



PROBLEM SOLVING
SCQF Level 5
40 Hour Unit (F3GD 11)

CORE SKILLS UNIT

ASSESSMENT SUPPORT PACK

Part 1: Information for tutors

What is involved?

Problem Solving 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. The Unit can be broken down into the following:

- ◆ 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 solving problems.

Learner motivation can be maximised by making the problem solving activities as relevant as possible to the learner. The activities should relate to the learner's personal, social, workplace, and educational situation. In addition, 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 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.

Learners must use only one problem solving activity to prove that they can meet all of the requirements of the Unit. They should not gather evidence from different problem solving activities.

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 interests of the learner. You can find guidance in Part 2 of this pack on suitable assessment examples.

When you are 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 that you can use to record successful completion of each stage of the assessment. You can sign and date these to keep a record of the learner's progress.

There are three stages to the problem solving process that are assessed by this Unit: the critical thinking stage, the planning and organising stage, and the reviewing and evaluating stage.

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. Learners will then evaluate the situation and devise an approach to deal with the situation. 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. Learners may use problem solving techniques such as mind-mapping and brainstorming to devise a strategy. The strategy may involve an approach that 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. Learners will firstly identify the steps involved and then devise an action plan, making clear the order in which steps need to be carried out and the relationships between them. The action plan may include steps that can be carried out simultaneously and learners will identify who is to carry out the steps. In devising the action plan the learners will take into account any limitations and issues relating to managing time and people. Learners will identify the 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, learners will carry out the steps as planned, monitor the steps allocated to others, and check the action plan is complete.

Reviewing and evaluating

On completion of the action plan the learners will decide on 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. Learners will gather evidence to support their evaluation. Examples of evidence could be questionnaires, records of interviews, and minutes of meetings. Learners will consider the evidence, make their evaluations based

on this, and will then suggest modifications or alternatives, if appropriate, for improving future problem solving activities.

Guidance on the Unit

What learners need to know or be able to do

The Unit states that learners will:

- ◆ identify the main factors affecting a non-routine situation or issue (eg what are the causes of the problem and who is involved)
- ◆ assess the importance of these factors
- ◆ consider what could be done and then justify an approach to address the problem
- ◆ work out an action plan to deal with the problem (eg work out the steps involved and the order to do them in; decide which steps can be done at the same time; decide who should carry out each step; think about working within limitations, managing time, and managing people)
- ◆ choose and obtain the resources they will need to carry out the action plan (eg equipment, information, money, and input from other people) – they might have to think about the procedures for obtaining these
- ◆ carry out the action plan and then check whether or not it is complete
- ◆ work out how to 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 steps, did they identify the correct resources and best ways of getting them, and did they use resources effectively)
- ◆ gather evidence and use their chosen criteria 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 they gathered, and, if it's appropriate, devise alternative ways of solving similar problems in the future

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

The notes contained in the following paragraphs provide general guidance on each of the 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 that affect the problem. These factors may include identifying the causes of the problem, looking at why the problem has arisen, and determining 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 steps need to be carried out, who should do them, and the order in which they need to be carried out. Some steps may be carried out simultaneously and learners will be able to allocate these to others. Learners will be able to clarify if permission is required for any steps and will obtain this if appropriate, and will also take into account any limitations. In planning, learners will be able to take into account requirements for managing people, time, and money. Learners will be able to identify the 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 learners will be able to put it into practice and either undertake steps themselves or monitor the completion of steps 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 steps specified in the action plan are complete and the solution to the problem has been reached, learners will be able to decide on the effectiveness of each stage of the problem solving activity. Learners will be able to choose criteria to judge how effective each step 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. 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 stage 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 learner may be able to devise alternative ways of solving similar problems in future.

Gathering evidence

Learners must use only one problem solving activity to prove that they can meet the requirements of the Unit. They should not gather evidence from different problem solving activities. At this level learners are expected to work independently. It may be appropriate for you to gather written evidence produced by learners while carrying out the problem solving activity. However, written evidence is not essential for this Unit and is inappropriate if it disadvantages the learner. You may wish instead to use oral questioning. This requires you to create and complete record sheets comprising a checklist, questions asked, and the learner's 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 that includes all the evidence-gathering items. An alternative would be to provide worksheets that 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 (which could be in a personal, workplace, social, or educational situation), 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 problem solving 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. The learner has been asked to investigate the causes of this and propose and implement a solution that will bring the wastage level down to what it was before.

Disabled learners and/or those with additional support needs

The additional support needs of individual learners should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

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 that 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 create an assessment task related to the learner's own situation

Some possible contexts for the problem solving activity are suggested overleaf. Part 3 contains generic exemplar record sheets and assessment checklists that you may use as they are. However, you may also adapt these to reflect the detail of the problem solving activity.

Using skills to solve a non-routine problem

Contexts

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 months' 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 steps within the action plan that 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 problem solving activity:

- 1 Do an assessment at your local sports centre to decide on your present level of fitness.
- 2 Work out how long you have to get fit enough to join the run.
- 3 Decide how much time you can spend training each day/week.
- 4 Decide on the sorts of training activities you can use.
- 5 Work out the costs involved for clothing, equipment, and entry to sports facilities.
- 6 Check if any of your friends can give help/advice.
- 7 Organise any resources you will need.
- 8 Plan a pilot week to try everything out.
- 9 Make a timetable for your training, incorporating fitness review sessions.
- 10 Work to your deadlines and allow time 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 30 students. Your tutors are keen that the all the students in your class have an opportunity to express their views as your course is new.

Here are some of the steps within the action plan that 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 problem solving activity:

- 1 Check with tutors the areas to be covered in the feedback from students and arrange rooms for meetings.
- 2 Make sure you 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 the students.
- 6 Organise meetings.
- 7 Check you have given all students a chance to give feedback.
- 8 Write up your findings to present at a 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 steps within the action plan that 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 problem solving activity:

- 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 the space available.
- 5 Draw up plans for new layout/s.
- 6 Inform and consult staff for views.
- 7 Arrange implementation of the new layout.
- 8 Review new procedures in an appropriate timescale.

Stages

As the tutor you might find it useful to think about these points when you are managing the assessment.

Critical thinking: Stage 1 of the problem solving activity

- ◆ You could encourage the learner to think of situations where they have been called upon to solve problems.
- ◆ You could explain the problem solving process in the light of the learner's prior experience.
- ◆ You could explain how the Unit will be assessed, eg by the learner keeping logs and/or providing written notes.
- ◆ You could observe and ask questions.
- ◆ The learner will consider the problem solving activity and identify factors that 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 that is unfamiliar to them, then the relationship between the factors involved must be clear.
- ◆ The learner will decide on the relative importance of the factors.
- ◆ The learner may apply 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 will work out an action plan of steps to help solve the problem.
- ◆ The action plan might contain steps that can be undertaken simultaneously, in which case the learner can allocate steps to others.
- ◆ The learner will identify and obtain any resources needed.
- ◆ The learner will work through the action plan and monitor any other person who has been allocated a step.
- ◆ The learner will check that the steps in the action plan have been completed.

Reviewing and evaluating: Stage 3 of the problem solving activity

- ◆ The learner will decide on how effective his/her action plan has been by deciding on criteria by which he/she can judge how effective each stage of the problem solving activity has been, eg did the learner identify the correct causes of the problem, did the action plan address these causes, did the action plan keep to a specified timescale, did everyone carry out their allotted steps, and were resources used effectively.
- ◆ The learner will gather evidence to support his/her evaluation, review the evidence and judge the effectiveness of all aspects of the problem solving activity.
- ◆ Based on these conclusions, if appropriate, the learner could suggest alternative ways of solving similar problems in the future.

Part 3: Exemplar recording documentation

This section provides sample forms that can be used by learners and tutors to gather evidence and record assessment decisions.

Assessment record sheets

Assessment record sheets are provided for each of the following stages:

- ◆ Stage 1: Critical thinking
- ◆ Stage 2: Planning and organising
- ◆ Stage 3: Reviewing and evaluating

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

Assessment checklists

You can use these to record the learner's achievements through each stage. Each checklist identifies the skills that learners must demonstrate.

Summary checklist

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

Assessment record sheet – Stage 1

Learner:	
Tutor:	
Stage 1: Critical thinking	
What is the problem you have been given to solve?	
What are the main factors affecting your problem? You could consider 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?	
Suggest an approach and justify your suggestion.	
Who will you need to help you with this?	
What information do you need to help you?	
Tutor comments:	
Tutor signature:	Date:

Assessment record sheet – Stage 2

Learner:		Tutor:		
Stage 2: Planning and organising				
Work out an action plan to solve your problem. The headings at the top of the first four columns ask for information on your action plan. The last column is for you to keep a record of what happened as you carried out your action plan.				
What needs to be done? What needs to be done? You should show what steps need to be carried out in the correct order.	Who might I need to ask for help, advice, or information?	What resources might I need?	What limitations are there? Consider the effect limitations such as time or cost might have.	What happened? As you carry out the steps in your action plan make a note of what happened.
Tutor comments:				
Tutor signature:			Date:	

Assessment record sheet – Stage 3

Learner:

Tutor:

Stage 3: Reviewing and evaluating

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 steps.

You should also note evidence you have retained to support your evaluation, eg minutes of meetings, questionnaires, evaluation sheets, and cost analyses.

When you have completed your review and evaluation, if appropriate devise alternative ways of solving problems in future based on your experience with this problem solving activity.

Criteria

Stage of plan

How effective was the problem solving activity? What were the strengths and weaknesses?

What evidence do you have to support your evaluation?

Based on your evaluation of this problem, and if it's appropriate, identify alternative ways of solving a similar problem in the future. Explain why you have decided on these.

Tutor comments:

Tutor signature:

Date:

Assessment checklists

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 that 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 the problem	
Choose and obtain the resources you will need to carry out the action plan	
Carry out the 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 that 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 at SCQF level 5	Date achieved
Stage 1: Critical thinking	
Stage 2: Planning and organising	
Stage 3: Reviewing and evaluating	
Tutor signature:	Date:

ADMINISTRATIVE INFORMATION

Credit value

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