Group Award Specification for:

PDA Modern Biological Technologies

Group Award Code: GR87 47

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Contents

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

The award of PDA Modern Biological Technologies, is an award made up of three HN Biology units and so the naming of this award was due to the nature of the Biological content contained within these three units and also the way the assessments support the learner to improve their biological skills and gain an understanding of modern techniques used within the scientific industries.

The group award title reflects the biological 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 Modern Biological Technologies 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.

The qualification is designed to address the practical laboratory skills needed for multi skilled individuals within the Science sector and includes the inter-personal skills required for the 21st century economy. Delivery will focus on the strengths of the region, working with local employers whilst creating a vision for the future.

Students will gain practical skills including study, research, analysis, planning and organisational skills. They will also learn to take responsibility for their own learning and develop abilities to be flexible and to work co-operatively with others. The course is taught within a classroom environment with practical experience gained in the laboratory with local employer visits and employer led components of the curriculum.

This award is aimed at a range of people: from school pupils in the senior phase (S5/6), college students and individuals who are currently in employment and who wish to obtain a formal qualification, employees who wish to obtain short, continuing professional development courses and will sit alongside Highers, and Advanced Highers.

Learners can enter with a range of qualifications but would benefit from having attained the skills, knowledge and understanding in either a Science Higher and three National 5 passes preferably in a Biological subject; or a National Progression award in Laboratory Science at SCQF level 6; or National certificate in Applied Sciences; or a Science Scottish Wider Access Programme (SWAP).

Progression routes from schools will be into either an HNC in Applied Sciences or HND Applied Sciences, or HND Applied Biological Sciences or HND Applied Chemical Sciences. Progression routes from further education into university have become harmonised over recent years. The landscape for articulation from the PDA framework has evolved over the past decade and many universities and FE colleges have concluded formal arrangements for transition onto degree pathways or on an individual basis. Students can also progress into employment within scientific laboratories, such as the food and drink industry, eg in a distillery or work in any scientific laboratory.

2 Qualification structure

This group award is made up of 3 SQA Higher National Units. It comprises 32 SCQF credit points at SCQF level 7. A mapping of Core Skills development opportunities is available in Section 5.3.

2.1 Structure

The learner must complete and pass all three mandatory units.

4 code	2 code	Unit title	SQA credit	SCQF credit points	SCQF level
H926	34	Biotechnology: An Introduction	1	8	7
J2RE	34	Cell Biology: Theory and Laboratory Skills	1	8	7
H92G	34	Microbiology: Theory and Laboratory Skills	2	16	7

3 Aims of the qualification

This award is a qualification designed to address the practical laboratory skills needed for multi skilled individuals within the Science sector and includes the inter-personal skills required for the 21st century economy.

3.1 General aims of the qualification

Professional Development Awards (PDAs) extend or broaden professional or vocational skills and are linked to National Occupational Standards.

The main attributes that this PDA will provide are:

1 Problem solving, critical and evaluative thinking
2 Planning, organisation and review/evaluation skills
3 Oral and written scientific communication skills.
4 Self-management
5 Social awareness
6 Interpersonal skills

3.2 Specific aims of the qualification

The specific aims of this PDA will enable learners to gain the necessary vocational and practical skills needed to prepare them for employment or progression.

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

Overall these aims will provide learners with an appropriate level of skills needed for employment in the biological area and will also prepare learners for progression to further studies in Science such as an HNC in Applied Sciences or HND Applied Sciences, or HND Applied Biological Sciences or HND Applied Chemical Sciences.

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 by the Qualification Design Team 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 Biology or Human Biology
- 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 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 Modern Biological Technologies 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 Skill entry profile provides a summary of the associated assessment activities that exemplify why a particular level has been recommended for this qualification. The information should be used to identify if additional learning support needs to be put in place for learners whose Core Skills profile is below the recommended entry level or whether learners should be encouraged to do an alternative level or learning programme.

Core Skill	**Recommended SCQF entry profile**	**Associated assessment activities**
Communication	4	Learners will undertake presentations
Numeracy	6	Learners will be required to decide on the steps and operations to solve complex problems, and carry out sustained and complex calculations, eg performing calculations related to serial dilutions and plate counts, utilising scientific notation.

Core Skill	Recommended SCQF entry profile	Associated assessment activities
Information and Communication Technology (ICT)	4	Learners could make effective and appropriate use of ICT packages to produce laboratory reports or pro formas in an appropriate format. Packages used will likely include word processing, spreadsheets, and graph drawing software. They will also be required to utilise internet search engines to source information on research topics.
Problem Solving	6	Following assessed practical experiments learners will be required to review and evaluate the effectiveness of the exercise with a thorough interpretation of random and systematic sources of error. Learners will be required to reach sound conclusions on the basis of the data collected and the inherent errors.
Working with Others	4	Group discussion

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 and/or trade/professional body requirements. 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

5.1.1 General aims of the qualification

1 Problem solving, critical and evaluative thinking
2 Planning, organisation and review/evaluation skills
3 Oral and written scientific communication skills
4 Self-management
5 Social awareness
6 Interpersonal skills

Code	Unit title	Aims					
		1	2	3	4	5	6
H926 34	Biotechnology: An Introduction	X	X	X	X	X	X
J2RE 34	Cell Biology: Theory and Laboratory Skills	X	X	X			
H92G 34	Microbiology: Theory and Laboratory Skills	X	X	X			X

5.1.2 Specific aims of the qualification

The specific aims of the PDA Modern Biological Technologies group award are to:

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

Code	**Unit title**	**Aims**					
		7	**8**	**9**	**10**	**11**	**12**
H926 34	Biotechnology: An Introduction	X		X	X	X	
J2RE 34	Cell Biology: Theory and Laboratory Skills	X	X	X	X	X	X
H92G 34	Microbiology: Theory and Laboratory Skills	X	X	X	X	X	X

5.2 Mapping of National Occupational Standards (NOS)

The PDA in Modern Biological Technologies group award has been mapped against the SVQ in Laboratory Skills (Life Science) at SCQF level 7, (GP4P 23) education route, which allows learners to demonstrate competence in job related skills.

Code	National Occupational Standard	Cell Biology: Theory and Laboratory Skills J2RE 34	Biotechnology: An Introduction H926 34	Microbiology: Theory and Laboratory Skills H92G 34
H6FJ 04	Maintain Health and Safety Procedures in Life Sciences and Related Industries	X		X
H6F2 04	Maintain Effective and Efficient Working Relationships in Life Sciences and Related Industries	X		
H6FK 04	Provide Technical Support for Computer Application			
H6FC 04	Preparing Reagents in Life Sciences and Related Industries			X
H6FL 04	Demonstrate Techniques and Skills in Life Sciences and Related Industries	X		X
H6FM 04	Diagnose Faults, Repair and Maintain Equipment in Life Sciences and Related Industries			
H6FN 04	Provide Technical Advice and Guidance in Life Sciences and Related Industries			
H6FP 04	Prepare New Methods, Resources and Equipment for Learning Activities in Life Sciences and Related Industries			
H6FR 04	Improve the Quality and Reliability of Activities in Life Sciences and Related Industries			
H6FS 04	Carry Out Risk Assessments in Life Sciences and Related Industries	X		X

Code	National Occupational Standard	Cell Biology: Theory and Laboratory Skills J2RE 34	Biotechnology: An Introduction H926 34	Microbiology: Theory and Laboratory Skills H92G 34
H6FT 04	Write Reports for Activities in Life Sciences and Related Industries	X		X
J1LD 04	Provide Support for Learning Activities in Life Sciences and Related Industries			
J1HY 04	Maintain Stocks of Resources, Equipment and Consumables in Life Sciences and Related Industries			
H6F3 04	Prepare For and Clearing Up After a Learning Activity in a Classroom or a Life Sciences and Related Industries Area	X		X
H6FV 04	Amplifying and Analysing DNA or RNA Samples Using PCR or qPCR In Life Sciences and Related Industries			
J1LE 04	Analysing Samples Using Light Microscopy in Life Sciences and Related Industries	X		
H6FX 04	Maintaining Cell Lines in Life Sciences and Related Industries			
H6FY 04	Analysis of DNA Using Gel Electrophoresis in Life Sciences and Related Industries			

5.3 Mapping of Core Skills development opportunities across the qualification

The following Core Skills will be developed in each unit through teaching and learning approaches but not enough to attract automatic certification.

Unit code	Unit title	Communications		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
H926 34	Biotechnology: An Introduction	O		O	O	O	S	O	O	S	O	O
J2RE 34	Cell Biology: Theory and Laboratory skills	O		S	O	O	S	E	O	O	O	O
H92G 34	Microbiology: Theory and Laboratory skills	O		S			S	O	O	S	O	O

5.4 Assessment strategy for the qualification

Unit Code	Unit title	Assessment				
		Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5
H926 34	Biotechnology: An Introduction	Holistic closed-book				Check list or video
J2RE 34	Cell Biology: Theory and Laboratory Skills	Holistic closed-book				Lab report or proforma or lab book entry
H92G 34	Microbiology: Theory and Laboratory Skills	Holistic closed-book			Lab report or proforma or lab book entry	N/A

6 Guidance on approaches to delivery and assessment

The structure of the PDA Modern Biological Technologies 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. Centers should note however that assessed practical activities must take place under supervised conditions. Centers 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. There is the possibility of arranging visits to local employers and using employer talks as part of the delivery method to enhance the learning. Unit approaches are to be utilised in assessment therefore it is important that learners have experienced them throughout the learning process.

Where sampling is undertaken, the unit specification will specify the elements of knowledge and/or skills that can be sampled within the evidence requirements. Other important information regarding assessment will be detailed on individual unit specifications.

6.1 Sequencing/integration of units

- The best sequence for delivery of the three units would be to start with *Cell Biology: Theory and Laboratory Skills*, *Biotechnology: An Introduction* and then leave *Microbiology: Theory and Laboratory* skills to the end of the course
- The assessments are mainly one closed-book exam which covers most outcomes with a lab report or proforma/lab book entry the other assessment

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 license 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

Progression routes from schools will be into either an HNC in Applied Sciences or HND Applied Sciences, or HND Applied Biological Sciences or HND Applied Chemical Sciences. Progression routes from further education into university have become harmonised over recent years. The landscape for articulation from the PDA framework has evolved over the past decade and many universities and FE colleges have concluded formal arrangements for transition onto degree pathways or on an individual basis.

6.2.2 Professional recognition

The PDA does not carry any professional recognition.

6.2.3 Credit transfer

New unit code	New unit title	Old unit code	Old unit title	Direct credit transfer	Elements of credit transfer
J2RE 34	Cell Biology: Theory and Laboratory Skills	H927 34	Cell Biology: Theory and Laboratory Skills	Yes	
H926 34	Biotechnology: An Introduction	DJ00 34	Biotechnology: An Introduction	No	
H92G 34	Microbiology: Theory and Laboratory Skills	DH55 34	Microbiology: Theory and Practice	Yes	

6.3 Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this PDA. 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 which 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 assessment support packs is available to view on SQA's website.

6.5 Resource requirements

Anyone delivering this PDA should have a background in Biology and the normal laboratory materials and resources for Biology will be suitable so no specialist equipment will be needed. All staff delivering the PDA will require to hold a qualification appropriate to the unit(s) delivered. All centers are required to ensure that specific requirements in terms of documents, texts and IT resources to support the learning processes within the PDA are met.

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 instruments of assessment 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 in Modern Biological Technologies is designed to provide the skills to enable you to work effectively within the Science industry within a variety of contexts.

The specific aims of the PDA Modern Biological Technologies group award are to:

- prepare learners for an appropriate level of employment, in science areas such as research and industrial laboratories: biotechnology, biological, microbiological, pharmaceutical 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.

Core and essential skills such as *Numeracy, Communication, Information and Communication Technology (ICT), Working With Others* will be developed throughout the PDA and are signposted in the Units, through teaching and learning approaches. Such as: research, analysis, reports, oral presentation, by calculations, critical thinking, planning and evaluation, and working as part of a team for practical activities.

Employers in these industries have expressed a need for technically competent scientists. The PDA Modern Biological Technologies group award is a specialised award which is intended to prepare you for employment at technician or technologist level in science laboratories.

The majority of the units, see table below, 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 lab report, lab diary or pro forma on the experiment.

Unit code	Unit title	Unit credits	SCQF level	SCQF credit point
J2RE 34	Cell Biology: Theory and Laboratory Skills	1	7	8
H926 34	Biotechnology: An Introduction	1	7	8
H92G 34	Microbiology: Theory and Laboratory Skills	2	7	16

Recommended entry

You 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 Biology or Human Biology
- 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 such as SWAP Access to Science.
- Learners should preferably possess some NQ Units at Higher level.

The PDA qualification contains units that provide you with the underpinning knowledge and skills which will enable you to seek employment in a variety of roles within key science industries. The skills gained from this PDA will be recognised informally by industry as skills needed for employment.

Award requirements

You will have to achieve all three mandatory credits to achieve the PDA qualification.

Employment and progression opportunities

Successful completion of the PDA may lead to career opportunities which include but are not confined within the following contexts: technician, careers in biological sciences and laboratory work within food and drink sector.

Employers may include the following: local authorities, food manufacturers, distilleries, breweries, food and drink sector. The practical nature of the course will provide you with the necessary skills to work in a laboratory.

Progression routes from schools will be into either an HNC in Applied Sciences or HND Applied Sciences, or HND Applied Biological Sciences or HND Applied Chemical Sciences. Progression routes from further education into university have become harmonised over recent years. The landscape for articulation from the PDA framework has evolved over the past decade and many universities and FE colleges have concluded formal arrangements for transition onto degree pathways or on an individual basis.