Pearson BTEC International Level 2 Qualifications Construction

Specification

Pearson BTEC International Level 2 Certificate in Construction (21058)
Pearson BTEC International Level 2 Extended Certificate in Construction (21059)
Pearson BTEC International Level 2 Diploma in Construction (21061)

For first teaching October 2015

Issue 3
Edexcel, BTEC and LCCI qualifications

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These qualifications have been approved by Pearson as meeting the criteria for Pearson’s Self-regulated Framework.

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This specification is Issue 3. We will inform centres of any changes to this issue. The latest issue can be found on our website: qualifications.pearson.com

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All information in this specification is correct at time of publication.

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### Summary of Pearson BTEC International Level Qualifications in Construction

<table>
<thead>
<tr>
<th>Summary of changes made between previous issue and this current issue</th>
<th>Page/section number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units 18, 19 added to Certificate size/structure</td>
<td>Page 8</td>
</tr>
</tbody>
</table>

If you need further information on these changes or what they mean, please contact us via our website at: qualifications.pearson.com.
1 Purpose of this specification

Pearson BTEC International Level 2 Certificate, Extended Certificate and Diploma qualifications in Construction are designed for international schools and colleges. They are part of an international suite of BTEC qualifications offered by Pearson. These qualifications are not available to centres in the United Kingdom, the Channel Islands, the Isle of Man or British armed forces schools overseas.

The purpose of this specification is to set out:

● the aims of the qualifications
● the structure and rules of combination of the qualifications
● the resources required by the centre to offer the qualifications
● the knowledge, skills and understanding which will be assessed as part of the qualifications
● the method of assessment and any associated requirements relating to it
● the criteria against which learners’ level of attainment will be measured (for example assessment criteria).

If you need guidance or support please contact your Pearson representative.

BTEC International Level 2 qualification titles covered by this specification

The following qualifications have been approved by Pearson Education Limited as meeting the criteria for Pearson’s Self-regulated Framework. These qualifications are not accredited or regulated by any UK regulatory body.

Pearson BTEC International Level 2 Certificate in Construction (21058)
Pearson BTEC International Level 2 Extended Certificate in Construction (21059)
Pearson BTEC International Level 2 Diploma in Construction (21061)

This specification must be used for delivery and teaching in your centres. For international centres, the qualifications in this specification replace the following QCF qualifications:

Pearson BTEC Level 2 Certificate in Construction (QCF) 500/7238/9
Pearson BTEC Level 2 Extended Certificate in Construction (QCF) 500/7239/0
Pearson BTEC Level 2 Diploma in Construction (QCF) 500/7240/7
Pearson’s suite of international BTEC qualifications

BTEC International Level 2 qualifications make up our suite of international BTECs. These qualifications are available in a range of sectors for learners who wish to explore a work-related vocational qualification or specific industry area. The qualifications offer learners the knowledge, understanding and skills they need to prepare them for employment.

On successful completion of a BTEC International Level 2 qualification, learners can progress to continued study in the same or related vocational area and/or within employment in the construction sector.

BTEC International Level 2 Certificate

The BTEC International Level 2 Certificate is a work-related vocational qualification that focuses on particular aspects of employment in the appropriate vocational sector. The BTEC International Level 2 Certificate is a qualification that can be part of a learner’s programme of study that will give them a vocational learning experience. The qualification has the potential to prepare learners for progression to an appropriate Level 3 programme in the same or related vocational area.

BTEC International Level 2 Extended Certificate

The BTEC International Level 2 Extended Certificate extends the work-related focus from the BTEC International Level 2 Certificate and covers the key knowledge and practical skills required in the appropriate vocational sector. Through optional units the BTEC International Level 2 Extended Certificate offers flexibility and a choice of emphasis. It provides an engaging programme for those who are clear about the vocational area they wish to explore through further study or for those who wish to enter employment. The qualification has the potential to prepare learners for progression to an appropriate Level 3 programme in the same or related vocational area.

BTEC International Level 2 Diploma

The BTEC International Level 2 Diploma extends the work-related focus from the BTEC International Level 2 Extended Certificate, with broader coverage of knowledge and practical skills required for the vocational sector.

The qualification has the potential to prepare learners for progression to an appropriate Level 3 programme in the same or related vocational area or for progression to employment in the appropriate vocational sector.

Other learners may want to use this qualification to extend the specialism they studied in the BTEC International Level 2 Certificate or the Pearson BTEC International Level 2 Extended Certificate programme.
## 2 Qualification summaries

### Key information

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Total Notional Learning Hours (NLH)</th>
<th>Qualification value (NLH/10)</th>
<th>Assessment</th>
<th>Unit grading information</th>
<th>Overall qualification grading information</th>
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<tbody>
<tr>
<td><strong>Pearson BTEC International Level 2 Certificate in Construction</strong></td>
<td>150 (including 90 Guided Learning Hours (GLH))</td>
<td>15</td>
<td>This qualification is internally assessed</td>
<td>Pass/Merit/Distinction</td>
<td>Pass/Merit/Distinction/Distinction*</td>
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<tr>
<td><strong>Pearson BTEC International Level 2 Extended Certificate in Construction</strong></td>
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<tr>
<td><strong>Pearson BTEC International Level 2 Diploma in Construction</strong></td>
<td>600 (including 360 Guided Learning Hours (GLH))</td>
<td>60</td>
<td>This qualification is internally assessed</td>
<td>Pass/Merit/Distinction</td>
<td>Pass/Merit/Distinction/Distinction*</td>
</tr>
</tbody>
</table>

For further information on Notional Learning Hours please see *Section 8: Programme delivery* and *Section 10: Understanding the units*. 
Aims of the Pearson BTEC International Level 2 qualifications in Construction

The Pearson BTEC International Level 2 Certificate, Extended Certificate and Diploma qualifications in Construction have been developed to:

- give full-time learners the opportunity to enter employment in the construction sector or to progress to Level 3 vocational qualifications
- provide education and training for construction employees
- give opportunities for construction employees to achieve a Level 2 vocationally-specific qualification
- give learners the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life.

Key features of the Pearson BTEC International Level 2 qualifications in Construction

These qualifications have been developed in the construction and built environment sector to:

- provide education and training for those who work or are intending to work in the construction industry
- provide opportunities for those who work or are intending to work in the construction industry to achieve a nationally-recognised Level 2 vocationally-specific qualification
- provide full-time learners with the opportunity to enter employment in the construction and built environment sector or to progress to vocational qualifications such as the Pearson BTEC National Level 3 in Construction
- give learners the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life.
Rationale for the Pearson BTEC International Level 2 qualifications in Construction

The construction industry continues to experience labour shortages throughout the skills range, and potential new entrants to the industry need to be given every encouragement. BTECs provide specialist work-related and motivating programmes of study. They address the key areas of knowledge, understanding and skills required for learners contemplating a career in the construction industry. The requirements of craft, operative and technician roles are reflected in the content, and focus is placed on learner progression into work, to an apprenticeship, or on to further study.

For learners who already have an interest in the construction industry but have not yet fully decided on a career path, the BTEC International Level 2 qualifications in construction provide an opportunity to try out a range of related activities, either by following a general path utilising a range of specialist units or by following one of the recommended specialist pathways which provide greater depth in a specialist area of study. Centres may offer a range of specialist optional units to produce appropriate courses of study for their learners, for example multi-skilled or specialist. On completion, learners will have achieved a recognised qualification and will be in a stronger position to decide between their progression options.

Options include progression to a further qualification in construction and the built environment, for example a Pearson Edexcel BTEC International Level 3 qualification in Construction, Civil Engineering or Building Services Engineering, or entry to industry with the possibility of undertaking additional training, possibly leading to the completion of an apprenticeship or a technical certificate.

BTECs are supported in the UK by the Construction Industry Training Board (CITB) within the construction sector, and link to the National Occupational Standards (NOS) for the sector where these are appropriate. In addition to the knowledge informed by the NOS, BTEC International specifications also provide learners with underpinning knowledge fundamental to their ability to develop knowledge and understanding within the specialist units, for example the underpinning knowledge in Unit 4: Use of Science and Mathematics in Construction.

Pearson BTEC International qualifications in construction are also suitable for mature learners who wish to gain a qualification, perhaps in preparation for a BTEC National, or for moving into work in the construction sector. Learners will be equipped with the knowledge, skills and understanding for any of the following occupations: bricklayer, carpenter and joiner, painter and decorator, plasterer, roof slater and tiler, dry liner, wall and floor tiler and construction operative.
National Occupational Standards (NOS)

These qualifications are designed to provide much of the underpinning knowledge and understanding for the UK National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs in due course. NOS form the basis of National Vocational Qualifications (NVQs). BTECs do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Each unit in the specification identifies links to elements of the NOS.

The Pearson BTEC International Level 2 qualifications in construction relate to the following Level 2 NOS components:

- Construction Operations
- Decorative Finishing and Industrial Painting Occupations
- Interior Systems
- Plastering
- Trowel Occupations
- Wood Occupations
- Wood Machining.
3 Centre resource requirements

As part of the approval process, the centre must make sure that the resource requirements below are in place before offering Pearson BTEC International Level 2 qualifications.

- The centre must have appropriate physical resources (for example equipment, IT, learning materials, teaching rooms) to support delivery and assessment.
- Staff involved in the assessment process must have relevant expertise and occupational experience.
- There must be systems in place to make sure that there is continuing professional development for staff delivering the qualifications.
- The centre must have in place appropriate policies that relate to the delivery of the qualification.
- The centre must deliver the qualifications in accordance with current equality legislation.
- The centre must have in place any specific unit resource requirements as listed in each unit under the heading Essential requirements.
## 4 Qualification structures

**Pearson BTEC International Level 2 Certificate in Construction**

The Pearson BTEC International Level 2 Certificate in Construction qualification totals 150 Notional Learning Hours (NLH).

Learners must achieve the mandatory unit(s) and optional units that provide for a combined total value of 15 to achieve the qualification.

This qualification is not designed to allow units to be imported from other Pearson qualifications.

### Mandatory unit/s

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit title</th>
<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Structure of the Construction Industry</td>
<td>2</td>
<td>50</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
<td>2</td>
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### Optional units

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit title</th>
<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
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<tbody>
<tr>
<td>4</td>
<td>Use of Science and Mathematics in Construction</td>
<td>2</td>
<td>50</td>
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<tr>
<td>5</td>
<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
<td>2</td>
<td>50</td>
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<tr>
<td>6</td>
<td>Construction Methods and Techniques for Low-rise Domestic Buildings</td>
<td>2</td>
<td>50</td>
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<tr>
<td>7</td>
<td>Construction Drawing Techniques</td>
<td>2</td>
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<tr>
<td>8</td>
<td>Exploring Carpentry and Joinery</td>
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<tr>
<td>11</td>
<td>Exploring Trowel Operations</td>
<td>2</td>
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<tr>
<td>14</td>
<td>Exploring Painting and Decorating</td>
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<tr>
<td>17</td>
<td>Exploring Building Services Techniques in Construction</td>
<td>2</td>
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<tr>
<td>18</td>
<td>Performing Plumbing Operations</td>
<td>2</td>
<td>50</td>
<td>5</td>
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<tr>
<td>19</td>
<td>Performing Electrical Operations</td>
<td>2</td>
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</tbody>
</table>
## Pearson BTEC International Level 2 Extended Certificate in Construction

The Pearson BTEC International Level 2 Extended Certificate in Construction qualification totals 300 Notional Learning Hours (NLH).

Learners must achieve the mandatory unit(s) and optional units that provide for a combined total value of 30 to achieve the qualification.

This qualification is not designed to allow units to be imported from other Pearson qualifications.

### Mandatory unit/s

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit title</th>
<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Structure of the Construction Industry</td>
<td>2</td>
<td>50</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
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</table>

### Optional units

<table>
<thead>
<tr>
<th>Unit</th>
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<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
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<tbody>
<tr>
<td>4</td>
<td>Use of Science and Mathematics in Construction</td>
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<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
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<td>9</td>
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<td>10</td>
<td>Performing Carpentry Operations</td>
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<tr>
<td>11</td>
<td>Exploring Trowel Operations</td>
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<td>12</td>
<td>Performing Blockwork Operations</td>
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<tr>
<td>13</td>
<td>Performing Brickwork Operations</td>
<td>2</td>
<td>50</td>
<td>5</td>
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<tr>
<td>14</td>
<td>Exploring Painting and Decorating</td>
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<tr>
<td>15</td>
<td>Performing Paperhanging Operations</td>
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<td>16</td>
<td>Performing Decorating Operations</td>
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<td>Exploring Plastering and Dry-lining Operations</td>
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<td>21</td>
<td>Exploring Roofing Operations</td>
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<td>5</td>
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<tr>
<td>22</td>
<td>Exploring Wall and Floor Tiling</td>
<td>2</td>
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</tbody>
</table>
Pearson BTEC International Level 2 Diploma in Construction

The Pearson BTEC International Level 2 Diploma in Construction qualification totals 600 Notional Learning Hours (NLH).

Learners must achieve the mandatory unit(s) and optional units that provide for a combined total value of 60 to achieve the qualification.

This qualification is not designed to allow units to be imported from other Pearson qualifications.

### Mandatory unit/s

<table>
<thead>
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<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
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<tbody>
<tr>
<td>1</td>
<td>Structure of the Construction Industry</td>
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<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
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### Optional units

<table>
<thead>
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<th>Level</th>
<th>Notional Learning Hours</th>
<th>Unit value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Sustainability in the Construction Industry</td>
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<tr>
<td>4</td>
<td>Use of Science and Mathematics in Construction</td>
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<td>5</td>
<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
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<td>2</td>
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</tbody>
</table>
5 Assessment and grading

The assessment of BTEC International Level 2 qualifications is criterion referenced and the centre is required to assess learners' evidence against published outcomes of learning and assessment criteria.

Each unit in the qualification has specified assessment and grading criteria which are to be used for grading purposes. A summative unit grade can be awarded at pass, merit or distinction:

- to achieve a ‘pass’ a learner must have satisfied all the pass assessment criteria
- to achieve a ‘merit’ a learner must additionally have satisfied all the merit grading criteria
- to achieve a ‘distinction’ a learner must additionally have satisfied all the distinction grading criteria

A grading scale of pass, merit and distinction is applied to all units.

BTEC internal assessment

All units in the BTEC International Level 2 qualifications are assessed through internal assessment, which means that the centre can deliver the programme in a way that suits its learners and relates to local need. The way in which the centre delivers the programme must also ensure that assessment is fair and that standards are consistent over time. To achieve this, it is important that centres:

- plan the assessment of units to fit with delivery, allowing the links across units
- write suitable assessments (for example assignments, projects or case studies) or select assessments from available resources, adapting them as necessary
- plan the assessment for each unit in terms of when it will be authorised by the Internal Verifier, when it will be used and assessed, how long it will take, and how the centre will determine that learners are ready to begin an assessment
- ensure each assessment is fit for purpose, valid, will deliver reliable assessment outcomes across assessors, and is authorised before use
- provide all the preparation, feedback and support that learners need to undertake an assessment before they begin producing their evidence
- make careful and consistent assessment decisions based only on the defined assessment criteria and unit requirements
- validate and record assessment decisions carefully and completely
- work closely with Pearson to ensure that the implementation, delivery and assessment is consistent with BTEC quality standards.
Internal Verifiers must oversee all assessment activity to make sure that individual assessors do not misinterpret the specification or undertake assessment that is not consistent with the BTEC quality standards in respect of level, content or duration of assessment. The process for ensuring that assessment is being conducted correctly is called internal verification. Normally, a programme team will work together with individuals being both assessors and Internal Verifiers. Internal Verifiers must make sure that assessment is fully validated in the centre by:

- checking every assessment instrument carefully and endorsing it before it is used
- ensuring that each learner is assessed carefully and thoroughly using the relevant assessment criteria and associated guidance in the specification
- ensuring the decisions of every assessor for each unit at all grades and for all learners are in line with BTEC quality standards.

Assessors must be standardised using Pearson-approved materials before making any assessment decisions. Assessors are usually the teachers in the school or college, but the term ‘assessor’ refers to the specific responsibility for carrying out assessment and making sure that it is carried out in a way that is correct and consistent with BTEC quality standards. Assessors may also draft or adapt internal assessment instruments. Centres are required to keep records of assessment and have assessment authorised by Pearson. The main records are:

- the overall plan of delivery and assessment, showing the duration of assessment and the timeline for internal verification
- assessment instruments, which are authorised through an Internal Verifier
- assessment records, which contain the assessment decisions for each learner for each unit
- an internal verification sampling plan, which shows how assessment decisions are checked, and which must include across the sample all assessors, unit assessment locations and learners
- internal verification records, which show the outcomes of sampling activity as set out in the sampling plan.

Learner preparation

As BTEC International Level 2 qualifications are all internally assessed, it is important that learners are prepared for assessment. Learners:

- must be prepared for and motivated to work consistently and independently to achieve the requirements of the qualification
- need to understand how they will be assessed and the importance of timescales and deadlines
- need to fully appreciate fully that all the work submitted for assessment must be their own.

Centres will need to give learners an induction and a guide or handbook to cover:

- the purpose of the assessment briefs for learning and assessment
- the relationship of the tasks given for assessment and the grading criteria
- the concept of vocational and work-related learning
- how they can develop responsibility for their own work and build their vocational and employability skills
- how they should use and reference source materials, including what would constitute plagiarism.
The centre must communicate assessment grading rules to all learners at the beginning of the programme.

For guidance on all of the rules surrounding internal assessment for BTEC qualifications please see the Guide to Internal Assessment for BTECs and Nationals which can be located in the key documents section of our website: www.btec.co.uk/keydocuments

Final assessment decisions

Final assessment is the culmination of the learning and assessment process. Learners should be given full opportunity to show how they have achieved the outcomes of learning covered by a final assessment. This is carried out by ensuring that learners have received all necessary learning, preparation and feedback on their performance and then confirming that they understand the requirements of an assessment, before any assessed activities begin.

There will then be a clear assessment outcome based on the defined assessment criteria. Centres must devise an assessment plan that will set a clear timeline for assessment decisions to be reached. Once an assessment has begun, learners must not be given feedback on progress towards criteria. After the final assignment is submitted, an assessment decision must be given.

An assessment decision:

- must be made with reference to the assessment criteria
- should record how it has been reached, indicating how or where criteria have been achieved
- may indicate why attainment against criteria has not been demonstrated
- must not provide feedback on how to improve evidence to meet higher criteria.

Centres’ Internal Verifiers and Assessors must work together to ensure that assessment decisions are reached promptly and validated before they are given to the learner.

Late submission

Centres must encourage learners to understand the importance of deadlines and of handing work in on time. For assessment purposes, it is important that learners are assessed fairly and consistently according to the assessment plan that the Internal Verifier has authorised and that some learners are not advantaged by having additional time to complete assignments. Centres are not required to accept assessment work that was not completed by the date in the assessment plan. Learners may be given authorised extensions for legitimate reasons, such as illness at the time of submission. If a late completion by a learner is accepted, the evidence should be assessed normally, unless it is judged to not meet the requirements for authenticity. It is not appropriate to give automatic downgrades on assessment decisions as ‘punishment’ for late submission.
Resubmission of improved evidence

Once an assessment decision is given to a learner it is final in all cases, except where the Internal Verifier approves one opportunity to resubmit improved evidence. The criteria used by the Internal Verifier to authorise a resubmission opportunity are always:

- initial deadlines or agreed extensions have been met
- the teacher considers that the learner will be able to provide improved evidence without further guidance
- the evidence submitted for assessment has been authenticated by the learner and the assessor
- the original assessment can remain valid
- the original evidence can be extended and re-authenticated.

Centres will need to provide a specific resubmission opportunity that is authorised by the Internal Verifier. Any resubmission opportunity must have a deadline that is within 10 days of the assessment decision being given to the learner, and in the same academic year.

Centres should make arrangements for resubmitting the evidence for assessment in such a way that it does not adversely affect other assessments and does not give the learner an unfair advantage over other learners. Centres must consider how the further assessment opportunity ensures that assessment remains fit for purpose and in line with the original requirements. For example, the centre may opt for learners to improve their evidence under supervised conditions, even if this was not necessary for the original assessment, to ensure that plagiarism cannot take place. How centres provide opportunities to improve and resubmit evidence for assessments needs to be fair to all learners.

Care must be taken when setting assignments and at the point of final assessment to ensure that the original evidence for assessment can remain valid and can be extended. The learner must not have further guidance and support in producing further evidence. The Standards Verifier is likely to want to include evidence that has been resubmitted as part of the sample they will review.

Retaking assessment

BTEC International Level 2 qualifications do not allow for compensation – this means that learners must achieve every pass criterion in order to successfully achieve the qualification.

Conditions for retaking a new assignment

If a learner has met all of the conditions set out above in *Resubmission of improved evidence* but has still not achieved the targeted pass criteria following the resubmission of the assignment, the Internal Verifier may authorise one retake opportunity to meet the required pass criteria. The Internal Verifier must authorise a retake in exceptional circumstances where they believe it is necessary, appropriate and fair to do so.
The criteria used by the Internal Verifier to authorise a resubmission opportunity are always:

- the retake must be a new task or assignment targeted only to the pass criteria that were not achieved in the original assignment – an assessor cannot award a merit or distinction grade for a retake
- the assessor must agree and record a clear deadline before the learner starts the retake
- the learner and assessor must sign declarations of authentication as they did for previous submissions

Standards Verifiers will require the centre to include evidence of any retakes in sampling. Retakes should not be required as a matter of course. Centres should keep a record of the number of retakes required on any programme to support the centres’ own quality monitoring.

**Calculation of the qualification grade**

**Pass qualification grade**

Learners who achieve the minimum eligible value specified by the rule of combination will achieve the qualification at pass grade (see Section 4: Qualification structures).

**Qualification grades above pass grade**

Learners will be awarded a merit, distinction or distinction* qualification grade by the aggregation of points gained through the successful achievement of individual units. The number of points available is dependent on the unit level and grade achieved and the value of the unit (as shown in the table below).

**Points available per unit value at specified unit grades and levels**

The table below shows the number of points scored per unit value at the unit level and grade.

<table>
<thead>
<tr>
<th>Unit level</th>
<th>Points per unit value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td>Level 1</td>
<td>3</td>
</tr>
<tr>
<td>Level 2</td>
<td>5</td>
</tr>
<tr>
<td>Level 3</td>
<td>7</td>
</tr>
</tbody>
</table>

Learners who achieve the correct number of points within the ranges shown in the ‘qualification grade’ table overleaf will achieve the qualification merit or distinction or distinction* grade (or combinations of these grades appropriate to the qualification).
### Qualification grade

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Points range above pass grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Merit</td>
</tr>
<tr>
<td>BTEC International Level 2 Certificate</td>
<td>85–94</td>
</tr>
<tr>
<td>BTEC International Level 2 Extended Certificate</td>
<td>170–189</td>
</tr>
<tr>
<td>BTEC International Level 2 Diploma</td>
<td>340–379</td>
</tr>
</tbody>
</table>

*Annexe A: Calculation of the qualification grade* gives examples of how qualification grades above a pass are calculated.

### 6 Centre and qualification approval

The centre must be approved by Pearson before delivering and assessing BTEC International Level 2 qualifications on Pearson’s Self-regulated Framework. Centres that have not previously been approved will need to apply for, and be granted, centre recognition as part of the process for approval to offer these qualifications.

Before you offer these qualifications you must meet both centre and qualification approval requirements.

### Approvals agreement

All centres are required to enter into an approval agreement that is a formal commitment by the head or principal of a centre to meet all requirements. If the centre does not comply with the agreement this could result in the suspension of certification or withdrawal of approval.

### 7 Quality assurance

Quality assurance is at the heart of BTEC International Level 2 qualifications on Pearson’s Self-regulated Framework. The centre internally assesses these qualifications and is responsible for making sure that all assessors and Internal Verifiers adhere to their internal verification processes, to ensure consistency and validity of the assessment process.

Pearson uses quality assurance to check that all centres are working to the agreed standard. It gives us the opportunity to identify and provide support, if needed, to safeguard certification.

8 Programme delivery

BTEC International Level 2 qualifications consist of mandatory units and optional units. Optional units are designed to provide a focus to the qualification and give more specialist opportunities in the sector.

In BTEC International Level 2 qualifications each unit shows the Notional Learning Hours.

Notional Learning Hours are defined as the total amount of time a learner is expected to take, on average, to complete the unit to the required standard, including teaching, study and assessment time.

Centres are advised to consider this definition when planning the programme of study associated with this specification.

Mode of delivery

Pearson does not define the mode of study for BTEC International Level 2 qualifications. Centres are free to offer the qualifications using any mode of delivery that meets their learners’ needs. Please refer to the policy pages on our website at: qualifications.pearson.com/policies

Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. Centres must have due regard to Pearson’s policies that may apply to different modes of delivery.

Resources

Physical resources need to support the delivery of the programme and the proper assessment of the outcomes of learning. They should therefore normally be of industry standard.

Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Pearson.

Where specific resources are required these have been indicated in individual units in the Essential requirements sections.
Delivery approach

It is important that centres develop an approach to teaching and learning that supports the specialist vocational nature of BTEC International Level 2 qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Delivery staff and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity in the sector. Maximum use should be made of the learner’s experience.

An outline learning plan is included in every unit as guidance, it demonstrates one way of planning the delivery and assessment of the unit. The outline learning plan can be used in conjunction with the programme of suggested assignments.

Support and training

Pearson offers an extensive package of training to support all aspects of BTEC delivery, including:

- **Teaching and published resources** – we provide an extensive selection of published materials along with our innovative range of digital teaching tools. We offer guides to support planning and delivery and to help students study. For more information please visit our website: qualifications.pearson.com/en/support/support-for-you/teacher.html

- **Subject Advisors** – our subject experts are on hand to answer any questions centres may have on delivering the qualification and assessment. For more information visit our website: qualifications.pearson.com/en/support/support-for-you/teacher.html

- **Training** – many of our training events form part of the added value service offered by Pearson. As well as standard events, we can create bespoke training programmes to meet centres’ specific needs. These can be delivered face-to-face or online so that centres can choose where, when and how training takes place. For more information please visit our website: qualifications.pearson.com/support/training-from-pearson.html

If you would like further information please contact your local Pearson representative – to find out how, visit: qualifications.pearson.com/en/about-us/about-pearson/where-we-are.html
9 Access and recruitment

Pearson is committed to providing qualifications with no artificial barriers. A full statement, included in our Equality Policy, can be found on our website at: qualifications.pearson.com/policies

Equality and fairness are central to our work. We are committed to making sure that qualifications do not discriminate and all learners achieve the recognition they deserve from undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Restrictions on learner entry

These qualifications are suitable for learners aged 14 and above. Centres must give due regard to Pearson’s policies that apply to the fair and equal recruitment of learners to all Pearson qualifications.

Centres are required to recruit learners to BTEC International Level 2 qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs.

Centres should take appropriate steps to assess each learner’s potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner in the centre during their programme of study and any specific support that might be necessary to allow them to access the assessment for the qualification.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a Level 2 qualification. For learners who have recently been in education, the profile is likely to include one of the following:

- a BTEC Level 1 qualification in Construction or a related vocational area
- a standard of literacy and numeracy supported by a general education equivalent to four GCSEs/International GCSEs at grade D–G
- other related Level 1 qualifications
- related work experience.

More mature learners may present a more varied profile of achievement that is likely to include experience of paid and/or unpaid employment.
**Recognition of Prior Learning**

Recognition of Prior Learning (RPL) is a method of assessment that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Pearson encourages centres to recognise learners’ previous achievements and experiences whether at work, home and at leisure, as well as in the classroom. RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be sufficient, reliable and valid.
10 Understanding the units

All units in this qualification have the following sections.

**Title**
The title is a short description of the content of the unit. This form of words will appear on the learner’s Notification of Performance (NOP).

**Level**
The level of the unit indicates the complexity and demand expected to achieve it. The level places the unit on a framework of comparability with other units and qualifications at that level.

**Notional Learning Hours (NLH)**
Notional Learning Hours (NLH) are the total amount of time a learner is expected to take, on average, to complete the unit to the required standard, including teaching, study and assessment time.

**Unit value**
The unit value is the total credit a learner will be awarded on successful completion of the unit.

**SRF unit code**
The unique approval code for the unit.

**Unit aim**
Says what the aims of the unit are in terms of what is covered and what the unit will enable learners to do.

**Unit introduction**
The introduction gives a short description of the unit, and details the key knowledge, skills and understanding the learner will gain through studying the unit. The introduction highlights the focus of the unit and how it links to the vocational sector to which the qualification relates.

**Outcomes of learning**
Outcomes of learning state what a learner can be expected to know, understand or be able to do as a result of completing a programme of learning for the unit.

**Assessment and grading criteria**
The assessment and grading criteria gives the information used to determine the evidence that each learner must produce in order to achieve a pass, merit or distinction grade. It is important to note that the merit and distinction grading criteria require a qualitative improvement in a learner’s evidence and not simply the production of more evidence at the same level.
**Unit content**

In the unit content section topics are listed as bullets to provide detail on what is needed to design and deliver a programme of learning. Not all topics have to be covered for learners to meet the assessment criteria. Centres are able to select the topics they deliver, ensuring that learners produce evidence of sufficient depth and breadth to meet the assessment criteria.

**Information for delivery staff**

This section gives delivery staff information on delivery and assessment. It contains the following subsections.

- **Essential requirements** – identifies any specialist resources needed to allow learners to generate the evidence required for the unit. The centre will need to ensure that any requirements are in place when it seeks approval to offer the qualification.
- **Employer engagement and vocational contexts** – gives examples of agencies, networks and other useful contacts for employer engagement and for sources of vocational contexts.
- **Delivery guidance** – explains the content’s relationship to the outcomes of learning and offers guidance on possible approaches to delivery of the unit. This section includes an example outline learning plan which demonstrates one way of planning the delivery and assessment of the unit. The delivery guidance section is based on the more usual delivery modes but is not intended to rule out alternative approaches.
- **Assessment guidance** – gives information about the evidence that learners must produce, together with any additional guidance if appropriate. This section should be read in conjunction with the assessment criteria and grading criteria. It also includes a programme of suggested assignments which demonstrates how assignments match and cover the assessment and grading criteria. This is provided for guidance only and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.
- **Suggested resources** – indicates resource materials that can be used to support the teaching of the unit, for example books, journals and websites.
Units
Unit 1: Structure of the Construction Industry

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30816H

This unit is internally assessed

Unit aim
This unit develops learners’ understanding of the diversity, complexity and impact of the UK construction industry on our lives and also the contribution made by those who work within it.

Unit introduction
The construction industry is an important sector in many economies and plays a key role in all our lives. It affects where we live, where we study and work, how we travel and even how we spend our leisure time. This unit looks at the structure of the construction industry, its economic significance and the wide range of work undertaken by the industry.

The construction and built environment sector forms a substantial part of the economy, from large infrastructure works such as motorways, through to hospitals and housing. It covers a diverse range of different activities, projects, employment and services. These activities begin with the design element of projects and continue through the construction phase into refurbishment and maintenance.

The unit will enable learners to gain an overview of the types of activities undertaken by those working in the construction industry, from site operatives to architects. Learners will gain an understanding of individual job roles and responsibilities and will examine the typical career development of various members of the design and construction team. They will also explore the various types of client who use the industry, and the range of work undertaken on their behalf. Learners will begin to recognise that clients range from private individuals using their own funds, to the national government using tax revenue to support capital work for the benefit of the whole country.

Construction is a growing sector within many developing countries. Multi-storey structures dominate many city skylines. Every one of these structures needed suitably qualified and trained personnel to construct them. Many experienced personnel work as key project supervisors on these unique and often complex jobs. Learners will investigate the wide range of opportunities open to them.

On completion of this unit, learners will be able to use the knowledge, understanding and skills gained to support a variety of different job roles in the construction industry.
Outcomes of learning

On completion of this unit a learner should:

1. Understand the diversity and complexity of the construction industry
2. Know the contribution the construction industry makes to our social and economic wellbeing
3. Know about human resources in the construction industry
4. Know about careers in the construction industry.
**Assessment and grading Criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To achieve a pass grade the evidence must show that the learner is able to:</strong></td>
</tr>
<tr>
<td>P1 describe the range of work undertaken by the construction industry.</td>
</tr>
<tr>
<td>P2 compare the types of client that use the construction industry.</td>
</tr>
<tr>
<td>P3 describe the social and economic benefits of the construction industry in both national and local terms.</td>
</tr>
<tr>
<td>P4 identify the personnel working in the construction industry.</td>
</tr>
<tr>
<td>P5 describe the roles and responsibilities of the personnel working in the construction industry.</td>
</tr>
<tr>
<td>P6 identify the qualifications, training and development needed to support careers in the construction industry.</td>
</tr>
</tbody>
</table>
Unit content

1 Understand the diversity and complexity of the construction industry

Activity areas:
- building
- architecture
- planning
- surveying
- civil and structural engineering
- building services, engineering
- other, e.g. estate management, repair and maintenance, facilities management, highways and permanent way engineers

Client types:
- private, e.g. individuals, sole traders
- private and public limited companies
- government, e.g. local, regional, central

Range of work undertaken:
- e.g. residential, commercial, retail, recreational, leisure, industrial, health, educational, agricultural, utilities and services, public buildings, transport infrastructure

2 Know the contribution the construction industry makes to our social and economic wellbeing

The construction economy:
- economic benefits of construction
- inner city regeneration
- housing market and property wealth
- contribution to GDP
- markets
- contribution to local and national economy, e.g. 2012 Olympics sites

The social economy:
- social benefits of construction
- security
- added value
- crime reduction
- aesthetics
- urban renewal
- quality standards
- contribution socially to local and national issues
3 Know about human resources in the construction industry

Roles and responsibilities of members of the construction team:
- client
- architect
- architectural technologist
- surveyors, e.g. quantity surveyor, building surveyor, land surveyor
- clerk of works
- managers, e.g. contract manager, site manager
- safety officer
- craftspersons
- general operatives
- other, e.g. estimator, buyer consulting engineers, subcontractor

Interaction between team members:
- simple organisational frameworks (‘top down’ and ‘flat’ structures)
- direct and lateral relationships
- service and line management relationships
- valuing others, e.g. promotion of equality and diversity, provision of safe working environment, investment in staff training and development

4 Know about careers in the construction industry

Career paths:
- professional
- technical
- craft
- operative
- bridging arrangements for progression from craft to technical occupations

The range of professional career pathways:
- professional organisations, e.g. CIOB, RICS, RIBA, ICE, CIBSE, relevant in–country organisations

The benefits of professional career pathways:
- professional approach
- reputation
- lifelong learning
- advancement
- promotion
- salaries
- position
- capacity
- client relationships
Training and education:

- routes, e.g. on-the-job, off-the-job, attendance at college, open learning, distance learning, online learning
- accredited qualifications, e.g. apprenticeships, diplomas, certificates, degrees, professional qualifications, continuing professional development, short courses relating to new developments
- licences to practice, e.g. CSCS cards, CORGI membership, relevant in-country licences to practice
Information for delivery staff

Essential requirements
Learners should have access to a variety of literature relevant to the construction industry. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with video and DVDs/CD ROMs, home country’s standards, BRE papers, maps and open access to the internet. A well-stocked careers library will help in the delivery of the human resource section of the content.

As ever, site visits and the use of specialist guest lecturers will prove invaluable. Centres with craft training departments have a useful teaching aid that could be used in a variety of ways.

Employer engagement and vocational contexts
The use of a local developer and a construction company would greatly improve the learning experience for learners, giving them a real context to visualise sustainable techniques and research the roles and responsibilities of the people producing the final project.

Delivery guidance
This unit should be one of the first units delivered in this qualification, as it introduces learners to the construction industry. Delivery should be invigorating and broaden the experiences, knowledge and understanding that learners get from the unit.

Tutors have opportunities to use a wide range of techniques to deliver this unit. Lectures, discussions, seminar presentations, live construction site visits, research using the internet and/or library resources and the use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject.

The unit has a broad content, covering how the construction industry is structured, the various roles and occupational skills of the people who work in it, the constraints that influence design, planning and production decisions, the need to consider the natural environment and the social and economic significance of the construction industry for the country.

This unit helps set the scene for the rest of the qualification. Depth of coverage is, therefore, not as important as breadth and the detail will follow in other, more specialised, units. An indication of the appropriate depth of treatment can be obtained by reviewing the content of the other units in this qualification, and the more advanced construction units at Level 3 of the Qualifications and Credit framework (QCF).

Teaching and learning strategies must be devised to help learners develop a clear and simple understanding of how the construction industry functions. This can be done by examining the industry from a variety of perspectives, breaking the knowledge down into bite-size pieces and then examining both the individual pieces and how they fit together to form the whole.

Properly structured site visits are always beneficial, as are guest speakers drawn from local employers, materials suppliers, trade unions and professional associations. Health and safety is paramount on site visits and it is important that learners comply with organisational policy, wherever they may be.
Input from learners who have progressed from similar backgrounds to higher-level qualifications could provide young learners with useful role models and enhance learning.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation on the unit content and the agreed definitions of sustainability – learners to investigate the diversity of the construction industry and client types.</td>
</tr>
<tr>
<td>Research on the construction industry client types and the work they commission – individual learning.</td>
</tr>
<tr>
<td>The construction economy – the contribution and economic benefits – tutor delivery.</td>
</tr>
<tr>
<td>Whole-class teaching – summarise individual research on clients.</td>
</tr>
<tr>
<td>Differentiation between private, commercial and governmental clients.</td>
</tr>
<tr>
<td>Understanding and application of the social values of construction to a scenario – whole-class teaching and small break-out groups for case studies.</td>
</tr>
<tr>
<td>Analysis of social benefits as a case study – prepare a range for teams.</td>
</tr>
<tr>
<td>What such developments can bring to run-down areas of cities.</td>
</tr>
<tr>
<td>Conclusion and outcomes for a case study – national and local benefits.</td>
</tr>
</tbody>
</table>

**Assignment 1: The Diversity, Complexity, Contribution and Benefits of Construction to the Economy**

<p>| List and discuss the construction industries personnel – tutor-led discussion. |
| Individual roles and responsibilities identified – learner research. |
| The professional role – tutor delivery. |
| Individual research on construction responsibilities. |
| Whole-class teaching to collate individual research. |
| Class discussion on meaning of ‘construction services’. |
| Management, supervisory, craft and professional careers – tutor delivery on the different management roles. |
| The professional associations – tutor delivery. |
| Training and qualifications required – tutor delivery. |
| Whole class divided into small teams, each given a professional association with a list of questions to answer. |
| Whole-class collation of research tasks. |
| Outline the interactions between the construction team – theory and assessment, how the previous roles interact with each other. |
| Independent research in small groups on the interaction between roles. |
| Whole-class discussion on interactions between personnel using outcomes of research. |</p>
<table>
<thead>
<tr>
<th><strong>Topic and suggested assignments/activities/assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifications, training and development to underpin career pathways – theory and assessment on professional roles, routes to qualify, progression routes for craft and supervisory roles.</td>
</tr>
<tr>
<td>Whole-class teaching on progression from craft to management.</td>
</tr>
<tr>
<td>Progression routes for a chosen career pathway, small team activities using the internet.</td>
</tr>
<tr>
<td>Learner research into professional association websites and qualification routes.</td>
</tr>
</tbody>
</table>

**Assignment 2: Human Resources and Careers in Construction**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be employed, and tutors are encouraged to consider and adopt these where appropriate. Some examples of possible assessment approaches are suggested above and below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

The structure of the unit content suggests that a minimum of two assignments could be used to provide learners with opportunities to produce the evidence required for achievement of all the grading criteria. For example, the first could cover P1, P2, P3, M1, M2 and D1 and the second P4, P5, P6, M3 and D2. They could be broken up into smaller component parts if this helps the assessment process.

For P1, learners must analyse the type of work the construction industry undertakes. For example, infrastructure works, hospitals, schools, ministry of defence work and housing are just a few markets that could be identified. Research into construction statistics would help learners with this criterion.

For P2, learners must compare the types of client that use the construction industry in terms of their roles and responsibilities. Reference must be made to private, public and commercial organisations at the least.

For P3, learners must clearly describe at least one social and one economic benefit of the construction industry from both the local and national perspective. Learners must make it clear where the benefits will be noticed most.

For P4, learners must identify a broad range of personnel working in the construction industry. Those identified must include differentiated examples of operatives, craftspersons, technical, supervisory, managerial and professional personnel.

For P5, learners must describe a broad range of personnel working in the construction industry, in terms of their roles and responsibilities. Those identified must include differentiated examples of operatives, craftspersons, technical, supervisory, managerial and professional personnel. The evidence should build on that produced for P4 and should take the same form.

For P6, learners must identify the qualifications, training and development needed to support three careers in the construction industry. One career should be at operative or craft level, the second at technician or supervisor level and the third at managerial or professional level.

For M1, learners must distinguish between three activity areas involved in a given construction project in terms of roles and responsibilities. The three activities should be drawn from the list provided in the content and should be clearly differentiated in terms of the roles and responsibilities of those engaged in the activities selected.

For M2, learners must compare the social and economic contribution made by different areas of the construction and built environment sector. There is clear benefit in using the same areas that were used to provide evidence for M1 and the evidence should take the same form as that for M1.

For M3, learners must explain how operatives and craftspersons can develop their careers and progress to a technical or professional role in a given area of activity. There is often more than one way to do this, and various qualifications and forms of training and development can support such progression. The evidence will be satisfactory if it is both correct and consistent.
For D1, learners must evaluate private, commercial and governmental clients in terms of the kind of work they generally commission. Learners need produce only one example of each but the three examples must be clearly differentiated and typical of each client.

For D2, learners must evaluate two different organisational frameworks in terms of how each affects the interactions between members of the construction team. Learners should clearly describe how each system works and where its use is most appropriate. Evidence for this criterion could be derived from an extension of the activities undertaken for P5 and could build upon the organisational structures of two different local companies or tutor-generated construction projects.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, M1, M2, D1</td>
<td>The Diversity, Complexity, Contribution and Benefits of Construction to the Economy.</td>
<td>A European construction firm is contemplating tendering for work in the UK. The company wishes to understand how the UK construction industry works, and what the social and economic benefits of investment in the UK might be.</td>
<td>Presentation to include text, diagrams, tables and charts as appropriate.</td>
</tr>
<tr>
<td>P4, P5, P6, M3, D2</td>
<td>Human Resources and Careers in Construction.</td>
<td>A joiner working for your company has asked you how he could progress to become a professional site manager, and what his daughter would need to do to become a building surveyor after obtaining her A levels.</td>
<td>Case study with learners identifying and describing construction career pathways and progression routes within the industry. Evidence to comprise a report including text, diagrams, tables and organisational charts as appropriate.</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Work in Construction</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
<td>Sustainable Construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction Technology and Design in Construction and Civil Engineering</td>
</tr>
</tbody>
</table>

Links to relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.

Suggested resources

Books


Journals

*Building Magazine*

*Construction News*

Websites *(Relevant websites applicable to learner’s home country)*

<table>
<thead>
<tr>
<th><a href="http://www.architecture.com">www.architecture.com</a></th>
<th>Royal Institute of British Architects</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.cioib.org.uk">www.cioib.org.uk</a></td>
<td>Chartered Institute of Building</td>
</tr>
<tr>
<td><a href="http://www.communities.gov.uk">www.communities.gov.uk</a></td>
<td>Communities and Local Government</td>
</tr>
<tr>
<td><a href="http://www.euskills.co.uk">www.euskills.co.uk</a></td>
<td>Energy and Utility Skills</td>
</tr>
<tr>
<td><a href="http://www.rics.org">www.rics.org</a></td>
<td>Royal Institution of Chartered Surveyors</td>
</tr>
</tbody>
</table>
Unit 2: Exploring Health, Safety and Welfare in Construction

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30817H
This unit is internally assessed

Unit aim
This unit develops learners’ knowledge and understanding of health, safety and welfare in the construction industry and provides an opportunity to perform and use risk assessments.

Unit introduction
It is essential that learners entering or already working in the construction industry understand health and safety issues and can carry out their work safely. Hazards can arise from plant equipment and substances used, the actual tasks carried out and from the way people perform these tasks. This unit focuses on health and safety organisational responsibilities to ensure that learners understand their own and other people’s responsibilities. Over recent years there have been changes to construction legislation with an increased emphasis on ensuring and demonstrating competence. If risks are not adequately controlled there is an increased probability that unfortunate and unnecessary accidents will occur. Learners will understand the importance of ensuring good standards of health and safety and will become familiar with the main parts of the health and safety management system.

Although not as important as loss of life, a serious accident can have major repercussions for those involved, their families and colleagues. As well as the human impact, accidents can have a financial impact, affect project timelines and jeopardise any future contracts being awarded. Learners will investigate typical causes of accidents on site and explore when to report accidents and to whom.

A key factor in preventing accidents is to ensure that risks are identified and controlled effectively. Learners will investigate the principles of risk assessments and gain knowledge of techniques through carrying out typical risk assessments.

These include skills for identifying hazards and risks; carrying out risk analysis; recording and analysing data; communication skills in recording and using information. Learners will be able to identify and describe hazards and risks present, review existing control measures and, where necessary, outline further controls in order to minimise risks more effectively.

As part of the unit learners will become familiar with construction sector statistics and campaigns undertaken by relevant authorities. They will be expected to develop an awareness of the applicable health, safety and welfare legislation.
Outcomes of learning

On completion of this unit a learner should:

1. Know the importance of health, safety and welfare in the construction and built environment sector
2. Be able to carry out risk assessments
3. Understand the importance of control measures in risk assessment.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>To achieve a pass grade the evidence must show that the learner is able to:</td>
</tr>
<tr>
<td><strong>P1</strong> outline key methods used to ensure good standards of health and safety on a construction site.</td>
</tr>
<tr>
<td><strong>P2</strong> identify the roles and responsibilities of relevant personnel.</td>
</tr>
<tr>
<td><strong>P3</strong> identify potential risks and hazards in an area of the working environment.</td>
</tr>
<tr>
<td><strong>P4</strong> conduct a risk assessment.</td>
</tr>
<tr>
<td><strong>P5</strong> explain how control measures are used in risk assessment procedures.</td>
</tr>
</tbody>
</table>
Unit content

1 Understand the importance of health, safety and welfare in the construction and built environment sector

Legal responsibilities:
- roles and responsibilities of individual personnel (including managers, supervisors, clients, principal contractors, contractors, employees) both on- and off-site, under the relevant legislation/regulations in home country

Workplace health and safety:
- workplace policy statements
- responsibilities and safe systems of work
- need for risk assessments

Health and safety management system:
- e.g. policy, organisation, planning and implementation, monitoring, review, audit and references to management systems, e.g. HS(G) 65, BS8800, ISO18001

Active monitoring and reactive monitoring techniques:
- explain importance of active and reactive monitoring with reference to HS(G) 65
- overview of active monitoring techniques, e.g. safety inspections, safety tours, communication and training
- overview of reactive monitoring techniques, e.g. accident, investigations

Legal requirements:
- mandatory legal actions (in general terms) required of a contractor on-site
- penalties (in general terms) for non-compliance

2 Be able to carry out risk assessments

Hazards:
- e.g. physical, environmental, chemical, biological and psychosocial hazards

Risks:
- identification of the risks that arise out of identified hazards relating to plant equipment, machinery and materials

Work methods:
- changes in working methods

Workplace changes:
- e.g. temperature, dust, humidity, confined spaces, traffic access and egress
Human factors:
- e.g. attitude, training, responsibility, experience

Risk assessments:
- purpose
- features of
- use of
- control measures, risk ratings and qualitative and quantitative risk assessment methods, relevant legislation/regulations in home country

Risk control:
- risk control hierarchy, purpose
- principles of same

3 Understand the importance of control measures in risk assessment

Training:
- typical examples of health and safety training in construction industry
- toolbox talks
- CSCS, CSPS, CTIB, CIOB

Procedures:
- written safe systems of work
- safe working instructions
- method statements
- permit to work systems

Protective equipment:
- correct use of personal protective equipment (PPE) (including hard hat, safety boots, ear defenders, safety glasses, respiratory protection)
- maintenance and storage of PPE
- reporting regimes for defective equipment

Substances:
- risks associated with a range of substances
- relevant legislation/regulations in home country
- risk assessments

Fire precautions:
- theory of fire triangle
- classes of fires
- types of fire extinguishers
- selection of appropriate extinguishers for given situations
Good housekeeping:
- tidy workplace with sufficient space for own work, materials used
- safe storage of materials
- clear routes of fire exits maintained
- avoidance of slip, trip and fall on the level hazards

Working at heights:
- awareness of relevant legislation/regulations in home country
- control measures
- fragile roofs
- movement of materials into position

Working below ground:
- standard trench support systems

Confined spaces:
- awareness of relevant legislation/regulations in home country
- confined space risk assessments
- competence
- control measures
- emergency arrangements

Safety signs:
- identification and appropriate positioning of safety signs
- difference between mandatory warning, prohibition and safety advisory signs

Plant, equipment and machinery:
- inspection and testing
- requirement for operator competence
- safe systems of work
- awareness of relevant legislation/regulations in home country

Electricity and buried/overhead services:
- use of volt supply on sites
- detection of cables
- colour coding selection of voltages
- Safe working practices when excavating
- safe working practices when working near to overhead cables
- safe working practices when working with electrical powered hand tools
Information for delivery staff

Essential requirements

There are many websites that provide excellent resources for all matters concerning health, safety and welfare, as do CITB, Construction Skills and the IOSH website discussion forums. These websites are excellent teaching and learning resources and can be used to research a variety of health, safety and welfare matters. The HSE website (UK) is particularly useful for statistics, downloadable material and footage. The best resource is access to a construction site and to ongoing construction work. Learners can find information using books, case studies, journals, magazines, suggested websites and newspapers.

A broad range of personal protective equipment should be available as noted in the delivery guidance.

Learners should have access to a range of practical construction activity resources/workshops or sites.

Access to a range of information resources to complete assignments and case studies will be essential, including CD ROMs and the internet.

Employer engagement and vocational contexts

Visits to construction sites and from employee ambassadors are extremely useful to the delivery of this unit.

Delivery guidance

Tutors have the opportunity to use a wide range of techniques to deliver this unit. Lectures, discussions, case studies, use of DVD or video material and footage, seminar presentations, site visits, supervised practical work, research using the internet and/or library resources and the use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject.

Centres will benefit from a working relationship with a local construction contractor. This can provide a source of useful material and will also offer opportunities for site visits that will broaden learners’ experience and place it within a real-world frame. The use of real-life experiences, as opposed to virtual scenarios, will reinforce the human cost of an accident and make learners more aware of the dangers inherent in the construction industry. Where a relationship with a local contractor proves difficult, centres should consider the use of DVD, video and/or photographic material as secondary sources for the production of the necessary evidence.

An awareness of health, safety and welfare must be integrated into every other unit and introduced to learners as soon as possible. In the case of full-time learners it may be desirable to use appraisal or hazard spotting exercises on craft activities within the centre, if such facilities are available. Where learners are working on a part-time basis within the construction industry, case studies or projects could be based on a site on which the learner is currently working. The learner will need to formulate and agree the scenario and terms of reference for the case study or project with their tutor and line manager. In all cases, any studies and projects used in the delivery of this unit should relate to learners’ prior experience if they are to be effective.

There is a range of legislative measures in place to reduce accidents and to improve the way incidents are dealt with. Learners should be aware of the existence of the principal construction related regulations but they do not need an in-depth
knowledge and understanding of them. They should, however, know that all health and safety legislation is governed by specific regulations and should be aware of how this affects the construction industry. They should learn the practical measures used on site and the risk control hierarchy, including PPE, used to reduce the occurrence and severity of accidents. They need to be able to identify the appropriate PPE for a range of construction tasks, and this PPE should be available for their inspection and use. Video, photographs and appropriate manufacturers’ catalogues should be used where this is not possible.

Guidance is given in the Association of Colleges Best Practice Guide to Incorporating Health and Safety into the Construction Curriculum and this should form the basis of the teaching and learning strategies adopted for health, safety and welfare in this unit, and in the qualification as a whole.

Health, safety and welfare issues are paramount and must be strictly reinforced through close supervision of workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres should read the Delivery approach section on page 20.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to unit content.</td>
</tr>
<tr>
<td>Introduction to health and safety in construction industry – whole-class teaching.</td>
</tr>
<tr>
<td>Examples of types of legislation, e.g. statute and civil, main Health and Safety Regulations in relation to construction activities.</td>
</tr>
<tr>
<td>Non-legal procedures affecting safety; company rules and procedures.</td>
</tr>
<tr>
<td>Group discussion on moral, legal and financial implications of health and safety.</td>
</tr>
<tr>
<td>Health and safety legal system – statute and civil law and enforcement structure, concept of ‘reasonably practicable’.</td>
</tr>
<tr>
<td>Learner activity – researching relevant statute and civil case law in relation to incidents that have occurred in the construction industry.</td>
</tr>
<tr>
<td>Group discussion following on from whole-class teaching.</td>
</tr>
<tr>
<td>Legal responsibilities of employers, self-employed, employees and levels of management under relevant legislation/ regulations in home country</td>
</tr>
<tr>
<td>Explain workplace health and safety policies – policy statements, responsibilities, safe system of work, method statements, overall requirement for risk assessment.</td>
</tr>
<tr>
<td>Explain attributes of an accident: definition of ‘accident’.</td>
</tr>
<tr>
<td>Overview of accident trends and causes of accidents in construction industry.</td>
</tr>
<tr>
<td>Learner activity – researching own company’s health and safety policy and accompanying documentation, to be simulated for full-time learners.</td>
</tr>
<tr>
<td>Health and safety management systems – include overview of policy, organisation, planning, monitoring, audit and review (POPMAR).</td>
</tr>
<tr>
<td><strong>Non-legal procedures affecting safety company rules and procedures.</strong></td>
</tr>
<tr>
<td>Preparation for Assignment 1: Management Controls and Responsibilities.</td>
</tr>
<tr>
<td>Carrying out Assignment 1 covering P1, P2, P3, M1 and D1.</td>
</tr>
<tr>
<td>Topic and suggested assignments/activities/assessment</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Risk assessment – purpose, definitions of ‘hazards’ ‘risks’ and ‘risk controls’.</td>
</tr>
<tr>
<td>Explain hazard groups – environmental, physical, biological, chemical and psychosocial.</td>
</tr>
<tr>
<td>Learner activity – carry out risk assessment of a workshop on site.</td>
</tr>
<tr>
<td>Workshop activity – workplace hazards, e.g. struck by objects, manual handling, electricity and electrical equipment, slips, trips and falls on the level, falls from height, untidy work area, fire, compressed gases, unfenced machinery, hazardous substance.</td>
</tr>
<tr>
<td>Environmental issues – demonstration of in-house reporting procedures.</td>
</tr>
<tr>
<td>Response to alarms, use of safety equipment, reporting of accidents, reporting of hazardous items of plant or equipment.</td>
</tr>
<tr>
<td>Legislation appropriate to personal protection.</td>
</tr>
<tr>
<td>Demonstration of different types of PPE and grading systems, importance of maintenance, reporting defects, obtaining replacements, shelf-life.</td>
</tr>
<tr>
<td>Demonstration – precautions to be observed when working near to any live equipment, permit to works, use of danger tags, warning notices, safety barriers, cones and tapes.</td>
</tr>
<tr>
<td>Company visit or guest speaker.</td>
</tr>
<tr>
<td>Explain quantitative and qualitative risk assessment techniques.</td>
</tr>
<tr>
<td>Explain quantitative risk ratings and risk reduction measures.</td>
</tr>
<tr>
<td>Explain purpose of risk control hierarchy, describe workplace precautions, risk control systems.</td>
</tr>
<tr>
<td>Group activity – identifying various workplace precautions and risk control systems.</td>
</tr>
<tr>
<td>Working at heights and risk control measures – use DVD footage, site visits and hazard-spotting exercise.</td>
</tr>
<tr>
<td>Work at Height relevant legislation/regulations in home country.</td>
</tr>
<tr>
<td>Demonstration of main groups of safety signage, appropriate positioning, consideration of human factors and languages</td>
</tr>
<tr>
<td>Practical activity and electronic quiz on safety signs and meaning of same.</td>
</tr>
<tr>
<td>Overview of plant and equipment and key equipment (mobile and hand tools) used in construction industry and hazards arising from them.</td>
</tr>
<tr>
<td>Requirement for operator competence and safe systems of work, inspection and testing regimes and references to relevant legislation/regulations in home country.</td>
</tr>
<tr>
<td>Hazardous substances – main types in construction industry, health effects, risk and safety phrases explained, chemical hazard warning labels, PPE and RPE, Workplace Exposure Limits and basic monitoring methods.</td>
</tr>
<tr>
<td>Electricity hazards including buried and overhead services, use of voltage on site, detection of cables, colour coding selection of voltages, safe working practices when excavating (hand digging) and safe working practices when working near overhead cables.</td>
</tr>
<tr>
<td>Confined spaces (definition of), overview of confined space risk assessments, permit to work systems, competence, control measures and emergency arrangements for confined space working – show pictures/DVD footage.</td>
</tr>
<tr>
<td>Working below ground – show standard trench support systems and excavation techniques, consideration of protection of persons working in excavations and setting up barriers, detection of underground services and isolation, monitoring and controls for inclement weather conditions and inspection regimes.</td>
</tr>
<tr>
<td>Fire precautions – give overview of theory of fire triangle, classes of fires, types of fire extinguishers, and how to select appropriate fire extinguishers for given situations, hot work consideration and examples of Permit To Works.</td>
</tr>
<tr>
<td>Topic and suggested assignments/activities/assessment</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Industrial visit to local, regional or national construction company.</td>
</tr>
<tr>
<td>Practical work on risk assessment and reporting of risk assessment.</td>
</tr>
<tr>
<td>Preparation for Assignment 2: Risk Assessment in the Working Environment.</td>
</tr>
<tr>
<td>Carrying out Assignment 2 – P4, P5, M2 and D2.</td>
</tr>
<tr>
<td>Review of unit delivery and assessment.</td>
</tr>
</tbody>
</table>
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the assessment and grading grid. Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be employed, and tutors are encouraged to consider and adopt these where appropriate. Some examples of possible assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

Some criteria could be assessed directly by the tutor during practical activities. If this approach is used, suitable evidence from guided activities would be observation records or witness statements. Guidance on their use is provided on the Edexcel website – www.edexcel.com.

The structure of the unit content suggests that a minimum of three assignments could be used to cover the three outcomes. For example, the first of these would cover P1, P2, P3, P4, M1 and D1, the second P4, P5, M2 and D2. These could be broken up into smaller component parts if this helps the assessment process.

To achieve a pass grade learners must meet the three pass criteria listed in the grading grid.

For P1, learners must outline five different examples that would contribute to ensuring good standards of health and safety on a construction site.

For P2, the learner must identify, but not describe in detail, the roles of at least two persons having key responsibilities for health, safety and welfare on a construction site. Examples of suitable evidencing approaches are as for P1.

For P3, learners must be able to show clear identification of potential hazards and the associated risks in a practical workshop or construction site group activity.

For P4, learners must conduct a risk assessment and identify at least one hazard in each case when using specified items of plant, equipment, machinery and materials, and describe the risks that arise from each of these hazards. Evidence for this criterion could take the form of an oral presentation, tutor questioning or a written report based on an investigation or on local survey/interviews.

For P5, learners must relate at least two areas of suitable risk reduction measures to the specific hazards being addressed and explain how each of the corresponding control measures works. References should be made to key items such as relevant legislation, the benefits of training and communication, the use of PPE, the use of construction plant and equipment, and procedures for safe systems of work. Evidence for this criterion could be a written report based on the findings of the actual risk assessment completed.

For M1, learners must clearly explain the ways in which both human and workplace factors can generally affect risks and hazards, and give at least one example of each of these.

For M2, learners should document the findings of P5 in a report format for management. Learners must provide a written risk assessment which demonstrates effective understanding of the entire risk assessment process, highlighting a good range of hazards, risks to people or property, risk rating quantification, control measures and utilisation of training and communication of the findings and setting of appropriate review timescales.
For D1, learners evaluate the effects of change on established methods or working conditions. This implies an appreciation of the types of changes that can occur and the ways in which these affect work practices, risk assessments and workplace policies. Evidence for this criterion could be derived from the results of local studies or investigations or from interviews with construction workers. An alternative source of evidence could be tutor provided case studies concerned with the effects of safety changes such as working at night when lighting levels are diminished, working at different heights, process alterations or the use of different plant and machinery.

For D2, learners must evaluate the impact of the risk assessment findings on different groups of persons who may be affected such as employees, members of the public, visitors and other contractors and distinguish control measures and risk ratings.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, M1, D1</td>
<td>Management Controls and Responsibilities.</td>
<td>You have been asked to report to a senior management giving an overview of a person’s assigned key roles and health and safety responsibilities for a specific job within the construction industry. The report should include proactive arrangements for ensuring good standards of health and safety with reference to applicable legislation.</td>
<td>Practical report showing understanding of persons assigned health and safety responsibilities as well as highlighting comparisons of good and poor health and safety cultures and the effect of each on the workforce.</td>
</tr>
</tbody>
</table>
### Criteria covered

<table>
<thead>
<tr>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Assessment in the Working Environment.</td>
<td>An environmentally conscious client asks you to prepare a written risk assessment on a variety of potential risks and hazards. The client would also like you to suggest appropriate control measures.</td>
<td>Produce a written risk assessment which includes a variety of physical, chemical, psychosocial, biological and environmental risks, quantification of risk ratings, evaluation of existing controls and suggestions for any further necessary sensible risk-reduction measures.</td>
</tr>
</tbody>
</table>

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit has some links with all the units in this qualification. The unit also supports the following unit in the Edexcel BTEC Level 3 Nationals in Construction, Civil Engineering and Building Services Engineering (June 2003): **Unit 1: Health, Safety and Welfare**. The unit provides opportunities to gain Level 2 key skills in application of number, information and communication technology, improving own learning and performance and problem solving.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
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<tbody>
<tr>
<td>Health and Safety and Welfare in Construction</td>
<td>Construction Methods and Techniques for Low-rise Domestic Buildings</td>
<td>Health, Safety and Welfare in Construction and the Built Environment</td>
</tr>
<tr>
<td>Exploring Carpentry and Joinery</td>
<td>Construction Technology and Design in Construction and Civil Engineering</td>
<td></td>
</tr>
<tr>
<td>Performing Joinery Operations</td>
<td>Building Technology in Construction</td>
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</tr>
<tr>
<td>Performing Carpentry Operations</td>
<td>Project Management in Construction and the Built Environment</td>
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</tr>
<tr>
<td>Exploring Trowel Operations</td>
<td>Mechanical and Electrical Services in Construction</td>
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<tr>
<td>Performing Blockwork Operations</td>
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<tr>
<td>Level 1</td>
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<td>Level 3</td>
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<tr>
<td>Exploring Painting and Decorating</td>
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<tr>
<td>Performing Paperhanging Operations</td>
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<tr>
<td>Performing Decorating Operations</td>
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<tr>
<td>Exploring Building Services Techniques</td>
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<tr>
<td>Performing Plumbing Operations</td>
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<tr>
<td>Performing Electrical Operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Links to the Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*. 
Suggested resources (relevant legislation/regulations/information in home country)


Books


Websites (Relevant websites applicable to learner’s home country)

<table>
<thead>
<tr>
<th>Construction Skills</th>
<th>Health and Safety Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.cskills.org/workinconstr/healthsafety/index.aspx">www.cskills.org/workinconstr/healthsafety/index.aspx</a></td>
<td>Institute of Occupational Health and Safety</td>
</tr>
<tr>
<td><a href="http://www.hse.gov.uk/construction">www.hse.gov.uk/construction</a></td>
<td>Workplace Law Network</td>
</tr>
<tr>
<td><a href="http://www.iosh.co.uk/index.cfm?go=discussion.threadandforum=1">www.iosh.co.uk/index.cfm?go=discussion.threadandforum=1</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.workplacelaw.net/topic/show/list/Construction">www.workplacelaw.net/topic/show/list/Construction</a></td>
<td></td>
</tr>
</tbody>
</table>
Unit 3: Sustainability in the Construction Industry

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30818H
This unit is internally assessed

Unit aim

This unit develops learners’ understanding of sustainability, explores how sustainability is integrated into construction projects and investigates how sustainability issues can be addressed more effectively in the future.

Unit introduction

Sustainability is important to the modern construction and built environment sector for many different reasons. Global climate changes pose an enormous challenge. Fossil fuels such as oil and gas are a finite resource, a ‘one-off gift’ to the human race. Once they have been used up they can never be replaced, and we must give urgent thought to new ways of providing the energy we need. It is becoming increasingly difficult to resource the materials needed to construct the built environment. We must reduce the waste and pollution generated by the construction industry.

Sustainability has been defined as ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’. Those working in the construction and built environment sector must rethink the way in which they design, construct, operate and manage the built environment in order to address sustainability issues.

Development of the built environment is, however, essential to the needs of people and communities. The expectation is that such development will now take place with minimal harm to the natural environment. The construction and built environment sector must therefore learn to create a balance between the need for development of the built environment and the need to protect the natural environment, both during construction and during the lifetime of the buildings and other structures created. This can only be achieved by the use of a wide range of knowledge, skills and understanding in the planning, design, production and maintenance stages of the construction process.

This unit gives learners an opportunity to explore the concept of sustainable construction and how it relates to the current and future impact of the built environment upon the natural environment. Learners will explore issues such as minimisation of waste, pollution control, the careful use of resources, preservation of wildlife, flora and fauna and protection of biodiversity.
The unit encourages learners to investigate how sustainable design and construction techniques can be used to address environmental issues. This will include the specification of products, materials and services that do minimal harm to the environment in terms of their manufacture, transport and incorporation into the built environment, the use of environmentally friendly designs, locally sourced materials, improved management techniques and alternative energy technology. On completion of this unit, learners should be able to use the knowledge, understanding and skills gained to support a sustainable approach to construction in the built environment.

**Outcomes of learning**

On completion of this unit a learner should:

1. Understand the concept of sustainability as it applies to the construction and built environment sector
2. Know the issues affecting the development of a sustainable built environment
3. Know how sustainability can benefit the built environment both locally and nationally
4. Know how sustainable design and construction techniques are used to address environmental issues.
### Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 explain what is meant by sustainability.</td>
<td>M1 assess the benefits of considering sustainability issues in the built environment.</td>
<td>D1 evaluate the consequences of not considering sustainability issues in the built environment.</td>
</tr>
<tr>
<td>P2 explain the relevance of sustainability to the construction and built environment sector.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 identify the issues associated with the provision of a sustainable built environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4 describe the issues associated with the provision of a sustainable built environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5 identify the benefits of using sustainable construction, in both local and national terms.</td>
<td>M2 compare the local and national benefits of sustainable construction in social and economic terms.</td>
<td>D2 justify the selection of specified sustainable construction in terms of effectiveness and relative cost.</td>
</tr>
<tr>
<td>P6 describe the benefits of using sustainable construction, in both local and national terms.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> identify the sustainable design and construction techniques used to minimise environmental impact.</td>
<td><strong>M3</strong> evaluate the effectiveness of sustainable construction techniques at each stage of the development process.</td>
<td></td>
</tr>
<tr>
<td><strong>P8</strong> describe the sustainable design and construction techniques used to minimise environmental impact.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Understand the concept of sustainability as it applies to the construction and built environment sector

Definitions of sustainability:
- the meaning of sustainability in social, physical, economic and general terms

Relevance of sustainability:
- finite resources
- global warming
- melting ice-caps
- rising sea levels
- climate change
- flooding
- shortages
- extinction of species
- potential consequences of a reduction in biodiversity
- needs of future generations
- local and global context
- inter-relationships, e.g. impact on construction design and planning

2 Know the issues affecting the development of a sustainable built environment

Built environment issues:
- nature of the built environment (significant features, existing and future)
- impact of the built environment on the natural environment, e.g. local, national, existing, future
- duty of the construction industry to present and future generations, e.g. to safeguard, maintain, improve and expand the built environment without harming the natural environment

Social and economic issues:
- meeting local and national needs
- improved business and employment opportunities
- skills development
- positive economic impact, e.g. contribution to gross domestic product (GDP), financial return on development, increased prosperity
- negative social impact, e.g. over-development, pollution
3 Know how sustainability can benefit the built environment both locally and nationally

Local benefits:
- employment
- social benefits
- green spaces
- aesthetics
- community consultation
- local involvement
- improved environments
- regeneration

National benefits:
- cleaner air
- reduction in flooding
- education
- conservation of resources
- economic wellbeing
- environmental protection
- better quality standards
- change in education
- government benefits
- tourism

4 Know how sustainable design and construction techniques are used to address environmental issues

Influencing factors:
- stages of the development process (planning, design, construction)
- factors influencing these stages (physical, technical, financial, legal and aesthetic)
- impact on the natural environment at each stage

Respecting the natural environment:
- overall aims and objectives
- minimisation of waste
- reduction of pollution
- control of rate of consumption of valuable resources
- conservation of natural assets
- preservation of wildlife, flora and fauna
- protection of biodiversity
Sustainable construction:

- techniques, e.g. environmentally friendly design, specification of locally sourced materials, improved site management, improved resource management, improved waste management, reclamation and recycling, alternative energy technology
Information for delivery staff

Essential requirements

Learners should have access to a variety of literature relevant to sustainability in the construction industry. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with video and DVD/CD ROMs, BRE papers, maps and open access to the internet. There is a wealth of internet resources available on the topics of sustainability and the environment. As ever, site visits and the use of specialist guest lecturers will prove invaluable.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The use of a local developer and a construction company would benefit the learning experience, as would access to the local environmental services, planning and/or building control departments. Giving learners a real context in which to visualise sustainable techniques and research the roles and responsibilities of the people will be of great value.

Delivery guidance

This unit should be the one of the first units delivered in the Pearson BTEC International Level 2 qualifications in Construction, because it introduces and emphasises the importance of sustainability in the construction industry and embeds the basic principles from the outset. Delivery should be invigorating and must broaden learners’ experiences, knowledge and understanding.

Tutors have the opportunity to use a wide range of techniques to deliver this unit. Lectures, discussions, seminar presentations, live construction site visits, research using the internet and/or library resources and the use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers will add to the relevance of the subject.

The unit helps set the scene for the rest of the qualification. Depth of coverage is, therefore, not as important as breadth, and a more detailed treatment will follow in other, more specialised, units. An indication of the appropriate depth of treatment can be obtained by reviewing the content of the other units in this qualification.

Teaching and learning strategies must be devised to help learners develop a clear and simple understanding of sustainability in the construction and built environment sector. This can be done by examining the topic from a variety of perspectives, breaking the knowledge down into bite size pieces and then examining both the individual pieces and how they fit together to form the whole. The most important function of this unit is to encourage learners to approach every aspect of their future learning in terms of the sustainability issues contained within this unit. Teaching and learning strategies should be devised with this primary aim in mind.

Properly structured site visits are always of benefit, as are guest speakers drawn from local environmental groups and the environmental services, planning and building control departments of the local authority. Health and safety is paramount on site visits and it is important that learners comply with organisational policy, wherever they may be.

An input from learners who have progressed from similar backgrounds to higher level qualifications could provide less-experienced learners with useful role models and enhance learning.
Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation on the unit content and definition of sustainability – learners to investigate the theory of sustainability and finite resources and their effect on construction.</td>
</tr>
<tr>
<td>Research on the construction industry issues, for example global warming, pollution, low energy buildings</td>
</tr>
<tr>
<td>– individual learning.</td>
</tr>
<tr>
<td>Individual research on why we need sustainability.</td>
</tr>
<tr>
<td>Consequences of not acting.</td>
</tr>
<tr>
<td>Examples provided by learners.</td>
</tr>
<tr>
<td>Group round-up led by tutor.</td>
</tr>
</tbody>
</table>

**Assignment 1: Sustainability in Construction and Built Environment**

Whole-class teaching – define social and economic values in a construction context
The benefits of the construction industry for the built environment.
Case-study scenario for a major city centre development, e.g. London Olympics 2012.
Understanding and application of social and economic values to a scenario.
Whole-class teaching and small break-out groups for case studies.
Analysis of social and economic benefits to a case study – prepare a range for teams.
What such developments can bring to run-down areas of cities.
Conclusion and outcomes.
The local benefits of sustainability – tutor-led discussion.
Identification of the benefits of the local project for environment and the community.
Commence research on sustainable techniques – learners.
The national benefits of sustainability – tutor-led discussion.
Individual research project on how sustainability has an effect nationally.
Identify the benefits nationally.
Research on national sustainable techniques and government policy – learners.
Examine the modern methods of sustainable construction – assessment on a modern method of sustainable construction using a case study – tutor delivery.
Tutor-led case study.
Critical examination by learners.
Conclusion on sustainable techniques.

**Assignment 2: Sustainable Construction Techniques**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be employed, and tutors are encouraged to consider and adopt these where appropriate. Some examples of possible assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

The structure of the unit content suggests that a minimum of two assignments could be used to provide learners with opportunities to produce the evidence required for achievement of all the grading criteria. For example, the first could cover P1, P2, P3, P4, M1 and D1 and the second P5, P6, P7, P8, M2, M3 and D2. They could be broken up into smaller component parts if this helps the assessment process.

For P1, learners must explain what is meant by sustainability. The explanation should include an accepted definition but should not rely exclusively on that definition.

For P2, learners must evaluate their definition of sustainability in terms of the way in which the construction and built environment sector operates and the effect of the industry on the natural environment. The evidence should clearly build on their responses to P1.

For P3, learners must identify four issues the industry must address in providing a sustainable built environment. Evidence for this criterion could be provided, for example, in the form of a presentation, the results of a local survey, a report on a real project that has been studied or through oral questioning based on a tutor-provided case study.

For P4, learners must describe two of the four issues identified in P3 in terms of the factors to which they relate such as government policy and legislation or reduction in carbon emissions. The evidence provided should build on that for P3.

For P5, learners must identify four benefits of the application of sustainability to the construction industry and should clearly differentiate between the local benefits and national benefits.

For P6, learners must describe two benefits of the application of sustainability to the construction industry. One benefit should refer to the local community and one should have a national focus. The evidence provided should build on that for P5.

For P7, learners must identify four sustainable design and construction techniques that are used to minimise environmental impact. At least one example of design and one example of construction should be included among the four. Learners should be careful to refer only to current practices.

For P8, learners must describe two sustainable design and construction techniques that are used to minimise environmental impact. One example of design and one example of construction should be included. The evidence provided should build on that for P7.

For M1, learners must assess the benefits of considering sustainability issues and relate this to community and individual needs. The evidence provided must build on that for P1, P2, P3 and P4.
For M2, learners must compare two local and national benefits of taking a sustainable construction approach to the construction and built environment sector. At least one benefit must be economic and one social. The evidence provided must build on that for P5 and P6.

For M3, learners must evaluate one specific sustainable construction technique from each stage of the development project (planning, design and construction) in terms of its effectiveness in use when compared to the techniques it has superseded. Cost is not an issue here. Evidence for this criterion could be built on P7 or P8, or through the investigation of a real construction project.

For D1, learners must evaluate the consequences of not considering sustainability issues. A case study either identified by learners or provided by the tutor would provide an excellent basis for producing the evidence required. Again effectiveness in use is the main issue, not cost. The evidence provided should build on that for M1.

For D2, learners must justify the selection of an appropriate sustainable technique for a tutor-specified construction project and justify the selection in terms of the environmental benefits in terms of both effectiveness in use and relative costs. There is no need to produce absolute costs and terms such as ‘more expensive’ or ‘much cheaper’ are acceptable.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, M1, D1</td>
<td>Sustainability in Construction and Built Environment.</td>
<td>A client is considering funding a traditional construction project but has ignored advice on sustainability. You have to convince the client that the project must be ‘a beacon of sustainability’.</td>
<td>Presentation supported by environmental assessment report.</td>
</tr>
<tr>
<td>P5, P6, P7, P8, M2, M3, D2</td>
<td>Sustainable Construction Techniques.</td>
<td>A client is considering a low- carbon development, to be built on a brownfield site, and to incorporate sustainable techniques. You have to produce material for the client to assist them in their deliberations.</td>
<td>Case study with learners identifying and describing sustainable techniques and the key benefits in this development.</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Health, Safety and Welfare in Construction</td>
<td>Sustainable Construction</td>
</tr>
<tr>
<td></td>
<td>Construction Technology and Design in Construction and Civil Engineering</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
Suggested resources

Books

Journals
*Building Magazine*
*Construction News*

Websites (*Relevant websites applicable to learner’s home country*)

| Chartered Institute of Building | www.ciob.org.uk |
| Communities and Local Government | www.communities.gov.uk |
| Energy and Utility Skills | www.euskills.co.uk |
| Friends of the Earth | www.foe.co.uk |
| Greenpeace | www.greenpeace.org.uk |
| Low Impact Housing | www.lowimpacthousing.com |
| Royal Institute of British Architects | www.architecture.com |
| Royal Institution of Chartered Surveyors | www.rics.org |
| Sector Skills Council for the Building Services Engineering | www.summitskills.org.uk |
Unit 4: Use of Science and Mathematics in Construction

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30819H
This unit is internally assessed

Unit aim
This unit enables learners to understand the science and mathematics used by construction workers. It offers learners opportunities to develop the mathematical and scientific skills needed to solve a variety of construction problems.

Unit introduction
The modern construction industry demands much more of its workforce than the ability to perform practical craft skills in a competent manner. These skills are extremely important, but they are not enough on their own. Science and mathematics underpin many activities in the modern world, and this is no less true of construction than it is of any other activity.

In order to be able to specify the right materials for a specific task, and know how to incorporate these materials into the design of buildings, learners will need to understand the basic scientific principles affecting the performance of construction materials. People working in construction must be able to perform a wide range of mathematical calculations relating to, for example, dimensions, areas, volumes, material quantities and costs, and be confident that the answers to such calculations are correct.

The content of the unit has been designed to focus specifically on concepts that will be clearly and immediately useful to learners. This will enable them to appreciate the importance of these concepts to the construction industry, and to be much better placed to apply them in a wide vocational context.

Specifically, learners will have the opportunity to investigate the effect of forces acting on structures and materials, and to explore how changes in temperature can influence both the design and specification of buildings. This unit also introduces the basic mathematical techniques needed to perform simple calculations relating to commonplace tasks such as setting out, dimensional control, determining material quantities and calculating land areas.
Outcomes of learning

On completion of this unit a learner should:

1. Understand the nature of forces and their effect on construction materials
2. Understand how changes in temperature affect construction materials
3. Be able to use simple formulae to solve construction problems
4. Be able to use simple trigonometry and graphical methods to solve construction problems.
## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To achieve a pass grade</strong></td>
</tr>
<tr>
<td><strong>the evidence must show that the learner is able to:</strong></td>
</tr>
<tr>
<td>P1 identify the effects of forces on structures in terms of basic scientific principles.</td>
</tr>
<tr>
<td>P2 explain the effects of forces on structures, using supporting calculations as appropriate.</td>
</tr>
<tr>
<td>P3 identify the effects of temperature changes on construction materials in terms of basic scientific principles.</td>
</tr>
<tr>
<td>P4 explain the effects of temperature changes on construction materials, using supporting calculations as appropriate.</td>
</tr>
<tr>
<td>P5 solve two different practical construction problems.</td>
</tr>
<tr>
<td>P6 solve two different practical construction problems one using trigonometry and one using graphical methods.</td>
</tr>
</tbody>
</table>
Unit content

1 Understand the nature of forces and their effect on construction materials
   Principles:
   ● relationship between mass, density and volume
   ● loading as the result of gravitational attraction
   ● relationship between force (load), mass and acceleration due to gravity
   ● reactions as equal and opposite to loads
   ● use of principle of moments to determine simple reactions for point loads only
   ● Hooke’s law
   ● stress
   ● strain
   ● modulus of elasticity
   ● factor of safety
   ● simple calculations relating to the above

   Effect of forces on construction materials in general use:
   ● typical construction materials (steel, concrete, brick, aluminium alloys, glass, plastics, other)
   ● key properties (strength, stiffness, weight, other)
   ● stresses (compressive, tensile, shear, bending)
   ● change of shape on loading

2 Understand how changes in temperature affect construction materials
   Principles:
   ● changes of state
   ● sensible heat
   ● cooling effect of evaporation
   ● expansion and contraction (including the expansion of water on freezing and the effect this has on porous construction materials)
   ● coefficients of thermal expansion for construction materials in general use
   ● simple calculations relating to the above

3 Be able to use simple formulae to solve construction problems
   Formulae:
   ● regular areas and volumes, e.g. square, rectangle, triangle, trapezium, circle, cubes and cylinders
   ● use of percentages, e.g. for adjustments to material quantities and costs, conversion of mortar and concrete mix proportions by volume to mix proportions by weight
Transposition of formulae:
- simple techniques to change subject of formulae (no more than four variables, nothing more complicated than four basic arithmetical operations and square or square root terms)

Evaluation of formulae:
- determination of numerical value of formulae (up to four variables, up to four basic arithmetical operations and square and square root terms)

Practical construction applications:
- mensuration techniques (to determine lengths, areas, volumes, material quantities and associated costs)
- adjustments to quantities (for cutting, waste, breakage and relevant current taxes, e.g. Value Added Tax (VAT))

4 Be able to use simple trigonometry and graphical methods to solve construction problems

Trigonometry:
- Pythagoras’ theorem and 3, 4, 5 triangle
- definition of sine, cosine and tangent
- simple calculations relating to the solution of right-angled triangles

Graphical methods:
- Cartesian coordinates
- straight line graphs (plotting, determination of gradients and intercepts, interpolation and extrapolation)

Practical construction applications:
- calculations relating to, for example, staircase design
- pitched roofs, setting out and dimensional control, checking for right angles, horizontal alignment, vertical alignment and squareness
- use of graphs to predict and interpolate values
- accuracy of calculations
- use of approximation to check a calculation
- effects of rounding-off errors
Information for delivery staff

Essential requirements

This should include the equipment needed to experiment with the effects of forces and changes in temperature on construction materials. Instruments are available at a realistic cost and it is not necessary to ‘buy the best’ in order to achieve the requirements of the unit specification. Where experimentation does take place, particularly if improvised, close attention should be paid to health, safety and welfare requirements.

The study of mathematics inherently requires little in the way of resources other than calculators and drawing equipment. Both of these are implicit requirements of many other units and, therefore, no extra resources are required for this unit. However, to ensure the vocational relevance of the unit a range of appropriate, realistic and feasible project material should be available. Delivery and assessment of the unit could incorporate material drawn from, or be integrated with, other suitable units within the qualification.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org

The vocational context lies in the other units supported by this unit, and it is in these other units that useful employer engagement should be sought.

Delivery guidance

Learners taking this unit may have had unrewarding experiences of studying science and mathematics at school and might consequently regard these subjects as ‘not for them’, as ‘bolted-on’ to real life and not relevant to their perception of how the world around them works. This perception will provide a significant barrier to their progress in a technological industry and tutors must seek to address their concerns. It is vital, therefore, that the delivery of the unit should stimulate, motivate, educate and enthuse learners. The mathematical principles involved should not be taught as pure mathematics but each method should, wherever possible, relate to problems of a technical nature applicable to relevant study in other units in the programme.

To ensure the vocational relevance of the unit a range of appropriate, realistic and feasible project material should be available to learners. The delivery of the unit could incorporate material drawn from, or be integrated with, other suitable units within the qualification.

For these reasons, it is recommended that the underpinning scientific principles are kept as simple as possible but the link between scientific knowledge and the practical applications of that knowledge should be strongly reinforced on every possible occasion. Simple practical demonstrations and learner centred experiments can be of great value in explaining the basic underpinning principles. Where lack of time and equipment makes this difficult there is a wealth of electronic material available to help in the delivery of the unit. Calculations to support the science are inevitable and should not be avoided, but the purpose and relevance of the calculations must be made very clear.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before practical activities take place.
**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
</table>
| **Principles of forces. Effect of forces on construction materials.**  
Suggested assignment: the effect of forces on construction materials.  
Suggested activities: small group discussions; presentations to whole group.  
Suggested assessment: report supported by calculations, tables and diagrams as appropriate. |
| **Basic principles of heat and temperature change. Effects and applications of heat and changes of temperature.**  
Suggested assignment: the effect of temperature changes on construction materials.  
Suggested activities: laboratory practical work; teacher demonstrations; practising calculations relating to heat and temperature; whole-class discussion of implications for porous construction materials of water expanding as it freezes. |
| **Assignment 1: The Use of Science in Construction** |
| Standard mathematical formulae. Transposition of standard mathematical formulae.  
Suggested assignment: solving construction problems using transposition and evaluation of formulae.  
Suggested activities: brackets, Of, Divide, Multiply, Add, Subtract (BODMAS); flash card tests for formulae; Whole-class instruction followed by learners practising substitution, transformation and evaluation of formulae; performing rough checks on answers; application to simple construction-based examples.  
Suggested assessment: construction-based calculations supported by sketches, drawings and graphs as appropriate. All working to be shown and correct units to be used throughout |
| **Trigonometry. Practical construction applications of trigonometry. Graphical methods. Practical construction applications of graphical methods.**  
Suggested assignment: solving construction problems using trigonometry and graphical methods. Suggested activities: Sine = Opposite/Hypotenuse; Cosine = Adjacent/Hypotenuse, Tangent = Opposite/Adjacent (SOHCAHTOA); whole class instruction followed by learners practising trigonometric calculations for staircases, pitched roofs and the setting out of buildings; manual checking of results; practising in drawing straight-line graphs; determining gradients and intercepts; reading off, interpolating and predicting values.  
Assignment 2: The Use of Mathematics in Construction  
Construction-based calculations and graphical solutions supported by sketches and drawings as appropriate. All working to be shown and correct units to be used throughout. |
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. The mathematical evidence required can be produced using hypothetical construction work but it will be of more benefit if it is linked to real-life construction projects. Examinations are inappropriate for this unit but short tests could be useful in checking understanding of basic mathematical techniques prior to their application. Some criteria could be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on the Edexcel website – www.edexcel.com. The assessment of the unit could incorporate material drawn from, or be integrated with, other suitable units within the qualification. Some examples of possible assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable. General guidance on the design of suitable assignments is available on the Edexcel website.

For P1, learners must identify the effects of gravitational forces on structures.

For P2, learners must describe how structures change in shape as they resist the loads caused by gravitational forces and how they may fail as a result of overloading. This must be quantified by converting volumes and densities into masses, and masses in kg into loads in N or kN. The learner must be able to determine simple reactions for a maximum of three point loads. The stresses and strains caused by such loads must be determined from information provided, and the effects of the forces on the structures must be related to the values obtained. This criterion could be evidenced, for example, through the production of notes and sketches with supportive graphs and calculations, based on construction-related practical experiments and investigative activities. Where appropriate, presentations, oral questioning and tutor witnessed use of mathematical techniques could be used as evidence.

For P3, learners must identify at least two key effects on construction materials of changes in temperature, for example change of state and dimensional changes.

For P4, learners must describe the effects of temperature changes in terms of sensible heat and latent heat changes for at least one common material, with water being the obvious example, together with the magnitude of any expansion or contraction for a different material, such as a metal in common use in construction or building services, for a range of sensible temperature changes. Examples of suitable evidencing approaches are as for P2.

For P5, learners must produce clear and accurate solutions for two different practical mensuration problems, as outlined in the unit content. The problems should include opportunities to transpose formulae, and to evaluate the transposed formulae numerically. Wherever possible these should be supported by simple illustrative sketches or diagrams. It is acceptable for learners to rework their calculations after feedback from the tutor, but it is recommended that reworking is monitored to avoid peer collaboration. Where appropriate, alternative problems could be set to avoid such collaboration. Evidence for this criterion could, for example, be derived from applied mathematical work related to other aspects of this unit or to other units within the specification. Alternatively, tutors may devise activities specifically for assessment purposes, but they must ensure that these have a clear and practical relevance to the construction industry.
For P6, learners must produce clear and accurate solutions for practical problems, one using trigonometry and another using graphical methods, as outlined in the unit content. Wherever possible these should be supported by simple illustrative sketches or diagrams. The use of data produced elsewhere in this, or in other units in the programme, is encouraged where such data is available, and the use of secondary information is acceptable where it is not. The data may come from practical construction work, setting out exercises, drawing classes or practical experimentation in science. See above for guidance on reworking. Examples of suitable evidencing approaches are as for P5.

For M1, learners must explain the differences between the practical limits of how much change of shape may be permitted under load, as compared to actual failure due to overloading. They should provide examples to support their explanations. This criterion could be evidenced through, for example, a presentation, a report or tutor questioning.

For M2, learners must explain how water, as ice, can damage porous building materials when the temperature falls below the freezing point of water. The explanation should be clearly related to the expansion of water on freezing and the effect of repeated cycles of freezing and thawing must be made clear. Examples of suitable evidencing approaches are as for M1, but could be supported by simple diagrams and calculations, as appropriate.

For M3, learners must compare the advantages and disadvantages of different methods used to solve problems, such as those associated with P5 and P6, and provide a coherent rationale for why these methods were selected. The selected techniques must achieve a reliable and accurate solution for each problem. Where alternative appropriate techniques exist a certain amount of learner subjectivity in selecting between these may be allowed, as this often reflects what is, and what is not, held to be difficult by individual learners. This criterion could be evidenced through written notes, a short presentation or tutor questioning.

For D1, learners must select two contrasting materials, and evaluate how the response of each to loads and temperature changes affect the way in which each is used in construction. The materials chosen could, for example, be steel and concrete, or plastic and brick. In the former example, evidence might address the strength and stiffness of steel, how it provides the tensile strength lacking in concrete, and how the very similar coefficients of thermal expansion allow them to be used together in reinforced concrete. In the latter example, learners’ evidence might explain that although some plastics are as strong as brick, their lack of stiffness and high coefficient of thermal expansion make them unsuitable for structural purposes. The actual materials selected should be negotiated and agreed between learners and tutor. Examples of suitable evidencing approaches are as for M2.

For D2, learners must demonstrate an ability to assess mathematical techniques in terms of accuracy, approximation and rounding-off errors. For example, graphs are generally less accurate than calculations, angles need to be to be accurate to the nearest minute, dimensions to be accurate to the nearest mm. Learners should recognise the advantages of calculating an approximate answer as a check on an answer produced using more formal methods, and they should also demonstrate an understanding of the need for care when rounding figures up or down, i.e. that errors are compounded when figures are further manipulated. They should demonstrate an awareness of the practical level of accuracy needed for different situations. This criterion could be evidenced, for example, through learner analysis of the methods used to solve problems such as those addressed for P5 and P6.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, M1, M2, D1</td>
<td>The Use of Science in Construction.</td>
<td>A training manager supervising new apprentices to support their studies has been asked to prepare a comparison of construction materials in common use in terms of their behaviour when acted on by forces and temperature changes.</td>
<td>A presentation to include text, diagrams, tables, graphs, test results and calculations as appropriate.</td>
</tr>
<tr>
<td>P4, P5, M3, D2</td>
<td>The Use of Mathematics in Construction.</td>
<td>A mathematical consultant has been contracted to oversee the refurbishment and adaptation of a large old building into modern office accommodation.</td>
<td>A presentation to include calculations, diagrams, tables, graphs and text as appropriate.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC in Construction and Built Environment sector suite. This unit has particular links with:

<table>
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<tr>
<td>Structure of the Construction Industry</td>
<td>Mathematics in Construction and the Built Environment</td>
</tr>
<tr>
<td>Exploring Health, Safety and Welfare in Construction</td>
<td>Science and Materials in Construction and the Built Environment</td>
</tr>
<tr>
<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
<td>The Underpinning Science for the Provision of Human Comfort in Buildings</td>
</tr>
<tr>
<td>Construction Methods and Techniques for Low-Rise Domestic Buildings</td>
<td>Structural Mechanics in Construction and Civil Engineering</td>
</tr>
<tr>
<td>Construction Drawing Techniques</td>
<td>Mechanical and Electrical Services in Construction</td>
</tr>
</tbody>
</table>
### Level 2
- Exploring Carpentry and Joinery
- Performing Joinery Operations
- Performing Carpentry Operations
- Exploring Trowel Operations
- Performing Blockwork Operations
- Performing Brickwork Operations
- Exploring Painting and Decorating
- Performing Paperhanging Operations
- Performing Decorating Operations
- Exploring Building Services Techniques in Construction
- Performing Plumbing Operations
- Performing Electrical Operations

### Level 3
- Building Services Science
- Low Temperature Hot Water Heating in Building Services Engineering

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

### Suggested resources

#### Books


#### Websites *(Relevant websites applicable to learner’s home country)*

- [www.buildingdesign.co.uk](http://www.buildingdesign.co.uk)
- [www.bre.co.uk](http://www.bre.co.uk)
- [www.cibse.org](http://www.cibse.org)
- [www.defra.gov.uk](http://www.defra.gov.uk)
- [www.aecportico.co.uk](http://www.aecportico.co.uk)

- Building Design
- Building Research Establishment Limited
- The Chartered Institution of Building Services Engineers
- Department for Food and Environmental and Rural Affairs
- National Building Specification
Unit 5: Construction Processes and Operations for Low-rise Domestic Buildings

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30820H
This unit is internally assessed

Unit aim
This unit enables learners to know the processes and operations used in low-rise construction, the sequencing of construction work, and how the properties of construction materials affect their specification and use.

Unit introduction
An understanding of the practical aspects that comprise the construction of buildings is an essential requirement of almost every job in the construction industry. Whether working as a supervisor, manager, designer or planner, there will always be a need to know something about the processes and operations used to construct buildings, and the part each plays in a construction project.

This unit provides learners with knowledge and understanding of the practical processes and operations involved in the construction of domestic low-rise buildings. The contributions made by the main construction crafts, and how these relate to the overall process, will also be investigated.

Learners will study processes and operations in the context of both traditional and modern construction techniques and will develop an awareness of the implications of each. This will help them develop an understanding of how modern off-site manufacturing processes influence on-site processes and operations.

This unit also offers learners an opportunity to explore the correct sequencing of construction activities and the simple planning techniques involved. This will help learners develop an understanding of how the various processes and operations of a project are integrated within the project time frame.

Learners will also study the practical activities associated with construction, enabling them to become familiar with the natural, processed and manufactured materials in general use in construction, together with the properties that make them suitable for their intended use in a particular element of a building.
Outcomes of learning

On completion of this unit a learner should:

1. Know the stages of a construction project and the importance of good planning and sequencing of construction work
2. Know the traditional and modern construction processes and operations used in low-rise domestic construction
3. Understand the properties and uses of natural, processed and manufactured construction materials.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
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<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
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<tbody>
<tr>
<td><strong>P1</strong></td>
<td>identify the stages of a construction project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>describe the stages of a construction project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>identify the craft operations involved in each stage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>describe the craft operations involved in each stage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>outline why construction craft operations must be performed in a logical sequence.</td>
<td><strong>M1</strong> interpret simple Gantt charts relating to the logical sequence of craft operations for a low-rise domestic building.</td>
<td><strong>D1</strong> predict the impact of production problems caused by poor planning and/or sequencing of the construction work for a low-rise building.</td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>describe the standard documentation used to support the planning and sequencing of construction work.</td>
<td></td>
<td></td>
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<td><strong>To achieve a pass grade the evidence must show that the learner is able to:</strong></td>
</tr>
<tr>
<td>P7 identify the main functional requirements of low-rise domestic buildings.</td>
</tr>
<tr>
<td>P8 describe the processes and operations used in traditional methods of construction.</td>
</tr>
<tr>
<td>P9 describe the processes and operations used in modern methods of construction.</td>
</tr>
<tr>
<td>P10 classify construction materials as natural, processed or manufactured.</td>
</tr>
<tr>
<td>P11 assess the properties of common construction materials.</td>
</tr>
</tbody>
</table>
Unit content

1 Know the stages of a construction project and the importance of good planning and sequencing of construction work

Stages of construction:
- setting up site
- groundwork
- substructure
- superstructure
- services
- finishes
- external works

Operations:
- key activities (bricklaying; carpentry and joinery; roofing)
- other activities, e.g. painting and decorating, ground work, concrete work, stonemasonry, plastering, plumbing, electrical installation

Sequencing and planning:
- appropriate and logical order of craft operations on site
- associated planning documentation (including use of bar and Gantt charts)
- production problems caused by inappropriate planning or sequencing of work
- effect of production problems and unforeseen events on productivity and cost, e.g. materials shortages, bad weather, accidents on site, industrial action, vandalism, flooding or a major trench collapse

2 Know the traditional and modern construction processes and operations used in low-rise domestic construction

Functional requirements of elements of low-rise domestic buildings:
- key elements and their functions (foundations, floors, walls, roofs, doors, windows, stairs, services), integration of elements to construct a building

Traditional construction:
- key characteristics (discrete units, individual designs and styles, load bearing walls, fixed internal partitions, on-site craft operations, labour intensive methods of work)

Modern construction:
- key characteristics (large complexes, modular systems, greater dimensional coordination, load bearing frames, non-load bearing curtain walling, lightweight demountable internal partitions, increasingly sophisticated services, requirement for a differently skilled workforce, off-site fabrication, on-site assembly), effect of off-site production of components, elements and materials on productivity and costs on-site
3 Understand the properties and uses of natural, processed and manufactured construction materials

Common materials:
- natural materials (stone, timber)
- processed materials (concrete, bricks, metals, alloys, timber products)
- manufactured materials (cements, limes, plastics, paints)

Uses and properties of materials:
- specification of appropriate materials
- properties that make specific materials suitable for specific purpose
Information for delivery staff

Essential requirements

Learners should have access to a variety of resource material relevant to the construction industry. Centres should be able to provide a wide range of relevant media including books, journals and periodicals, together with DVD/CD ROM titles, BRE papers, maps and open access to the internet for learners. Case studies of construction projects will help to illustrate both the nature of individual craft operations and the need for proper sequencing of construction processes and operations. A number of pre-prepared Gantt charts will be needed for use in the outcome of learning. Prepared drawings, specifications and schedules for domestic dwellings, an electronic database and/or online database and/or a virtual learning environment, prepared architectural models of low-rise buildings and structures and sales brochures for new housing developments will all prove useful. It would be useful for learners to be able to visit housing projects under construction to help reinforce learning. Centres with craft training departments could use their workshops and simulated projects to support this unit.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The unit deals with the processes and operations used in low-rise construction, the sequencing of construction work, and how the properties of construction materials affect their specification and use. The vocational context is therefore obvious. Centres should develop links with local house building companies, and develop the knowledge, understanding and skills the learners need to obtain jobs within such firms. Many further education colleges offer construction craft programmes, on which they train the apprentices employed by the local house building companies. They will therefore have a pre-existing relationship upon which they can build. It should also be possible for learners studying this unit to visit practical classes where apprentices are being trained and assessed, in order to experience the environment in which construction work is done and to see how the various building elements are integrated into the building.

Delivery guidance

Lectures, discussions, seminar presentations, site visits, supervised practical work, research using the internet and/or library resources and the use of personal and/or industrial experience are all suitable methods of delivery and assessment.

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, site visits, supervised practical work, research using the internet and/or library resources and the use of personal and/or industrial experience will be suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject.

The outcomes of learning of the unit form a logical, consistent and progressive structure. Outcome of learning 1 sets the stage for outcome of learning 2. The methods of construction that are covered in outcome of learning 2 identify the materials to be studied for outcome of learning 3.

A traditional teaching and learner-centred approach to delivery is recommended. This will enable learners to develop an understanding of the methods and processes inherent in the unit content.
The underlying focus of the unit is on craft operations at various stages in the construction process, in both traditional and modern forms of construction. A wide range of construction operations should be explored. To this end the construction of a typical low-rise domestic building is seen as the most useful focus for every outcome of learning, so that learners can appreciate the interrelationship of the various crafts and activities. It is not necessary for every single operation to be considered but the main construction crafts operations such as bricklaying, carpentry and joinery and roofing must be explored in some depth. Once these have been identified, typical outputs for the various grades of labour can be established, including gang sizes and ratios, plant and material requirements. These can then be used to determine suitable timescales for the work which can be plotted onto a Gantt chart, although there is no requirement for learners to prepare one to achieve a pass at this level.

Having identified the broad range of activities comprising the construction of a typical low-rise domestic building, a variety of alternative forms of construction can be introduced, together with their functional requirements. Learners should be encouraged to identify similarities or differences between the various forms of construction and materials used and to make comparisons. Of particular interest should be the comparison of on-site and off-site activities. Inevitably, in exploring various construction processes and operations, it will be necessary to specify a variety of construction materials. Learners should investigate the properties and uses of materials commonly encountered in the construction of a typical low-rise domestic building. They should highlight the particular properties of each material that makes them suitable for use in specific situations.

Site visits have an important role in the delivery of this unit and as many opportunities as are possible should be taken to enable learners to see for themselves the procedures, materials and processes used in the workplace. Similarly, centres that are equipped to deliver construction crafts could use their own craft facilities as a useful teaching aid. There is, however, no requirement for the learner to perform construction craft operations, and any learners wishing to do so should consider taking one of the specialist units available within the qualification.

Health and safety issues are paramount and should be strictly reinforced through close supervision of workshops and activity areas. Risk assessments must be undertaken before practical activities take place.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole-class discussion – various stages of a construction project and operations involved in each stage. Learners to form into small groups to discuss one stage per group. Each group to make a presentation to the class of their findings.</td>
</tr>
<tr>
<td>Suggested activities – learners to consider a hypothetical building project and the required documentation including schedules, plans and Gantt charts or equivalent.</td>
</tr>
<tr>
<td>Small-group work – learners to produce construction documents and plan the construction process, from site clearance to completion and handover, with guidance and advice from tutor. Whole-class, tutor-led discussion on the outcomes.</td>
</tr>
</tbody>
</table>

**Assignment 1: Operations Involved at Each Stage of a Construction Project**

**Assignment 2: Sequencing of Construction Operations**
### Topic and suggested assignments/activities/assessment

| Suggested activities – two site visits, one to a traditional low-rise building, one to a modern low-rise building. Notes to be taken and tutor-provided check lists to be completed. |
| Learners to write up notes of site visits in centre and describe key elements of the buildings and their function – guidance from the tutor is permissible at this stage. |
| Class to split into two groups to discuss the main features of traditional methods of construction and modern methods of construction. Groups to present their findings to each other for discussion, constructive criticism and amendment. |
| Whole-class, tutor-led discussion on the differences in design and construction. This should include issues such as labour requirements, speed of erection, modular coordination, off-site prefabrication, use of construction plant and equipment and quality of work. |

**Assignment 3: Traditional and Modern Methods of Construction**

| Suggested activities – visits to workshops and builders’ merchants to establish common materials in use. Tutor-provided checklists to be completed. |
| Suggested activities – learners to explore differing building materials, examining information from websites, manufacturers’ information and literature as appropriate. |
| Small-group work, with learners exploring the use of one material per group and suggesting which properties of the material make it fit for its intended purpose. Groups to present their findings to each other for discussion, positive criticism and amendment. Tutor to lead discussion to firm up learners’ conclusions. |

**Assignment 4: Construction Materials**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. Some examples of possible assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

Some criteria could be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on our website.

The structure of the unit content suggests that a minimum of four assignments could be used to provide learners with opportunities to produce the evidence required to achieve all the grading criteria. For example, the first could cover P1, P2, P3 and P4, the second P5, P6, M1 and D1, the third P7, P8, P9 and M2 and the fourth P10, P11, M3 and D2. These could be broken up into smaller component parts if this helps the assessment process.

For P1, learners must be able to identify the stages of a tutor-specified construction project. Evidence for this criterion could be provided in the form of a presentation or a report based on a real project or on a tutor-provided case study. Appropriate drawings, sketches or tables could provide useful evidence.

For P2, learners must describe the stages of a tutor-specified construction project. The evidence should take the form of that used for P1.

For P3, learners must identify the craft operations in use in each of the stages identified in P1 and described in P2. There should be evidence of the operations that are always found on construction sites and some of those that are sometimes, but not always, found on individual sites.

For P4, learners must describe the craft operations in use at each of the stages identified in P1. The evidence should take the form of that used for P3.

For P5, learners must provide a summary of the reasons why construction operations must be performed in a logical sequence and the possible effects if this does not happen.

For P6, learners must be able to identify simple bar charts and Gantt charts and provide evidence that they understand why they are important and where they are used. Examples of suitable evidence are as for P1 and P3. This could be done using group presentations with enlarged Gantt charts.

For P7, learners must be able to identify the main functional requirements of building elements such as foundations, floors, walls, roofs, doors, windows, stairs and services. The requirement is that learners demonstrate an understanding of what building elements must achieve, rather than how they fulfil those functions. For example, they should be aware that foundations must bear combined dead, imposed and wind loads without causing any settlement or movement that would impair the stability of, or cause damage to, any part of the building, and transmit the combined load to the ground. There is no requirement for learners to know how this is done at this stage. Evidence for this criterion could be provided in the form of a report or presentation, based, for example, on surveys of real buildings, visits to building sites, off-site fabrication centres, manufacturers’ premises or building centres, or through examination of tutor-provided drawings or photographs.
For P8, learners must describe the processes and operations used in traditional methods of construction. The evidence could take the form of checklists, supported with comments, completed during site visits and added to after in-class discussions subsequent to the visit.

For P9, learners must describe the processes and operations used in modern methods of construction. As for P8, the evidence could take the form of checklists, supported with comments, completed during site visits and added to after in-class discussions subsequent to the visit.

For P10, learners must classify the construction materials in common use in the construction industry as either natural, processed or manufactured. The list of materials could be provided by the tutor and classified by learners. There is no requirement for learners to produce evidence of understanding how the materials are processed or manufactured at this stage.

For P11, learners must assess the properties of construction materials, i.e. how they perform in use. This could be done by producing a table of common construction materials against their properties with short comments such as 'high', 'low', 'good' and 'poor' (for example) in each cell. The important criteria vary from material to material but might include some or all of the following: strength, hardness, ductility, elasticity, cost, resistance to degradation, appearance, thermal and/or electrical properties, workability and environmental and/or sustainability issues. The evidence can be presented as a presentation to the tutor and other members of the group.

For M1, learners must demonstrate the ability to interpret simple bar (Gantt) charts used to plan and monitor the sequence of craft operations applicable to typical low-rise domestic dwellings. There is no requirement here for learners to prepare such charts themselves. Evidence for this criterion could take the form of a presentation, or written or oral verbal responses to questions, based around tutor-provided Gantt charts.

For M2, learners must provide an explanation of the advantages and disadvantages of modern forms of construction, as compared to traditional forms, in terms of the different operations and craft processes, productivity and costs. Evidence for this criterion could be derived from an extension of the activities suggested for P7, P8 and P9.

For M3, learners build on their awareness of the important properties of natural, processed and manufactured construction materials to explain how this affects the use to which such materials are put, and how this links with the selection and specification of materials. The evidence should build upon that provided for P10 and P11.

For D1, learners must use their knowledge and understanding of the logical sequencing of craft operations to predict the possible consequences of incorrect sequencing or unforeseen events on production, costs and the satisfactory conclusion of the construction project. The range of unseen events could include, for example, materials shortages, bad weather, accidents on site, industrial action, vandalism, flooding or a major trench collapse. Evidence for this criterion could be derived through an extension of the assessment activities suggested for M1.

For D2, learners must be able to justify the specification of two construction materials for use in two different tutor-specified situations, chosen from those listed in the unit content. Evidence for this criterion could, for example, take the form of written specifications for building elements identified from a survey of a real building, from architectural drawings or from provided photographs.
**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

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<th>Assignment title</th>
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<tr>
<td>P1, P2, P3, P4</td>
<td>Operations Involved at Each Stage of a Construction Project.</td>
<td>You are working as a supervisor. You have been asked by your manager to consider the building operations sequence involved with a given low-rise building.</td>
<td>A report to include text, diagrams, tables and graphs as appropriate.</td>
</tr>
<tr>
<td>P5, P6, M1, D1</td>
<td>Sequencing of Construction Operations.</td>
<td>As a supervisor within a construction team, you have been asked to interpret and produce the documentation associated with construction operations.</td>
<td>Group presentations.</td>
</tr>
<tr>
<td>P7, P8, P9, M2</td>
<td>Traditional and Modern Methods of Construction.</td>
<td>The differences between the construction methods used on two building sites, one modern and one traditional.</td>
<td>A report to include text, diagrams, tables and graphs as appropriate</td>
</tr>
<tr>
<td>P10, P11, M3, D2</td>
<td>Construction Materials.</td>
<td>Classification of materials as natural, processed or manufactured. The link between material properties and uses and the specification of construction materials on that basis.</td>
<td>Group presentations.</td>
</tr>
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</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
Suggested resources

Books

Journals
*Building Magazine*
*Construction News*

Websites *(Relevant websites applicable to learner's home country)*

<table>
<thead>
<tr>
<th>Website</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.cio.org.uk">www.cio.org.uk</a></td>
<td>Chartered Institute of Building</td>
</tr>
<tr>
<td><a href="http://www.ciria.org.uk">www.ciria.org.uk</a></td>
<td>Construction Industry Research and Information Association</td>
</tr>
<tr>
<td><a href="http://www.citb.co.uk">www.citb.co.uk</a></td>
<td>Construction Skills</td>
</tr>
<tr>
<td><a href="http://www.dqi.org.uk">www.dqi.org.uk</a></td>
<td>Design Quality Indicator</td>
</tr>
<tr>
<td><a href="http://www.managenergy.net">www.managenergy.net</a></td>
<td>Directorate-General for Energy and Transport</td>
</tr>
<tr>
<td><a href="http://www.edenframe.com">www.edenframe.com</a></td>
<td>Eden Frame Achieving Sustainable Construction</td>
</tr>
<tr>
<td><a href="http://www.fsc-uk.info">www.fsc-uk.info</a></td>
<td>Forest Stewardship Council</td>
</tr>
<tr>
<td><a href="http://www.buildingforafuture.co.uk">www.buildingforafuture.co.uk</a></td>
<td>Green Building Magazine</td>
</tr>
<tr>
<td><a href="http://www.hsebooks.co.uk">www.hsebooks.co.uk</a></td>
<td>Health and Safety Executive Book finder</td>
</tr>
<tr>
<td><a href="http://www.hse.gov.uk">www.hse.gov.uk</a></td>
<td>Health and Safety Executive</td>
</tr>
<tr>
<td><a href="http://www.huf-haus.com">www.huf-haus.com</a></td>
<td>Huf House Houses by Design</td>
</tr>
<tr>
<td><a href="http://www.nhbc.co.uk">www.nhbc.co.uk</a></td>
<td>National House-Building Council</td>
</tr>
<tr>
<td><a href="http://www.newbuilder.co.uk">www.newbuilder.co.uk</a></td>
<td>Sustainable construction information</td>
</tr>
<tr>
<td><a href="http://www.woodforgood.com">www.woodforgood.com</a></td>
<td>Wood for Good</td>
</tr>
</tbody>
</table>

Email
Health and Safety Executive hseinformationservices@natbrit.com
Unit 6: Construction Methods and Techniques for Low-rise Domestic Buildings

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30821H
This unit is internally assessed

Unit aim
The aim of this unit is to give learners the knowledge and understanding of the methods and techniques involved in the various stages of the construction of low-rise domestic buildings.

Unit introduction
The construction process is firmly founded on teamwork, and the success of the industry depends on the different skills provided by a wide range of individuals – including designers, planners and managers, as well as those involved in the practical craft occupations. An understanding of different modern structural forms and the various types and functions of the elements that are involved in buildings, is an essential requirement for all those working in construction.

The unit will enable learners to gain knowledge and understanding of the different modern structural forms used in the construction of houses, flats and maisonettes, together with an understanding of the relationship between the function of a building, the function of the elements that comprise the building, and the final structural form.

Throughout this unit, learners will extend and develop their knowledge and understanding by exploring pre-construction activities such as site investigations, site surveys, site preparation, specialist demolition and environmental considerations. They will also explore the substructure (below ground), superstructure (above ground level) and external work phases of projects, together with their related elements.

Learners will be able to explore how new building elements are formed and how these elements are combined to produce the final building and incorporate sustainability into all aspects of the construction. Learners will also investigate the on-site temporary arrangements needed to support the construction process. Learners will develop an understanding of how this impacts at both local and national level. They will also learn how primary utilities such as water, electricity and drainage are provided to a building. Health, safety and welfare issues will be emphasised throughout.

Traditional and modern methods of construction will be explored and compared, particularly in terms of the use of modern sustainability principles.

On completion of this unit, learners will be able to use the knowledge and understanding gained to underpin a wide range of construction job roles.
Outcomes of learning

On completion of this unit a learner should:

1. Understand the relationship between the functions of a building and its elements
2. Know the methods and techniques associated with pre-construction, groundworks, substructure and external works for low-rise buildings
3. Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>compare three examples of structural forms used in the construction of low-rise domestic buildings.</td>
<td><strong>M1</strong></td>
<td>explain how building elements and primary services are integrated into low-rise domestic buildings.</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>assess the main functions of buildings and their elements.</td>
<td><strong>D1</strong></td>
<td>evaluate a modern low-rise domestic building in terms of how the structural form addresses the intended design function of the building.</td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>describe the primary services provided to low-rise construction projects.</td>
<td><strong>M2</strong></td>
<td>compare the different methods and techniques used in the pre-construction, groundwork, substructure and external works for a low-rise domestic building.</td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>describe the methods and techniques used in the pre-construction and groundwork phases of low-rise domestic construction projects.</td>
<td><strong>D2</strong></td>
<td>evaluate two given construction methods and techniques in terms of their contribution to the performance-in-use of a low-rise building.</td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>describe the methods and techniques used in the substructure phase of low-rise domestic construction projects.</td>
<td><strong>M3</strong></td>
<td>assess the methods and techniques used in the construction of the superstructure in terms of their suitability for modern methods of construction.</td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>describe the provision of external works to low-rise domestic buildings.</td>
<td><strong>M4</strong></td>
<td></td>
</tr>
<tr>
<td><strong>P7</strong></td>
<td>describe the methods and techniques used in the superstructure phase of low-rise domestic construction projects.</td>
<td><strong>D3</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment and grading criteria</td>
<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td><strong>P8</strong> identify the advantages and disadvantages of traditional and modern methods of construction.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unit content

1 Understand the relationship between the functions of a building and its elements

Functions of buildings and building elements:
- design functions and performance characteristics (strength, stability, protection from climate, durability, resistance to fire, thermal insulation, sound insulation, sustainability)

Common structural forms for low-rise methods of construction:
- relationship between the function of a building and its structural form
- common structural forms (traditional, crosswall, skeletal, framed including new construction methods)
- advantages and disadvantages of each in terms of design and construction

Primary services:
- water
- gas
- electricity
- drainage

2 Know the methods and techniques associated with pre-construction, groundworks, substructure and external works for low-rise buildings

Pre-construction work:
- site survey
- site investigation
- site security
- demolition by specialist contractors
- environmental and sustainability considerations
- health, safety and welfare issues

Groundworks:
- temporary control of subsoil and surface water during excavation (simple sump pumping, well point systems)
- permanent control of subsoil water (land drainage)
- health, safety and welfare issues associated with excavation (protection of both on-site personnel and public)

Substructures:
- foundations (traditional strip, deep strip or trench fill, isolated pad, raft, short bored piles)
- selection of appropriate foundation for a variety of ground conditions
- design and construction of ground floors (solid, suspended)
- health, safety and welfare issues
External works:
- estate roads, access roads and driveways
- paths

3 Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings

Superstructures:
- building elements (walls, floors, roofs, other)
- safety aspects of each

Wall types:
- solid masonry
- cavity masonry
- timber frame
- internal partitions, modern options

Floors:
- design and construction of suspended floors in both timber and concrete

Roofs:
- flat
- lean-to
- mono-pitch
- double pitch
- gable end
- hipped end

Modern and traditional construction methods and techniques:
- in terms of construction plant
- modularisation
- off-site fabrication
- labour requirements, effect on sustainability
Information for delivery staff

**Essential requirements**

Learners should have access to a variety of resource material relevant to the construction industry. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with DVD/CD ROM titles, BRE papers, maps and open access to the internet for learners.

Professional quality drawing equipment will be needed by learners to produce supporting sketches and drawings, although they might reasonably be expected to have their own instruments such as pens, pencils, scale rules, compasses, dividers and adjustable set squares. A list of the necessary drawing equipment should be provided, either before the course starts or at the beginning of the course as part of the induction process.

**Employer engagement and vocational contexts**

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Site visits, and the development of a relationship with a local construction company would enable learners to see how the theoretical knowledge gained in class is applied in a real-life context. The invitation of specialist guest speakers will enhance the delivery of this unit.

**Delivery guidance**

Visits to local construction sites, and the development of a relationship with the site managers of such sites, would greatly benefit the learning experience delivered in the classroom. Health and safety is of paramount importance during any visit and suitable risk assessments must be carried out before any visits are arranged.

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, site visits, supervised practicals, research using the internet and/or library resources and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject.

The outcomes of learning that make up this unit provide a logical, consistent and progressive structure to the content. Outcome of learning 1 focuses on the various structural forms used in the construction of low-rise domestic buildings, the functions of these buildings and the various elements comprising them, and how these elements are integrated to produce the final structural form. The provision of primary services to low-rise domestic buildings is included here to emphasise the need to consider the integration of such services from the early stages of design.

Outcome of learning 2 focuses on the methods and techniques used in the pre-construction, groundwork, substructure and external works stages of the construction of low-rise domestic buildings and the constraints that influence the selection of appropriate methods and techniques.

Outcome of learning 3 deals with similar issues to those dealt with in outcome of learning 2, but this time the methods and techniques are related to the superstructure phase of a low-rise domestic building. Both traditional and modern methods of construction are in use in today’s construction industry and learners should be given the opportunity to see both in use through the use of a programme.
of visits to appropriate sites. Learners should be encouraged to observe and record the important differences between the two methods and to suggest the benefits of each and where each could be most appropriately used.

A traditional teaching and learner-centred approach to delivery could be adopted for much of the unit content. This will enable learners to acquire and develop an understanding of the inherent methods and techniques.

The scope of the unit is wide and depth of delivery should take account of this. It is the structure and range of the work that is important. There is no requirement to explore each phase of the construction process and the methods and techniques used at each phase, in their entirety.

The main method of communicating information in construction is sketching and drawing. It is desirable that learners are able to produce a range of sketches and drawings to support their learning, although this is not a formal requirement of the assessment regime. Centres should ensure that appropriate time and facilities are made available for this.

Site visits have an important role to play in the delivery of the unit because they bring the subject to life for full-time learners and broaden the experience of part-time learners. Health, safety and welfare are always of paramount importance and hazard identification and good practice should be emphasised at all stages in the delivery of the unit. The construction industry impacts on the natural environment in many ways and this too should feature throughout the delivery, with environmental issues and sustainable construction techniques being signposted wherever appropriate.
Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to unit content – tutor-led discussion and delivery of the unit content, method of assessment and time scales, pass, merit and distinction, grading criteria.</td>
</tr>
<tr>
<td>Low-rise buildings – tutor delivery of examples using local emphasis on the built environment.</td>
</tr>
<tr>
<td>Functions of a building – seminar using research produced by individual learners or small groups of learners; this to be collated by the tutor and then discussed by the whole group.</td>
</tr>
<tr>
<td>Common structural forms of buildings – delivery by tutor.</td>
</tr>
<tr>
<td>Building services – tutor delivery of basic theory; water, gas, drainage, electric and telephone. Site visit at appropriate times to see services being integrated into low-rise buildings.</td>
</tr>
</tbody>
</table>

Assignment 1: The Functional Requirements of Low-rise Buildings

Pre-construction work – individual research used to support tutor-led discussion. 
Groundworks – theoretical delivery by tutor, individual exercises on health and safety aspects. 
Substructure – video on aspects of foundations and ground floors, tutor-led discussion on walls, floors and foundation types. 
External works – individual research on aspects of and links to roads, drainage and services.

Assignment 2: Pre-construction, Groundworks, Substructure and External Works for Low-rise Buildings

Superstructures – tutor delivery on types of walls, floors and roofs 
Site visits to one site using traditional methods of construction and one site using modern methods of construction. Learners to complete checklists supported by comments to compare methods and advantages and disadvantages of same.

Assignment 3: Superstructures for Low-rise Domestic Buildings

Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. Some examples of possible assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.
Some criteria could be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on the Edexcel website – www.edexcel.com.

The structure of the unit content suggests that a minimum of three assignments could be used to provide learners with opportunities to produce the evidence required to achieve all the grading criteria. For example, the first of these could cover P1, P2, P3, M1 and D1, the second P4, P5, M2 and D2 and the third P6, P7, P8 and M3. These could be broken up into smaller component parts if this helps the assessment process.

For P1, learners must compare three examples of different structural forms used in the construction of low-rise domestic buildings. Evidence for this criterion could be provided, for example, in the form of a short report, a set of notes, a presentation, or through oral questioning. Annotated sketches and drawings would be useful, and could reduce the amount of text required but should not be used to replace it completely. This evidence might be based on learner visits to building sites or local buildings of interest, or on tutor-provided drawings and/or photographs.

For P2, learners must assess the general functions of buildings and their elements. This should include heat, light and shelter aspects and any other important requirements of the occupants.

Reference to building regulations would help indicate how the building conforms to legislation.

For P3, learners must describe the primary services of water, electricity, gas, telephone and drainage. There is no requirement for evidence of how and where these services enter low-rise domestic buildings for this criterion.

For P4, learners must describe the methods and techniques used in the pre-construction and groundwork phases of low-rise domestic construction projects, as listed in the unit content. Evidence for this criterion could be provided, for example, in the form of a short report, a set of notes, a presentation, or through oral questioning. Annotated sketches and drawings would be useful, and could reduce the amount of text required, but should not be used to replace text completely. This evidence might be based on visits to building sites, interviews with building workers, other investigative activities and/or tutor-provided case studies and other materials.

For P5, learners must be able to identify and briefly describe the common methods and techniques employed in the substructure phase of low-rise domestic construction projects, as listed in the unit content. There is no requirement here for learners to address non-typical situations such as highly exposed sites, sloping sites and made-up ground. Evidence for this criterion could be derived from an extension of the activities suggested for P4.

For P6, learners must be able to describe the provision of external works to low-rise domestic buildings as listed in the unit content, including vehicular and pedestrian access to buildings and links with existing public roads and footpaths. The descriptions provided should make reference to basic construction details including the materials used. Evidence for this criterion could be derived from an extension of the activities suggested for P5.

For P7, learners must be able to describe at least two of the common methods and techniques employed in the superstructure stage of construction projects for low-rise domestic buildings, from the key areas listed in the unit content. There is no requirement for learners to address non-typical construction situations. Examples of suitable evidence approaches are as for P6.
For P8, learners need to identify the important features of traditional methods of construction and modern methods of construction in terms of their advantages and disadvantages. For example, timber framing or thin joint masonry could be compared against solid and cavity-walled systems.

For M1, learners must explain how building elements and primary services are integrated into low-rise domestic buildings. Evidence for this criterion could be derived through an extension of the activities suggested for P3.

For M2, learners must compare the different methods and techniques used in the pre-construction, groundwork, substructure and external works for a low-rise domestic building, in terms of their performance in use. Evidence for this criterion could be derived using activities similar to those suggested for P4 and P5.

For M3, learners must assess the methods and techniques used in the construction of the superstructure in terms of their suitability for modern methods of construction. This should build upon the evidence produced for P8.

For D1, learners must evaluate a tutor-prescribed structure in terms of the building elements that comprise that structure, the functions of the component parts of the structure and the extent to which the structural form of the building addresses its intended design function. Evidence for this criterion could be derived using one of the assessment activities suggested for P1, P2 or P3, or based on a tutor-specified low-rise building, or on drawings and/or photographs provided by the tutor. Whatever approach is used, the tutor must ensure that the items learners evaluate are fit for purpose.

For D2, learners must evaluate two given construction methods and techniques in terms of their contribution to the performance-in-use of a low-rise building. Each of these must be evaluated individually in either design, technical, financial or environmental terms. For example, learners could address the environmental issues associated with both methods and techniques, or they could address a different issue for each method and technique, or choose any other combination. Evidence for this criterion could be derived using one of the assessment activities suggested for P6 or P7, but the tutor must provide, or negotiate with learners, the two construction methods and techniques to be evaluated, to ensure that that these are fit for purpose.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, M1, D1</td>
<td>The Functional Requirements of Low-rise Buildings.</td>
<td>You have been asked, by your team leader, to give a presentation to the housing manager of a local housing association, on the common structural forms of low-rise buildings, the functional requirements of the elements that comprise low-rise buildings, and the integration of the primary services provided to low-rise buildings.</td>
<td>Presentation</td>
</tr>
<tr>
<td>P4, P5, M2, D2</td>
<td>Pre-construction, Groundworks, Substructure and External Works for Low-rise Buildings.</td>
<td>You have been asked, by your team leader, to take part in a project to raise community awareness of the pre-construction, groundwork, substructure and external works to be undertaken.</td>
<td>Pamphlet</td>
</tr>
<tr>
<td>P6, P7, P8, M3</td>
<td>Superstructures for Low-rise Domestic Buildings.</td>
<td>You have been asked, by your team leader, to produce a report on the various methods and techniques used to create the superstructure, and a comparison of the advantages of traditional and modern methods of construction in use on low-rise projects.</td>
<td>Report</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Methods and Techniques for Low-rise Domestic Buildings</td>
<td>Sustainable Construction</td>
</tr>
<tr>
<td>Construction Drawing Techniques</td>
<td>Construction Technology and Design in Construction and Civil Engineering</td>
</tr>
<tr>
<td></td>
<td>Building Technology in Construction</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

Suggested resources

Books


Websites *(Relevant websites applicable to learner’s home country)*

<table>
<thead>
<tr>
<th>Website</th>
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</tr>
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<tbody>
<tr>
<td><a href="http://www.architecture.com">www.architecture.com</a></td>
<td>Royal Institute of British Architects</td>
</tr>
<tr>
<td><a href="http://www.bre.co.uk/page.jsp?id=317">www.bre.co.uk/page.jsp?id=317</a></td>
<td>Building Research Establishment Limited</td>
</tr>
<tr>
<td><a href="http://www.englishpartnerships.co.uk/mmc.htm">www.englishpartnerships.co.uk/mmc.htm</a></td>
<td>The National Regeneration Agency</td>
</tr>
</tbody>
</table>
Unit 7: Construction Drawing Techniques

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30822H

This unit is internally assessed

Unit aim

This unit enables learners to know about the drawings, drawing equipment, materials standards and conventions used in construction drawing. The unit also offers learners opportunities to develop their sketching and drawing skills.

Unit introduction

Construction drawing is, along with the written word, one of the main methods by which information is communicated within the construction industry. Construction drawings can help turn an idea into a reality and offer a clear, accurate and convenient way of communicating construction information. This unit is designed to provide learners with the basic knowledge, understanding and skills required to produce simple construction sketches and drawings using manual drawing techniques.

Learners will initially investigate the different kinds of drawings used in the construction industry and explore the purpose of each. This will be followed by an introduction to the resources needed to produce these drawings. Learners will become familiar with the drawing equipment and materials in common use, and will develop an understanding of the equipment and paper needed to undertake given drawing tasks.

Learners will build upon this knowledge and understanding to explore drawing standards and conventions in common use. They will learn about the scales, hatchings, lines, dimensions, annotations and projection methods used in construction drawing.

The best way to learn construction drawing is to practise construction drawing techniques, and that is what learners will do. They will have the opportunity to develop skills in producing construction sketches and drawings using relevant techniques, conventions and standards. The main focus of the unit is on the development of construction sketching and drawing techniques rather than on design considerations such as the use of space. Knowledge and understanding of the latter can follow, perhaps in another unit, when the drawing skills needed to underpin such knowledge and understanding have been more fully developed.
Outcomes of learning

On completion of this unit a learner should:

1. Know the different types of drawings used in the construction industry
2. Know the drawing equipment and materials used to produce construction sketches and drawings
3. Be able to apply construction drawing standards and conventions to produce sketches and working drawings.
### Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

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<tbody>
<tr>
<td><strong>P1</strong></td>
<td>identify the different types of drawings used in the construction industry.</td>
<td><strong>M1</strong> relate the type and purpose of specified drawings to the drawing equipment, materials, standards and conventions used to produce them.</td>
<td><strong>D1</strong> evaluate a range of different types of given drawings in terms of the perceived benefits and relative costs of the resources and techniques used to produce the drawings.</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>describe the purpose of the different types of drawings used in the construction industry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>identify the main items of drawing equipment used to produce construction sketches and drawings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>identify the different materials used to produce construction sketches and drawings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>select the equipment and materials needed to produce specified construction sketches and drawings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>identify the construction drawing standards and conventions used in the construction industry.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> apply construction drawing standards and conventions to produce sketches and working drawings.</td>
<td><strong>M2</strong> produce a portfolio of sketches and drawings, with work that is neat and drawn to scale.</td>
<td><strong>D2</strong> produce a portfolio of sketches and drawings, with work that is neat, precise, technically accurate and drawn to an appropriate scale.</td>
</tr>
</tbody>
</table>
1 **Know the different types of drawings used in the construction industry**

Types of drawings:
- location
- assembly
- component
- presentation
- sketch
- working drawings

Purpose of each type:
- location drawings show position of buildings on site
- assembly drawings show how something is put together
- component drawings show details of individual components such as windows, doors, staircases and fitted kitchen units
- presentation drawings convey information to the client
- sketch drawings are basic freehand drawings to an approximate scale
- working drawings show how to construct buildings and other structures

2 **Know the drawing equipment and materials used to produce construction sketches and drawings**

Equipment:
- e.g. pencil, pen, compasses, adjustable set square, eraser, drawing board, scale rule, dividers, protractors, french curves, stencils

Materials:
- paper
- media

Paper:
- detail paper
- cartridge paper
- tracing paper
- paper sizes (A0, A1, A2, A3, A4)

Media:
- pencil (HB, H, 2H)
- pen (0.2–0.25 mm and 0.4–0.5 mm) and ink
3 Be able to apply construction drawing standards and conventions to produce sketches and working drawings

Standards:
- Construction Drawing Practice, BS1192 Part 5

Conventions:
- scales
- hatchings
- lines
- dimensions
- annotation
- title block
- projection methods

Scales:
- e.g. 1:1, 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:1250, 1:2500

Hatchings:
- brickwork
- blockwork
- concrete
- stone
- soil/earth
- timber
- plywood
- hardcore
- insulation

Lines:
- centre lines
- grid lines
- break lines
- section lines
- outlines
- dimension lines
- hidden detail

Dimensions:
- modular
- running
- for coordination
- for sizing work
Annotation:
- upper case
- lower case

Title block:
- drawing title
- drawing number
- revision number
- scale
- date
- drawn by
- notes

Projection methods:
- orthographic

Sketches and construction drawings:
- plans
- elevations
- sections
- details
Information for delivery staff

Essential requirements
Centres should provide access to a drawing studio containing drawing boards and equipment of a standard that will enable learners to achieve the assessment requirements.

The use of parallel motion drawing boards/tables, whilst desirable, is not a mandatory requirement. Whilst it is recognised that the industry is increasingly moving towards the use of CAD, there is no requirement within this unit for learners to have access to PCs and CAD software/hardware.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Construction drawing is the main method of communication in the construction industry and builders construct buildings from working drawings. The vocational context of this unit is apparent in every unit in the qualification. It follows that the knowledge, understanding and skills that comprise this unit will support all other units in the programme. Employers can engage both by providing work experience in drawing offices and on site, and by providing copies of drawings used in previous projects to support the teaching and learning of construction drawing and associated units.

Delivery guidance
Tutors delivering this unit must ensure that learners are provided with sufficient time to develop their drawing skills. This should be facilitated through the use of extensive supervised practical drawing activities and demonstrations of the practices, equipment, materials and techniques involved.

The unit has been designed to provide the knowledge, understanding and skills needed to produce a variety of construction drawings. The emphasis is on manual drawing techniques, and computer aided design (CAD) techniques are not a requirement of this unit. The development of sketching skills will allow learners to improve the hand-eye coordination needed to produce good quality construction drawings.

The learning implied by the content of this unit will complement that found in Unit 5: Construction Processes and Operations for Low-rise Domestic Buildings and Unit 6: Construction Methods and Techniques for Low-rise Domestic Buildings. There is also benefit to learners who are following the craft units. These learners will have to read and interpret drawings relating to the craft tasks they will be asked to perform, and this unit will help develop the required understanding.

In exploring manual drawing techniques, learners will acquire the interpretative skills required in the spatial arrangement of plans and elevations. The discipline of accurate line drawing and lettering will help with numeric and communication skills. In particular, learning manual drawing techniques will have a very beneficial effect on learners’ understanding of construction technology.

The tutor will need to provide examples of different types of high quality drawings for use in the teaching and learning of outcomes of learning. These must include all drawing types included under this outcome and should cover a wide variety of resources and techniques.
This will help learners to see how drawings are used to communicate information and to understand how the drawings they use are produced. It will also allow the use of carefully regulated self-assessment or peer-assessment relating to the quality and utility of such drawings.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all drawing offices and other activity areas, and risk assessments must be undertaken prior to practical drawing activities.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutor to explain the different types of drawing used in the construction industry, followed by a whole-class discussion of the purposes and uses of such drawings.</td>
</tr>
<tr>
<td>Learners to be provided with a variety of location drawings, assembly drawings, component drawings, presentation drawings, working drawings and sketches. The drawings should be without titles and scales.</td>
</tr>
<tr>
<td>Small-group work to identify types of drawings from a description of various purposes of drawings provided by the tutor. Learners should also look at the scale of each drawing. Whole-class, tutor-led discussion to follow with each group stating the outcomes of their decisions and the supporting reasons for those decisions.</td>
</tr>
<tr>
<td>Whole-class, tutor-led discussion re drawing equipment and materials.</td>
</tr>
<tr>
<td>Individual work on ‘drawing equipment identification sheets’.</td>
</tr>
<tr>
<td>Small-group work with each group being given one type of construction sketch or drawing to discuss. Each group to select the equipment and materials needed to produce that type of construction drawing. Each group to then make a simple presentation explaining the reasons behind their selection.</td>
</tr>
<tr>
<td>Practical demonstration (group or individual) of how to fix and mark out sheets of drawing paper. The hand-to- eye motor skills associated with this task are best taught by demonstration by the tutor, followed by practice by learners. The tutor should monitor learners as they practise their skills and provide guidance, advice, correction or praise, as needed. The sheets should contain title boxes with appropriate attributes.</td>
</tr>
<tr>
<td>Practical demonstration (group or individual) of how to use the equipment to produce a drawing. The hand- to-eye motor skills associated with using technical drawing equipment are best taught by demonstration by the tutor, followed by practice by learners. The tutor should monitor the learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate.</td>
</tr>
</tbody>
</table>

**Assignment 1: Construction Drawings, Resources, Standards and Conventions**

**Assignment 2: Producing Construction Drawings**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised, vocationally related, practical experiences, with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that are fit for purpose. Tutors should remember to review their proposed assessment activities in terms of validity, sufficiency, authenticity and reliability.

Some criteria may be addressed directly by the tutor during practical activities, for example through observation or by oral responses to questions from the tutor. Where this approach is appropriate suitable evidence would include observation records or witness statements. Guidance on their use is provided on our website.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable. General guidance on the design of suitable assignments is available on our website.

The use of two assessment instruments is suggested to allow full coverage of the outcomes. The first assessment instrument would comprise P1, P2, P3, P4, P5, P6, M1 and D1 and should focus on the correct selection of the equipment, materials, standards and conventions required to complete the construction drawings tasks, and the reason why each is deemed to be appropriate. The second assessment instrument would comprise P7, M2 and D2 and should focus on the production of the portfolio of sketches and construction drawings.

For P1, learners must have the opportunity to look at a variety of different, tutor-provided, drawings, including at least one example of each of the types listed in the unit content. The type of drawing should not be explicitly clear and classification of the drawings into types should be by scrutiny of the drawings only. Learners must identify the type of drawing in each case. Evidence for this criterion could be provided by annotations to the tutor-provided drawings, or by oral response to tutor-generated questions.

For P2, learners must provide simple descriptions of the purpose of each of the drawings identified in P1 above. Evidence for this criterion could once again be provided by annotations to the tutor-provided drawings, or by oral response to tutor-generated questions.

For P3, learners must identify the main items of equipment used to produce construction drawings, as set down in the unit content. Learners are not required to select specific equipment for given tasks to achieve this grading criterion. Evidence for this criterion could be provided by annotations to the tutor-provided drawings, or by oral response to tutor-generated questions.

For P4, learners must identify the materials used to produce construction drawings, as set down in the unit content. Learners are not required to select specific materials for given tasks to achieve this grading criterion. Evidence for this criterion could be provided, for example, through annotations to the tutor-provided drawings, or through oral evidence in response to a series of tutor-presented relevant items.

For P5, learners must select the appropriate equipment and materials required for specified sketches and construction drawings. Learners are not required to select or use any specific drawing conventions at this grade. Evidence for this criterion could be derived, for example, through assessment of learner work, oral questioning and direct observation.
For P6, learners must identify the construction drawing standards and conventions used in the construction industry. They must be able to differentiate between standards and conventions and identify where each is used. They are not required to provide evidence of their use in sketches or construction drawings.

For P7, learners must produce a range of drawings, to be specified by, or agreed with, the tutor and presented in a portfolio containing the work to be assessed. These drawings should include at least one plan, one elevation, one section and one detail. To provide relevance to learners they could be linked to a single building such as the learner’s own home, or perhaps to a local building of interest. For the assessed work to achieve an acceptable standard the work must demonstrate use of the appropriate standards and conventions.

For M1, learners must explain which drawing equipment, materials, standards and conventions are appropriate for producing a variety of different, tutor-provided drawings. This must include at least one example of each of the types listed in the unit content. Evidence for this criterion could, for example, be derived through an extension of the assessment activities suggested for P1.

For M2, learners must produce a range of drawings, to be specified by, or agreed with, the tutor and presented in a portfolio containing the work to be assessed. These drawings must include at least one plan, one elevation, one section and one detail. To provide relevance to learners they could be linked to a single building such as the learner’s own home, or perhaps to a local building of interest. For the assessed work to achieve the standard required by the merit criterion it must provide evidence that an acceptable standard of drafting has been achieved. Specifically, the assessed work must consistently be neat and tidy, and produced using a variety of appropriate equipment and drawing media. The correct scales and projections must have been used for the work, and appropriate and consistent use must have been made of lines and hatching. Dimensioning and annotation must be clear and correct, with no more than a few exceptions. The appropriate conventions must have been observed in a consistent fashion, and it must be possible to extract some useful information from the drawings. At this grade a limited number of corrected mistakes can be allowed, and a limited amount of tutor guidance is acceptable.

For D1, learners must look at a number of construction drawings, including at least one example of each of the types listed in the unit content, evaluate the fitness for purpose of the type of drawing employed, and relate this to the relative costs of the resources and techniques required to produce that drawing. Evidence for this criterion could, for example, be derived through an extension of the assessment activities suggested for P1 and/or M1.

For D2, learners must produce a range of drawings, to be specified by, or agreed with, the tutor and presented in a portfolio containing the work to be assessed. These drawings must include at least one plan, one elevation, one section and one detail. To provide relevance to learners they could be linked to a single building such as the learner’s own home, or perhaps to a local building of interest. For the assessed work to achieve the standard required of the distinction criterion, it must provide evidence that a good standard of drafting has been achieved. Specifically, all of the assessed work must be neat and tidy, and be produced using a variety of appropriate drawing equipment and materials. The correct scales and projections must have been used and appropriate use must have been made of lines and hatching. Dimensioning and annotation must be clear and correct. The appropriate conventions must have been consistently observed, and it must be possible to extract a comprehensive range of useful information from the drawings. It is anticipated that at this grade the work will have been done without significant guidance from the tutor.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, D1</td>
<td>Construction Drawings, Resources, Standards and Conventions.</td>
<td>Your manager has asked you to provide drawings, a comprehensive range of drawing equipment and materials, together with suitable reference material in preparation for a project.</td>
<td>Report comprising text, images, tables and charts as appropriate.</td>
</tr>
<tr>
<td>P7, M2, D2</td>
<td>Producing Construction Drawings.</td>
<td>A client has asked you to produce a construction drawing of a local building of interest.</td>
<td>A portfolio of four sketches and drawings to include one plan, one elevation, one section and one detail.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite of units. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Construction Drawing Skills</td>
<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
<td>Sustainable Construction</td>
</tr>
<tr>
<td></td>
<td>Construction Methods and Techniques for Low-rise Domestic Buildings</td>
<td>Construction Technology and Design in Construction and Civil Engineering</td>
</tr>
<tr>
<td></td>
<td>Exploring Carpentry and Joinery</td>
<td>Building Technology in Construction</td>
</tr>
<tr>
<td></td>
<td>Performing Joinery Operations</td>
<td>Graphical Detailing in Construction and the Built Environment</td>
</tr>
<tr>
<td></td>
<td>Performing Carpentry Operations</td>
<td>Surveying in Construction and Civil Engineering</td>
</tr>
<tr>
<td></td>
<td>Exploring Trowel Operations</td>
<td>Building Surveying in Construction</td>
</tr>
<tr>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Performing Blockwork Operations</td>
<td>Design Procedures in Construction</td>
<td></td>
</tr>
<tr>
<td>Performing Brickwork Operations</td>
<td>Construction in Civil Engineering</td>
<td></td>
</tr>
<tr>
<td>Exploring Painting and Decorating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing Paperhanging Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing Decorating Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploring Building Services Techniques in Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing Plumbing Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing Electrical Operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C.*
Suggested resources

Books
BSI – *Construction Drawing Practice, BS1192 Part 5* (British Standards Institute, 1999) ISBN 0580295141

Digest
*Building Research Establishment: Guidance on Construction Site Communication*

Journals
*AJ Journal* (Royal Institute of British Architects)
*AT Magazine* (Chartered Institute of Architectural Technologists)
*Building Construction Manager* (Chartered Institute of Building)

Websites (Relevant websites applicable to learner’s home country)

<table>
<thead>
<tr>
<th><a href="http://www.building.co.uk">www.building.co.uk</a></th>
<th>Building Magazine</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.ciat.org.uk">www.ciat.org.uk</a></td>
<td>Chartered Institute of Architectural Technologists</td>
</tr>
<tr>
<td><a href="http://www.construction-manager.co.uk">www.construction-manager.co.uk</a></td>
<td>Construction Manager Magazine</td>
</tr>
<tr>
<td><a href="http://www.architecture.com">www.architecture.com</a></td>
<td>Royal Institute of British Architects</td>
</tr>
</tbody>
</table>
Unit 8: Exploring Carpentry and Joinery

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30823H
This unit is internally assessed

Unit aim

This unit enables learners to use the appropriate hand tools, materials and personal protective equipment used in carpentry and joinery together with the necessary skills to mark out and form simple joints for use in a frame.

Unit introduction

Carpentry and joinery are different trades, but they use similar tools, materials, personal protective equipment and skills. Together they comprise the largest craft group in the construction industry.

Carpenters generally work outdoors on site and perform tasks such as the on-site fitting of door frames, doors, windows, kitchen units, staircases and timber roofs. Joiners generally work indoors in workshops and perform tasks such as the manufacture of timber products such as staircases, windows and doors. Both carpenters and joiners need to be able to form joints in timber.

The initial focus of this unit is on the hand tools, materials and personal protective equipment (PPE) used in carpentry and joinery. This is followed by guidance on the use of setting out rods to mark out work and instruction in the safe working techniques used to form joints in timber for use in the production of a simple frame.

Working in carpentry and joinery involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

Outcomes of learning

On completion of this unit a learner should:

1 Know the hand tools and materials commonly used to perform carpentry and joinery tasks
2 Understand the important health, safety and welfare issues associated with carpentry and joinery tasks
3 Be able to apply safe working practices to mark out and form joints for a timber frame to a given specification.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To achieve a pass grade</strong></td>
</tr>
<tr>
<td>the evidence must show that the learner is able to:</td>
</tr>
<tr>
<td>P1 identify the hand tools used to perform carpentry and joinery tasks.</td>
</tr>
<tr>
<td>P2 select the hand tools required to perform given carpentry and joinery tasks.</td>
</tr>
<tr>
<td>P3 identify the materials used to perform carpentry and joinery tasks.</td>
</tr>
<tr>
<td>P4 select the materials required to perform given carpentry and joinery tasks.</td>
</tr>
<tr>
<td>P5 identify the PPE and safe working practices used to perform carpentry and joinery tasks.</td>
</tr>
<tr>
<td>P6 explain the selection of the PPE and safe working practices to be used in given carpentry and joinery tasks.</td>
</tr>
</tbody>
</table>
## Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> produce setting out rods and use them to mark out work.</td>
<td><strong>M3</strong> produce finished work with all joints within 3 mm tolerance and square.</td>
<td><strong>D1</strong> produce finished work with all joints within 1 mm tolerance and square.</td>
</tr>
<tr>
<td><strong>P8</strong> set out and cut joints in timber.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P9</strong> use a range of joints to produce a timber frame to a given specification.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform carpentry and joinery tasks

Hand tools:
- pencil
- steel rule
- combination/tri-square
- marking knife
- marking/mortice gauge
- sliding bevel
- wooden mallet
- claw hammer
- mortice/bevel-edged chisel
- tenon/panel/dovetail saw
- jack/plough/block plane
- wheel brace
- bradawl
- hand screwdrivers
- bench holdfast

Materials:
- renewable softwoods
- nails
- panel pins
- woodscrews
- polyvinyl acetate glue
- abrasive paper

2 Understand the important health, safety and welfare issues associated with carpentry and joinery tasks

Health, safety and welfare issues:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by sharp tools and instruments
- musculoskeletal injuries resulting from lifting and moving heavy loads
PPE:
- safety boots
- hand protection
- goggles
- other PPE as appropriate

3 Be able to apply safe working practices to mark out and form joints for a timber frame to a given specification

Marking out:
- production and use of setting out rods
- vertical and horizontal sections of simple frames
- use in producing specified timber products

Joints:
- e.g. housing, through/corner halving, tee halving, through/corner bridle, through/haunched mortice and tenon, dovetail

Timber frame:
- production of specified simple frame made from prepared timber sections to include a range of the joints listed above to given specifications
Information for delivery staff

**Essential requirements**

Learners will require access to hand tools, carpentry and joinery work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of timber joints and frames, adequate washing facilities, and access to first-aid facilities.

**Employer engagement and vocational contexts**

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Visits to carpentry and joinery companies and from employees in the wood occupations could add to the relevance of the subject for learners. This should give learners the opportunity to speak to experienced carpenters and joiners and to ask them questions about their experiences in the industry and the benefits it has brought to them. In order to appreciate the construction workplace environment, visits to carpentry and joinery workplaces are strongly recommended.

**Delivery guidance**

The purpose of the unit is to introduce learners to the hand tools most commonly used in carpentry and joinery and to the basic skills, techniques and materials required to form simple joints and frames. This unit also requires learners to produce and use a setting out rod. Throughout this unit reference to safe working practices should always be addressed, as well as the appropriate PPE.

*Unit 8: Exploring Carpentry and Joinery* is a stand-alone unit, and is the first unit to complete in the wood pathway. Other units, *Unit 9: Performing Joinery Operations* and/or *Unit 10: Performing Carpentry Operations*, would follow after this if chosen.

The most important aspect of the delivery requires learners to develop practical skills and techniques. This is best done by the tutor introducing relevant skills and techniques which methodically allow learners to build on acquired skills and techniques to complete more complex tasks. This will require demonstrating by the tutor followed by the learners practising the processes.

The unit requires learners to initially draw a setting out rod for a timber product. The tutor should produce an A4 drawing handout of the product to facilitate the production of the rod. The drawing process will require tutor demonstrations of appropriate techniques followed by learners practising these skills and techniques. The tutor will then need to demonstrate how the setting out rod can be used to accurately mark out the timber for the product.

The unit requires learners to use hand tools to produce a timber product, the design of which will need to incorporate a range of the joints listed in the unit content. The tutor will need to demonstrate the skills and techniques of using hand tools and equipment followed by learners practising these skills and techniques.
Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture. Whole-class, tutor-led discussion about hand tools and materials. Individual work on ‘tool and material identification sheets’.</td>
</tr>
<tr>
<td>Practical: requisitioning tools and materials from store.</td>
</tr>
<tr>
<td>Lecture. Whole-class, tutor-led discussion re PPE and safe working techniques PPE should be discussed in terms of when and where it is necessary and how it works. Individual work on ‘PPE identification sheets’.</td>
</tr>
<tr>
<td>Practical: learners complete requisition sheets to obtain PPE from stores. Learners provided with opportunities to select and wear the full range of the PPE used in carpentry and joinery.</td>
</tr>
<tr>
<td>Pre-practical and practical. Other health and safety issues should be demonstrated by the teacher before practical work commences and reinforced at intervals throughout. Learners should performing basic skills, under close supervision, before they attempt any individual practical carpentry and joinery tasks.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used in Carpentry and Joinery**

Pre-practical: demonstration of how to keep individual work areas tidy. The hand-to-eye motor skills associated with carpentry and joinery are best taught by the tutor demonstrating the skills required, followed by learners practising the skills.

Demonstration group/individual to ‘take off’ from the setting out rod.

Demonstration group/individual to make a timber frame

Demonstration group/individual to finish a timber frame.

Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be done under supervision and the tutor should stop the task if learners are working unsafely. Learners should work individually to produce their joints and timber frame.

**Assignment 2: Performing Carpentry and Joinery Tasks**
Assessment guidance

The assessment strategies used in this unit need to reflect the assessment grading criteria. The evidence must relate to the grading criteria.

For P1, learners must identify the hand tools used to carry out simple carpentry and joinery tasks. The evidence could be provided by a tool identification worksheet.

For P2, learners must select appropriate hand tools to carry out specified carpentry and joinery tasks. The evidence could be provided by a tool requisition sheet.

For P3, learners must identify the materials used in simple carpentry and joinery tasks. The evidence could be provided by a materials identification worksheet.

For P4, learners must select appropriate materials to carry out specified carpentry and joinery tasks. The evidence could be provided by a tool requisition sheet.

For P5, learners must identify the safe working practices and PPE used to minimise the risks associated with the hazards. Tutor observation or oral questioning could be used to provide the evidence here.

For P6, learners must explain the selection the safe working practices and PPE associated with a given carpentry and joinery tasks. Oral questioning could be used here.

For P7, learners must draw and use a simple setting out rod for a timber product. The evidence must be provided by learners’ drawn assessment work, as well as written statements by learners in respect of how a rod is used to mark out the timber components.

For P8, learners must set out and cut joints in timber. The evidence will be learners’ completed practical assessment work.

For P9, learners must use a range of joints to produce a timber product to a given specification. The evidence could be provided by learners’ practical assessment work.

For M1, learners must justify the use hand tools and materials safely to minimise health, safety and welfare risks. This evidence could be provided by a witness statement.

For M2, learners must justify the appropriate use of PPE and safe working practices to minimise health, safety and welfare risks. This evidence must be provided by a witness statement.

For M3, learners must produce finished work, to include the setting out rod and timber product, that is square and constructed to within ± 3mm of given specifications. Gaps in wood joints must not be greater than ±3mm.

For D1, learners must produce finished work, to include the setting out rod and a timber product, that is square and constructed to within ± 1mm of given specifications. Gaps in wood joints must not be greater than ±1mm.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Carpentry and Joinery.</td>
<td>As an on-site assistant, you have been asked to prepare for a carpentry and joinery task. Your immediate line manager wishes to see you identify and select the tools and working techniques to be used, compliance with health and safety risk assessments, and your overall general preparation.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Carpentry and Joinery Tasks.</td>
<td>As an on-site construction worker, a carpentry and joinery task has been assigned to your team.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
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<tr>
<td>Developing Carpentry Skills</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
</tr>
<tr>
<td>Developing Joinery Skills</td>
<td>Performing Joinery Operations</td>
</tr>
<tr>
<td></td>
<td>Performing Carpentry Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
### Suggested resources

#### Books

Brett P – *Site Carpentry: Level 2, 3rd Edition* (Nelson Thornes, June 2007)  
ISBN 9780748781850

ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills*  
(Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition*  

#### Websites (Relevant websites applicable to learner's home country)

<table>
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<tr>
<th>Website</th>
<th>Description</th>
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</thead>
<tbody>
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<td>Good Woodworking Magazine</td>
</tr>
<tr>
<td><a href="http://www.hse.gov.uk">www.hse.gov.uk</a></td>
<td>Health and Safety Executive</td>
</tr>
<tr>
<td><a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a></td>
<td>Students of Woodwork Information</td>
</tr>
</tbody>
</table>
Unit 9: Performing Joinery Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30824H
This unit is internally assessed

Unit aim

This unit enables learners to use the hand tools, power tools, materials and personal protective equipment (PPE) appropriate to joinery tasks and the skills used to mark out and form simple joints.

Unit introduction

Joinery is the skill of shaping and jointing wood, and is one of the most important skills in working with wood. It involves shaping and fitting pieces of wood together in a precise manner to form various objects or structures. Joiners construct a variety of components of a building, for example doors, windows, kitchen cabinets, staircases, furniture and other fittings. Traditionally, joiners generally work on a smaller scale than site carpenters. Joiners mainly work indoors in workshops on benches while site carpenters work both inside and outside on building sites. However, in the modern construction industry joiners can be found working in workshops, on site or possibly both.

This unit introduces learners to the hand tools most commonly used in joinery and the processes and techniques involved in using hand tools to form joinery products. Learners will draw a setting out rod, which is an accurate drawing representing the actual size of the joinery item to be produced. They will then use the setting out rod to mark out timber and construct the joinery product.

Working in joinery involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools and materials commonly used to perform joinery tasks
2. Understand the important health, safety and welfare issues associated with joinery tasks
3. Be able to apply safe working practices to mark out and form joints for a timber product.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>identify the hand tools used to perform joinery tasks.</td>
<td><strong>M1</strong> justify the safe use of hand tools and materials to minimise health, safety and welfare risks.</td>
<td><strong>D1</strong> produce finished work safely with all joints within 1 mm tolerance and square.</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>select the hand tools required to perform given joinery tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>identify the materials used to perform joinery tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>select the materials required to perform given joinery tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>identify the PPE and safe working practices used to perform joinery tasks.</td>
<td><strong>M2</strong> justify the safe use of appropriate PPE and working practices to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>explain the selection of the PPE and safe working practices to be used in given joinery tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P7</strong></td>
<td>produce setting out rods and use them to mark out timber.</td>
<td><strong>M3</strong> produce finished work safely with all joints within 3 mm tolerance.</td>
<td></td>
</tr>
<tr>
<td><strong>P8</strong></td>
<td>set out and cut joints in timber.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P9</strong></td>
<td>use a range of joints to produce a panel door or a casement window to a given specification.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform joinery tasks

Hand tools:
- try square
- marking gauge
- combination gauge
- mortice gauge
- sliding bevel
- wooden mallet
- claw hammer
- mortice/bevel-edged chisels
- tenon saw
- smoothing/block plane
- wheel brace
- bradawl
- hand screwdrivers
- sash cramp
- G-clamp
- bench hooks
- spirit level

Materials:
- renewable softwoods
- nails
- panel pins
- woodscrews
- polyvinyl acetate glue
- abrasive paper

2 Understand the important health, safety and welfare issues associated with joinery tasks

Health, safety and welfare issues:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by sharp tools and instruments
- musculoskeletal injuries resulting from lifting and moving heavy loads
PPE:
- safety boots
- hand protection
- goggles

3 Be able to apply safe working practices to mark out and form joints for a timber product

Marking out:
- production and use of setting out rods
- vertical and horizontal sections
- use in producing specified timber products

Joints:
- corner/tee halving, through housing, dovetail halving, mortice and tenon (wedged), double/twin mortice and tenons (wedged)

Timber product:
- panel door or casement window
Information for delivery staff

Essential requirements

Learners will require access to hand tools, joinery work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of panel doors and casement windows, adequate washing facilities, and access to first-aid facilities.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Visits to joinery companies and from employees in the wood occupations could add to the relevance of the subject for learners. This should give learners the opportunity to speak to experienced joiners and cabinetmakers and to ask them questions about their experiences in the industry and the benefits it has brought to them. In order to appreciate the construction workplace environment, joinery shop visits are strongly recommended.

Delivery guidance

This unit should be delivered in a fully-equipped joinery workshop to ensure learners have a thorough opportunity of understanding joinery techniques and processes. The unit introduces learners to the hand tools most commonly used in joinery. Access to these tools is a requirement. Learners should each have a joinery workbench with a woodworking vice available. The unit also requires the learner to produce and use a setting out rod, and appropriate equipment should also be made available to the individual learner. We strongly recommend that Unit 8: Exploring Carpentry and Joinery be completed prior to this unit.

The purpose of the unit is to introduce learners to the hand tools most commonly used in joinery and to the basic skills, techniques and materials required to make a panel door or a casement window. This unit also requires learners to produce and use a setting out rod. Throughout this unit reference to safe working practices should always be addressed, as well as the appropriate PPE.

We strongly recommend that Unit 8: Exploring Carpentry and Joinery be completed prior to Unit 9: Performing Joinery Operations and/or Unit 10: Performing Carpentry Operations.

To complete this unit learners must develop practical skills and techniques. This is best done by the tutor introducing relevant skills and techniques which allow learners to build, in a methodical fashion, on acquired skills and techniques, so as to complete more complex tasks. This will require tutor demonstrations followed by learners practising the processes.

Some examples of the timber product that may be used to evidence practical joinery skills are a small panel door or a small casement window.

The unit requires learners to draw a setting out rod for a timber product. The tutor should produce an A4 drawing handout of the product to facilitate the production of the rod. The drawing process will require tutor demonstrations of appropriate techniques followed by learners practising the skills and techniques. The tutor will then need to demonstrate how the setting out rod can be used to accurately mark out the timber for the panel door or the casement window.
The unit requires learners to use hand tools to produce a timber product, the design of which will need to incorporate a range of the joints listed in the unit content. The tutor will need to demonstrate the skills and techniques of using hand tools and equipment followed by learners practising these skills and techniques.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand and materials commonly used to perform joinery tasks.</td>
</tr>
<tr>
<td>Lecture. Whole-class, tutor-led discussion about hand tools and materials. Individual work on ‘tool and material identification sheets’.</td>
</tr>
<tr>
<td>Assignment 1: Resources and Techniques Used in Joinery</td>
</tr>
<tr>
<td>Health, safety and welfare issues associated with joinery tasks</td>
</tr>
<tr>
<td>Lecture. Whole-class, tutor-led discussion re PPE and safe working techniques. PPE should be discussed in terms of when and where it is necessary and how it works. Individual work on ‘PPE identification sheets’.</td>
</tr>
<tr>
<td>Practical: learners complete requisition sheets to obtain PPE from stores. Learners provided with opportunities to select and wear the full range of the PPE used in joinery.</td>
</tr>
<tr>
<td>Pre-practical and practical. Other health and safety issues should be demonstrated by the tutor before practical work commences and reinforced at intervals throughout. Learners should performing basic skills, under close supervision, before they attempt any individual practical joinery tasks.</td>
</tr>
<tr>
<td>Produce and use a setting out rod for a timber product to a given specification.</td>
</tr>
<tr>
<td>Pre-practical: demonstration of how to produce and use a setting out rod. The hand-to-eye motor skills associated with this task are best taught by the tutor demonstrating the skills required, followed by learners practising the skills.</td>
</tr>
<tr>
<td>Demonstration group/individual to produce a setting out rod for a timber product.</td>
</tr>
<tr>
<td>Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be done under supervision. Learners should work individually to produce their setting out rods.</td>
</tr>
<tr>
<td>Complete joinery tasks safely using tools to given specifications.</td>
</tr>
<tr>
<td>Pre-practical: demonstration of how to keep individual work areas tidy. The hand-to-eye motor skills associated with joinery tasks are best taught by the tutor demonstrating the skills required, followed by learners practising the skills.</td>
</tr>
<tr>
<td>Demonstration group/individual to ‘take off’ from the setting out rod.</td>
</tr>
<tr>
<td>Demonstration group/individual to make a panel door or a casement window.</td>
</tr>
<tr>
<td>Demonstration group/individual to finish a panel door or a casement window.</td>
</tr>
<tr>
<td>Assignment 2: Performing Joinery Tasks</td>
</tr>
<tr>
<td>Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be carried out under supervision and the tutor should stop the task if learners are working unsafely. Learners should work individually to produce their timber product.</td>
</tr>
</tbody>
</table>
Assessment guidance

The assessment strategies used in this unit need to reflect the assessment grading criteria. The evidence must relate to the grading criteria.

For P1, learners must identify the hand tools used to carry out simple joinery tasks. The evidence could be provided by a tool identification worksheet.

For P2, learners must select appropriate hand tools to carry out specified joinery tasks. The evidence could be provided by a tool requisition sheet.

For P3, learners must identify the materials used in simple joinery tasks. The evidence could be provided by a materials identification worksheet.

For P4, learners must select appropriate materials to carry out specified joinery tasks. The evidence could be provided by a tool requisition sheet.

For P5, learners must identify the safe working practices and PPE used to minimise the risks associated with the hazards. Tutor observation or oral questioning could be used to provide the evidence here.

For P6, learners must explain the selection of the safe working practices and PPE associated with the given joinery tasks. Oral questioning could be used here.

For P7, learners must draw and use a simple setting out rod for a timber product. The evidence must be provided by the learner’s drawn assessment work, as well as a written statement by learners in respect of how a rod is used to mark out the timber components.

For P8, learners must set out and cut joints in timber. The evidence must be provided by learners’ practical assessment work.

For P9, learners must use a range of joints to produce a panel door or a casement window to a given specification. The evidence must be provided by learners’ practical assessment work.

For M1, learners must justify the use of hand tools and materials safely to minimise health, safety and welfare risks. This evidence must be provided by a witness statement.

For M2, learners must justify the appropriate use of PPE and safe working practices to minimise health, safety and welfare risks. This evidence must be provided by a witness statement.

For M3, learners must produce finished work safely (setting out rod and timber product such as panel door or casement window) which is square and constructed to within ± 3 mm of given specifications. Gaps in wood joints must not be greater than ±3 mm.

For D1, learners must produce finished work safely (setting out rod and timber product such as panel door or casement window) which is square and constructed to within ± 1 mm of given specifications. Gaps in wood joints must not be greater than ±1 mm.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
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<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Joinery.</td>
<td>You have been asked to identify and select the tools and working techniques to be used for a new construction project involving joinery tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Joinery Tasks.</td>
<td>As part of the same construction project, you have been assigned the task of producing a panel door or a casement window.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

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</tr>
<tr>
<td></td>
<td>Exploring Carpentry and Joinery</td>
</tr>
<tr>
<td></td>
<td>Performing Carpentry Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
Suggested resources

Books
ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills*
(Butterworth-Heinemann, 1996) ISBN 9780340645284

Websites (Relevant websites applicable to learner’s home country)

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</tbody>
</table>
Unit 10: Performing Carpentry Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30825H
This unit is internally assessed

Unit aim

This unit enables learners to use appropriate hand tools, power tools, materials, personal protective equipment. The unit also enables learners to develop carpentry skills through performing carpentry tasks.

Unit introduction

Carpentry is the skill of cutting, working and joining timber together. It is also concerned with fitting timber structures into building. Carpenters install partitions, doors, windows, flooring, roofs, staircases and almost every other wooden component of buildings. Carpenters can also be found working indoors in a factory environment pre-fabricating timber construction components such as roof trusses, timber beams, timber framed houses and partitions, for later assembly on site.

This unit introduces learners to the hand tools most commonly used in carpentry. The unit also reinforces the processes and techniques involved in using hand tools in carpentry. The content of this unit involves the drawing of a setting out rod and the production of a timber product.

Working in carpentry involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

Outcomes of learning

On completion of this unit a learner should:
1. Know the hand tools and materials commonly used to perform carpentry tasks
2. Understand the important health, safety and welfare issues associated with carpentry tasks
3. Be able to apply safe working practices to perform carpentry tasks.
## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
|---------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| P1                              | identify the hand tools used to perform carpentry tasks.                    | M1 justify the safe use of hand tools and materials to minimise health, safety and welfare risks.             |
| P2                              | select the hand tools required to perform given carpentry tasks.            |                                                                                                               |
| P3                              | identify the materials used to perform carpentry tasks.                     |                                                                                                               |
| P4                              | select the materials required to perform given carpentry tasks.             |                                                                                                               |
| P5                              | identify the PPE and safe working practices used to perform carpentry tasks.| M2 justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks.|
| P6                              | explain the selection of the PPE and safe working practices to be used in given carpentry tasks. |                                                                                                               |
| P7                              | produce setting out rods and use them to mark out work.                     | M3 produce finished work with all joints within 3 mm tolerance and square.                                      |
| P8                              | set out and cut joints in timber.                                           |                                                                                                               |
| P9                              | use a range of joints to perform carpentry tasks to a given specification.  | D1 produce finished work with all joints within 1 mm tolerance and square.                                      |
Unit content

1 Know the hand tools and materials commonly used to perform carpentry tasks

Hand tools:
- pencil
- combination square
- marking gauge
- sliding bevel
- wooden mallet
- claw hammer
- bevel-edged chisels
- tenon/panel saw
- jack/smoothing plane
- block plane
- wheel brace
- bradawl
- screwdrivers
- mitre box
- nail pincers
- nail punch

Materials:
- renewable softwoods
- nails
- woodscrews
- polyvinyl acetate glue
- abrasive paper

2 Understand the important health, safety and welfare issues associated with carpentry tasks

Health, safety and welfare issues:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by sharp tools and instruments
- musculoskeletal injuries resulting from lifting and moving heavy loads
PPE:
- safety boots
- hand protection
- goggles
- other PPE as appropriate

3 Be able to apply safe working practices to perform carpentry tasks

Marking out:
- production and use of setting out rods
- vertical and horizontal views and sections
- use in producing specified timber products

Joints:
- e.g. housing, through/corner halving, tee halving, through/corner bridle, through/haunched mortice and tenon, dovetail

Carpentry task:
- hanging doors (side-hung using butt hinges)
- fixing ironmongery (simple mortice lock, cylinder night latch, lever handles)
- fixing mouldings (picture rails, skirting boards, dado rails, architraves) to masonry walls as appropriate
Information for delivery staff

Essential requirements
Learners will require access to hand tools, carpentry work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of timber joints and frames, adequate washing facilities, and access to first-aid facilities.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Visits to carpentry companies and from employees in the wood occupations could add to the relevance of the subject for learners. This should give learners the opportunity to speak to experienced carpenters and to ask them questions about their experiences in the industry and the benefits it has brought to them. To appreciate the construction workplace environment, visits to carpentry workplaces are strongly recommended.

Delivery guidance
The purpose of the unit is to introduce learners to the hand tools most commonly used in carpentry and to the basic skills, techniques and materials required to perform carpentry tasks. This unit also requires learners to produce and use a setting out rod. Throughout this unit, reference to safe working practices should always be addressed, as well as the appropriate PPE.

To complete this unit learner must develop practical skills and techniques. This is best done by the tutor introducing skills and techniques gradually, enabling learners to build on acquired skills and techniques to complete more complex tasks. This will require tutor demonstrations followed by learners practising the processes.

The unit requires learners to use hand tools to perform carpentry tasks, the design of which will need to incorporate a range of the joints listed in the unit content. The tutor will need to demonstrate the skills and techniques of using hand tools and equipment followed by learners practising these skills and techniques. The tasks that learners can perform to demonstrate achievement of the required skills are hanging a door, fixing ironmongery to the door and fixing mouldings to masonry walls.

The unit requires learners to initially draw a setting out rod for a timber product. The tutor should produce an A4 drawing handout of the product to facilitate learners in their production of the rod. The drawing process will require tutor demonstrations of appropriate techniques followed by learners practising these skills and techniques. The tutor will then need to demonstrate how the setting out rod can be used to accurately mark out the timber for practical carpentry tasks.
Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture. Whole-class, tutor-led discussion re hand tools and materials. Individual work on ‘tool and material identification sheets’.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used in Carpentry**

Lecture. Whole-class, tutor-led discussion re PPE and safe working techniques. PPE should be discussed in terms of when and where it is necessary and how it works.

Individual work on ‘PPE identification sheets’.

Practical: learners complete requisition sheets to obtain PPE from stores. Learners provided with opportunities to select and wear the full range of the PPE used in carpentry.

Pre-practical and practical. Other health and safety issues should be demonstrated by the tutor before practical work commences and reinforced at intervals throughout. Learners should be performing basic skills, under close supervision, before they attempt any individual practical carpentry tasks.

Pre-practical: demonstration of how to keep individual work areas tidy. The hand-to-eye motor skills associated with carpentry are best taught by the tutor demonstrating the skills required, followed by learners practising the skills.

Demonstration group/individual to ‘take off’ from the setting out rod.

Individual to perform carpentry tasks including fixing mouldings, hanging doors and fixing ironmongery.

**Assignment 2: Performing Joinery Tasks**

Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be done under supervision and the tutor should stop the task if learners are working unsafely. Learners should work individually to perform their carpentry tasks.
**Assessment guidance**

The assessment strategies used in this unit need to reflect the assessment grading criteria. The evidence must relate to the grading criteria.

For P1, learners must identify the hand tools used to carry out simple carpentry tasks. The evidence could be provided by a tool identification worksheet.

For P2, learners must select appropriate hand tools to carry out specified carpentry tasks. The evidence could be provided by a tool requisition sheet.

For P3, learners must identify the materials used in simple carpentry tasks. The evidence could be provided by a materials identification worksheet.

For P4, learners must select appropriate materials to carry out specified carpentry tasks. The evidence could be provided by a tool requisition sheet.

For P5, learners must identify the safe working practices and PPE used to minimise the risks associated with the hazards. Tutor observation or oral questioning could be used to provide the evidence here.

For P6, learners must explain the selection of safe working practices and PPE associated with the given carpentry tasks. Oral questioning could be used here.

For P7, learners must draw and use a simple setting out rod for a timber product. The evidence must be provided by the learner’s drawn assessment work, as well as a written statement by learners in respect of how a rod is used to mark out the specified carpentry tasks.

For P8, learners must set out and cut joints in timber. The evidence must be provided by learners’ practical assessment work.

For P9, learners must use a range of joints to perform carpentry tasks including hanging a door, fixing ironmongery and fixing mouldings to masonry walls to a given specification. The evidence must be provided by learners’ practical assessment work.

For M1, learners must justify the use of hand tools and materials safely to minimise health, safety and welfare risks. This evidence must be provided by a witness statement.

For M2, learners must justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks. This evidence must be provided by a witness statement.

For M3, learners must produce finished work which is square and constructed to within ± 3 mm of given specifications. Gaps in wood joints must not be greater than ±3 mm.

For D1, learners must produce finished work which is square and constructed to within ± 1 mm of given specifications. Gaps in wood joints must not be greater than ±1 mm.
Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Carpentry.</td>
<td>Your team leader has asked you to identify and select the tools and working techniques to be used in a new project assigned to your team. Your team will need you to also identify compliance with health and safety risk assessments, general preparation for and planning of carpentry tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Joinery Tasks.</td>
<td>As part of the same project, you have been asked to perform carpentry tasks including hanging a door, fixing ironmongery and fixing mouldings to masonry walls.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Carpentry Skills</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
</tr>
<tr>
<td>Exploring Carpentry and Joinery</td>
<td>Performing Joinery Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
**Suggested resources**

**Books**

ISBN 9780748781850

ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills*  
(Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition*  

**Websites (Relevant websites applicable to learner’s home country)**

<table>
<thead>
<tr>
<th>Website</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.getwoodworking.com">www.getwoodworking.com</a></td>
<td>Good Woodworking Magazine</td>
</tr>
<tr>
<td><a href="http://www.hse.gov.uk">www.hse.gov.uk</a></td>
<td>Health and Safety Executive</td>
</tr>
<tr>
<td><a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a></td>
<td>Students of Woodwork Information</td>
</tr>
</tbody>
</table>
Unit 11: Exploring Trowel Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30826H
This unit is internally assessed

Unit aim
This unit will enable learners to develop the skills to safely select and use the appropriate tools and personal protective equipment (PPE) to construct basic brickwork and blockwork structures.

Unit introduction
Brickwork and blockwork form a large proportion of the visual elements of the buildings and structures seen in our towns and cities. Bricklayers are justified in feeling proud of their valuable contribution to the built environment. Unlike other elements of construction that are renewed, replaced or repaired throughout the life of a building, brickwork and blockwork are durable and long lasting. The brickwork and blockwork often forms the structure of the building itself.

Bricklayers use bricks and mortar to build structures such as walls, bridges and chimneys, using a variety of specialist tools to carry out precise and accurate work from architectural drawings. Bricklaying is one of the oldest construction crafts, and structures exist in the Near East and India that are over 5000 years old. This has led to the development of specific terminology and a variety of techniques, patterns and processes. Bricks themselves are made to standard sizes out of clay that has been formed in a mould or extruded and wire cut, and then fired in a kiln. The standard sizing of bricks allows them to be overlapped in a variety of regular patterns known as bonds, and it is this bonding that gives brickwork its regular and attractive appearance as well as its strength and stability.

This unit investigates the commonly used hand tools, equipment and craft skills needed to construct basic brickwork and blockwork structures. Emphasis is placed on the correct selection and safe use of the appropriate tools and equipment. The unit covers the principles and methods of producing and using gauge rods when performing brickwork and blockwork tasks.

Outcomes of learning
On completion of this unit a learner should:
1 Know the hand tools and materials commonly used to perform brickwork and blockwork tasks
2 Understand the important health, safety and welfare issues associated with brickwork and blockwork tasks
3 Be able to apply safe working practices to set out and construct solid brick and block walling to given specifications.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
|---------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| **P1** identify the hand tools used to perform brickwork and blockwork tasks. | **M1** justify the safe use of hand tools and materials to minimise health, safety and welfare risks. |  |
| **P2** select the hand tools used to perform brickwork and blockwork tasks. |  |  |
| **P3** identify the materials used to perform brickwork and blockwork tasks. |  |  |
| **P4** select the materials required to perform brickwork and blockwork tasks. |  |  |
| **P5** identify the PPE and safe working practices used to perform brickwork and blockwork tasks. | **M2** justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks. |  |
| **P6** explain the selection of the PPE and safe working practices to be used in brickwork and blockwork tasks. |  |  |
### Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> produce a gauge rod for setting out brick and block walls.</td>
<td><strong>M3</strong> produce finished work with bricks in line to ± 3 mm, plane face deviation ≤ 3 mm and corners plumb to within ± 5 mm per metre height.</td>
<td><strong>D1</strong> produce finished work with bricks in line to ± 3 mm, plane face deviation ≤ 3 mm and corners plumb to within ± 3 mm per metre height, plus clean face work and no interruption to bed joint continuity.</td>
</tr>
<tr>
<td><strong>P8</strong> identify common bonding arrangements used in the construction of solid brick and block walls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P9</strong> produce solid brick and block walls to a given specification.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform brickwork and blockwork tasks

Hand tools:
- walling trowel
- pointing trowel
- jointing iron
- spirit level
- builder’s line and pins
- tingle
- corner blocks
- club hammer
- bolster chisel
- brick hammer

Materials:
- common bricks
- facing bricks
- engineering bricks
- solid blocks
- insulation blocks
- sand
- cement
- lime
- water

2 Understand the important health, safety and welfare issues associated with brickwork and blockwork tasks

Health, safety and welfare:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- safe working practices, use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by tools and equipment
- abrasive materials
- lime
- cement
- falling objects
- untidy work area
- musculoskeletal injuries resulting from lifting and moving heavy loads
PPE:
- safety boots
- hard hat
- high visibility jacket
- hand protection
- goggles
- other PPE as appropriate

3 Be able to apply safe working practices to set out and construct solid brick and block walling to given specifications

Half-brick walling:
- in facings
- jointed one side to straight lengths in stretcher bond

On-brick walling:
- to straight lengths in facings
- jointed one side in English bond and Flemish bond

Block walling:
- to straight lengths in stretcher bond

Brickwork:
- prepare timber gauge rods marked with saw cuts at 75 mm
- use of these to gauge for brickwork

Blockwork:
- gauge identified on same gauge rods at 225 mm
- use of these to gauge for blockwork
Information for delivery staff

Essential requirements

Learners will require access to a bricklaying workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre’s health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts

The involvement of industry is essential to the establishment of a real-world context within the delivery of the course content. Most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish how they can help. Links or assistance could include:

- the use of visiting speakers to promote recruitment to the BTEC programme
- possible sponsorship of the centre’s construction programme
- provision of materials or samples
- loan of or assistance with specialist equipment
- access to specifications, construction drawings, quality control documentation and health and safety documentation
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put the learning from this unit into an industrial context.

Specific content level and expected outcomes will need to be discussed in advance.

- Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:
  - an investigation of quality control procedures in use on site
  - an investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage
  - the use of brickwork as a feature or aesthetic element within construction
  - an investigation of site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal
  - an investigation of potential risks associated with onsite brickwork operations (companies will be sensitive to possible conclusions and may require you to be guided by their health and safety officer)
● an investigation of how accurate batching of mortar is achieved during on site mixing
● an investigation into setting out and dimensional tolerance of brickwork and block walling on site
● observation of sustainable site practice.

It may be that within one site visit different groups will investigate different ‘on site’ elements or operations.

It is essential that school and local authority guidelines and procedures are strictly adhered to for all visits, and that tutors visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company’s health and safety officer. Learners should be supervised, kept in small groups and accompanied at all times during a site visit.

Please note that Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

**Delivery guidance**

Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills. This should be facilitated through extensive use of supervised practical workshop activities allied to group teaching and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.

This qualification will be delivered by both schools and further education colleges (FECs). Some schools will need to work in partnership with an external provider of training to enable learners to practise and apply the vocational skills needed to complete the practical tasks. Others may have a suitable workshop, covered area or external space and will be able to import craft trainers for specific lessons, whilst some schools will find it necessary to use the facilities of their local FE provider. It should, however, be noted that this unit essentially acts as a ‘taster’ to allow learners to make informed decisions about the selection of further units or qualifications and is designed to provide a broad appreciation of brickwork and blockwork operations. The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The three outcomes of learning should be delivered in an appropriate sequence to be specified by the tutor. Delivery will be largely practical, with learners taking the opportunity to identify, select and use tools, materials and equipment in a workshop environment. Practical activities for outcome of learning 1 could include the selection of tools and materials for completing specified simple brickwork and blockwork tasks. Outcome of learning 2 requires learners to understand health and safety issues and appropriate PPE and safe working practices. Outcome of learning 3 requires learners to produce and use a gauge rod and apply safe working practices to complete brickwork and blockwork tasks.

Visiting expert speakers could add to the relevance of the subject. In order to appreciate the work place environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced bricklayers and to ask them questions about their experiences in the industry and the benefits it has brought to them.
Most learners will not have visited a building site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

Sample materials and/or wall charts should be available and, where possible, on permanent display within the classroom or workshop, to enable learners to become readily familiar with their identification, use and application.

It is intended that this unit will provide learners with their first experience of the practical skills associated with the production of brickwork and blockwork, together with any job knowledge required to underpin such practical skills. It underpins Unit 12: Performing Blockwork Operations and Unit 13: Performing Brickwork Operations.

The tasks specified in the unit are typical of those specified for a Level 2 NVQ in Trowel Occupations and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible and will help to develop skills in teamworking, self-management and effective participation, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to unit structure and the programme.</td>
</tr>
<tr>
<td>Health and safety induction to PPE and safe working practices.</td>
</tr>
<tr>
<td>Use of PPE outlined to learners.</td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover preparing and rolling mortar incorporating learning the materials and mix proportions of common mortars integrated into practical learning.</td>
</tr>
<tr>
<td>Spreading mortar and preparation of bed joint.</td>
</tr>
<tr>
<td>Application of mortar to cross joints.</td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover brickwork walling exercises (4 by 4, 6 by 6 pyramid.</td>
</tr>
<tr>
<td>Knowledge and understanding of materials and tools to be integrated with practical activities and demonstrations.</td>
</tr>
<tr>
<td>Introduction to brickwork and blockwork dimensions.</td>
</tr>
<tr>
<td>Marking out and production of gauge rod.</td>
</tr>
</tbody>
</table>
### Topic and suggested assignments/activities/assessment

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Knowledge and understanding of materials, tools and safe working practices to be integrated with practical activities and demonstrations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrations and practical activities to cover accurate and safe cutting of bricks and blocks.</td>
<td>Working to line and level.</td>
<td></td>
</tr>
<tr>
<td>Brickwork bonding arrangements.</td>
<td>Knowledge and understanding of materials, tools and safe working practices to be integrated with practical activities and demonstrations.</td>
<td></td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover practical half brick walling exercises.</td>
<td>Half brick wall stretcher bond.</td>
<td></td>
</tr>
<tr>
<td>Knowledge and understanding of materials, tools and safe working practice to be integrated with practical activities and demonstrations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover practical one brick walling exercises.</td>
<td>One brick wall English bond.</td>
<td></td>
</tr>
<tr>
<td>Knowledge and understanding of materials, tools and safe working practice to be integrated with practical activities and demonstrations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover practical one brick walling exercises.</td>
<td>One brick wall Flemish bond.</td>
<td></td>
</tr>
<tr>
<td>Knowledge and understanding of materials, tools and safe working practice to be integrated with practical activities and demonstrations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrations and practical activities to cover introduction and demonstration of blocklaying.</td>
<td>Practical blockwork exercises/practice.</td>
<td></td>
</tr>
<tr>
<td>Knowledge and understanding of materials, tools and safe working practice to be integrated with practical activities and demonstrations.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Assignment 1:** Resources and Techniques Used in Brickwork and Blockwork  
**Assignment 2:** Performing Brickwork and Blockwork Tasks
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used, suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website – www.edexcel.com. Photographic evidence and quality control records should be produced to justify the grading level awarded to learners.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify hand tools commonly used for brickwork and blockwork. This could be evidenced, for example, by completion of tool identification sheets or by oral questioning.

For P2, learners must select commonly used hand tools for the tutor-specified tasks. This could be evidenced, for example, by completion of appropriate requisition orders for the tools needed for the specified tasks, by tutor observation or by oral questioning.

For P3, learners must identify materials commonly used for brickwork and blockwork. This could be evidenced, for example, by completion of material identification sheets or by oral questioning.

For P4, learners must select commonly used materials for the tutor-specified tasks. This could be evidenced, for example, by completion of appropriate requisition orders for the materials needed for the specified tasks, by tutor observation or by oral questioning.

For P5, learners must identify the safe working practices and PPE used to minimise the risks associated with the hazards. Tutor observation or oral questioning could be used to provide the evidence.

For P6, learners must explain the selection of safe working practices and PPE associated with the given brickwork and blockwork tasks. Oral questioning could be used.

For P7, learners must construct an accurate gauge rod. A limited amount of tutor guidance is acceptable at this grade. The tutor should check the accuracy of the setting out rods before use, to ensure that they are fit for purpose.

For P8, learners must identify at least two different bonding arrangements used for brickwork and blockwork. The emphasis is on the construction of solid walls in either brick or block. Learners do not need to provide evidence relating to the construction of cavity walls.
For P9, learners must be able to construct at least one brick wall to a minimum of five courses high and one block wall to a minimum of three courses high to given specifications and to an acceptable industrial standard. There is no requirement for the learner to demonstrate achievement of the tolerances required for M3 and D2 but all work must be correctly bonded with all joints properly formed and all bricks in their correct orientation. It is anticipated that considerable guidance will be given to learners at this grade. Quality control records, including dimensional tolerance, together with photographs of completed work could be used to provide evidence for this criterion.

For M1, learners must justify the safe use of hand tools and materials safely to perform their given tasks. This could be verified, for example, by tutor observation or through oral questioning.

For M2, learners must justify the safe use of PPE appropriate to the task. The learner must understand the need to follow safe working practices and procedures before moving onto the practical outcome of learning. Tutor observation or oral questioning could be used here.

For M3, learners must produce work of an acceptable standard and to the tolerances indicated. All work will be correctly bonded with correct brick orientation, perpends in line and of uniform width and all joints fully formed and neatly finished. The tolerances stated in the grading grid are stricter than those for the pass criterion and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade. Quality control records, including dimensional tolerance, together with photographs of completed work could be used here.

For D1, learners must produce work of a good standard and to the tolerances indicated. This implies that all work will be correctly bonded with correct brick orientation, perpends in line and of uniform width and all joints fully formed and neatly finished. Attention will have been paid to the selection and blending of bricks and cleanliness of presentation. The requirements are stricter than those for M2 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided. Quality control records, including dimensional tolerance, together with photographs of completed work could be used here.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

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<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Brickwork and Blockwork.</td>
<td>In preparation for a new brickwork and blockwork task, you have been asked to prepare the identification and selection of the tools, access equipment and working techniques to be used, compliance with health and safety risk assessments.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
</tbody>
</table>
**Criteria covered** | **Assignment title** | **Scenario** | **Assessment method**
--- | --- | --- | ---
P7, P8, P9, M3, D1 | Performing Brickwork and Blockwork Tasks. | The team leader has asked you to produce a brickwork and blockwork structure. | Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements

**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

**Level 2**

<table>
<thead>
<tr>
<th>Performing Blockwork Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performing Brickwork Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

**Suggested resources**

**Books**


**Websites** (*Relevant websites applicable to learner’s home country*)

- [www.brick.org.uk](http://www.brick.org.uk)
  - Brick Development Association Initiative
Unit 12: Performing Blockwork Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30827H
This unit is internally assessed

Unit aim

This unit will enable learners to develop the skills required to select and safely use the appropriate tools and personal protective equipment (PPE) for setting out and constructing blockwork structures.

Unit introduction

Blockwork has been an integral part of the construction industry since the introduction of concrete blocks in the early twentieth century. Blocks are now one of the most common materials used in construction, and are generally used in preference to bricks when building/forming walls. Blocks are larger than bricks so fewer are required in any given structure, and this saves on labour, time and money.

There are several different grades of concrete block, including dense concrete blocks that are used for their structural properties and are considered to be weather resistant, and lightweight concrete blocks which are used primarily for their thermal insulation properties and are not considered to be weather resistant.

This unit offers learners the opportunity to explore the common bonding arrangements for raising corners and junctions using concrete blocks, and the processes and techniques used in their construction. A strong emphasis is placed on the appropriate selection and use of tools and personal protective equipment, and on the good housekeeping practices needed to ensure compliance with acceptable health, safety and welfare practices.

Learners will have the opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools and materials commonly used to perform blockwork tasks
2. Understand the important health, safety and welfare issues associated with blockwork tasks
3. Be able to apply safe working practices to the setting out and construction of corners and junctions in solid block walling to given specifications.
### Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
|---------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| **P1** identify the hand tools used to perform blockwork tasks. | **M1** justify the safe use of hand tools and materials to minimise health, safety and welfare risks. | |
| **P2** select the hand tools required to perform given blockwork tasks. | **M2** justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks. | |
| **P3** identify the materials used to perform blockwork tasks. | | |
| **P4** select the materials required to perform given blockwork tasks. | | |
| **P5** identify the PPE and safe working practices used to perform blockwork tasks. | | |
| **P6** explain the selection of the PPE and safe working practices to be used in given blockwork tasks. | | |
### Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> identify the correct bonding arrangement to be used in the construction of solid block walling.</td>
<td><strong>M3</strong> produce finished work with blocks in line ± 3 mm and face plane deviation ≤ 3 mm.</td>
<td><strong>D1</strong> produce finished work with blocks in line ± 3 mm and face plane deviation ≤ 3 mm and with corners plumb to within ± 3 mm per metre height.</td>
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<tr>
<td><strong>P8</strong> set out block walling details to given dimensions with guidance and supervision.</td>
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<tr>
<td><strong>P9</strong> produce corners and junctions in solid block walling to given specifications.</td>
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</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform blockwork tasks

Hand tools:
- walling trowel
- pointing trowel
- jointing iron
- spirit level
- builder’s line and pins
- tingle
- corner blocks
- club hammer
- bolster chisel
- brick hammer
- gauge rods
- building profiles

Materials:
- blocks, e.g. lightweight, aerated, dense, hollow, solid, fair-faced and keyed
- sand
- cement
- lime
- water

2 Understand the important health, safety and welfare issues associated with blockwork tasks

Health, safety and welfare:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- safe working practices
- use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by tools and equipment
- cutting blocks
- abrasive materials
- lime
- cement
- falling objects
- untidy work area,
- musculoskeletal injuries resulting from lifting and moving heavy loads
PPE:
- safety boots
- hard hat
- high visibility jacket
- hand protection
- goggles
- other PPE as appropriate

3 Be able to apply safe working practices to the setting out and construction of corners and junctions in solid block walling to given specifications

Setting out:
- correctly calculated lengths of walling
- bonding and lengths of walling
- indents and toothings to walling

Block walling in stretcher bond to:
- straight lengths incorporating indents and toothings for junction wall
- corners
- ‘T’ junctions
- staggered junctions
Information for delivery staff

Essential requirements

Learners will require access to a bricklaying workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre’s health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org

The involvement of industry is essential to the establishment of a real-world context within the delivery of the course content. Most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- the use of visiting speakers to promote recruitment to the BTEC programme
- possible sponsorship of the centre’s construction programme
- provision of materials or samples
- loan of or assistance with specialist equipment
- access to specifications, construction drawings, quality control documentation and health and safety documentation
- assistance with the development of links with other sources of help, including material suppliers, architects, clerk of works consultancies, trade associations, consultants
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put the learning from this unit into an industrial context specific content level and expected outcomes will need to be discussed in advance

Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- an investigation of quality control procedures in use on site
- an investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage
● the use of fair faced block walling as a feature or aesthetic element within construction
● an investigation of site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal
● an investigation of potential risks associated with on site block walling operations (companies will be sensitive to possible conclusions and may require you to be guided by their health and safety officer)
● an investigation of how accurate batching of mortar is achieved during on site mixing
● an investigation into setting out and dimensional tolerance of block walling on site
● observation of sustainable site practice.

It may be that within one site visit different groups will investigate different ‘on site’ elements or operations.

It is essential that school and local authority guidelines and procedures are strictly adhered to for all visits, and that tutors visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company’s health and safety officer. Learners should be supervised kept in small groups and accompanied at all times during a site visit.

Delivery guidance

Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities allied to group teaching and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.

This qualification will be delivered by both schools and further education colleges (FECs). Some schools will need to work in partnership with an external provider of training to enable learners to practise and apply the vocational skills needed to complete the practical tasks. Others may have a suitable workshop, covered area or external space and will be able to import craft trainers for specific lessons, whilst some schools will find it necessary to use the facilities of their local FE provider. The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The three outcomes of learning should be delivered in an appropriate sequence specified by the tutor. Delivery will be largely practical, with learners taking the opportunity to identify, select and use tools, materials and equipment in a workshop environment. Practical activities for outcome of learning 1 could include the selection of tools and materials for completing specified blockwork tasks. Outcome of learning 2 requires learners to understand health and safety issues and appropriate PPE and safe working practices. Outcome of learning 3 requires learners to set out and produce solid block walling to given specifications.

Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced bricklayers and to ask them questions about their experiences in the industry and the benefits it has brought to them.
Most learners will not have visited a building site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

Sample materials and/or wall charts should be available and, where possible, on permanent display within the classroom or workshop, to enable learners to become readily familiar with their identification, use and application.

It is intended that this unit will give learners further experience of the practical skills associated with the production of block walling, together with the basic job knowledge required to underpin such practical skills. The unit builds on the knowledge, understanding and skills found in Unit 11: Exploring Trowel Operations, and complements Unit 13: Performing Brickwork Operations.

The tasks specified in the unit are typical of those specified for a Level 2 NVQ in Trowel Occupations and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible and will help to develop skills in teamworking, self-management and effective participation, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before practical activities take place.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

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<td>Preparing and rolling mortar incorporating learning about mix proportions.</td>
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<td>Spreading mortar and preparation of bed joint.</td>
</tr>
<tr>
<td>Application of mortar to cross joints.</td>
</tr>
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<td>Blockwork walling exercises (4 by 4, 6 by 6 pyramid).</td>
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<td>Blockwork dimensions and multiples (calculations).</td>
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<tr>
<td>Practical use of a gauge rod.</td>
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<td>Knowledge and understanding of tolerance and dimensional quality control.</td>
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<tr>
<td>Practical blockwork walling exercises in straight lengths.</td>
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<td>----------------------------------------------------</td>
</tr>
<tr>
<td>Hazard identification and associated risks.</td>
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<tr>
<td>Identification and development of control procedures.</td>
</tr>
<tr>
<td>Health and safety activities and games.</td>
</tr>
<tr>
<td>Preparation and planning for blockwork activities.</td>
</tr>
<tr>
<td>Selection of tools, materials and plant.</td>
</tr>
<tr>
<td>Setting out corners and junctions</td>
</tr>
<tr>
<td>Setting out for practical activities.</td>
</tr>
<tr>
<td>Practical exercises – developing corners and junction.</td>
</tr>
<tr>
<td>Planning and preparation for assessed practical tasks.</td>
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<td>Setting out for assessed practical tasks.</td>
</tr>
<tr>
<td>Completion of assessed practical tasks.</td>
</tr>
<tr>
<td>Completion of quality control and dimensional tolerance checks.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used in Blockwork**

**Assignment 2: Performing Blockwork Tasks**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website – www.edexcel.com. Photographic evidence and quality control records should be produced to justify the grading level awarded to learners.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify hand tools commonly used for blockwork tasks. This could be evidenced, for example, by completion of tool identification sheets or by oral questioning.

For P2, learners must select commonly used hand tools and PPE for the tutor-specified tasks. This could be evidenced, for example, by completion of appropriate requisition orders for the tools needed for the specified tasks, by tutor observation or by oral questioning.

For P3, learners must identify the materials commonly used for blockwork tasks. This could be evidenced, for example, by completion of material identification sheets or by oral questioning.

For P4, learners must select commonly used materials for the tutor specified tasks. This could be evidenced, for example, by completion of appropriate requisition orders for the materials needed for the specified tasks, by tutor observation or by oral questioning.

For P5, learners must identify the safe working practices and PPE used to minimise hazards associated with blockwork tasks. Tutor observation or oral questioning could be used to provide the evidence.

For P6, learners must explain the selection of the safe working practices and PPE associated with the given blockwork tasks. Oral questioning could be used to provide evidence.

For P7, learners must consider different bonding arrangements that can be used for blockwork and identify those which are to be used in at least two tutor-specified practical tasks. Evidence could be provided by tutor observation or oral questioning.

For P8, learners must set out the block walls under supervision. They must use simple calculations to determine the lengths of walling, in terms of the bonding, and set out any indents and toothings to the walling. It is anticipated that considerable guidance will be given to learners at this grade.
For P9, learners must be able to safely construct block walls and junctions to a minimum of three courses high to given specifications and to an acceptable industrial standard. There is no requirement for learners to achieve the tolerances specified in M3 or D2 but the finished work must be stable and correctly bonded with all joints properly formed. It is anticipated that considerable guidance will be given to learners at this grade. Quality control records, including dimensional tolerance, together with photographs of completed work could provide evidence.

For M1, learners must justify the use of good health, safety and welfare practices to perform tasks. This could be verified, for example, through oral questioning.

For M2, learners must justify the use of PPE appropriate to a task and understand the need to follow safe working practice and procedures in order to minimise health, safety and welfare risks. Tutor-led oral questioning could be used here.

For M3, learners must produce work of an acceptable standard. This should be to the tolerances provided. Blockwork should be correctly bonded with perpends in line and of uniform width, with all joints fully formed and neatly finished. The tolerances stated in the grading grid are stricter than those for the pass criterion and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade.

For D1, the tolerances are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Blockwork.</td>
<td>To prepare for a blockwork task, you have been asked to identify and select the tools, access equipment and working techniques to be used and ensure compliance with health and safety risk assessments.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Blockwork Tasks.</td>
<td>You have been assigned to perform a blockwork task by your team leader.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 2</th>
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</thead>
<tbody>
<tr>
<td>Exploring Brickwork and Blockwork</td>
</tr>
<tr>
<td>Performing Brickwork Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.

Suggested resources

Books


Carillion – *Brickwork NVQ and Technical Certificate Level 2* (Heinemann, 2006) SBN 0435430866


Websites *(Relevant websites applicable to learner’s home country)*

| www.brick.org.uk | Brick Development Association Initiative |
Unit 13: Performing Brickwork Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30828H
This unit is internally assessed

Unit aim
This unit will enable learners to develop the skills required to select and safely use the appropriate tools and personal protective equipment (PPE) for setting out and constructing brickwork structures.

Unit introduction
Bricklayers are an integral part of the construction industry and are responsible for much of the built environment found throughout the UK.

The Romans introduced brickwork to the UK approximately 2,000 years ago. However, it was not until the 19th century that it became widely adopted by the construction industry. This rise in popularity occurred during the industrial revolution, when industrialisation of the brick manufacturing process, together with huge increases in the demand for housing, prompted a widespread take up of the use of bricks as a building method. While construction methods have continued to evolve, building with bricks remains a key activity within the construction industry.

This unit introduces learners to the common bonding arrangements used for raising corners, junctions and piers in brickwork, and to the processes and techniques used in their construction, including pointing and jointing. A strong emphasis is placed on the appropriate selection and use of tools and personal protective equipment, and on the good housekeeping needed to ensure compliance with acceptable health, safety and welfare practices. Learners will have an opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

Outcomes of learning
On completion of this unit a learner should:
1. Know the hand tools and materials commonly used to perform brickwork tasks
2. Understand the important health, safety and welfare issues associated with brickwork tasks
3. Be able to apply safe working practices to the setting out and construction of brickwork to given specifications.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
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<tbody>
<tr>
<td><strong>To achieve a pass grade</strong></td>
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<tr>
<td><strong>the evidence must</strong></td>
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<tr>
<td><strong>show that the learner</strong></td>
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<td><strong>is able to:</strong></td>
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<tr>
<td><strong>P1</strong> identify the hand tools used to perform brickwork tasks.</td>
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<td><strong>P8</strong> set out brickwork to given dimensions with some guidance and supervision.</td>
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Unit content

1 Know the hand tools and materials commonly used to perform brickwork tasks

Hand tools:
- walling trowel
- pointing trowel
- jointing iron
- spirit level
- builder’s line and pins
- tingle
- corner blocks
- club hammer
- bolster chisel
- brick hammer
- gauge rods
- building profiles

Materials:
- common bricks
- facing bricks
- engineering bricks
- special bricks
- sand
- cement
- lime
- water

2 Understand the important health, safety and welfare issues associated with brickwork tasks

Health, safety and welfare:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- safe working practices
- use of PPE to minimise risks from identified hazards

Hazards:
- slips, trips and falls
- cuts and injuries caused by tools and equipment
- cutting blocks
- abrasive materials
- lime
- cement
• falling objects
• untidy work area, musculoskeletal injuries resulting from lifting and moving heavy loads

PPE:
• safety boots
• hard hat
• high visibility jacket
• hand protection
• goggles
• other PPE as appropriate

3 Be able to apply safe working practices to the setting out and construction of brickwork to given specifications

Stages of setting out:
• correct calculation of lengths of walling detail
• correct bonding of walling detail
• calculation and checking of all building dimensions

Half-brick walling:
• to corners in stretcher bond

One-brick walling:
• to corners and attached piers in English bond and Flemish bond

Two-brick:
• isolated piers in English bond
Information for delivery staff

Essential requirements

Learners will require access to a bricklaying workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first-aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre’s health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts

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- assistance with the development of links with other sources of help, including: material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put the learning from this unit into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit. Copies of drawings or other documentation will be needed in advance of the visit. Suitable activities could include:

- an investigation of quality control procedures in use on site
- an investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage
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Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced bricklayers and to ask them questions about their experiences in the industry and the benefits it has brought to them.

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<td><strong>Assignment 1: Resources and Techniques Used in Brickwork</strong></td>
</tr>
<tr>
<td>Brickwork walling exercises (4 by 4, 6 by 6 pyramid).</td>
</tr>
<tr>
<td>Brickwork dimensions and multiples (calculations).</td>
</tr>
<tr>
<td>Practical use of a gauge rod.</td>
</tr>
<tr>
<td>Accurate and safe cutting of bricks.</td>
</tr>
<tr>
<td>Setting out and working to line and level.</td>
</tr>
<tr>
<td>Brickwork bonding arrangements</td>
</tr>
<tr>
<td>Practical brickwork walling exercises half and one brick thick (straight walls).</td>
</tr>
<tr>
<td>Hazard identification and associated risks.</td>
</tr>
<tr>
<td>Identification and development of control procedures.</td>
</tr>
<tr>
<td>Health and safety activities and games.</td>
</tr>
<tr>
<td>Preparation and planning for brickwork activities.</td>
</tr>
<tr>
<td>Selection of tools, materials and plant.</td>
</tr>
<tr>
<td>Setting out corners and attached piers in English and Flemish bond.</td>
</tr>
<tr>
<td>Setting out for practical activities.</td>
</tr>
<tr>
<td>Practical exercises on brickwork walling – including corners and attached piers.</td>
</tr>
<tr>
<td>Half brick wall in stretcher bond.</td>
</tr>
<tr>
<td>One brick wall in Flemish bond to corners and attached piers.</td>
</tr>
<tr>
<td>Self- and formative assessment and feedback.</td>
</tr>
</tbody>
</table>
## Topic and suggested assignments/activities/assessment

Planning and preparation for assessed practical tasks.
Setting out for assessed practical tasks.

**Assignment 2: Performing Brickwork Tasks**

- One brick wall in English bond to corners and attached piers.
- Two brick walls to isolated piers in English bond.
- Completion of quality control and dimensional tolerance checks.
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used, suitable evidence would be observation records or witness statements. Guidance on their is given on our website. Photographic evidence and quality control records should be produced to justify the grading level awarded to learners.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify the hand tools commonly used to perform brickwork tasks. This could be evidenced, for example, by completion of tool identification sheets or by oral questioning.

For P2, learners must select commonly used hand tools and PPE for the tutor-specified tasks and should clean and return them after use. This could be evidenced, for example, by completion of appropriate requisition orders for the tools needed for the specified tasks, by tutor observation or by oral questioning.

For P3, learners must identify the materials commonly used in brickwork. This could be evidenced, for example, by completion of material identification sheets or by oral questioning.

For P4, learners must select commonly used materials for the tutor specified tasks. This could be evidenced, for example, by completion of appropriate requisition orders for the materials needed for the specified tasks, by tutor observation or by oral questioning.

For P5, learners must identify the safe working practices and PPE used to minimise hazards associated with brickwork tasks. Tutor observation or oral questioning could be used to provide the evidence.

For P6, learners must explain the selection of safe working practices and PPE associated with the given brickwork tasks. Oral questioning could be used to provide the evidence.

For P7, learners must consider the different bonding arrangements that can be used for brickwork and identify at least two which are to be used in the given practical tasks. Evidence could be provided by tutor observation or oral questioning.

For P8, learners must set out the brickwork under supervision. They must use simple calculations to determine the lengths of walling detail, set out bonding details and check all building dimensions. It is anticipated that considerable guidance will be given to learners at this grade.
P9, learners must be able to construct brickwork to a minimum of five courses high to given specifications and an acceptable industrial standard. There is no requirement for learners to achieve the tolerances specified in M3 or D2 but the work must be correctly bonded with all joints properly formed and all bricks in their correct orientation. It is anticipated that considerable guidance will be given to learners at this grade. Quality control records, including dimensional tolerance, together with photographs of completed work could provide evidence.

For M1, learners must justify the use of good health, safety and welfare practices to perform their given tasks. This could be verified, for example, through oral questioning.

For M2, learners must justify the PPE appropriate to the task and follow safe working practice and procedures in order to minimise health, safety and welfare risks. Evidence could be provided by tutor observation or oral questioning.

For M3, learners must produce work to a minimum height of nine courses to an acceptable standard. This means that the work must be done to the tolerances indicated and be correctly bonded with correct brick orientation, perpends in line and of uniform width, with all joints fully formed and neatly finished. The tolerances stated in the grading grid are stricter than those for the pass criterion and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade. Quality control records, including dimensional tolerance, together with photographs of completed work could provide evidence.

For D1, learners must produce work to a minimum height of nine courses to a good standard. This means that the work must be done to the tolerances indicated and be correctly bonded with correct brick orientation, perpends in line and of uniform width, with all joints fully formed and neatly finished. Attention will have been paid to the selection and blending of bricks and cleanliness of presentation. The requirements are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided. Quality control records, including dimensional tolerance, together with photographs of completed work could provide evidence.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Brickwork.</td>
<td>In preparation for a forthcoming project, you have been asked to identify and select the tools, access equipment and working techniques to be used, ensuring that you comply with health and safety risk assessments.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
</tbody>
</table>
### Criteria covered

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Brickwork Tasks.</td>
<td>As part of the same project, you have been given the task of producing a brickwork structure.</td>
<td>Practical assessment. Evidence to include quality of completed work supported with photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Brickwork and Blockwork</td>
</tr>
<tr>
<td>Performing Blockwork Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

### Suggested resources

#### Books


#### Websites

(Relevant websites applicable to learner’s home country)

| www.brick.org.uk | Brick Development Association Initiative |
Unit 14: Exploring Painting and Decorating

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30829H

This unit is internally assessed

Unit aim

The aim of this unit is to enable learners to explore the work of the painter and decorator. The focus is on learning about this work through the practical application of skills in surface preparation and paint application.

Unit introduction

Painting and decorating is one of the oldest skill sets within the construction industry. In prehistoric times our ancestors painted pictures on the walls of their caves. Since then, people from every culture have decorated their homes, places of worship, places of work and other important buildings, to make them appear more attractive, more welcoming, warmer or cooler.

However, these are not the only reasons to paint surfaces. Paint is applied to protect surfaces exposed to the weather, to provide a ‘colour code’ in industrial settings and to produce hygienic surfaces that are easy to clean. Decorating is the final stage in making a building comfortable and attractive, and the ability to produce a quality paint finish is a valuable skill. This means that there will always be employment for people with appropriate skills in painting and decorating. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit provides an ideal place to start learning about painting and decorating.

The unit is primarily concerned with the basic principles of preparing surfaces and applying paints for decorative purposes. On completing this unit learners will know which tools and materials are commonly used for basic surface preparation and painting activities and be able to prepare surfaces for painting and to apply paints to prepared surfaces using safe working practices. Learners will also be aware of the health, safety and welfare issues involved in painting and decorating. The unit provides a sound basis for the study of further units relating to painting and decorating activities. In these further units, learners will be able to study paperhanging, applying textured finishes and installing coving and centre-pieces.

Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools, materials and access equipment used by decorators to perform specified tasks
2. Understand safe working practices to prepare new and previously painted surfaces for painting
3. Be able to apply safe working practices in the application of paints to prepared surfaces.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>identify hand tools and access equipment used to perform painting and decorating tasks.</td>
<td>explain the safe use of tools, materials and access equipment to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>select hand tools and access equipment used to perform painting and decorating tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>identify materials used to perform specified tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>select materials used to perform specified tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>identify the PPE and safe working practices used to perform specified tasks.</td>
<td>justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>explain the selection of PPE and safe working practices used to perform specified tasks.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
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<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P7</strong> follow manufacturers’ guidelines when preparing materials for use.</td>
<td><strong>M3</strong> produce finished work with surfaces abraded without scoring and filled smooth, and finished paintwork bristle-free with all cutting-in sharp and neat.</td>
<td><strong>D1</strong> produce finished work with surfaces abraded without scoring and filled smooth, finished paintwork bristle-free with all cutting-in sharp and neat and with no misses or other impairments evident from 1 m.</td>
</tr>
<tr>
<td><strong>P8</strong> perform painting and decorating activities using hand tools.</td>
<td><strong>P9</strong> demonstrate the safe use of materials when performing painting and decorating tasks.</td>
<td><strong>P10</strong> demonstrate the safe use of low level access equipment when performing painting and decorating tasks.</td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools, materials and access equipment used by decorators to perform specified tasks

Hand tools:
- scraper
- filling knife
- putty knife
- shavehook
- paint kettle
- paint brush
- paint roller
- paint roller tray and scuttle
- caulking board
- hacking knife
- hot air stripper
- cleaning of tools

Materials:
- powder-based and ready-mixed fillers
- coated abrasives
- abrasive powders and compounds
- detergents and washing materials
- water-based paints
- solvent-based paints
- liquid paint removers

PPE:
- safety footwear
- overalls
- hand protection
- eye protection

Access equipment:
- uses of stepladders
- hop-ups
- trestle working platforms
2 Understand safe working practices to prepare new and previously painted surfaces for painting

New surfaces:
- timber
- ferrous metal
- non-ferrous metal
- plaster
- plasterboard
- masonry

Previously painted surfaces:
- sound surfaces
- unsound surfaces
- existing surfaces, e.g. matt emulsion, soft sheen emulsion, silk emulsion, water-based eggshell, solvent-based gloss

3 Be able to apply safe working practices in the application of paints to prepared surfaces

Working with paints:
- water-based paints, e.g. matt emulsion, soft sheen emulsion, silk emulsion, acrylic primer undercoat, acrylic eggshell, acrylic gloss
- solvent-based paints, e.g. wood primer, metal primer, undercoat, eggshell, gloss

Health, safety and welfare:
- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- use of safe practices to minimise risks from identified hazards
- Control of Substances Hazardous to Health (COSHH)
Information for delivery staff

Essential requirements
A range of decorating tools, materials, personal protective equipment and access equipment will be required. A sufficient range of substrates, both painted and unpainted, will also be needed. The practical activities will proceed more effectively in a dedicated workshop but portable frames can be used where this is not possible.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The involvement of industry is essential to the establishment of a real-world context within the delivery of the course content. Most medium to large construction companies are actively seeking links with schools and colleges, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- the use of visiting speakers to promote recruitment to the BTEC programme
- possible sponsorship of the centre’s construction programme
- provision of materials or samples
- loan of or assistance with specialist equipment
- access to specifications, construction drawings, quality control documentation and health and safety documentation
- assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put learners’ learning into an industrial context

Specific content level and expected outcomes will need to be discussed in advance. Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit.

Delivery guidance
Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities allied to group teaching and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.

Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced painters and decorators and to ask them questions about their experiences in the industry and the benefits it has brought to them.
It is intended that this unit will provide learners with their first coherent experience of the practical skills associated with painting and decorating, together with any job knowledge required to underpin such practical skills. It provides a useful link to Unit 15: Performing Paperhanging Operations, and Unit 16: Performing Decorating Operations.

The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified for a Level 2 NVQ in Decorative Finishing and Industrial Painting Operations and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners taking the opportunity to identify, select and use tools, materials and equipment in a workshop environment. Practical activities for outcome of learning 1 could include the selection of tools and equipment for a basic painting toolkit, materials for specified painting tasks and low-level access equipment for preparation and painting activities off the ground. Outcome of learning 2 requires learners to prepare a range of new and previously treated surfaces to receive paints and could be addressed by learners interpreting risk assessments and applying the principles of health, safety and welfare to surface preparation tasks. Outcome of learning 3 requires learners to carry out a range of painting activities, by applying specified materials to those surfaces prepared for outcome of learning 2. Outcome of learning 1 requires learners to use low-level access equipment in a safe manner whilst carrying out the activities for outcomes of learning 2 and 3.

The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2 m in height.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas.
**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to tools used by the painter and decorator. Discussion about the various uses of different tools and how they should be maintained and stored.</td>
</tr>
<tr>
<td>Introduction to materials commonly used by the painter and decorator. Discuss the difference between water-borne and solvent-borne paints and finishes and how each one dries.</td>
</tr>
<tr>
<td>Introduction to personal protective equipment (PPE) commonly used by the painter and decorator. Explain the different items of PPE and what purpose each one serves.</td>
</tr>
<tr>
<td>Practical activities: introduction to low-level access equipment commonly used by the painter and decorator. Activities should include erecting and dismantling access equipment. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: preparing new and previously painted surfaces. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: applying solvent-based and water-based paints to new and previously painted surfaces. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: cleaning tools and equipment after use in preparation for storage. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used in Painting and Decorating**

Practical assessment: activities should include preparing an area and applying paints. Safe working practices should be demonstrated by learners throughout all practical activities.

**Assignment 2: Performing Painting and Decorating Tasks**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt them where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used, suitable evidence from guided activities would be observation records or witness statements. Guidance on their use is provided on the Edexcel website – www.edexcel.com.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify commonly used hand tools, specified by the content, and access equipment. This could be evidenced, for example, by tutor observation or by oral questioning.

For P2, learners must select the tools and access equipment required to complete the specified tasks. This could be evidenced by learners completing a stores requisition, by tutor observation, or by oral questioning.

For P3, learners must identify the materials, as specified by the content, required to perform the specified tasks. This could be evidenced by tutor observation or by oral questioning.

For P4, learners must select the materials required to complete the specified tasks. This could be evidenced by learners completing a stores requisition, by tutor observation, or by oral questioning.

For P5, learners must identify the PPE and safe working practices required to perform the specified tasks. This could be evidenced by oral questioning or group discussion.

For P6, learners must explain their selection of PPE and safe working practices. This could be evidenced through oral questioning or group discussion.

For P7, learners must prepare all materials for use in line with manufacturers’ guidelines. This could be evidenced through tutor observation.

For P8, learners must prepare, to an acceptable industrial standard, at least two previously painted, and at least two previously unpainted surfaces to receive paints. There are no specific quality requirements for the finished work, but learners must demonstrate at least a basic understanding of the processes and some practical ability. The tutor must make the decision as to whether the learner has met the criterion based on the overall quality of both the learner’s performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.

For P9, learners must demonstrate techniques appropriate to both water- and solvent-based paints to paint the surfaces prepared for P8. There are no specific quality requirements for the finished work, but learners must demonstrate at least a basic understanding of the processes and some practical ability. The tutor must make the decision as to whether the learner has met the criterion based on the overall quality of both the learner’s performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.
For P10, learners must demonstrate that they can use low-level access equipment safely. This will include the safe erection, dismantling and storage of any equipment used. Evidence for this is likely to be generated via direct observation of the learner using low-level access equipment to perform the tasks specified for P8 and P9.

For M1, learners must be able to justify the use of appropriate access equipment. The access equipment need only be capable of providing the learner with access to the ceiling of a typical room and should not exceed 2 m in height. Tutor-led oral questioning could be suitable here. Learners must also justify the safe use of tools and materials when performing specified tasks.

For M2, learners must be able to justify the good health, safety and welfare practices to minimise the risks involved in performing their given tasks. This will include checking a provided risk assessment to make sure that the PPE they are to use, and the control measures to be taken, are appropriate for the materials to be used. This could be verified, for example, through oral questioning.

For M3, learners must produce work of an acceptable standard. The quality requirements stated in the grading grid are stricter than those for a pass grade and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade.

For D1, learners must produce work of a good standard. The quality requirements stated in the grid are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided at this grade.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

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<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Painting and Decorating.</td>
<td>A training manager, supervising new apprentices to support their studies, has been asked to select the tools and working techniques to be used, compliance with health and safety risk assessments, general preparation for and planning of painting and decorating tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>Criteria covered</td>
<td>Assignment title</td>
<td>Scenario</td>
<td>Assessment method</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>P7, P8, P9, P10, M3, D1</td>
<td>Performing Painting and Decorating Tasks.</td>
<td>As a training manager, you have been asked to prepare and paint both unpainted surfaces and previously painted surfaces using both water-based and solvent-based paints.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC in Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Construction Painting Skills</td>
<td>Performing Paperhanging Operations</td>
</tr>
<tr>
<td>Developing Construction Decorating Skills</td>
<td>Performing Decorating Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

**Suggested resources**

**Books**


Unit 15: Performing Paperhanging Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30830H
This unit is internally assessed

Unit aim
The aim of this unit is to give learners the opportunity to develop skills and knowledge in paperhanging. The focus is primarily on the development of skills through practical application.

Unit introduction
People have been decorating buildings with paint for many centuries, and for most of this time there was little else available. The idea of using wallpaper to cover interior walls came to Britain from China and Europe in the sixteenth century. However, during the nineteenth century machine printing was introduced and as a result wallpaper became much more affordable. Wallpaper received another boost in the 1950s when the introduction of washable, pre-pasted and pre-trimmed papers, together with the availability of an increased range of designs, established paperhanging as a widely used decorative technique, particularly in domestic settings.

Today, wallpaper is used to enhance the appearance and elegance of a room, to add colour and texture to areas that might otherwise appear plain, and to cover up cracks and other flaws in a wall or ceiling. There are many different types of wallpaper: some are used for preparation purposes and require either paint or another paper to be applied on top, and others provide a decorative finish that requires no further attention.

Decorating is the final stage in making a building comfortable and attractive, and the ability to hang wallpaper is a valuable skill. This means that there will always be employment for people with the appropriate wallpapering skills. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit provides a good place to begin learning about paperhanging. On completion of this unit, learners will know which tools, materials and equipment are commonly used for simple wallpapering activities and be able to mix adhesives and hang wallpapers in line with recognised safe working practices. As for any construction activity, health, safety and welfare are of paramount importance, and this is emphasised throughout the unit, particularly in relation to working on low-level access equipment.
Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools, materials and access equipment used by decorators to perform paperhanging activities
2. Understand the important health, safety and welfare issues associated with paperhanging tasks
3. Be able to apply safe working practices when performing paperhanging tasks.
### Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>identify the hand tools and access equipment used to perform paperhanging operations.</td>
<td>M1 justify the safe use of tools, materials and access equipment to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>select the hand tools and access equipment used to perform specified paperhanging tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>identify the materials used in paperhanging operations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>select the materials used in specified paperhanging tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>identify the PPE and safe working practices used to perform specified paperhanging tasks.</td>
<td>M2 justify the appropriate use of PPE and safe working practices to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>explain the selection of PPE and safe working practices used to perform specified tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment and grading criteria</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>P7</strong> follow manufacturers’ guidelines when preparing materials for use.</td>
<td><strong>M3</strong> produce finished work with no air bubbles, blisters or wrinkles and no gaps or overlaps &gt; 2 mm.</td>
<td><strong>D1</strong> produce finished work with no air bubbles, blisters or wrinkles, no gaps or overlaps &gt; 2 mm, with straight, neat ends with no scissor marks, plumb deviation &lt; 2 mm from vertical and any patterns accurately matched.</td>
<td></td>
</tr>
<tr>
<td><strong>P8</strong> perform specified tasks using hand tools.</td>
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<td></td>
</tr>
<tr>
<td><strong>P9</strong> demonstrate the safe use of materials when performing specified tasks.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>P10</strong> demonstrate the safe use of low level access equipment when performing specified tasks.</td>
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</tr>
</tbody>
</table>
Unit content

1 Know the hand tools, materials and access equipment used by decorators to perform paperhanging activities

Hand tools:
- paperhanging brush
- paste brush
- paste table
- plumb line and plumb bob
- tape measure
- trimming knife
- scissors
- spirit level
- caulking board
- straight edge
- bucket
- sponge
- seam roller

Materials:
- powder-based pastes
- ready mixed pastes
- size
- preparatory papers
- simplex papers
- duplex papers
- embossed papers
- straight and drop pattern papers

PPE:
- safety footwear
- overalls
- hand protection
- eye protection
- other PPE as appropriate

Access equipment:
- stepladders
- hop-ups
- trestle working platforms
2 **Understand the important health, safety and welfare issues associated with paperhanging tasks**

- **Pastes:**
  - starch paste
  - cellulose paste
  - ready mixed PVA paste

- **Wall coverings:**
  - lining paper
  - simplex paper
  - duplex paper
  - embossed paper
  - straight patterns
  - drop patterns

- **Techniques:**
  - preparation of wall surfaces to receive coverings, e.g. making good and sealing/sizing
  - accurate measurement and cutting of wall coverings
  - mixing and applying wallpaper pastes
  - hanging wallpapers to vertical walls around corners, obstructions and openings

- **Health, safety and welfare:**
  - maintenance of clean and tidy work space
  - identification of hazards associated with given tasks
  - use of safe practices to minimise risks from identified hazards
  - particular reference to relevant legislation/regulations in home country requirements

3 **Be able to apply safe working practices when performing paperhanging tasks**

- **Access equipment:**
  - safely use stepladders
  - hop-ups and trestle working platforms
  - erection
  - dismantling and storage of equipment

- **Paperhanging tasks:**
  - preparing surfaces to receive wallpaper
  - hanging wallpaper to vertical surfaces around internal and external corners, windows, doors, fireplaces, sockets and light switches
Information for delivery staff

Essential requirements
A range of decorating tools, materials, personal protective equipment and access equipment will be required. A wide range of wallpaper pastes and different papers must also be made available. Learners must have access to lining paper, simplex paper, duplex paper, embossed paper, straight patterns and drop patterns so that they can see how the selection of the paper to be used influences the techniques to be used. The practical activities will proceed more effectively in a dedicated workshop but where this is not a possibility portable frames can be used.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The involvement of industry is essential to the establishment of a real-world context within the delivery of the course content. Most medium to large construction companies are actively seeking links with schools and colleges, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- the use of visiting speakers to promote recruitment to the BTEC programme
- possible sponsorship of the centre’s construction programme
- provision of materials or samples
- loan of or assistance with specialist equipment
- access to specifications, construction drawings, quality control documentation and health and safety documentation
- assistance with the development of links with other sources of help, including material suppliers, architects, clerk of works consultancies, trade associations, consultants, etc.
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put the learning from this unit into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit.

Delivery guidance
Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities allied to group teaching and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.
Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended.

Learners should be given the opportunity to speak to experienced paperhangers and to ask them questions about their experiences in the industry and the benefits it has brought to them.

It is intended that this unit will provide learners with further experience of the practical skills associated with paperhanging, together with the basic job knowledge required to underpin such practical skills. It builds on the knowledge, understanding and skills found in Unit 14: Exploring Painting and Decorating, and complements Unit 16: Performing Decorating Operations.

The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified for a Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners taking the opportunity to identify, select and use tools, materials and equipment in a workshop environment.

Practical activities for outcome of learning 1 could include the selection of tools and equipment for a basic paperhanging toolkit, materials for specified paperhanging tasks and low-level access equipment for any activities that cannot be done from the ground. Outcome of learning 2 could be addressed by learners interpreting given risk assessments and applying the principles of health, safety and welfare to given paperhanging tasks. Outcome of learning 3 requires learners to demonstrate safe use of low-level access equipment when carrying out a range of paperhanging activities using specified materials.

The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2 m in height.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to tools used for paperhanging. Discussion about the various uses of different tools and how they should be maintained and stored.</td>
</tr>
<tr>
<td>Introduction to materials commonly used for paperhanging. Discuss the difference between starch and cellulose-based paints and different types of wallpaper.</td>
</tr>
</tbody>
</table>
### Topic and suggested assignments/activities/assessment

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to personal protective equipment (PPE) commonly used when</td>
<td>Carrying out paperhanging activities. Explain the different items of</td>
</tr>
<tr>
<td>paperhanging activities.</td>
<td>PPE and what purpose each one serves.</td>
</tr>
<tr>
<td>Practical activities: introduction to low-level access equipment commonly</td>
<td>used when paperhanging. Activities should include erecting and</td>
</tr>
<tr>
<td>used when paperhanging.</td>
<td>dismantling access equipment. Safe working practices should be</td>
</tr>
<tr>
<td></td>
<td>demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: preparing new and previously decorated surfaces to</td>
<td>receive wallpaper. Safe working practices should be demonstrated by</td>
</tr>
<tr>
<td>receive wallpaper.</td>
<td>learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: hanging wallpapers to previously prepared surfaces.</td>
<td>Safe working practices should be demonstrated by learners throughout</td>
</tr>
<tr>
<td></td>
<td>all practical activities.</td>
</tr>
<tr>
<td>Practical activities: cleaning tools and equipment after use in preparation</td>
<td>Storage. Safe working practices should be demonstrated by learners</td>
</tr>
<tr>
<td>for storage.</td>
<td>throughout all practical activities.</td>
</tr>
<tr>
<td><strong>Assignment 1: Resources and Techniques Used to Hang Wallpaper</strong></td>
<td></td>
</tr>
<tr>
<td>Practical assessment: activities should include preparing an area and</td>
<td>hanging lining paper and a vinyl paper. Safe working practices should</td>
</tr>
<tr>
<td></td>
<td>be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td><strong>Assignment 2: Performing Paperhanging Tasks</strong></td>
<td></td>
</tr>
</tbody>
</table>
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt them where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on our website.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify commonly used hand tools and access equipment. This could be evidenced by tutor observation or by oral questioning.

For P2, learners must select the tools and access equipment required to complete the specified tasks. This could be evidenced by learners completing a stores requisition, by tutor observation or by oral questioning.

For P3, learners must identify the materials required to perform the specified tasks. This could be evidenced by tutor observation or by oral questioning.

For P4, learners must select the materials required to complete the specified tasks. This could be evidenced for example by learners completing a stores requisition, by tutor observation or by oral questioning.

For P5, learners must identify the PPE and safe working practices required to perform the specified tasks. This could be evidenced by oral questioning or group discussion.

For P6, learners must explain their selection of PPE and safe working practices. This could be evidenced through oral questioning or group discussion.

For P7, learners must prepare all materials for use in line with manufacturers’ guidelines. This could be evidenced through tutor observation.

For P8, learners must hang wallpaper to walls. There are no specific quality requirements for the finished work, but learners must demonstrate at least a basic understanding of the processes and some practical ability. The tutor must make the decision as to whether learners have met the criterion based on the overall quality of both learners’ performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.

For P9, learners must demonstrate the safe use of materials when performing specified tasks. The tutor must make the decision as to whether learners have met the criterion based on the overall quality of both the learners’ performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.

For P10, learners must demonstrate that they can use low-level access equipment safely. This will include the safe erection, dismantling and storage of any equipment used. Evidence for this is likely to be generated via direct observation of learners using low-level access equipment to perform the tasks specified for P8.
For M1, learners must justify the safe use of tools, materials and safely erect, use, dismantle and store the access equipment provided. The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2 m in height. This may be demonstrated by group activity if more than one person is generally required to carry out the procedure in the workplace, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities. Evidence could be provided by tutor observation and oral questioning. Learners must also demonstrate the safe use of tools and materials when performing specified tasks.

For M2, learners must justify the use of good health, safety and welfare practices to minimise the risks involved in performing their given tasks. This will include checking a provided risk assessment to make sure that the PPE they are to use, and the control measures to be taken, are appropriate for the materials to be used. This could be verified, for example, by tutor observation or through oral questioning. The responsibility for ensuring that learners work safely lies with the tutor, and practical work must not proceed if learners are not working safely.

For M3, learners must produce work of an acceptable standard. The quality requirements stated in the grading grid are stricter than those for the pass grade and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade.

For D1, learners must produce work of a good standard. The quality requirements stated in the grid are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used to Hang Wallpaper.</td>
<td>A training manager supervising new apprentices to support their studies has been asked to prepare to identify and select the tools and working techniques to be used, compliance with health and safety risk assessments, general preparation for and planning of paperhanging tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
</tbody>
</table>
Criteria covered | Assignment title | Scenario | Assessment method
--- | --- | --- | ---
P7, P8, P9, P10, M3, D1 | Performing Paperhanging Tasks. | As a training manager, you have been asked to prepare vertical walls and hang wallpaper to them. | Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.

**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Painting and Decorating</td>
<td>Performing Decorating Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

**Suggested resources**

**Books**


Unit 16: Performing Decorating Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30831H
This unit is internally assessed

Unit aim
The aim of this unit is to give learners the opportunity to develop skills and knowledge in applying textured finishes and installing coving and ceiling centrepieces. The focus is primarily on the development of skills through practical application.

Unit introduction
The application of paint and wallpaper to interior surfaces is not the only way to make a room appear more elegant and appealing. Textured finishes can be applied to walls and ceilings to provide a finish that is both attractive and hard wearing, and the installation of coving and ceiling centrepieces will usually enhance a room.

Decorating is the final stage in making a building comfortable and attractive, and applying textured finishes and installing coving and ceiling centrepieces are valuable skills. This means that there will always be employment for people with the skills to do this. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit is a good place to begin learning about this form of decoration.

On completion of this unit learners will know which tools, materials and equipment are commonly used for texturing activities, installing coving and ceiling centrepieces and will be able to perform these processes in line with recognised safe working practices. There is a strong emphasis on health, safety and welfare throughout, particularly in relation to working on low-level access equipment.

Outcomes of learning
On completion of this unit a learner should:
1 Know the hand tools, materials and access equipment used by decorators
2 Understand safe working practices for the application of textured finishes and the installation of coving and ceiling centrepieces
3 Be able to apply safe working practices when performing coving, texturing and ceiling centre piece installation tasks.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

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</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>identify the hand tools and access equipment used to perform decorating tasks.</td>
<td>M1 justify the safe use of tools, materials and access equipment to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>select hand tools and access equipment to perform specified decorating tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>identify materials used in decorating tasks.</td>
<td></td>
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<td>P4</td>
<td>select materials used in specified decorating tasks.</td>
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<tr>
<td>P5</td>
<td>identify the PPE and safe working practices used to perform specified tasks.</td>
<td>M2 justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>explain the selection of PPE and safe working practices used to perform specified tasks.</td>
<td></td>
<td></td>
</tr>
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<td>Assessment and grading criteria</td>
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<td><strong>P7</strong> follow manufacturers’ guidelines when preparing materials for use.</td>
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<td><strong>P8</strong> perform specified tasks using hand tools.</td>
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<tr>
<td><strong>P9</strong> demonstrate the safe use of materials when performing coving, texturing and ceiling centre piece installation tasks.</td>
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</tr>
<tr>
<td>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</td>
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</tr>
<tr>
<td><strong>M3</strong> produce finished work with neat and consistent textured finishes and covings and ceiling centre pieces accurately placed to ± 3 mm.</td>
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<tr>
<td><strong>P10</strong> demonstrate the safe use of low level access equipment when performing coving, texturing and ceiling centre piece installation tasks.</td>
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<tr>
<td>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</td>
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</tr>
<tr>
<td><strong>D1</strong> produce finished work with neat and consistent textured finishes, covings and centre pieces accurately placed to ± 3 mm, a high standard textured finish with no misses or other imperfections visible from 1 m, and covings and ceiling centrepieces accurately placed to ± 1 mm.</td>
<td></td>
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</tr>
</tbody>
</table>
Unit content

1 Know the hand tools, materials and access equipment used by decorators

Hand tools:
- caulking tools
- plastic combs
- mixing tools
- rubber stipplers
- lacer
- textured rollers
- hard point saw
- tape measure
- coving mitre
- knife
- laying in brush
- inch brush
- filling and putty knives
- bark roller

Materials:
- texturing materials
- cold water and warm water mix
- plasterboard coving
- fibrous plaster coving
- polystyrene coving
- plaster centrepieces
- foam centrepieces

PPE:
- safety footwear
- overalls
- hand protection
- eye protection
- other PPE as appropriate

Access equipment:
- uses of stepladders
- hop-ups
- trestle working platforms
2 Understand safe working practices for the application of textured finishes and the installation of coving and ceiling centrepieces

Textured finishes:
● basic medium stipple
● swirl
● bark
● broken leather

Fixing covings:
● e.g. polystyrene, plasterboard, fibrous plaster

Fixing centrepieces:
● e.g. fibrous plaster, foam

Health, safety and welfare:
● maintenance of clean and tidy work space
● identification of hazards associated with given tasks
● use of safe practices to minimise risks from identified hazards
● particular reference to COSHH requirements

3 Be able to apply safe working practices when performing coving, texturing and ceiling centrepiece installation tasks

Preparing bare surfaces:
● plaster
● plasterboard

Preparing previously painted surfaces:
● water-based matt finishes
● solvent-based eggshell and gloss finishes

Applying textured finishes:
● basic, medium stipple
● swirl
● bark
● broken leather

Installing coving and centrepieces:
● plasterboard
● fibrous plaster
● foam
Health, safety and welfare:

- maintenance of clean and tidy work space
- identification of hazards associated with given tasks
- use of safe practices to minimise risks from identified hazards
Information for delivery staff

Essential requirements
A range of decorating tools, materials, personal protective equipment and access equipment will be required. A wide range of specialist tools must be made available, especially for production of the textured surfaces listed in the unit content. The practical activities will proceed more effectively in a dedicated workshop but portable frames can be used where this is not a possibility.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. Most medium to large construction companies are actively seeking links with schools and colleges, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

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- loan of or assistance with specialist equipment
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- assistance with the development of links with other sources of help, including: material suppliers, architects, clerk of works consultancies, trade associations, consultants, etc
- sponsorship of individual learners and direct recruitment to modern apprenticeships and training schemes
- the provision of focused site visits and/or sector-related work experience
- access to visiting speakers who will put the learning from this unit into an industrial context – specific content level and expected outcomes will need to be discussed in advance.

Whilst site visits will aid learners’ general awareness and perceptions of site-based construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow-up activities should be prepared and discussed with the company well in advance of the visit.

Delivery guidance
Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.
Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced decorators and to ask them questions about their experiences in the industry and the benefits it has brought to them.

It is intended that this unit will provide learners with further experience of the practical skills associated with decorating, together with the basic job knowledge required to underpin such practical skills. It builds on the knowledge, understanding and skills found in Unit 14: Exploring Painting and Decorating, and complements Unit 15: Performing Paperhanging Operations.

The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified for a Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners gaining the opportunity to identify, select and use tools, materials and equipment in a workshop environment. Practical activities for outcome of learning 1 could include the selection of tools and equipment to assemble a basic texturing toolkit, materials for specified texturing tasks and low-level access equipment for installing covings and centre pieces to ceilings. Outcome of learning 2 could be met by learners interpreting provided risk assessments and applying the principles of health, safety and welfare to the performance of the required practical tasks. Outcome of learning 3 will require learners to practise and perform the required practical tasks.

The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2 m in height. Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas.
Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to tools used for applying textured finishes and installing coving and ceiling centrepieces. Discussion about the various uses of different tools and how they should be maintained and stored.</td>
</tr>
<tr>
<td>Introduction to materials commonly used for applying textured finishes and installing coving and ceiling centrepieces. Discuss the difference between polystyrene, gyproc and fibrous plaster coving and centrepieces.</td>
</tr>
<tr>
<td>Introduction to personal protective equipment (PPE) commonly used when applying textured finishes and installing coving and ceiling centrepieces. Explain the different items of PPE and what purpose each one serves.</td>
</tr>
<tr>
<td>Practical activities: introduction to low-level access equipment commonly used when applying textured finishes and installing coving and ceiling centrepieces. Activities should include erecting and dismantling access equipment. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: preparing new and previously decorated surfaces to receive textured finishes, coving and ceiling centrepieces. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: applying textured finishes, coving and ceiling centrepieces to previously prepared surfaces. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical activities: cleaning tools and equipment after use in preparation for storage. Safe working practices should be demonstrated by learners throughout all practical activities.</td>
</tr>
<tr>
<td>Practical assessment: activities should include preparing an area and applying a textured finish. Safe working practices should be demonstrated by learners throughout all practical activities. <strong>Assignment 1: Resources and Techniques Used in Performing Decorating Tasks</strong></td>
</tr>
<tr>
<td>Practical assessment: activities should include preparing an area and installing coving and a ceiling centrepiece. Safe working practices should be demonstrated by learners throughout all practical activities. <strong>Assignment 2: Performing Decorating Tasks</strong></td>
</tr>
</tbody>
</table>
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used, suitable evidence would be observation records or witness statements. Guidance on their use is provided on the Edexcel website – www.edexcel.com

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must identify the hand tools and access equipment commonly used in decorating. This could be evidenced, by tutor observation or by oral questioning.

For P2, learners must select the tools and access equipment required to complete the specified decorating tasks. This could be evidenced, for example, by learners completing a stores requisition, by tutor observation or by oral questioning.

For P3, learners must identify the materials used in decorating. This could be evidenced by tutor observation or by oral questioning.

For P4, learners must select the materials required to complete the specified tasks. This could be evidenced by learners completing a stores requisition, by tutor observation or by oral questioning.

For P5, learners must identify the PPE and safe working practices required to perform the specified tasks. This could be evidenced by oral questioning or group discussion.

For P6, learners must explain their selection of PPE and safe working practices. This could be evidenced through oral questioning or group discussion.

For P7, learners must prepare all materials for use in line with manufacturers’ guidelines. This could be evidenced through tutor observation.

For P8, learners must prepare, to an acceptable industrial standard, a ceiling area and apply at least two different textured finishes. There are no specific quality requirements for the finished work, but learners must demonstrate at least a basic understanding of the processes and some practical ability. The tutor must make the decision as to whether learners have met the criterion based on the overall quality of both the learners’ performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.

For P9, learners must prepare, to an acceptable industrial standard, a ceiling area and install at least two different types of coving and at least two different ceiling centrepieces. There are no specific quality requirements for the finished work, but learners must demonstrate at least a basic understanding of the processes and some practical ability. The tutor must make the decision as to whether learners have met the criterion based on the overall quality of both the learners’ performance and the finished product. It is anticipated that considerable guidance will be given to learners at this grade.
For P10, learners must demonstrate that they can use low-level access equipment safely. This will include the safe erection, dismantling and storage of any equipment used. Evidence for this is likely to be generated via direct observation of learners using low-level access equipment to perform the tasks specified for P8 and P9.

For M1, learners must justify the safe use of tools, materials and access equipment provided. Tutors will need to ensure that individual learners are provided with equal opportunities to show understanding. Tutor-led oral questioning is suitable here.

For M2, learners must justify the use of good health, safety and welfare practices to minimise the risks involved in performing their given tasks. This will include checking a provided COSHH risk assessment to make sure that the PPE they are to use later on, and the control measures to be taken, are appropriate for the materials to be used. This could be verified, for example, by the tutor through oral questioning.

For M3, learners must produce work of an acceptable standard. The quality requirements stated in the grading grid are stricter than those for the pass grade and must be achieved to obtain the higher grade. A limited amount of tutor guidance is acceptable at this grade.

For D1, learners must produce work of a good standard. The quality requirements stated in the grid are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Performing Decorating Tasks.</td>
<td>A training manager supervising new apprentices to support their studies has been asked to identify and select the tools and working techniques to be used, compliance with health and safety risk assessments, general preparation for and planning of decorating tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, P10, M3, D1</td>
<td>Performing Decorating Tasks.</td>
<td>As a training manager, you have been asked to prepare ceilings and apply textured finishes, two types of coving and ceiling centrepieces.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Construction Painting Skills</td>
<td>Exploring Painting and Decorating</td>
</tr>
<tr>
<td>Developing Construction Decorating Skills</td>
<td>Performing Paperhanging Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.

Suggested resources

Books


Unit 17: Exploring Building Services Techniques in Construction

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30832H
This unit is internally assessed

Unit aim
This unit enables learners to explore techniques in building services by undertaking practical exercises in plumbing and electrics using industry standard hand tools and equipment.

Unit introduction
The purpose of this unit is to allow learners to undertake some practical aspects of building services in construction. They will need to be able to select the right tools and equipment for performing building services operations and be able to assess the hazards and safety measures required in carrying out these operations. Learners will be able to see how electrical cabling and wiring is fitted together and how copper pipes and fittings deliver water services by physically undertaking some of these operations.

Building services form a large part of any construction project and tend to be undertaken by specialist subcontractors in each services field. They often use very complex systems in heating, lighting and ventilating a modern building structure which are not visible, as they are hidden within the building structure. Safety is of paramount importance, especially when dealing with electricity and water, and learners will acquire skills to enable them to operate safely. In addition, building services are crucial to the smooth functioning of any building. They distribute heat, energy and light around the building system and remove waste products through ventilation, exhaustion and disposal. Services also include the movement of occupants, for example the use of lifts and escalators, and the associated protective measures for example fire alarms and sprinklers.

Electrical services are also an essential element in the safe distribution of power and lighting requirements of domestic and commercial properties. Plumbing services safely distribute hot and cold water, and heating supplies around the building structure.
Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools and materials commonly used to perform simple building services tasks
2. Understand the important health, safety and welfare issues associated with building services tasks
3. Be able to apply safe working practices to perform work on basic elements of building services installations.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>To achieve a pass grade the evidence must show that the learner is able to:</td>
</tr>
<tr>
<td>P1 identify the hand tools used to perform building services techniques.</td>
</tr>
<tr>
<td>P2 select the hand tools used to perform specified building services tasks.</td>
</tr>
<tr>
<td>P3 identify the materials used to perform building services techniques.</td>
</tr>
<tr>
<td>P4 select the materials to be used in specified building services tasks.</td>
</tr>
<tr>
<td>P5 explain the safety requirements before performing building services operations.</td>
</tr>
<tr>
<td>P6 explain the selection of appropriate PPE commonly used for undertaking simple building services operations.</td>
</tr>
</tbody>
</table>
### Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade</th>
<th>To achieve a merit grade</th>
<th>To achieve a distinction grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>the evidence must show that the learner is able to:</td>
<td>the evidence must show that, in addition to the pass criteria, the learner is able to:</td>
<td>the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</td>
</tr>
<tr>
<td><strong>P7</strong> carry out safely the installation of a simple electrical circuit using industry standard connections.</td>
<td><strong>M3</strong> produce finished work, fitted and constructed to acceptable tolerances.</td>
<td><strong>D1</strong> produce finished work, fitted and constructed to minimal tolerances.</td>
</tr>
<tr>
<td><strong>P8</strong> carry out safely the installation of a simple pipework installation using industrial standard connections.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P9</strong> demonstrate the safe performance of building services operations.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform simple building services tasks

Hand tools:
- pencil
- tape measure
- tube cutters
- junior hacksaw
- half round file
- pipe grips
- screwdrivers
- bench vice
- tube bending machine
- blowtorch
- grips
- cable cutters
- spirit level

Mechanical building services tasks:
- basic pipe joints
- compression type A fittings
- solder end feed types
- solder ring type fittings
- flux
- steel wool
- push fit plastic joints
- cutting pipe to correct length
- horizontal or vertical installation as per industrial standards

Electrical building services tasks:
- basic electrical connections
- spade connectors
- screw terminals
- solder type
- push fit or clip in connectors
- cutting cable to correct length
- suitable terminations
- cables installed correctly in line with industrial standards
2 Understand the important health, safety and welfare issues associated with building services tasks

Health, safety and welfare:
- relevant legislation/regulations in home country
- right tool for the right job
- procedures for safe isolation of building services (gas, water, electricity)
- maintenance of clean and tidy workplace
- identification of hazards
- control measures to reduce risks

Access equipment:
- safe checking, erection, use, dismantling and storage of mobile scaffold, extending ladders, stepladders

Portable power tools:
- cordless drill/screwdriver
- hammer action drill

PPE:
- safety boots
- hand protection
- goggles
- other PPE as appropriate

3 Be able to apply safe working practices to perform work on basic elements of building services installations

Basic building services:
- basic distribution systems (water, gas, electricity)

Marking out:
- from building services drawings (pipework, electrical circuits)
- use of scale measurements
- associated simple calculations

Installing components:
- use clips and brackets to support pipes and cables
- fix appliances and components to a variety of surface finishes

Installation skills:
- bend and fix 15 mm and 22 mm diameter tube to construct pipe systems
- use 1.5 mm² and 2.5 mm² PVC cable in electrical installations
Health, safety and welfare:
- relevant legislation/regulations in home country
- right tool for the right job
- procedures for safe isolation of building services (gas, water, electricity)
- maintenance of clean and tidy workplace
- identification of hazards
- use of control measures to reduce risks

Access equipment:
- safe checking, erection, use, dismantling and storage of mobile scaffold, extending ladders, stepladders
Information for delivery staff

Essential requirements

Learners will require access to hand tools, portable power tools, materials, PPE and access equipment of a nature and standard typical of a work environment. The learning environment must be a safe place of work with adequate space for construction of the pipe work, the safe use of access equipment, adequate washing facilities, and access to first aid facilities and a person trained in first aid. The practical activities will proceed effectively only in a dedicated workshop and should not be attempted in a domestic environment. Centre health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Visits to materials suppliers may be of benefit and the invitation of guest speakers to discuss electrical and mechanical services may help to put the learning from this unit into a real and industrial context. Often, large educational establishments have estates offices which provide an ideal resource for further research and investigation of mechanical and electrical installations.

Delivery guidance

Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities and demonstrations of the theories, equipment and techniques involved.

Delivery should stimulate, motivate, educate and enthuse learners. Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced building services engineers, including plumbers and electrical engineers, and to ask them questions about their experiences in the industry and the benefits it has brought to them.

It is intended that this unit will provide learners with their first experience of the practical skills associated with building services engineering, together with any job knowledge required to underpin such practical skills. It underpins Unit 18: Performing Plumbing Operations and Unit 19: Performing Electrical Operations.

The delivery of this unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified at Level 2 NVQs in Mechanical Engineering Services – Plumbing (6089), or Installations and Commissioning for Electro technical Systems (2356) and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.
Group activities are permissible, but tutors will need to ensure that individual learners are given equal experiential and assessment opportunities. The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners gaining the opportunity to identify, select and use tools, materials and equipment for basic installation tasks in a workshop environment.

Practical activities for outcome of learning 1 could include the selection of tools and equipment to assemble a basic building services toolkit, materials for specified electrical and plumbing tasks and low-level access equipment for installing services systems that cannot be accessed from the ground. Outcomes of learning 2 and 3 could be met by learners interpreting given risk assessments and applying the principles of health, safety and welfare to the practice and performance of the required practical tasks.

Learners are not expected to make connections to, or work with, live systems. The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2m in height. Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit introduction – scheme of work unit content introduction by tutor, explanation of grading criteria for pass, merit and distinction.</td>
</tr>
<tr>
<td>The common hand tools, power tools used in electrical and plumbing installations – theory input with assessment assignment set. Access equipment demonstration by tutor.</td>
</tr>
<tr>
<td>Explanation of PPE used for building services operations – theory input with examples demonstration or guest supplier speaker.</td>
</tr>
<tr>
<td>Explanation of the safe use and operation of access equipment – theory input with practical demonstration using low-level access platforms.</td>
</tr>
<tr>
<td>Safety theory for building services operations – theory input with assessment assignment.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used to Perform Building Services Tasks**

<table>
<thead>
<tr>
<th>Plumbing – jointing methods demonstration by tutor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical – jointing methods demonstration by tutor.</td>
</tr>
<tr>
<td>Topic and suggested assignments/activities/assessment</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Pipework – simple installation techniques and procedures, demonstration and practice.</td>
</tr>
<tr>
<td>Individual exercises by learners.</td>
</tr>
<tr>
<td>Types of fittings.</td>
</tr>
<tr>
<td>Pipe bending techniques.</td>
</tr>
<tr>
<td>Soldering techniques.</td>
</tr>
</tbody>
</table>

**Assignment 2: Performing Building Services Tasks**
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through contextualised vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used suitable evidence would be observation records or witness statements. Guidance on their use is provided on our website.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must describe the hand tools used to perform simple building services operations. This could be evidenced by completion of tool identification sheets.

For P2, learners must select the correct hand tools to be used in specified building services operations. This could be evidenced by completing requisition sheets.

For P3, learners must describe the materials used in simple building services operations. This could be evidenced by completion of material identification sheets.

For P4, learners must select the correct materials to be used in specified building services operations. This could be evidenced by completing material requisition sheets.

For P5, learners must explain the basic health and safety requirements that need to be addressed before performing building services operations, for example the risk assessment, method statement, isolation of services and requirements to protect the public.

For P6, learners must explain the selection of PPE that will be used in performing building services operations, for example safety helmet, isolation padlocks and gloves.

For P7, learners must perform a practical electrical exercise involving the installation of a simple electrical circuit such as a ring main, fused spur or one way lighting switch using safe working practices.

For P8, learners must perform a practical plumbing exercise such as installing a hot and cold water supply to a sink, bath or wash hand basin, using safe working practices.

With P9 learners have to demonstrate that they have worked safely during the practical installation criteria. This could be evidenced through witness statements or observation records.

For M1, learners must justify the safe use of tools and materials provided. This should include low-level access equipment. Tutors must ensure that individual learners are provided with equal opportunities to show their understanding. Tutor-led oral questioning is suitable here.
For M2, learners must justify the use of good health, safety and welfare practices to perform their given tasks. This will include checking a provided COSHH risk assessment to make sure that the PPE they are to use, and the control measures to be taken, are appropriate for the materials and techniques to be used. This could be verified by tutor-led oral questioning.

For M3, learners must produce work of an acceptable standard. The quality requirements stated in the grading grid are stricter than those for the pass grade and must be achieved to obtain the higher grade. Learners must carry out the building services installation tasks safely and to good industrial standards and tolerances, with straight runs and right-angled bends. A limited amount of guidance is acceptable at this grade.

For D1, learners must produce work of a good standard. The quality requirements stated in the grading grid are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should have been provided.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used to Perform Building Services Tasks.</td>
<td>A training manager, supervising new apprentices to support their studies, has been asked to identify and select the tools and working techniques to be used. In addition, she has been asked to consider compliance with health and safety risk assessments, general preparation for and planning of building services crafts.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and setting out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Performing Building Services Tasks.</td>
<td>As a training manager you have been asked to perform both mechanical and electrical building services tasks on a contract for a local authority.</td>
<td>Practical assessment. Evidence to include quality of completed work supported by photographs, observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Plumbing Skills</td>
<td>Performing Plumbing Operations</td>
<td>Mechanical and Electrical Services in Construction</td>
</tr>
<tr>
<td>Developing Electrical</td>
<td>Performing Electrical Operations</td>
<td></td>
</tr>
<tr>
<td>Installation Skills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.

Suggested resources

Books

Blaus J – Electrical NVQ and Technical Certificate Book 2

ISBN 0748779795

Thompson J – Plumbing NVQ and Technical Certificate Level 2

ISBN 9781405139625

Treloar R D – Plumbing: Heating and Gas Installations, 2nd Edition
(Blackwell Science, 2000) ISBN 0632053321

Journals

The Gas Installer

Heating, Ventilation and Plumbing

IEE Wiring Matters

Plumbing and Heating

Websites (Relevant websites applicable to learner’s home country)

<table>
<thead>
<tr>
<th>Website</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.bpec.org.uk">www.bpec.org.uk</a></td>
<td>Building Engineering Services Training</td>
</tr>
<tr>
<td><a href="http://www.iphe.org.uk">www.iphe.org.uk</a></td>
<td>Chartered Institute of Plumbing and Heating</td>
</tr>
<tr>
<td><a href="http://www.iee.org.uk">www.iee.org.uk</a></td>
<td>Engineering</td>
</tr>
<tr>
<td><a href="http://www.summitskills.org.uk">www.summitskills.org.uk</a></td>
<td>The Institute of Engineering And Technology</td>
</tr>
<tr>
<td></td>
<td>The Sector Skills Council for Building Engineering</td>
</tr>
<tr>
<td></td>
<td>Services Engineering</td>
</tr>
</tbody>
</table>
Unit 18: Performing Plumbing Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30833H
This unit is internally assessed

Unit aim
This unit explores the tools, equipment and working techniques used to perform plumbing and heating and ventilation tasks, and provides opportunities to use the techniques to install pipework systems.

Unit introduction
Plumbing and heating and ventilation operations are important trade activities in the building services sector.
This unit focuses on the hand tools, portable power tools, access equipment, personal protective equipment (PPE) and safe working techniques used to install pipework systems for both plumbing and heating and ventilating trades.
The identification, correct selection, and safe use of the hand tools and power tools required to carry out the installation work is strongly emphasised.
The unit addresses the health, safety and welfare issues to be considered when using plumbing and heating and ventilating skills to install pipework systems. Particular attention is paid to the safe use of electrical equipment in the presence of water.
The unit also provides learners with an opportunity to understand the requirements for the safe use of access equipment, including stepladders and extension ladders.
Learners will have the opportunity to form joints in pipework using both compression fittings and capillary fittings. They will incorporate such joints in the pipework arrangements typically found in domestic buildings.
However, learners seeking a discrete package of units relating to the building services crafts would benefit from studying the three building services units, either in an integrated manner or as separate units. The units are Unit 17: Exploring Building Services Techniques in Construction, Unit 18: Performing Plumbing Operations and Unit 19: Performing Electrical Operations.
Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools and portable power tools commonly used to perform plumbing and heating and ventilating tasks
2. Understand the important health, safety and welfare issues associated with plumbing and heating and ventilating tasks
3. Be able to apply safe working practices to form pipe joints and install pipework systems to given specifications.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 identify the hand tools and portable power tools used to perform basic plumbing and heating and ventilating tasks.</td>
<td>M1 explain the safe use of hand tools and portable power tools to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P2 select the hand tools and portable power tools required to perform specific plumbing and heating and ventilating tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 identify the PPE, access equipment and safe working practices used to perform basic plumbing and heating and ventilating tasks.</td>
<td>M2 explain the safe erection, use, dismantling and storage of low-level access equipment.</td>
<td></td>
</tr>
<tr>
<td>P4 explain the selection of PPE, access equipment and working techniques appropriate to a given plumbing task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5 measure and mark out pipe work systems.</td>
<td>M3 produce finished work with all joints watertight, all bends 90° ± 10° and pipework securely fixed to surface.</td>
<td>D1 produce finished work with all joints watertight, pipework runs either horizontal or vertical, all bends 90° ± 5° and pipework securely and neatly fixed to surface.</td>
</tr>
<tr>
<td>P6 perform pipe jointing techniques.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P7 produce pipework installations to a given specifications.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and portable power tools commonly used to perform plumbing and heating and ventilating tasks

Hand tools:
- pencil
- tape measure
- tube cutters
- junior hacksaw
- half round file
- pipe grips
- screwdrivers
- bench vice
- tube bending machine
- blowtorch

Portable power tools:
- cordless drill/screwdriver
- hammer action drill

2 Understand the important health, safety and welfare issues associated with plumbing and heating and ventilating tasks

PPE:
- safety boots
- hand protection
- goggles
- other PPE as appropriate

Access equipment:
- safe checking, erection, use, dismantling and storage of extending ladders and stepladders

Health, safety and welfare:
- right tool for the right job
- COSHH requirements
- safe isolation of plumbing systems
- safe use of portable power tools in the presence of water
- need to maintain a clean and tidy workplace
- identification of hazards and control measures to reduce risks
Hazards:
● falls from height
● slips, trips and falls
● cuts and injuries caused by sharp tools and instruments
● burns caused by using blowtorches
● electrical trauma caused by defective equipment
● musculoskeletal injuries resulting from lifting and moving heavy loads

3 Be able to apply safe working practices to form pipe joints and install pipework systems to given specifications

Measuring and marking out:
● from provided building services drawings
● use of scale measurements
● associated simple calculations

Forming basic pipe joints:
● use of compression type A fittings
● solder end feed types
● solder ring type fittings
● flux
● steel wool

Installing pipework systems:
● cutting pipe to correct length
● manipulating pipes by bending and fixing 15 mm and 22 mm diameter tube
● forming watertight pipe joints
● using clips and brackets to install pipes to a variety of surface finishes

Specifications:
● joints to be watertight
● bends to be right-angles
● pipe runs to be horizontal and/or vertical as appropriate
● pipework to be securely clipped to surface
Information for delivery staff

Essential requirements

Learners will require access to hand tools, portable power tools, materials, PPE and access equipment of a nature and standard typical of a work environment. The learning environment must be a safe place of work with adequate space for construction of the pipe work, the safe use of access equipment, adequate washing facilities, and access to first aid facilities and a person trained in first aid. The practical activities will proceed effectively only in a dedicated workshop and should not be attempted in a domestic environment. Centre health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The unit deals with the tools, equipment, materials, PPE and skills typical of the plumbing, heating and ventilating crafts. The vocational context is therefore obvious. Some learners may wish to build on this unit and progress to a career in the building services crafts. Centres should, therefore, develop links with local plumbing and heating and ventilating companies, and develop the skills learners need to obtain an apprenticeship. Many further education colleges offer Apprenticeship programmes, on which they train the apprentices employed by the local companies. They will, therefore, have a pre-existing relationship on which they can build. It should also be possible for learners studying this unit to visit practical classes where apprentices are being trained and assessed to experience the environment in which trainee plumbers work. Further information on local plumbing firms can be obtained from www.yellowsearch24.co.uk, www.thompsonlocal.com and www.trustatrader.com among other websites.

Delivery guidance

It is intended that this unit will give learners some of the practical skills associated with plumbing and heating and ventilating together with the associated job knowledge required to underpin such practical skills. Learners must be allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities, as well as group teaching and demonstrations of the tools, equipment, materials, techniques and PPE involved. Learners will need to discuss the materials, components, tools, equipment, PPE and techniques to be used with a responsible and competent person and should respond positively to any advice given. They should then select the tools, equipment, materials, components and PPE appropriate for the task in hand, and use these to perform the specified plumbing tasks.

Health and safety is of paramount importance in the building services trades. Learners are expected to comply with any and all provided risk assessments, but they are not required to produce these risk assessments. Learners should be encouraged to be alert to the hazards found in the workplace, and to report them to their tutor, but they are not required to suggest control measures. Tutors are responsible for performing all risk assessments, including those for COSHH, and for ensuring that learners comply with these risk assessments.
Tutors must terminate any practical exercise where learners are not complying with the risk assessments provided.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th><strong>Topic and suggested assignments/activities/assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture. Whole-class, tutor-led discussion about hand tools and portable power tools. Individual work on ‘tool identification sheets’.</td>
</tr>
<tr>
<td>Practical: requisitioning tools from store.</td>
</tr>
<tr>
<td>Lecture. Whole-class, tutor-led discussion about PPE, access equipment and safe working techniques. PPE should be discussed in terms of when and where it is necessary and how it works. Individual work on ‘PPE identification sheets’.</td>
</tr>
<tr>
<td>Practical: learners complete requisition sheets to obtain PPE from store. Learners provided with opportunities to select and wear the full range of the PPE used in plumbing and heating and ventilating.</td>
</tr>
<tr>
<td>Pre-practical and practical. Other health and safety issues should be demonstrated by the tutor before practical work commences and reinforced at intervals throughout. Learners should practise erecting and taking down access equipment and performing basic skills, under close supervision, before they attempt any individual practical plumbing and heating and ventilating tasks.</td>
</tr>
<tr>
<td><strong>Assignment 1: Resources and Techniques Used in Plumbing, Heating and Ventilating</strong></td>
</tr>
<tr>
<td>Pre-practical: demonstration of how to keep individual work areas tidy. The hand-to-eye motor skills associated with plumbing are best taught by the tutor demonstrating the skills required, followed by learners practising the skills.</td>
</tr>
<tr>
<td><strong>Assignment 2: Producing Pipework Systems</strong></td>
</tr>
<tr>
<td>Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be carried out under supervision and the tutor should stop the task if learners are working unsafely. Learners should work individually to produce their pipework installations.</td>
</tr>
</tbody>
</table>
Assessment guidance

For P1, learners must identify the hand tools and hand-held power tools in common use in plumbing and heating and ventilating.

For P2, learners must select the hand tools and hand-held power tools required to complete the specified plumbing and heating and ventilating tasks. This will be most clearly evidenced by completion of appropriate requisition orders.

For P3, learners must identify the PPE, access equipment and safe working techniques in common use in plumbing and heating and ventilating. Learners should be aware of any hazards associated with the practical tasks they perform but they need not produce risk assessments or suggest control measures.

For P4, learners must explain the selection of PPE, access equipment and working techniques. This could be evidenced through tutor-led oral questioning.

For P5, learners must measure and mark out pipework systems, from provided drawings, to acceptable tolerances. A tolerance of ± 5 mm is acceptable for linear measurements and ± 10° for intended right angles. It is anticipated that considerable guidance will be given to learners at this grade.

For P6, learners must perform pipe jointing techniques by forming a minimum of two capillary joints and two compression joints. Learners must be aware of the need for joints to be watertight, but the production of perfectly watertight joints is not a requirement for this grade. It is anticipated that considerable guidance will be given to learners at this grade.

For P7, learners must produce a pipework installation to a given specification. The installation must comply with the information given in the building service drawing(s) provided and must contain a minimum of two capillary joints, two compression joints and two 90° bends. The tolerances and other requirements stipulated in P4 and P5 should also apply here.

For M1, learners must explain the safe use of hand tools and portable power tools to perform their given tasks. Learners should be aware of any hazards associated with the practical tasks, particularly when hand-held power tools are used in the presence of water, but need not produce risk assessments or suggest control measures.

For M2, learners must explain the safe use of good health, safety and welfare practices to erect, use, dismantle and store low-level access equipment such as extending ladders and stepladders. As for M1 above, learners should be aware of any hazards associated with the use of low-level access equipment, but need not produce risk assessments or suggest control measures.

For M3, learners must produce a pipework installation that complies with the information given in the building service drawing(s) provided and which contains a minimum of two capillary joints, two compression joints and at two 90° bends. The finished work must be of an acceptable standard with all joints watertight and all bends 90° ± 10°. The pipework must be securely fixed to the surface finish but neatness is not an issue for this grade.

For D1, learners must produce a pipework installation that complies with the information given in the building service drawing(s) provided and which contains a minimum of two capillary joints, two compression joints and two 90° bends. The finished work must be of a good standard with all joints watertight and all bends 90° ± 5°. The pipework runs should be either horizontal or vertical and all pipework must be securely and neatly fixed to the surface finish.
**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, M1, M2,</td>
<td>Resources and Techniques used in Plumbing, Heating and Ventilating.</td>
<td>A training consultant, supervising new apprentices to support their studies, has been asked to identify and select the tools, access equipment and working techniques to be used. In addition, he has been asked to consider compliance with health and safety risk assessments, general preparation for and planning of plumbing and heating and ventilating tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and marking out work to acceptable tolerances.</td>
</tr>
<tr>
<td>P5, P6, P7, M3, D1</td>
<td>Producing Pipework Systems.</td>
<td>A consultant has been contracted to perform pipe jointing techniques and production of specified pipework systems for projects on a major government contract.</td>
<td>Practical assessment. Evidence to include quality of completed installation supported by observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Safety and Welfare in Construction</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
<td>Plumbing Technology in Building Services Engineering</td>
</tr>
<tr>
<td>Working as a Team to Move and Handle Resources</td>
<td>Exploring Building Services Techniques in Construction</td>
<td></td>
</tr>
<tr>
<td>Developing Plumbing Skills</td>
<td>Performing Electrical Operations</td>
<td></td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C.*
Suggested resources

Books
Sidney K (Editor) – *Basic Plumbing Pro Tips and Simple Steps* (Meredith Corporation, 2002) ISBN 0696213206

Journals
*Heating and Plumbing Monthly*
*Heating and Ventilating News*
*Heating and Ventilating Review*
*HVP: Heating, Ventilating and Plumbing*

Websites *(Relevant websites applicable to learner's home country)*

<table>
<thead>
<tr>
<th>Website</th>
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</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.bpec.org.uk">www.bpec.org.uk</a></td>
<td>Building Engineering Services Training</td>
</tr>
<tr>
<td><a href="http://www.iphe.org.uk">www.iphe.org.uk</a></td>
<td>Chartered Institute of Plumbing and Heating Engineering</td>
</tr>
<tr>
<td><a href="http://www.cibse.org">www.cibse.org</a></td>
<td>The Chartered Institution of Building Services Engineers</td>
</tr>
<tr>
<td><a href="http://www.hse.gov.uk">www.hse.gov.uk</a></td>
<td>Health and Safety Executives</td>
</tr>
<tr>
<td><a href="http://www.iosh.co.uk">www.iosh.co.uk</a></td>
<td>Institute of Occupational Safety and Health</td>
</tr>
<tr>
<td><a href="http://www.trustatrader.com">www.trustatrader.com</a></td>
<td>Online Directory of Traders only</td>
</tr>
<tr>
<td><a href="http://www.thompsonlocal.com">www.thompsonlocal.com</a></td>
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<tr>
<td><a href="http://www.theplumber.com">www.theplumber.com</a></td>
<td>Plumbing</td>
</tr>
<tr>
<td><a href="http://www.householdersguide.com">www.householdersguide.com</a></td>
<td>Real Estate Information</td>
</tr>
<tr>
<td><a href="http://www.rospa.co.uk">www.rospa.co.uk</a></td>
<td>The Royal Society for the Prevention of Accidents</td>
</tr>
<tr>
<td><a href="http://www.summitskills.org.uk">www.summitskills.org.uk</a></td>
<td>The Sector Skills Council for Building Services Engineering</td>
</tr>
</tbody>
</table>
Unit 19: Performing Electrical Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30834H
This unit is internally assessed

Unit aim

This unit enables learners to carry out the installation of electrical circuits for power and lighting safely using current industry standard techniques.

Unit introduction

The purpose of this unit is to allow learners to undertake some of the practical aspects of electrical installation in the construction industry. They will need to be able to select the right tools and access equipment for performing electrical services operations and be able to assess the hazards and safety measures required in carrying out these operations. Learners will be able to see how electrical cabling and wiring is fitted together by undertaking some of these operations in a practical setting.

A specialist electrical subcontractor would usually install and power, lighting and data systems in a domestic or commercial property. This involves wiring in cable from the mains to the outlet sockets or light fittings. This work must be done correctly to ensure the safety of the building occupants.

Electricity can injure or kill if you receive an electric shock so all wiring must be installed in accordance with current electrical legislation. Learners must understand the risks and hazards involved in working with electricity and how to protect themselves from these risks. Final testing of the final installations is therefore an important factor before the circuit goes live.

Due to the nature of electricians’ work it is sometimes necessary to work at heights. Learners will explore how to gain access to a specific height using safe access systems. Safe access systems will need to be erected and dismantled correctly including inspection before use.

Outcomes of learning

On completion of this unit a learner should:
1. Know the hand tools and materials used in carrying out electrical installation tasks
2. Understand the important health, safety and welfare issues associated with performing electrical installation operations
3. Be able to apply safe working practices to electrical installations.
**Assessment and grading criteria**

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>identify the correct tools for carrying out electrical installations.</td>
<td>M1 explain the safe use of tools, materials and PPE to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>describe the correct PPE required for undertaking electrical installations.</td>
<td>M2 explain the safe erection, use, dismantling and storage of access equipment.</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>identify the access equipment for undertaking electrical installations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>explain the main health and safety legislation that applies to electrical installations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>identify the safety requirements before commencing electrical operations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>produce a simple electrical lighting and power circuit to current industrial standards.</td>
<td></td>
<td>D1 produce finished work with minimal tolerances and straight, neat cable runs.</td>
</tr>
<tr>
<td>P7</td>
<td>demonstrate the safe performance of electrical installations by testing the electrical circuits to current industrial standards.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials used in carrying out electrical installation tasks

Hand tools:
- pencil
- tape measure
- steel rule
- ball pen hammer
- hacksaw
- junior hacksaw
- pliers
- side cutters
- stripping knife
- cable stripper
- spirit level

Portable power tools:
- cordless drill/screwdriver
- hammer action drill

PPE:
- safety boots
- hand protection
- eye protection
- dust masks
- overalls

Materials:
- cable types
- jointing materials
- fittings
- sockets
- switches

2 Understand the important health, safety and welfare issues associated with performing electrical installation operations

Country specific legislation, e.g.:
- Health and Safety at Work Act 1974
- Electricity at Work Act 1989
- BS 7671 Requirements for Electrical Installations 2008
Working area:
- maintaining a clean and tidy work space
- identifying hazards
- appropriate control measures to reduce risk

Access equipment:
- safe checking
- use
- dismantling and storage of mobile scaffolds
- extending ladders
- stepladders

3 Be able to apply safe working practices to electrical installations

Circuits:
- ring
- radial
- lighting
- one-way
- two-way
- intermediate
- loop in systems

Marking out:
- interpret electrical drawings
- measuring to scale
- simple associated calculations (lengths, spacings, angles, quantities)

Fixing accessories:
- switch boxes
- socket boxes
- batten lamp holder
- Edison screw
- ceiling roses

Install services cables:
- complete, simple, wiring systems using 2.5 mm² and 5.5 mm² PVC twin with CPC
- dressing
- bending radius
- entry to accessories
Clipping:
- approved clips
- correct spacing
- secured fixings

Connecting:
- insulation cut to correct length
- no damage
- correct polarity

Testing:
- visual inspection
- continuity
- insulation resistance
- polarity
- functional testing

Safe isolation:
- identifying circuit
- notifying relevant people
- switching off
- removing fuses
- locking off
- placing notices
- testing for voltage
- using proving unit
Information for delivery staff

Essential requirements

Learners will require access to hand tools, materials and equipment within a suitable workshop facility. There is no provision at this level for a live electrical facility. Access platforms will be required but these could be hired in from a plant supplier for a training day.

Employer engagement and vocational contexts

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

Visits to materials suppliers may be of benefit and inviting guest speakers or electrical subcontractors to discuss electrical services may help to place learning in a real and industrial context. Often, large educational establishments have estates offices which would provide an ideal resource for further research and investigation of electrical installations.

Delivery guidance

Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.

Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced electricians and to ask them questions about their experiences in the industry and the benefits it has brought to them.

It is intended that this unit will provide learners with further experience of the practical skills associated with electrical installations and their testing, together with the basic job knowledge required to underpin such practical skills. It builds on the knowledge, understanding and skills found in Unit 17: Exploring Building Services Techniques in Construction, and complements Unit 18: Performing Plumbing Operations.

The delivery of the unit should provide a practical craft focus that complements the core units. It offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified for a Level 3 NVQ in Installing and Commissioning Electro technical Systems (2356) and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work- based evidence, and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

Group activities are permissible, but tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.
The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners gaining the opportunity to identify, select and use tools, materials and equipment in a workshop environment. Teaching and learning activities for outcome of learning 1 could include research into the health, safety and welfare legislation relevant to electrical installation. This should include learners interpreting given risk assessments to prepare for the practical tasks. For outcome of learning 2, learners should compile a list of the tools and equipment required to assemble a basic electrician’s toolkit. They should also investigate risk assessments concerned with working at heights and the use of low level access equipment for installing electrical installations that cannot be accessed from the ground. Outcome of learning 3 requires the application of safe working practices to the required practical tasks.

The correct selection and safe use of tools, addressed in Unit 17: Exploring Building Services Techniques in Construction, should be reviewed and reinforced throughout the delivery of this unit.

Learners are not expected to make connections to, or work with, live systems. The access equipment need only be capable of providing learners with access to the ceiling of a typical room and should not exceed 2 m in height.
Outline learning plan
The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit introduction – scheme of work unit content and grading criteria explained by tutor.</td>
</tr>
<tr>
<td>Tools and materials – tutor delivery.</td>
</tr>
<tr>
<td>Individual research on materials.</td>
</tr>
<tr>
<td>Explanation of safe procedures used for electrical operations – practical assessment for <strong>Assignment 1: Resources and Techniques Used in Electrical Installations.</strong></td>
</tr>
<tr>
<td>Demonstration of the safe use and operation of access equipment – practical assessment for <strong>Assignment 2: Producing Electrical Installations.</strong></td>
</tr>
<tr>
<td>Demonstration by tutor.</td>
</tr>
<tr>
<td>Demonstration by learners.</td>
</tr>
<tr>
<td>The Electrical Legislation and Regulations – theory in preparation for Assignment 1 the Electrical Health and Safety.</td>
</tr>
<tr>
<td>Individual research by learners.</td>
</tr>
<tr>
<td>Electrical legislation – delivery by tutor.</td>
</tr>
<tr>
<td>Electrical – the services drawing and marking out – theory on drawn information and marking out for electrical work – delivered by tutor.</td>
</tr>
<tr>
<td>Learners mark out for the practical exercise.</td>
</tr>
<tr>
<td>Drill and fix conduit as required.</td>
</tr>
<tr>
<td>Electrical – wiring procedures and techniques for lighting preparation for practical assessment, assignment.</td>
</tr>
<tr>
<td>Electrical wiring for lighting.</td>
</tr>
<tr>
<td>Light fittings.</td>
</tr>
<tr>
<td>Cable sizes.</td>
</tr>
<tr>
<td>Practice electrical circuit.</td>
</tr>
<tr>
<td>Electrical – wiring procedures and techniques for power circuit installations preparation for practical assessment, assignment.</td>
</tr>
<tr>
<td>Electrical wiring for power circuits.</td>
</tr>
<tr>
<td>Cable sizing.</td>
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<tr>
<td>Electrical fittings.</td>
</tr>
<tr>
<td>Isolation of circuits.</td>
</tr>
<tr>
<td>Practice power circuit.</td>
</tr>
</tbody>
</table>
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through vocationally related, practical experiences with tasks specifically designed with the grading criteria in mind.

The practical tasks to be undertaken should include installation of conventional domestic power circuits, both ring and radial, and lighting circuits including one-way, two-way, and intermediate.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. However, because this is a predominantly practical unit, many criteria will need to be assessed directly by the tutor during practical activities, for example by direct observation, oral responses to questions and in terms of the quality of the practical work produced. Where this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website – www.edexcel.com

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

For P1, learners must use the correct terminology and identify the hand tools and materials for electrical tasks. This could be evidenced by completion of appropriate requisition orders for the tools and materials needed for the specified tasks, by tutor observation or by oral questioning.

For P2, learners must describe the PPE required for undertaking electrical work. Gloves, hat, boots and glasses must also be identified.

For P3, learners must identify the low-level access equipment required for undertaking electrical work. Low-level access platforms and mobile towers must be identified.

For P4, learners must be able to identify the relevant health, safety welfare and legislation issues associated with the performance of at least two practical tasks. They should also demonstrate an understanding of the need for safe working practices including a tidy work area, good housekeeping and the use of low-level access equipment. There is no need for them to produce risk assessments at this stage, and no requirement for a deeper understanding of electrical legislation.

P5 calls for learners to identify the safety requirements before commencing work, for example the safe isolation of electrical power to a circuit.

For P6, learners must construct, install and test a simple electrical lighting and power circuit to acceptable standards set by the tutor, reflecting the level of the qualification and carried out under strict guidance and supervision. There is a requirement for cables to be straight and neat, and for connections to be made to at least three types of fixing accessories. At this grade learners will be expected to carry out these tasks under close supervision. All tasks must emphasise the importance of health, safety and welfare. Learners will test the system for faults under guidance from the tutor and rectify any faults with their guidance. The responsibility for ensuring that learners work safely lies with the tutor, and practical work must not proceed if learners are not working safely. It is anticipated that learners will need considerable guidance at this grade.

P7 enables learners to provide evidence that they have worked safely and have fully tested the electrical circuit to industrial standards.
For M1, learners must explain the use of good health, safety and welfare practices in performing tasks. This will include checking a provided COSHH risk assessment to make sure that the PPE they are to use, and the control measures to be taken, are appropriate for the materials and techniques to be used. Learners must be able to explain why safe isolation is important when working on electrical wiring, and describe the importance of maintaining a clean and tidy work area. This could be verified by tutor observation or through oral questioning. The responsibility for ensuring that learners work safely lies with the tutor, and practical work must not proceed if learners are not working safely.

For M2, learners must be able to explain the correct health, safety and welfare procedures in the erection, use, dismantling and storage of access equipment including steps, extension ladders and mobile scaffolding. Learners are expected to understand procedures to minimise risk.

For M3, learners must produce work of an acceptable standard. The quality requirements stated in the grading grid are stricter than those for the pass criterion and must be achieved to obtain the higher grade. Learners must safely produce at least two simple electrical installations to acceptable standards and acceptable tolerances, with straight, neat cable runs, using hand and portable power tools with minimum supervision. A limited amount of guidance and supervision is acceptable at this grade.

For D1, learners must produce work of a good standard. The quality requirements stated in the grading grid are stricter than those for M3 and must be achieved to obtain the higher grade. Little or no tutor guidance should be provided.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, M1, M2</td>
<td>Resources and Techniques Used in Electrical Installations.</td>
<td>A client has asked you to identify and select the tools, access equipment and working techniques to be used. In addition, you should consider compliance with health and safety risk assessments, general preparation for and planning of electrical installation tasks.</td>
<td>Completion of requisition orders as appropriate, degree of compliance with health and safety risk assessments, measuring and marking out work to acceptable tolerances.</td>
</tr>
<tr>
<td>Criteria covered</td>
<td>Assignment title</td>
<td>Scenario</td>
<td>Assessment method</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
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<td>-------------------</td>
</tr>
<tr>
<td>P6, P7, M3, D1</td>
<td>Producing Electrical Installations.</td>
<td>As a consultant you have been asked to produce simple electrical lighting and power circuits to current industrial standards and also to carry out an appropriate test.</td>
<td>Practical assessment. Evidence to include quality of completed installation supported by observation records and/or witness statements.</td>
</tr>
</tbody>
</table>

**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Safety and Welfare in Construction</td>
<td>Exploring Building Services Techniques in Construction</td>
<td>Mechanical and Electrical Services in Construction</td>
</tr>
<tr>
<td>Working as a Team to Move and Handle Resources</td>
<td>Performing Plumbing Operations</td>
<td>Electrical Principles in Building Services Engineering</td>
</tr>
<tr>
<td>Developing Electrical Installation Skills</td>
<td></td>
<td>Electrical Installation Standards and Components in Building Services Engineering</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

**Suggested resources**

**Books**


**Journals**

*Wiring Matters magazine*

**Websites** (*Relevant websites applicable to learner’s home country*)

| www.theiet.org | The Institution of Engineering and Technology |
Unit 20: Exploring Plastering and Dry-lining Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30835H
This unit is internally assessed

Unit aim
This unit will enable learners to use plastering hand tools safely and understand the different materials and techniques involved in applying this skill.

Unit introduction
The collective term ‘plastering and dry-lining’ covers a range of different skills that are employed by skilled workers in the construction industry to provide a finished surface for final decoration. Plastering requires a lot of practice in order to develop the techniques involved in producing a finished surface. Plastering is a very technical skill using a hand trowel that has to be mastered in order to achieve an acceptable finish. This unit is focused on exploring the basic skills and materials involved in plastering and dry-lining.

Plasterwork is one of the most ancient of handicrafts employed in connection with building operations, the earliest evidence showing that the dwellings of primitive man were erected in a simple fashion with sticks and plastered with mud. This construction method is still in evidence in parts of the developing world as it provides a very effective shelter against the elements. The pyramids in Egypt contain plasterwork executed at least four thousand years ago, probably much earlier, and yet remain hard and durable.

Plasterwork refers to construction or ornamentation done with plaster, such as a layer of plaster on an interior wall or plaster decorative mouldings on ceilings or walls. The process of creating plasterwork, called plastering, has been used in building construction for centuries. Dry-lining is the process of using plasterboard linings secured to traditional brick or block backgrounds and is a dry trade, hence the name dry-lining. With this technique the joints in the boards are taped and jointed.

This unit introduces learners to the commonly used hand tools, equipment and basic craft skills needed to stud partitions and apply plaster coats. It also introduces learners to materials such as gypsum plaster, sand and cement and sand and lime mixes. Emphasis is on the correct selection and safe use of the appropriate tools and equipment.
Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools and materials commonly used to perform plastering and dry-lining tasks
2. Understand the important health, safety and welfare issues associated with plastering and dry-lining tasks
3. Be able to apply safe working practices to undertake plastering and dry-lining tasks.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To achieve a pass grade</strong></td>
</tr>
<tr>
<td>the evidence must</td>
</tr>
<tr>
<td>show that the learner is able to:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>To achieve a merit grade</strong></td>
</tr>
<tr>
<td>the evidence must show that, in</td>
</tr>
<tr>
<td>addition to the pass criteria,</td>
</tr>
<tr>
<td>the learner is able to:</td>
</tr>
<tr>
<td><strong>To achieve a distinction</strong></td>
</tr>
<tr>
<td>grade the evidence must show</td>
</tr>
<tr>
<td>that, in addition to the pass</td>
</tr>
<tr>
<td>and merit criteria, the learner</td>
</tr>
<tr>
<td>is able to:</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>identify the hand tools used to perform plastering and dry lining tasks.</td>
<td>M1</td>
</tr>
<tr>
<td>P2</td>
<td>select the hand tools required to perform given plastering and dry lining tasks.</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>identify the materials used to perform plastering and dry lining tasks.</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>select the materials used to perform plastering and dry lining tasks.</td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>identify the PPE and safe working practices used to perform plastering and dry-lining tasks.</td>
<td>M2</td>
</tr>
<tr>
<td>P6</td>
<td>explain the selection of the PPE and safe working practices to be used in given plastering and dry-lining tasks.</td>
<td></td>
</tr>
</tbody>
</table>
## Assessment and grading criteria

<table>
<thead>
<tr>
<th>To achieve a pass grade</th>
<th>To achieve a merit grade</th>
<th>To achieve a distinction grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>the evidence must show that the learner is able to:</td>
<td>the evidence must show that, in addition to the pass criteria, the learner is able to:</td>
<td>the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</td>
</tr>
<tr>
<td>P7 apply render and skim finishes to prepared wall areas.</td>
<td>M3 produce finished work with a minimum of trowel marks on wet finish and with angle beads measured, cut and fixed to an external plasterboard corner.</td>
<td>D1 produce finished work with no trowel marks and all angle beads plumb.</td>
</tr>
<tr>
<td>P8 apply plasterboard dry lining finishes to wall areas.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform plastering and dry-lining tasks

Hand tools:
- hawk
- plastering trowel
- gauging trowel
- square mouth trowel
- plastic float
- Stanley knife
- hand mixer
- featheredge
- derby
- wet brush
- scratcher
- mixing tub
- snips
- tape measure
- club hammer
- mixing shovel
- tin snips
- claw hammer
- spirit level

Equipment:
- low-level access platforms
- hop ups
- ladder
- tower scaffolds
- electric mixing tools

Materials:
- plasterboard
- sand/lime/cement
- browning
- bonding
- finish plaster
- scrim
- angle bead
- nails
2 Understand the important health, safety and welfare issues associated with plastering and dry-lining tasks

Hazards:
- identification of hazards
- COSHH
- risks
- dust
- chemicals
- use of tools
- electricity

Health safety and welfare:
- maintenance of a clean and tidy work space
- identification of hazards associated with given tasks
- use of safe practices to minimise risk from identified hazards

PPE:
- eye protection
- dust mask
- safety boots
- knee protection
- hard hat
- gloves where appropriate
- overalls
- barrier cream

3 Be able to apply safe working practices to undertake plastering and dry-lining tasks

Usage:
- dry-lining onto stud walls
- dot and dab
- wet finishes
- render and set

Mixing materials:
- standard ratio mixes
- mix sand and cement (lime can be used as a substitute) render
- mix plaster skim coat finishes
Wet finishes:
- apply rendering and plaster skim to block walls to a reasonable standard

Dry finishes:
- measure, cut and fix plaster board to given areas, scrim joints and apply finish coat to a suitable background
Information for delivery staff

**Essential requirements**

Suitable wall areas are required in order to perform plastering operations on blockwork and timber stud frames. Appropriate hand tools, power tools and equipment will be required for learners to be able to identify the correct equipment to use. Low-level access platforms will be required for learners to correctly set up in preparation for plastering. A mixing area is required when plastering.

**Employer engagement and vocational contexts**

Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

A visit from suppliers’ representatives would be ideal to provide a visual stimulus to the full range of plasters and their applications. A guest speaker from a plastering company would also provide an industrial link to what clients require. Manufacturers’ websites also provide up-to-date industrial information.

**Delivery guidance**

Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their practical skills. This should be facilitated through extensive use of supervised practical workshop activities and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.

Visiting expert speakers could add to the relevance of the subject. A plastering manufacturer can often prove very helpful with resources and guidance. Learners should be given the opportunity to speak to experienced plastering contractors, and suppliers so their industrial experiences can be brought into the classroom. Demonstrations by the tutor are also recommended.

It is intended that this unit will give learners their first experience of the theoretical and practical skill associated with plastering and dry-lining materials. They will require some theoretical knowledge on plastering and health and safety before starting the practical work.

The unit should be delivered to give a practical craft focus that offers an opportunity for learners to gain an appreciation of practical construction craft skills, and is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.

The tasks specified in the unit are typical of those specified at Level 2 NVQs in Plastering and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no requirement for work-based evidence and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.

The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners gaining the opportunity to identify, select and use tools, materials and equipment for basic plastering tasks in a workshop environment. Outcome of learning 2 could be met by learners interpreting given risk assessments and applying the principles of health and safety. Practical
activities for outcome of learning 1 could include the selection of tools and equipment to assemble a basic plastering toolkit with a demonstration as to how each is used and the PPE required for specified plastering tasks.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before practical activities take place.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th>Topic and suggested assignments/activities/assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying hand tools and PPE used for plastering tasks.</td>
</tr>
<tr>
<td>Tutor delivery on the hand tools used for plastering and dry-lining finishes. Practical demonstration, invited supplier as guest speaker.</td>
</tr>
<tr>
<td>How to erect, use and dismantle access platforms to reach ceiling work.</td>
</tr>
<tr>
<td>Preparation for P1 assessment by individual learners.</td>
</tr>
<tr>
<td>Selecting hand tools to perform plastering task.</td>
</tr>
<tr>
<td>Tutor exercise sheet with a range of hand tools learners select correct ones for a variety of applications. Preparation for P2 assessment on practical tool selection.</td>
</tr>
<tr>
<td>Identify and describe the use of materials.</td>
</tr>
<tr>
<td>Dry-linings – plasterboard, fixings, jointing.</td>
</tr>
<tr>
<td>Wet finishes – render and set, plastering in coats.</td>
</tr>
<tr>
<td>Uses of plastering and dry-lining.</td>
</tr>
<tr>
<td>Prepare and practise for P4.</td>
</tr>
<tr>
<td>Hazard identification – what PPE will be required.</td>
</tr>
<tr>
<td>Control measures to reduce risks.</td>
</tr>
<tr>
<td>Demonstration by tutor on good practice in working safely.</td>
</tr>
<tr>
<td>Good housekeeping and removal of waste.</td>
</tr>
<tr>
<td>COSHH data sheets.</td>
</tr>
<tr>
<td>Access platforms correctly used.</td>
</tr>
</tbody>
</table>

**Assignment 1: Resources and Techniques Used in Plastering and Dry-lining**

<table>
<thead>
<tr>
<th>Assignment 1: Resources and Techniques Used in Plastering and Dry-lining</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPE justification – tutor-led discussions.</td>
</tr>
<tr>
<td>Health and safety case studies – tutor directed.</td>
</tr>
<tr>
<td>Individual health and safety considerations exercise.</td>
</tr>
<tr>
<td>Prepare for P5 assessment.</td>
</tr>
<tr>
<td>Mix materials correctly using instructions – practical exercise:</td>
</tr>
<tr>
<td>● sand and cement (lime substitute)</td>
</tr>
<tr>
<td>● plaster finish coat</td>
</tr>
<tr>
<td>● Prepare walls for plastering – practical exercise.</td>
</tr>
<tr>
<td><strong>Topic and suggested assignments/activities/assessment</strong></td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Carry out rendering to a wall area using suitable materials – practical exercise.</td>
</tr>
<tr>
<td>Apply skim coat to rendered wall area when base coat dry – practical exercise.</td>
</tr>
<tr>
<td>Plaster finishing – practical exercise.</td>
</tr>
<tr>
<td>Fix plasterboard to backgrounds correctly – to softwood studs using nails or screws.</td>
</tr>
<tr>
<td>Wet skim or dry joint finish plasterboards – practical exercise.</td>
</tr>
<tr>
<td>Complete observation record for P6 and P7 assessment.</td>
</tr>
</tbody>
</table>

**Assignment 2: Plastering and Dry-lining Practical Work**

Measure, cut and apply angle beads to an external plasterboard corner.
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through vocationally-related, practical experiences with tasks specifically designed with grading criteria in mind.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt them where appropriate. There is a lot of practical plastering work within this unit which predominately deals with learners mastering the trowel skills required, the tools and equipment, the setting out and preparation of backgrounds before plastering, mixing of materials, and their application. Written assessments are required for outcomes of learning 1 and 2 followed by a practical assessment on plastering for outcome of learning 3.

Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive; they are an illustration of the different forms of assessment evidence that are acceptable.

For P1, learners must demonstrate the ability to identify the hand tools for undertaking plastering operations. This could be evidenced by completion of an identification sheet needed for the specified tasks, by tutor observation or by oral questioning.

For P2, learners must be able to select the hand tools required for plastering operations.

For P3, learners must identify the correct materials that are used to perform plastering and dry-lining tasks. This could be produced in a table format with the correct material against a task.

For P4, learners must select the materials used to perform plastering and dry-lining tasks. This could be undertaken from a list of materials and a set of tasks in which the two must be matched.

For P5, learners must explain the health and safety aspect of safe working practices and the PPE required for plastering tasks. Learners could produce a list of hazards and the associated PPE for each. Demonstration of good housekeeping, correct use of equipment and working safely could all be evidenced on observation records.

For P6, learners must explain why particular items of PPE are used for both plastering and dry-lining tasks. Tutor-led oral questioning could be used here.

For P7, learners must perform plastering operations onto walls using trowel skills to a reasonable standard. This would be expected to be an area that has a few trowel marks but is fully bonded to the background and which is flat to within ± 4 mm for an area of 1 m².

For P8, learners must apply plasterboard dry-lining finishes. This could be to solid or partition backgrounds and the joints will need to be completed.

For M1, learners must justify the safe use of hand tools and materials to minimise health, safety and welfare risks. Oral questioning could be used here. There is no requirement for them to perform risk assessments.

For M2, learners must justify the use of PPE and safe working practices to perform plastering and dry-lining tasks. Oral questioning could be used here. There is no requirement for them to perform risk assessments.
For M3, learners must perform plastering operations onto walls using trowel skills to an acceptable standard. This would be expected to be an area that has a few trowel marks but is fully bonded to the background and which is flat to within ± 3 mm for an area of 1 m². Learner must also correctly measure an external corner, transfer this measurement and cut an angle bead correctly, which then must be fixed to a plasterboard corner.

For D1, learners must complete work to a good quality with no trowel marks and a smooth clean finish. This would be expected to be an area that has a few trowel marks but is fully bonded to the background and which is flat to within ± 2 mm for an area of 1 m². Learner must also correctly measure an external corner, transfer this measurement and cut an angle bead correctly, which then must be fixed plumb vertically and/or horizontally to a plasterboard corner.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Plastering and Dry-lining.</td>
<td>A client has asked you to identify and select the tools, materials, access equipment and safe working techniques to be used. In addition, you should consider compliance with health and safety risk assessments, general preparation for, and planning of, plastering and dry-lining tasks.</td>
<td>Completion of requisition orders as appropriate, observation of compliance with health and safety risk assessments, especially those for work at height.</td>
</tr>
<tr>
<td>P7, P8, M3, D1</td>
<td>Plastering and Dry-lining Practical Work.</td>
<td>A contract has been awarded to you and your team to perform plastering on a section of wall and dry-lining on another section of wall.</td>
<td>Practical assessment. Evidence to include quality of finished surfaces, supported by observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
Links to other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Trowel Operations</td>
</tr>
<tr>
<td>Performing Blockwork Operations</td>
</tr>
<tr>
<td>Performing Brickwork Operations</td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.

Suggested resources

Books
ISBN 9780435449452

Websites *(Relevant websites applicable to learner’s home country)*

<table>
<thead>
<tr>
<th>Website</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.british-gypsum.com">www.british-gypsum.com</a></td>
<td>Plastering Systems</td>
</tr>
<tr>
<td><a href="http://www.knauf.co.uk">www.knauf.co.uk</a></td>
<td>Building Materials Manufacturers</td>
</tr>
</tbody>
</table>
Unit 21: Exploring Roofing Operations

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30836H
This unit is internally assessed

Unit aim

This unit explores the tools, equipment and working techniques used to perform roofing tasks, and gives learners the opportunity to use these techniques to lay plain tiles to a sloping roof surface.

Unit introduction

Roofing occupations are important in the construction industry. These occupations include mastic asphalting, bitumen roofing, liquid applied roofing, single ply roofing and roof slating and tiling. This unit deals with the tools and materials used to fix slates and tiles only and the practical task focuses on preparing a sloping roof to receive plain tiles and fixing of plain tiles to that surface.

This unit focuses on the hand tools, access equipment, personal protective equipment (PPE) and safe working techniques used to perform roofing operations. The identification, correct selection, and safe use of the correct hand tools and materials required to carry out roofing work is strongly emphasised.

The unit addresses the health, safety and welfare issues to be considered when using roofing skills to fix slates and tiles. Particular attention is paid to issues associated with work at height.

The unit gives learners an opportunity to understand the requirements for the safe use of access equipment including extension ladders, mobile scaffold towers and mobile elevated working platforms.

Learners will have the opportunity to prepare a sloping roof surface to accept plain tiles and then fix plain tiles to that surface.

This unit will also provide learners with their first experience of the practical skills associated with the performance of roofing tasks, together with any job knowledge required to underpin such practical skills.

Outcomes of learning

On completion of this unit a learner should:
1 Know the hand tools and materials commonly used to perform roofing tasks
2 Understand the important health, safety and welfare issues associated with given roofing tasks
3 Be able to use safe working practices to fix plain roof tiles to a sloping roof surface.
Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>identify the hand tools and materials used to perform roofing tasks.</td>
<td>M1 explain the safe use of hand tools and materials to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>select the hand tools and materials required to perform specific roofing tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>identify the PPE, access equipment and safe working practices used to perform roofing tasks.</td>
<td>M2 explain the safe erection, use, dismantling and storage of access equipment.</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>explain the selection of PPE, access equipment and working techniques appropriate to a given roofing task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>identify hazards associated with work at height.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>explain the measures taken to control the risks associated with work at height.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P7</td>
<td>apply an underlay to a sloping roof structure.</td>
<td>M3 produce finished work with watertight roof finish and all tiles laid to correct lap and gauge.</td>
<td></td>
</tr>
<tr>
<td>P8</td>
<td>fix tile battens to the roof.</td>
<td>D1 produce finished work with watertight roof finish, all tiles laid to correct lap and gauge, a half-bond formed at both verges and an undercloak at the eaves.</td>
<td></td>
</tr>
<tr>
<td>P9</td>
<td>fix plain roof tiles to the battens.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools and materials commonly used to perform roofing tasks

Hand tools:
- claw hammer
- tile cutter
- slate cutter
- tape measure
- trowel
- lead dresser
- under cloak cutters

Materials:
- plain tile fixings and nails
- eaves, tile and a half
- 38 mm x 25 mm softwood battens
- plain ceramic tiles
- slates
- sand and cement
- under cloak

2 Understand the important health, safety and welfare issues associated with given roofing tasks

PPE:
- hard hats
- safety boots
- safety gloves
- goggles
- ear muffs and other PPE as appropriate

Access equipment:
- extending ladders
- mobile scaffold towers
- mobile elevated working platforms
- safe checking, erection, use, dismantling and storage

Working at height:
- hazards associated with working in icy, rainy and windy conditions
- falls from roofs, through gaps in roofs and through fragile roof materials
- need to wear safety belts, safety harnesses and non-slip shoes
- use of edge protection when working on sloping roofs
- use of enclosed rubbish chutes to protect persons working below
Hazards:
- falls from roofs and while ascending and descending
- being struck by falling roofing elements
- electric shock caused by contact with defective equipment
- cuts caused by sharp edges of tiles and cutting tools
- injuries caused by flying debris

3 Be able to use safe working practices to fix plain roof tiles to a sloping roof surface

Safe working practices:
- used to apply underlay
- fix battens to roof
- fix plain tiles to battens

Apply underlay:
- e.g. sarking felt, roofing felt

Fix battens to roof:
- 38 mm x 20 mm softwood battens, spacing to suit tiles used

Fix plain tiles to battens:
- to given specification

Specification:
- minimum area 3 m²
- minimum pitch 30°
- underlay and battens as appropriate
- set out eaves batten and first course to overhangs
- secure plain tiles to form flush line to eaves
- form half-bond at verges
- form undercloak at eaves
Information for delivery staff

Essential requirements
Learners will require access to hand tools, materials, PPE and access equipment of a nature and standard typical of a roofing work environment. The learning environment must be a safe place of work with adequate space for construction of the roof tiling model, the safe use of access equipment, adequate washing facilities, and access to first aid facilities and a person trained in first aid. The practical activities will proceed effectively only in a dedicated workshop and should not be attempted in a domestic environment. Centre health and safety risk assessments should be available and implemented as a learning resource.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.

The unit deals with the tools, access equipment, materials, PPE and skills typical of the roofing crafts. The vocational context is therefore obvious. Some learners may wish to build on this unit and progress to a career in roof slating and tiling. Centres should therefore develop links with local roofing companies, and develop skills the learners need to obtain an apprenticeship. Some further education colleges offer Apprenticeship programmes, on which they train the apprentices employed by the local companies. They will therefore have a pre-existing relationship on which they can build. It should also be possible for learners studying this unit to visit practical classes where apprentices are being trained and assessed, in order to experience the environment in which trainee roofers work.

Delivery guidance
It is intended that this unit will give learners some of the practical skills associated with roofing together with the associated job knowledge required to underpin such practical skills. Learners must be allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities, group teaching, and demonstrations of the tools, access equipment, materials, techniques and PPE involved.

Learners will need to discuss the materials, tools, access equipment, PPE and techniques to be used with a responsible and competent person and should respond positively to any advice given. They should then select the tools, access equipment, materials, components and PPE appropriate for the task in hand, and use these to perform the specified roofing tasks.

Health and safety is of paramount importance in the construction crafts. Learners are expected to comply with any and all provided risk assessments, but they are not required to produce these risk assessments. Learners should be encouraged to be alert to the hazards found in the workplace, and to report them to their tutor, but they are not required to suggest control measures. Tutors are responsible for performing all risk assessments, and for ensuring that learners comply with these risk assessments. Tutors must terminate any practical exercise where learners are not complying with the risk assessments provided.
Working at height is a particular issue in roofing operations. This will involve the use of access equipment and the assessment of the particular risks involved in working at height, as noted in the unit content. Learners must be aware of these important health and safety considerations but, for the purposes of this unit, the risk entailed in working at height should be eliminated by restricting learners to working only on frames supported on the ground.

**Outline learning plan**

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

<table>
<thead>
<tr>
<th><strong>Topic and suggested assignments/activities/assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory: whole-class, tutor-led discussion about hand tools and materials. Individual work on ‘tool identification sheets’. Practical: requisitioning tools from store.</td>
</tr>
<tr>
<td>Theory: whole-class, tutor-led discussion about PPE, access equipment and safe working techniques PPE should be discussed in terms of when and where it is necessary and how it works. Individual work on ‘PPE identification sheets’. Practical: learners complete requisition sheets to obtain PPE from store. Learners provided with opportunities to select and wear the full range of the PPE used in roofing. Other health and safety issues should be demonstrated by the tutor before practical work commences and reinforced at intervals throughout. Practical: learners should practise erecting and taking down access equipment and performing skills, under close supervision, before they attempt any practical roofing tasks. All practical work should be done on frames supported on the ground. Theory: learners should be given instruction in the hazards of doing similar work at height, whether repairing and maintaining an existing roof or fixing new roof coverings.</td>
</tr>
<tr>
<td><strong>Assignment 1: Resources and Techniques Used in Roofing</strong></td>
</tr>
<tr>
<td>Pre-practical: practical demonstration of how to keep individual work areas tidy. The hand-to-eye motor skills associated with roofing are best taught by the tutor demonstrating the skills required, followed by learners practising the skills. Practical: the tutor should monitor learners as they practise their skills and provide guidance and advice, and correction or praise, as appropriate. The practical tasks should be carried out under supervision and the teacher should stop the task if the learner is working unsafely.</td>
</tr>
<tr>
<td><strong>Assignment 2: Tiling a Pitched Roof</strong></td>
</tr>
</tbody>
</table>
Assessment guidance

For P1, learners must identify the hand tools and materials in common use in roof slating and tiling. The range of hand tools and materials should be wider than that to be used for the practical roofing task associated with P7, P8 and P9.

For P2, learners must select the hand tools and materials required to complete the specified practical roofing task. This will be most clearly evidenced by completion of appropriate requisition orders. Learners must demonstrate either selection or de-selection of the tools and should not simply replicate their response to P1.

For P3, learners must identify the PPE, access equipment and safe working techniques in common use in roof slating and tiling. In a similar way to P1, the range of PPE, access equipment and safe working techniques should be wider than that to be used for the practical roofing task associated with P7, P8 and P9. Learners should be aware of any hazards associated with the practical tasks they perform but they need not produce risk assessments or suggest control measures.

For P4, learners must explain the selection of PPE, access equipment and working techniques appropriate to the given practical roofing task. This will be most clearly evidenced by completion of appropriate requisition orders and through oral questioning.

For P5, learners must identify hazards associated with work at height. It is anticipated that considerable guidance will be given to learners at this grade. Learners are not required to work at height in this unit, and should work off frames that sit on the ground, but they should recognise the hazards of work at height.

For P6, learners must explain the measures taken to control the risks associated with work at height. The control measures proposed should relate directly to the hazards identified in P5.

For P7, learners must apply an underlay to a sloping roof structure. The area to be covered should be a minimum area of 3 m² and the suggested pitch of the roof should be a minimum of 30°. The underlay should be reasonably neat and laid without ridges, or the battens will not sit properly on the roof, but this is not an assessment issue.

For P8, learners must fix tile battens to the roof. The battens should be of appropriate size, correctly spaced to take the tiles to be used and fixed firmly, and parallel to each other.

For P9, learners must fix plain roof tiles to the battens in the manner prescribed for the plain tiles selected. For M1, learners must explain the safe use of hand tools and materials to perform their given tasks. Learners should be aware of any hazards associated with the practical tasks they perform but need not produce risk assessments or suggest control measures. They should understand all health and safety guidelines that are provided for a given task.

For M2, learners must explain the use of good health and safety practices to erect, use, dismantle and store low-level access equipment such as extending ladders, mobile scaffold towers and mobile elevated working platforms. As for M1 above, learners should be aware of any hazards associated with the use of low-level access equipment, but need not produce risk assessments or suggest control measures. They should understand all health and safety guidelines that are provided for a given task.

For M3, the learner must produce finished work of a standard acceptable for P7, P8 and P9, but with a watertight roof finish and all tiles laid to correct lap and gauge.
For D1, learners must produce finished work of a good standard with watertight roof finish and all tiles laid to correct lap and gauge as for M3, but also with a half-bond properly formed at both verges and an undercloak at the eaves.

**Programme of suggested assignments**

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Resources and Techniques Used in Roofing.</td>
<td>As a roofer working freelance in a small company, you have been asked, by your site manager, to prepare the work area for a small-scale project. You will need to identify and select appropriate tools, materials, access equipment and working techniques. In addition, you will need to consider compliance with health and safety risk assessments and prepare for and plan roofing tasks.</td>
<td>Completion of requisition orders as appropriate, observation of compliance with health and safety risk assessments, especially those for work at height.</td>
</tr>
<tr>
<td>P7, P8, P9, M3, D1</td>
<td>Tiling a Pitched Roof.</td>
<td>As a freelance roofer’s assistant you have been asked to tile a pitched roof at ground level. The roof will later be transported to a fixed structure for finishing.</td>
<td>Practical assessment. Evidence to include quality of finished roof surface, supported by observation records and/or witness statements.</td>
</tr>
</tbody>
</table>
**Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit forms part of the BTEC Construction and Built Environment sector suite. This unit has particular links with:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Safety and Welfare in Construction</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
</tr>
<tr>
<td>Working as a Team to Move and Handle Resources</td>
<td></td>
</tr>
</tbody>
</table>

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in *Annexe C*.

**Suggested resources**

**Books**

**Journals**
*Roofing*

*Roofing, Cladding and Insulation magazine*

**Websites** *(Relevant websites applicable to learner's home country)*

<table>
<thead>
<tr>
<th><a href="http://www.instituteofroofing.org">www.instituteofroofing.org</a></th>
<th>The Institute of Roofing</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.nfrc.co.uk">www.nfrc.co.uk</a></td>
<td>The National Federation of Roofing Contractors Limited</td>
</tr>
</tbody>
</table>
Unit 22: Exploring Wall and Floor Tiling

Level: SRF Level 2
Notional Learning Hours: 50
Unit value: 5
SRF unit code: 30837H
This unit is internally assessed

Unit aim

This unit develops learners’ understanding of the tools and materials used in wall and floor tiling and offers opportunities to use safe working practices to perform appropriate wall- and floor-tiling tasks.

Unit introduction

Wall and floor tiling is usually undertaken by specialist sub-contractors. These sub-contractors employ skilled tilers who can undertake a wide range of tasks from domestic showers to public swimming baths. Skilled tilers can work with a variety of different types of tiles and can produce attractive designs to meet individual client requirements.

Tiling is a finishing process that involves working closely with other trades in the construction industry and is usually undertaken towards the end of the construction process. The quality of the work done must, therefore, be high because the finished product will be highly visible.

This unit focuses on the hand tools, portable power tools, personal protective equipment (PPE) and safe working techniques used to perform wall- and floor-tiling tasks. The identification, correct selection, and safe use of the hand tools and power tools required to carry out the installation work is strongly emphasised. Learners will explore the techniques used to set out tiling accurately from specifications and drawings supplied. They will also investigate the health, safety and welfare issues to be considered when performing wall- and floor-tiling tasks.

Outcomes of learning

On completion of this unit a learner should:

1. Know the hand tools, portable power tools and materials commonly used to perform wall- and floor-tiling tasks
2. Understand the important health and safety issues associated with wall- and floor-tiling tasks
3. Be able to apply safe working practices to prepare, set out, and perform tiling tasks.
### Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the outcomes of learning for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

<table>
<thead>
<tr>
<th>Assessment and grading criteria</th>
<th>To achieve a pass grade the evidence must show that the learner is able to:</th>
<th>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</th>
<th>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>identify the hand tools and portable power tools used to perform wall and floor tiling tasks.</td>
<td><strong>M1</strong> justify the safe use of hand tools, portable power tools and materials to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>select the hand tools and portable power tools required to perform given wall and floor tiling tasks.</td>
<td><strong>M2</strong> justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks.</td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>identify the materials used in wall and floor tiling.</td>
<td><strong>M3</strong> produce finished work, with tiles fixed with full beds and joint tolerance ± 3 mm, cutting trim within 3 mm and grout uniform with generally neat appearance.</td>
<td><strong>D1</strong> produce finished work, with tiles fixed with full beds and joint tolerance ± 2 mm, cutting trim within 2 mm and grout full and uniform with neat appearance throughout.</td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>select the materials needed for use in given wall and floor tiling tasks.</td>
<td><strong>M4</strong></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>identify the PPE and safe working practices used to perform wall and floor tiling tasks.</td>
<td><strong>M5</strong></td>
<td></td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>explain the selection of PPE and working techniques to be used in given wall and floor tiling tasks.</td>
<td><strong>M6</strong></td>
<td></td>
</tr>
<tr>
<td><strong>P7</strong></td>
<td>produce 1 m² of finished wall (floor) tiling including grout with generally neat appearance.</td>
<td><strong>M7</strong></td>
<td></td>
</tr>
</tbody>
</table>
Unit content

1 Know the hand tools, portable power tools and materials commonly used to perform wall- and floor-tiling tasks

Hand tools:
- scraper
- tile cutter
- tile drill
- adhesive spreader
- grout tool
- sponge

Power tools:
- power sander
- tile cutter
- paddle mixer

Surface preparation materials:
- e.g. abrasives paper, filler, battens, surface primer, sealers

Tiles:
- wall and floor, e.g. ceramic, porcelain, quarry, slate, stone, concrete, terrazzo, marble, glass, metal

Adhesives:
- e.g. wall and floor adhesives, flexible adhesives for different backgrounds, ready mixed, dry powdered

Grout:
- e.g. pre-mixed, dry powder, coloured, combined adhesive and grout

2 Understand the important health and safety issues associated with wall- and floor-tiling tasks

PPE:
- gloves
- hard hats
- safety boots and shoes
- safety glasses or goggles
- ear defenders
- dust masks
- barrier creams
- overalls
Control of Substances Hazardous to Health (COSHH):
- e.g. safety data sheets, manufacturers’ labels, manufacturers’ instructions, identification of hazards, risks to health, control measures

Health, safety and welfare:
- right tool for the right job
- need to maintain a clean and tidy workplace
- identification of hazards and control measures to reduce risks
- safe systems of working e.g. preparing surfaces and materials for application, manual handling, disposal of materials, working at height, cleaning, storage, use and maintenance of tools

Hazards:
- falls from height
- slips, trips and falls
- cuts and injuries caused by sharp tools and instruments
- musculoskeletal injuries resulting from lifting and moving heavy loads

3 Be able to apply safe working practices to prepare, set out, and perform tiling tasks

Safe working practices:
- setting out, applying adhesives, tiling

Setting out:
- using spirit level
- plumb line
- chalk line
- pencil
- tape measure

Applying adhesive:
- using pre-mixed adhesive
- mixing adhesive
- spreading adhesive
- quality checks

Tiling:
- tile spacers
- horizontal and vertical adjustment
- drying time
- grouting
- polishing off
Information for delivery staff

Essential requirements
Suitable wall and floor areas are required in order to set out work in preparation for tiling operations. Appropriate hand tools, power tools and equipment will be required for learners to be able to identify the correct equipment to use. A mixing area is required for patching of walls for the repair of tiling backgrounds. Suitable tiled areas will be required for learners to be able to remove old wall tiles in preparation for new tiles.

Employer engagement and vocational contexts
Construction Skills is the Sector Skills Council for the construction industry and details of their activity and services can be found at www.cskills.org.
A tiling showroom visit would be ideal to provide a visual stimulus to the full range of tiles and their applications. A guest speaker from an interior design company would also provide an industrial link between client requirements and the finished work. Reference to manufacturers’ websites will give up-to-date industrial information.

Delivery guidance
Tutors delivering this unit must ensure that learners are allowed considerable opportunity to develop their knowledge and practical skills and this should be facilitated through extensive use of supervised practical workshop activities and demonstrations of the theories, equipment and techniques involved. Delivery should stimulate, motivate, educate and enthuse learners.
Visiting expert speakers could add to the relevance of the subject. In order to appreciate the workplace environment, site visits are strongly recommended. Learners should be given the opportunity to speak to experienced tiling contractors and suppliers so that recent and relevant industrial experience is brought into the classroom.
It is intended that this unit will give learners their first experience of the theoretical and practical skill associated with setting out and preparing for tiling operations, prior to a further study on the practical aspects of tiling.
This unit should be delivered to give a practical craft focus that offers an opportunity for learners to gain an appreciation of practical construction craft skills. Is intended to provide an introduction to an NVQ, or a taster for those who have yet to finalise their career choice.
The tasks specified in the unit are typical of those specified at Level 2 NVQs in Tiling (6313) and provide a useful introduction to the knowledge and skills required to underpin the competencies specified in those qualifications. There is, however, no formal requirement for work-based evidence and full-scale work is not mandatory. Whilst some mapping against the relevant NVQs is possible, achievement of this unit should not be directly comparable to achievement of the relevant elements in the NVQ. This unit is not intended to replicate or replace an NVQ.
The three outcomes of learning are linked but can be delivered independently of each other. Delivery will be largely practical, with learners gaining the opportunity to identify, select and use tools, materials and equipment for basic installation tasks in a workshop environment. Outcome of learning 1 could be met by learners identifying the hand tools and portable power and then selecting the tools to perform given wall- and floor-tiling tasks. Learners would also be required to identify the materials used...
in wall- and floor-tiling tasks to achieve this learning outcome. Outcome of learning 2 could be met by learners interpreting given risk assessments and applying the principles of health, safety and welfare to the tasks they are to perform. Practical activities for outcome of learning 3 should include wall and floor tiling, but although learners may practise with several different types of tile they need only use one tile in each of the assessments.

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before practical activities take place.

Outline learning plan
The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

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<tr>
<th>Topic and suggested assignments/activities/assessment</th>
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<tbody>
<tr>
<td><strong>Unit introduction.</strong></td>
</tr>
<tr>
<td>Tile types, adhesives, grouts and equipment used in wall and floor tiling – formative assessment in the identification of and uses of tools – delivery by tutor.</td>
</tr>
<tr>
<td>Independent research on tiles.</td>
</tr>
<tr>
<td>Practical: requisitioning tools and materials from store.</td>
</tr>
<tr>
<td>Health and safety – hazard identification and control measures associated with tiling, for example dust, dermatitis, electric shock.</td>
</tr>
<tr>
<td>Site visit to a tiling operation.</td>
</tr>
<tr>
<td>Pre-practical and practical. Other health and safety issues should be demonstrated by the tutor before practical work commences and reinforced at intervals throughout.</td>
</tr>
<tr>
<td>Learners should perform basic skills, under close supervision, before they attempt any individual wall- and floor-tiling tasks.</td>
</tr>
<tr>
<td><strong>Assignment 1: Tools, Materials, PPE, Hazards, Risks and Control Measures</strong></td>
</tr>
<tr>
<td>The setting out of wall tiling – practical work using different sizes.</td>
</tr>
<tr>
<td>The setting out of floor tiling – practical work using different sizes.</td>
</tr>
<tr>
<td>Background preparation theory – different types.</td>
</tr>
<tr>
<td>Individual preparation of work areas.</td>
</tr>
<tr>
<td>Individual preparation of tiling areas.</td>
</tr>
<tr>
<td>The use and mixing of powdered adhesives – theory.</td>
</tr>
<tr>
<td>The correct mixing and application of grouts.</td>
</tr>
<tr>
<td>The preparation for tiling walls and floors – practical work.</td>
</tr>
<tr>
<td>Demonstration by tutor.</td>
</tr>
<tr>
<td><strong>Assignment 2: Practical Wall- and Floor-tiling Tasks</strong></td>
</tr>
</tbody>
</table>
Assessment guidance

The evidence requirements for pass, merit and distinction grades are shown in the grading criteria grid. Achievement of the grading criteria should be evidenced through vocationally-related, practical experiences with tasks specifically designed with the grading criteria in mind.

The practical tasks to be undertaken should include the setting out of wall tiling to include an opening, and the setting out of floor tiling. It may be necessary to make repairs to backgrounds before tiling can commence but this is no requirement that this be evidenced.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. Examples of possible assessment approaches for some of the individual criteria are suggested below. These are not intended to be prescriptive or restrictive, and are provided as an illustration of alternative forms of acceptable assessment evidence.

For P1, learners must identify the hand tools and portable power tools used in wall and floor tiling. There is no requirement for these tools to be selected for specific tiling tasks. Individual research on tools from suppliers’ catalogues and information gained during visits to tile suppliers will help learners to evidence this criterion.

For P2, learners must select the hand tools and portable power tools needed to perform specific tiling tasks. There must be evidence of either selection or de-selection and this must be relevant to the tasks specified. It is not sufficient to present a comprehensive list of tools that could be used by wall and floor tilers. Use of requisition forms would provide a useful form of evidence.

For P3, learners must identify the materials used in wall and floor tiling. This should include evidence of those materials used to prepare surfaces, the different types of tile available and the adhesives and grouts used in wall and floor tiling. There is no requirement for these materials to be selected for specific tiling tasks. Individual research on tools from suppliers’ catalogues and information gained during visits to tile suppliers will help learners to evidence this criterion.

For P4, learners must select the materials needed to perform specific tiling tasks. There must be evidence of either selection or de-selection and this must be relevant to the tasks specified. It is not sufficient to present a comprehensive list of materials that could be used by wall and floor tilers. Use of requisition forms would provide a useful form of evidence.

For P5, learners must identify the PPE and safe working practices used by wall and floor tilers. This should include evidence of hazards associated with both the tasks and any hazardous materials that may be used. This should include the importance of maintaining a tidy work area and using good housekeeping techniques while working. There is no need for them to produce risk assessments at this stage, and no requirement for a deeper understanding of health and safety legislation. There is no requirement for PPE to be selected for specific tiling tasks. Individual research gained during visits to tile suppliers will help learners to evidence this criterion.

For P6, learners must explain the selection of the PPE and safe working practices used in specific tiling tasks. There must be evidence of either selection or de-selection and this must be relevant to the tasks specified. It is not sufficient to present a comprehensive list of PPE and control measures that could be used by wall and floor tilers. Use of requisition forms for PPE would provide a useful form of evidence. Tutor-led oral questioning would also be useful.
For P7, learners must produce 1 m² of finished wall (floor) tiling including grout with generally neat appearance. There are no tolerances at this grade but the work must be complete in that there must be 1 m² of tiling and every tile joint must have been grouted. It is anticipated that considerable guidance will be given to learners at this grade.

For M1, learners must justify the safe use of hand tools and hand-held power tools to perform their given tasks. Learners should be aware of any hazards associated with the tools that would be used in a given situation. For example, learners need to be aware of the dangers of using hand-held power tools in the presence of water. Learners must understand all health and safety guidelines that are provided for a task in hand.

For M2, learners must justify the use of appropriate PPE and safe working practices to minimise health, safety and welfare risks. Learners should be aware of any hazards associated with a task and should be able to interpret risk assessments and comply with the conditions of the risk assessment. There is no requirement for them to produce risk assessments or suggest control measures.

For M3, learners must produce 1 m² of wall tiling including grouting. The work must be reasonably neat and within the required tolerances for this grade. It is anticipated that some guidance will be given to learners at this grade.

For D1, learners must produce 1 m² of wall tiling including grouting. The work must be neat and within the required tolerances for this grade. It is anticipated that learner will have worked with minimal guidance at this grade.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any suggested assignments to meet local needs and resources.

<table>
<thead>
<tr>
<th>Criteria covered</th>
<th>Assignment title</th>
<th>Scenario</th>
<th>Assessment method</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1, P2, P3, P4, P5, P6, M1, M2</td>
<td>Tools, Materials, PPE, Hazards, Risks and Control Measures.</td>
<td>A client has asked you to select the tools, equipment, materials, PPE, control measures and safe working practices to be used in a forthcoming project.</td>
<td>Report supported by requisition forms, images, drawings and text as appropriate.</td>
</tr>
<tr>
<td>P7, P8, M3, D1</td>
<td>Practical Wall- and Floor-tiling Tasks.</td>
<td>The client has awarded you a contract to produce 1m² of both wall and floor tiling.</td>
<td>Completed task, photographs, witness testimony and observation statements as appropriate.</td>
</tr>
</tbody>
</table>

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

Links to any relevant Construction Industry Council (CIC) Occupational Standards are summarised in Annexe C.
Suggested resources

Books
Adams H and Adams E–*Tile Style* (Stewart, Tabori and Chang, 2005)
ISBN 158479450X
Meehan T and Meehan L–*Working with Tile* (Taunton Press, 2005)
ISBN 9781561586776

Journals
*The Tile and Stone Journal* (www.tileandstonejournal.com)

Websites *(Relevant websites applicable to learner’s home country)*

- www.tileandstonejournal.com
- www.tilersforums.co.uk
- www.uktilingnews.co.uk
Annexes
Annexe A: Calculation of the qualification grade

Generic examples of calculation of the qualification grade above pass grade

Pearson will automatically calculate the qualification grade for learners when unit grades are submitted by the centre.

The two tables below (which are also included in Section 5: Assessment and grading) are used to calculate the qualification grade above pass. The generic examples that follow the tables demonstrate how the tables are used.

Points available per unit value at specified unit grades and levels

The table below shows the number of points scored per unit value at the unit level and grade.

<table>
<thead>
<tr>
<th>Unit level</th>
<th>Points per unit value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td>Level 1</td>
<td>3</td>
</tr>
<tr>
<td>Level 2</td>
<td>5</td>
</tr>
<tr>
<td>Level 3</td>
<td>7</td>
</tr>
</tbody>
</table>

Learners who achieve the correct number of points within the ranges shown in the ‘qualification grade’ table below will achieve the qualification merit or distinction or distinction* grade.

Qualification grade

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Points range above pass grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson BTEC International Level 2 Extended Certificate</td>
<td>170–189, 190–199, 200 and above</td>
</tr>
<tr>
<td>Pearson BTEC International Level 2 Diploma</td>
<td>340–379, 380–399, 400 and above</td>
</tr>
</tbody>
</table>

Generic examples

Please note the following examples are generic and are not based on the units included in this specification.
Generic example 1
Achievement of pass qualification grade
A learner completing a Pearson BTEC International Level 2 Certificate, qualification value of 15, achieves the points required to gain a pass qualification grade and does not achieve the points to gain a merit grade.

<table>
<thead>
<tr>
<th>Level</th>
<th>Unit value</th>
<th>Grade</th>
<th>Grade points</th>
<th>Points per unit = unit value x grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2</td>
<td>5</td>
<td>Pass</td>
<td>5 × 5 = 25</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2</td>
<td>5</td>
<td>Pass</td>
<td>5 × 5 = 25</td>
</tr>
<tr>
<td>Unit 3</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6 × 6 = 30</td>
</tr>
</tbody>
</table>

Qualification grade totals

<table>
<thead>
<tr>
<th>Grade</th>
<th>15</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Generic example 2
Achievement of merit qualification grade
A learner completing a Pearson BTEC International Level 2 Certificate, qualification value of 15, achieves the points required to gain a merit qualification grade.

<table>
<thead>
<tr>
<th>Level</th>
<th>Unit value</th>
<th>Grade</th>
<th>Grade points</th>
<th>Points per unit = unit value x grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2</td>
<td>5</td>
<td>Pass</td>
<td>5 × 5 = 25</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6 × 6 = 30</td>
</tr>
<tr>
<td>Unit 3</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6 × 6 = 30</td>
</tr>
</tbody>
</table>

Qualification grade totals

<table>
<thead>
<tr>
<th>Grade</th>
<th>15</th>
<th>Merit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

Generic example 3
Achievement of distinction qualification grade
A learner completing a Pearson BTEC International Level 2 Certificate, qualification value of 15, achieves the points required to gain a distinction qualification grade.

<table>
<thead>
<tr>
<th>Level</th>
<th>Unit value</th>
<th>Grade</th>
<th>Grade points</th>
<th>Points per unit = unit value x grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6 × 6 = 30</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6 × 6 = 30</td>
</tr>
<tr>
<td>Unit 3</td>
<td>2</td>
<td>5</td>
<td>Distinction</td>
<td>7 × 7 = 35</td>
</tr>
</tbody>
</table>

Qualification grade totals

<table>
<thead>
<tr>
<th>Grade</th>
<th>15</th>
<th>Distinction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>
Generic example 4
Achievement of merit qualification grade
A learner completing a Pearson BTEC International Level 2 Extended Certificate, qualification value of 30, achieves the points required to gain a merit qualification grade.

<table>
<thead>
<tr>
<th>Level</th>
<th>Unit value</th>
<th>Grade</th>
<th>Grade points</th>
<th>Points per unit = unit value x grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 6 = 30$</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2</td>
<td>5</td>
<td>Pass</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 5 = 25$</td>
</tr>
<tr>
<td>Unit 3</td>
<td>2</td>
<td>5</td>
<td>Distinction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 7 = 35$</td>
</tr>
<tr>
<td>Unit 6</td>
<td>2</td>
<td>10</td>
<td>Pass</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10 \times 5 = 50$</td>
</tr>
<tr>
<td>Unit 8</td>
<td>3</td>
<td>5</td>
<td>Pass</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 7 = 35$</td>
</tr>
<tr>
<td>Qualification grade totals</td>
<td>30</td>
<td>Merit</td>
<td></td>
<td>175</td>
</tr>
</tbody>
</table>

Generic example 5
Achievement of merit qualification grade
A learner completing a Pearson BTEC International Level 2 Diploma, qualification value of 60, achieves the points required to gain a merit qualification grade.

<table>
<thead>
<tr>
<th>Level</th>
<th>Unit value</th>
<th>Grade</th>
<th>Grade points</th>
<th>Points per unit = unit value x grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2</td>
<td>5</td>
<td>Merit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 6 = 30$</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2</td>
<td>5</td>
<td>Pass</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 5 = 25$</td>
</tr>
<tr>
<td>Unit 3</td>
<td>2</td>
<td>5</td>
<td>Distinction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 7 = 35$</td>
</tr>
<tr>
<td>Unit 6</td>
<td>2</td>
<td>10</td>
<td>Merit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10 \times 6 = 60$</td>
</tr>
<tr>
<td>Unit 9</td>
<td>1</td>
<td>5</td>
<td>Merit</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5 \times 4 = 20$</td>
</tr>
<tr>
<td>Unit 10</td>
<td>2</td>
<td>10</td>
<td>Distinction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10 \times 7 = 70$</td>
</tr>
<tr>
<td>Unit 11</td>
<td>2</td>
<td>10</td>
<td>Merit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10 \times 6 = 60$</td>
</tr>
<tr>
<td>Unit 14</td>
<td>2</td>
<td>10</td>
<td>Merit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10 \times 6 = 60$</td>
</tr>
<tr>
<td>Qualification grade totals</td>
<td>60</td>
<td>Merit</td>
<td></td>
<td>360</td>
</tr>
</tbody>
</table>
Annexe B: Grading domains – BTEC International Level 2
generic grading domains

<table>
<thead>
<tr>
<th>Grading domain 1</th>
<th>Indicative characteristics – merit</th>
<th>Indicative characteristics – distinction</th>
</tr>
</thead>
</table>
| Application of knowledge and understanding  
(outcome of learning stem understand or know) | ● Show depth of knowledge and development of understanding in given situations (for example explain why, make judgements based on analysis).  
● Apply and/or select relevant concepts.  
● Apply knowledge to different contexts.  
● Apply knowledge to non-routine contexts (i.e. assessor selection).  
● Make comparisons.  
● Show relationships between pass criteria. | ● Synthesise knowledge and understanding across pass/merit criteria.  
● Evaluate concepts/ideas/actions.  
● Analyse/research and make recommendations  
● Judge implications of application of knowledge/understanding  
● Apply knowledge and understanding to complex activities/contexts |

<table>
<thead>
<tr>
<th>Grading domain 2</th>
<th>Indicative characteristics – merit</th>
<th>Indicative characteristics – distinction</th>
</tr>
</thead>
</table>
| Development of practical and technical skills  
(outcome of learning stem be able to) | ● Use advanced techniques/processes/ skills successfully.  
● Act under limited supervision/ demonstrate independence (note: pass cannot require support).  
● Apply to non-routine activities.  
● Demonstrate within time and/or resource constraints.  
● Produce varied solutions (including non-routine).  
● Modify techniques/processes to situations. | ● Demonstrate creativity/originality/own ideas.  
● Apply skill(s) to achieve higher order outcome.  
● Select and use successfully from a range of advanced techniques/processes/skills.  
● Reflects on skill acquisition and application.  
● Justifies application of skills/methods.  
● Makes judgements about risks and limitations of techniques/processes.  
● Innovates or generates of application of techniques/processes for new situations. |
<table>
<thead>
<tr>
<th>Grading domain 3</th>
<th>Indicative characteristics – merit</th>
<th>Indicative characteristics – distinction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal development for occupational roles</strong></td>
<td>Takes responsibility in planning and undertaking activities.</td>
<td>Manages self to achieve outcomes successfully.</td>
</tr>
<tr>
<td>(Any outcome of learning stem)</td>
<td>Reviews own development needs.</td>
<td>Plans for own learning and development through the activities.</td>
</tr>
<tr>
<td></td>
<td>Finds and uses relevant information sources.</td>
<td>Analyses and manipulates information to draw conclusions.</td>
</tr>
<tr>
<td></td>
<td>Acts within a given work-related context showing understanding of responsibilities.</td>
<td>Applies initiative appropriately.</td>
</tr>
<tr>
<td></td>
<td>Identifies responsibilities of employers to the community and the environment.</td>
<td>Assesses how different work-related contexts or constraints would change performance.</td>
</tr>
<tr>
<td></td>
<td>Applies qualities related to the vocational sector.</td>
<td>Takes decisions related to work contexts.</td>
</tr>
<tr>
<td></td>
<td>Internalises skills/attributes (creating confidence).</td>
<td>Applies divergent and lateral thinking in work-related contexts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grading domain 4</th>
<th>Indicative characteristics – merit</th>
<th>Indicative characteristics – distinction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application of generic skills</strong></td>
<td>Communicates using appropriate technical/professional language.</td>
<td>Presents self and communicates information to meet the needs of a typical audience.</td>
</tr>
<tr>
<td>(Any outcome of learning stem)</td>
<td>Makes judgements in contexts with explanations.</td>
<td>Takes decisions in contexts with justifications.</td>
</tr>
<tr>
<td></td>
<td>Explains how to contribute within a team.</td>
<td>Produces outputs subject to time/resource constraints.</td>
</tr>
<tr>
<td></td>
<td>Makes adjustments to meet the needs/expectations of others (negotiation skills).</td>
<td>Reflects on own contribution to working within a team.</td>
</tr>
<tr>
<td></td>
<td>Select and justify solutions for specified problems.</td>
<td>Generate new or alternative solutions to specified problems.</td>
</tr>
</tbody>
</table>
Annexe C: National Occupational Standards/mapping with NVQs

The grid below maps the knowledge covered in the Pearson BTEC Level 2 Certificate, Extended Certificate and Diploma in Construction against the underpinning knowledge of the Level 2 NVQ in Construction Operations, the Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations, the Level 2 NVQ in Interior Systems, the Level 2 NVQ in Plastering, the Level 2 NVQ in Trowel Occupations, the Level 2 NVQ in Wood Occupations and the Level 2 NVQ in Wood Machining.

<table>
<thead>
<tr>
<th>BTEC UNITS</th>
<th>NVQ LEVEL 2 QUALIFICATIONS AND UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Unit title</td>
</tr>
<tr>
<td>1</td>
<td>Structure of the Construction Industry</td>
</tr>
<tr>
<td>2</td>
<td>Exploring Health, Safety and Welfare in Construction</td>
</tr>
<tr>
<td>5</td>
<td>Construction Processes and Operations for Low-rise Domestic Buildings</td>
</tr>
<tr>
<td>6</td>
<td>Construction Methods and Techniques for Low-rise Domestic Buildings</td>
</tr>
<tr>
<td>8</td>
<td>Exploring Carpentry and Joinery</td>
</tr>
<tr>
<td>No</td>
<td>Unit title</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Performing Joinery Operations</td>
</tr>
<tr>
<td>10</td>
<td>Performing Carpentry Operations</td>
</tr>
<tr>
<td>11</td>
<td>Exploring Trowel Operations</td>
</tr>
<tr>
<td>12</td>
<td>Performing Blockwork Operations</td>
</tr>
<tr>
<td>No</td>
<td>Unit title</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>13</td>
<td>Performing Brickwork Operations</td>
</tr>
<tr>
<td>14</td>
<td>Exploring Painting and Decorating</td>
</tr>
<tr>
<td>15</td>
<td>Performing Paperhanging Operations</td>
</tr>
<tr>
<td>16</td>
<td>Performing Decorating Operations</td>
</tr>
<tr>
<td>17</td>
<td>Exploring Building Services Techniques in construction</td>
</tr>
<tr>
<td>18</td>
<td>Performing Plumbing Operations</td>
</tr>
<tr>
<td>No</td>
<td>Unit title</td>
</tr>
<tr>
<td>----</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Performing Electrical Operations</td>
</tr>
<tr>
<td>20</td>
<td>Exploring Plastering and Dry-lining Operations</td>
</tr>
<tr>
<td>21</td>
<td>Exploring Roofing Operations</td>
</tr>
<tr>
<td>22</td>
<td>Exploring Wall and Floor Tiling</td>
</tr>
</tbody>
</table>