



Higher National Graded Unit specification

General information for centres

This Graded Unit has been validated as part of the HNC Food Science and Technology. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit title: Food Science and Technology: Graded Unit 1

Graded Unit code: F7EW 34

Type of Graded Unit: Project

Assessment Instrument: Practical Assignment

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HNC Food Science and Technology to enable candidates to:

- ◆ develop study and research skills which will help them to become independent learners
- ◆ develop practical scientific and technical skills
- ◆ develop transferable skills such as problem solving which they will need to function effectively in the food and drinks industry
- ◆ contribute to the demand for trained personnel by employers

General information for centres (cont)

Recommended prior knowledge and skills: It is recommended that the candidate should have completed or be in the process of completing the following Units relating to the above specific aims prior to undertaking this Graded Unit:

F6VF 34: Food Industry Principles: An Introduction
F6VE 34: Food Industry Practices: An Introduction
F6VG 34: Food Manufacturing: Processing Practices at Ambient Temperatures
F6VJ 34: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures
F6VH 34: Food Manufacturing: Processing Practices at Elevated Temperatures
F6VL 34: Microbiology of Foods 1
F6VD 34: Food Composition
F4TL 34: Food Hygiene Intermediate

Core Skills

There are opportunities to develop the Core Skills components listed below in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Problem Solving — Critical Thinking at SCQF level 6
Problem Solving — Planning and Organising at SCQF level 6
Problem Solving — Reviewing and Evaluating at SCQF level 6

Communication — Oral Communication at SCQF level 5
Communication — Reading at SCQF level 5
Communication — Writing at SCQF level 6

Numeracy — Using Graphical Information at SCQF level 4
Numeracy — Using Number at SCQF level 5

Information and Communication Technology — Accessing Information at SCQF level 5
Information and Communication Technology — Providing/Creating Information at SCQF level 5

Assessment: This Graded Unit will be assessed by the use of a Practical Assignment. The developed **Practical Assignment** should provide the candidate with the opportunity to produce evidence that demonstrates she/he has met the aims of the Graded Unit that it covers.

Administrative Information

Graded Unit code: F7EW 34

Graded Unit title: Food Science and Technology: Graded Unit 1

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
02	Titles of Units F6VD 34 amended by removal of numeral 1 in line with QDT agreement.	26/04/10

Source: SQA

© Scottish Qualifications Authority 2008, 2010

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 Higher National qualifications.

Additional copies of this Graded Unit specification if sourced by the Scottish Qualifications Authority can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates

Graded Unit title: Food Science and Technology: Graded Unit 1

Conditions of assessment

The candidate should be given a date for completion of the **Practical Assignment**. However, the instructions for the assessment task should be distributed to allow the candidate sufficient time to assimilate the details and carry out the assessment task. During the time between the distribution of the assessment task instructions and the completion date, assessors may answer questions, provide clarification, guidance and reasonable assistance. The assessment task should be marked as soon as possible after the completion date. The final grading given should reflect the quality of the candidate'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 candidate 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, assignment, case study, etc. In this case, a candidate's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

Instructions for designing the assessment task

The assessment task is a project. The project is an investigation into the processing of a food product or products. The project undertaken by the candidate must be a complex task which involves:

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

The assessment task must require the candidate 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

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project brief

The underlying purpose of the practical assignment is to provide candidates with an opportunity to undertake a project to demonstrate that they possess scientific and technological skills relevant to the contemporary food and drink industry.

Candidates will be required to choose a project which enables them to investigate the processing of a food product or products. It should enable them to carry out some practical work and to apply some scientific principles. It must also enable them to draw conclusions. In some cases, depending on the choice of project, candidates may be able to make recommendations but this is not a necessary requirement.

Candidates should select a project which covers material taken from at least four of the mandatory Units for this group award. The project may also make use of material from optional Units, provided all the Units involved are part of the programme of study followed by the candidate for this group award. When choosing a project, candidates should make sure that it will be sufficient basis to meet all the requirements of this Graded Unit.

Candidates will be required to negotiate and develop a brief for their project. It should enable them to cover the following stages:

Stage 1 — Planning

As part of this stage, candidates will be required to:

- 1 Set objectives for the project.
- 2 Give reasons to justify their choice of project.
- 3 Identify sources of technical and scientific information for the project.
- 4 Identify the practical activities required to complete the project.
- 5 Prepare a timetable for the completion of the project.

Stage 2 — Developing

During this stage, candidates will be expected to:

- 1 Gather relevant technical and scientific information from the sources identified in the Planning stage.
- 2 Carry out the practical work associated with the project in a safe and hygienic manner (this would involve using processing plant equipment and/or undertaking practical laboratory work).
- 3 Present the results of the practical work in a suitable format.
- 4 Draw conclusions about the project, based on the practical work and the technical and scientific information gathered.
- 5 Monitor the actual progress of the plan against the timetable and take any necessary corrective action.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Stage 3 — Evaluating

For this stage, candidates will be expected to:

- 1 Comment on the extent to which the objectives of the project have been met.
- 2 Comment on the strengths and weaknesses of the project.
- 3 Draw some lessons for future projects that they may undertake.

Guidance on grading candidates

Candidates who meet the minimum Evidence Requirements will have their achievement graded as C — competent, or A — highly competent or B — somewhere between A and C. The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table.

Grade A	Grade C
<p>Is a seamless, coherent piece of work which:</p> <ul style="list-style-type: none"> ◆ has sufficient evidence for the three essential phases of the project, is produced to a high standard, and is quite clearly inter-related ◆ is highly focused and relevant to the tasks associated with the project brief ◆ demonstrates high levels of relevant skills ◆ is clear and well structured throughout and maintains a high level of accuracy and technical content ◆ effectively consolidates and integrates knowledge and skills from different Units in HNC Food Science and Technology ◆ contains a variety of practical work which is carried out precisely, safely and hygienically and accompanied by detailed and comprehensive presentation of results ◆ gathers information from a wide range of scientific and technical sources and relates this in a considered and valid way to the practical work of the project ◆ provides logical and coherent reasons to support points made 	<p>Is a co-ordinated piece of work which:</p> <ul style="list-style-type: none"> ◆ has sufficient evidence for the three essential phases of the project and is produced to an adequate standard ◆ is focused and relevant to the tasks associated with the project brief ◆ demonstrates adequate levels of relevant skills ◆ is satisfactorily structured and adequate in terms of accuracy and technical content ◆ consolidates and integrates knowledge and skills from Units in HNC Food Science and Technology but this may lack some continuity and consistency ◆ contains practical work which is carried out adequately and accompanied by presentation of suitable results ◆ gathers scientific and technical information for the project and makes some connection between it and the practical work of the project ◆ provides reasons to support points made but this may not be done consistently and some reasons may lack coherence

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The project will be marked out of 100. Assessors will mark each stage of the project, taking into account the criteria outlined. The marks will then be aggregated to arrive at an overall mark for the project. Assessors will then assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70% — 100%

B = 60% — 69%

C = 50% — 59%

Note: the candidate must achieve all of the minimum evidence specified below for each stage of the project in order to achieve the Graded Unit.

Evidence Requirements

The project consists of three stages: Planning, Developing, and Evaluating. The following table specifies the minimum evidence required to pass each stage.

Note: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Project stage	Minimum Evidence Requirements
Stage 1 — Planning 20% of total marks	<p>Present a plan for the project which includes:</p> <ul style="list-style-type: none"> ◆ objectives for the project ◆ reasons to justify the choice of project ◆ sources of technical and scientific information for the project ◆ description of the practical activities required to complete the project ◆ a timetable for the completion of the project which identifies the main activities required for the project and contains a timescale for the completion of each stage <p>Additional guidance on grading This section of the practical assignment will be assessed by the presentation of evidence for each of the five aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 20 marks. Guidance on allocation of the marks is given in the support notes for this Unit.</p>
	<p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Planning stage. This can be demonstrated by presenting evidence covering all five aspects of the Planning stage and achieving a mark of at least 10/20.</i></p>

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 2 — Developing 60% of total marks	<p>Present evidence of the Developing stage of the project which will cover:</p> <ul style="list-style-type: none"> ◆ gathering relevant technical and scientific information from the sources identified in the Planning stage ◆ carrying out the practical work associated with the project in a safe and hygienic manner (this would involve using processing plant equipment and/or undertaking practical laboratory work) ◆ presenting the results of the practical work in a suitable format ◆ drawing conclusions about the project, based on the practical work and the technical and scientific information gathered ◆ monitoring the actual progress of the project against the timetable and take any necessary corrective action <p>Additional guidance on grading This section of the practical assignment will be assessed by the presentation of evidence for each of the five aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts, tables or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 60 marks. Guidance on allocation of the marks is given in the support notes for this Unit.</p>
	<p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Developing stage. This can be demonstrated by presenting evidence covering all five aspects of the Developing stage and achieving a mark of at least 30/60.</i></p>

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating 20% of total marks	<p>Present evidence of the Evaluating stage of the project which will cover:</p> <ul style="list-style-type: none"> ◆ the extent to which the objectives of the project have been met ◆ strengths and weaknesses of the project ◆ lessons for future projects that they may undertake <p>Additional guidance on grading</p> <p>This section of the practical assignment will be assessed by the presentation of evidence for each of the three aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 20 marks. Guidance on allocation of the marks is given in the support notes for this Unit.</p> <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage. This can be demonstrated by presenting evidence covering all three aspects of the Evaluating stage and achieving a mark of at least 10/20.</i></p>

Support notes

Candidates will negotiate a project with their tutor. For day-release candidates this could be a work-based topic. Examples of the type of project which candidates might select could be:

- ◆ factors affecting the can vacuum formation when preparing a soft drink from a fruit concentrate
- ◆ effect of pre-treatments on the Vitamin C concentration of frozen potato chips
- ◆ effects of differing levels of components of sausages with reference to texture, cost and current legislation
- ◆ processing of berries using Fluidised Bed Drier optimising conditions with reference to speed and final product quality
- ◆ comparison of factors affecting the quality of a mayonnaise-based sauce produced by utilising a colloid mill and an homogeniser

This Unit is based on the mandatory Units in the HNC Food Science and Technology. It should be attempted, therefore, when candidates have completed as many of these Units as possible as they provide candidates with the skills, knowledge and understanding required for this Graded Unit.

This Unit is likely to be undertaken during the last 12 weeks of the session. As a guide, candidates would spend two weeks researching and planning for the project so that by week three they are in a position to present evidence on their plan for the project.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The next five/six weeks would be devoted to carrying out the practical work. Candidates should be encouraged to keep a logbook of all activities which could be discussed with the tutor during the Planning and Developing stages and would also provide a valuable source of reference for the Evaluating stage. Depending on their choice of project, candidates may have to work with technical and purchasing staff and to work around other projects which might require the use of the same piece of equipment. Tutors should make sure that candidates follow appropriate safety and hygiene procedures when undertaking all types of practical activity, whether they are using processing plant equipment or undertaking laboratory work.

On completion of the practical activity candidates would present evidence of the Developing stage. Thereafter, they should evaluate their work throughout the project as a whole and present evidence to demonstrate that they have done this.

Guidance on Awarding Marks

The following gives guidance on how to apportion marks for each of the stages of the practical assignment. When deciding what marks to award, assessors should take into account the grading criteria and the requirements of the generic level descriptor for SCQF level 7.

Stage 1 Planning

This section is worth 20 marks which should be allocated as set out below.

Up to three marks for the specific objectives for the project — marks should be awarded on the basis of:

- ◆ the extent to which the objectives are consistent with the material in Units in the HNC Food Science and Technology
- ◆ the extent to which the objectives are relevant to a situation in the contemporary food and drink industry
- ◆ the extent to which the objectives are clear, specific and achievable within the expected time frame

Up to three marks for reasons to justify the choice of project — marks should be awarded on the basis of:

- ◆ the clarity and comprehensibility of the outline of the project (maximum of 1 mark)
- ◆ the extent to which the reasons are convincing including the clarity with which they are presented
- ◆ the degree of initiative and/or originality shown by the candidate in selecting the project and making arrangements for it

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Up to four marks for sources of technical and scientific information for the project — marks should be awarded on the basis of:

- ◆ the range of sources identified
- ◆ the complexity of the technical and scientific information involved
- ◆ the degree of initiative and originality shown by the candidate in identifying sources
- ◆ extent to which non-routine sources are used

Up to five marks for the description of the practical activities required to complete the project — marks should be awarded on the basis of:

- ◆ the range of scientific and technical practical work to be undertaken
- ◆ the relevance of the practical work to the project
- ◆ the extent to which the suggested practical work is feasible and within the capabilities which could be expected of a candidate on HNC Food Science and Technology
- ◆ the clarity and accuracy of the description
- ◆ degree of originality shown by the candidate in choosing suitable practical activities

Up to five marks for a timetable for the completion of the activity — marks should be awarded on the basis of:

- ◆ the inclusion of a final completion date and significant milestones to reaching this date
- ◆ how realistic the timetable is likely to be with respect to factors such as the availability of resources for practical work, other commitments which the candidate might have, etc
- ◆ identification of resources (including time) needed to carry out the plan
- ◆ the extent to which the timetable is consistent with the objectives of the project

Stage 2 Developing

This section is worth 60 marks which should be allocated as set out below.

Up to 12 marks for gathering relevant technical and scientific information about the project from the sources identified in the Planning stage — marks should be awarded on the basis of:

- ◆ the accuracy and clarity of the information gathered
- ◆ the relevance of the information to the project
- ◆ the range of different types of technical and scientific information gathered
- ◆ the range of sources actually used by the candidate to gather technical and scientific information
- ◆ the extent to which the candidate was required to use her/his initiative in gathering technical and scientific information

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Up to 20 marks for carrying out the practical work associated with the project — marks should be awarded on the basis of:

- ◆ extent to which the practical work was conducted in a safe and hygienic manner
- ◆ extent to which practical work was conducted in a manner which made effective and economical use of resources
- ◆ number and range of practical activities carried out (this may involve the use of pilot plant equipment, laboratory work or other relevant practical work)
- ◆ relevance of the practical work actually carried out to the project
- ◆ clarity and accuracy of the description of the practical work

Up to eight marks for presenting the results of the practical work in a suitable format — marks should be awarded on the basis of:

- ◆ the choice of format to present the results from the practical work including any calculations where appropriate
- ◆ precision of results from the practical work
- ◆ clarity and accuracy of the presentation of the results of the practical work

Up to 10 marks for drawing conclusions about the project based on the practical work and the technical and scientific information gathered — marks should be awarded on the basis of:

- ◆ the extent to which the conclusions are explicitly based on the technical and scientific information gathered
- ◆ the extent to which the conclusions are explicitly based on the practical work undertaken
- ◆ the quality and validity of reasons given to justify the conclusions
- ◆ the relevance of the conclusions to the objectives of the project

Up to 10 marks for monitoring the actual progress of the project against the timetable and taking any necessary corrective action — marks should be awarded on the basis of:

- ◆ the effectiveness of the methods used by the candidate to check progress of the plan against the timetable (candidates could use a log book or other method of recording progress)
- ◆ the extent to which methods of corrective action were suitable in the circumstances (or why corrective action proved to be unnecessary)
- ◆ the quality and validity of reasons given to support points made about monitoring progress and taking any corrective action
- ◆ clarity and accuracy of the presentation of the effectiveness of monitoring and any corrective action

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Stage 3 Evaluating

This section is worth 20 marks which should be allocated as set out below.

Up to seven marks for an assessment of the extent to which the objectives of the project have been met — marks should be awarded on the basis of:

- ◆ comprehensive coverage of all objectives
- ◆ making explicit connections between how well the objectives were met and the Planning and Developing stages of the project
- ◆ reflection on the suitability of the objectives for the project
- ◆ the strength and validity of the reasons given to support points made
- ◆ the use of any feedback from others (eg tutors) on the objectives of the project

Up to seven marks for an explanation strengths and weaknesses — marks should be awarded on the basis of:

- ◆ making reference to both the Planning and Developing stages when explaining strengths and weaknesses
- ◆ identification of both strengths and weaknesses (which could, if desired, be expressed in terms of what went well and what did not go as well as expected)
- ◆ extent to which the candidate adopts a realistic attitude to identifying strengths and weaknesses
- ◆ the strength and validity of the reasons given to support points made
- ◆ the use of feedback from others (eg tutors) in identifying strengths and weaknesses

Up to six marks for lessons for future projects that the candidate may undertake (eg for HND Food Science and Technology) — marks should be awarded on the basis of:

- ◆ making reference to both the Planning and Developing stages when drawing lessons
- ◆ extent to which the lessons follow from strengths and weaknesses of the project as identified by the candidate
- ◆ extent to which the lessons are likely to be feasible and practicable as far as the candidate is concerned
- ◆ the strength and validity of the reasons given to support points made
- ◆ the use of feedback from others (eg tutors) on this project when drawing lessons for the future

DISABLED CANDIDATES AND/OR THOSE WITH ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates 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.

General information for candidates

For this Graded Unit you will be expected to carry out a project to investigate the processing of a food product or products. You will be able to discuss possible projects with your tutors but it will be up to you to choose a suitable project.

You will be expected to follow three stages for your project — Planning, Developing and Evaluating.

During the Planning stage (worth 20 marks) you will be expected to do the following:

- ◆ set objectives for your project
- ◆ identify reasons to justify your choice of project
- ◆ identify suitable sources of technical and scientific information for your project
- ◆ identify suitable practical activities required to complete the project
- ◆ prepare a timetable for your project

You have to pass the Planning stage by gaining 10 marks out of 20 before you can move on to the other two stages.

In the Developing stage (worth 60 marks), you will:

- ◆ gather relevant technical and scientific information from the sources you identified in the Planning stage
- ◆ carry out the practical work associated with the project: you will be expected to do this in a safe and hygienic manner
- ◆ present the results of your practical work in a suitable format
- ◆ draw conclusions about the project based on the practical work and the technical and scientific information gathered
- ◆ monitor the progress of your project against your timetable and take any necessary corrective action to make sure you meet your deadlines

The Evaluating stage (worth 20 marks) requires you to think about how your project has worked out and to:

- ◆ comment on the extent to which the objectives of your project have been met
- ◆ comment on the strengths and weaknesses of your project
- ◆ draw some lessons for future projects that you may undertake

You will present evidence for each of the three stages. There are a number of ways in which you could do this but your tutor will advise you on what is a suitable method in your case. Marks will be awarded for the evidence you present.

The project will be marked out of 100. To pass the Unit you must achieve 50% of the total marks and gain at least 50% of the marks for each of the three stages of the project. You will be awarded a grade for your project.

- ◆ If you achieve an overall mark of 50–59% you will be awarded a Grade C.
- ◆ If you achieve an overall mark of 60–69% you will be awarded a Grade B.
- ◆ If you achieve an overall mark of 70% or higher you will be awarded a Grade A.