



Higher National Graded Unit specification

General information for centres

This Graded Unit has been validated as part of the HNC Bioscience. 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: Bioscience: Graded Unit 1

Graded Unit code: F39J 34

Type of Graded Unit: Project

Assessment Instrument: Investigation

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 National 1 to Doctorates.*

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HNC Bioscience to:

- ◆ develop study and research skills in the area of bioscience
- ◆ develop transferable skills including the Core Skills
- ◆ develop candidates' ability to undertake planning, development, synthesis and evaluation in the area of bioscience
- ◆ develop candidates' employment skills and enhance candidates' employment prospects, by providing the candidate with a wide range of practical and laboratory skills and an awareness of safe working practices and health and safety issues
- ◆ develop candidates' fundamental knowledge and understanding of cell biology, microbiology, biochemistry and environmental issues
- ◆ enable candidates to develop a range of scientific and practical laboratory skills used by the bioscience industries
- ◆ prepare candidates for employment at a junior technical or support level in bioscience industries
- ◆ prepare candidates for HND and degree programmes in bioscience, including programmes in applied bioscience, agricultural science, applied animal science, green technology and related areas

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:

Unit Code	Unit title
DJ1K 34	Cell Biology Theory and Practice
DH2J 34	Biochemistry: Theory and Practice
F21L 34	Microorganisms: Growth, Activity and Significance
DF82 34	Quality and Health and Safety Systems in Science Industries
F2G8 34	Environmental Awareness
D75X 34	Information Technology Applications Software 1

Core Skills: There are opportunities to develop the Core Skills of *Problem Solving* (Critical Thinking; Planning and Organising; Reviewing and Evaluating), *Numeracy* (Using Number; Using Graphical Information) and *Communication* (Oral; Written), all at SCQF level 5, and *Information Technology* all at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Assessment: This Graded Unit will be assessed by the use of an investigation. The developed investigation 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: F39J 34

Graded Unit title: Bioscience: Graded Unit 1

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
03	Update of Conditions of Assessment.	06/08/18

Source: SQA

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

Graded Unit title: Bioscience: Graded Unit 1

Conditions of assessment

The candidate should be given a date for completion of the Investigation Report. 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.

Reasonable assistance is the term used by SQA to describe the difference between providing candidates with some direction to generate the required evidence for assessment and providing too much support which would compromise the integrity of the assessment. Reasonable assistance is part of all learning and teaching processes.

In relation to the assessment of Higher National Project-based Graded Units, assessors may provide advice, clarification, and guidance during the time between the distribution of the project instructions and the completion date, ie at each stage of the project.

Remediation allows an assessor to clarify candidate responses, either by requiring a written amendment or by oral questioning, where there is a minor shortfall or omission in evidence requirements. In either case, such instances must be formally noted by the assessor, either in writing or recording, and be made available to the internal and external verifier.

In relation to Higher National Project-based Graded Units, candidates must be given the opportunity for remediation at each stage of the project.

The evidence for a Higher National Project-based Graded Unit is generated over time and involves three distinct stages, each of which has to be achieved before the next is undertaken. This means that any re-assessment of stages must be undertaken before proceeding to the next stage. The overall grade is derived from the total number of marks *across all* sections, and should reflect the ability of the candidate to work autonomously and the amount of support required. In relation to Higher National Project-based Graded Units, candidates who have failed any stage of the project and have been unable to provide the necessary evidence through remediation must be given the opportunity for re-assessment of that stage.

Any candidate who has failed their graded unit or wishes to upgrade their award must be given a re-assessment opportunity, or in exceptional circumstances, two re-assessment opportunities. In the case of project-based graded units, this must be done using a substantially different project.

The final grading given must reflect the quality of the candidate's evidence at the time of the completion of the graded unit. Candidates must be awarded the highest grade achieved — whether through first submission or through any re-assessment, remediation, and/or reasonable assistance provided.

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

Instructions for designing the assessment task

The assessment task is a project. 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

The assessment task should be an investigation requiring the candidate to undertake research, analysis, evaluation and reporting in the area of bioscience. Within the investigation the candidate will be required to carry out at least one practical task, involving laboratory practice, applicable to the bioscience subject area.

Key topics for investigation should be drawn from the areas of cell biology, microbiology, biochemistry and environmental issues.

Further details of possible investigative topics are found in the Support Notes.

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

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 comprehensive evidence for each of the three essential phase of the project that is produced to a high standard and is clearly inter-related◆ demonstrates an accurate and insightful interpretation of the project investigation◆ provides an initial project timetable containing a comprehensive list of project activities as well as milestones to be reached◆ is clear and well structured throughout with language of a high standard in terms of level, accuracy and technical content used◆ effectively consolidates and integrates required knowledge and practical skills◆ the candidate has demonstrated a thorough use of research materials and tools◆ the candidate demonstrates a high level of self motivation throughout the investigation and completes the stages of the project with infrequent and minimal tutor support◆ the candidate clearly recognises all areas for improvement or modification	<p>Is a co-ordinated piece of work which:</p> <ul style="list-style-type: none">◆ provides evidence of the three essential phases of the project◆ demonstrates interpretation of the project investigation◆ provides project timetable containing the essential project activities and milestones◆ is satisfactorily structured and uses language which is adequate in terms of accuracy and technical content◆ consolidates and integrates required knowledge and practical skills◆ the candidate has made some use of research materials and tools◆ the candidate seeks additional tutor intervention to keep the investigation on track◆ the candidate recognises some areas for improvement or modification

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.

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

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 Plan of action 10%	<p>Plan of action report which includes:</p> <ul style="list-style-type: none">◆ the rationale for the investigation◆ a set of aims and objectives for the investigation◆ identification of the main issues for research and the sources to be used◆ identification of materials and resources required and how they will be accessed◆ identification of the stages (milestones) involved in the project work and the timescales for completion of each stage (project plan) will be achieved◆ identification of appropriate Health and Safety procedures <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Planning stage.</i></p>
Stage 2 — Developing 66%	<ul style="list-style-type: none">◆ The candidate conducts the investigation without seeking or requiring an excessive level of tutor support <p>Preparation of an investigation report that includes:</p> <ul style="list-style-type: none">◆ a contents page◆ review of current up to date literature relevant to the investigation◆ details of the type of practical task, methodology, laboratory techniques and use of equipment involved in the investigation◆ identification, collection/collation of significant data/insignificant data◆ manipulation and analysis of significant data◆ presentation of appropriate data (figures, graphs, tables, equations)◆ discussion of data and the findings◆ conclusions drawn from critical analysis of data◆ reference listing of sources used in literature review <p>Candidates may be required to answer questions from the assessor to validate the evidence.</p> <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Developing stage.</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 24%	<p>Evaluation Report which should:</p> <ul style="list-style-type: none"> ◆ contain an abstract ◆ summarise any unforeseen events and how they were handled ◆ identify knowledge and/or skills which have been gained or developed ◆ assess the strengths and weaknesses of the output of the investigation ◆ determine to what extent the investigation met the original brief ◆ suggest potential development themes for the investigation <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage.</i></p>

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

Support notes

The investigation should involve the application of biological principles and techniques that have been developed during the defined mandatory Units.

An example of a project for HNC Bioscience Graded Unit 1 might be an investigation of nitrogen fixing bacteria. Candidates could investigate how different species and strains of nitrogen fixing bacteria (cyanobacteria, Rhizobium and Azotobacter) affect the growth of clover plants grown from seed and maintained in controlled environments. A series of tubes could be set up using solid support media in which nitrogen is a limiting growth factor. This could provide the basis for a wide range of different investigations by candidates, who would undertake a literature review, plan their milestones and then select which aspect(s) they would investigate, what measurements, analyses and tests they would carry out.

It is recommended that at the start of the year tutorials are held to introduce the project to the candidates and provide initial direction. Thereafter it is suggested that regular scheduled meetings between the tutor and individual candidates are held to review progress and to provide appropriate guidance. The guidance must not be such that it influences the final grading, but, for example, pointing out to the candidate the consequences of significant deviation from their plan during the development phase, would be legitimate.

It is desirable for notes of the meetings to be made for the purposes of clarity and to further simulate the working environment. The notes should be agreed upon by both parties.

Candidates could be encouraged to keep a laboratory notebook incorporating a diary of the progress and tasks completed. This would facilitate the reflective component and help to ensure that milestones are completed in a businesslike manner.

Tutor questions may be used to ascertain the candidates' understanding of the issues contained in the Case Study report and to probe the validity of the proposal.

The following checklist gives a recommendation of how the planning, developing and evaluative stages could be recorded.

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

HNC Bioscience Graded Unit grading checklists

Project Stage	Minimum Evidence Requirements	Mark	Comment
Planning	The project plan accurately specifies the project in both technical and non-technical terms and is prepared in a clear and concise manner.		
	♦ project description and rationale		
	♦ aims, objectives and main issues		
	♦ identification of materials and resources required and how they will be accessed		
	♦ identification of timescales for completion of each stage (project plan milestones)		
	♦ identification of Health and safety procedures		
	The candidate must achieve all of the minimum evidence specified above in order to pass the planning stage. This will account for 10% of the total mark.		

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

Project Stage	Minimum Evidence Requirements	Mark	Comment
Developing	Output scientific investigation report		
	<ul style="list-style-type: none"> ◆ title, contents page ◆ record of progress ◆ introduction (literature review) ◆ aims and objectives ◆ use of equipment ◆ resources/materials and methods ◆ collation of data <ul style="list-style-type: none"> — collection of data of appropriate quality 		
	<ul style="list-style-type: none"> ◆ presentation of data <ul style="list-style-type: none"> — clear and well structured 		
	<ul style="list-style-type: none"> ◆ analysis/interpretation of data <ul style="list-style-type: none"> — contains a full analysis of results is accurate and comprehensive 		
	<ul style="list-style-type: none"> ◆ discussion including sources of error 		
	<ul style="list-style-type: none"> ◆ conclusion and discussions <ul style="list-style-type: none"> — the report has clear and accurate conclusions and recommendations 		
	<ul style="list-style-type: none"> ◆ bibliography/references <ul style="list-style-type: none"> — the candidate develops a knowledge base to support the demands of the project evidenced by a wide range of information resources 		
	<ul style="list-style-type: none"> ◆ Health and Safety requirements 		
	<ul style="list-style-type: none"> ◆ independence of learning and initiative including level of supervision <ul style="list-style-type: none"> — demonstrates a high level of self motivation throughout the project. The candidate undertakes some additional research beyond that demanded by the project. The candidate undertakes the project with the minimum of supervision. 		
The candidate must achieve all of the minimum evidence specified above in order to pass the developing stage. This will account for 66% of the total mark.			

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

Project Stage	Minimum Evidence Requirements	Mark	Comment
Evaluating	Evaluation Report which should:		
	contain an abstract (outline of the investigation)		
	◆ summarise any unforeseen events and how they were handled — candidates who did not encounter any unforeseen events should make reference to this in the evaluation		
	◆ identify skills/and or knowledge which have been gained and/or developed — includes a self-evaluation for what the candidate has learned from undertaking the project. The candidate identifies clear and full details of the skills he/she has developed as a result of doing the project (project management skills, keeping to deadlines, recognising limitations of knowledge — approaching expert sources).		
	◆ assess the strengths and weaknesses of the output of the investigation		
	◆ determine to what extent the assignment met the original brief/future development themes		
	The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage. This will account for 24% of the total mark.		

Equality and inclusion

This graded unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Equality and inclusion*, which is available on SQA's website: www.sqa.org.uk.

General information for candidates

This is a single credit Graded Unit at SCQF level 7 (8 SCQF credit points at SCQF level 8).

This Graded Unit is a project (investigation), to be completed towards the end of your HNC course. It is designed to assess your ability to integrate and apply knowledge and understanding from the following defined Units in order to meet the principal aims of the HNC Bioscience award.

DJ1K 34	<i>Cell Biology Theory and Practice</i>
DH2J 34	<i>Biochemistry: Theory and Practice</i>
F21L 34	<i>Microorganisms: Growth, Activity and Significance</i>
DF82 34	<i>Quality and Health and Safety Systems in Science Industries</i>
F2G8 34	<i>Environmental Awareness</i>
D75X 34	<i>Information Technology Applications Software 1</i>

You will be asked to carry out an investigation to generate data that will be used to construct a report of that investigation. The details of your investigation will be discussed with your tutor, and may involve practical tasks in a laboratory or field-based setting. The investigation will require you to plan, develop and evaluate. You will be asked to provide an action planning document, an investigation report and a report to evaluate your management and effectiveness in conducting the investigation. You will be given a high degree of autonomy during all stages of the investigation, however your tutor is available for guidance and support as and when required. After the submission of your report, your tutor may interview you to probe your understanding of the issues contained in your report and the validity of your conclusions.

The project (investigation) will be assessed in three stages: planning, developing, evaluating.

You will need to pass the planning stage of your investigation before you can progress to the developing stage, and pass the developing stage before you continue to the evaluating stage.

The project will be marked out of 100. To pass you must achieve 50% of the total marks and all the minimum Evidence Requirements for each of the three phases of the work.

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 grade 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%

There are opportunities to develop your Core Skills in *Problem Solving*, *Numeracy*, and *Communication*, all at SCQF level 5 and Information Technology at SCQF level 6 in this Unit.