a task, taking into account available resources and managing the completion of the task.
- *Review and Evaluation*: the ability to reflect on and review the process, evaluate the outcomes, and identify where alternative strategies have been used.

This study unit is one in a series of units:

Problem Solving (Access 2)

Problem Solving (Access 3)

Problem Solving (Int 1)

Problem Solving (Int 2)

Problem Solving (Higher)

### Progression

At Higher the candidate should tackle a complex problem, either:

- an unfamiliar context
- analysis of complex or unfamiliar variables and clarification of the relationships between these
- management of a complex task involving a large number of variables. This task may require a plan which involves branching, i.e. more than one strand of activity. The plan may also involve opportunities to review and adjust the initial strategy.

As with all core skills, candidates can achieve Problem Solving at Higher by

- successfully completing courses where the core skill is embedded
- successfully completing the core skill Problem Solving unit.

The aim of this pack is to enable the candidate to complete the core skill Problem Solving unit at Higher where the core skill is not embedded.

**Possible approaches to delivery**

This unit is concerned with the learning process that involves analysing, planning, undertaking and evaluating problem solving activities. The product, i.e. the candidate's presentation of findings, is not assessed. The assessment task sheets are therefore essential in providing evidence.

Emphasis should be on group activities. The tutor should offer a limited degree of support.

Students should be encouraged as far as possible to integrate a problem solving activity into their normal course work.

This pack supplements the guidance in the unit specification and has been designed to give valid, reliable and practicable examples of assessment. The examples provided are intended to give guidance to tutors on how this unit may be delivered, and to enable students to successfully complete core skill Problem Solving at Higher.

There are a number of assessment tasks which correspond to the three outcomes.

***It is important to note that using assessments based on the examples provided does not automatically guarantee successful external moderation. It is the responsibility of each centre to make sure that all the appropriate internal quality assurance procedures are satisfactorily completed.***

Before using this material you may find it useful to consult the appropriate SQA guidance materials on quality assurance.

The pack is designed in a flexible learning fashion but it is recommended that **at least** three meetings with the candidate take place. These meetings are referred to as Tutor Checkpoints.

The first Tutor Checkpoint should establish that the task selected by the candidate has enough breadth and scope and is non-routine.

The second Tutor Checkpoint should be an interim interview to monitor the candidate's progress.

The third Tutor Checkpoint should check that all outcomes have been addressed and should validate and authenticate the candidate's work.

## Assessment information

### Integration of assessment

The candidate should be encouraged to appreciate that the focus of this unit is the development of transferable skills.

The Higher Still Development Unit has produced advice about integrating the teaching and assessment of core skills with other activities. A wide range of opportunities exist for the integration of the problem solving activity with other subjects. For example:

- *in Business Studies*: producing a set of marketing materials
- *in Travel and Tourism*: planning a holiday or an itinerary
- *in Care*: organising a work experience placement.

The range of contexts in which Problem Solving can be developed is very wide and may involve investigating; inventing; improving performance or learning; devising a study or other programme; taking part in organising a placement, visit or other event. Such contexts can be found in virtually all curricular and vocational areas.

### Instruments of assessment

This pack has been designed around the SQA National Assessment Bank Support materials and should generate enough evidence for the purposes of achieving the unit.

***It is strongly recommended that assessors use this pack along with the observation checklist provided by SQA in the NAB pack. This checklist allows the assessor to record that the candidate has completed the necessary stages and helps to validate and authenticate the candidate's work***

## Attendance/Tutor contact requirements

This is likely to vary from centre to centre. Typically the unit will take 40 hours to complete. Within that time there must be at least three meetings or interviews with the candidate.

Since many students will work in small groups during the course of this unit, group interviews may be appropriate.

## Other resources required

As a formative exercise students are required to select a mini project. The purpose of this project is to reinforce many of the needs for clear analysis of the problem, good planning, the identification of adequate resources, goal setting, time management and evaluation. The

time given to the mini project is only 6–8 hours. No more time can be allocated to this task as the summative tasks are likely to take 20–30 hours of the nominal 40 hours given over to the unit in most centres.

Since time for the mini project is restricted, it is recommended that tutors prepare a bank of resources related to the topic choices. Centre librarians are usually able to help with this kind of preparation. The Health Education Board Scotland website (<http://www.hebs.scot.nhs.uk/>) has some excellent information, as does the Scottish Executive website (<http://www.scotland.gov.uk/>).

As part of the summative assessment students have to identify resources themselves. They are likely to require the use of Internet facilities, the library and, occasionally, a telephone. Many student projects also require the organisation of external visits.

## Problem Solving and the Progress File

Some centres may wish to incorporate Problem Solving activities into their implementation of the Progress File. Students tackling Problem Solving at Higher are likely to be using the Exploring Pathways, Widening Horizons or Broadening Horizons workbook.

### **Why use the Progress File in combination with the Problem Solving unit?**

The Progress File helps to reinforce the importance of Core Skills in general and in the workplace in particular. Using the File in this way will also help to give Problem Solving a context within the wider framework of personal and social development.

### **Where can the Progress File be used in combination with the Problem Solving unit?**

Areas within the Progress File which are particularly relevant to Problem Solving include:

The Self-Assessment and Reviewing Progress sections identify areas of strength and weakness and may help to place students at the correct core skill level. This exercise may also help students to identify areas where there is a particular development need and so help students to relate the Problem Solving unit to their own personal situation.

### **Research/action planning**

Arranging a work experience placement is a worthwhile project for students to undertake in itself, but it can also help them gain credit for Problem Solving. This Problem Solving pack could be used alongside some of the support materials in the Progress File that help students to identify vocational goals, as well as preparing them for and helping them to plan their placement.

### **The end product of the Problem Solving activity**

In some cases the inclusion of the end product of a Problem Solving activity may be a useful addition to the Progress File portfolio. Examples of such end products may include student newsletters, information leaflets or a supervisor's workplace reports.

## Tutor evaluation questionnaire

Learning and Teaching Scotland is interested in the views of tutors who have used these learning materials with students. Your feedback and comments will assist us in evaluating and, where necessary, improving this pack for future student and tutor use.

Please answer all of the questions as fully and frankly as possible and return this form to Learning and Teaching Scotland at the following address: Gardyne Road, Dundee, DD5 1NY.

Thank you for your assistance.

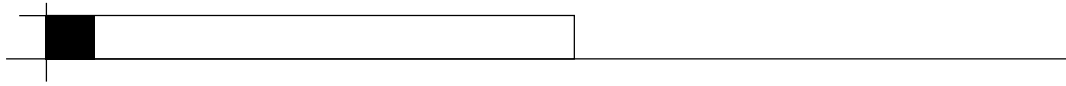
- |   |   |   |                                   |                                      |  |
|---|---|---|-----------------------------------|--------------------------------------|--|
| 1 | The content is pitched at the appropriate level for the target student                        | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 2 | The content is accurate and up-to-date  | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 3 | The content meets the requirements of the stated outcomes/aims/objectives                     | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 4 | The content is sufficient to allow the student to achieve the stated outcomes/aims/objectives | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 5 | The learning approaches are appropriate   | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |

*contd overleaf*

- |    |   |   |                                   |                                      |  |
|----|---|---|-----------------------------------|--------------------------------------|--|
| 6  | The language is suitable for the target student   | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 7  | Sufficient and significant Activities, SAQs and Tutor Assignments are included                    | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 8  | Appropriate feedback has been included  | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 9  | The assessment methods are appropriate  | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 10 | The standards of assessment are acceptable  | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 11 | The pack is structured in such a way as to allow students to find their way through the materials | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |
| 12 | Overall I would rate this pack as effective   | Agree<br>Strongly<br><input type="checkbox"/> | Agree<br><input type="checkbox"/> | Disagree<br><input type="checkbox"/> | Disagree<br>Strongly<br><input type="checkbox"/> |

Name \_\_\_\_\_ School/College \_\_\_\_\_ Date \_\_\_\_\_

Thank you once again for your assistance.



# Student Log Book

**Core Skill: Problem Solving**

**Higher**

Student Name:

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Tutor Name:

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Date:

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## The log book

### Planning – recording personal contributions to the task

Whether working alone or in a group, students must keep a record of their individual contribution to the Problem Solving activity. A blank diary sheet has been provided for this purpose. Other ways of providing this evidence may be agreed – perhaps by using e-mail for example.

What the student should do:

- agree their recording documents with you (examples which you could adapt are provided)
- maintain the record as appropriate – it is likely that a weekly record will be kept
- entries should be brief but frequent and you must ensure that these are meeting all the requirements of their plan.

**Task record**

Date: \_\_\_\_\_

Activities:

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Have you encountered any problems? If yes, give details. \_\_\_\_\_

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How have you addressed these problems? \_\_\_\_\_

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How far have you achieved your goals? \_\_\_\_\_

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**Task record**

Date: \_\_\_\_\_

Activities:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Have you encountered any problems? If yes, give details. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How have you addressed these problems? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How far have you achieved your goals? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**APPENDIX 2**

Tutor Checklist – Core Skill Problem Solving (Higher)

Student Name: \_\_\_\_\_ Tutor Name: \_\_\_\_\_

**Tutor Checkpoint One**

Date: \_\_\_\_\_

Has the student successfully achieved Outcome 1? Yes/No

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Tutor Checkpoint Two**

Date: \_\_\_\_\_

Has the student successfully achieved Outcome 2? Yes/No

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Tutor Checkpoint Three**

Date: \_\_\_\_\_

Has the student successfully achieved Outcome 3? Yes/No

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Has the student successfully achieved the unit? Yes/No

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Student Signature: \_\_\_\_\_ Tutor Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **Interview guidelines**

### **Outcome 1**

Has the student identified a problem which is sufficiently complex?

Have all required resources been identified?

### **Outcome 2**

Does the student have any particular strengths or weaknesses in time management?

How does the student plan to improve their time management?

Is the plan specific, measurable, achievable, realistic and time-bound?

Does the student carry out the solution according to their plan?

Does the student show any particular strengths or weaknesses in the way in which they carry out the plan/deal with problems and difficulties?

### **Outcome 3**

Has the student identified suitable evaluation criteria?

Has the student made an accurate evaluation?

Has the student identified alternative strategies?

