PROBLEM SOLVING
SCQF Level 6
40 Hour Unit (F3GD 12)

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 work with complex problems with a high degree of independence and initiative. The Unit is designed for those who have a significant 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 6 are required to deal with finding a solution to a complex situation or issue. Variables affecting the situation/issue will be complex and unfamiliar to the learners.

Learners must use only one problem solving activity to prove that they 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 you must keep a detailed checklist. Similarly, if you use oral questioning you must keep a record of both the question and the learner's response. 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 identify and analyse the factors affecting a complex situation or issue. Learners will identify the factors and then decide on the relative and comparative importance to the issue of each of the factors. Learners will then analyse and identify possible ways of solving the problem and select and justify an approach to deal with the situation. Learners will use problem solving techniques such as mind-mapping, brainstorming, or sub-dividing the problem into its component parts to devise and justify their approach. At this level learners will require to undertake research from various sources to analyse the problem and support the decision on an appropriate approach.

Planning and organising

Learners will decide on a course of action to deal with the factors affecting the complex situation or issue. Learners will firstly identify the steps involved and then devise an action plan, making clear the order in which the steps need to be carried out and the relationship 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 learners will take into account any limitations and issues relating to managing time and people. Learners will identify resources to be used; these may include equipment, information, and money. Obtaining resources may also involve implementing procedures and organising input from others. Once the action plan has been devised, learners will carry out the steps as planned and monitor the steps allocated to others. Learners will monitor the implementation of the action plan continuously and will review and amend the action plan where necessary. If appropriate, an interim review of progress will take place. Learners will check that the implementation of the action plan is complete.

Reviewing and evaluating

On completion of the action plan learners will decide on criteria to judge how effective each stage of the problem solving activity has been. Examples of criteria that could be used include the correct analysis of the causes of the problem, devising an action plan to address these factors, keeping to a timescale, and effective use of money and personnel. Learners may also

consider the effectiveness of any amendments made to the action plan during its implementation. Learners will gather evidence to support their evaluation. Examples of evidence could be comparisons made with other systems, market research, product testing, and quantitative and qualitative research. Learners will consider the evidence, make their evaluation based on this, and will then suggest modifications or alternatives for improving future problem solving activities. Learners will justify their evaluation and recommendations from the evidence they have gathered.

Evidence from learners for each of the problem solving skills could take the form of a log of the steps undertaken. You should retain all other supporting evidence, eg notes of discussions, minutes or records of meetings, questionnaires, and observation checklists. Examples are given in Part 3.

Guidance on the Unit

What learners need to know or be able to do

The Unit states that learners will:

- identify the factors affecting a complex situation or issue (eg what are the causes of the problem, why has the situation arisen, who and what is involved, and what is the effect of the problem)
- assess the relevance and comparative importance of these factors
- analyse and identify possible ways of solving the problem
- select and justify their approach to solve the problem
- work out an action plan to deal with the problem (eg identify and decide on the steps involved and the order in which they should be done; which steps can be undertaken simultaneously; who should carry out each step; any limitations to be worked within; managing time; managing people)
- choose and obtain the resources they will need to carry out the action plan (eg people, equipment, and physical resources) and consider the procedures for obtaining these
- carry out the action plan, reviewing and amending it continuously, as appropriate
- choose criteria by which they can judge how effective every aspect of their problem solving activity has been (eg was their original analysis of causes correct, did their action plan address all these factors, did the action plan keep to the specified timescale, did everyone carry out their allotted steps, did they correctly identify the resources and best ways of getting them, did they use resources effectively, did the action plan keep within budget, and did any amendments to the action plan improve its effectiveness)
- gather evidence, relevant to their chosen criteria, to judge the effectiveness of all aspects of their problem solving activity (eg by making comparisons with other systems, market research, product testing, and quantitative and qualitative research)
- decide how effective every aspect of their problem solving activity has been in resolving the situation or issue, justifying their conclusions from the evidence they have gathered
- make recommendations for possible improvements to solving similar problems in future (eg the need for fuller initial investigation; the use of an alternative strategy.)

Assessment guidance, together with some suggested activities, 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 complex situation or issue to identify the factors that affect the problem. These factors may include identifying the causes of the problem, who and what is involved, and looking at why the problem has arisen. Learners will be able to identify the relative and comparative 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 analyse the problem and identify possible ways of solving the problem. Learners will then select and justify an approach to solving the problem.

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 key factors affecting the problem. In the action plan learners will be able to clearly identify what steps need to be carried out, who needs to do them, and the order in which they should be carried out. The action plan may involve branching, with some steps being carried out simultaneously and learners will be able to allocate these steps to others. Learners will take into account any limitations and any issues relating to managing time or people. Learners could use Gantt charts to predict and monitor resource usage and costs, if this is appropriate.

Learners will be able to identify and obtain 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 supervise the completion of steps where these have been allocated to others. Learners will be able to demonstrate the effective task management skills required in dealing with a complex problem, eg in deciding who does what and overseeing this process. Learners will be able to monitor and review the progress of the action plan continuously and undertake an interim review if appropriate. The action plan will be amended in accordance with the findings of these ongoing reviews.

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 every aspect of the problem solving activity. Learners will be able to choose criteria to judge how effective every aspect has been. Criteria may include making a correct analysis of the original causes of the problem, devising the action plan to address these, keeping on time, and appropriate allocation of steps and use of resources. Learners may also include keeping within budget and making effective amendments to the action plan if these were needed. 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 comparisons with other systems, market research, product testing, and quantitative and qualitative research findings. Having carried out this evaluation and based on the findings, learners will be able to recommend alternative ways of solving similar problems in future, justifying these recommendations using the evidence gathered.

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:

- The learner's local community centre is considering setting up a pre-school play group on weekday mornings. He/she has been asked to assess the feasibility of this and produce a report outlining the factors to be taken into consideration and the likely costs of running the facility.
- The learner is planning to go on to higher education once he/she has completed his/her school/college course. The learner will research the degree options, taking account of the credit value of his/her current qualifications and how they relate to courses available and the learner's long-term career plan. The learner will research and analyse the various methods of funding open to him/her. The learner will select a higher education course and justify the selection based on the feasibility of course content, accommodation costs, duration of degree course, and affordability.

- The social enterprise using Fair Trade products at the learner's centre is losing customers. The learner is asked to investigate the reasons for this. He/she will make some hypotheses as to reasons for this, eg the products are out of date; local companies are undercutting them on price; the supply times are too long so the enterprise has limited stock; the service from the students is not as high as those from local outlets. The learner will devise a strategy for investigating the validity of these hypotheses and, based on the evidence gathered, will produce a report with recommendations as to future actions by the social enterprise.

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 learner 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 complex problem

Contexts

Personal/social context

The learner is asked to solve the following problem:

You would like to set up a drama group in your area with a view to ultimately staging a production. You have had an encouraging response from possible members in support of the idea and your local community centre has offered a room and some office facilities. Before you go ahead, however, you need to find out if sponsorship is available for this sort of group, look for suitable premises for meetings, rehearsals, and productions, and work out the budget requirements.

Here are some of the steps within the action plan which learners might have to carry out. They will use problem solving techniques such as mind-mapping to help analyse the problem solving activity and research skills to justify their approach and undertake the problem solving activity:

1. Contact the community centre to check on room and office facilities.
2. Organise premises for an initial meeting for those interested in joining a group.
3. Publicise this meeting and draw up an agenda.
4. Hold a meeting and check on numbers, people who can offer practical help, and future members' expectations of a drama group.
5. Write up the minutes of the meeting, summarise and review your findings and organise help with next stage.
6. Find out about possible premises and investigate availability and costs.
7. Summarise and review findings.
8. Work out costs, including a membership fee.
9. Contact local companies and other agencies about sponsorship.
10. Review findings.
11. Contact prospective members and hold a second meeting to give information on progress and make a decision about forming the group.

Educational context

The learner is asked to solve the following problem:

You are investigating the causes of recent changing patterns of employment in the local economy as part of a research project for a course assessment. You will need first-hand information from large, medium, and small local employers and access to current official statistics. Plan how you can go about getting this information and implement this plan.

Here are some of the steps within the action plan which learners might have to carry out. They will use problem solving techniques such as mind-mapping to help analyse the problem solving activity and research skills to justify their approach and undertake the problem solving activity:

1. Find out background information on the local economy past and present, eg using council website and newspaper archives.
2. Review your findings.
3. Make a list of different sized local employers and find out who to contact.
4. Decide on a representative sample of employers.
5. Draw up a letter explaining what you are doing, why you are doing it, and what you require. Send this to employers.
6. Collate and act on responses, arranging meetings or contacting by postal questionnaire.
7. Keep a record of your sources and review progress.
8. Devise a questionnaire to use either in face-to-face interviews or for postal distribution.
9. Attend meetings and write up what you find.
10. Concurrently with earlier steps, identify and investigate secondary sources of information for statistics, recording findings.
11. Review findings.

Workplace context

The learner is asked to solve the following problem:

You work for a large local company that has decided to sponsor a local community project. The management has given you the task of identifying and investigating eligible projects and drawing up a short-list to be considered for sponsorship. You will have to write a background report on your findings and organise an event where the short-listed groups can present their projects to senior management.

Here are some of the steps within the action plan which learners might have to carry out. They will use problem solving techniques such as mind-mapping to help analyse the problem solving activity and research skills to justify their approach and undertake the problem solving activity:

1. Write an explanatory document setting out the intentions of your company and any criteria to be used in awarding sponsorship.
2. Check this with your company's legal department.
3. Make a list of local community centres and contact them for information about community projects.
4. Place an advertisement in the local free press outlining your sponsorship plan and asking for details of projects.
5. Make a list of suitable projects.
6. Contact community projects and arrange fact finding visits/meetings.
7. Review and summarise findings, make a short-list, and write a background report.
8. Arrange a presentation event.
9. Contact projects to invite them to give a presentation.
10. Notify unsuccessful projects.

Stages

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

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 check the learner is familiar with problem solving techniques and research methods.
- You could explain how the Unit will be assessed, eg by learners keeping logs and/or providing written notes.
- You could observe and ask questions.
- The learner will consider the problem solving activity and identify the factors that affect the situation, eg what are the causes of the situation, who and what is involved, why has the situation arisen, and what is the effect of the problem.
- The learner will assess the relative and comparative importance of these factors.
- The learner will apply problem solving techniques such as brain storming and mind-mapping to help analyse the problem and decide on an approach to solve the problem.
- The learner will justify their approach, referring to any research evidence gathered.

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 may contain steps that can be carried out simultaneously and the learner will 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 steps from the action plan.
- The learner will undertake reviews of the action plan as it progresses and make any required amendments.
- The learner will check 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 the action plan has been by deciding on the criteria by which he/she can judge how effective each stage of the problem solving activity has been, eg was his/her original analysis of causes correct, did the action plan address these causes, did the action plan keep to a specified timescale, did everyone carry out their allotted steps, were resources used effectively, and did any amendments made improve the action plan's effectiveness.
- The learner will gather evidence to support his/her evaluation, review the evidence, and judge the effectiveness of the action plan's steps.
- Based on these decisions, the learner will suggest alternative ways of solving similar problems in future and justify his/her recommendations from the evidence gathered.

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 achievement 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 factors affecting your problem? You should give all the key factors such as the causes of the problem, why the situation arisen, who and what is involved, and state the effect of the problem. What are the most important factors and why?
Analyse the problem and identify possible ways to solve the problem. (You will use problem solving techniques to help to analyse the problem.)
What is the best approach you can take to solve the problem? Explain why you have decided on this approach.

What information do you need to help you?
Who will you need to help you with this?
List the evidence you retain to support your analyses of the problem to be solved, eg mind maps, flow charts and/or brainstorming records.
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. Keep a record of any evidence in support of your planning and organising, for example comparisons with other systems, qualitative or quantitative research.				
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 along with any amendments.
Tutor comments:				
Tutor signature:			**Date:**	

Assessment record sheet – Stage 3

Learner:
Tutor:
Stage 3: Reviewing and evaluating
Now that 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 every aspect of your problem solving activity has been. Your criteria might be identifying the causes of the problem correctly, working out an action plan to address these factors, keeping to a timescale, using appropriate resources, keeping within a budget, and/or everyone working effectively at their allocated steps. You should also decide on the effectiveness of any amendments you made to your action plan based on your ongoing review of its progress. You should also note the evidence you have retained to support your evaluation, eg minutes of meetings, cost analyses, market research, comparisons with other systems, product testing, and quantitative and qualitative research. When you have completed your review and evaluation, you will recommend alternative ways of solving problems in future based on your experience with this problem solving activity and the evidence you have gathered. Give reasons for your recommendations.
Criteria
Aspect of problem solving activity/amendment to plan
How effective was it? What were the strengths and weaknesses?

What evidence do you have to support your evaluation?	
Based on your evaluation of this problem, identify alternative ways of solving a similar problem in the future. Explain why you have decided on these and give reasons for your recommendations.	
Tutor's comments:	
Tutor signature:	**Date:**

Assessment checklists

Learner:	
Checklist for Stage 1: Critical thinking	
Skills	**Achieved**
Identify the factors affecting a complex situation or issue	
Assess the relevance and comparative importance of these factors	
Analyse and identify possible ways of solving the problem	
Select and justify your approach to solve the problem	
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, reviewing and amending it continuously, as appropriate	
Tutor signature:	**Date:**

Learner:	
Checklist for Stage 3: Reviewing and evaluating	
Skills	**Achieved**
Choose criteria by which you can judge how effective every aspect 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 every aspect of your problem solving activity has been in resolving the situation or issue, justifying your conclusions from the evidence you have gathered	
Use this evidence to draw conclusions and make recommendations for possible improvements to solving similar problems in future	
Tutor signature:	**Date:**

Summary checklist

Learner:	
Learner number:	
Centre:	
Problem Solving at SCQF level 6	**Date achieved**
Stage 1: Critical thinking	
Stage 2: Planning and organising	
Stage 3: Reviewing and evaluating	
Tutor signature:	**Date:**

ADMINISTRATIVE INFORMATION

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