FOUNDATION APPRENTICESHIPS IN SCIENTIFIC TECHNOLOGIES (LABORATORY SKILLS) AT SCQF LEVEL 6
A GUIDE FOR EMPLOYERS
AIMS
This guide aims to support employers and learning providers to identify appropriate activities required during a Foundation Apprenticeship work placement. It provides the following information:
- The purpose of Foundation Apprenticeships
- The definition of work-based learning in the context of Foundation Apprenticeships
- How a Foundation Apprenticeship is delivered
- How employers can support learners
- An understanding of the Vocational Qualification (SVQ) units within the Foundation Apprenticeship
- Links to useful resources
- Practical examples of work-based activities and evidence for the SVQ units within the Foundation Apprenticeship in Scientific Technologies (Laboratory Skills) at SCQF level 6 (Page 6)

“With the Foundation Apprenticeship, I’ve learned lots of new skills that I didn’t think I was capable of learning, and doing things that I never thought I’d do.”

Rabiya, Foundation Apprentice
WHAT ARE FOUNDATION APPRENTICESHIPS?

Foundation Apprenticeships provide a work-based learning opportunity for senior-phase secondary school pupils. Typically commencing in S5 and finishing at the end of S6, a Foundation Apprenticeship develops knowledge and understanding of an industry. Alongside this, learners also spend time with a local employer to gain valuable industry experience.

Foundation Apprenticeships are completed alongside other subjects like Nationals and Highers. They are linked to the growth sectors of the Scottish economy and are available in the following subjects:

- Accountancy
- Business Skills
- Civil Engineering
- Creative and Digital Media
- Engineering
- Financial Services
- Food and Drink Technologies
- Hardware and System Support
- Scientific Technologies
- Social Services and Healthcare
- Social Services Children and Young People
- Software Development

Foundation Apprenticeships contain three distinct but related components:

Knowledge provides the learner with the relevant theories or reasons for the work-based learning activities. Knowledge allows individuals to evidence not only what they have done but to do so from an informed position of why they did it. This element of the Foundation Apprenticeship is typically aligned to National Progression Awards (NPA) or National Certificate (NC) units.

Skills are the ability to carry out a particular activity, operation or task. Skills describe how something is done with proficiency and are crucial to progression. The expectation of the Foundation Apprenticeship is for skills acquisition to be consistent with the characteristics of applied knowledge, skills and understanding at SCQF level 6.

Competence is defined by each industry or standard setting body as the performance that makes an individual fit to practise in a job. It involves both knowledge and skills. SVQ Units within Foundation Apprenticeships describe the performance criteria, knowledge and understanding requirements necessary for competence in a particular activity or function. Competence will vary from industry to industry but defining level of expected performance at SCQF level 6 will ensure like-for-like activity across different Foundation Apprenticeships, thereby supporting recognition or prior learning articulation to Modern Apprenticeship pathways.

How is a Foundation Apprenticeship delivered?

Learning providers work alongside employers to develop the knowledge and skills learners need to meet all the outcomes of the Foundation Apprenticeship. This includes the classroom-based teaching of knowledge and understanding elements of the Foundation Apprenticeship. This is combined with work-based learning opportunities to provide learners with the experiential learning they need to apply their learning directly in the workplace, ultimately to meet the requirements of the SVQ units of the Foundation Apprenticeship.

Foundation Apprenticeships are typically delivered over two years through S5 and S6 (though there are an increasing amount of shorter duration delivery models becoming available in some regions for selected frameworks). Learners attend a learning provider for one day a week (either on two afternoons or one full day as agreed with local authority) in year one to study a National Progression Award (NPA) or a National Certificate (NC) at SCQF level 6. During year one, participants will have engagement with industry through a series of industry visits, talks and an industry challenge where available. In year two, focus then moves to developing practical skills and competencies in the workplace required of the SVQ units, where learners attend a work placement for approximately one full day per week.

What is work-based learning and how does it apply to Foundation Apprenticeships?

For the purposes of this guide, work-based learning means learning that is directly linked to skills and knowledge required to operate competently in a workplace. A major component of a Foundation Apprenticeship is the sector specific work-based learning. In this context, work-based learning relates directly to the activities undertaken by learners whilst they are on a work-placement.

This provides the first-hand experience for learners to acquire sector specific skills, apply knowledge and reflect on their learning. These activities count towards the overall learning and assessment of the units from the Scottish Vocational Qualification (SVQ) within each Foundation Apprenticeship.

1 The term ‘learners’ is used in this guide to refer to pupils.
**Employer involvement**

The involvement of employers is a critical aspect of every Foundation Apprenticeship, and may include:

- Providing learners with a work placement to enable them to gain valuable experience in the workplace
- Providing learners with appropriate work-based opportunities to enable them to develop their learning and skills
- Ensuring all work-based learning provided is based on current expertise, equipment, practices and processes
- Setting industry challenge projects

Employers may also be involved in other activities, for example, the recruitment and selection process, guest speaking, coaching and mentoring, and in the assessment of practice of learners.

Employers identify a suitable workplace mentor to act as the point of contact for learners when they are in the work placement. The mentor provides support to the learner within the workplace to ensure they access the range of activities required to complete the SVQ units from the Foundation Apprenticeship, and provides advice to the learner on their progress in relation to the work-based learning. The mentor also supports with developing a learning plan which provides details of the activities which the learner will undertake in the workplace to achieve the SVQ units. The centre will provide further details on mentors.

Further details on employer involvement and workplace mentors can be found in the Foundation Apprenticeship Guidance Note: Employer Engagement (details provided in the useful resources section of this document).

The learning provider meets regularly with employers to ensure learners are being supported and are working on the right types of activities. Further details can be found in the appendices of this document.

**About the Scottish Vocational Qualification units**

It is important that employers understand the SVQ units within a Foundation Apprenticeship, as this will help them to provide learners with access to work-based activities that are relevant to the SVQ units they need to complete.

Within every Foundation Apprenticeship there are a number of SVQ units which relate to a particular occupational function, and which provide the standards upon which competence is assessed in the workplace. The SVQ units also form part of a Modern Apprenticeship.

The Foundation Apprenticeship in Scientific Technologies (Laboratory Skills) at SCQF level 6 includes three mandatory units from the SVQ in Laboratory and Associated Technical Activities (Industrial Science) at SCQF level 6.

SVQ units are derived directly from National Occupational Standards (NOS) which describe what an individual needs to do (performance criteria), know and understand (knowledge and understanding criteria) to demonstrate competence in the unit. Evidence (assessment) requirements specify the type and amount of evidence required for the unit and are developed by an Awarding Body to complete the unit development when it is used to form part of a qualification structure.

Learners must provide evidence they are competent across all criteria to meet the requirements of all SVQ units within the Foundation Apprenticeship. All evidence is assessed against the standards and leads to an overall judgment being made by an assessor on whether the learner is competent or not yet competent. Where a learner is found to be not yet competent in any part of the standards, they will be given the opportunity for further training and to provide further evidence for assessment at a later date.

Acceptable performance in a unit will be the satisfactory achievement of the standards set out in the SVQ unit specification. Every SVQ unit has knowledge statements which underpin competence.

**About the assessment of SVQ units**

Assessment is the process of evaluating an individual’s attainment of knowledge, understanding and skills. Assessment of the SVQ units involves generating and collecting evidence of a learner’s attainment of knowledge, understanding and skills and judging that evidence against defined standards.

The Guide to Assessment covers a wide range of assessment methods in unit assessments for school, college and workplace qualifications as well as external assessment for National Qualifications. There are three essential forms of assessment: observation, product evaluation and questioning. Assessment can also use a combination of some or all of the three forms. All assessment methods, such as a project or performance, can be classified under one or more of these forms.

SVQ units are assessed internally by centres, this means that work-place assessors are responsible for deciding whether evidence meets the standards for SVQ units. The assessors are identified by the centre, they are occupationally competent in the role and professionally competent in conducting work-based assessment (or working towards this). The internal assessment decisions are externally verified by the Awarding Organisation who offers the units.

Evidence must meet the following requirements:

<table>
<thead>
<tr>
<th>Valid</th>
<th>The assessment method chosen will be appropriate to the standards being assessed. It will produce evidence relevant to the standards.</th>
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<tr>
<td>Authentic</td>
<td>The evidence will be the learner’s own work.</td>
</tr>
<tr>
<td>Current</td>
<td>The evidence will exemplify the current level of the learner’s performance.</td>
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<tr>
<td>Reliable</td>
<td>The assessment decision is comparable and consistent with other assessors within the centre.</td>
</tr>
<tr>
<td>Sufficient</td>
<td>The evidence will demonstrate competence over time (e.g. not just a single occasion).</td>
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</table>

2 A learner who completes the Foundation Apprenticeship will receive mandatory units from the relevant Modern Apprenticeship leaving them fewer units to complete if they start the relevant Modern Apprenticeship.
Employer Engagement

The aim of this guidance is to share some best practice with learning providers to help support the delivery of the work-based element of Foundation Apprenticeships. This guidance provides details on how employers from all sectors and of all sizes can be involved in several different opportunities throughout the Foundation Apprenticeship programme. Refer to this document for information on work placement roles and responsibilities for employers and learning providers.

Developing the Young Workforce

Work Placements Standard: This document sets out the expectations for a young person, school, employer, local authority and parent/carer, before, during and after work placements. Refer to this document for information to help improve the quality of learning in the workplace.

SQA Guide to Assessment

This guide is designed to provide support for everyone who assesses SQA qualifications. It covers the full range of SQA qualifications and is based around the principles of assessment, that all qualifications must be valid, reliable, practicable, equitable and fair. Refer to this document for information on unit content and standards, methods of assessment and acceptable evidence.
PRACTICAL EXAMPLES

Examples of activities and evidence for the SVQ units: A Foundation Apprenticeship in Scientific Technologies (Laboratory Skills) SCQF level 6 (GN14 46)

These examples aim to support employers with identifying suitable work-based activities to develop the practical skills of S5 and S6 pupils during the work placement component of the Foundation Apprenticeship in Scientific Technologies (Laboratory Skills) at SCQF level 6 (GN14 46).

The Foundation Apprenticeship in Scientific Technologies (Laboratory Skills) at SCQF level 6 includes three mandatory units from the SVQ in Laboratory and Associated Technical Activities (Industrial Science) at SCQF level 6. The SVQ units are delivered and assessed while on placement in the workplace:

- FY9W 04 Follow Health and Safety Procedures for Scientific or Technical Activities
- H00C 04 Carry Out Simple Scientific or Technical Tests Using Manual Equipment
- H00J 04 Prepare Compounds and Solutions for Scientific or Technical Use

The table below provides generic examples of typical work-based activities and examples of possible evidence which may support the development of the practical skills within each of the SVQ units. Please note, these are examples and are not intended to be prescriptive.

Some examples of activities and evidence are holistic therefore may cover several performance criteria (and knowledge and understanding) within a unit and/or across units, as opposed to aligning with a single performance criteria. This supports good practice in the holistic approach to assessment, which in turn reduces the volume of evidence required by learners and reduces bureaucracy in assessment.

It is important to note not all work-based activities may be suitable for a pupil to undertake (e.g. not an employee). For example, there may be a legislative reason a pupil/non-employee cannot conduct a particular activity within a workplace.

FY9W 04 Follow Health And Safety Procedures For Scientific Or Technical Activities

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Examples of work-based activities</th>
<th>Examples of evidence which may support learners to demonstrate the practical skills in the unit (product evaluation, observation and questioning)</th>
</tr>
</thead>
</table>
| **P1** Ensure that your work is carried out in accordance with workplace procedures | - Attending induction which covers initial sector specific workplace procedures and health and safety
- Attending a presentation given by mentors which covers; PPE, First Aid and lab safety officers, evacuation procedures, etc
- Conducting work activities | - Records of attending induction and training, including handouts used
- Witness testimony from the person delivering induction and giving the presentation detailing the topics covered
- Personal statement from the learner or a professional discussion with mentor to cover scope and knowledge and understanding points |

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<th>Examples of evidence</th>
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<tr>
<td><strong>P2</strong> Accurately assess health and safety in relation to your work and the workplace</td>
<td>■ Undertaking a real-life or simulated event to assess health and safety, (scenario may include spillage of a hazardous substance and the subsequent processes thereafter)</td>
<td>■ Records of the learner preparing for and undertaking the learning project activity (e.g. PPE)</td>
</tr>
<tr>
<td><strong>P3</strong> Use safe practices and the appropriate personal protective clothing and equipment for the work</td>
<td><strong>See P1</strong> (previous page)</td>
<td><strong>See P1</strong> (previous page)</td>
</tr>
<tr>
<td><strong>P4</strong> Identify any breaches to health and safety procedures and report them to the appropriate person as soon as possible</td>
<td>■ Identifying and reporting breaches in health and safety within the working environment whilst undertaking your own duties</td>
<td>■ Emails or personal statement from the learner reporting the breach and their actions thereafter in line with organisational procedures</td>
</tr>
<tr>
<td><strong>P5</strong> Ensure that you maintain and tidy your work area to a standard of health and safety which is consistent</td>
<td></td>
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<tr>
<td><strong>P6</strong> Prepare, maintain and use equipment and materials in accordance with manufacturer’s instructions and local safety regulations</td>
<td>■ Maintaining a clean and tidy work area ■ Conducting operations in line with manufacturer’s instructions and employer regulations ■ Disposing of waste materials in line with organisational procedures</td>
<td>■ Records of relevant training attended ■ Records of waste disposed (e.g. log entries and emails) ■ Observation of learner undertaking the tasks</td>
</tr>
<tr>
<td><strong>P7</strong> Recognise hazardous materials used in your work activities</td>
<td>■ Identifying correctly the hazardous materials used in own area of work ■ Conducting risk assessment and/or COSHH assessment</td>
<td>■ Records of professional discussion with mentor ■ Copies of the completed risk assessment and/or COSHH assessment</td>
</tr>
<tr>
<td><strong>P8</strong> Follow established procedures to protect yourself and others during work activities</td>
<td>■ Identifying, selecting and using the correct protection measures when conducting hazardous activities</td>
<td>■ Observation or professional discussion detailing how the learner protected themselves and others during work activities</td>
</tr>
<tr>
<td><strong>P9</strong> Follow the correct procedure when an emergency arises or is suspected</td>
<td>■ Following workplace emergency procedures in a real-time event or scenario (e.g. fire drill)</td>
<td>■ Evidence of the learner evacuating a premise (e.g. personal statement or witness testimony)</td>
</tr>
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</table>
### Performance Criteria
What the learner needs to be able to do to demonstrate competence within the unit

### Examples of work-based activities
which may support learners to develop the required practical skills in the unit

### Examples of evidence
which may support learners to demonstrate the practical skills in the unit (product evaluation, observation and questioning)

| **P1** Develop and maintain working relationships with people which promote goodwill and trust | **Evidence cross references with FY9W 04 (P1 & P3)** | **Records of attending induction and training – detailing the topics covered, including handouts used**
| ■ Attending induction which covers initial sector specific workplace procedures and health and safety | ■ Attending a presentation given by mentors which covers; PPE, First Aid and lab safety officers, evacuation procedures, etc | ■ Personal statement from the learner or a professional discussion with mentor to cover scope, knowledge and understanding points
| ■ Conducting work activities | ■ Observation of learner carrying out own work |

| **P2** Use safe practices and the appropriate Personal Protective Equipment (PPE) when doing scientific or technical activities | **Preparing to undertake a work activity by putting on industry specific PPE before commencing task (e.g. checking the pH of a solution using a pH meter)** | **Records (observation) of the learner using appropriate PPE and preparing to undertake analysis (e.g. calibration of equipment and conducting the analysis)**
| ■ Preparing to undertake a work activity by putting on industry specific PPE before commencing task (e.g. checking the pH of a solution using a pH meter) | ■ Completed records of results of the analysis/lab tests | ■ Photocopy or hard copy of electronic files and log entries
| ■ Records (observation) of the learner using appropriate PPE and preparing to undertake analysis (e.g. calibration of equipment and conducting the analysis) |

| **P3** Obtain the appropriate equipment and materials for the manual tests required | **Gathering all equipment needed to conduct a work activity (e.g. to check the pH of a solution using a pH meter, booking of samples into lab etc)** | **See P2**
| ■ Gathering all equipment needed to conduct a work activity (e.g. to check the pH of a solution using a pH meter, booking of samples into lab etc) |

| **P4** Conduct manual laboratory tests on samples in accordance with the correct procedures and techniques | **Conducting lab tests after checking standard operating procedures and under supervision of mentor/assessor** | **See P2**
| ■ Conducting lab tests after checking standard operating procedures and under supervision of mentor/assessor |

| **P5** Record the results of manual tests in accordance with workplace procedures | **Recording the results from lab tests conducted in an appropriate and agreed format (e.g. on paper or electronic format)** | **See P2**
| ■ Recording the results from lab tests conducted in an appropriate and agreed format (e.g. on paper or electronic format) |

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<td><strong>P6</strong> Dispose of waste items from manual laboratory tests in accordance with workplace procedures</td>
<td>■ Disposing of any waste materials &lt;br&gt; ■ Discussion with mentor / assessor prior to disposal to ensure compliance</td>
<td>■ Records confirming the correct disposal of material (e.g. log entries and emails)</td>
</tr>
<tr>
<td><strong>P7</strong> Return equipment and materials that can be used for future testing to the correct storage location</td>
<td>■ Returning the equipment and materials used &lt;br&gt; ■ Checking and recording any malfunctions, replenishment of supplies as per workplace procedures &lt;br&gt; ■ Discussing with mentor / assessor prior to activity to ensure correct storage</td>
<td>■ Records indicating materials have been returned correctly &lt;br&gt; ■ Records detailing any malfunctions recorded (e.g. log entries and emails)</td>
</tr>
<tr>
<td><strong>P8</strong> Communicate the required information laboratory activities to authorised people in accordance with departmental and organisational procedures</td>
<td>■ Providing information of the testing done by verbal report and a written method (e.g. paper or electronic record and entries in own laboratory book)</td>
<td>■ Personal statement providing details of the verbal report, and product evidence of the written method (e.g. emails, database screenshots, entries into laboratory information systems)</td>
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**Notes**

A holistic approach has been taken to provide examples of activities and evidence which cover performance criteria within and across units. This promotes efficient and effective gathering of evidence.

Observation, video evidence and/or the use of voice recording software for professional discussions may be appropriate in this unit.

Guidance on simulation can be found in the Assessment Strategy. Where permitted, simulation should only be undertaken in a minority of situations, for example where there is a potential risk to the learner or others. To be effective, simulation must succeed in recreating the atmosphere, conditions and pressures of the real situation.
### H00J 04 Prepare Compounds And Solutions For Scientific Or Technical Use

#### Performance Criteria
What the learner needs to be able to do to demonstrate competence within the unit

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| **P1** Ensure that your work is carried out in accordance with workplace procedures | Evidence cross references with FY9W 04 (P1 & P3)  
- Attending induction which covers initial sector specific workplace procedures and health and safety  
- Attending training which covers; PPE, First Aid and lab safety officers, evacuation procedures etc | Records of attending induction and training – detailing the topics covered, including handouts used  
Personal statement from the learner or a professional discussion with mentor to cover scope, knowledge and understanding points  
Observation of learner carrying out own work |
| **P2** Use safe practices and the appropriate personal protection equipment (PPE) when doing scientific or technical activities | Preparing to undertake a work activity by putting on industry specific PPE before commencing task (e.g. checking the pH of a solution using a pH meter) | Evidence cross references with H00C 04 (P2)  
Direct observation of learner using appropriate PPE (this observation may provide evidence for other performance criteria in this unit) |
| **P3** Use balances for accurately weighing out materials | Preparing sodium chloride solutions of differing molarity from solid sodium chloride or other as required (e.g. 1M and 0.1M using an appropriate balance)  
Using and familiarising with differing weighing accuracies (grams and milligrams) and graduated cylinders and/ or beakers to measure the solvent (water) | Product evidence indicating the calculations used to determine the amount of solid and solvent required to prepare the required concentration \( c = n \div v \)  
Evidence of preparing the solution from solid. Preparations of two differing concentrations will provide specific evidence as required in the scope of this unit e.g. scope 2, 4, 5 and part of 6. |
| **P4** Measure out required concentrations of liquids for scientific or technical use | Preparing a 0.5M sodium chloride solution by dilution from the 1M stock solution (prepared earlier) using volumetric flasks and pipettes | Product evidence indicating the dilution calculations used to determine the volume of stock solution and solvent required to prepare the required concentration \( C1V1 = C2V2 \)  
Evidence of preparing a solution from a stock solution (observation) |

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<td><strong>P5</strong> Measure specific volumes of liquids and weights of solids for scientific or technical use</td>
<td>See P3 (previous page)</td>
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</tbody>
</table>
| **P6** Communicate the required information about the work done, in accordance with departmental and organisational procedures | - Providing information on the preparation by giving a verbal report and recording the method in own laboratory book | - Cross references with H00C 04 P8 personal statement providing details of the verbal report, and product evidence of the written method (e.g. emails, databases, entries into laboratory information systems)  
  - Written record of weights and volumes used to prepare the required solutions (e.g. photocopy of a section of their laboratory book) |

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