

## SQA Advanced Project-based Graded Unit Specification

### General information for centres

This Graded Unit has been validated as part of the SQA Advanced Diploma in Chemical Process Technology. Centres are required to develop a project-based assessment in accordance with this validated specification.

**Graded Unit title:** Chemical Process Technology: Graded Unit 2  
(SCQF level 8)

**Graded Unit code:** HV0T 48

**Type of Project:** Practical Assignment

**Publication date:** November 2017

**Source:** Scottish Qualifications Authority

**Version:** 01

### Graded Unit purpose

This Graded Unit is designed to provide evidence that the learner has achieved the following principal aims of the SQA Advanced Diploma in Chemical Process Technology:

- ◆ Prepare learners for an appropriate level of employment.
- ◆ Develop a range of contemporary vocational skills including investigative skills, developing health and safety skills in a practical environment or as part of a design project and enhancing risk assessment skills.
- ◆ Prepare learners for progression to further studies.
- ◆ Provide learners with a wider range of practical laboratory skills or process equipment/plant design skills.
- ◆ Develop study and research skills.
- ◆ Develop Core Skills such as *Working with Others* in a team environment.

### Credit points and level

2 SQA Credits at SCQF level 8: (16 SCQF credit points at SCQF level 8)

## SQA Advanced Unit Specification

### Recommended entry to the Graded Unit

It is recommended that the learner should have completed or be in the process of completing the following Units relating to the above principal aims prior to undertaking this Graded Unit:

HV00 47	<i>Fundamental Chemistry: Theory and Laboratory Skills</i>
HV0L 47	<i>Organic Chemistry: Theory and Laboratory Skills</i>
HV0M 47	<i>Physical Chemistry: Theory and Laboratory Skills</i>
HV0R 47	<i>Chemical Process Technology: Graded Unit 1</i>
HV03 47	<i>Chemical Engineering: Principles</i>
HV0W 48	<i>Aromatic Chemistry: Theory and Laboratory Skills</i>
HV07 48	<i>Process Operations: Heat Exchange, Drying and Evaporation</i>
HV0A 47	<i>Fluid Mechanics: Theory and Laboratory Skills</i>
HV10 48	<i>Instrumental Techniques 1</i>
HV0D 47	<i>Industrial Chemicals: Processes and Products</i>
HV0C 47	<i>Process Safety Engineering</i>
HV06 48	<i>Process Operations: Distillation</i>
HV15 48	<i>Thermodynamics and Kinetics: Theory and Laboratory Skills</i>
HV09 47	<i>Heat Transfer Theory and Practical Skills</i>
HV14 48	<i>Phase Equilibrium and Surface Chemistry</i>
HV0X 48	<i>Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills</i>
HV0K 47	<i>Inorganic Chemistry: Theory and Laboratory Skills</i>

#### And

Two of the Units below:

HP48 46	<i>Engineering Mathematics 1</i>
HP49 47	<i>Engineering Mathematics 2</i>
HT1M 47	<i>Engineering Mathematics 3</i>

### Core Skills

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill                      *Problem Solving* at SCQF level 6

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit specification.

### Assessment Support Pack

The Assessment Support Pack for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable instrument of assessment. Centres wishing to develop their own assessments should refer to the Assessment Support Pack to ensure a comparable standard. Assessment Support Packs are available on SQA's secure website.

### Equality and inclusion

This Graded Unit has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on SQA's website: [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements)

### Assessment

This Graded Unit will be assessed by the use of a project-based practical assignment developed by centres. The project should provide the learner with the opportunity to produce evidence that demonstrates they have met the aims of this Graded Unit.

The project undertaken by the learner must be a complex task which involves:

- ◆ variables which are complex or unfamiliar
- ◆ relationships which need to be clarified
- ◆ a context which may be unfamiliar to the learner

The project must require the learner to:

- ◆ analyse the task and decide on a course of action for undertaking the project
- ◆ plan and organise work and carry it through to completion
- ◆ reflect on what has been done and draw conclusions for the future
- ◆ produce evidence of meeting the aims which this Graded Unit has been designed to cover

Learners must carry out the investigation individually, and learners should not produce joint evidence. Assessors must be satisfied that the work has been completed by the individual learner.

### Conditions of assessment

The learner should be given a date for completion of the project. However, the instructions for the project should be distributed to allow the learner sufficient time to assimilate the details and carry out the project. During the time between the distribution of the project instructions and the completion date, assessors may answer questions, provide clarification, guidance and reasonable assistance. The project should be marked as soon as possible after the completion date. The final grading given should reflect the quality of the learner's evidence at the time of the completion date.

The evidence for the project is generated over time and involves three distinct stages, where each stage has to be achieved before the next is undertaken. Thus any re-assessment of stages must be undertaken before proceeding to the next stage.

If a learner fails the project overall or wishes to upgrade, then this must be done using a *substantially different* project, ie all stages are undertaken using a new project. In this case, a learner's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

At SCQF level 8 learners should work independently. It is the responsibility of the centre to take reasonable steps to ensure that the project is the work of the learner. For example, centres may wish to informally question learners at various stages on their knowledge and understanding of the project on which they have embarked. Centres should ensure, where research, etc is carried out in other establishments or under the supervision of others, that the learner does not receive undue assistance.

## Evidence Requirements for this Graded Unit

The project undertaken by learners will consist of three stages: Planning, Developing, and Evaluating. The following table specifies the minimum evidence required to pass each stage.

Project stage	Minimum Evidence Requirements	% Mark Allocation
Stage 1 — Planning	<ul style="list-style-type: none"> <li>◆ The learner's development of the project brief. (1.1)</li> <li>◆ A summary of background theory and principles. (1.2)</li> <li>◆ A set of project aims/objectives. (1.3)</li> <li>◆ Identification of materials and resources required and how they will be accessed. (1.4)</li> <li>◆ Identification of the steps involved in the practical or design activities and write up phases of the development stage and the timescales for completion of each stage. (1.5)</li> <li>◆ Identification of appropriate Health and Safety procedures and requirements. (1.6)</li> </ul>	20%
	<i>The learner <b>must</b> achieve all of the minimum evidence specified above in order to pass the Planning stage.</i>	
Stage 2 — Developing	<ul style="list-style-type: none"> <li>◆ Practical or design activities to produce collated scientific data. (2.1)</li> <li>◆ Output (scientific report) of the practical or design activities. (2.2)</li> <li>◆ Record of the processes underpinning the activities, ie logbook/diary. (2.3)</li> </ul>	60%
	<i>The learner <b>must</b> achieve all of the minimum evidence specified above in order to pass the Developing stage.</i>	
Stage 3 — Evaluating	Evaluation report which: <ul style="list-style-type: none"> <li>◆ Contains an abstract. (3.1)</li> <li>◆ Evaluates the output of the investigation. (3.2)</li> <li>◆ Evaluates the processes involved in producing the output of the investigation. (3.3)</li> <li>◆ Suggests potential development themes for the project. (3.4)</li> </ul>	20%
	<i>The learner <b>must</b> achieve all of the minimum evidence specified above in order to pass the Evaluating stage.</i>	

**Important Note:** Centres **must** complete the Grading Checklist on pages 11–16 for each Chemical Process Technology project. Completed checklists will be used as part of the external verification process to ensure the accuracy and consistency of grading between learners in the centre and across the centres.

### Assessing and grading learners

The overall project will be marked out of **100**. Only whole marks should be used.

The percentage of marks allocated to each stage of the project is outlined in the **Evidence Requirements**.

It is a requirement that learners must meet the minimum Evidence Requirements for the Planning stage before progressing to the Developing stage before progressing to the Evaluating stage. Assessors should use the grade-related criteria outlined below to judge learner performance.

Learners are required to work independently to meet the Evidence Requirements of the Graded Unit. At the same time, learners need appropriate support. SQA uses the term reasonable assistance to describe the balance between supporting learners in their project and not providing too much assistance.

At the end of each stage there should be opportunities for remediation and re-assessment of learners for that particular stage. This includes the final Evaluation stage. Any re-assessment should be carried out in line with the centre's own assessment policy.

To pass the Graded Unit learners must achieve:

Planning stage:

- ◆ A minimum of 50% of the total marks (10 marks) **and** all of the minimum Evidence Requirements.

Developing stage:

- ◆ A minimum of 50% of the total marks (30 marks) **and** all of the minimum Evidence Requirements.

Evaluating stage:

- ◆ A minimum of 50% of the total marks (10 marks) **and** all of the minimum Evidence Requirements.

## SQA Advanced Unit Specification

The grade-related criteria to be used to judge learner performance for this Graded Unit is specified in the following table.

Grade-related criteria	
Grade A	Grade C
<p>Is a seamless, coherent piece of work:</p> <ul style="list-style-type: none"> <li>◆ The project brief accurately specifies the project in both technical and non-technical terms and is prepared in a clear and concise manner.</li> <li>◆ The project objectives accurately and fully reflect the long term project targets.</li> <li>◆ The initial project plan contains a comprehensive list of project activities and timings. The information in the initial plan is used to assess if the project can be completed within timescales.</li> <li>◆ The learner develops a substantial knowledge base to support the demands of the project.</li> <li>◆ The learner undertakes the project with the minimum of supervision. Where the learner feeds back to their supervisor it is on a proactive basis, updating the supervisor on progress made and actions for the next stage of the project.</li> <li>◆ The learner identifies all known project risks, categorises them in terms of their likely level of occurrence and identifies actions for minimising such risks.</li> <li>◆ The learner undertakes all practical or design activities according to current Health and Safety requirements and applies good laboratory practice to a high standard.</li> </ul>	<p>Is a co-ordinated piece of work:</p> <ul style="list-style-type: none"> <li>◆ The project brief includes accurate information about the main technical and non-technical requirements of the project.</li> <li>◆ The project objectives identify the key long term project targets.</li> <li>◆ The initial project plan shows all essential project activities and timings. Evidence that the plan has been monitored on a number of occasions during the life of the project to inform on-going project planning and development should be available.</li> <li>◆ The learner develops a sound knowledge base to support the demands of the project.</li> <li>◆ The learner undertakes the project with interventions from the project supervisor, to ensure the project remains on track.</li> <li>◆ The learner identifies main risks that are likely to occur during the progress of the project and identifies main actions for minimising such risks.</li> <li>◆ The learner undertakes all practical or design activities according to current Health and Safety requirements and applies good laboratory practice to a standard regarded as acceptable in a scientific setting.</li> </ul>

## SQA Advanced Unit Specification

<b>Grade-related criteria</b>	
<b>Grade A</b>	<b>Grade C</b>
<ul style="list-style-type: none"> <li>◆ Demonstrates appropriate use of a range of types of instrumentation/equipment to a complex level and a high standard (eg using the more advanced features of the equipment competently).</li> <li>◆ Analysis of results is accurate and comprehensive, takes account of all known sources of error and is either substantiated in terms of known theory and/or identifies limitations in theory.</li> <li>◆ The diary is regularly maintained and provides a detailed record of results, calculations and conclusions.</li> <li>◆ The project report is well structured, contains only relevant information, is technically accurate, uses clear and correct English and has clear and accurate conclusions and recommendations.</li> <li>◆ The project report includes a full analysis of results, and a comprehensive evaluation of the project against project objectives.</li> <li>◆ The learner identifies clear and full details of the new knowledge and skills they have developed as a result of doing the project such as project management skills, keeping to deadlines, recognising limitations of knowledge — approaching expert sources.</li> <li>◆ The learner demonstrates a high level of self-motivation throughout the project.</li> <li>◆ The learner undertakes additional research beyond that demanded by the project.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Demonstrates appropriate use of a range of types of instrumentation/equipment to a standard that is acceptable within a scientific setting.</li> <li>◆ Analysis of results is sufficiently accurate and detailed and takes account of main sources of error and establishes key relationships between results and theory.</li> <li>◆ The diary contains a sufficient level of details about project ideas, results and progress and there is evidence that entries have been made on a number of occasions during the life of the project.</li> <li>◆ The project report meets acceptable standards in terms of structure, technical accuracy, use of English and has accurate conclusions and recommendations.</li> <li>◆ The project includes an analysis of results and an evaluation of the project against the project objectives.</li> <li>◆ The learner provides a number of examples of new knowledge and skills they have developed as a result of doing the project.</li> <li>◆ The learner demonstrates an acceptable level of motivation throughout the project.</li> <li>◆ The learner undertakes research demanded by the project.</li> </ul>

## SQA Advanced Unit Specification

The marks allocated to each stage will then be aggregated to arrive at an overall mark for the project. Assessors will then assign an overall grade to the learner for this Graded Unit based on the following grade boundaries.

- A = 70%–100%
- B = 60%–69%
- C = 50%–59%

These grade boundaries are fixed and should **not** be amended.

If a learner does not achieve a pass or wishes to upgrade, then this must be done using a substantially different project, ie all stages are undertaken using a new project. In these circumstances, the highest grade achieved should be awarded.

More information on reasonable assistance, remediation and re-assessment may be found in the SQA publication *Guidance for the Implementation of Graded Units in Higher National Certificates and Diplomas* (SQA, 2008, Publication code: CA4405).



## **SQA Advanced Project-based Graded Unit Support Notes**

**Graded Unit title:** Chemical Process Technology: Graded Unit 2  
(SCQF level 8)

### **Guidance on approaches to delivery and assessment of this Graded Unit**

In order to pass the Graded Unit a learner must pass each one of the three stages (Planning, Developing, Evaluating) ie they must achieve a minimum of 50% of the total marks for each stage, and achieve all of the minimum Evidence Requirements on at least one occasion for each stage. Centres should note that the grading checklist should be applied holistically and it is not a requirement that learners address all of the bullet points in the checklist (although they must achieve all of the minimum Evidence Requirements on at least one occasion for each stage).

#### **Scenario 1**

Where a learner achieves a minimum of 50% of the total marks for a stage but does not achieve all of the minimum Evidence Requirements on at least one occasion, then they may receive guidance and remediation and re-submit that stage. Only the parts of the project that have failed to achieve the minimum Evidence Requirements should be returned for guidance and remediation.

In the case of such re-submission, the evidence supplied by the learner following remediation will be marked to 50% of the original marks available, and against the same standard as that set out in the original marking scheme. That is to say, that if a previously non-addressed minimum Evidence Requirement was worth ten marks, then a learner may on remediation receive a maximum of 5 marks, and these would be awarded for five items of qualifying evidence. If a learner supplies further items of evidence then additional marks will not be awarded, as 50% is now the maximum mark which may be awarded for this Evidence Requirement. Parts of the project that achieve the minimum Evidence Requirements on the first submission should not be altered or remarked.

The final grading given should reflect the quality of the learner's evidence at the time of the Unit completion date and must take into account the grade levels indicated in each of the three stages by reference to the grade-related criteria table above. For example where a learner has demonstrated a high level of performance in each stage but has been allowed remediation in one of the stages to address a missing minimum Evidence Requirement this would not necessarily preclude a Grade 'A'.

#### **Scenario 2**

Where a learner achieves all of the minimum Evidence Requirements on at least one occasion for a stage but does not achieve a minimum of 50% of the total marks, then they may receive guidance and remediation and re-submit that stage.

In the case of such re-submission, the learner may address aspects of the stage to bring the overall stage up to 50% of the total marks available. The maximum mark that may now be awarded for the stage is 50% of the total marks available.

The final grading given should reflect the quality of the learner's evidence at the time of the Unit completion date and must take into account the grade levels indicated in each of the three stages by reference to the grade-related criteria table above. For example where a

## SQA Advanced Unit Specification

learner has been allowed remediation for an entire stage, then this would indicate a Grade 'C' for that stage, so overall a final Grade 'A' could not be awarded. (Refer to Grade 'A' Criteria 1 above — no high level of performance demonstrated in each stage.) However if some re-assessment opportunities were provided only for one entire stage, this would not necessarily preclude a Grade 'B'.

### Scenario 3

Where a learner does not achieve a minimum of 50% of the total marks for a stage and does not achieve all of the minimum Evidence Requirements on at least one occasion, then they may receive guidance and remediation and re-submit that stage.

In the case of such re-submission, the evidence supplied by the learner following remediation for the minimum Evidence Requirements will be marked to 50% of the original marks available, and against the same standard as that set out in the original marking scheme. The learner may also, if required, address other aspects of the stage to bring the overall mark for the stage to 50% of the total marks available. The maximum mark that may now be awarded for the stage is 50% of the total marks available.

The final grading given should reflect the quality of the learner's evidence at the time of the Unit completion date and must take into account the grade levels indicated in each of the three stages by reference to the grade-related criteria table above. For example where a learner has been allowed remediation for an entire stage, then this would indicate a Grade 'C' for that stage, so overall a final Grade 'A' could not be awarded. (Refer to Grade 'A' Criteria 1 above — no high level of performance demonstrated in each stage.) However if some re-assessment opportunities were provided only for one entire stage, this would not necessarily preclude a Grade 'B'.

### Guidance on grading

When allocating the final grade on completion, a levelling process should be adopted taking the grade-related criteria and overall marks into account, eg a learner may achieve 10/20 for Planning *following remediation for that stage*, 47/60 for Developing, 15/20 for Evaluation — this would indicate an 'A' grade (72 out of 100) but due to inadequate planning performance would not meet the Grade 'A' criteria and therefore may be levelled at a Grade 'B'.

### Grading Checklist

A grading checklist is presented below to facilitate the allocation of marks.

## **SQA Advanced Unit Specification**

### **Chemical Process Technology: Graded Unit 2**

#### **Grading Unit Checklist**

**Centre Name:** .....

**Centre Number:** .....

**Learner Name:** .....

**Learner Number:** .....

## SQA Advanced Unit Specification

### Stage 1: Planning Stage

Grading Criteria		Maximum mark	Mark Awarded (1st Submission)	Mark Awarded (after remediation)
1.1 (a)	Evidence of analysing and interpreting what is involved in the practical or design project brief and presenting it in a clear and concise manner.	3		
1.1 (b)	The identification of the key factors influencing the project and their interrelationships.	2		
1.2	A summary of background theory and principles clarifying and exemplifying the brief, with identification of information sources.	3		
1.3	Set of project aims/objectives that accurately and fully reflect the long term project targets.	2		
1.4	Evidence that the learner has identified the material/resources required to complete the project, and where they can be accessed.	3		
1.5 (a)	Identification of the steps involved in the practical or design project and write-up phases of the development stage.	2		
1.5 (b)	The initial project plan contains a comprehensive list of project activities and timings. The information in the initial plan is used to assess if the project can be completed within timescales.	2		
1.6	Identification of appropriate Health and Safety procedures and requirements. Identifies all known project risks, categorises them in terms of their likely level of occurrence and identifies actions for minimising such risks. Alternatively, identification of the potential Health and Safety requirements in the process equipment or plant designed.	3		
<b>Total</b>		20		

## SQA Advanced Unit Specification

### Stage 2: Developing Stage

Grading Criteria		Maximum mark	Mark Awarded (1st Submission)	Mark Awarded (after remediation)
2.1 (a)	Resources/materials and methods. Demonstrates appropriate use of a range of types of instrumentation/equipment and/or techniques to a complex level and a high standard.	4		
2.1 (b)	Performs a range of laboratory or field work and methods commensurate with 40 hours of lab/field time.	8		
2.1 (c)	Collection of data and appropriate quality.	6		
2.2 (a)	Title, contents page.	1		
2.2 (b)	Introduction, including underpinning theory, aims and objectives of the practical or design project. The aims and objectives should be developed and enhanced from those in the original plan in light of experience.	4		
2.2 (c)	Laboratory/ design methods are accurately and fully described in report.	4		
2.2 (d)	Presentation of data is clear and well structured.	2		
2.2 (e)	Contains a full analysis/interpretation of results that is accurate and comprehensive.	8		
2.2 (f)	Takes account of all known sources of error and is either substantiated in terms of known theory and/or identifies limitations in theory.	2		
2.2 (g)	The report has clear and accurate conclusions, discussions and recommendations.	5		

## SQA Advanced Unit Specification

Grading Criteria		Maximum mark	Mark Awarded (1st Submission)	Mark Awarded (after remediation)
2.2 (h)	Appropriate bibliography/referencing of sources and references including full and appropriate referencing within the report through use of an established system (eg Vancouver or Harvard).	4		
2.2 (i)	The report is clear and well structured, contains only relevant information, is technically accurate and uses clear and correct English.	2		
2.3	Record of the processes underpinning the practical or design activity, eg logbook, diary, progress report. The diary is regularly maintained and provides a detailed record of results, calculations and conclusions.	4		
2.4	Appropriate Health and Safety Assessments (eg risk, COSHH, Manual Handling) are produced and undertakes all practical activities according to Health and Safety requirements. Alternatively, appropriate Health and Safety assessments are produced for the process equipment or plant designed.	2		
2.5	Demonstrates a high level of self-motivation/initiative throughout the project, as evidenced by: <ul style="list-style-type: none"> <li>◆ consistently demonstrating initiative.</li> <li>◆ sourcing extra information.</li> <li>◆ willingness to learn new techniques.</li> </ul> The learner undertakes additional research well beyond that demanded by the project.	2		

## SQA Advanced Unit Specification

<b>Grading Criteria</b>		<b>Maximum mark</b>	<b>Mark Awarded (1st Submission)</b>	<b>Mark Awarded (after remediation)</b>
2.6	The learner undertakes the project with the minimum of supervision. Where the learner feeds back to their supervisor it is on a proactive basis, updating the supervisor on progress made and actions for the next stage of the project.	2		
<b>Total</b>		60		

## SQA Advanced Unit Specification

### Stage 3: Evaluation Stage

Grading Criteria		Maximum mark	Mark Awarded (1st Submission)	Mark Awarded (after remediation)
3.1	Contain an abstract (outline of the assignment).	4		
3.2 (a)	Assess the strengths and weaknesses of the output of the practical or design assignment.	2		
3.2 (b)	Determine and justify to what extent the assignment met the aims and objectives.	4		
3.3 (a)	Summary of any difficulties encountered and how they were handled.	2		
3.3 (b)	Identify knowledge and skills which have been gained and/or developed.	4		
3.4	Suggest potential development of the project/recommendations for the future.	4		
<b>Total</b>		20		



## SQA Advanced Unit Specification

Centres are strongly advised to give learners adequate time to choose their topic and carry out the planning stage. Careful planning enables the learner to complete the following tasks of developing and of evaluating more effectively.

The briefing task sheet for the learners should include clear indications of how the Unit is being assessed so that the learner can provide all the evidence required to complete the Unit. It is strongly advised that learners are provided with a detailed description of the requirements of the planning stage to enable them to carry out the task prior to proceeding to the development stage. It is advisable that the planning stage should be assessed prior to the learner progressing to the developing stage.

However if the development stage does not progress as anticipated the learners may return to their plans and modify them. If changes to plans are needed during the developing stage this can be reflected on during the evaluation.

The evaluation stage develops the reflective skills of the learners.

### Opportunities for developing Core and other essential skills

This Unit has the Core Skill of *Problem Solving* embedded in it. This means that when learners achieve the Unit, their Core Skills profile will also be updated to show they have achieved *Problem Solving* at SCQF level 6.

The delivery and assessment of this Unit may also provide learners with the opportunity to develop the Core Skills of *Communication*, *Numeracy* and *Information and Communication Technology (ICT)*.

The precise nature and level of these will vary depending on the nature of the project topic, however some indicative examples are given below.

#### **Communication — Writing at SCQF level 6**

Learners will produce a written communication which presents, analyses, and evaluates a substantial body of information, and develop interpretations and conclusions in relation to an issue which is explored in depth.

#### **Communication — Writing at SCQF level 6**

Learners will be required to extract, summarise, and provide a full explanation of the relationships between substantive information drawn from a range of different sources.

#### **Numeracy — Using Graphical Information at SCQF level 6**

Learners may use an appropriate form of complex table, chart, diagram, or qualitative form, to communicate complex information.

## **SQA Advanced Unit Specification**

### ***Information and Communication Technology (ICT) — Providing Information at SCQF level 5***

Learners will select appropriate websites/data sources to research an issue and present findings in an appropriate format including referencing.

It is also to be expected that certain of the analytical instruments used will be operated via computer, and that databases may be deployed.

This Unit has the Core Skill of Problem Solving embedded in it, so when learners achieve this Unit their Core Skills profile will be updated to show that they have achieved Problem Solving at SCQF level 6.

## History of changes to Graded Unit

Version	Description of change	Date

© Scottish Qualifications Authority 2016, 2017

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

**FURTHER INFORMATION:** Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our [Centre Feedback Form](#).

### General information for learners

**Graded Unit title:** Chemical Process Technology: Graded Unit 2  
(SCQF level 8)

This is a 2-credit Unit at SCQF level 8. This Unit is project-based and will require you to undertake a laboratory and/or field investigation using a variety of research methods and techniques. You will be assessed both on the laboratory/field work undertaken, and on the report of that work. The topic of research will be left to your choice with advice from your lecturer. This enables you to find out more about an area that interests you particularly and may reflect some developing fields or an interest at your employment.

The project will be marked out of 100. To pass the Graded Unit you must achieve 50% of the total marks and all of the minimum Evidence Requirements for each of the three sections. The three sections are:

**The Planning Stage:** Where you will produce a plan outlining the nature of the project and the requirements to proceed.

**The Developing Stage:** Where you will undertake the practical or design project, keep a laboratory diary or log book, and produce a comprehensive written report.

**The Evaluating Stage:** Where you will summarise the output of the developing stage (ie the report), and evaluate the project and the processes evolved in undertaking the project.

The SQA Advanced Diploma in Chemical Process Technology covers diverse areas and a variety of chemical industries (eg oil and gas, pharmaceutical, environmental, dyes, inks, biotechnology). Suggested projects are given below. However, please note that this list is intended as a guide and is not exhaustive.

- ◆ A complex organic synthesis of a product, with analysis of the product
- ◆ Investigation of reaction kinetics
- ◆ A work based yield optimisation project
- ◆ Development of a process plant
- ◆ Commissioning and calibration of suitable laboratory equipment
- ◆ A chemical engineering design project
- ◆ A chemical engineering practical project
- ◆ An analytical chemistry based project.

#### Core Skills

This Unit has the Core Skill of *Problem Solving* at SCQF level 6 embedded in it. You may also have opportunities to develop the Core Skills of *Communication*, *Numeracy* and *Information and Communication Technology (ICT)*.

This Unit has the Core Skill of Problem Solving embedded in it, so when you achieve this Unit your Core Skills profile will be updated to show that you have achieved Problem Solving at SCQF level 6.