



Group Award Specification for:

**Professional Development Award (PDA) in
Laboratory Science at SCQF level 7**

Group Award Code: GM3G 47

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1 Introduction

This document was previously known as the Arrangements document. The purpose of this document is to:

- ◆ assist centres to implement, deliver and manage the qualification
- ◆ provide a guide for new staff involved in offering the qualification
- ◆ inform course managers, teaching staff, assessors, learners, employers and HEIs of the aims and purpose of the qualification
- ◆ provide details of the range of learners the qualification is suitable for and progression opportunities

This is the group award specification for the PDA in Laboratory Science at SCQF level 7, and it is a revision of the group award which had previously been validated in June 2009.

The PDA Laboratory Science group award is intended to act both as a vocational qualification to meet the workforce demands of the science industry and as an entry route to further study at Colleges and Universities, particularly those Higher National qualifications and degrees covering areas of the sciences.

The PDA Laboratory Science group award will be attractive to a diverse group of learners including those in employment, school leavers, adult returners and Modern Apprentices.

The group award title reflects the scientific nature of the award and is linked to the skills required to become competent to work in a laboratory environment. The general approach is to develop good technical, investigative and problem solving skills. Learners for the PDA Laboratory Science group award will be able to work in a broad range of companies; hence the title of the award is generic enough to reflect the diversity of the Science Industry in Scotland.

In recent years industry has expressed concern over the lack of availability of technically competent people to work in science laboratories. The science industry was finding that university graduates lacked the required skills, which meant that considerable effort had to be put into re-training graduates for the jobs, and it is envisaged that the flexible and industry tailored PDA Laboratory Science group award will improve learners' employment and progression prospects.

The PDA Laboratory Science group award is also embedded in the Modern Apprenticeship in Life Science and Related Science Industries at SCQF level 7 which is related directly to an array of National Occupational Standards. These are embraced in the range of SVQs defined in the Modern Apprenticeship in Life Science and Related Science Industries at SCQF level 7.

The theoretical content may be delivered by open and distance learning methods, provided that adequate preparations are made. Additional planning and resources will be needed for learner support and assessment. Quality assurance procedures must also be sufficient and robust in order to support open and distance learning.

The group award is designed as a discrete, specialised qualification to equip learners with the knowledge, skills and understanding required for employment or progression to further academic study, and may be seen to be supporting the national strategies and drivers as outlined below.

The Scottish Life Sciences Strategy states that ‘the Life Sciences industry in Scotland is recognised by both UK and Scottish Governments as one with high growth potential and the capacity to contribute significantly to the nation’s productivity. Scotland hosts the UK’s second largest Life Sciences cluster and one of the most sizeable in Europe. The sector contributes some £1.5bn of GVA a year and turnover worth £3.1bn to the Scottish economy.’ The provision of this group award will help to meet the needs of industry.

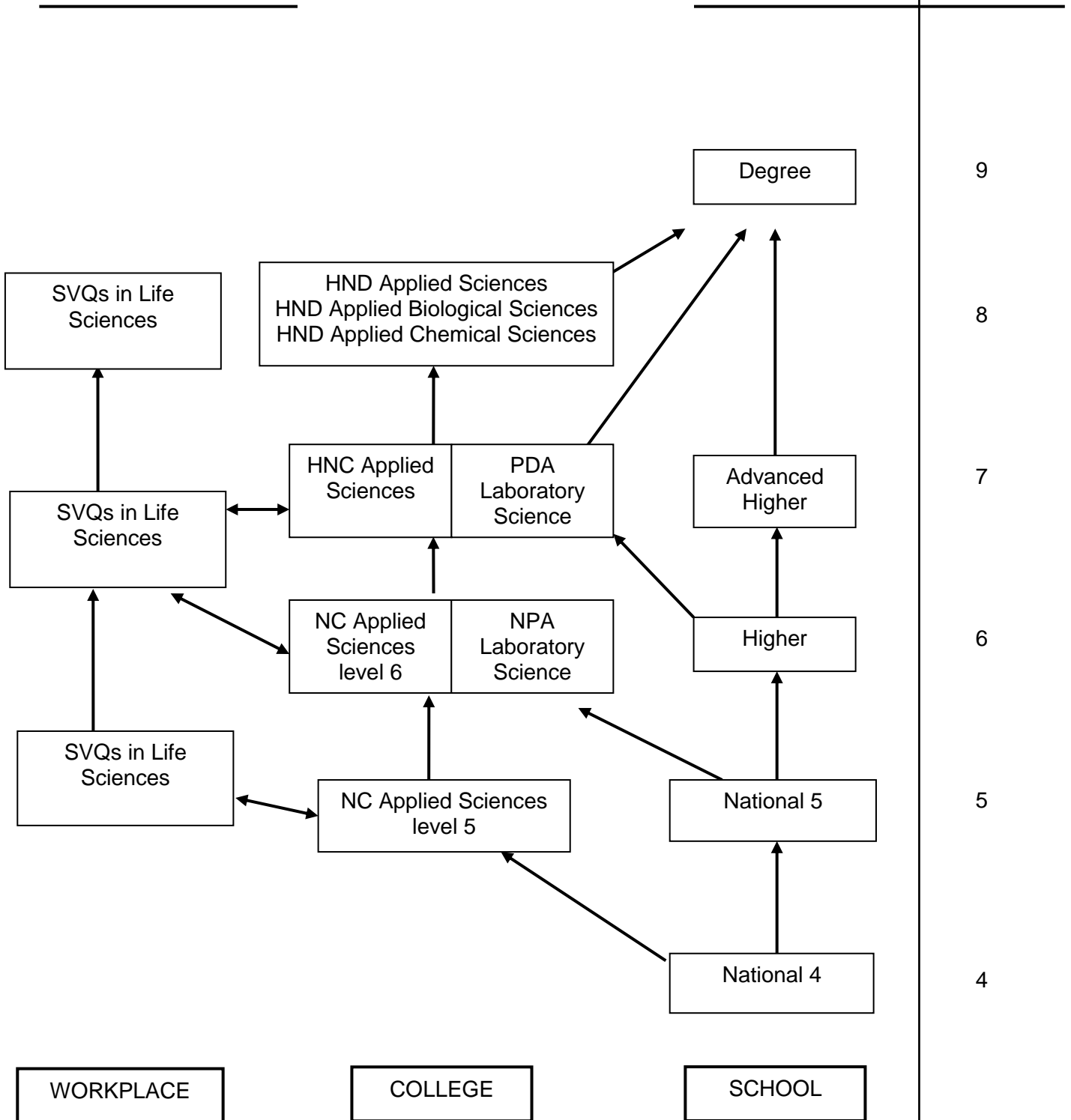
The Wood Commission Report emphasised that ‘moving beyond school, we must ensure that young people at college pursue studies with an expectation that they will lead successfully to employment in the prevailing labour market. The newly formed regional colleges, through more focused and ambitious outcome agreements, and working closely with industry, should ensure that a college education provides skills and qualifications relevant to the market requirements and in particular the new challenges of the modern technology orientated economy.’ And that ‘as they move into the senior phase, young people of all abilities should have the opportunity to follow industry relevant vocational pathways alongside academic studies.’

The current review has allowed the group award to take into account changes that have taken place due to the introduction of Curriculum for Excellence, the review of the HNC/HND provision, inclusion of updated technical data, revised assessment strategies, flexibility to meet the needs of industry and recognition of the needs of learners for progression to higher education.

The following diagram illustrates potential progression routes:

PROGRESSION CHART

SCQF levels



2 Qualification structure

Mandatory Section (1 credit)

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H922 34	Biochemistry: Theory and Laboratory Skills	7	8	1
	Or			
H927 34	Cell Biology: Theory and Laboratory Skills	7	8	1
	Or			
H93F 34	Physics for Life Sciences	7	8	1

Mandatory Section (1 credit)

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H8XP 33	Mathematics for Science 1	6	8	1
	Or			
H8XT 33	Statistics for Science 1	6	8	1

Optional Section A (0–1 credit)

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H923 33	Biology: An Introduction	6	8	1
	Or			
H92W 33	Fundamental Chemistry: An Introduction	6	8	1
	Or			
H93D 33	Physics 1	6	8	1

Optional Section B (3–6 credits)

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H922 34	Biochemistry: Theory and Laboratory Skills	7	8	1
H927 34	Cell Biology: Theory and Laboratory Skills	7	8	1
H93F 34	Physics for Life Sciences	7	8	1
H91V 34	Laboratory Skills for Science Industries	7	16	2
H920 34	Animal and Plant Cell Culture: An Introduction	7	8	1
H91T 34	Applied Biochemical Techniques	7	8	1
H926 34	Biotechnology: An Introduction	7	8	1
H929 34	DNA and Genetics	7	8	1
H93A 34	Ecology and Ecosystems	7	8	1
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	7	16	2
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	7	8	1
H936 34	Physical Chemistry: Theory and Laboratory Skills	7	8	1
H933 34	Organic Chemistry: Theory and Laboratory Skills	7	8	1
H92G 34	Microbiology: Theory and Laboratory Skills	7	16	2
H92K 34	Science Industry: Key Issues	7	8	1

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H93E 34	Physics 2	7	8	1
H93G 34	Physics Principles: Heat and Thermodynamics	7	8	1
H93H 34	Physics Principles: Mechanics	7	8	1
DF82 34	Quality and Health and Safety Systems in Science Industries	7	8	1
D77H 34	Employment Experience 2	7	8	1
D75X 34	Information Technology: Applications Software 1	7	8	1

Optional Section C (0–3 credits)

Unit code	Unit title	SCQF level	SCQF credit points	SQA credit
H92C 35	Human Body Structure and Function	8	16	2
H930 35	Instrumental Techniques 1	8	8	1
H924 35	Biomedical Investigations	8	8	1
H932 35	Main Group Inorganic Chemistry	8	8	1
H92F 35	Microbiological Techniques	8	16	2
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	8	8	1
H931 35	Instrumental Techniques 2	8	8	1
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	8	8	1
H935 35	Phase Equilibrium and Surface Chemistry	8	8	1
H92J 35	Protein Structure and Function	8	8	1
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	8	8	1
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	8	8	1
H92E 35	Immunological Techniques	8	8	1
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	8	8	1
H92A 35	DNA Molecular Techniques	8	16	2

This group award is made up of 64 SCQF credit points (8 SQA unit credits). A minimum of 16 SCQF credit points are required to be achieved from the mandatory sections. A further 48 SCQF credit points are required from the optional Sections A–C.

SCQF level 6 units in Biology, Chemistry and Physics are included in the framework, and they are aimed at learners with little or no subject knowledge and should be used as a building unit to allow achievement of the mandatory SCQF level 7 unit. The number of SCQF level 6 units which contribute to the framework has been restricted in order to ensure the competency level is maintained. A total of 16 SCQF credit points can be achieved at SCQF level 6, with the remainder of the SCQF credits points achieved from a combination of SCQF level 7 and 8 units.

3 Aims of the qualification

The overall aim of the PDA Laboratory Science group award is to provide a progressive, integrated and coherent education which will be responsive to the needs of learners and employers.

3.1 General aims of the qualification

The general aims of the PDA Laboratory Science group award are to develop:

- ◆ knowledge of study, research and analysis.
- ◆ an ability to define and solve problems.
- ◆ transferable skills.
- ◆ an ability to be flexible and work co-operatively with others.
- ◆ responsibility for own learning.
- ◆ planning, organisation and review/evaluation skills.
- ◆ oral and written scientific communication skills.
- ◆ numerical and ICT skills.
- ◆ employability skills.
- ◆ flexibility, knowledge, skills and motivation as a basis for progression to further study.

3.2 Specific aims of the qualification

The specific aims of the PDA Laboratory Science group award are to:

- ◆ prepare learners for an appropriate level of employment, in science areas such as research and industrial laboratories; biotechnology, biological, chemical, microbiological, pharmaceutical and environmental industries.
- ◆ develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.
- ◆ provide learners with an element of vocational specialisation in a variety of areas.
- ◆ prepare learners for progression to further studies in science related disciplines.
- ◆ provide a flexible route to the group award, allowing access to those in employment through part-time study and full-time provision.
- ◆ provide learners with a wide range of practical laboratory skills to further enhance job prospects through the practical content of the course.

4 Recommended entry to the qualification

Entry to this qualification is at the discretion of the centre. The following information on prior knowledge, skills, experience or qualifications that provide suitable preparation for this qualification has been provided as guidance only.

Learners would benefit from having attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- ◆ one Science Higher and no fewer than three National 5 passes, including chemistry, biology or human biology and mathematics
- ◆ National Progression Award in Laboratory Science at SCQF level 6
- ◆ National Certificate in Applied Sciences at SCQF level 6
- ◆ National Qualification in an appropriate science and mathematics programme, such as SWAP Access to Science. Learners should preferably possess some NQ Units at Higher level.

This group award will be attractive to a diverse group of learners including those in employment, school leavers, adult returners and Modern Apprentices. It is intended that admission to the PDA Laboratory Science group award should be as broad based as possible, but that this should be consistent with the selection of learners who have a reasonable chance of successfully completing the group award. In many cases learners will already be working in a science laboratory as an apprentice or undertaking the course as part of their professional development.

4.1 Core Skills entry profile

The Core Skills entry profile provides a summary of the associated assessment activities that exemplify why a particular level has been recommended for this group award. Whilst learners will naturally use and develop aspects of all five Core Skills as they work through the units making up the group award, the information below should be used to identify if additional learning support needs to be put in place. This may be necessary for learners whose Core Skills profile is below the recommended entry level or where learners need to undertake supporting units in order to develop one (or more) particular Core Skills. Indeed, it may help identify whether learners should be encouraged to do an alternative level or learning programme.

It should be noted that although there is no mandatory entry and exit levels the following is recommended:

Core Skill	Recommended SCQF entry profile	Associated assessment activities
Communication	SCQF level 5	Research, analysis, reports, oral presentation
Numeracy	SCQF level 6	Numerical and graphical presentation, numerical and algebraic calculations
Information and Communication Technology (ICT)	SCQF level 5	Accessing information for research purposes, assimilation and analysis of research information, creation of graphical and narrative material for report and presentation purposes
Problem Solving	SCQF level 5	Critical thinking, planning and evaluation
Working with Others	SCQF level 5	Co-operative working as part of a team for practical activities

5 Additional benefits of the qualification in meeting employer needs

This qualification was designed to meet a specific purpose and what follows are details on how that purpose has been met through mapping of the units to the aims of the qualification. Through meeting the aims, additional value has been achieved by linking the unit standards with those defined in National Occupational Standards. In addition, significant opportunities exist for learners to develop the more generic skill, known as Core Skills through doing this qualification.

5.1 Mapping of qualification aims to units

Code	Unit title	General aims									
		1	2	3	4	5	6	7	8	9	10
H922 34	Biochemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H927 34	Cell Biology: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H93F 34	Physics for Life Sciences	X	X	X	X	X	X	X	X	X	X
H8XP 33	Mathematics for Science 1	X	X	X		X	X		X	X	X
H8XT 33	Statistics for Science 1	X	X	X		X	X		X	X	X
H923 33	Biology: An Introduction	X	X	X	X	X	X	X	X	X	X
H92W 33	Fundamental Chemistry: An Introduction	X	X	X	X	X	X	X	X	X	X
H93D 33	Physics 1	X	X	X	X	X	X	X	X	X	X
H91V 34	Laboratory Skills for Science Industries	X	X	X	X	X	X	X	X	X	X
H920 34	Animal and Plant Cell Culture: An Introduction	X	X	X	X	X	X	X	X	X	X
H91T 34	Applied Biochemical Techniques	X	X	X	X	X	X	X	X	X	X
H926 34	Biotechnology: An Introduction	X	X	X	X	X	X	X	X	X	X
H929 34	DNA and Genetics	X	X	X	X	X	X	X	X	X	X
H93A 34	Ecology and Ecosystems	X	X	X	X	X	X	X	X	X	X
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H936 34	Physical Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H933 34	Organic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92G 34	Microbiology: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92K 34	Science Industry: Key Issues	X	X	X	X	X	X	X	X	X	X
H93E 34	Physics 2	X	X	X	X	X	X	X	X	X	X

Code	Unit title	General aims									
		1	2	3	4	5	6	7	8	9	10
H93G 34	Physics Principles: Heat and Thermodynamics	X	X	X	X	X	X	X	X	X	X
H93H 34	Physics Principles: Mechanics	X	X	X	X	X	X	X	X	X	X
DF82 34	Quality and Health & Safety Systems in Science Industries	X	X	X		X	X	X	X	X	X
D77H 34	Employment Experience 2		X	X	X	X	X	X	X	X	X
D75X 34	Information Technology: Applications Software 1		X	X		X	X		X	X	X
H92C 35	Human Body Structure and Function	X	X	X	X	X	X	X	X	X	X
H930 35	Instrumental Techniques 1	X	X	X	X	X	X	X	X	X	X
H924 35	Biomedical Investigations	X	X	X		X	X	X	X	X	X
H932 35	Main Group Inorganic Chemistry	X	X	X	X	X	X	X	X	X	X
H92F 35	Microbiological Techniques	X	X	X	X	X	X	X	X	X	X
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H931 35	Instrumental Techniques 2	X	X	X	X	X	X	X	X	X	X
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H935 35	Phase Equilibrium and Surface Chemistry	X	X	X	X	X	X	X	X	X	X
H92J 35	Protein Structure and Function	X	X	X		X	X	X	X	X	X
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92E 35	Immunological Techniques	X	X	X	X	X	X	X	X	X	X
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92A 35	DNA Molecular Techniques	X	X	X	X	X	X	X	X	X	X

5.2 Mapping of National Occupational Standards (NOS)

The PDA Laboratory Science group award has been mapped against the SVQ in Life Sciences and Related Industries at SCQF level 7.

Code	National Occupational Standard	Mathematics for Science 1 (H8XP 33)	Statistics for Science 1 (H8XT 33)	Cell Biology: Theory and Laboratory Skills (H927 34)	Physics for Life Sciences (H93F) 34)	Biochemistry: Theory and Laboratory Skills (H922 34)
H6F2 04	Maintain Effective and Efficient Working Relationships			X	X	X
H6F3 04	Prepare For and Clearing Up After a Learning Activity			X	X	X
H6F4 04	Provide Support for Learning Activities					
H6F5 04	Maintain Stocks of Resources, Equipment and Consumables					X
H6F6 04	Use Information Recording Systems					
H6F8 04	Carry out Testing using Manual or Automated Equipment			X		X
H6F9 04	Carry out Sampling Operations			X		X
H6FA 04	Drawing Blood Samples from Patients for Investigation					
H6FB 04	Carry out Small Scale Processing					
H6FC 04	Preparing Reagents					X
H6FD 04	Receiving, Sorting, Transporting and Storing Samples			X		X
H6FF 04	Operating in a Clean Room or Aseptic Facility					

Code	National Occupational Standard	Mathematics for Science 1 (H8XP 33)	Statistics for Science 1 (H8XT 33)	Cell Biology: Theory and Laboratory Skills (H927 34)	Physics for Life Sciences (H93F) 34)	Biochemistry: Theory and Laboratory Skills (H922 34)
H6FG 04	Preparing Biological Specimens or Samples for Investigations			X		X
H6FJ 04	Maintain Health and Safety Procedures			X	X	X
H6FK 04	Provide Technical Support for Computer Application Software and Equipment					
H6FL 04	Demonstrate Techniques and Skills					
H6FM 04	Diagnose Faults, Repair and Maintain Equipment					
H6FN 04	Provide Technical Advice and Guidance					
H6FP 04	Prepare New Methods, Resources and Equipment for Learning Activities					
H6FR 04	Improve the Quality and Reliability of Activities					
H6FS 04	Carry out Risk Assessments			X	X	X
H6FT 04	Write Reports for Activities			X	X	X
H6FV 04	Amplifying and Analysing DNA or RNA Samples using PCR or qPCR					
H6FW 04	Analysing Samples using Light Microscopy			X		
H6FX 04	Maintaining Cell Lines					
H6FY 04	Analysis of DNA using Gel Electrophoresis					
H6G0 04	Plan and Collect Samples for Testing					

Code	National Occupational Standard	Mathematics for Science 1 (H8XP 33)	Statistics for Science 1 (H8XT 33)	Cell Biology: Theory and Laboratory Skills (H927 34)	Physics for Life Sciences (H93F) 34)	Biochemistry: Theory and Laboratory Skills (H922 34)
H6G1 04	Carry out Investigation			X	X	X
H6G2 04	Analysis of Samples using High Performance Liquid Chromatography					
H6G3 04	Analysis of Samples using Spectroscopy					
H6G4 04	Analysis of Samples using Gas Chromatography					
H6G5 04	Applying Basic Statistics					
H6G6 04	Develop and Provide Training					
H6G7 04	Culturing or Fermenting Cells					

5.3 Mapping of Core Skills development opportunities across the qualification

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
H922 34	Biochemistry: Theory and Laboratory Skills	O		S	O	O	S	O	O	S	O	O
H927 34	Cell Biology: Theory and Laboratory Skills	O		S	O	O	S	O	O	O	O	O
H93F 34	Physics for Life Sciences	O	O	E	O	O	S	E	O	S	O	O
H8XP 33	Mathematics for Science 1			O	E			O	O	O		
H8XT 33	Statistics for Science 1			O	E	O	O	E	O	O		
H923 33	Biology: An Introduction	O		S	O	O	S	O	O	O	O	O
H92W 33	Fundamental Chemistry: An Introduction	O		E	O	O	O	S	S	S	O	O
H93D 33	Physics 1	O		E	O	O	S	E	O	S	O	O
H91V 34	Laboratory Skills for Science Industries	O	O	S	E	O	S	E	O	S	O	O
H920 34	Animal and Plant Cell Culture: An Introduction	O		O		O	S	O	O	S	O	O
H91T 34	Applied Biochemical Techniques	S	S	S	S	O	S	O	O	S	S	S
H926 34	Biotechnology: An Introduction	O		O	O	O	S	O	O	S	O	O
H929 34	DNA and Genetics	O		S	O	O	S	O	O	O	O	O
H93A 34	Ecology and Ecosystems	O		O	O	O	S	O	S	S	S	O

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H936 34	Physical Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H933 34	Organic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H92G 34	Microbiology: Theory and Laboratory Skills	O		S			S	O	O	S	O	O
H92K 34	Science Industry: Key Issues	O	O			O	O	E	O	O	S	S
H93E 34	Physics 2	O		E	O	O	S	E	O	S	O	O
H93G 34	Physics Principles: Heat and Thermodynamics	O		E	O	O	S	O	O	S	O	O
H93H 34	Physics Principles: Mechanics	O		E	O	O	O	E	O	O		
DF82 34	Quality and Health and Safety Systems in Science Industries	S	S			O	O	O	O		S	S
D77H 34	Employment Experience 2	O	O			O	O	O	O	O	E	E
D75X 34	Information Technology: Applications Software 1					E	E	O	O	O		
D75X 34	Human Body Structure and Function	O		S	O	O	S	O	O	S	O	O

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
H93E 34	Instrumental Techniques 1	O		S	O	O	S	F	F	F	O	O
H924 35	Biomedical Investigations	S	O	S	O	O		S	O	O	O	O
H932 35	Main Group Inorganic Chemistry	O		S	O	O	S	O	O	S	O	O
H92F 35	Microbiological Techniques	O		S			S	O	O	S	O	O
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H931 35	Instrumental Techniques 2			O	O	O	O	O	O	O		
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H935 35	Phase Equilibrium and Surface Chemistry	O	O	E	E	O	O	F	O	O	O	O
H92J 35	Protein Structure and Function	O		S	O	O	S	S	O	O	O	O
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	O		S	O	O	S	O	O	S	O	O
H92E 35	Immunological Techniques	O		S			S	F	O	S	O	O
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H92A 35	DNA Molecular Techniques	O		S			S	O	O	S	O	O

5.4 Assessment strategy for the qualification

In the majority of units, theory based outcomes are assessed holistically by means of an end of unit closed-book assessment under controlled conditions. Practical outcomes are evidenced by a variety of means; please consult individual unit specifications for clarification and details of arrangements. The units in the following table are notable exceptions.

Unit	Assessment
Laboratory Skills for Science Industries	<p>Outcome 1: Production of Control of Substances Hazardous to Health (COSHH) and risk assessments</p> <p>Outcome 2: Practical activities and laboratory diaries/pro formas</p> <p>Outcome 3: Evidence of presenting and analysing scientific information</p> <p>Outcome 4: Production of laboratory reports/poster/presentation</p>
Employment Experience 2	Assessed holistically by means of a portfolio of evidence generated at the learner's place of work. Evidence will be produced by the learner during routine tasks but will also include reflective statements of their experience and supporting witness testimony to support the learner performance.
Quality and Health & Safety Systems in Science Industries	<p>Outcome 1: Assessment on key aspects of health and safety procedures in relation to science</p> <p>Outcome 2: Assignment on an industrial quality system</p> <p>Outcome 3: Industrial visit and associated report on quality and health and safety systems</p>
Biotechnology: An Introduction	<p>Outcomes 1–4: Closed-book assessment</p> <p>Outcome 5: Debate or presentation</p>

6 Guidance on approaches to delivery and assessment

6.1 Sequencing/integration of units

The structure of the PDA Laboratory Science group award allows a high degree of flexibility in the mode of delivery. A distance learning delivery mode is possible provided adequate materials, tutorial support, assessment facilities and laboratory time exist. Centres should note however that assessed practical activities must take place under supervised conditions.

Centres will define which order the units are undertaken based on learner recruitment patterns, mode of delivery, resource implications, and logical progression dictated by topic and content.

The group award lends itself to a wide range of delivery mechanisms including formal teaching, case studies, group work, tutorial, laboratory/practical work and demonstration/coaching opportunities. A number of units specifically indicate some of these approaches are to be utilised in assessment therefore it is important that learners have experienced them throughout the learning process.

The inclusion of SCQF level 6 units in biology, chemistry and physics within the PDA Laboratory Science group award provides an opportunity to support learners who have limited prior knowledge of a particular science. The opportunity to undertake one of these units should be sequenced at an early stage of delivery.

6.1.1 Delivery schedule

There are many driving forces which determine a delivery programme for any group award including accommodation, staff availability, materials and equipment.

The following tables indicate suggested delivery programmes of units for a two year part-time delivery programme operating on a two block delivery system.

Professional Development Award in Laboratory Science	
Year 1	
Teaching block 1	Teaching block 2
Biology: An Introduction	Laboratory Skills for Science Industries
Cell Biology: Theory and Laboratory Skills	Statistics for Science 1
Year 2	
Teaching block 1	Teaching block 2
Laboratory Skills for Science Industries (cont)	Human Body Structure and Function
Biotechnology: An Introduction	

Professional Development Award in Laboratory Science	
Year 1	
Teaching block 1	Teaching block 2
Fundamental Chemistry: An Introduction	Fundamental Chemistry: Theory and Laboratory Skills (cont)
Fundamental Chemistry: Theory and Laboratory Skills	Statistics for Science 1
Year 2	
Teaching block 1	Teaching block 2
Laboratory Skills for Science Industries	Laboratory Skills for Science Industries (cont)
Cell Biology: Theory and Laboratory Skills	Biochemistry: Theory and Laboratory Skills

6.2 Recognition of prior learning

SQA recognises that learners gain knowledge and skills acquired through formal, non-formal and informal learning contexts.

In some instances, a full group award may be achieved through the recognition of prior learning. However, it is unlikely that a learner would have the appropriate prior learning and experience to meet all the requirements of a full group award.

The recognition of prior learning may **not** be used as a method of assessing in the following types of units and assessments:

- ◆ HN Graded Units
- ◆ Course and/or external assessments
- ◆ Other integrative assessment units (which may or not be graded)
- ◆ Certain types of assessment instruments where the standard may be compromised by not using the same assessment method outlined in the unit
- ◆ Where there is an existing requirement for a licence to practice
- ◆ Where there are specific health and safety requirements
- ◆ Where there are regulatory, professional or other statutory requirements
- ◆ Where otherwise specified in an assessment strategy

More information and guidance on the *Recognition of Prior Learning* (RPL) may be found on our website www.sqa.org.uk.

The following sub-sections outline how existing SQA unit(s) may contribute to this group award. Additionally, they also outline how this group award may be recognised for professional and articulation purposes.

6.2.1 Articulation and/or progression

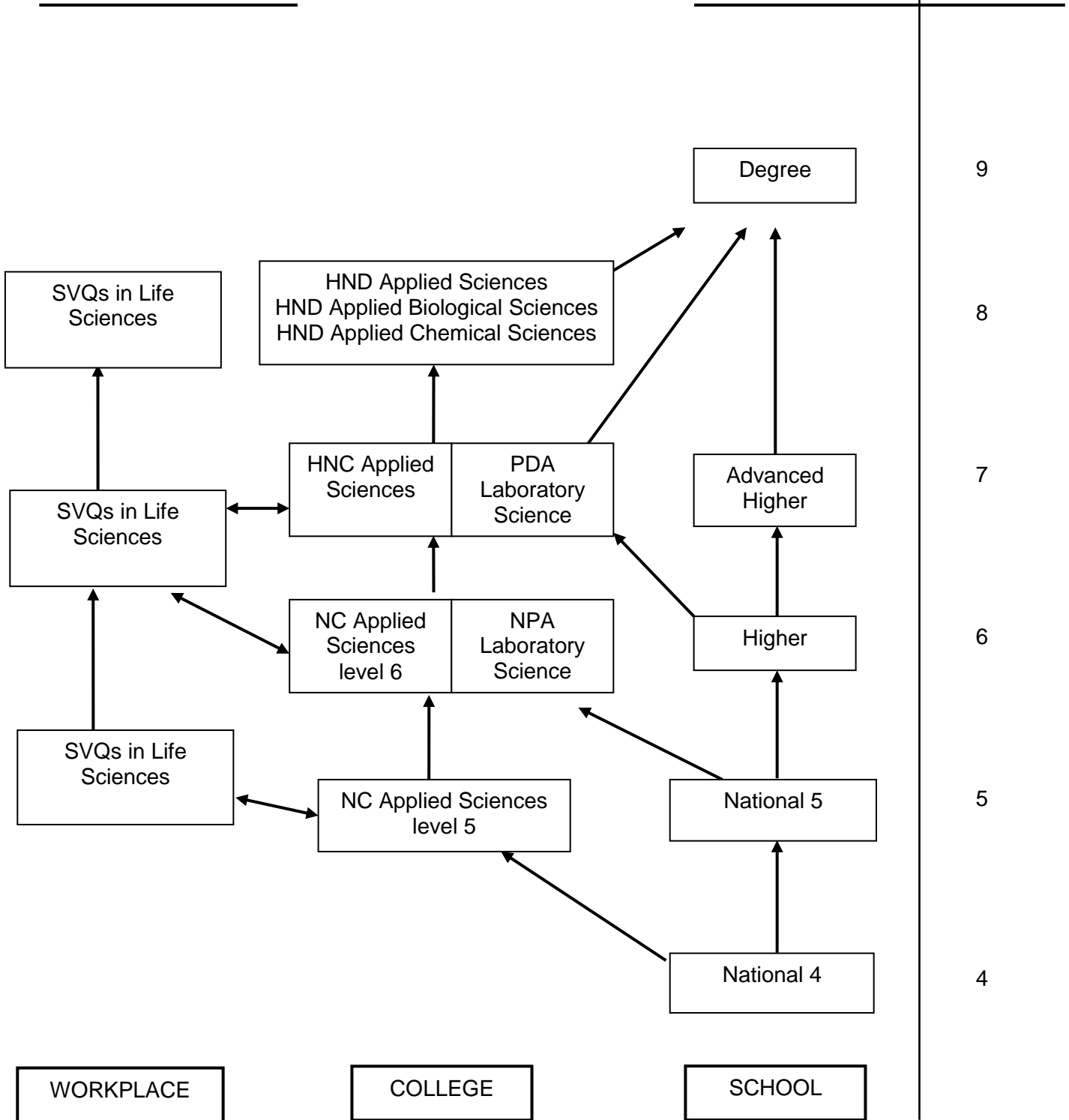
The PDA Laboratory Science group award has an appropriate balance between academic and vocational knowledge and skills through the mix of unit content and teaching approaches. In addition, the group award contains relevant technical and transferable skills to enable immediate entry to employment while at the same time allowing articulation to further study.

The PDA Laboratory Science group award also forms an integral part of the Modern Apprenticeship in Life Science and Related Science Industries at SCQF level 7, providing the knowledge and understanding and basic skills required to allow the development of vocational skills in the work place.

The following diagram illustrates potential progression routes:

PROGRESSION CHART

SCQF levels



6.2.2 Transitional arrangements

It is recommended that learners who are in the process of completing the predecessor group award finish it rather than switching to the new group award. However, there may be occasions when it is not possible for learners to complete the existing group award, eg where they were unable to complete their studies due to ill health or difficulties with funding or employment and where the centre has progressed to offer the new group award and only one or two units need to be completed. In these cases it is recommended that the following suggested credit transfer arrangements be considered.

6.2.3 Credit transfer

New unit code	New unit title	Old unit code	Old unit title	Direct credit transfer	Elements of credit transfer
H922 34	Biochemistry: Theory and Laboratory Skills	DH2J 34	Biochemistry: Theory and Practice	Yes	
H927 34	Cell Biology: Theory and Laboratory Skills	DJ1K 34	Cell Biology: Theory and Practice	No	Pass of unit DJ1K 34 credits Outcomes 1, 3 and 4
H93F 34	Physics for Life Sciences	N/A		No	
H8XP 33	Mathematics for Science 1	DN8D 33	Mathematics for Science 1	No	Pass of unit DN8D 33 credits Outcome 1
H8XT 33	Statistics for Science 1	DN8C 34	Statistics for Science 1	Yes	
H923 33	Biology: An Introduction	N/A		No	
H92W 33	Fundamental Chemistry: An Introduction	DX29 33	Fundamental Chemistry: An Introduction	Yes	
H93D 33	Physics 1	DN33 33	Physics 1	Yes	
H91V 34	Laboratory Skills for Science Industries	N/A		No	Pass of unit DF82 34 credits Outcome 1 Pass of unit DG70 34 credits Outcome 4
H920 34	Animal and Plant Cell Culture: An Introduction	DH2H 34	Animal and Plant Cell Culture: An Introduction	Yes	
H91T 34	Applied Biochemical Techniques	DG6Y 34	Applied Biochemical Techniques	No	Pass of unit DG6Y 34 credits Outcomes 2, 3 and 4
H926 34	Biotechnology: An Introduction	DJ00 34	Biotechnology: An Introduction	No	
H929 34	DNA and Genetics	DJ6Y 34	DNA Structure and Function	No	Both units, DJ6Y 34 and DP4P 34, required for credit transfer
		DP4P 34	Genetics		

New unit code	New unit title	Old unit code	Old unit title	Direct credit transfer	Elements of credit transfer
H93A 34	Ecology and Ecosystems	DN37 34	Ecology and Ecosystems	Yes	
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	DH2K 34	Fundamental Chemistry: Theory and Practice	Yes	
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	DP2N 34	Fundamental Concepts of Inorganic Chemistry	No	Pass of unit DP2N 34 credits Outcome 4
H936 34	Physical Chemistry: Theory and Laboratory Skills	DP2R 34	Fundamental Concepts of Physical Chemistry	Yes	
H933 34	Organic Chemistry: Theory and Laboratory Skills	DP2P 34	Fundamental Concepts of Organic Chemistry	Yes	
H92G 34	Microbiology: Theory and Laboratory Skills	DH55 34	Microbiology: Theory and Practice	Yes	
H92K 34	Science Industry: Key Issues	DP9M 34	Science Industry: Key Issues	Yes	
H93E 34	Physics 2	DN 34 34	Physics 2	Yes	
H93G 34	Physics Principles: Heat and Thermodynamics	F43H 34	Physics Principles: Heat and Thermodynamics	Yes	
H93H 34	Physics Principles: Mechanics	F3XE 34	Physics Principles: Mechanics	Yes	
DF82 34	Quality and Health & Safety Systems in Science Industries	DF82 34	Quality and Health & Safety Systems in Science Industries	Yes	
D77H 34	Employment Experience 2	D77H 34	Employment Experience 2	Yes	

New unit code	New unit title	Old unit code	Old unit title	Direct credit transfer	Elements of credit transfer
D75X 34	Information Technology: Applications Software 1	D75X 34	Information Technology: Applications Software 1	Yes	
H92C 35	Human Body Structure and Function	DG71 35	Human Body Structure and Function	Yes	
H930 35	Instrumental Techniques 1	DH54 35	Instrumental Techniques: Theory and Practice 1	Yes	
H924 35	Biomedical Investigations	DP4R 35	Biomedical Investigations	Yes	
H932 35	Main Group Inorganic Chemistry	DV9F 35	Main Group Inorganic Chemistry	Yes	
H92F 35	Microbiological Techniques	DH2P 35	Microbiological Techniques: Theory and Practice	Yes	
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	DP5W 35	Base-Catalysed Reactions and Organometallic Reagents in Organic Synthesis	Yes	
H931 35	Instrumental Techniques 2	DH2N 35	Instrumental Techniques: Theory and Practice 2	Yes	
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	DX2H 35	Organic Stereochemistry	No	Pass of unit DX2H 35 credits Outcomes 1 and 2
H935 35	Phase Equilibrium and Surface Chemistry	DP5X 35	Phase Equilibrium and Surface Chemistry	Yes	
H92J 35	Protein Structure and Function	DG6X 35	Protein Structure and Function	Yes	

New unit code	New unit title	Old unit code	Old unit title	Direct credit transfer	Elements of credit transfer
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	DP4N 35	Thermodynamics and Kinetics	Yes	
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	DR0E 35	Transition Metal Chemistry	Yes	
H92E 35	Immunological Techniques	DH2L 35 DH2M 35	Immunological Techniques: Theory and Practice Immunotechnology: Theory and Practice	No	Both units, DH2L 35 and DH2M 35 required for credit transfer
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	DP54 35	Aromatic Chemistry	Yes	
H92A 35	DNA Molecular Techniques	DJ6X 35	DNA Molecular Techniques: Theory and Practice	No	

6.3 Opportunities for e-assessment

E-assessment may be appropriate for some assessments in the units comprising this group award. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres that wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

6.4 Support materials

A list of existing ASPs is available to view on SQA's website.

Understanding Standards documents have been produced for the following units:

Unit code	Unit title
H91V 34	Laboratory Skills for Science Industries

6.5 Resource requirements

Delivering centres will require appropriate science teaching laboratories and technical support as well as appropriate laboratory resources to support the delivery of the practical elements of the PDA Laboratory Science group award.

Centres must ensure that specific requirements in terms of documents, texts and IT resources to support the learning processes within the PDA Laboratory Science group award are met.

All staff delivering the PDA Laboratory Science group award must hold a qualification appropriate to the unit(s) delivered.

7 General information for centres

Equality and inclusion

The unit specifications making up this group award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

Internal and external verification

All assessments used within this/these qualification(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/GuideToAssessment).

8 Glossary of terms

Embedded Core Skills: is where the assessment evidence for the unit also includes full evidence for complete Core Skill or Core Skill components. A learner successfully completing the unit will be automatically certificated for the Core Skill. (This depends on the unit having been successfully audited and validated for Core Skills certification.)

Finish date: The end of a group award's lapsing period is known as the finish date. After the finish date, the group award will no longer be live and the following applies:

- ◆ learners may not be entered for the group award
- ◆ the group award will continue to exist only as an archive record on the Awards Processing System (APS)

Lapsing date: When a group award is entered into its lapsing period, the following will apply:

- ◆ the group award will be deleted from the relevant catalogue
- ◆ the group award specification will remain until the qualification reaches its finish date at which point it will be removed from SQA's website and archived
- ◆ no new centres may be approved to offer the group award
- ◆ centres should only enter learners whom they expect to complete the group award during the defined lapsing period

SQA credit value: The credit value allocated to a unit gives an indication of the contribution the unit makes to an SQA group award. An SQA credit value of 1 given to an SQA unit represents approximately 40 hours of programmed learning, teaching and assessment.

SCQF: The Scottish Credit and Qualification Framework (SCQF) provides the national common framework for describing all relevant programmes of learning and qualifications in Scotland. SCQF terminology is used 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: SCQF credit points provide a means of describing and comparing the amount of learning that is required to complete a qualification at a given level of the Framework. One National Unit credit is equivalent to 6 SCQF credit points. One National Unit credit at Advanced Higher and one Higher National Unit credit (irrespective of level) is equivalent to 8 SCQF credit points.

SCQF levels: The level a qualification is assigned within the framework is an indication of how hard it is to achieve. The SCQF covers 12 levels of learning. HNCs and HNDs are available at SCQF levels 7 and 8 respectively. Higher National Units will normally be at levels 6–9 and graded units will be at level 7 and 8. 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.

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

Signposted Core Skills: refers to opportunities to develop Core Skills arise in learning and teaching but are not automatically certificated.

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. Centres are advised to check SQA's APS Navigator to confirm they are using the up to date qualification structure.

NOTE: Where a unit is revised by another unit:

- ◆ No new centres may be approved to offer the unit which has been revised.
- ◆ Centres should only enter learners for the unit which has been revised where they are expected to complete the unit before its finish date.

Version Number	Description	Date

Acknowledgement

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

9 General information for learners

This section will help you decide whether this is the qualification for you by explaining what the qualification is about, what you should know or be able to do before you start, what you will need to do during the qualification and opportunities for further learning and employment.

The PDA Laboratory Science group award is a vocational qualification providing the knowledge and skills required to allow for progression to further study and employment in science-based industries.

The aims of the PDA Laboratory Science group award are designed to:

- ◆ prepare you for an appropriate level of employment, in science areas such as research and industrial laboratories; biotechnology, biological, chemical, microbiological, pharmaceutical and environmental.
- ◆ develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.
- ◆ provide you with an element of vocational specialisation in a variety of areas.
- ◆ prepare you for progression to further studies in science related disciplines.
- ◆ provide a flexible route to the group award, allowing access to those in employment through part-time study and full-time provision.
- ◆ develop study and research skills.
- ◆ develop Core Skills such as working with others in a team environment and communication skills through the use of report writing and working in a laboratory environment.
- ◆ provide you with a wide range of practical laboratory skills to further enhance job prospects through the practical content of the course.

The PDA Laboratory Science group award is an SCQF level 7 qualification which contains 8 credits (64 SCQF credit points). In order to achieve the PDA Laboratory Science group award, you must achieve 8 credits as follows:

Section	Credits required	Notes
Mandatory section	2 credits must be achieved	
Optional Sections A, B and C	6 credits must be achieved	Maximum of 1 credit from Section A Maximum of 3 credits from Section C

It is recommended that all learners be given a copy of the group award structure from Section 2 with clarification and explanation as appropriate. You should liaise with your lecturer to ensure that you complete the necessary units to achieve the group award itself but also that progression routes remain open to you.

Industries which encompass science are diverse including:

- ◆ Chemicals
- ◆ Food and drink
- ◆ Health
- ◆ Life sciences
- ◆ Oil and gas

Employers in these industries have expressed a need for technically competent scientists. The PDA Laboratory Science group award is a specialised award which is intended to prepare you for employment at technician or technologist level in science laboratories. In addition, the PDA Laboratory Science group award supports the Modern Apprenticeship in Life Science and Related Science Industries at SCQF level 7.

The majority of the units have theory and practical outcomes. To pass the theory outcomes you will be required to pass an end of unit test. To pass a practical outcome you will be expected to perform a range of laboratory experiments to a required standard, and to produce a report/pro forma on the experiment.

Progression opportunities to and from the PDA Laboratory Science group award are illustrated in the following diagram:

PROGRESSION CHART

SCQF levels

