



PROBLEM SOLVING
SCQF Level 5
40 Hour Unit

CORE SKILLS UNIT

ASSESSMENT SUPPORT PACK

Part 1: Information for tutors

What is involved?

Problem Solving at SCQF level 5 is about using skills to solve problems in personal, workplace, social and educational situations. The focus of the Unit is on transferable problem solving skills:

- ◆ critical thinking;
- ◆ planning and organising;
- ◆ reviewing and evaluating.

This Unit is designed for delivery in schools, colleges, workplaces, community and other learning environments.

At this level, learners are expected to be able to work with non-routine problems and with a degree of independence. The Unit is designed for those who have a reasonable level of skill and experience in using problem solving skills.

Learner motivation can be maximised by making the problem solving activities as relevant as possible to the learner's likely uses for problem solving. The activities should be drawn from the learner's personal, social, workplace and educational situation. Additionally, integration of the problem solving activities with those of other SQA qualifications being undertaken should be explored. For example, where a learner is undertaking other National Qualifications, motivation for problem solving can be increased if the activities are related to these National Qualifications and the learner can see the direct relevance of the problem solving. If you do decide to adopt this approach, separate records of assessment decisions must be kept for this Unit and evidence for this Unit should be clearly accessible.

Assessment and evidence

Learners at SCQF level 5 are required to deal with finding a solution to a non-routine situation or issue. If the situation is unfamiliar to the learners then the relationships between the variables affecting the situation should be clear. If the situation is familiar then the relationship between the variables may need to be clarified. You should try to identify naturally-occurring opportunities for assessment where possible. For learners who are working towards vocational Units or subject specific Units, opportunities for assessment of problem solving skills could arise while completing tasks which provide evidence for both the vocational/subject specific Unit and this Unit. Some of the exemplars in this pack could be used or contextualised for this purpose.

Assessment is likely to be by one or more of:

- ◆ written tasks;
- ◆ oral questioning;
- ◆ observation;

Assessment of the unit should be based as far as possible on the everyday activities of the learner. You can find guidance in Part 2 of this pack on suitable assessment activities. When assessing by observation, it is essential to keep a detailed checklist. When you are assessing by oral questioning, you must keep a copy of the questions asked and the answers given. All items of evidence must be signed and dated by you.

Part 3 of this pack supplies exemplar forms which you can use to record successful completion of each of the unit tasks. You can sign and date these as the learner achieves each task to keep a record of the learner's progress.

Critical Thinking

Learners will recognise and analyse the main factors affecting a non routine situation or issue. Learners will identify the factors affecting the issue and then decide on the relative importance to the issue of each of these. The learners will then evaluate the situation and devise an approach to deal with the situation. The learners will use methods such as summarising, explaining and drawing conclusions to assist their evaluation of the issue and will devise a strategy to deal with the situation. The learners will use problem solving techniques such as mind-mapping and brainstorming to devise a strategy. The strategy may involve an approach which is new to the learners or may be a modification of an existing approach.

Planning and Organising

Learners will decide on a course of action to deal with the factors affecting the non routine situation or issue. The learners will firstly identify the activities involved and then devise an action plan, making clear the order in which activities need to be carried out and relationships between them. The action plan may include activities which can be carried out simultaneously and the learners will identify who is to carry out the activities. In devising the action plan the learners will take into account any limitations and issues relating to managing time and people. The learners will identify resources to be used; these may include equipment, information and costs. Obtaining resources may also involve implementing procedures and input from others. Once the action plan has been devised the learners will carry out the activities as planned, monitor the activities allocated to others and check the action plan is complete.

Reviewing and Evaluating

On completion of the action plan the learners will decide on a criteria to judge how effective each stage of the problem solving activity has been. Examples of criteria which could be used include the correct identification of the causes of the problem, keeping to a timescale and effective use of personnel. The learners will gather evidence to support their evaluation. Examples of evidence are questionnaires, records of interviews and minutes of meetings. The learners will consider the evidence, make their evaluations based on this and will then suggest modifications or alternatives for improving future problem solving activities.

Evidence from the learners for each of the problem solving skills will take the form of a log of the activities undertaken. You should retain other supporting evidence, notes of discussions, minutes of meetings, findings of surveys for example, along with observation checklists. Examples are available in Part 3.

Planning

You should work out where opportunities for meeting the standard are likely to arise. Where possible this should be built into the assessment process. You should discuss this assessment process with the learners so that they are quite clear about what is expected from them.

Guidance on the Unit

What learners need to know or be able to do

The Unit states that on completion the learner will know how to:

- ◆ identify the factors affecting a non routine situation or issue (eg What are the causes of the problem? Why has the situation arisen? Who and what is involved? What effects is the problem causing?)
- ◆ assess the relative importance of these factors;
- ◆ consider what could be done and then decide on an approach to solve the problem which can be justified with reference to the factors they have identified;
- ◆ work out an action plan to deal with key factors affecting the problem (eg identifying the activities involved; the order in which these should be undertaken; which activities may be undertaken simultaneously; deciding who should carry out each task ; working within limitations; managing time; managing people);
- ◆ choose and obtain the resources needed to carry out an action plan (eg equipment, information, money, input from other people; procedures for obtaining these);
- ◆ carry out an action plan, checking it is complete;
- ◆ choose criteria by which they can judge how effective each stage of their problem solving activity has been (eg Did they identify the correct causes of the problem? Did their action plan address these causes? Did the action plan keep to the specified timescale? Did everyone carry out their allotted activities? Did they identify the correct resources and best ways of getting them? Did they use resources effectively?)
- ◆ gather evidence, relevant to their chosen criteria, with which to judge the effectiveness of all aspects of their problem solving activity;
- ◆ draw conclusions from their problem solving activity, justifying these based on the evidence which they have gathered and where appropriate, devise alternative ways of solving similar problems in the future.

Assessment guidance, together with some suggested activities, is contained in Part 2.

The Unit can be broken down into the following three stages:

- ◆ critical thinking;
- ◆ planning and organising;
- ◆ reviewing and evaluating;

The notes contained in the following paragraphs provide general guidance on the steps involved in meeting the requirements for these three stages.

Critical Thinking

Learners will be able to demonstrate their ability to apply critical thinking to the first stage of the problem solving process. They will be able to investigate and analyse a non routine situation or issue to identify the main factors which affect the problem. These factors may include identifying the causes of the problem, looking at why the problem has arisen and who is involved. Learners will be able to identify the relative importance of these factors and the effects caused by the problem. Learners will be able to use problem solving techniques such as brainstorming or mind-mapping to decide on an approach to solve the problem. They will be able to seek information or help from others if appropriate.

Planning and Organising

Learners will be able to use the results of their critical thinking to work out an action plan to deal with the problem. In the action plan learners will be able to clearly identify what activities need to be done, who should do them and the order in which they should be carried out. Some activities may be carried out simultaneously and the learners will be able to allocate these to others. The learners will be able to clarify if permission is required for any tasks and will obtain this if appropriate and will also take into account any limitations. In planning, the learners will be able to take into account requirements for managing people, time and money. Learners will be able to identify resources needed to carry out the action plan. These may include equipment, information, money and input from people and learners will be aware of procedures for obtaining these. When the action plan is complete the learners will be able to put it into practice and either undertake activities themselves or monitor the completion of activities where these have been allocated to others. Learners will be able to demonstrate task management skills in deciding who does what and in overseeing this process.

Reviewing and Evaluating

Once all the activities specified in the action plan are complete and the solution to the problem has been reached the learners will be able to decide on the effectiveness of each stage of the problem solving activity. The learners will be able to choose criteria to judge how effective each stage of the action plan has been. Criteria may include identifying the correct causes of the problem, keeping to time, appropriate allocation of tasks and use of resources. The learners will be able to use evidence from the implementation of the action plan to judge the effectiveness of all aspects of the problem solving activity and decide how effective each part has been. Evidence might include records of discussions, minutes of meetings questionnaires or analyses of cost or time savings. Having carried out this evaluation and based on the findings, the learners will be able to devise alternative ways of solving similar problems in future.

Gathering evidence

It may be appropriate for you to gather written evidence produced by the learners while carrying out the practical activities. However, written evidence is not essential for this Unit and is inappropriate if it disadvantages the learners.

You may wish instead to use oral questioning. This requires you to create and complete record sheets comprising a checklist, questions asked and learners' responses.

From the learner's point of view, it is useful to have the means of keeping all the work of this Unit together. You can help here by creating and providing a workbook which includes all the evidence-gathering items. An alternative would be to provide worksheets which can be made into a portfolio.

If you have chosen to integrate the problem solving work with that of other Units being undertaken by the learners, it may be possible to assess the problem solving as part of a larger single activity. In this case you must keep separate records for this Unit.

The Unit requires learners to investigate a problem in their workplace, draw up and carry out an action plan to solve the problem and finally review how effective their problem solving activity has been.

This may be achieved in many ways. Some typical activities might be:

- ◆ Investigating the reasons why attendance has been falling at a group or club the learner attends in the evenings; devising and setting in place a plan to attract more members.
- ◆ Drawing up, implementing and reviewing the effectiveness of a personal revision plan for an exam subject.
- ◆ The wastage level in production by the learner's team on work placement has risen over the past months. They have been asked to investigate the causes of this and propose and implement a solution which will bring the wastage level down to what it was before.
- ◆ Learners must use only one problem situation to prove that they can do all of the tasks in this Unit. They should not gather evidence from different problem situations for different tasks.

Part 2: Assessment guidance

You can use the exemplar assessments given in this section in several ways:

- ◆ to help identify the type and amount of evidence which the learners needs to produce;
- ◆ to help identify the level of complexity in evidence required for the Core Skill at this level;
- ◆ to help you to create an assessment task related to the learner's own situation;
- ◆ as an off-the-shelf assessment.

At this level learners are expected to investigate a non-routine problem, apply problem solving techniques to analyse the problem, decide on an approach to solve the problem and draw up and carry out an action plan to solve the problem. Finally, the learner reviews how effective each stage of the problem solving activity has been and devises alternative ways of solving similar future problems.

Learners must complete all three stages of the problem solving task. These are:

- ◆ critical thinking;
- ◆ planning and organising;
- ◆ reviewing and evaluating;

Learners must use only one problem solving situation to prove they can do all the tasks in the Unit. At this level learners are expected to work independently.

Some possible contexts for the task are suggested overleaf

Part 3 contains generic exemplar record sheets which you may use as they are. However, you may also adapt these to reflect the detail of the tasks you decide to set.

Task – Using skills to solve a non – routine problem

Personal/Social context

The learner is asked to solve the following problem:

Some of your “sporty” friends are to take part in a 10k fun-run for charity in a couple of month’s time. You are not very fit but would like to join them. Devise a personal fitness programme for yourself so you can join in.

Here are some of the tasks which the learners might have to carry out. They might find it helpful to use problem solving techniques like mind–mapping to help them to analyse the task:

- 1 Do an assessment at their local sports centre to decide on their present level of fitness.
- 2 Work out how long they have to get fit enough to join the run.
- 3 Decide how much time they can spend training each day/week.
- 4 Decide on the sorts of training activities they can use.
- 5 Work out the costs involved for clothing, equipment, entry to sports facilities.
- 6 Check if any of their friends can give help/advice.
- 7 Organise any resources they will need.
- 8 Plan a pilot week to try everything out.
- 9 Make a timetable for their training incorporating fitness review sessions.
- 10 Work to their deadlines and allow times to adjust training if required.

Educational Context

The learner is asked to solve the following problem:

You have been elected as your class representative. This means you will need to attend a meeting with your course tutors as part of the review of your course to act as spokesperson for your group of thirty students. Your tutors are keen that all the students in your class have an opportunity to express their views as your course is new.

Here are some of the tasks which the learners might have to carry out. They might find it helpful to use problem solving techniques like mind-mapping to help them to analyse the task:

- 1 Check with tutors the areas to be covered in the feedback from students and arrange rooms for meetings.
- 2 Make sure they have a list of all members of the class.
- 3 Arrange to see students in small groups.
- 4 Arrange to see any students who are unable to meet at group times.
- 5 Devise questions to ask them.
- 6 Organise meetings.
- 7 Check they have given all students a chance to give feedback.
- 8 Write up their findings to present at meeting.

Workplace Context

The learner is asked to solve the following problem:

The car park at your workplace has enough space for staff cars but recently some people have not been able to park because of badly parked cars belonging to employees and visitors. Your task is to devise and organise a better system.

Here are some of the tasks which the learners might have to carry out. They might find it helpful to use problem solving techniques like mind–mapping to help them to analyse the task:

- 1 Find out how many employees use the car park and how many visitors' spaces are required.
- 2 Investigate the size and current layout of the car park and any particular issues relating to parking.
- 3 Check health and safety requirements.
- 4 Calculate space allocations to allow for best use of space available.
- 5 Draw up plans for new layout/s.
- 6 Inform and consult staff for views.
- 7 Arrange implementation of new layout.
- 8 Review new procedures in appropriate timescale.

As the tutor you might find it useful to think about these elements when you are managing the activity:

Critical Thinking: Stage 1 of the problem solving activity

- ◆ you encourage the learner to think of situations where they have been called upon to solve problems;
- ◆ you explain the problem solving process in the light of the learner's prior experience;
- ◆ you explain how the unit will be assessed, eg by learners keeping logs and/or providing written notes; you observing and asking questions;
- ◆ the learner considers the problem solving task and identifies at least five factors which affect the situation, eg what are the causes of the situation, who is responsible, why has the situation arisen and what are the effects of the situation;
- ◆ if the learner is examining a situation which is unfamiliar to them then the relationship between factors involved must be clear;
- ◆ the learner decides on the relative importance of the factors;
- ◆ the learner applies problem solving techniques such as brain-storming and/or mind-mapping to help analyse the problem and decide on an approach to solve the problem and can ask for help from others to do this.

Planning and Organising: Stage 2 of the problem solving activity

- ◆ the learner works out an action plan to help them solve the problem;
- ◆ the plan will be sequential but might contain steps which can be undertaken simultaneously in which can the learner will allocate activities to others;
- ◆ the learner identifies and obtains any resources needed;
- ◆ the learner works through the action plan and monitors any other person who has been allocated an activity;
- ◆ the learner checks the activities in the action plan have been completed.

Reviewing and Evaluating: Stage 3 of the problem solving activity

- ◆ the learner decides on how effective their action plan has been by deciding on criteria by which they can judge how effective each stage of the problem solving process has been, eg did they identify the correct causes of the problem, did their action plan address these causes, did the action plan keep to a specified timescale, did everyone carry out their allotted activities, were resources used effectively?
- ◆ the learner gathers evidence to support their evaluation, reviews the evidence and judges the effectiveness of the action plan's steps;
- ◆ based on these decisions the learner devises alternative ways of solving similar problems in the future.

Part 3: Exemplar recording documentation

This section provides sample forms which can be used by the learners and tutor to gather evidence and record assessment decisions.

Record sheets

Record sheets are provided for each of the three tasks

- ◆ Task 1: Critical Thinking
- ◆ Task 2: Planning and Organising
- ◆ Task 3: Reviewing and Evaluating

The learners can provide written answers on these forms. Alternatively, if you use oral questioning, you may use them to write down the learners' answers.

Assessment checklists

You can use these to record the learners' achievements through each task: each checklist identifies the skills which learners must demonstrate.

Summary checklist

The summary checklist enables you to record the results from the assessment checklist on a single form.

Assessment Record Sheets

Learner:	
Tutor:	Date:
What is the problem you have been given to solve?	
Stage 1: Critical thinking — Investigating a problem	
What are the main factors affecting your problem? You should give at least five factors such as what are the causes of the problem, why has the problem arisen and who is involved.	
What are the most important factors and why?	
What approach can you take to solve the problem? Suggest at least three and indicate which you think is the best approach and why.	
Who will you need to help you with this?	

Do you need information to help you?

Tutor Comments

Tutor signature:

Date:

Learner:	Tutor:	Date:
Stage 2: Planning and Organising — work out an action plan		
<p>Work out an action plan to solve the problem. You should use the appropriate column of the sheet below to record what you do. You should show what activities need to be done in the order they should be carried out. Some activities will need to be carried out simultaneously and you will need to identify who carries these out. Note any limitations, such as time or cost, to your plan. Identify the resources you will need to use, such as equipment money or help from other people. Note any procedures that need to be followed to obtain these, for example completing an order form.</p>		
<p>What needs to be done? List activities in order but make it clear which are to be done simultaneously</p>		
<p>Who will help with activities?</p>		
<p>What resources are needed? Indicate any procedures required to obtain these</p>		
<p>Are there any limitations?</p>		

The record of what is done. You should make clear who has carried out activities and how long activities have taken.

Tutor's comments

Tutor signature:

Date:

Learner:	Tutor:	Date:
Stage 3: Review and Evaluate — decide how effective your action plan has been		
<p>Now you have completed your action plan to solve your problem, decide how effective your action plan and solution have been. Decide on criteria to judge how effective each stage has been. Your criteria might be identifying the causes of the problem correctly, keeping to a timescale, using appropriate resources, and/or everyone working effectively at their allocated activities. You should also note evidence you have retained to support your evaluation, for example, minutes of meetings, questionnaires, evaluation sheets, cost analyses.</p> <p>When you have completed your review and evaluation devise alternative ways of solving problems in future based upon your experience with this problem solving activity. You should devise at least two alternative ways of solving problems and give reasons for these alternatives.</p>		
Criteria		
Stage of plan		
How effective was it? What were the strengths and weaknesses?		

What evidence do you have to support your evaluation?

Tutor's comments

Based on your evaluation of this problem solving activity describe at least two alternative ways of solving problems in the future. Explain why you have decided on these.

Tutor signature:

Date:

Assessment checklist

Learner:	
Checklist for Stage 1: Critical Thinking	
Skills	Achieved
Identify the factors affecting a non-routine situation or issue.	
Assess the relative importance of these factors.	
Consider what could be done and then decide on an approach to solve the problem which can be justified with reference to the factors you have identified.	
Tutor signature:	Date:

Learner:	
Checklist for Stage 2: Planning and Organising	
Skills	Achieved
Work out an action plan to deal with key factors affecting the problem.	
Choose and obtain the resources you will need to carry out an action plan.	
Carry out an action plan, checking it is complete.	
Tutor signature:	Date:

Learner:	
Checklist for Stage 3: Reviewing and Evaluating	
Skills	Achieved
Choose criteria by which you can judge how effective each stage of your problem solving activity has been.	
Gather evidence, relevant to your chosen criteria, with which to judge the effectiveness of all aspects of your problem solving activity.	
Decide how effective each stage of your problem solving activity has been in resolving the situation or issue, referring to the evidence you have gathered.	
Draw conclusions from your problem solving activity, justifying these based on the evidence which you have gathered and where appropriate, devise alternative ways of solving similar problems in the future.	
Tutor signature:	Date:

Summary checklist

Learner:	
Learner number:	
Centre:	
Problem Solving SCQF 5	Date achieved
Stage 1: Critical Thinking	
Stage 2: Planning and Organising	
Stage 3: Reviewing and Evaluating	
Tutor signature:	Date:

Part 4: Information for learners

As you work through this Unit, your tutor will need to gather evidence to prove that you have demonstrated all the problem solving skills.

This can be done by:

- ◆ your tutor asking you questions;
- ◆ you writing a short report;
- ◆ you filling in a work book, worksheet or diary;
- ◆ you keeping records of evidence of what you have done such as minutes of meetings, questionnaires, analysis of cost or time savings.

By the end of the Unit you must show that you can:

- ◆ identify the factors affecting a non routine situation or issue (eg What are the causes of the problem? Why has the situation arisen? Who and what is involved? What effects is the problem causing?)
- ◆ assess the relative importance of these factors;
- ◆ consider what could be done and then decide on an approach to solve the problem which can be justified with reference to the factors you have identified;
- ◆ work out an action plan to deal with key factors affecting the problem (eg identifying the activities involved; the order in which these should be undertaken; which activities may be undertaken simultaneously; deciding who should carry out each activity ; working within limitations; managing time; managing people);
- ◆ choose and obtain the resources you will need to carry out an action plan (eg equipment, information, money, input from other people; procedures for obtaining these);
- ◆ carry out an action plan, checking it is complete.

- ◆ choose criteria by which you can judge how effective each stage of your problem solving activity has been (eg Did you identify the correct causes of the problem? Did your action plan address these causes? Did the action plan keep to the specified timescale? Did everyone carry out their allotted activities? Did you use resources effectively?)
- ◆ gather evidence, relevant to your chosen criteria, with which to judge the effectiveness of all aspects of your problem solving activity;
- ◆ draw conclusions from your problem solving activity, justifying these based on the evidence which you have gathered and where appropriate, devise alternative ways of solving similar problems in the future.

These are some of the things you might do to provide the evidence:

- ◆ Investigating the reasons why attendance has been falling at a group or club you attend in the evenings; devising and setting in place a plan to attract more members.
- ◆ Drawing up, implementing and reviewing the effectiveness of a personal revision plan for an exam subject.
- ◆ The wastage level in production by your team on work placement has risen over the past months. You have been asked to investigate the causes of this and propose and implement a solution which will bring the wastage level down to what it was before

Learners with disabilities and/or additional support needs

The additional support needs of individual learners should be taken into account when planning learning experiences, selecting the most appropriate assessment activity and considering any reasonable steps which might be necessary to allow the learner to meet the assessment standard.

Further advice can be found in SQA's Assessment Arrangements' web pages (www.sqa.org.uk)

ADMINISTRATIVE INFORMATION

Credit Value

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Helpdesk	0845 279 1000
Fax:	0845 213 5000
Email:	customer@sqa.org.uk
Website:	www.sqa.org.uk

Optima Building	Ironmills Road
58 Robertson Street	Dalkeith
Glasgow	Midlothian
G2 8QD	EH22 1LE

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