Arrangements for:

HND Environmental Sciences

Group Award Code: G86D 16

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Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Contents

History of changes

It is anticipated that changes will take place during the life of the qualification, and this section will record these changes. This document is the latest version and incorporates the changes summarised below.

Version number	Description	Date
05	**Mandatory Units** Fundamental Chemistry: Theory and Laboratory Skills (H92X 34) added as an alternative to Fundamental Chemistry: Theory and Practice (DH2K 34) Cell Biology: Theory and Laboratory Skills (H927 34) added as an alternative to Cell Biology: Theory and Practice (DJ1K 34) Instrumental Techniques 1 (H930 35) added as an alternative to Instrumental Techniques: Theory and Practice 1 (DH54 35) **Optional Units** Animal Biology (H921 35) added as an alternative to Animal Biology (DP4L 34) Biochemistry: Theory and Laboratory Skills (H922 34) added as an alternative to Biochemistry: Theory and Practice (DH2J 34)) Biotechnology: An Introduction (H926 34) added as an alternative to Biotechnology: An Introduction (DJ00 34) Immunological Techniques (H92E 35) added as an alternative to Immunological Techniques: Theory and Practice (DH2L 35) Instrumental Techniques 2 (H931 35) added as an alternative to Instrumental Techniques: Theory and Practice 2 (DH2N 35) Fundamental Chemistry: An Introduction (H92W 33) added as an alternative to Fundamental Chemistry: An Introduction (DX29 33) Animal and Plant Cell Culture: An Introduction (H920 34) added as an alternative to Animal and Plant Cell Culture: An Introduction (DH2H 34)	10/09/2015
04	**Revision of Units:** DJ89 34 Applied Sciences: Graded Unit 1 has been replaced by H91W 34. DP4Y 34 Environmental Chemistry has been replaced by H92V 35. DN37 34 Ecology and Ecosystems has been replaced by H93A 34. DN8C 34 Statistics for Science 1 has been replaced by H8XT 33. DG6Y 34 Applied Biochemical Technologies has been replaced by H91T 34. DH2P 35 Microbiological Techniques has been replaced by H92F 35. DH55 34 Microbiology: Theory and Practice has been replaced by H92G 34. DP4M 34 Plant Biology has been replaced by H92H 35. DG6X 35 Protein Structure and Function has been replaced by H92J 35. DN8D 33 Mathematics for Science 1 has been replaced by H8XP 33	19/06/15

	All the above units will finish 31/07/2017 DE1K 33 Workplace Communication in English has been replaced by H8T2 33 and unit will finish by 31/07/2016	
03	Framework: Waste Management and Pollution Control, Unit code amended to read F55S 35 — typographical error	20/01/11
02	Amendments made to optional section of framework.	08/04/10

1 Introduction

This is the Arrangement document for HND Environmental Sciences G86D 16 which was validated in September 2005. This document includes: background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

2 Rationale for the revision of the award

2.1 The Development Groups

The HN Science Development Group was formed in April 2004 after the HN Science conference in February 2004 in order to take forward the HN Science review process following successful validation of the HNC Applied Sciences.

The HND Environmental Science Development Team was formed in May 2004 from staff members in colleges already delivering the current HNC/D Environmental Sciences awards.

2.2 The Need for the Award

In April 2004, the HNC Applied Sciences award was validated under the new design principles. At validation the intention was stated that the HNC would form a flexible basis for the 1st year for suitable new HND Science awards to include recommended options for progression to specific HNDs. The majority of the current HN Science courses are approaching their lapsing period and it was considered the ideal time to rewrite HND Science courses under the SQA design principles including the HND Environmental Sciences.

2.3 Market Research

All centres involved in the delivery of the HND Environmental Sciences were represented on the development team and no specific consultation with this group was deemed necessary.

Further academic consultation occurred at the HN Science Conferences on February 2004 and January 2005 to which all colleges in Scotland were invited. At these events presentations were given on the proposed structure and development of a new HND Environmental Sciences. Discussion which took place in the workshops shaped the final structure of the new award, including recommended options in the HNC Applied Sciences which will form the first year of the HND Environmental Sciences award.

An employer group, representing a range of industries in the environmental sector, completed a questionnaire with the aim of collating information as to the appropriate curriculum areas for an updated HND Environmental Sciences framework, the Core Skills required, and the potential for employment/progression for graduates with the qualification. Comments made were taken into consideration when reviewing the final structure of the awards. The demand for Core Skills by industry was supported by the results.

Overall responses indicated that the HND Environmental Sciences award was a good, broad based award and would be a beneficial entry qualification into the industries that were consulted.

The Institute of Environmental Management and Assessment (IEMA) were consulted with regards to the HND Environmental Sciences. The IEMA represents industry in the areas of:

- Water
- Waste Management
- Green Business
- Light and Heavy Industry
- SMEs

They welcomed the new award and have agreed to Professional Body Recognition.

Other organisations and professional institutions consulted included: Scottish Natural Heritage (SNH); SEPA; The Environmental Association for Universities and Colleges (EAUC): SEMTA (Science, Engineering, Manufacturing Technologies Alliance). There was general agreement that the award was valid and would be of benefit to Scotland.

2.4 Target groups

The existing HN Environmental Sciences awards are already popular in the delivering colleges, and it is envisaged that the updated HND programme will improve candidates' employment and progression prospects.

These courses will recruit candidates from both school leavers and adult returners.

The HND Environmental Sciences is intended to act both as a vocational qualification to meet the workforce demands of the science industry and as an entry route to Science degrees at Scottish Universities, particularly those degrees in environmental sciences.

2.5 Professional Body Recognition

Candidates on a full-time HND Environmental Sciences award can gain Student Membership to the Institute of Environmental Management and Assessment (IEMA). Joining the IEMA not only keeps candidates up to date with current environmental issues but, more importantly, supports their professional development for a career in environmental management and related fields.

'The IEMA is justifiably one of the most highly regarded and respected environmental bodies in the UK. Membership of the IEMA is becoming the accepted way for environmental practitioners to demonstrate their competence to prospective employers. Throughout your career the IEMA will also provide professional support both in terms of training courses and through the network of environmental professionals that are members.' Dr Diana Montgomery FIEMA CEnv, Group Head of Environment, Centrica Plc.

On completion of studies, candidates automatically advance to graduate member status.

To gain student membership candidates should be on a full-time HND Environmental Sciences course and should provide a photocopy of their candidate ID card or a letter from the college confirming their attendance and send to the IEMA along with a completed membership form.

2.6 Articulation Arrangements

In designing the award, the Development Group has been fully aware of the need for the qualification to contain relevant technical and transferable skills to enable immediate entry to employment while at the same time allowing articulation to degree courses. The Development Group believes that an appropriate balance between academic and vocational knowledge and skills has been achieved through the mix of Unit content and teaching approaches. Care has been taken in the design of the curriculum of these awards to ensure that topics and Units required to maintain articulation routes are included. Thus we foresee no difficulties in maintaining our existing articulation routes.

Articulation agreements are already in place for the existing HND Environmental Sciences award and it is expected that similar agreements will be established for these new awards. Examples of existing support from various universities are as follows:

Existing Articulation Arrangements

HE Institution	Articulation from HNC/D
University of Stirling	HNC — First year of BSc Environmental Sciences
University of Stirling	HND — Second year of BSc Environmental Sciences*

The new Higher National Diploma and Certificate Science Qualifications have been nationally devised and delivered across Scotland. Like Standard Grades and Highers these will be nationally delivered, assessed and recognized qualifications. For all new Higher National programmes the development team has engaged representatives from Higher Education at the early stages of development. With early input from Universities we hope to ease the process of articulation to higher qualifications ensuring that we cover all necessary areas of the curriculum. Early discussion and consultation could lead to '**National Articulation Arrangements'**. Instead of each college developing their own, articulation would be to a specific qualification rather than an individual college.

Examples of these 'National' articulation arrangements are as follows:

HE Institution	Articulation Arrangements
Edinburgh University	Second year of BSC Biological Science*
Napier University, Edinburgh	Second year of BSC Environmental/Environmental Sciences (currently being finalised)*
Stirling University	Second year of BSC Environmental/Environmental Sciences (currently being finalised)*

* A candidate who has achieved a grade B pass in the Graded Unit could articulate to second year of selected Degree courses. Universities may also allow candidates into Third year with a grade A pass in the Graded Unit and with a reference from the College.

2.7 Employment opportunities

Futureskills Scotland published jointly by Highlands and Islands enterprise and Scottish Enterprise make labour market projections for the years 2003–2008. These predictions are based on an economic forecasting model produces by the researchers at the universities of Warwick and Cambridge. This model forecast that within Scotland, in the periods covered, there will be 500,000 new jobs arising of which:

- 103,000 will be in health and education
- 5,000 will be in chemicals
- 8,000 will be in manufacturing
- 5,000 will be in the food, drink and tobacco industries and
- that 56% of these new jobs will require a qualification at HNC or above

The HND award has been designed to meet the needs of this expanding employment market and candidates will develop the competences required to enhance their ability to obtain employment as a senior technician, junior laboratory manager or production process controller in Science based industries.

Typical job opportunities are diverse and include posts in :

- industrial research and development laboratories
- quality assurance laboratories
- college, university and research institute laboratories and
- local authority laboratories

Jobs in the purely Environmental Sector in Scotland are expected to grow markedly over the next ten years, so much so that the Scottish Executive has published - Going for Green Growth: a green jobs strategy for Scotland (2005). A report in SEPA View (June 2005), states that the Environmental Support Unit (JITESU) has identified potential for the creation of 20,000 jobs in the Scottish environmental sector. Opportunities exist in:

- Waste management and recycling
- Renewable energy
- Environmental management
- Resource efficiency
- Green manufacturing
- Green procurement
- Green tourism

2.8 Relation of this Award to Existing SQA Provision

Since this award is being written under the new design principles for HNCs and HNDs, it is intended that it will replace the existing HNC/D Environmental Sciences awards.

Related awards are shown below:

SVQ	Environmental Conservation level 2 (G70H 22) SCQF level 5 Environmental Conservation level 3 (G70K 23) SCQF level 6
SPA	Environmental responsibility at work (G5XG 04)
HND	Sustainable Environmental Management (G7FT 16) SCQF level 8
NQ	Managing Environmental Resources (CO55) SCQF level 2 — SCQF level 7

3 Aims of the award

3.1 General aims of the HND Environmental Sciences

The overall aim is to provide a progressive, integrated and coherent education which will be responsive to the needs of candidates, employers and higher institutions. Specifically these are to:

- **develop candidates' knowledge and skills** such as planning, analysis and synthesising in the area of environmental science.

- **develop employment skills** and enhance candidates' employment prospects by providing the candidate with a wide range of practical laboratory skills coupled with the ability to carry out investigations in the field. Candidates will also become familiar with 'soft skills' such as learning to work on their own or in a team environment as well as developing skills in producing oral and written reports and enhancing their presentation and communication skills.

- **enable progression** within the SCQF framework to HE level or a PDA/SVQ within the workplace as candidates are undertaking a wide range of transferable skills and underpinning knowledge.

- **develop study and research skills** in the area of environmental science the use of which would be demonstrated in the Graded Units.

- **develop transferable skills** including Core Skills to be demonstrated across all Units including IT skills, numeracy, presentation skills, working in a team and problem-solving.

- **provide a stimulating and intellectually satisfying learning experience.** The level and content of knowledge necessary for successful completion of this award will require diligence and commitment from the candidate. The structure of the award, design of the assessments and the relationship between theory and observed good practice are intended to provide a balance between presented learning and developmental thinking on the part of the candidate.

- **develop in the candidate skills of independent study and communication** and an informal sense of the responsibility attached to the work of environmental scientists which should be demonstrated particularly in Graded Unit 2.

- **provide the candidate with a deeper underpinning knowledge** in environmental science.

3.2 Specific aims of the HND Environmental Sciences

The aims of the HND Environmental Sciences specifies the knowledge and skills required in order to be deemed competent in this subject area are to:

- **prepare candidates for an appropriate level of employment**, in areas such as sustainable development: research and development; biological and chemical analysis; ecological surveying, pollution and waste management, renewable technologies.

- **develop a range of contemporary vocational skills** relating to the use, support and development of systems appropriate to employment at technician or professional level.

- **develop options to permit an element of vocational specialisation** in a variety of environmental science areas in Units such as: ecology, biodiversity, environmental sampling, earth science, environmental management, sustainable development.

- **prepare candidates for progression to further studies** in science related disciplines e.g. Environment Management and Environment Science

- **provide a flexible route to a qualification**, meeting demand, for example, for those already in employment. The unitised structure of the course and the intended modes of delivery may provide access to this qualification from those in employment through day-release provision and for direct entry or seconded candidates through full-time provision. Discrete Units will be available for study.

- **provide candidates with a wider range of practical laboratory skills** to further enhance job prospects through the practical content of the course.

4 Access to awards

4.1 Access requirements for the award

It is intended that admission to this course should be as broadly based as possible, but should be consistent with the selection of candidates who have a reasonable chance of successfully completing the course. The following entry requirements are given as guidelines only:

- One Science Higher or Managing Environmental Resources Higher and not fewer than three Standard Grade credit passes (SCQF level 5)/Intermediate 2 passes (SCQF level 5), one of which must include Chemistry, Biology, Biotechnology, Human Biology or Mathematics.

- HNC in a relevant Science award
- SVQ level 3 in a relevant Science area
- National Qualification in an appropriate Science and Maths programme, such as SWAP Access to Science. Candidates should preferably possess some NQ Units at Higher level.
- Scottish Group Award (SGA) in Science at Intermediate 2.
- Qualification comparable to the above, gained through other awarding bodies, such as GCSE, City and Guilds.
- At the discretion of the presenting centre for applicants with a different experiential background, who could benefit from taking the course or Units within the course, eg adult returners, overseas candidates with relevant qualifications and/or work experience.

4.2 Alternative Access Arrangements

The presenting centre may operate alternative access arrangements in cases where the candidate is convinced s/he already has the required competences in a given area. These arrangements are as follows:

- Assessment on demand
- Credit Transfer
- Accreditation of Prior Learning
- Relevant Work Experience eg science industries, conservation management, waste management, pollution control, renewable energy, etc.

Individual presenting centres will outline their systems for each of these as appropriate.

- For candidates where English is not their first language, it is recommended that they possess English for Speakers of Other Languages (ESOL) SCQF level 5.

5 Award structure

5.1 Framework

Mandatory Units (22 credits)

Unit Title	Code	SCQF Credit points	SCQF level	SQA Credit Value
Presentation Skills in Science	DG70 34	8	7	1
Statistics for Science 1	H8XT 33*	8	6	1
Information Technology Applications Software 1	D75X 34	8	7	1
Quality and Health & Safety Systems in Science Industries	DF82 34	8	7	1
Fundamental Chemistry: Theory and Practice	DH2K 34	16	7	2
Or				
Fundamental Chemistry: Theory and Laboratory Skills	H92X 34	16	7	2
Applied Sciences: Graded Unit 1	H91W 34*	8	7	1
Environmental Sciences: Graded Unit 2	DW7P 35	16	8	2
Earth Science	DN36 34	8	7	1
Instrumental Techniques: Theory and Practice 1	DH54 35	8	8	1
Or				
Instrumental Techniques 1	H930 35	8	8	1
Environmental Chemistry	H92V 35*	8	8	1
Terrestrial Ecosystems	DP4X 35	8	8	1
Cell Biology: Theory and Practice	DJ1K 34	8	7	1
Or				
Cell Biology: Theory and Laboratory Skills	H927 34	8	7	1
Aquatic Ecosystems	DP4V 35	8	8	1
Environmental Biology	D033 13	8	7	1
Environmental Sampling and Analysis	DT4X 35	8	8	1
Plan an Environmental Management system	DV0N 35	16	8	2
Ecology and Ecosystems	H93A 34*	8	7	1
Sustainable Development	DN38 34	8	7	1
Genetics	DP4P 34	8	7	1

Optional Units (8 credits)

Unit Title	Code	SCQF Credit points	SCQF level	SQA Credit Value
Bioinformatics	DV9D 35	8	8	1
Animal Biology Or Animal Biology	DP4L 34 H921 35	8 8	7 8	1 1
Applied Biochemical Techniques	H91T 34*	8	7	1
Biochemistry: Theory and Practice Or Biochemistry: Theory and Laboratory Skills	DH2J 34 H922 34	8 8	7 7	1 1
Biotechnology: An Introduction Or Biotechnology : An Introduction	DJ00 34 H926 34	8 8	7 7	1 1
DNA Structure and Function	DJ6Y 34	8	7	1
Employment Experience 2	D77H 34	8	8	1
Pestology	DV9E 34	8	7	1
Immunological Techniques: Theory and Practice Or Immunological Techniques	DH2L 35 H92E 35	8 8	8 8	1 1
Immunotechnology: Theory and Practice	DH2M 35	8	8	1
Instrumental Techniques: Theory and Practice 2 Or Instrumental Techniques 2	DH2N 35 H931 35	8 8	8 8	1 1
Plant Biology	H92H 35*	8	8	1
Microbiological Techniques: Theory and Practice	H92F 35*	16	8	2
Microbiology: Theory and Laboratory Skills	H92G 34*	16	7	2
Fundamental Chemistry: An Introduction Or Fundamental Chemistry: An Introduction	DX29 33 H92W 33	8 8	6 6	1 1
Animal and Plant Cell Culture: An Introduction Or Animal and Plant Cell Culture: An Introduction	DH2H 34 H920 34	8 8	7 7	1 1
Protein Structure and Function	H92J 35*	8	8	1
Mathematics for Science 1	H8XP 33*	8	6	1
Environmental Awareness	F2G8 34	8	7	1
Pollution and Waste Management: An Introduction	F55S 35	8	7	1
Waste Management and Pollution Control	F55S 35	8	8	1
Monitoring and Analytical Methods	F5T6 35	8	8	1

Unit Title	Code	SCQF Credit points	SCQF level	SQA Credit Value
for Environmental Science				
Energy and the Environment	F6BL 35	8	8	1

Broadening Units (Optional) up to a maximum of (5 credits)

Unit Title	Code	SCQF Credit points	SCQF level	SQA Credit Value
Workplace Communication in English	H8T2 33*	8	6	1
Personal Development Planning	DE3R 34	8	7	1
Work Role Effectiveness (2003)	DG6E 34	8	7	3
or				
Work Role Effectiveness (2003)	DG6G 35	8	8	3

*Refer to history of changes for revision details.

5.2 Conditions of the award

Candidates will be awarded an HND Environmental Sciences on successful completion of 240 SCQF credit points which will include successful achievement of all the Units and the Graded Units in the mandatory section (22 mandatory Unit credits and 8 option Unit credits giving a total of 30 credits). The mandatory Units include 112 SCQF points at level 8 ie the minimum number of SCQF points at level 8 can be achieved through attainment of the mandatory section.

5.3 Graded Units

The purpose of the Graded Unit is to assess the candidate's ability to integrate and apply the knowledge and/or skills gained in individual Units, to demonstrate that they have achieved the aims of the award and to grade candidate achievement.

Candidates will take a 1 credit Graded Unit at level 7 in the HNC Applied Sciences award. As well as the 1 credit Graded Unit, candidates will also take a 2 credit Graded Unit at level 8 in year 2 of the HND Environmental Sciences award.

5.3.1 Type of Graded Units

HNC Applied Sciences: Investigation Report (HND Environmental Science year 1)

This Unit will be a project based on an investigation which should take place during the last block of study. It will cover a range of skills achieved through studying the mandatory Units of the award.

HND Environmental Sciences: Practical Assignment

This Unit will be a project based on a practical assignment which should take place during the last block of the second year of study. It will cover a range of skills achieved through studying the mandatory Units of the award.

5.3.2 Rationale for Graded Unit Assessment

Investigation Report

Candidates will be given a topic to research. They will produce a report covering the planning, developing and evaluation stages of the investigation. An investigation report allows candidates to integrate knowledge and skills gained in the mandatory Units. It allows them to use research skills, set timescales, identify main issues, methods and sources of research. It also allows them to use scientific reporting skills in setting out the aims, data, analysis, summary, evaluation and references relevant to their investigation.

Practical Assignment

Candidates will be given a practical assignment to carry out. They will produce a laboratory report covering the planning, developing and evaluation stages of the project. A practical assignment allows candidates to integrate knowledge and skills gained in the mandatory Units. It allows them to use practical laboratory skills, Good Laboratory Practice, risk assessments and other Health and Safety considerations as well as extending investigative skills to a practical situation. It also allows them to use reporting skills by producing a logbook/diary of their activities as well as the final laboratory report.

A complete set of specifications for mandatory and optional Units are included on the SQA website. The recommended timing for delivery of the Graded Units should be at the end of each academic year.

5.4 Core Skills

This award has been designed using the new design principles and therefore the importance of Core Skills has been recognised and these are developed throughout the award. These Core Skills may be embedded in the entry qualifications that the presenting students have already achieved, Problem Solving at Intermediate 2 is embedded in all Science Highers. It should be noted that although there is no mandatory entry and exit levels the following is recommended:

HND Environmental Sciences

Core Skill	Recommended Entry Level	Recommended Exit Level
Communication	Intermediate 2	Higher
Numeracy	Intermediate 1	Higher
Information Technology	Intermediate 2	Higher
Problem Solving	Intermediate 1	Higher
Working With Others	Intermediate 1	Higher

Core Skills Signposting

There may be opportunities to gather evidence towards Core Skills or Core Skills Components however there is only automatic certification as detailed:

Core Skill	Component	HN Unit	Level	Mandatory/ Optional
Communication	Oral Communication	Presentation Skills in Science	H	M
	Written Communication	Presentation Skills in Science	H	M
Information Technology	Using Information Technology	Information Technology: Applications Software 1	H	M

5.5 Mapping Information

The mapping of the aims of the award to individual Units within the award is presented in Appendix 1.

5.6 Articulation, professional recognition and credit transfer

Articulation arrangements are described in Section 2.6 and professional recognition in Section 2.5.

5.6.1 Credit Transfer

In principle, candidates can be given credit transfer between current HNC/D Units and new HN Units. This should be carried out on a Unit by Unit basis as sometimes there is no direct equivalence between Units on the old and revised award — this is particularly true of Graded Units. Where candidates wish to apply for credit transfer and there is doubt as to the equivalence of the Units concerned the issue should be referred to the Moderation Section at SQA. In any event it is recommended that current candidates complete the 2nd year of revised HND Environmental Science award.

Guidelines for interim credit transfer arrangements are presented in Appendix 2.

6 Approaches to delivery and assessment

6.1 Content and Context

The HND Environmental Sciences is a specialised award which allows candidates to gain advanced knowledge and technical skills in quality issues, environmental sampling and analysis, ecology, environmental management, sustainable development and its associated technologies. As such, it is intended to prepare candidates for employment at senior technician level/middle management in a range of employment positions in the growing environmental sector.

The award allows candidates to progress to study options in Higher Education, particularly in the field of environmental sciences and environmental management

There are a range of Units common to new HND awards developed as part of the SQA HN Science review enabling candidates to transfer Units from one award to another.

6.2 Delivery and Assessment

Although centres can choose the order in which to teach the Units within the award, guidelines have been produced on timetabling the mandatory Units (Appendix 3). These timetables reflect the building block nature of the Units.

NB: It is essential that the first year of study allows candidates to complete all the Units comprising the HNC in Applied Sciences providing an exit route at the end of year one.

Another constraint on timetabling could arise with the need for laboratory time and fieldwork, timetabling should be planned well in advance to ensure adequate resources are available for delivery and assessment. See below:

Practical laboratory hours and fieldwork

HND Environmental Sciences: Mandatory Units ((22 credits)

Product Code	Unit Title	Credit Value	SCQF level	Lab Hours	Field-work
DG70 34	Presentation Skills in Science	1	7	0	0
DN8C 34	Statistics for Science 1	1	7	0	0
D75X 34	Information Technology Applications Software 1	1	7	0	0
DF82 34	Quality and Health & Safety Systems in Science Industries	1	7	0	0
DH2K 34	Fundamental Chemistry: Theory and Practice	2	7	40	0
DJ89 34	Applied Sciences: Graded Unit 1	1	7	0	0
DW7P 35	Environmental Sciences: Graded Unit 2	2	8	30	10
DN36 34	Earth Science	1	7	10	20
DH54 35	Instrumental Techniques: Theory and Practice 1	1	8	20	0
DP4Y 34	Environmental Chemistry	1	7	20	0
DP4X 35	Terrestrial Ecosystems	1	8	10	10
DJ1K 34	Cell Biology: Theory & Practice	1	7	10	0
DP4V 35	Aquatic Ecosystems	1	8	10	10
D033 13	Environmental Biology	1	7	10	0
DT4X 35	Environmental Sampling and Analysis	2	8	30	10
DV0N 35	Plan an Environmental Management system	2	8	0	40
DN37 34	Ecology and Ecosystems	1	7	10	10
DN38 34	Sustainable Development	1	7	0	0
DP4P 34	Genetics	1	7	10	0

Graded Units should be delivered and assessed in the final block of study after the Units contributing to the knowledge and for that Graded Unit have been completed.

The assessment strategy of the design principles to encourage a more holistic approach to assessment has been adopted in this award. The new HN Unit specification places the emphasis on reducing assessment load for candidates and centres by devising assessments which assess the entire theory content of the Unit where appropriate, and by sampling of knowledge and/or skills carried out under closed-book conditions on a random basis to ensure the candidates do not have prior knowledge of the sample.

Unit specifications detail exactly the Evidence Requirements and assessment procedures for each assessment event. Should centres wish to use a different mode of assessment from that recommended, they should seek prior moderation from SQA.

Assessment exemplar material for all recommended year 1 and 2 core Units is available from SQA.

The award is suited for delivery in a range of attendance modes: Part-time/Block Release/MA Framework/Evening; Full-time/selected Units as CPD Options; some Units may be delivered as work based Units; e-Learning or flexi-learning to reduce time away from the bench.

Assessment Strategy

One of the key features of the revised HN awards is the reduction in the time candidates have to spend on summative Unit assessment. This should provide lecturers with more time to deliver Units. Lecturers are encouraged to use this additional time to reinforce learning and enhance the development of candidates practical skills. Holistic assessment is highlighted in the Units of the award and centres should be encouraged to use this approach where possible.

The timing of assessment for each Unit is at the discretion of the centre, and where possible, assessment should be integrated as described in the Unit descriptors.

6.3 Integration of Assessment

There are opportunities for centres to integrate the teaching of a number of Units. These Units could include, Presentation skills in Science, Statistics for Science 1, Quality and Health and Safety systems in Science Industries and Information Technology Applications Software 1, although this list is not exhaustive and there may be other Units which could be integrated, depending on the optional Units chosen eg Instrumental Techniques 1 could be integrated with a Unit that has a practical based Outcome.

6.4 Open Learning

HND Environmental Sciences could be delivered by Open Learning. Candidates would have to attend the presenting centre or other agreed institution to complete the practical assessments. Centre-devised supervision agreement should detail controlled conditions to ensure authenticity of evidence.

7 General information for centres

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**.

Internal and external verification

All instruments of assessment used within this/these Group Award(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* **(www.sqa.org.uk)**.

8 General information for candidates

Centres should provide candidates with a brief summary of the Group Award before they commence on their course of study. It should include information on what the Group Award is about, and provide information on the knowledge and skills which will be developed, what is involved in assessment and, in particular, the Graded Units, Core Skills, and the conditions of the award.

This would normally be presented as part the information in a course handbook and should include information on the possible routes of progression in education or types of employment available for candidates obtaining the qualification. Information can be found in the following sections of this document: course content (5.1), access arrangements (4.1 and 4.2), articulation routes (2.6), employment opportunities (3.2).

As mentioned earlier in this document the HND Environmental Sciences is intended to act both as a vocational award and as an entry route to degree courses.

9 Glossary of terms

SCQF: This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF see Appendix 2 or visit the SCQF website at **www.scqf.org.uk**.

SCQF credits: One HN credit is equivalent to 8 SCQF credit points. This applies to all HN Units, irrespective of their level.

SCQF levels: The SCQF covers 12 levels of learning. HN Units will normally be at levels 6–9. Graded Units will be at level 7 and 8 (see Section 6 for further information on this).

Subject Unit: Subject Units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Graded Unit: Graded Units assess candidates' ability to integrate what they have learned while working towards the Units of the Group Award. Their purpose is to add value to the Group Award, making it more than the sum of its parts, and to encourage candidates to retain and adapt their skills and knowledge.

Dedicated Core Skill Unit: This is a Unit that is written to cover one or more particular Core Skills, eg HN Units in Information Technology or Communications.

Embedded Core Skills: This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

Signposted Core Skills: This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

Qualification Design Team: The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the HNC/D from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

Consortium-devised HNCs and HNDs are those developments or revisions undertaken by a group of centres in partnership with SQA.

Specialist single centre and specialist collaborative devised HNCs and HNDs are those developments or revisions led by a single centre or small group of centres who provide knowledge and skills in a specialist area. Like consortium-devised HNCs and HNDs, these developments or revisions will also be supported by SQA.

10 Appendices

Appendix 1

Mapping of Aims to Units

General aims of the HND Environmental Sciences

General aims / Unit titles	Develop candidates' knowledge and skills	Develop employment skills	Enable progression with the SCQF	Develop study and research skills	Develop transferable skills	Provide a stimulating and intellectually satisfying learning experience	Develop in the candidate skills of independent study and communication	Provide the candidate with a deeper underpinning knowledge
Presentation Skills in Science	√	√	√	√	√	√	√	
ITA Software 1	√	√	√		√	√	√	
Fundamental Chemistry: T&P	√	√	√	√	√	√	√	
Quality and H&S Systems in Science Industries	√	√	√	√	√	√	√	
Graded Unit 1	√	√	√	√	√	√	√	
Statistics for Science 1	√	√	√	√	√	√	√	
Cell Biology: T&P	√	√	√	√	√	√	√	
DNA Structure and Function			√		√	√	√	
Microbiology: T&P	√	√	√	√	√	√	√	
Biochemistry: T&P	√	√	√	√	√	√	√	√
Applied Biochemical Techniques	√	√	√	√	√	√	√	√

General aims / Unit titles	Develop candidates' knowledge and skills	Develop employment skills	Enable progression with the SCQF	Develop study and research skills	Develop transferable skills	Provide a stimulating and intellectually satisfying learning experience	Develop in the candidate skills of independent study and communication	Provide the candidate with a deeper underpinning knowledge
Sustainable Development	√	√	√	√	√	√	√	√
Food Science: Theory and Practice	√		√	√		√		

General aims Unit titles	Develop candidates' knowledge and skills	Develop employment skills	Enable progression with the SCQF	Develop study and research skills	Develop transferable skills	Provide a stimulating and intellectually satisfying learning experience	Develop in the candidate skills of independent study and communication	Provide the candidate with a deeper underpinning knowledge
Environmental Sampling and Analysis	√	√	√	√	√	√	√	√
Plan an Environmental management system	√		√	√	√	√	√	√
Microbiological Techniques: T&P	√	√	√	√	√	√	√	√
Immunological Techniques: T&P	√	√	√	√	√	√	√	√
Animal Biology	√	√	√	√	√	√	√	√
Plant Biology	√	√	√	√	√	√	√	√
Terrestrial Ecosystems	√		√		√	√		√
Aquatic Ecosystems	√		√		√	√		√
Ecology & Ecosystems	√	√	√	√	√	√	√	√
Graded Unit 2	√	√	√	√	√	√	√	√
Immunotechnology: T&P	√	√	√	√	√	√	√	√
Protein Structure & Function: T&P	√	√	√	√	√	√	√	√
Instrumental Techniques: T&P 1	√	√	√	√	√	√	√	√
Animal & Plant Cell Culture: An Introduction	√	√	√	√	√	√	√	
Genetics	√	√	√	√	√	√	√	

General aims Unit titles	Develop candidates' knowledge and skills	Develop employment skills	Enable progression with the SCQF	Develop study and research skills	Develop transferable skills	Provide a stimulating and intellectually satisfying learning experience	Develop in the candidate skills of independent study and communication	Provide the candidate with a deeper underpinning knowledge
Earth Science	√	√	√	√	√		√	
Environmental Biology	√	√	√	√	√	√	√	√
Employment Experience 2	√	√	√	√	√	√	√	
Biotechnology: An Introduction	√	√	√	√	√	√	√	√
Instrumental Techniques II	√	√	√	√	√	√	√	√
Environmental Chemistry	√	√		√	√			√

Appendix 2

Credit Transfer Arrangements

HND Mandatory Units

Code	New Unit Title	Credit value	SCQF level	Old Unit Title	Code
DH2K 34	Fundamental Chemistry: Theory & Practice	2	7	General Chemical Principles - (1.0) + one other Chemistry single credit unit from old framework	A6LF04
DJ89 34	Applied Science: Graded Unit 1	1	7	No equivalent	
D75X 34	Information Technology: Applications Software 1	1	7	Information Technology Applications 1 (1.0)	A6AM04
DG70 34	Presentation Skills in Science	1	7	Communication: Selecting and Presenting Complex Information (1.0)	A0X904
DF82 34	Quality and Health & Safety Systems in Science Industries	1	7	Introduction to Laboratory Management and Organisational Structure (1.0)	A6M404
DN8C 34	Statistics for Science 1	1	7	Introduction to Statistics for Quality Analysis (1.0)	BA4604
DW7P 35	Environmental Science: Graded Unit 2	2	8	No equivalent	
DP4Y 34	Environmental Chemistry	1	7	Environmental Chemistry	D5KF04 or D62Y04
DN36 34	Earth Science	1	7	Geological Systems	
DP4X 35	Terrestrial Ecosystems	1	8	Terrestrial Ecosystems	A7AR04
DP4V 35	Aquatic Ecosystems	1	8	Aquatic Ecosystems	A6Y404
D033 13	Environmental Biology	1	7	Environmental Biology	A6F804 or D52B04
DT4X 35	Environmental Sampling and Analysis	1	8	Laboratory Skills: Analytical Techniques (1.5)	A6LK04

Code	New Unit Title	Credit value	SCQF level	Old Unit Title	Code
DV0N 35	Plan an environmental management system	2	8	Environmental Policy and Management (2.0)	A46H04
DN37 34	Ecology and Ecosystems	1	7	Ecology and Ecosystems: An Introduction (1.5)	A6Y304
DN38 34	Sustainable Development	1	7	The Environment: An Introduction (1.0)	A6X204

HND Optional Units

Code	New Unit Title	Credit Value	SCQF level	Old Unit Title	Code
DH2H 34	Animal & Plant Cell Culture: An Introduction	1	7	Animal & Plant Cell Culture	D5K2 04
DP4L 34	Animal Biology (I)	1	7	Animal & Plant Biology	D5K1 04
D77H 34	Employment Experience 2	1	8	Workplace Experience (2.0)	A6T134
DH2L 35	Immunological Techniques: Theory & Practice	1	8	Epidemiology of Infectious Disease - (1.5)	A6XG04
DH2N 35	Instrumental Techniques: Theory and Practice 2	1	8	Laboratory Skills 2 - (1.0	A6X704
DP4M 34	Plant Biology	1	7	Plant Biology	D2V004
DG6X 35	Protein structure & function	1	8	Proteins: Structure, Function and Applications	D3B204
DV9E 34	Pestology	1	7	Pestology (1.0)	A6Y604
DH2P 35	Microbiological Techniques: Theory & Practice	2	8		
DJ1K 34	Cell Biology: Theory & Practice	1	7		
DJ6Y 34	DNA Structure & Function	1	7		
DH2J 34	Biochemistry: Theory & Practice	1	7		
DH55 34	Microbiology: Theory & Practice	2	7		

Appendix 3

Guidelines for Timetabling of Mandatory Units

Please note that this list of credit equivalences is not exhaustive nor do credit values always match where a credit equivalence is quoted. If in any doubt please submit your proposal for credit transfer to the Moderation Section of SQA.

HNC Applied Sciences — Environmental Sciences option (year 1 of HND)

Two Block timetable

Block 1	**Fund. Chem. (2 credit)** **C**	**Quality H&S** **C**	**Pres. Skills** **C**	**Cell Biol** **C**	**IT** **C**	**Stats** **C/O**	**Earth science** **C**
Block 2	**Ecology and Eco** **C**	**Sust Dev** **C**	**Genetics** **C**	**Env Chem** **C**	**Graded Unit 1** **C**	**Env Biology** **C**	**Option 1**

HND Environmental Sciences year 2

Two Block Timetable

Block 1	**Terr Eco**	**Aquat Eco**	**Inst Tech 1**	**Env Sampling**	**Option 2**	**Option 3**	**Option 4**
Block 2	**Env Mgt (2 credit)**		**Graded Unit 2 (2 credit)**	**Option 5**	**Option 6**	**Option 7**	**Option 8**

The options chosen may depend on the intended career path of the candidates or on which degree course they hope to progress to.