Arrangements for:

National Progression Award (NPA) in Computer Networks and Systems

SCQF level 5

Group Award Code: G9J8 45

Validation date: June 2009

Date of original publication: November 2009

Version: 1.0

Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of National Qualification Group Awards.

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	Authorised by

Contents

1 Introduction

This is the Arrangements Document for the new Group Award in Computer Networks and Systems, at SCQF level 5 which was validated in June 2009. 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.

The award is composed of Units which form part of the National Certificate awards in Digital Media Computing. Candidates for the NC Digital Media Computing awards have the opportunity to be certificated for these NPA awards depending on their choice of Units within their programmes. Conversely, candidates who achieve an NPA award will have SCQF credits that can count towards the NC DMC awards.

UNIT Computing: Install and Maintain Computer Hardware (SCQF level 5)

CODE F1KF 11

SUMMARY

The Unit is designed to enable candidates to work effectively and safely with a range of computer hardware. The Unit will provide candidates with the practical skills involved in setting up, maintaining and upgrading computer systems as well some basic knowledge of the structure of a computer system. The content of the Unit includes system components and connections, simple fault finding and housekeeping procedures, the use of expansion slots and safe working practices along with environmental issues arising from the use and disposal of computer equipment.

This Unit is suitable for a wide range of candidates and it is particularly appropriate for those who are interested in a career in technical support or a similar area.

OUTCOMES

1 Identify the basic function of hardware components and their safe operation.
2 Set up an operational computer system with a range of computer hardware.
3 Maintain and upgrade an existing computer system.

UNIT Computing: Install and Maintain Computer Software (SCQF level 5)

CODE F1KP 11

SUMMARY

This Unit is designed to enable candidates to correctly install and configure system and application software on a computer. The Unit will provide candidates with information about the range of system software, such as operating systems, the wide variety and classification of application software, such as word processors and the methods of obtaining software and the legal issues involved. The Unit will give candidates practical experience in installing system and application software within legal constraints. The contents of the Unit include planning and preparation for software installation, identification and understanding of manufacturer system requirements, software installation and maintenance of software installations.

This Unit is suitable for candidates who have an interest in computer software or who are undertaking a course of study in computing.

OUTCOMES

1 Identify types and features of software products and types of software legislation and licensing.
2 Install and configure system software and application software.
3 Update and troubleshoot installed software.

UNIT Computing: Computer Networking Fundamentals (SCQF level 5)

CODE F1KH 11

SUMMARY

The overall aim of this Unit is to enable candidates to set up a small computer network. Candidates will also be required to apply an appropriate methodology and select tools to test and troubleshoot a small network installation. The Unit will provide candidates with information about the different types and features of networking components and the physical network topologies used in industry. Candidates will be made aware of the need for standards and protocols in computer networks. The candidate will also be made aware of the Transmission Control Protocol/Internet Protocol (TCP/IP) networking model and its components. Throughout the Unit the candidate should be exposed to common networking terminology and concepts.

This Unit is suitable for candidates who have an interest in computer networks or who are undertaking a course of study in a computing-related field.

OUTCOMES

1 Identify computer networking concepts and network components.
2 Plan and assemble a computer network using existing and manufactured components.
3 Configure and test a computer network.

2 Rationale for the development of the Group Award(s)

The rationale for developing the National Progression Award in Computer Networks and Systems at SCQF level 5 is to address shortcomings in the current SQA provision at SCQF level 5 and to provide centres with a progressive set of awards.

The Scottish Qualifications Authority has collaborated with some of the main IT vendors (CompTIA, Cisco, Microsoft, Apple, Adobe) to ensure their qualifications reflect current business practices whilst supplying candidates with skills which will enhance their employment prospects.

Following the NC review a number of Units were retired, rewritten or added to the catalogue to ensure SQA offered up-to-date, relevant and industry-based Units in their entry level portfolio. In order to ensure candidates achieve an entry level qualification in as flexible a manner as possible, creating smaller achievable subsets of qualifications (which would contribute to the attainment of a Group Award) benefits candidates, centres and employers. Thus centres can offer a diverse range of qualifications within the Group Award to meet their staff skills, available resources and timetable commitments whilst offering candidates the opportunity of undertaking a wide variety of National Progression Awards (NPAs) as is possible. Candidates can undertake small

taster courses in a variety of areas before selecting an area for further study at HNC level.

Recent changes to certifications offered by the main vendors, Cisco, CompTIA and Microsoft have been brought about following massive industry consultation exercises. Full details of the consultation exercises are publicly available (www.cisco.com, www.comptia.org, www.microsoft.com). Thus it is safe to conclude demand exists within the economy for relevant, up-to-date IT qualifications.

2.1 How the award meets the criteria for SCQF level 5

The level of this award is SCQF level 5 as all 18 SCQF Credit points available are at SCQF level 5. This meets the criteria required by the design principles of NPA (ie at least half of the SCQF credit points are at the level of the Group Award).

SCQF Level Descriptor 5

Knowledge and Understanding	Candidates are expected to demonstrate and/or work with: ▪ basic knowledge in a subject/discipline which is mainly factual but has some theoretical component ▪ a range of simple facts and ideas about, and associated with, a subject/discipline ▪ knowledge and understanding of basic processes, materials and terminology
Practice: Applied knowledge and understanding	Candidates are expected to: ▪ relate ideas and knowledge to personal and/or practical contexts ▪ complete some routine and non-routine tasks using knowledge associated with a subject/discipline ▪ plan and organise both familiar and unfamiliar tasks ▪ select appropriate tools and materials and use these safely and effectively ▪ adjust tools where necessary using safe practices
Generic Cognitive Skills	Candidates are expected to: ▪ use a problem solving approach to deal with a situation or issue which is straightforward in relation to a subject/discipline ▪ operate in a familiar context but where there is a need to take account of or use information of different kinds, some of which will be theoretical or hypothetical ▪ use some abstract concepts eg make generalisations and/or draw conclusions
Communication, ICT and Numeracy skills	Use a range of routine skills, for example: ▪ produce and respond to detailed written and oral communication in familiar contexts ▪ use standard applications to process, obtain and combine data ▪ use a range of numerical and graphical data in straightforward contexts which have some complex features
Autonomy, Accountability and Working with Others	Candidates are expected to: ▪ work alone or with others on tasks with minimum supervision ▪ agree goals and responsibilities for self and/or work team with manager/supervisor ▪ take leadership responsibility for some tasks ▪ show an awareness of others' roles, responsibilities and requirements in the carrying out of work and make a contribution to the evaluation and improvement of practices and processes

3 Aims of the Group Award

This award is new and does not replace any existing award. It provides an opportunity for candidates to group together Units relating to the theme of Computer Networks and Systems at SCQF level 5.

The general aim of these awards is to produce robust qualifications that allow candidates to enter vocational education, and centres to provide a solid grounding to candidates.

The overall aim of the award is to enable candidates to work safely with computer systems and hardware components; to install, configure and upgrade a range of systems and application software; and implement, maintain and troubleshoot a simple network.

3.1 Principal aims of the Group Award

The principal aims of the award are to provide candidates with the opportunity to:

- identify the basic function of hardware components and their safe operation
- set up an operational computer system with a range of computer hardware
- maintain and upgrade an existing computer system
- identify types and features of software products and types of software legislation and licensing
- install and configure system software and application software
- update and troubleshoot installed software
- identify computer networking concepts and network components
- plan and assemble a computer network using existing and manufactured components
- configure and test a computer network
- progress within the SCQF, eg to another NPA or to the National Certificate Digital Media Computing or another National Certificate
- develop employment skills which are directly related to the relevant National Occupational Standards

3.2 General aims of the Group Award

- To produce a flexible award that is appropriate for a variety of delivery modes
- To enhance the portfolio available to centres by mapping to the NOS
- To ensure that candidates gain appropriate knowledge and understanding in all Units
- To allow the development of specific knowledge and skills
- To meet skills gaps identified by employers
- To provide opportunities to develop Core Skills and/or other transferable skills
- To allow candidates to progress to a selection of different awards

3.3 Target groups

The age range of candidates is from young secondary education and adult learners, in the community and FE. The practical nature of the component Units and their relevance to modern technology usage will help centres engage and motivate the 'difficult to teach' client groups that are often encountered at SCQF level 5.

The provision of awards at SCQF level 5 meets the requirements of candidates for an entry-level qualification that matches their ability and for progression at an appropriate pace to further levels of study. This award is a subset of the National Certificate in Digital Media Computing suite of awards. Overall, this award should be well suited to the following candidate groups: young people entering after leaving school (often with low-attainment); mature adults returning to full-time study or preparing for a career change; mature adults who have previous experience of short IT courses and wish to extend their interest. There is nothing in the awards structure or content that would provide artificial barriers to candidates with disabilities.

The majority of candidates undertaking this award are looking to improve their skills in using the internet more safely and efficiently. This award could be used as a stepping stone for progression and articulation to the next level.

Many centres will use this award to address the needs of the 16–18 year olds that fall into the category of Not in Education, Employment or Training (NEET). This cohort is targeted by the Government's Get Ready for Work Programme, a work-based training programme. The Units in this NPA are highly relevant to the experiences and Outcomes of the Curriculum for Excellence, with some specific links as noted below:

Reference	Outcome	Topic Area(s)
TCH 315F / ICT	I can recognise security risks when handling electronic information and can consider the different ways to protect technological devices from outside interference.	Safety
TCH 417F / Comp	I can compare different forms of security software to gain knowledge and understanding of their functions in protecting contemporary technologies.	Safety
TCH 317H / ICT	I can explore and use the features of a variety of familiar and unfamiliar software to determine the most appropriate to solve problems or issues.	Applications Software
TCH 318H / ICT	In different learning situations, I explore and use data handling software which allows me to search, sort, calculate, interpret, retrieve or display information.	Applications Software
TCH 419H / Bus Ed and Comp	Throughout my learning, I can approach uncertainty with confidence when selecting and using appropriate software to solve increasingly complex problems or issues in new or familiar situations.	Problem Solving
TCH 322K / ICT	Having gained knowledge and understanding of the components of a computer, I can make an informed choice when deciding on the system required for a specific purpose.	System Selection
TCH 425K / Comp	Through research, I can gain knowledge of computer systems to understand their differing features and consider their suitability for the world of work.	System Selection
TCH 426K / Bus Ed	Whilst working in a simulated or real workplace, I can examine my work environment considering office layout, ergonomics factors, and health and safety legislation.	Safety

3.4 Employment opportunities

Candidates who undertake this award could expect increased employment opportunities in the IT or Interactive Media sector if they enter employment directly from school. This could lead on to the candidate undertaking SVQs or a Modern Apprenticeship in IT.

It is envisaged that those candidates who progress directly into employment on completion of this award may be able to gain positions such as Computer Technician, Network Technician or Help Desk Support Technician.

4 Access to Group Award

Access to this award will be at the discretion of the centre, however, the following provides guidance on what is considered to be knowledge and/or experience appropriate for entry to the award:

It would be beneficial if candidates possessed basic IT skills. This may be evidenced by D01D 10 *Information Technology* (Intermediate 1) or equivalent qualifications or experience.

Mature candidates without formal qualifications but with appropriate industrial experience can also be admitted.

Candidates who have already acquired relevant skill via previous qualifications or experience may be able to have these accredited via Accreditation of Prior Experiential Learning (APEL).

5 Group Award structure

All Units are mandatory within the framework of the NPA Computer Networks and Systems at SCQF level 5.

5.1 Framework

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Computing: Install and Maintain Computer Hardware	F1KF 11	6	5	1
Computing: Install and Maintain Computer Software	F1KP 11	6	5	1
Computing: Computer Networking Fundamentals	F1KH 11	6	5	1

5.2 Mapping information

The Units have been written so as to be fully compatible with the relevant National Occupational Standards for IT Users. This will facilitate progression of candidates onto SVQs. It also gives the NPA credibility with employers.

F1KF 11: Computing: Install and Maintain Computer Hardware

Outcome 1 looks at identifying the basic function of hardware components and their safe operation. The Performance Criteria cover identifying the basic hardware components of a computer system, identifying the function of the basic hardware components of a computer system, and identifying health, safety and environmental issues arising from the use of computer equipment.

This Outcome maps closely to the following e-skills NOS standards:

- **IUF:B3** Follow and understand the need for safety and security practices
- **SIS:B1** Select and connect up a personal computer safely with associated hardware and storage media to meet needs

Outcome 2 looks at setting up an operational computer system with a range of computer hardware. The Performance Criteria cover setting up and testing a basic stand-alone computer system safely, attaching and testing peripheral devices to the system safely, diagnosing faults with the computer system and hardware correctly and undertaking remedial action to resolve the faults diagnosed.

This Outcome maps closely to the following e-skills NOS standards:

- **SIS:B1** Select and connect up a personal computer safely with associated hardware and storage media to meet needs

Outcome 3 is about maintaining and upgrading an existing computer system. The Performance Criteria cover performing basic maintenance and housekeeping procedures correctly and safely, installing motherboard components to an existing computer system and installing a secondary storage device.

This Outcome maps closely to the following e-skills NOS standards:

- **IUF:B4** Maintain system and troubleshoot IT system problems

F1KP 11: Computing: Install and Maintain Computer Software

Outcome 1 is about identifying types and features of software products and types of software legislation and licensing. The Performance Criteria cover identifying types and features of system software, identifying types and features of application software, identifying methods of software distribution and legal issues involved, identifying methods of software registration and the benefits of registration, identifying types of installation media and common file types encountered during software installation and identifying software installation concepts.

This Outcome maps closely to the following e-skills NOS standards:

- **IPU:B1** Plan, select and use appropriate IT systems and software for different purposes

Outcome 2 is about installing and configuring system software and application software. The Performance Criteria cover identifying manufacturer's system requirements for software installation, installing and configuring system software, installing and configuring application software and testing and documenting installed software.

This Outcome maps closely to the following e-skills NOS standards:

SIS:B1 Select and connect up a personal computer safely with associated hardware and storage media to meet needs
SIS:B3 Install and configure software for use

Outcome 3 is about updating and troubleshooting installed software. The Performance Criteria cover updating system software, updating application software, identifying and reporting software problems and resolving software problems.

This Outcome maps closely to the following e-skills NOS standards:

OSP:B1 Keep computer hardware and software operating efficiently
OSP:B3 Troubleshoot and respond to common IT system problems and errors
OSP:B5 Maintain software to meet performance needs

F1KH 11: Computing: Computer Networking Fundamentals

Outcome 1 is about identifying computer networking concepts and network components. The Performance Criteria cover identifying key computer networking concepts and terminology, identifying common physical networking topologies and their features, identifying a networking model and its components, identify types and features of network components and identifying different types and uses of networking cables.

Outcome 2 is about planning and assembling a computer network using existing and manufactured components. The Performance Criteria cover planning the physical layout and the equipment requirements of a small network, connecting a cable to a patch panel and to a telecommunications outlet/connector and test it, testing that network cables are operational for the network installation and assembling the computer network.

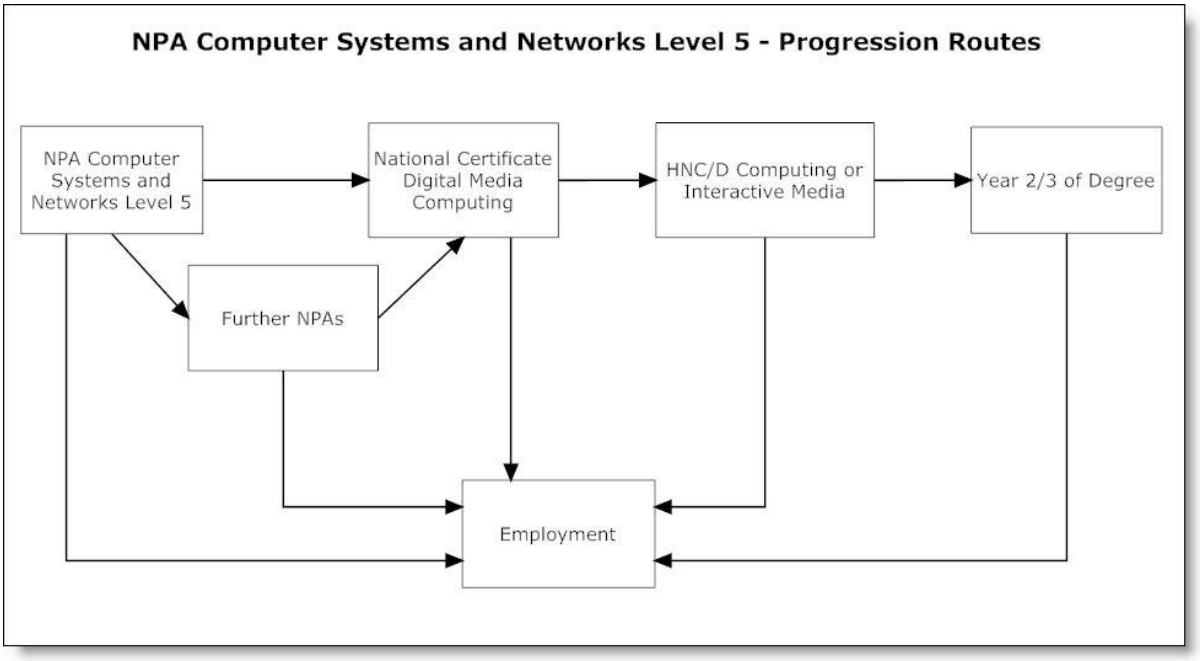
Outcome 3 is about configuring and testing a computer network. The Performance Criteria cover configuring a computer network using appropriate networking software, establishing connections between the different computers on the network, transferring data between the different computers on the network and resolving network problems identified during the configuration and testing process.

These Outcomes map closely to the following e-skills NOS standards:

- **SIS:B2** Select and connect an IT system to a communication service to meet needs
- **SIS:B4** Check that the IT system and communication service are working successfully

5.3 Articulation, professional recognition and credit transfer

Candidates who undertake this award could expect to progress to higher level IT or Interactive Media qualifications at college or university. At present many colleges offer HNCs and HNDs in Information Technology and Interactive Media. Several universities offer undergraduate and postgraduate courses for which this qualification would provide a good basis.



Progression pathways within the Scottish Credit and Qualifications Framework:

SCQF level	SQA National Units, Courses and Group Awards	Higher Education	Scottish Vocational Qualifications	SCQF level
12		Doctorates		12
11		Masters IT or Interactive Media	SVQ 5 IT User	11
10		Honours Degree		10
9		Ordinary Degree		9
8		Higher National Diploma IT or Interactive Media	SVQ 4 IT User	8
7	Advanced Higher	Higher National Certificate IT or Interactive Media		7
6	**National Certificate in Digital Media Computing**		SVQ 3 IT User	**6**
5	**National Progression Award in Computer Networks and Systems**		SVQ 2 IT User	**5**
4	Intermediate 1		SVQ 1 IT User	4
3	Access 3			3
2	Access 2			2
1	Access 1			1

*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.

6 Approaches to delivery and assessment

6.1 Delivery

The context for the NPA is the rapidly changing and expanding role of computers in everyday situations. The NPA aims to provide candidates with the confidence to implement, maintain and troubleshoot these everyday situations faced by candidates. This will provide a useful range of vocational skills. The precise content of the Units will change as technology evolves over time and new devices are introduced.

In a wider context the NPA may be delivered either as a standalone qualification or as part of a larger Group Award. Thus relevant vocational PC skills may be delivered within the context of a wide range of awards.

There are opportunities to integrate items within the component Units, however, no recommendation is offered here.

6.2 Assessment

Written and/or oral recorded evidence is required which demonstrates that the candidate has achieved the standard specified in the Outcomes and Performance Criteria for each Unit. The assessment will be supervised, controlled and under closed-book conditions. The instruments of assessment will provide opportunities for the theory-based Outcomes to be fulfilled by means of sampling across the range of the content of the Outcomes. Where re-assessment is required it should contain a different sample from the range of mandatory content. Achievement can be decided by use of a cut-off score.

Performance evidence supplemented by an activity log of the candidate's activity and an assessor observation checklist is required for practical Outcomes, which demonstrates that the candidate has achieved the standard specified in the Outcomes and Performance Criteria. The assessment will be carried out under supervised and controlled conditions. Candidates will have access to notes and reference work as well as online help for this assessment. The candidates' activity logs will be completed over an extended period of time. These logs will provide evidence that candidates have used safe working practices and tested the system after each activity has been completed:

- The candidate activity logs will show that the candidate has completed all of the tasks, with due regard to health and safety. An assessor must endorse each candidate log together with the candidate with each of their names, signature and the relevant date(s).

- The assessor observation checklists will be used to record all the tasks have been undertaken correctly, by the candidate. An assessor must endorse each checklist with the candidate's name, signature and date.

The Assessment Support Packs (ASPs) for these Units provide sample assessment material including an instrument of assessment for the knowledge, and a sample log and an assessor checklist. Centres wishing to develop their own assessments should refer to Assessment Support Packs to ensure a comparable standard.

The use of holistic assessments covering more than one Unit is encouraged.

6.3 Use of e-assessment

The opportunity exists to use e-assessment for these Units. This may take the form of e-testing (for knowledge and understanding only). There is no requirement for centres to seek prior approval if using e-assessment for either of these purposes so long as the normal standards for validity and reliability are observed. If a centre is presenting this assessment online the following assessment methods, where appropriate, may be selected:

- multiple-choice
- drag and drop
- multiple response
- mix and match
- a combination of the above

6.4 Open and distance learning

Given the highly practical nature of the mandatory Units comprising the award, care may be required if open or distance learning approaches are to be offered. A blended learning approach may be adopted where centres provide some open or distance learning materials and instructor led practical sessions. Arrangements for assessment should be made in a supervised environment.

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 Group Award 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 and Quality Assurance for Colleges of Further Education* **(www.sqa.org.uk)**.

8 General information for candidates

The National Progression Award in Computer Networks and Systems at SCQF level 5 will introduce candidates to the fundamental knowledge and skills required to make effective use of computer hardware, software and networks. The Units that comprise this National Progression Award are a subset of the Units in the National Certificate in Digital Media Computing suite of awards at SCQF level 5.

This National Progression Award is capable of being delivered in a wide range of delivery modes. It is well suited to delivery as an intensive short-course programme,

making full use of the inter-relationship between the Units. This award can also be delivered on a full-time, part-time or flexible mode at a centre's discretion.

The delivery of the component Units will be largely through practical activities, supported by tutor demonstration and exposition. Basic information and theory will be covered but candidates will also develop independence in their learning through exercises which will require information to be acquired from the internet and assessed for suitability and relevance.

With the increasing availability of e-learning materials, it is highly likely that some of the delivery of these awards will be presented in an online format.

The assessment for these Units is largely composed of practical assignments and the evidence for achievement will be a logbook maintained by the candidate along with stored and printed elements of their work with corresponding candidate checklist(s) completed by the assessor (where necessary). The candidate's knowledge and understanding will be tested by written and/or oral recorded evidence.

The testing of knowledge and understanding may be carried out through computer-based assessment (e-assessment) which will provide candidates with 'on-demand' testing and immediate return of their results.

A successful candidate will have gained the knowledge and skills suitable to complement the study of other National Progression awards similar to this award or to progress to a selection of different National Certificates awards, particularly the Digital Media Computing suite, or Higher National Diploma awards.

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 visit the SCQF website at **www.scqf.org.uk**

SCQF credit points: One SCQF credit point equates to 10 hours of learning. NQ Units at SCQF levels 2–6 are worth 6 SCQF credit points, NQ Units at level 7 are worth 8 SCQF points.

SCQF levels: The SCQF covers 12 levels of learning. National Qualification Group Awards are available at SCQF levels 2-6 and will normally be made up of National Units which are available from SCQF levels 2–7.

Dedicated Unit to cover Core Skills: This is a non-subject Unit that is written to cover one or more particular Core Skills.

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 National Certificate/National Progression Award 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 National Certificates/National Progression Awards are those developments or revisions undertaken by a group of centres in partnership with SQA.