

Pearson BTEC
International Level 2 in
Construction



Specification

First teaching from September 2022

L2

Issue 1



Pearson BTEC International Level 2 Qualifications in Construction

Specification

First teaching September 2022

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About Pearson

We are the world's leading learning company operating in countries all around the world. We provide content, assessment and digital services to learners, educational institutions, employers, governments and other partners globally. We are committed to helping equip learners with the skills they need to enhance their employability prospects and to succeed in the changing world of work. We believe that wherever learning flourishes so do people.

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Welcome

With a track record built over 40 years of learner success, our BTEC International Level 2 qualifications are recognised internationally by governments and employers. These qualifications are designed to enhance the curriculum and prepare learners for the ever-changing world of work. BTEC International Level 2 qualifications allow learners to progress to study at Level 3 and above or to the workplace.

Career-ready education

BTECs enable a learner-centred approach to education, with a flexible, unit-based structure and knowledge applied to project-based assessments. BTECs focus on the holistic development of the practical, interpersonal and thinking skills required to be successful in employment and higher education.

When creating the BTEC International Level 2 qualifications in this suite, we worked with many employers, colleges and schools to ensure that we met their needs.

BTEC addresses these needs by offering:

- a range of BTEC qualification sizes, each with a clear purpose, so that there is something to suit each learner's choice of study programme and progression plans
- internationally relevant content, which is closely aligned with employer and further education needs
- assessments and projects chosen to help learners progress; this means that some assessments and projects are set by you to meet local needs, while others are set by Pearson, ensuring a core of skills and understanding common to all learners.

We provide a full range of support, both resources and people, to ensure that learners and teachers have the best possible experience during their course. See *Section 10 Resources and support*, for details of the support we offer.

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Introduction to the BTEC International Level 2 qualifications for the construction sector

This specification contains all the information you need to deliver the Pearson BTEC International Level 2 Qualifications in Construction. We also refer you to other handbooks and policies. This specification includes all the units for these qualifications. These qualifications are part of the suite of construction qualifications offered by Pearson. In this suite, there are qualifications that focus on different progression routes, allowing learners to choose the one best suited to their aspirations. These qualifications are not regulated in England.

All qualifications in the suite share some common units and assessments, which gives learners some flexibility in moving between sizes.

In the construction sector these qualifications are:

Pearson BTEC International Level 2 Award in Construction

Pearson BTEC International Level 2 Certificate in Construction

Pearson BTEC International Level 2 Extended Certificate in Construction

Pearson BTEC International Level 2 Diploma in Construction.

This specification signposts the other essential documents and support that you need as a centre in order to deliver, assess and administer the qualifications, including the staff development required. A summary of all essential documents is given in *Section 7 Administrative arrangements*. Information on how we can support you with these qualifications is given in *Section 10 Resources and support*.

The information in this specification is correct at the time of publication.

Qualifications, sizes and purposes at a glance

Title	Size and structure	Summary purpose
Pearson BTEC International Level 2 Award in Construction	120 GLH Equivalent in size to one International GCSE. A minimum of three units, of which two are mandatory and assessed by a Pearson Set Assignment. Mandatory content (50%).	This qualification is designed to support learners who want an introduction to the sector through applied learning and for whom an element of construction would be complementary. The qualification supports progression to further study at Level 3/pre-tertiary education as part of a programme of study that includes BTEC International Level 3 qualifications and/or International A levels
Pearson BTEC International Level 2 Certificate in Construction	240 GLH Equivalent in size to two International GCSEs. A minimum of eight units, of which four units are mandatory and assessed by a Pearson Set Assignment. Mandatory content (50%).	This qualification is designed to support learners who are interested in learning about the construction sector alongside other fields of study, with a view to progressing to a wide range of courses at Level 3/pre-tertiary level, not necessarily in construction-related subjects. The qualification is designed to be taken as part of a programme of study that includes other appropriate BTEC International Level 2 qualifications or International GCSEs.
Pearson BTEC International Level 2 Extended Certificate in Construction	360 GLH Equivalent in size to three International GCSEs. A minimum of eleven units, of which nine are mandatory and three which are assessed by a Pearson Set Assignment. Mandatory content (75%).	This qualification is designed to support learners who want to study construction as a substantial element of a one-year, full-time course alongside smaller courses in other subjects, or for those wanting to take it alongside another area of complementary or contrasting study as part of a two-year, full-time study programme. The qualification would support progression to further education at Level 3/pre-tertiary level if taken as part of a programme of study that included other BTEC International Level 2 qualifications or International A Levels.

Title	Size and structure	Summary purpose
<p>Pearson BTEC International Level 2 Diploma in Construction</p>	<p>480 GLH</p> <p>Equivalent in size to four International GCSEs.</p> <p>At least thirteen units, of which ten are mandatory and three are assessed by Pearson Set Assignment.</p> <p>Mandatory content (62.5%).</p>	<p>This qualification is designed to support learners who want to study construction as a one-year, full-time course, or for those wanting to take it alongside another area of complementary or contrasting study as part of a two-year, full-time study programme.</p> <p>The qualification would support progression to Level 3/pre-tertiary level courses if taken as part of a programme of study that included other BTEC International Level 2 qualifications or International GCSEs.</p>

Structures of the qualifications at a glance

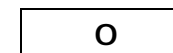
This table shows all the units and the qualifications to which they contribute. The full structure for this Pearson BTEC International Level 2 in Construction is shown in *Section 2 Structure*. **You must refer to the full structure to select units and plan your programme.**

Key

Pearson Set Assignment units are shown in bold



Mandatory units



Optional units

Unit (number and title)	Unit size (GLH)	Award (120 GLH)	Certificate (240 GLH)	Extended Certificate (360 GLH)	Diploma (480 GLH)
1 Construction Technology	30	M	M	M	M
2 Exploring Health, Safety and Welfare in Construction	30	M	M	M	M
3 Scientific and Mathematical Applications for Construction	30	O	O	M	M
4 Construction and Design	30	O	M	M	M
5 Construction Processes and Operations for Low-rise Domestic Buildings	30	O	O	M	M
6 Construction Methods and Techniques for Low-rise Domestic Buildings	30	O	O	M	M
7 Construction Drawing Techniques	30	O	O	M	M
8 Exploring Carpentry and Joinery	30	O	M	M	M
9 Performing Joinery Operations	30	O	O	M	M
10 Performing Carpentry Operations	30	O	O	O	O
11 Exploring Trowel Operations	30	O	O	O	M
12 Performing Blockwork Operations	30	O	O	O	O
13 Performing Brickwork Operations	30	O	O	O	O
14 Exploring Painting and Decorating	30	O	O	O	O
15 Performing Paperhanging Operations	30	O	O	O	O
16 Performing Decorating Operations	30	O	O	O	O

continued overleaf

Unit (number and title)	Unit size (GLH)	Award (120 GLH)	Certificate (240 GLH)	Extended Certificate (360 GLH)	Diploma (480 GLH)
17 Exploring Building Services Techniques in Construction	30	0	0	0	0
18 Performing Plumbing Operations	30	0	0	0	0
19 Performing Electrical Operations	30	0	0	0	0
20 Exploring Plastering and Dry Lining Operations	30	0	0	0	0
21 Exploring Roofing Operations	30	0	0	0	0
22 Exploring Wall and Floor Tiling	30	0	0	0	0
23 Tendering and Estimating	60	0	0	0	0
24 Exploring Surveying	60	0	0	0	0
25 Exploring Civil Engineering	60	0	0	0	0
26 Exploring Building Services Engineering	60	0	0	0	0
27 Exploring Facilities Management	60	0	0	0	0
28 Maintenance and Adaptation of Buildings	60	0	0	0	0

Qualification and unit content

Pearson has developed the content of the new BTEC International Level 2 qualifications in collaboration with employers and subject experts so that content is up to date and includes knowledge, understanding, skills and personal attributes required in the sector.

The mandatory content ensures that all learners are following a coherent programme of study and that they acquire knowledge, understanding and skills that will be worthwhile and fulfilling, and will also provide a basis for further study at Level 3. Learners are expected to show achievement across mandatory units as detailed in *Section 2 Structure*.

BTEC qualifications encompass applied learning that brings together knowledge and understanding with practical and technical skills. This applied learning is achieved through learners performing vocational tasks that encourage the development of appropriate vocational behaviours and transferable skills. Transferable skills include communication, teamwork and research and analysis, which are valued by employers. Opportunities to develop these skills are signposted in the units.

Our approach provides rigour and balance and promotes the ability to apply learning immediately in new contexts. The units include guidance on approaches to breadth and depth of coverage, which can be modified to ensure that content is current and reflects international variations.

Assessment

Assessment is designed to fit the purpose and objective of the qualification. It includes a range of assessment types and styles suited to vocational qualifications in the sector. All assessment is internal, but some mandatory units are assessed using Pearson Set Assignments.

Pearson Set Assignment (PSA) units

Some units in the qualifications are assessed using a Pearson Set Assignment. Each assessment is set by Pearson and is marked by teachers.

Set assignment units are subject to external standards verification processes common to all BTEC units. By setting an assignment for some units, we can ensure that all learners take the same assessment for a specific unit. Learners are permitted to resit set assignment units during their programme. Please see *Section 6 Internal assessment* for further information.

Set assignments are available from June each year and are valid until the end of August in the following year. For detailed information on the Pearson Set Assignment, please see the table in *Section 2 Structure*. For further information on preparing for assessment, see *Section 5 Assessment structure*.

Internal assessment

All units in the sector are internally assessed and subject to external standards verification. Before you assess you will need to become an approved centre, if you are not one already. You will need to prepare to assess using the guidance in *Section 6 Internal assessment*.

For units where there is no Pearson Set Assignment, you select the most appropriate assessment styles according to the learning set out in the unit. This ensures that learners are assessed using a variety of styles to help them develop a broad range of transferable skills. Learners could be given opportunities to:

- write up the findings of their own research
- use case studies to explore complex or unfamiliar situations
- carry out projects for which they have choice over the direction and outcomes
- demonstrate practical and technical skills using appropriate tools/processes.

For these units, Pearson will provide an Authorised Assignment Brief that you can use. You will make grading decisions based on the requirements and supporting guidance given in the units. Learners may not make repeated submissions of assignment evidence. For further information, please see *Section 6 Internal assessment*.

Language of assessment

Assessment of the units for these qualifications is available in English but can be translated as necessary.

Learners taking the qualification/s may be assessed in sign language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments, see *Section 7 Administrative arrangements*.

Grading for units and qualifications

Achievement of the qualification requires demonstration of depth of study in each unit, assured acquisition of a range of practical skills required for employment or for progression to higher education, and successful development of transferable skills. Learners who achieve a qualification will have achieved across mandatory units where applicable.

Units are assessed using a grading scale of Distinction (D), Merit (M), Pass (P) and Unclassified (U). All mandatory and optional units contribute proportionately to the overall qualification grade, for example a unit of 60 GLH will contribute double that of a 30 GLH unit.

Qualifications in the suite are graded using a scale of P to D*, **or** PP to D*D*. Please see *Section 9 Understanding the qualification grade* for more details. The relationship between qualification grading scales and unit grades will be subject to regular review as part of Pearson's standards monitoring processes, on the basis of learner performance and in consultation with key users of the qualifications.

1 Qualification purpose and progression

Pearson BTEC International Level 2 qualifications in Construction

Who are these qualifications for?

The Pearson BTEC International Level 2 qualifications in Construction are designed for learners in the 14–19 age group, who wish to pursue a career in construction via level 3 and then to higher education or through junior business employment.

Which size qualification to choose?

Choosing the most suitable size of qualification will depend on the learner's broader programme of study. For example, a learner who wishes to focus mainly on construction and its practical elements may take the Diploma, while a learner who selects a smaller qualification, such as the Award or Certificate, will likely combine it with International GCSEs, in order to support their desired progression.

Qualification structures have been designed to enable a learner who starts with the smallest qualification to progress easily to the larger qualifications.

What do these qualifications cover?

The content of these qualifications has been designed to support progression to particular roles in construction, most likely via further study at Level 3 and then through higher-education routes in the particular areas.

All learners will be required to take mandatory content that is directly relevant to progression routes in all of the identified areas.

In addition, learners take optional units that support the progression route identified in the qualification title.

What could these qualifications lead to?

These qualifications support progression to further study in construction and related subjects for example courses in:

- International BTEC Level 3 in Building Services Engineering
- International BTEC Level 3 in Civil Engineering
- International BTEC Level 3 in Construction and the Built Environment.

How do these qualifications provide transferable skills?

In the BTEC International Level 2 units, there are opportunities during the teaching and learning phase to give learners practice in developing transferable skills. Where we refer to transferable skills in this specification, we are generally referring to skills in the following three main categories:

- **cognitive and problem-solving skills** – using critical thinking, approaching non-routine problems, applying expert and creative solutions, using systems and technology
- **interpersonal skills** – communicating, working collaboratively, negotiating and influencing, self-presentation
- **intrapersonal skills** – self-management, adaptability and resilience, self-monitoring and development.

There are also specific requirements in some units for assessment of these skills where relevant, for example, where learners are required to undertake real or simulated activities. These skills are indicated in the units and in *Appendix 1: Transferable employability skills*.

How do the qualifications provide transferable knowledge and skills for further and higher education?

All BTEC International Level 2 qualifications provide transferable knowledge and skills that prepare learners for progression to university. The transferable skills that universities value include:

- the ability to learn independently
- the ability to research actively and methodically
- the ability to give presentations and be active group members.

BTEC learners can also benefit from opportunities for deep learning, where they are able to make connections across units and select areas of interest for detailed study.

2 Structure

Qualification structure/s

The structures for the qualifications in this specification are:

- Pearson BTEC International Level 2 Award in Construction
- Pearson BTEC International Level 2 Certificate in Construction
- Pearson BTEC International Level 2 Extended Certificate in Construction
- Pearson BTEC International Level 2 Diploma in Construction.

Pearson BTEC International Level 2 Award in Construction

Mandatory units

There are 2 mandatory units, which includes 2 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete 60 GLH of optional units.

Pearson BTEC International Level 2 Award in Construction (120 GLH)				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Construction Technology	30	Mandatory	Set assignment
2	Exploring Health, Safety and Welfare in Construction	30	Mandatory	Set assignment
Optional units – learners must complete 60 GLH of optional units				
3	Scientific and Mathematical Applications for Construction	30	Optional	Internal
4	Construction and Design	30	Optional	Set assignment
5	Construction Processes and Operations for Low-rise Domestic Buildings	30	Optional	Internal
6	Construction Methods and Techniques for Low-rise Domestic Buildings	30	Optional	Internal
7	Construction Drawing Techniques	30	Optional	Internal
8	Exploring Carpentry and Joinery	30	Optional	Internal
9	Performing Joinery Operations	30	Optional	Internal
10	Performing Carpentry Operations	30	Optional	Internal
11	Exploring Trowel Operations	30	Optional	Internal
12	Performing Blockwork Operations	30	Optional	Internal

Optional units – learners must complete 60 GLH of optional units (<i>continued</i>)				
13	Performing Brickwork Operations	30	Optional	Internal
14	Exploring Painting and Decorating	30	Optional	Internal
15	Performing Paperhanging Operations	30	Optional	Internal
16	Performing Decorating Operations	30	Optional	Internal
17	Exploring Building Services Techniques in Construction	30	Optional	Internal
18	Performing Plumbing Operations	30	Optional	Internal
19	Performing Electrical Operations	30	Optional	Internal
20	Exploring Plastering and Dry Lining Operations	30	Optional	Internal
21	Exploring Roofing Operations	30	Optional	Internal
22	Exploring Wall and Floor Tiling	30	Optional	Internal
23	Tendering and Estimating	60	Optional	Internal
24	Exploring Surveying	60	Optional	Internal
25	Exploring Civil Engineering	60	Optional	Internal
26	Exploring Building Services Engineering	60	Optional	Internal
27	Exploring Facilities Management	60	Optional	Internal
28	Maintenance and Adaptation of Buildings	60	Optional	Internal

Pearson BTEC International Level 2 Certificate in Construction

Mandatory units

There are 4 mandatory units, which include 3 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete 120 GLH of optional units.

Pearson BTEC International Level 2 Certificate in Construction (240 GLH)				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Construction Technology	30	Mandatory	Set assignment
2	Exploring Health, Safety and Welfare in Construction	30	Mandatory	Set assignment
4	Construction and Design	30	Mandatory	Set assignment
8	Exploring Carpentry and Joinery	30	Mandatory	Internal
Optional units – learners must complete 120 GLH of optional units				
3	Scientific and Mathematical Applications for Construction	30	Optional	Internal
5	Construction Processes and Operations for Low-rise Domestic Buildings	30	Optional	Internal
6	Construction Methods and Techniques for Low-rise Domestic Buildings	30	Optional	Internal
7	Construction Drawing Techniques	30	Optional	Internal
9	Performing Joinery Operations	30	Optional	Internal
10	Performing Carpentry Operations	30	Optional	Internal
11	Exploring Trowel Operations	30	Optional	Internal
12	Performing Blockwork Operations	30	Optional	Internal
13	Performing Brickwork Operations	30	Optional	Internal
14	Exploring Painting and Decorating	30	Optional	Internal
15	Performing Paperhanging Operations	30	Optional	Internal
16	Performing Decorating Operations	30	Optional	Internal

Optional units – learners must complete 120 GLH of optional units (<i>continued</i>)				
17	Exploring Building Services Techniques in Construction	30	Optional	Internal
18	Performing Plumbing Operations	30	Optional	Internal
19	Performing Electrical Operations	30	Optional	Internal
20	Exploring Plastering and Dry Lining Operations	30	Optional	Internal
21	Exploring Roofing Operations	30	Optional	Internal
22	Exploring Wall and Floor Tiling	30	Optional	Internal
23	Tendering and Estimating	60	Optional	Internal
24	Exploring Surveying	60	Optional	Internal
25	Exploring Civil Engineering	60	Optional	Internal
26	Exploring Building Services Engineering	60	Optional	Internal
27	Exploring Facilities Management	60	Optional	Internal
28	Maintenance and Adaptation of Buildings	60	Optional	Internal

Pearson BTEC International Level 2 Extended Certificate in Construction

Mandatory units

There are 9 mandatory units, which include 3 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete 90 GLH of optional units.

Pearson BTEC International Level 2 Extended Certificate in Construction (360 GLH)				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Construction Technology	30	Mandatory	Set assignment
2	Exploring Health, Safety and Welfare in Construction	30	Mandatory	Set assignment
3	Scientific and Mathematical Applications for Construction	30	Mandatory	Internal
4	Construction and Design	30	Mandatory	Set assignment
5	Construction Processes and Operations for Low-rise Domestic Buildings	30	Mandatory	Internal
6	Construction Methods and Techniques for Low-rise Domestic Buildings	30	Mandatory	Internal
7	Construction Drawing Techniques	30	Mandatory	Internal
8	Exploring Carpentry and Joinery	30	Mandatory	Internal
9	Performing Joinery Operations	30	Mandatory	Internal
Optional units – learners must complete 90 GLH of optional units				
10	Performing Carpentry Operations	30	Optional	Internal
11	Exploring Trowel Operations	30	Optional	Internal
12	Performing Blockwork Operations	30	Optional	Internal
13	Performing Brickwork Operations	30	Optional	Internal
14	Exploring Painting and Decorating	30	Optional	Internal
15	Performing Paperhanging Operations	30	Optional	Internal
16	Performing Decorating Operations	30	Optional	Internal

Optional units – learners must complete 90 GLH of optional units (<i>continued</i>)				
17	Exploring Building Services Techniques in Construction	30	Optional	Internal
18	Performing Plumbing Operations	30	Optional	Internal
19	Performing Electrical Operations	30	Optional	Internal
20	Exploring Plastering and Dry Lining Operations	30	Optional	Internal
21	Exploring Roofing Operations	30	Optional	Internal
22	Exploring Wall and Floor Tiling	30	Optional	Internal
23	Tendering and Estimating	60	Optional	Internal
24	Exploring Surveying	60	Optional	Internal
25	Exploring Civil Engineering	60	Optional	Internal
26	Exploring Building Services Engineering	60	Optional	Internal
27	Exploring Facilities Management	60	Optional	Internal
28	Maintenance and Adaptation of Buildings	60	Optional	Internal

Pearson BTEC International Level 2 Diploma in Construction

Mandatory units

There are 10 mandatory units, which includes 3 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete 180GLH of optional units.

Pearson BTEC International Level 2 Diploma in Construction (480 GLH)				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Construction Technology	30	Mandatory	Set assignment
2	Exploring Health, Safety and Welfare in Construction	30	Mandatory	Set assignment
3	Scientific and Mathematical Applications for Construction	30	Mandatory	Internal
4	Construction and Design	30	Mandatory	Set assignment
5	Construction Processes and Operations for Low-rise Domestic Buildings	30	Mandatory	Internal
6	Construction Methods and Techniques for Low-rise Domestic Buildings	30	Mandatory	Internal
7	Construction Drawing Techniques	30	Mandatory	Internal
8	Exploring Carpentry and Joinery	30	Mandatory	Internal
9	Performing Joinery Operations	30	Mandatory	Internal
11	Exploring Trowel Operations	30	Mandatory	Internal
Optional units – learners must complete 180 GLH of optional units				
10	Performing Carpentry Operations	30	Optional	Internal
12	Performing Blockwork Operations	30	Optional	Internal
13	Performing Brickwork Operations	30	Optional	Internal
14	Exploring Painting and Decorating	30	Optional	Internal
15	Performing Paperhanging Operations	30	Optional	Internal
16	Performing Decorating Operations	30	Optional	Internal

Optional units – learners must complete 180 GLH of optional units (continued)				
17	Exploring Building Services Techniques in Construction	30	Optional	Internal
18	Performing Plumbing Operations	30	Optional	Internal
19	Performing Electrical Operations	30	Optional	Internal
20	Exploring Plastering and Dry Lining Operations	30	Optional	Internal
21	Exploring Roofing Operations	30	Optional	Internal
22	Exploring Wall and Floor Tiling	30	Optional	Internal
23	Tendering and Estimating	60	Optional	Internal
24	Exploring Surveying	60	Optional	Internal
25	Exploring Civil Engineering	60	Optional	Internal
26	Exploring Building Services Engineering	60	Optional	Internal
27	Exploring Facilities Management	60	Optional	Internal
28	Maintenance and Adaptation of Buildings	60	Optional	Internal

Set assignment units

This is a summary of the type and availability of set assignment units. For more information, see *Section 5 Assessment structure*, and the units and sample assessment materials.

Unit	Type	Availability
Unit 1: Construction Technology	<ul style="list-style-type: none">• An assignment set by Pearson and marked by the centre.• The advised assessment period is 13 hours.• Completed using a computer.	Two available for each series.
Unit 2: Health, Safety and Welfare in Construction	<ul style="list-style-type: none">• An assignment set by Pearson and marked by the centre.• The advised assessment period is 6 hours.• Completed using a computer.	Two available for each series.
Unit 4: Construction and Design	<ul style="list-style-type: none">• An assignment set by Pearson and marked by the centre.• The advised assessment period is 9 hours.• Completed using a computer.	Two available for each series.

Employer involvement in assessment and delivery

You are encouraged to give learners opportunities to be involved with employers. For more information, please see *Section 4 Planning your programme*.

3 Units

Understanding your units

The units in this specification set out our expectations of assessment in a way that helps you to prepare your learners for assessment. The units help you to undertake assessment and quality assurance effectively.

Each unit in the specification is set out in a similar way. This section explains how the units work. It is important that all teachers, assessors, internal verifiers and other staff responsible for the programme review this section.

Section	Explanation
Unit number	The number is in a sequence in the sector. Numbers may not be sequential for an individual qualification.
Unit title	This is the formal title that we always use, it appears on certificates.
Level	All units are at Level 2.
Unit type	This shows if the unit is internal or assessed using a Pearson Set Assignment. See structure information in <i>Section 2 Structure</i> for details.
Guided Learning Hours (GLH)	Units may have a GLH value of 60 or 30. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	This is a brief formal statement on the content of the unit that is helpful in understanding its role in the qualification. You can use this in summary documents, brochures, etc.
Unit introduction	This is written with learners in mind. It indicates why the unit is important, how learning is structured and how it might be applied when they progress to employment or higher education.
Assessment	For internal set assignment units, this section states whether set assignments are required to be completed.
Learning aims	These help to define the scope, style and depth of learning of the unit. You can see where learners should be learning standard requirements ('understand') or where they should be actively researching ('investigate'). You can find out more about the verbs we use in learning aims in <i>Appendix 2: Glossary of terms used</i> .
Summary of unit	This section helps teachers to see at a glance the main content area given against the learning aims and the structure of the assessment. The content areas and structure of assessment must be covered. The forms of evidence given are suitable to fulfil the requirement.

Section	Explanation
Content	This section sets out the required teaching content of the unit. Content is compulsory except when shown as 'e.g.'. Learners should be asked to complete summative assessment only after the teaching content for the unit or learning aim(s) has been covered.
Assessment criteria	Each learning aim has Pass and Merit criteria. Each assignment has at least one Distinction criterion. A full glossary of terms used is given in <i>Appendix 2: Glossary of terms used</i> . All assessors need to understand our expectations of the terms used. Distinction criteria represent outstanding performance in the unit. Some criteria require learners to draw together learning from across the learning aims.
Essential information for assignments	This shows the maximum number of assignments that may be used for the unit to allow for effective summative assessment and how the assessment criteria should be used to assess performance. For set assignment units, this section will include any conditions for taking the assignment.
Further information for teachers and assessors	This section gives you information to support the implementation of assessment. It is important that this is read carefully alongside the assessment criteria, as the information will help with interpretation of the requirements.
Resource requirements	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources, see <i>Section 10 Resources and support</i> .
Essential information for assessment decisions	This section gives guidance on and examples for each learning aim or assignment of the expectations for Pass, Merit and Distinction standard.
Assessment controls	This section gives details of the rules that learners need to abide by when taking the assessment.
Links to other units and other curriculum subjects	This section shows you the main relationships between different units and any clear links to other curriculum subjects. This helps you to structure your programme and make best use of available materials and resources.
Employer involvement	This section gives you information on the units, which can be used to involve learners with employers. This will help you to identify the kind of involvement that is likely to be most successful.
Opportunities to develop transferable employability skills	This section gives you guidance on how transferable employability skills might be developed in teaching and assessment of the unit.

Index of units

This section contains all the units developed for these qualifications. Please refer to *pages 4–5* to check which units are available in all qualifications in the construction sector.

Unit 1:	Construction Technology	25
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Unit 1: Construction Technology

Level: 2

Unit type: **Pearson Set Assignment**

Guided learning hours: **30**

Unit in brief

Learners will acquire an understanding of the performance and construction of low-rise structures both above and below ground.

Unit introduction

Have you thought about how a building is constructed? There are many different types of buildings we can construct and occupy. This unit will examine the different forms of construction that can be used for low-rise (up to 5.2 metres in height) offices, retail units and homes.

The use of prefabrication to construct buildings is now a sustainable method used to build quickly and reduce damage to the environment. You will examine the modern methods of construction that rely heavily on offsite prefabrication, which benefits the environment sustainably.

You will understand how to set up a site, examining the tasks that must be completed before starting work, along with the infrastructure that you will need to put in place to run the job efficiently and safely.

Sub-structure works are the most important part of a project as they have to safely support the superstructure that rests upon them. You will understand the methods that are used in constructing several different types of foundation and the safety aspects of supporting excavations while employees work within them. You will also consider the removal of water from excavations.

Moving above the sub-structure, you will understand the need for provisions to stop damp rising, and the construction associated with the superstructure of a building. This is the part that has to be aesthetically pleasing, keeping out the weather elements and ensuring that the occupants are at a comfortable temperature. You will develop a detailed understanding of how walls, floors and roofs are constructed, and you will be able to name each component part, along with its functions. This will change with each different type of construction method that can be employed in a building.

Assessment

This unit has a Pearson Set Assignment. Learners must complete a Pearson Set Assignment Brief.

Learning aims

In this unit you will:

- A** Understand the structural performance required for low-rise construction
- B** Explore how sub-structures are constructed
- C** Explore how superstructures are constructed.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the structural performance required for low-rise construction	A1 Performance requirements A2 Common structural forms for low-rise construction	This unit is assessed through a Pearson Set Assignment.
B Explore how sub-structures are constructed	B1 Preconstruction work B2 Sub-structures groundworks	
C Explore how superstructures are constructed	C1 Superstructures – walls C2 Superstructures – floors C3 Superstructures – roofs	

Content

Learning aim A: Understand the structural performance required for low-rise construction

A1 Performance requirements

The in-situ requirements for elements of a building, the characteristics, properties, location, features and applications, and the interaction of different elements making up the sub-structure and superstructure. Learners will need to be able to demonstrate the use of sketching techniques.

How buildings are designed and constructed, considering:

- strength
- stability
- fire resistance
- thermal insulation
- sound insulation
- weather resistance
- sustainability.

Strength and stability

Buildings are designed to resist live, dead and dynamic loads to include:

- self-weight
- use
- snow
- wind.

How buildings achieve their required strength – for the following, understand what is required, where it is required, why it is done and how it is achieved:

- **Tested materials:** grading of hard core, slump testing and compressive testing of concrete, stress grading of structural timber, mortar testing.
- **Specification of materials:** material regulatory standards, strength classification of concrete, bricks, blocks, mortar, timber.
- **Cavity walls:** construction to provide composite strength and stability, thermal performance, insulation, wall-tie spacing.
- **Lateral and vertical restraint:** internal walls, floor- and roof-tie positions, resist the spread of the walls, resist uplift from wind loadings.
- Transfer of loads to foundations: roof to walls, floors to walls.

Fire resistance

How buildings are protected against fire and maintain their structural integrity – for the following, understand what is required, why it is done and how it is achieved:

- fire-resistant materials, which include plasterboard, concrete, blockwork and intumescent paint
- fire compartments and fire barriers (separating building design requirements – walls, separating floors, door closes, fire-resistant doors), fire escapes, refuge areas, cavity fire barriers, fire alarm systems, smoke detection, sprinkler systems.

Thermal insulation

How buildings are insulated against heat loss – for the following, understand why it is done, what types of thermal insulation and resistant materials are used, and where it is provided:

- **Purpose of insulation:** reduction of heat loss from a building, energy costs, prevention of the loss of heated air through gaps within a building or structure, providing an acceptable U-value in accordance with regulations.
- **Types of insulation:** sheep's wool, mineral wool, glass fibre, cellulose, foam, advantages of one type over another.
- **Types of thermally resistant materials:** aerated lightweight concrete blocks, timber, lightweight screens.
- **Location:** cavity insulation, wall insulation, roofing insulation, flooring insulation, double glazing, draught strips.

Sound insulation

How buildings meet their required sound resistance – for the following, understand why it is used, what needs to be provided, where it is required and how sound resistance is achieved:

- Purpose: to resist the passage of sound through a structure, preventing nuisance and noise disturbance of adjacent neighbours, reduce external infrastructure noise, reduce aircraft noise, provide confidentiality.
- Types of sound insulation: triple glazing, heavy-density blockwork, sound insulation quilts, plasterboard layers, flooring mats, carpeting, acoustic ceilings.
- Locations: floor, wall and ceiling construction between adjacent rooms and flats, boundary walls, internal partition walls, windows, doors.
- Provision: adding material density, sound isolation of structures, reduction of transference by using machinery silencers.

Weather resistance

How buildings achieve their resistance to the weather elements – for the following, understand why it is done, what types of materials are used and where they are provided:

- Purpose: to keep occupants in an acceptable environment, thermal comfort of occupants, humidity levels, prevention of damage to finishes, prevention of water staining.
- Materials: selection of waterproof and impervious materials, double glazing, use of falls, weather seals and sealants, flashings, soffits.
- Location: guttering, window and door openings, external walls, ventilation ducts, roof finishes, overhanging eaves.

Sustainability

Sustainability is preserving resources for future generations and minimising the impact of construction activities on the natural environment.

For the following, understand why it is done, how it is achieved, what sustainable materials are used for construction and where they are used:

- Purpose: reduction in building energy use, conserving finite resources, reduction in carbon emissions to the atmosphere, reduction in pollution and wastage.

- Methods: building orientation for light and heat, reduction in the use of virgin greenfield sites, brownfield reuse of sites, recycling waste materials into new products, low embodied energy materials, green renewable natural materials, using local suppliers, prefabrication of elements, reduction in construction wastage.
- Materials:
 - hemp, lime, rendering finishes
 - sheep's wool insulation
 - straw construction of walls
 - timber: cedar cladding, softwoods in timber framing
 - aluminium: guttering, downpipes.

A2 Common structural forms for low-rise construction

For the following construction methods, understand how they are designed and detailed, what the terminology of each component is called, how and why each method differs, and the advantages and disadvantages of each structural form. Learners will need to be able to demonstrate the use of sketching techniques.

- Traditional cavity wall construction: load-bearing elements; brickwork and blockwork, blockwork outer and brickwork inner with external render finishes (hemp, brickwork).
- Cross-wall construction: load-bearing cross-wall element, relationships of connecting floors, prefabricated concrete cross wall, use of cross-wall construction in accommodation units.
- Structural insulated panels (SIPS): panel finishes (brickwork, blockwork and render, insulation and timber cladding, hemp rendering, tiling), panel function (panel design to support load), position of insulation.
- Timber-framed construction: timber framing use, position of insulation, vapour/moisture barriers including damp-proof membranes, position of plywood on panels, connection binder details, external brick cladding, methods of tying external finish to supporting panel, formation of openings, panel/secondary finishes (brickwork, blockwork and render, insulation and timber cladding, hemp rendering, tiling), panel function (panel design to support load).

Learning aim B: Explore how sub-structures are constructed

B1 Preconstruction work

For the following activities that have to be completed before work can begin on site, understand why they are carried out, what has to be provided on a site and how it is accomplished. Learners will need to be able to demonstrate the use of sketching techniques and associated calculations (areas, volumes, distances, perimeters, time durations).

Desk-based preconstruction:

- **health and safety:** planning for safe construction, method statements and risk assessments, compliance with health and safety regulations
- **planning to occupy a construction site:** scaled site layout plan indicating site accommodation, welfare facilities, storage accommodation, compounds, temporary roads and hard standing, fixed plant, fire precaution measures

- **producing a programme of work:** schedule of activities or resources, purchasing of resources, organising safety signs, traffic management, road closures and crossings.

Site-based preconstruction:

- **demolition and clearance of existing structures:** sustainable demolition and recycling of brownfield sites, tree removal, general site clearance of vegetation
- **enabling work:** protection of existing services (water, gas, electricity), formation of access and egress routes, installation of temporary supports
- **site set-up:** fencing, gates and security of the site, temporary lighting, decontamination works, installation of site accommodation and associated services, signage, creation of storage compounds and hard standing, temporary works required to construct and support.

B2 Sub-structures groundworks

Understand how sub-structures are constructed safely, covering what is used, why it is used (including potential hazards), where it is used and how it is achieved. Learners will need to be able to demonstrate the use of sketching techniques and associated calculations (areas, volumes, distances, perimeters).

- **Hazards associated with groundworks:** gas, collapse of the sides of the excavation, protection of third parties, movement of ground water, confined space, safe access and egress, overburden, likelihood of collapse due to type of soil, avoiding services, proximity of excavation plant.
- **Control of water:** temporary control of sub-soil and surface water during excavation (simple sump pumping), permanent control of sub-soil water (land drainage).
- **Earthwork support:** method of support to the sides of the excavation (earthwork support), steel trench sheets, timbering, hydraulic trench support, aluminium walling.
- **Function of a foundation:** to safely transmit the loads of the building to the sub-soil, to settle within acceptable limits for settlement, to support the loads of the building for its lifespan.
- **Understand how foundations are detailed:** the different types used to support a low-rise building, detailing and terminology, strip and deep strip, trench/mass fill, raft, short bored piles and ground beam, engineering brickwork to damp-proof course (DPC) and cavity fill, weepholes, selection of appropriate foundation for a variety of ground conditions, the advantages/disadvantages of each foundation type.
- **Understand how ground floors are detailed:** design and construction of ground floors, solid and suspended, beam and block, timber joists, solid concrete, including DPC, damp-proof membrane (DPM), sand blinding, hardcore, thermal insulation (location of insulation), sub-floor ventilation and advantages/disadvantages of each floor type.

Learning aim C: Explore how superstructures are constructed

C1 Superstructures – walls

For the following, understand what is used, where it is used, why it is used and how it is achieved. Learners will need to be able to demonstrate the use of sketching techniques and associated calculations (areas, volumes, distances, perimeters).

- **Understand how walls are detailed:** types of construction (cavity masonry, timber frame, insulated panels (SIPs) and their advantages and disadvantages, wall-tie spacing, internal partitions (timber, metal stud, solid blockwork).
- **Functions of a wall:** to resist heat transfer, to reduce sound transmission, to transfer loads to foundations, to provide shelter, to provide security.
- **Materials used:** thin jointed masonry, lightweight thermal blockwork, quality of facing bricks, types of mortar and quality.
- **Types of wall finishes:** rendered blockwork, facing brickwork (including pointing – bucket handle/tooled, recessed, weathered, flush) and their advantages and disadvantages.
- **Wall openings and their functions:** provide ventilation, provide light, provide aesthetics.
- **Components of a wall opening:** lintel, sill, window, door, threshold, damp-proof course, cavity trays, cavity closers, weepholes, and the function of each.
- **Detailing around wall openings:** details of heads, thresholds, sills and jambs, including wall-tie spacing.
- **Functions of detailing:** prevention of damp transfer, continuity of insulation, maintaining structural integrity, load distribution.

C2 Superstructures – floors

For the following, understand what is used, where it is used, why it is used and how it is achieved. Learners will need to be able to demonstrate the use of sketching techniques and associated calculations (areas, volumes, distances, perimeters).

- **Understand how floors are detailed:** types of construction (intermediate); solid, timber, engineered timber and the advantages and disadvantages.
- **Function of a floor:** to provide a level surface, to reduce sound transmission, to transfer loads to walls, to provide accommodation of services.
- **Materials used:** stress-graded timber joists, beam and block, eco-joists, engineered timber joists, precast concrete planks.
- **Types of floor finishes:** screeded, chipboard, moisture-resistant chipboard, tongued-and-grooved softwood floorboards, skirtings.
- **Components of a floor:** supporting joists, structure, floor covering, wall support, skirtings and the function of each.

C3 Superstructures – roofs

For the following, understand what is used, where it is used, why it is used and how it is achieved. Learners will need to be able to demonstrate the use of sketching techniques and associated calculations (areas, volumes, distances, perimeters).

- **Understand how roofs are detailed:** types of construction – flat, lean-to, mono pitch, double pitch, gable end, hipped end, their specific maintenance and advantages and disadvantages, the terminology used to label a roof detail.

- **Functions of a roof:** to provide methods of discharging rainfall away from the building, to waterproof the structure, to provide a recreational area, aesthetics, provide additional accommodation/space.
- **Materials used:** trussed rafters, traditional timber roof with purlins, breather membrane, tile felt, tile battens, roof tiles, bitumen felt.
- **Types of roof finishes:** finish employed for each type of roof, fixing of finishes, felt and tile battens, three-layer felt construction, rain water gutters, fittings and downpipes, stages involved in the application of the roof finishes.
- **Components of a roof:** common rafters, jack rafters, cripple jack rafters, wall plates, roof trusses, binders, diagonal wind bracing, ridge board, fascia, eaves, valley, soffit, gables, hip, dormer window, insulation and the function of each.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the structural performance required for low-rise construction		A.D1 Evaluate the performance and structural form of a given low-rise building project scenario.
A.P1 Describe the performance requirements for low-rise buildings. A.P2 Describe the common structural forms used to construct low-rise buildings.	A.M1 Explain the performance requirements and structural form of a given low-rise building project scenario.	
Learning aim B: Explore how sub-structures are constructed		BC.D2 Evaluate the sub-structure and superstructure construction details for a given low-rise building project scenario.
B.P3 Describe the preparation work that must be completed before construction can begin on a site. B.P4 Describe the safe working practice that must be followed to construct the foundations and ground floor slab for a low-rise building.	B.M2 Explain the preparation work to be completed to enable construction to begin on site for the foundations and ground floor slab of a given low-rise building project scenario.	
Learning aim C: Explore how superstructures are constructed		
C.P5 Describe the purpose, use and typical construction of walls in low-rise buildings. C.P6 Describe the purpose, use and typical construction of floors in low-rise buildings. C.P7 Describe the purpose, use and typical construction of roofs in low-rise buildings.	C.M3 Explain the construction details used in the walls, floors and roof or a given low-rise building project scenario.	

Essential information for assignments

This unit is assessed using a Pearson Set Assignment Brief. A set assignment must be used to assess learners.

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will evaluate the in-situ performance requirements and structural form for a given low-rise building project scenario. They will demonstrate a sound knowledge and understanding of the specific advantages and limitations of traditional cavity wall construction, cross-wall construction, structural systems and timber-framed construction for use in the given project scenario. Learners will compare and review the different forms of construction in the context of the scenario and will bring together key considerations to form a supported conclusion, drawing on information relevant to the given scenario. It is expected that the learner will use illustrations and/or sketches with annotations to convey knowledge and understanding in their response.

For Merit standard, learners will explain the in-situ performance requirements and structural form for a given low-rise building project scenario. They will provide a coherent, logical and mostly balanced discussion that considers the application, performance characteristics, uses, advantages and limitations of the different structural forms that could be considered for the scenario. They will demonstrate some understanding of the specific advantages and limitations of traditional cavity wall construction, cross-wall construction, structural systems and timber-framed construction for use in the given project scenario. It is expected that the learner will use illustrations and/or sketches with annotations to convey knowledge and understanding in their response.

For Pass standard, learners will describe the common structural forms used in the construction of low-rise buildings. They will cover a minimum of three structural forms from the unit content, describing how they are designed and detailed. They will use the construction terminology used to describe each component and outline how and why each method differs, and the advantages and disadvantages of each structural form. It is expected that learners will use illustrations and/or sketches with appropriate annotations to convey their knowledge and understanding of the different structural forms. Learners will also describe the characteristics and properties of the in-situ performance requirements for the different structural forms. They will cover the unit content and will describe how strength and stability, fire resistance, thermal insulation, sound insulation, weather resistance and sustainability in each common structural form are used in the construction of low-rise buildings.

Learning aims B and C

For Distinction standard, learners will evaluate the sub-structure and superstructure construction for a given low-rise building project scenario. Learners will demonstrate sound knowledge and understanding of typical materials, components and finishes used in the walls, floors and roof of the given scenario. Learners will review these within the context of the scenario and will bring together key considerations to form a supported conclusion, including recommending alternatives where appropriate, drawing on information relevant to the given scenario. It is expected that the learner will use illustrations and/or sketches with annotations to convey knowledge and understanding in their response.

For Merit standard, learners will provide a coherent, logical and mostly balanced discussion that explains the preparation work required to enable construction to begin on site for the foundations and ground floor slab of a given low-rise building project scenario. They will cover planning, site set-up, enabling works, and the demolition and clearance of any existing structures. They will demonstrate an understanding of the site practices undertaken to construct foundations and ground floor slabs, outlining the function of each succinctly for the given scenario. Finally, they will explain typical materials, components and finishes appropriate for use in the walls, floors and roof of a given low-rise building project scenario. It is expected that the learner will use illustrations and/or sketches with annotations to convey knowledge and understanding in their response.

For Pass standard, learners will describe the safe working practices that must be followed to construct the foundations and ground floor slabs for a low-rise building. Learners will use annotated sketches to demonstrate the construction sequence for the groundworks for these sub-structures. The annotations will highlight the hazards associated with the work and describe how these can be mitigated. Learners should demonstrate knowledge and understanding of the function of foundations and ground slabs. Their explanation will also cover the activities that have to be completed before work can begin on site, why these activities are completed and how they can be accomplished. As part of this it is anticipated that they may interpret a given site plan using mathematics to calculate the perimeter for site fencing, or the area available for welfare facilities and/or site storage. Learners might also use mathematics skills to prepare a programme for the works to be undertaken. In a similar manner, learners will describe the purpose, use and typical construction of walls, floors and roofs used for a low-rise building. Learners will demonstrate they understand what is used, where it is used, why it is used and how construction is achieved. They should make use of appropriate construction terminology and cover the types of walls, floors and roofs given in the unit content. It is anticipated that learners will use sketches with annotations to illustrate their description.

Assessment controls

Time: this assignment has a recommended time period. This is for advice only and can be adjusted depending on learners' needs.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resources to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 7: Construction Drawing Techniques
- Unit 27: Exploring Facilities Management
- Unit 28: Maintenance and Adaptation of Buildings

Employer involvement

This unit would benefit from employer involvement in the form of:

- a construction site manager as a guest speaker
- exemplar construction drawings for 'real-world' low-rise buildings
- visits to a construction site for a low-rise building.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research, planning, sketching and mathematics skills.

Unit 2: Exploring Health, Safety and Welfare in Construction

Level: 2

Unit type: **Pearson Set Assignment**

Guided learning hours: **30**

Unit in brief

Learners will develop knowledge and understanding of health, safety and welfare in the construction industry and will be given 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 tasks carried out, and the way people perform these tasks. This unit focuses on health and safety organisational responsibilities to ensure that you understand your own and other people's responsibilities. Over recent years there have been changes to construction legislation, with increased emphasis on ensuring and demonstrating competence. If risks are not adequately controlled there is a greater probability that unfortunate and unnecessary accidents will occur.

In this unit you 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 the awarding of any future contracts. You 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. You 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; and communication skills in recording and using information. You 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 you will become familiar with construction sector statistics and campaigns undertaken by relevant authorities. You will be expected to develop an awareness of the applicable health, safety and welfare legislation.

Assessment

This unit has a Pearson Set Assignment. Learners must complete a Pearson Set Assignment Brief.

Learning aims

In this unit you will:

- A** Know the importance of health, safety and welfare in the construction and built environment sector
- B** Be able to carry out risk assessments
- C** Understand the importance of control measures in risk assessment.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Know the importance of health, safety and welfare in the construction and built environment sector	A1 Legal responsibilities A2 Workplace health and safety A3 Health and safety management systems A4 Active monitoring and reactive monitoring techniques	This unit is assessed through a Pearson Set Assignment.
B Be able to carry out risk assessments	B1 Risk assessments B2 Hazards B3 Risks B4 Work methods B5 Risk control	
C Understand the importance of control measures in risk assessment	C1 General on-site health and safety C2 Training and education C3 Substances C4 Working at height C5 Working below ground C6 Confined spaces C7 Plant, equipment and machinery C8 Electricity and buried/overhead services	

Content

Learning aim A: Know the importance of health, safety and welfare in the construction and built environment sector

A1 Legal responsibilities

Understand the roles and responsibilities of individual personnel, both on and off site, under the relevant legislation/regulations in home country, including:

- managers
- supervisors
- clients
- principal contractors
- contractors
- employees.

A2 Workplace health and safety

Distinguish between a workplace policy statement, responsibilities and a safe system of work, and the need for risk assessments in a construction environment.

- Workplace policy statements.
- Responsibilities and safe systems of work.
- Need for risk assessments.

A3 Health and safety management systems

Understand health and safety management systems in home country, including:

- policies
- organisation
- planning and implementation
- monitoring
- review
- audit and references to management systems, e.g. HS(G) 65, BS8800, ISO18001.

A4 Active monitoring and reactive monitoring techniques

Explain the importance of active and reactive monitoring in home country, including:

- overview of active monitoring techniques, e.g.:
 - safety inspections
 - safety tours
 - communication
 - training
- overview of reactive monitoring techniques, e.g.:
 - accident
 - investigations.

Learning aim B: Be able to carry out risk assessments

B1 Risk assessments

Understand the purpose and key features to be able to carry out risk assessments.

- Purpose of a risk assessment.
- Definition of a hazard and risk.
- Use of a risk assessment.
- Control measures.
- Risk ratings.
- Qualitative and quantitative risk assessment methods.
- Legislation/regulations in home country.

B2 Hazards

Identification of types of hazards within the construction environment, including:

- physical
- environmental
- chemical
- biological
- psychosocial.

B3 Risks

Identification of the risks that arise out of identified hazards relating to:

- plant
- equipment
- machinery
- materials.

B4 Work methods

Understand how working methods affect hazards and risks in a construction environment, including:

- changes in working methods
- workplace changes, e.g.:
 - temperature
 - dust
 - humidity
 - confined spaces
 - traffic
 - access and egress.

B5 Risk control

Understand risk control, including:

- purpose
- evaluating risk and adequacy of current controls:
 - likelihood of harm and probable severity
 - risk ratings
 - prioritisation of risk
 - applying controls to specific hazards
 - residual risks: acceptable/tolerable risk level.

Learning aim C: Understand the importance of control measures in risk assessment

C1 General on-site health and safety

General provisions for managing construction safety on site.

- 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.
- Human factors – attitude, training, responsibility, experience.
- Correct use of personal protective equipment (PPE), including:
 - hard hat
 - safety boots
 - ear defenders
 - safety glasses
 - respiratory protection.
- Correct use of on-site safety signs.
- Fire precautions, including:
 - types of fire extinguishers
 - signage
 - correct selection of appropriate extinguishers for given situations.

C2 Training and education

- Induction and on-site safety training, e.g. toolbox talks.
- Fire safety training.
- Off-site training requirements and links to control measures, e.g.:
 - for working at height
 - noise
 - confined spaces.
- Training associated with equipment.

C3 Substances

Aspects of the use of substances and chemicals during construction activities on site:

- awareness of relevant legislation/regulations in home country
- risk associated with a range of substances.

C4 Working at height

The approach to working safely at height:

- awareness of relevant legislation/regulations in home country
- control measures, including the organisation and planning required before working at height commences
- avoiding risks from working at height by establishing whether an alternative safer method can be used
- movement of materials into position.

C5 Working below ground

Explore methods of working safely below ground, including:

- hazards presented by working near or in open excavations, including:
 - buried services
 - falls
 - excavation collapse
 - water ingress
 - contaminated ground
- method of eliminating or mitigating risk associated with excavations such as:
 - excavation supports
 - barriers
 - dewatering
 - positioning of spoil
 - routing of vehicles and plant
- standard trench support systems.

C6 Confined spaces

Explore methods of working safely in confined spaces, including:

- awareness of relevant legislation/regulations in home country
- confined space risk assessments
- competence
- emergency arrangements
- use of appropriate PPE.

C7 Plant, equipment and machinery

Explore methods of working safely with plant, equipment and machinery, including:

- awareness of relevant legislation/regulations in home country
- inspection and testing
- requirement for operator competence
- safe systems of work.

C8 Electricity and buried/overhead services

Explore methods of working safely with electricity and buried/overhead services, including:

- 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.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Know the importance of health, safety and welfare in the construction and built environment sector		A.D1 Analyse how changes in work methods affect hazards and risks on construction sites.
A.P1 Outline key methods used to ensure good standards of health and safety on a construction site.	A.M1 Describe how human and workplace factors affect hazards and risks on construction sites.	
A.P2 Identify the roles and responsibilities of relevant personnel.		
A.P3 Identify potential risks and hazards in an area of the working environment.		
Learning aim B: Be able to carry out risk assessments		BC.D2 Evaluate the impact of the risk assessment on employees, visitors to sites and the public.
B.P4 Conduct a risk assessment.		
Learning aim C: Understand the importance of control measures in risk assessment		
C.P5 Explain how control measures are used in risk assessment procedures.	C.M2 Relate the findings of the risk assessment to the recommended control measures.	

Essential information for assignment

This unit is assessed using a Pearson Set Assignment Brief. A set assignment must be used to assess learners.

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Learning aim A

For Distinction standard, learners will evaluate the effects of change on established methods or working conditions. They will demonstrate an appreciation of the types of changes that can occur and the ways in which these affect work practices, risk assessments and workplace policies. The Pearson Set Assignment will give construction scenarios which will include the effects of safety issues 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 Merit standard, 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 Pass standard, learners must outline five different examples that would contribute to ensuring good standards of health and safety on a construction site. They must identify, but not describe in detail, the roles of at least two people with key responsibilities for health, safety and welfare on a construction site. They should provide examples of suitable evidencing approaches and be able to show clear identification of the potential hazards and the associated risks in a variety of onsite or construction workshop environments.

Learning aims B and C

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

For Merit standard, learners should document the findings of identified control measures 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 Pass standard, 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. They should describe the risks that arise from each of these hazards. 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. They should make references to key aspects 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.

Assessment controls

Time: this assignment has a recommended time period. This is for advice only and can be adjusted depending on learners' needs.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resources to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings

All practical units – for example:

- Unit 8: Exploring Carpentry and Joinery
- Unit 9: Performing Joinery Operations
- Unit 10: Performing Carpentry Operations
- Unit 11: Exploring Trowel Operations
- Unit 12: Performing Blockwork Operations
- Unit 13: Performing Brickwork Operations

Employer involvement

This unit would benefit from employer involvement in the form of:

- technical workshops involving staff from local construction organisations with expertise in a range of specialist areas
- contribution of ideas to unit assignments for individual learner projects
- contribution of project materials
- guest speakers from a related health and safety background
- work experience opportunities on a construction site
- business materials to be used as exemplars
- support from local business staff as mentors
- health and safety policies and procedural documentation.

Unit 3: Scientific and Mathematical Applications for Construction

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

This unit will develop learners' understanding of the science and mathematics used in construction projects. It will help learners to develop the mathematical and scientific skills needed to solve a variety of construction problems.

Unit introduction

An understanding of the properties of construction materials is an essential requirement of almost every job in the construction industry. Whether working as a supervisor, manager, designer or planner, you will always need to know about the materials used to construct buildings and why they are used.

In this unit you will learn the scientific principles affecting the performance of construction materials. You will develop skills to perform a wide range of mathematical calculations relating to, for example, dimensions, areas, volumes, material quantities and costs. You will have the opportunity to investigate the effect of forces acting on construction materials, and to explore how changes in temperature affect materials. This unit will also introduce you to the mathematical techniques needed to perform simple calculations relating to commonplace tasks such as setting out, dimensional control, determining material quantities and calculating land areas. The content of the unit has been designed to focus specifically on concepts that will be clearly and immediately useful to you when undertaking construction-related activities. You will be able to appreciate the importance of these concepts to the construction industry and be much better placed to apply them in a wide vocational context.

Learning aims

In this unit you will:

- A** Understand the effects of forces and temperature changes on materials used in construction
- B** Use mathematical techniques to solve construction problems.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the effects of forces and temperature changes on materials used in construction	A1 Effect of forces A2 Changes in temperature	A presentation to include text, diagrams, tables, graphs, test results and calculations as appropriate, accompanied by a written report.
B Use mathematical techniques to solve construction problems.	B1 Algebraic and graphical methods B2 Mensuration B3 Trigonometry	A presentation to include calculations, diagrams, tables, graphs and text as appropriate, accompanied by notes and teacher observation records.

Content

Learning aim A: Understand the effects of forces and temperature changes on materials used in construction

A1 Effect of forces

Understand the effect of forces on construction materials.

- Typical construction materials (steel, concrete, brick, blocks, aluminium alloys, glass, plastics, wood):
 - key properties (strength, ductility, density)
 - stresses (compressive, tensile, shear, bending).
- Nature of forces:
 - identifying forces:
 - push and pull
 - active and passive
 - gravitational forces
 - forces as loads
 - effects on materials:
 - change of shape
 - stresses (compressive, tensile, shear, bending)
 - Hooke's law ($F = -Kx$).
- Determining effect of forces:
 - simple calculations for the following:
 - tensile and compressive stresses (Stress = Force/Area)
 - strain (Strain = Change in length/Original length)
 - modulus of elasticity (Modulus of elasticity = Stress/Strain).

A2 Changes in temperature

Understand how changes in temperature affect construction materials.

- Typical construction materials (steel, concrete, brick, blocks, aluminium alloys, glass, plastics, wood):
 - key properties (thermal resistance and conductivity, porosity, strength, rate of hydration).
- Scientific principles:
 - changes of state
 - sensible heat
 - evaporation
 - expansion and contraction.
- Effects on construction materials:
 - cooling effect of evaporation or expansion of water on freezing and contraction on thawing, its effect on porous construction materials and material cracks and fissures
 - coefficients of thermal expansion for construction materials
 - solving problems involving temperature changes.

Learning aim B: Use mathematical techniques to solve construction problems

B1 Algebraic and graphical methods

- Applications:
 - stress–strain relationship for construction materials
 - change in rate of hydration with increase or decrease in temperature
 - relationship between thickness and thermal resistance of an insulating material
 - calculating cost of materials required for a construction activity.
- Rearranging formulae:
 - change subject of simple formulae containing three variables (e.g. $F = ma$, $V = IR$, $s = vt$, $W = mg$)
 - complex formulae involving indices, square roots and trigonometric functions of the form:
 - e.g. $E_k = \frac{1}{2}mv^2$, $T = 2\pi$, (l/g) , $y = (2x^3)^4$, $a^2 = b^2 + c^2 - 2bccosA$
- Substituting values into and evaluating formulae:
 - determination of numerical value of formulae (using a maximum of four variables, all four arithmetical operations and square and square root terms), of the form:
 - e.g. $E_k = \frac{1}{2}mv^2$, $T = 2\pi$, (l/g) , $y = (2x^3)^4$, $a^2 = b^2 + c^2 - 2bccosA$
- Forming linear equations of the form:
 - e.g. $x + 3 = 8$, $6m + 11 = 25 - m$, $2(x + 1) = 8$, $7/x = 2$, $4/t = \frac{1}{2}$,
 $3x = 7(8 - 2x)$
- Solving equations:
 - equations of the form:
 - e.g. $x + 3 = 8$, $6m + 11 = 25 - m$, $2(x + 1) = 8$, $7/x = 2$, $4/t = \frac{2}{3}$,
 $3x = 7(8 - 2x)$
- Plotting a linear relationship from given data and interpreting information from graphs:
 - Cartesian coordinates
 - gradient and intercept
 - interpolation and extrapolation.
- Accuracy of calculations:
 - use of approximation to check a calculation
 - effects of rounding errors.

B2 Mensuration

Measurement of area of square, rectangle, triangle, circle and trapezium, and surface areas and volumes of cubes, prisms and cylinders.

- Areas:
 - cross-sectional area of an I-section beam
 - cross-sectional area of a drainage pipe
 - plot of land laid out as a trapezium
 - surface area of a cone.

- Volumes:
 - cylinder
 - cube
 - prism
 - cone
 - I-section beam.
- Accuracy of calculations:
 - use of approximation to check a calculation
 - effects of rounding errors.

B3 Trigonometry

Using trigonometry.

- Applications:
 - staircase design
 - pitched roofs, setting out and dimensional control, checking for right angles, horizontal alignment, vertical alignment and squareness.
- Pythagoras' theorem:
 - finding lengths in right-angled triangles
 - 3-4-5 triangles.
- Relationships:
 - right-angled triangle functions (sine, cosine, tangent)
 - trigonometric relationship ($\tan \theta = \sin \theta / \cos \theta$).
- Accuracy of calculations:
 - use of approximation to check a calculation
 - effects of rounding errors.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the effects of forces and temperature changes on materials used in construction		A.D1 Evaluate two different construction materials in terms of their behaviour under load and their response to changes in temperature in practical construction contexts.
A.P1 Explain the action and effects of forces on three different construction materials, applying scientific and mathematical principles.	A.M1 Discuss how two different construction materials behave under load in practical construction contexts.	
A.P2 Explain the effects of temperature change on three different materials used in construction, applying scientific principles.	A.M2 Discuss the action and effect of extremes of temperature change upon two different construction materials in practical construction contexts.	
Learning aim B: Use mathematical techniques to solve construction problems		
B.P3 Apply algebraic and graphical methods to solve two different practical construction problems.	B.M3 Solve a practical construction problem using trigonometric, mensuration and algebraic methods.	B.D2 Justify the application of algebraic and graphical methods, mensuration and trigonometry to solve a practical construction problem.
B.P4 Apply mensuration and trigonometry to solve two different practical construction problems.		

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims, and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.M2, A.D1)

Learning aim: B (B.P3, B.P4, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

To ensure the vocational relevance of the unit, a range of appropriate, realistic and feasible project material should be available. There are no special resources required for testing the materials, though centres are encouraged to use equipment for demonstration of the effects of forces and changes in temperature on construction materials.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must evaluate two building materials in terms of their behaviour under load and their response to changes in temperature in practical construction contexts, including where water is present. The evaluation should include how the response of each material to loads and temperature changes affects the way in which it is used in construction. The materials chosen could be steel and concrete, for example, or plastic and brick. In the former example, evidence might address the strength and ductility 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 strength and high coefficient of thermal expansion make them unsuitable for structural purposes. The materials selected should be negotiated and agreed between learners and teacher.

For Merit standard, learners must discuss how two different building materials behave under load. Learners should consider one ductile and one brittle material and analyse their stress-strain relationship as well as the nature of stresses. Learners must also discuss the action and effects of extremes of temperature change on two construction materials. This should include how water, as ice, can damage two building materials when the temperature drops below the freezing point of water, i.e. the expansion of water on freezing, and the effect of repeated cycles of freezing and thawing on the two chosen materials.

For Pass standard, learners must explain and determine the action and effects of forces on construction materials, applying scientific principles. The scientific principles should include gravitational forces and a description of Hooke's law. To determine the effects of forces on construction materials learners should be given three situations involving materials under load, and they must determine, using calculations and diagrams, the stresses, strains and modulus of elasticity. The learner should conclude the effects of the forces on the materials in relation to their findings. Evidence for this criterion could be provided in the form of a presentation (with a teacher observation report) or a report supported with appropriate drawings or sketches together with notes and sketches, for example with supportive graphs and calculations, based on construction-related investigative activities. Learners must also explain the effects of temperature changes on three different construction materials. They should use the coefficients of thermal expansion to determine the effect on three materials from the list provided in topic A2. Learners should be given three situations and determine sensible heat and latent heat changes, plus the magnitude of any expansion or contraction, for a range of temperature changes.

Learning aim B

For Distinction standard, learners must use and justify their application of algebraic and graphical methods, mensuration and trigonometry to solve a practical construction problem. The problem can have various aspects, such as cost of materials, their stress-strain relationship, calculation of quantities required for a given shape, use in a pitched roof or a staircase, etc. This criterion could be evidenced through written notes and/or an oral presentation supported by an observation record/video evidence.

For Merit standard, learners must solve a practical construction problem using trigonometric, mensuration and algebraic methods. Learners must comment on the reliability and accuracy of their answers.

For Pass standard, learners must apply algebraic and graphical methods to solve two different practical construction problems. The algebraic problems should include opportunities to rearrange (transpose) formulae and to evaluate the formulae numerically. 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, teachers may devise activities specifically for assessment purposes, but they must ensure that these have a clear and practical relevance to the construction industry. To apply graphical methods, learners can use data generated through other work in this unit or qualification or use secondary information where it is not. The data may come from practical construction work, setting-out exercises or drawing classes. Learners must decide what they are going to do and apply their findings to reach a conclusion in terms of the construction contexts. Learners must also apply mensuration and trigonometry to solve two different practical construction problems. The problems should include opportunities to calculate areas and volumes and to apply knowledge of Pythagoras' theorem and trigonometric relationships. Learners must decide what they are going to do and apply their findings to reach a conclusion in terms of the construction contexts.

Assessment controls

Time: assignments should have a recommended time period. This is for advice only and can be adjusted depending on learners' needs.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resources to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- International GCSE/core curriculum

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills.

Unit 4: Construction and Design

Level: 2

Unit type: **Pearson Set Assignment**

Guided learning hours: **30**

Unit in brief

Learners will understand the underlying principles of building design to produce initial designs that meet the needs of a client.

Unit introduction

Have you ever wondered why buildings are very different in their design and function?

On completing this unit, you will understand what the construction industry undertakes in terms of the different types of buildings and structures it designs and builds. You will learn how client briefs can be developed by analysing the client's needs and requirements for the building and considering the external constraints on development.

You will gain an understanding of the different types of construction activities that take place within the industry, from new build through to the refurbishment of older buildings. The contribution that construction makes to the built environment, to the regional and national economy and to the people cannot be overestimated in terms of health and safety, design, wealth and comfort.

You will start to look at how designs are influenced by client needs and external constraints. The building designer, who may be an architect, is usually the first appointment that a client will make. They will analyse the client's needs, develop a design brief and generate a number of concept ideas that could meet with the client's approval. These ideas may have to fit in with the style of traditional buildings within a locality or could be a more modern contemporary design when there are no such constraints. The client will then select a concept for the architect to develop into a final design solution that can utilise a number of methods of graphical communication.

In this unit you will analyse needs and constraints in order to produce a typical client brief for a low-rise domestic building (up to two storeys in height) and produce a range of sketch proposals or ideas.

This unit has synoptic assessment requiring you to select and integrate knowledge from across the qualification, therefore it should be taken at the end of the course of study.

Assessment

This unit has a Pearson Set Assignment. Learners must complete a Pearson Set Assignment Brief.

Learning aims

In this unit you will:

- A** Understand the work of the construction industry
- B** Understand a client's needs to develop a design brief for a low-rise building
- C** Produce a range of initial sketch ideas to meet the requirements of a client brief for a low-rise building.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the work of the construction industry	A1 The construction industry and the built environment A2 The types of activities undertaken in the construction industry	This unit is assessed through a Pearson Set Assignment.
B Understand a client's needs to develop a design brief for a low-rise building	B1 Understanding a client's needs B2 Understanding the constraints on design B3 Production of a client brief for a low-rise building	
C Produce a range of initial sketch ideas to meet the requirements of a client brief for a low-rise building	C1 Generation of initial sketch ideas to facilitate development of the final design solution	

Content

Learning aim A: Understand the work of the construction industry

A1 The construction industry and the built environment

Understand how the construction industry contributes to and impacts wider society, including:

- the design of attractive, aesthetically pleasing structures and buildings that make our built environment pleasant to live in:
 - designing for appearance and aesthetics
 - designing for sustainability
 - designing for functionality
 - designing for occupant and public safety
- the contribution to the infrastructure of the built environment in terms of:
 - roads
 - drainage
 - provision of services (gas, electricity, water and communication technology)
 - flood defences
 - natural disaster mitigation measures
- the inclusion of the community in terms of:
 - housing
 - green spaces
 - transport hubs
 - employment opportunities
 - security
- the economic benefits and employment opportunities that construction brings, develops and maintains in terms of:
 - jobs and careers
 - wealth generated by property and land development
 - regeneration of inner-city areas
- consideration of the benefits that the construction sector brings to:
 - the built environment
 - the local community
 - the nation or region as a whole.

A2 The types of activities undertaken in the construction industry

Know the range of work that the construction industry undertakes, including:

- civil engineering, infrastructure works including railways, motorways, roads, bridges, airports, service distribution, sewers, tunnels, sea defences, flood defences, river and harbour works, renewable energies
- industrial: factories, workshops, industrial estates, warehousing
- residential: private housing, apartments, housing for assisted living, social housing
- commercial: banks, offices, business parks
- retail: shops, retail shopping parks, shopping centres
- health: hospitals, clinics, health centres, doctors' surgeries
- education: schools, colleges, universities, training centres
- leisure and recreation: leisure centres, cinemas, swimming pools, stadiums

- sports facilities
- activities: design and construction of buildings and structures, design and construction of infrastructure works, refurbishment of existing buildings, repairs and maintenance of building, estates management, facilities management.

Learning aim B: Understand a client's needs to develop a design brief for a low-rise building

B1 Understanding a client's needs

Understanding the client's needs in terms of:

- sustainability:
 - materials
 - thermal efficiency
 - alternative energies
 - orientation
 - carbon footprint
 - climate mitigation and occupant comfort
- building use:
 - residential
 - communal space
 - retail
 - industrial
 - commercial
 - education
 - health
- accommodation:
 - rooms
 - size
 - function
 - space
 - orientation
 - floors
- style and aesthetics:
 - external
 - street scene
 - internal
 - style
 - preferred materials
 - mood boards
 - colours
 - local and regional influences.

B2 Understanding the constraints on design

The client and design team will need to consider other influences and constraints on design to include:

- resources:
 - budget:
 - initial costs and life cycle costs
 - market positioning
 - level of specification
 - specialist skills required
 - site:
 - area
 - location
 - access
 - services
 - building:
 - size
 - structural form
 - materials
 - sustainability
- local, regional and national government legislation and standards that restrict what can be built and how it must be constructed:
 - regulations that impact on what can be built
 - regulations that impact on the appearance or aesthetics of the building
 - local or regional plans for development areas
 - regulations relating to building standards
 - local needs and demand
 - specific regulations that impact on:
 - style
 - height
 - materials
 - structural form
 - density
 - community consultations
 - objections to the development
- timescales:
 - completion date
 - contract period
- mood board:
 - client's design style preferences
 - aesthetic preference and influence
 - external and internal finishes.

B3 Production of a client brief for a low-rise building

Using the analysis of needs and constraints, produce a client brief that will aid the development of appropriate design solutions:

- existing situation
- project requirements
- budget
- design factors and constraints
- specification for internal and external features
- end users.

Learning aim C: Produce a range of initial sketch ideas to meet the requirements of a client brief for a low-rise building**C1 Generation of initial sketch ideas to facilitate development of the final design solution**

- Initial sketch ideas in response to the client brief:
 - freehand sketching floor plans to approximate scale
 - freehand sketching external views in one- or two-point perspective
 - concept ideas for external appearance
 - concept ideas for internal layout.
- Client approval and review of ideas against the client brief:
 - review of the ideas against the client brief
 - client feedback and concept selection.
- Responding to client feedback:
 - amend and refine ideas to produce sketches for the final concept or a 3D CAD model for the final concept
 - addition of annotations to communicate construction form and type.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the work of the construction industry		
<p>A.P1 Describe the range of activities undertaken by the construction industry.</p> <p>A.P2 Describe the contribution that the construction industry makes to society.</p>	<p>A.M1 Explain the local contribution made by the construction industry to society.</p>	<p>A.D1 Evaluate the local and national contributions made by the construction industry to society.</p>
Learning aim B: Understand a client's needs to develop a design brief for a low-rise building		
<p>B.P3 Describe a client's needs to develop a client brief for a given project scenario.</p> <p>B.P4 Describe the constraints on design, considering resources, planning and timescales to develop a client brief for a given project scenario.</p>	<p>B.M2 Analyse needs an constraints, considering resources, planning and timescales to develop a client brief for a given project scenario that prioritises the design requirements.</p>	<p>B.D2 Refine needs and constraints to develop a client brief for a given project scenario that examines ways of complying with design requirements and constraints.</p>
Learning aim C: Produce a range of initial sketch ideas to meet the requirements of a client brief for a low-rise building		
<p>C.P5 Produce initial sketches for a minimum of two concept ideas, including the application of maths, that meet the requirements of a client brief.</p> <p>C.P6 Review concept ideas against the requirements of a client brief.</p>	<p>C.M3 Produce initial sketches for a minimum of three fully annotated concept ideas, including the application of maths, that meet the requirements of a client brief.</p> <p>C.M4 Refine a concept idea following client feedback.</p>	<p>C.D3 Produce initial sketches for a minimum of four fully annotated concept ideas, including the application of maths, that fully comply with all the requirements of a client brief and are influenced by different design styles.</p>

Essential information for assignments

This unit is assessed using a Pearson Set Assignment Brief. A set assignment must be used to assess learners.

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

This unit is assessed internally by the centre using a Pearson Set Assignment and externally verified by Pearson.

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge of the type of work that the construction industry undertakes across all sectors. They will be able to evaluate both local and national contributions made by the construction industry to society. In doing so they will consider most of the following: infrastructure, the built environment, community use, economic benefits, and both direct and indirect employment brought about by construction development. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge of the type of work that the construction industry undertakes across most sectors. They will be able to explain both local and national contributions made by the construction industry to society. In doing so they will consider some of the following: infrastructure, the built environment, community use, economic benefits, and direct or indirect employment brought about by construction development. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of the type of work that the construction industry undertakes across some sectors. They will be able to describe local or national contributions made by the construction industry to society. In doing so they will consider a few of the following: infrastructure, the built environment, community use, economic benefits and employment brought about by construction development. They will make limited use of technical vocabulary within their work.

Learning aims B and C

For Distinction standard, learners will demonstrate developed knowledge of construction design in order to analyse a scenario and produce an initial design that will effectively work within identified constraints. In doing so they will analyse and refine client needs and the impact of external constraints to produce a comprehensive and effective client brief. They will then produce a range of effective designs influenced by different design styles. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge of construction design in order to analyse a scenario and produce an initial design that will effectively work within identified constraints. In doing so they will analyse client needs and the impact of external constraints to produce an appropriate client brief. They will then produce some effective designs. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of construction design in order to consider a scenario and produce an initial design that will effectively work within some of the identified constraints. In doing so they will describe client needs and the impact of some external constraints to produce a basic client brief. They will then produce some basic designs. They will make limited use of technical vocabulary within their work.

Assessment controls

Time: this assignment has a recommended time period. This is for advice only and can be adjusted depending on learners' needs.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resources to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 7: Construction Drawing Techniques

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in the interpretation and analysis of scenarios.

Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

This unit will develop learners' knowledge of the construction processes and operations that are used in low-rise construction, the sequencing of construction work, and how the properties of construction materials affect their specification and use. For this unit, 'low-rise construction' applies to a building 5.2 metres in height or less.

Unit introduction

In almost every job role in the construction industry, it is important to have an understanding of the key activities and elements that are typical of low-rise buildings. Whether somebody is working as a supervisor, manager, designer or planner, they will always need to know about the processes, activities and operations used to construct buildings and the part that each has in a construction project.

In this unit you will study processes and operations in the context of both traditional and modern construction techniques. You will develop an awareness of the implications of each type of technique. This will help you understand how modern off-site manufacturing processes influence on-site processes and operations.

This unit offers you an opportunity to explore the correct sequencing of construction activities and the simple planning techniques involved. This will help you understand how the various processes and operations of a project come together within the project timeframe and what happens when a project does not go to plan.

You will study the practical activities associated with construction, enabling you to become familiar with natural, processed and manufactured materials that are in general use for constructing low-rise buildings. You will also learn about the properties that make these materials suitable for their intended use in a particular element of a building.

Learning aims

In this unit you will:

- A** Understand the importance of sequencing and planning stages of construction work
- B** Explore traditional and modern construction processes and operations used in low-rise construction
- C** Understand the properties and uses of construction materials.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the importance of sequencing and planning stages of construction work	A1 Construction operations A2 Sequencing and planning	A written report that considers the operations and stages of construction and the need for appropriate sequencing and planning.
B Explore traditional and modern construction processes and operations used in low-rise construction	B1 Key elements and their function in low-rise buildings B2 Traditional construction of low-rise buildings B3 Modern construction of low-rise buildings	A written evaluation of traditional and modern methods of construction and the materials that are used in the construction of low-rise buildings.
C Understand the properties and uses of construction materials	C1 Common construction materials C2 Material uses and properties	

Content

Learning aim A: Understand the importance of sequencing and planning stages of construction work

A1 Construction operations

Understand stages of construction and construction operations.

- Stages of construction operations:
 - setting up site
 - groundwork
 - sub-structure
 - superstructure, including finishes and internal services
 - external works including provision of utility services
 - finishes.
- Construction operations:
 - key activities including:
 - brickwork and blockwork
 - carpentry and joinery
 - roofing
 - other activities including:
 - painting and decorating
 - groundwork
 - concrete work
 - stonemasonry
 - floor, wall and ceiling finishes
 - plumbing, heating and ventilation installation
 - electrical installation.

A2 Sequencing and planning

Understand how construction stages and operations are sequenced and the impact of sequencing on the progress of construction projects.

- Planning an appropriate and logical order of construction operations on site:
 - use of Gantt charts
 - use of bar charts.
- Production problems caused by inappropriate planning or sequencing of work.
- Effects of production problems and unforeseen events on productivity and cost, e.g. materials shortages, bad weather, accidents on site, industrial action, flooding or a major trench collapse.

Learning aim B: Explore traditional and modern construction processes and operations used in low-rise construction

B1 Key elements and their functions in low-rise buildings

Know the key elements of low-rise buildings that allow them to meet their functional requirements.

- Functional requirements of key elements of low-rise domestic buildings:
 - key elements and their functions, including:
 - foundations – to support the building loads
 - floors – to provide a habitable and functional space
 - walls – to provide enclosure for human comfort, support the loads and protect from weathering elements
 - roofs – to make buildings weatherproof and provide human comfort
 - doors – to provide access
 - windows – to allow natural light and ventilation
 - stairs – to provide access
 - services – to provide water supply, drainage, electricity, gas and telecommunications
 - integration of elements to construct a building.

B2 Traditional construction of low-rise buildings

Understand the processes required for traditional construction of low-rise buildings.

- Processes and operations:
 - setting up a site
 - materials storage
 - setting out a building
 - groundworks
 - on-site craft operations:
 - in-situ concrete
 - brickwork and blockwork
 - roofing works
 - carpentry and joinery
 - finishes
 - installation of services.
- Understand the impact of on-site traditional production:
 - use of off-site production of components, elements and materials and its effect:
 - productivity on site
 - costs on site
 - environmental impact.
- Performance in use.

B3 Modern construction of low-rise buildings

Understand the processes required for modern construction of low-rise buildings.

- Processes and operations including:
 - setting out the building with greater dimensional coordination
 - just-in-time delivery of components
 - off-site fabrication:
 - modules
 - pods
 - frames
 - integrated services
 - frame construction
 - on-site assembly
 - non-load-bearing curtain walling
 - cladding
 - lightweight demountable internal partitions
 - automation – 3D printing, robotics.
- Understand the impact of off-site production:
 - use of off-site production components, elements and materials and its effect:
 - productivity on site
 - costs on site
 - environmental impact
 - performance in use
 - safety improvement.

Learning aim C: Understand the properties and uses of construction materials**C1 Common construction materials**

Know the classification of materials.

- Natural materials including:
 - stone
 - timber
 - adobe
 - cob
 - straw
 - earth.
- Processed materials including:
 - aggregates
 - concrete
 - bricks
 - metals and alloys
 - timber products
 - bituminous materials.
- Manufactured materials including:
 - cements
 - limes
 - plastics
 - paints.

C2 Material uses and properties

Understand the properties and uses of common construction materials.

- Common construction materials including:
 - bricks and blocks
 - concrete
 - timber
 - cements
 - metals
 - bituminous materials
 - plastics
 - aggregates
 - paints.
- Properties of construction materials including:
 - density
 - tensile and compressive strength
 - elasticity
 - ductility
 - porosity
 - thermal resistance
 - resistance to degradation or durability
 - workability
 - thermal conductivity and reflectivity.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the importance of sequencing and planning stages of construction work		A.D1 Evaluate the sequence of construction stages and operations in relation to effects caused by production problems and unforeseen events and the effect on productivity and cost for a low-rise building.
A.P1 Describe the construction stages and operations for a low-rise building.	A.M1 Analyse the sequence of construction stages and operations in relation to problems caused by inappropriate planning and sequencing of activities for a low-rise building.	
A.P2 Explain the importance of sequencing construction operations for a low-rise building.		
Learning aim B: Explore traditional and modern construction processes and operations used in low-rise construction		BC.D2 Evaluate traditional and modern construction operations and processes, including the specification of different construction materials and their performance, for use in two different situations.
B.P3 Describe functional requirements of key elements in low-rise buildings.	B.M2 Compare and contrast traditional and modern construction processes and operations.	
B.P4 Explain the processes and operations used in traditional methods of construction and in modern methods of construction.		
Learning aim C: Understand the properties and uses of construction materials		
C.P5 Describe the construction materials as natural, processed or manufactured.	C.M3 Explain how the properties of a natural, a processed and a manufactured construction material determine their performance and their use in low-rise buildings.	
C.P6 Describe the properties of common construction materials used in low-rise buildings.		

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, BC.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a variety of resource material relevant to the construction industry. 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 prepared Gantt charts, drawings, specifications and schedules for low-rise buildings are required.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will need to produce an evaluation of the planning of a project. Evidence could be provided in the form of a presentation or a report based on a real project or on a teacher-provided case study. Learners will need to evaluate the effects of problems and unforeseen events, for example incorrect sequencing of activities or shortages of materials. A range of unforeseen events should be considered, as included within the unit content. Learners will need to 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.

For Merit standard, learners must analyse the sequence of construction stages and operations for a given low-rise building that is presented in planning and sequencing documentation. Learners will need to interpret simple bar (Gantt) charts used to plan and sequence key and other activities for the identified low-rise building. Learners will need to include in their analysis details of production problems that are caused by inappropriate planning and sequencing of construction operations.

Learners must use their knowledge and understanding of construction operations to explain the activities that are completed at different stages of construction operations for low-rise building. Appropriate drawings, sketches or charts could provide useful evidence to demonstrate the potential problems linked to inappropriate planning and sequencing of activities.

For Pass standard, learners must be able to describe the stages of a teacher-specified low-rise construction project. Learners could produce drawings, sketches or tables to support their written work. In their response learners should describe both key and other activities that are carried out during stages of the construction project, including setting up site, groundwork, sub-structure, superstructure, external works and finishes. Learners also need to provide an explanation of the importance of the sequencing of construction operations for the specified low-rise construction project. They must include details of why construction operations must be performed in a logical sequence and the possible effects if this does not happen. They should also make reference to tools that are used to plan construction operations, for example bar charts and Gantt charts, including how and where these are used.

Learning aims B and C

For Distinction standard, learners must evaluate the effects of traditional and modern construction operations and processes. In their evaluation they must consider the effect of off-site production of components, elements and materials in terms of overall productivity, environmental impact, performance in use and costs for the construction project. The evaluation should be based upon teacher-provided case studies of both a traditional and a modern low-rise building. Case studies should have sufficient details regarding costs and programme of works to allow learners to draw conclusions.

Learners must also evaluate the suitability of the specification of two construction materials for use in the two different teacher-specified situations. Learner evidence could be in the form of written specifications for building elements identified from a survey of a real building, from architectural drawings or from provided photographs. Evidence is likely to be in the form of a written report or an individual learner presentation supported by a teacher record/recording or teacher record of learner responses to verbal questions.

For Merit standard, learners must compare and contrast traditional and modern construction operations and processes in terms of overall productivity, environmental impact, performance in use and costs. The comparison should be based upon learners' research into traditional and modern methods of construction.

Learners should build upon their awareness of the important properties of natural, processed and manufactured construction materials to give details of how material properties affect how construction materials of each type perform and behave when in use. The types of material must include one natural, one processed and one manufactured construction material. Learners also need to give details of how the selection and specification of materials for given low-rise buildings is influenced by how materials perform in use.

Evidence could be in the form of a written report or an individual learner presentation (teacher record/recording with supporting materials required) or teacher record of learner responses to verbal questions.

For Pass standard, learners must describe functional requirements of key elements in low-rise buildings. The descriptions should cover a range of elements, including foundations, floors, walls, roofs, doors, windows, stairs and services. Learners must demonstrate an understanding of the purpose of these building elements rather than how they fulfil those functions. For example, they should be aware that foundations must bear combined 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.

Learners must explain the processes and operations used in traditional methods of construction, including clear details of the impact of using traditional methods of construction on overall productivity. These should include setting up a site, materials storage, setting out a building, groundworks and on-site craft operations. Similarly, learners must explain the processes and operations used in modern methods of construction. They should explain the impact on productivity of using modern methods of construction. This should include setting out the building, just-in-time delivery, off-site fabrication, on-site assembly, non-load-bearing curtain walling, cladding, lightweight demountable internal partitions, increasingly sophisticated services and frame construction.

Learners must then describe construction materials in common use in the local construction industry as either natural (three examples), processed (three examples) or manufactured (three examples). Within their descriptions learners should show they understand how the materials are processed or manufactured. Learners must describe the properties of common construction materials. They could do this by clearly describing each of the properties listed in the unit content with examples of materials that have those properties. Evidence could be provided in the form of a report or presentation (teacher record/recording of presentation required with supporting materials) 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 teacher-provided drawings or photographs.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 7: Construction Drawing Techniques

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and presentations
- site visits
- drawings, Gantt charts and photographs as exemplars
- visits to manufacturers of materials and components.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and presentation skills.

Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

This unit will develop learners' knowledge and understanding of the methods and techniques involved in the various stages of the construction of low-rise domestic buildings. For this unit, 'low-rise construction' applies to a building 5.2 metres in height or less.

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. In this unit you will gain an understanding of different modern structural forms and the various types and functions of the elements that are involved in buildings. This is an essential requirement for all those working in construction.

The unit will allow you to gain knowledge and understanding of the different modern structural forms used in the construction of houses, flats and apartments. You will also gain 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, you will develop your knowledge and understanding of the construction process by exploring pre-construction activities such as site investigations, site surveys, site preparation, specialist demolition and environmental considerations.

You will explore the sub-structure (below ground), superstructure (above ground level) and external work phases of projects, together with their related elements.

With this understanding you will be able to explore how new building elements are formed and how these elements are combined as part of the final building, and how sustainability is incorporated into all aspects of the construction. You will also investigate the on-site temporary arrangements needed to support the construction process.

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

Learning aims

In this unit you will:

- A** Understand the relationship between the functions of a building and its elements
- B** Know the methods and techniques associated with pre-construction, groundworks, sub-structure and external works for low-rise buildings
- C** Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the relationship between the functions of a building and its elements	A1 Functions of buildings and building elements A2 Common structural forms for low-rise methods of construction A3 Primary services	A written evaluation of a low-rise building in terms of the structural form and use of the building.
B Know the methods and techniques associated with pre-construction, groundworks, sub-structure and external works for low-rise buildings	B1 Pre-construction work B2 Groundworks B3 Sub-structures B4 External works	A written evaluation of methods and techniques used for the construction of low-rise buildings and how the construction methods contribute to the performance in use of the building.
C Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings	C1 Superstructures C2 Wall types C3 Floors C4 Roofs C5 Modern and traditional construction methods and techniques	

Content

Learning aim A: Understand the relationship between the functions of a building and its elements

A1 Functions of buildings and building elements

Understand design functions and performance characteristics:

- strength
- stability
- protection from climate
- durability
- resistance to fire
- thermal insulation
- sound insulation
- sustainability.

A2 Common structural forms for low-rise methods of construction

Understand the 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.

A3 Primary services

Know the primary services that are used in low-rise buildings:

- water
- gas
- electricity
- telephone
- drainage.

Learning aim B: Know the methods and techniques associated with pre-construction, groundworks, sub-structure and external works for low-rise buildings

B1 Pre-construction work

Understand the operations and processes required during the pre-construction phase of low-rise buildings:

- site survey
- site investigation
- site security
- demolition by specialist contractors
- environmental and sustainability considerations
- health, safety and welfare issues.

B2 Groundworks

Understand the operations and processes required during groundworks of low-rise buildings:

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

B3 Sub-structures

Understand the operations and processes required during the construction of sub-structures for low-rise buildings:

- foundations:
 - traditional strip
 - deep strip or trench fill
 - isolated pad
 - raft
 - short bored pile
- selection of appropriate foundation for a variety of ground conditions
- design and construction of ground floors:
 - solid
 - suspended
- health, safety and welfare issues.

B4 External works

Know the key external works associated with low-rise buildings that allow them to meet their functional requirements:

- estate roads
- access roads
- driveways
- paths.

Learning aim C: Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings

C1 Superstructures

Understand the function and types of elements of the superstructure of low-rise buildings that allow them to meet their functional requirements.

- Building elements:
 - walls
 - floors
 - roofs.
- Safety aspects of each.

C2 Wall types

Understand the wall types used for low-rise buildings that allow them to meet their functional requirements:

- solid masonry
- cavity masonry
- timber frame
- adobe
- internal walls:
 - stud walls
 - metal frame partitions, modern options
- doors and windows.

C3 Floors

Understand the design and construction of suspended floors used in low-rise buildings.

- Types of suspended floors:
 - timber
 - concrete.

C4 Roofs

Understand the design and construction of roofs used for low-rise buildings:

- flat
- lean-to
- mono-pitch
- double pitch
- gable end
- hipped end.

C5 Modern and traditional construction methods and techniques

Understand the methods and techniques used for the construction of low-rise buildings:

- in terms of construction plant
- modularisation
- off-site fabrication
- labour requirements
- effect on sustainability.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the relationship between the functions of a building and its elements		A.D1 Evaluate a modern low-rise domestic building in terms of how the structural form addresses the intended design function of the building.
<p>A.P1 Describe three examples of structural forms used in the construction of low-rise domestic buildings.</p> <p>A.P2 Assess the main functions of buildings and their elements.</p> <p>A.P3 Describe the primary services provided to low-rise construction projects.</p>	<p>A.M1 Explain how building elements and primary services are integrated into a low-rise domestic building.</p>	
Learning aim B: Know the methods and techniques associated with pre-construction, groundworks, sub-structure and external works for low-rise buildings		BC.D2 Evaluate two given construction methods and techniques in terms of their contribution to the performance-in-use of a low-rise building.
<p>B.P4 Describe the methods and techniques used in the preconstruction and groundwork phases of low-rise domestic construction projects.</p> <p>B.P5 Describe the methods and techniques used in the sub-structure phase of low-rise domestic construction projects.</p>	<p>B.M2 Compare the different methods and techniques used in the pre-construction, groundwork, sub-structure and external works for a low-rise domestic building.</p>	
Learning aim C: Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings		
<p>C.P6 Describe modern and traditional methods and techniques used in the superstructure phase of low-rise domestic construction projects.</p> <p>C.P7 Describe the provision of external works to low-rise domestic buildings.</p>	<p>C.M3 Assess the methods and techniques used in the construction of the superstructure in terms of their suitability for modern methods of construction.</p>	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.P3, A.M1, A.D1)

Learning aims: B and C (B.P4, B.P5, C.P6, C.P7, B.M2, C.M3, BC.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a variety of resource material relevant to the construction industry. Centres should 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.

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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must evaluate a teacher-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. The evaluation should be based on either a teacher-specified low-rise building or on drawings and/or photographs provided by the teacher.

For Merit standard, learners must explain how the different building elements and primary services are integrated in the construction of the given low-rise domestic building. This should include details of how specific primary services, such as electricity and water, are incorporated within the structure of the building to allow the service to be provided in different rooms and areas of the building.

For Pass standard, learners must compare three examples of different structural forms used in the construction of low-rise domestic buildings. Evidence could be in the form of a short report, a set of notes or a presentation. Annotated sketches and drawings could also be used to support written work.

Learners must include in their report an assessment of the general functions of buildings and their elements. The assessment should include reference to heat, light and shelter requirements as well as other important requirements of the occupants. Learners should include details of how the building conforms to local and national legislation.

Learners must also describe the primary services of water, electricity, gas, telephone and drainage and their purpose within low-rise buildings.

Learning aims B and C

For Distinction standard, 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 terms of the design of the building, technical requirements, financial constraints or the environment and sustainability. 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. The two construction methods and techniques to be evaluated should allow for both positive and negative factors to be considered.

For Merit standard, learners must compare the different methods and techniques used in the pre-construction, groundwork, sub-structure and external works for a low-rise domestic building in terms of their performance in use. They must also assess the methods and techniques used in the construction of the superstructure in terms of their suitability for the use of modern methods of construction.

For Pass standard, learners must describe the methods and techniques used in the preconstruction 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 or a presentation.

Learners must be able to identify and describe the common methods and techniques employed in the sub-structure phase of low-rise domestic construction projects, as listed in the unit content. Similarly, 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.

Learners must also 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. Their descriptions should make reference to basic construction details, including the materials used.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 7: Construction Drawing Techniques

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and presentations
- site visits
- provision of drawings and photographs of low-rise domestic buildings.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to:

- develop skills in carrying out research, organising and analysing information
- select the most appropriate methods for presenting technical information to third parties
- develop practical skills relating to the sketching and drawing of construction details.

Unit 7: Construction Drawing Techniques

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand the underlying principles of construction drawing techniques to produce technical working drawings.

Unit introduction

Regardless of which role you might choose in the construction industry, interpretation of drawings would be an essential part of it. Drawing is the main language of the construction industry as it is considered a clear, accurate and convenient way of communicating construction information. This unit offers you opportunities to interpret the information contained in various types of drawings. This skill is transferable and you can use it in a range of contexts within the industry.

In this unit you 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. You will become familiar with the drawing equipment and materials in common use. You will also be introduced to a computer-aided drafting (CAD) environment.

You will build upon this knowledge and understanding to explore drawing standards and conventions in common use. This will include scales, hatchings, lines, dimensions, annotations and projection methods used in construction drawings.

It is generally believed that the best way to learn construction drawing is to practise the techniques, and that is what you will do. You will have the opportunity to develop skills in producing construction sketches and drawings using relevant techniques, conventions and standards. The unit allows opportunities to apply manual techniques, CAD or a mix of the two.

Learning aims

In this unit you will:

- A** Understand the requirements to produce construction drawings
- B** Explore the production of construction drawings.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Understand the requirements to produce construction drawings</p>	<p>A1 Purpose of drawings A2 Manual materials and equipment A3 Computer-aided drafting (CAD)</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report covering types of drawings, their purpose, drawing equipment and materials, and an introduction to CAD techniques.</p>
<p>B Explore the production of construction drawings</p>	<p>B1 Drawing conventions B2 Drawings</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce construction drawings of a local building of interest. The work may be produced using manual techniques, CAD or a mix of both.</p>

Content

Learning aim A: Understand the requirements to produce construction drawings

A1 Purpose of drawings

Understand the information required at various stages of the construction process and the purpose of using different types of drawings.

- Identification of the information required at various stages of the construction process.
- Types of drawings:
 - location, assembly, component, presentation, working drawings.
- Purpose of each type:
 - location drawings: show position of buildings on site
 - assembly drawings: show how components and elements are 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
 - working drawings: show how to construct buildings and other structures.

A2 Manual materials and equipment

Understand the materials and equipment required to produce drawings using manual techniques.

- Manual techniques:
 - equipment:
 - text including pencil, pen, compasses, adjustable set square, eraser, drawing board, scale rule, dividers, protractors, French curves, stencils
 - materials:
 - paper – detail paper, cartridge paper, tracing paper, paper sizes (A0, A1, A2, A3, A4 or sizes commonly used within the region)
 - media – pencil (HB, H, 2H), pen (0.2–0.25 mm and 0.4–0.5 mm) and ink.

A3 Computer-aided drafting (CAD)

Understand the features of a CAD system.

- Features of a CAD system to include:
 - basic drawing commands and editing commands to produce and erase lines, circles, text
 - manipulation of views, including zoom and pan options
 - saving the drawing data in an appropriate format
 - drawing template, to typically include a border, title block, projection, scale, drawing number, title of drawing, material, names of drawing creator and who checks/authorises the drawing
 - health and safety requirements.
- Evaluating drawings:
 - resources and techniques
 - costs and benefits.

Learning aim B: Explore the production of construction drawings

B1 Drawing conventions

Know the conventions used and standards required for the production of construction drawings.

- Conventions:
 - 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
 - projection methods: orthographic.
- Standards:
 - presentation methods and graphical representation techniques as indicated in the International Standards Organisation ISO 128 and subsequent updates.

B2 Drawings

Produce plans, elevations, sections and details typical of a domestic dwelling.

- Floor plans.
- Front and rear elevations.
- One section.
- One foundation and one roof detail.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the requirements to produce construction drawings		
<p>A.P1 Describe the purpose of different types of drawings required at various stages of the construction process.</p> <p>A.P2 Interpret information communicated through different types of drawings.</p> <p>A.P3 Describe the appropriate selection and use of equipment and materials needed to produce construction drawings manually.</p> <p>A.P4 Describe the features of a computer-aided-design system.</p>	<p>A.M1 Explain the production of drawings and the equipment/media used to produce them.</p>	<p>A.D1 Evaluate the production of drawings using computer-aided design and traditional drafting techniques.</p>
Learning aim B: Explore the production of construction drawings		
<p>B.P5 Describe drawing conventions and standards used in the construction industry.</p> <p>B.P6 Apply drawing standards and conventions to produce construction drawings to meet a given brief, drawn to appropriate scales.</p>	<p>B.M2 Produce construction drawings to meet a given brief that are:</p> <ul style="list-style-type: none"> · precise · technically accurate · drawn to appropriate scales. 	<p>B.D2 Evaluate construction drawings produced to meet a given brief in terms of compliance with current national/international standards.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.P3, A.P4, A.M1, A.D1)

Learning aim: B (B.P5, B.P6, B.M2, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a traditional drawing studio environment equipped with drawing boards and drawing equipment and/or computer facilities with appropriate CAD software.

Essential information for assessment decisions

Learning aims A and B

For Distinction standard, learners will demonstrate developed knowledge of the equipment, media and processes involved in the production of construction drawings. They will make good use of their knowledge of construction technology to produce effective working drawings. They will be able to demonstrate sound knowledge and understanding of both traditional manual techniques and CAD and will produce a set of working drawings using either traditional or CAD techniques. They will evaluate construction drawings and the methods used to produce them against international standards for drawing presentation and conventions. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge of the equipment, media and processes involved in the production of construction drawings. They will make use of their knowledge of construction technology to produce working drawings. They will be able to demonstrate knowledge and understanding of both traditional manual techniques and CAD and will produce a set of working drawings using either traditional or CAD techniques. They will explain the methods used to produce construction drawings. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of the equipment, media and processes involved in the production of construction drawings. They will make use of their knowledge of construction technology to produce basic working drawings. They will be able to demonstrate some knowledge and understanding of both traditional manual techniques and CAD and will produce a set of basic working drawings using either traditional or CAD techniques. They will describe the methods used to produce construction drawings. They will make limited use of technical vocabulary within their work.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities
- work experience
- working drawings as exemplars
- visits to appropriate architects' design offices/studios.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop:

- drawing skills
- presentation skills
- writing skills.

Unit 8: Exploring Carpentry and Joinery

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand the use of tools, materials and equipment used in carpentry and joinery and will develop skills in preparing, cutting and joining wood.

Unit introduction

Did you know that carpenters normally work on construction sites fitting staircases, doors and windows, while joiners work in joinery workshops manufacturing the staircases, doors and windows?

The knowledge and skills you will develop are applicable in today's construction industry. Both carpenters and joiners will at some time have to make a timber frame. For example, carpenters would assemble a door frame on site to fit into a brick wall, while a joiner would make a window frame in a workshop for an external wall.

This unit will introduce you to the tools, materials and personal protective equipment (PPE) used by carpenters and joiners. You will learn about the potential health and safety hazards in a carpentry and joinery work area, how to carry out a risk assessment, and what is safe working practice in the use of common tools and equipment. You will also develop the knowledge, skills and techniques to determine and select appropriate materials to produce a timber frame to a given specification.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used in carpentry and joinery tasks
- B** Develop practical skills using safe techniques to produce a timber frame.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Understand tools, materials and equipment used in carpentry and joinery tasks</p>	<p>A1 Tools, materials, equipment and information for carpentry and joinery</p> <p>A2 Safe use and storage of the carpentry and joinery tools, materials and equipment</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to explain the safe use and storage of tools, materials and equipment. This could take the form of a written or oral report.</p>
<p>B Develop practical skills using safe techniques to produce a timber frame</p>	<p>B1 Health and safety</p> <p>B2 Construction of a timber frame</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would need to complete a risk assessment and a materials and equipment requisition sheet prior to producing a timber frame to a given size and specification.</p>

Content

Learning aim A: Understand tools, materials and equipment used in carpentry and joinery tasks

A1 Tools, materials, equipment and information for carpentry and joinery

Purpose and use of tools, materials, equipment and information for carpentry and joinery tasks.

- Setting-out tools including:
 - steel rule
 - tri-square
 - sliding bevel
 - carpenter's pencil
 - marking/mortice gauges
 - combination square
 - tape measure
 - spirit level.
- Hand tools and equipment including:
 - mallet
 - chisels (bevelled and mortice)
 - tenon saw
 - universal saw
 - nail punch
 - claw hammer
 - nail pincers
 - marking knife
 - screwdrivers (slotted, Pozi drive, Phillips)
 - bradawl
 - cordless drill
 - drill types (twist, auger) and sizes
 - smoothing plane, block plane
 - tools used for woodwork unique to the region or host country.
- Equipment including:
 - sizes of G clamps
 - sash cramps
 - bench hook
 - woodworking bench with vice.
- Information including:
 - purpose of drawings
 - how to read drawings
 - units of measurement
 - common abbreviations and symbols used
 - title box.

- Materials including those used in the construction of a timber frame, their properties and characteristics:
 - wood and wood composites:
 - types of softwood, different sizes, characteristics, properties and use: softwood finishes (rough sawn, regularised, planed all round), effect of grain, knots, plywood construction (different thicknesses), medium density fibreboard (MDF) (different thicknesses)
 - renewable wood sources, how to identify, the Forest Stewardship Council (FSC) or other regional/national sustainable forestry marks/initiatives
 - types of glue, properties and use: natural adhesives, synthetic glues (polyvinylacetate)
 - types of fixings – oval nails, panel pins, round wire nails, Pozi drive woodscrews, wall plugs, sizes available, fixing use and selection
 - finishing materials – abrasive paper types, grades of paper, finishing material use.

A2 Safe use and storage of the carpentry and joinery tools, materials and equipment

- Appropriate practices when working with carpentry and joinery equipment and materials.
- Selection and use of personal protective equipment (PPE): high-visibility visor, safety boots, eye protection, dust mask, ear plugs, ear defenders, knee pads, sun screen, sun protection.
- Appropriate storage of tools, materials and equipment: storage of glues (shelf life/pot life), dry, under cover, between batons for ventilation, timber bearers, pallets, height restrictions with respect to storage, security.
- Maintaining a clean and tidy storage area.
- Safe movement of items: safe manual handling techniques when lifting, moving, stacking materials.
- The need for appropriate behaviour and a positive attitude towards health and safety.
- Cleaning tools immediately after use to prevent build-up of deposits and to maintain fitness for future use.
- Returning tools and equipment to appropriate storage upon completion of practical work.

Learning aim B: Develop practical skills using safe techniques to produce a timber frame

B1 Health and safety

Risk assessment prior to starting the activity and approved procedures during the practical activity.

- Hazard identification and risks associated with the practical activity:
 - specified task – trips, slips, cuts and injuries caused by tools and equipment
 - awareness of other people in the area
 - safe movement of items and minimisation of musculoskeletal injuries (manual lifting techniques)
 - dust
 - flying particles

- use of tools and equipment
- exposure to sunlight
- working in high-temperature climates.
- Identification of people at risk.
- Use of control measures to remove or minimise the risk.
- Adoption of safe working practices, including the use of PPE:
 - ensuring a clean and tidy work area
 - the need for appropriate behaviour and a positive attitude towards health and safety
 - cleaning tools immediately after use to prevent build-up of deposits and to maintain fitness for future use.

B2 Construction of a timber frame

Measuring, marking out, cutting and constructing timber joints.

- Preparing and setting up the work area:
 - marking out and cutting of practice joints (bridle joint, mitre joint, half lap joint, housing joint, tee halving joint, dovetail joint, mortice and tenon joint)
 - assembly of joint
 - measuring, marking out and constructing a timber frame using a setting-out rod.
- Cutting joints to make a timber frame:
 - gluing up a timber frame using sash cramps/G clamps on a level surface
 - checking frame is square (check diagonals).
- Safe use of chisels, saws, cordless drills.
- Using dust-minimisation techniques.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used in carpentry and joinery tasks		
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment for carpentry and joinery.</p> <p>A.P2 Explain the safe use and storage of carpentry and joinery tools, materials and equipment.</p>	<p>A.M1 Justify the selection of tools, materials and equipment for a specified carpentry and joinery task.</p>	<p>A.D1 Evaluate the use of alternative materials for a specified carpentry and joinery task.</p>
Learning aim B: Develop practical skills using safe techniques to produce a timber frame		
<p>B.P3 Carry out a risk assessment prior to commencing the construction of a timber frame.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Measure and mark out four different types of joints for a 300 × 300 mm timber frame to a given specification. Dimensionally square to 3 mm.</p> <p>B.P6 Produce a 300 × 300 mm timber frame using four different types of joints to a given spec:</p> <ul style="list-style-type: none"> · ±3 mm joint gap tolerance. 	<p>B.M2 Measure and mark out four different types of joints for a 300 × 300 mm timber frame to a given specification. Dimensionally square to 2 mm.</p> <p>B.M3 Produce a 300 × 300 mm timber frame using four different types of joints to a given spec:</p> <ul style="list-style-type: none"> · ±2 mm joint gap tolerance · not twisted. 	<p>B.D2 Measure and mark out four different types of joints for a 300 × 300 mm timber frame to a given specification. Dimensionally square to 1 mm.</p> <p>B.D3 Produce a 300 × 300 mm timber frame using four different types of joints to a given spec:</p> <ul style="list-style-type: none"> · ±1 mm joint gap tolerance · not twisted.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.P6, B.M2, B.M3, B.D2, B.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped joinery workshop suitable for the production of the practical outcome.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of the selection, safe use and correct storage of carpentry and joinery tools, materials and equipment. They will be able to justify their selection and evaluate choice of materials against possible alternatives that could be used for a specified practical task.

For Merit standard, learners will demonstrate good knowledge and understanding of the selection, safe use and correct storage of carpentry and joinery tools, materials and equipment. They will be able to justify their selection for a specified practical task.

For Pass standard, learners will demonstrate basic knowledge and understanding of the selection, safe use and correct storage of carpentry and joinery tools, materials and equipment. They will be able to explain their selection for a specified practical task.

Learning aim B

For Distinction standard, learners will demonstrate developed knowledge, understanding and skills when undertaking practical carpentry and joinery work. They will carry out a risk assessment and then, working safely, produce a timber frame with four different joints to a high degree of accuracy within a tolerance of ± 1 mm.

For Merit standard, learners will demonstrate good knowledge, understanding and skills when undertaking practical carpentry and joinery work. They will carry out a risk assessment and then, working safely, produce a timber frame with four different joints to a good degree of accuracy within a tolerance of ± 2 mm.

For Pass standard, learners will demonstrate basic knowledge, understanding and skills when undertaking practical carpentry and joinery work. They will carry out a risk assessment and then, working safely, produce a timber frame with four different joints to a basic degree of accuracy within a tolerance of ± 2 mm.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 9: Performing Joinery Operations
- Unit 10: Performing Carpentry Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop hazard identification and safe working skills.

Unit 9: Performing Joinery Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand safety procedures and safe working practice when using tools, materials and equipment to safely complete joinery tasks.

Unit introduction

Did you know that working with wood and associated timber products requires the greatest number and variety of tools in the construction trade? Joiners work with a huge number of different tools, some of which can be used only for a specific purpose or task.

In this unit you will build upon the skills and knowledge gained from *Unit 8: Exploring Carpentry and Joinery*. You will learn about safe practices when working in a joinery environment. You will also undertake practical activities, making sure that you work safely at all times. Your practical activities will include calculating the amount of materials and equipment you need and scheduling them for use.

For the joinery task you will produce a setting-out rod/drawing of a timber door which you will use to help mark out your timber. Then you will cut timber joints to make and assemble a door.

Note: *Unit 8: Exploring Carpentry and Joinery* is a prerequisite for this unit. Evidence from Unit 8 cannot be used for this unit. Unit 9 requires you to select personal protective equipment and the resources required (materials and equipment), and to schedule these for more demanding practical tasks.

Learning aims

In this unit you will:

- A** Explore health and safety practice in performing joinery tasks
- B** Demonstrate practical skills and safe working techniques to carry out joinery tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Explore health and safety practice in performing joinery tasks</p>	<p>A1 Health and safety practice and the impact upon employers and employees</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to prepare a presentation or report into health and safety good practices when applied to joinery work within a joinery workshop environment.</p>
<p>B Demonstrate practical skills and safe working techniques to carry out joinery tasks</p>	<p>B1 Resources used for joinery</p> <p>B2 Safety equipment, its use and safety measures when undertaking joinery tasks</p> <p>B3 Knowledge and techniques</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to produce a joinery item such as a small framed, ledged and braced timber door, including preparatory work such as the scheduling of materials and equipment required and the production of a setting-out rod for use in producing the door.</p>

Content

Learning aim A: Explore health and safety practice in performing joinery tasks

A1 Health and safety practice and the impact upon employers and employees

A range of established safe working practice applies to construction activities in a joinery workshop, including changes and updates to key health and safety practice in accordance with guidance and national legislation in the host country when undertaking joinery work.

Generic health and safety at work

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - ensure the health and safety of all employees
 - provide and maintain plant and system of work
 - provide safe systems of work, including ensuring safety and the control of risk in connection with the use, handling, storage and transport of substances
 - provide information, instruction, training and supervision
 - produce a health and safety policy (in line with national legislation)
 - provide (and not charge for) equipment required for safety
 - provide facilities for employees' welfare at work
 - consult and cooperate with employees on health and safety.
- Employee good practice to:
 - take reasonable care for the health and safety of themselves and others
 - cooperate with employers to enable the employer to perform or comply with their duties under any national health and safety legislation in the host country
 - correctly use anything provided for health and safety
 - not misuse or damage anything provided for health and safety reasons.

Manual handling of materials and equipment in a joinery workshop

Understand the good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - avoid manual handling so far as reasonably practicable if there is a possibility of injury
 - assess manual handling operations that cannot be avoided and reduce the risk where practicable and possible
 - avoid the requirement for manual handling or limit loads
 - provide mechanical means of handling, where practicable and possible
 - reduce the risk of injury so far as reasonably practicable.
- Employee good practice to:
 - follow appropriate systems of work laid down for their safety
 - make proper use of equipment provided for their safety during manual handling
 - not misuse or damage anything provided for manual handling
 - cooperate with their employers on manual handling health and safety matters
 - inform the employer if they identify hazardous handling activities
 - take care to ensure that their activities do not put others at risk.

Control of substances hazardous to health

Understand the good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - conduct risk assessments for hazardous materials present in the workplace
 - provide control measures to prevent harm to health and maintain these measures in good working order
 - ensure that the control measures are adopted and used
 - provide information, instruction and training for employees and others
 - provide health monitoring and surveillance in appropriate cases
 - plan for emergencies.
- Employee good practice to:
 - attend relevant training provided by the employer
 - report hazards and risks
 - use control measures.

Control of noise at work

Understand the good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - carry out a risk assessment to determine the level of noise and exposure
 - ensure that the risk from noise exposure to employees is eliminated at source or reduced to as low a level as is reasonably practicable
 - provide suitable and sufficient training for employees
 - provide personal protective equipment (PPE).
- Employee good practice to:
 - cooperate with their employers on health and safety and noise control
 - wear PPE.

Learning aim B: Demonstrate practical skills and safe working techniques to carry out joinery tasks

B1 Resources used for joinery

The correct selection and use of materials and equipment, their properties and advantages and disadvantages, including calculating and scheduling the quantities of materials and equipment required to produce a framed, ledged and braced door.

- Setting-out tools.
- Hand tools and equipment.
- Equipment and selection to hold and secure work.
- Materials.

B2 Safety equipment, its use and safety measures when undertaking joinery tasks

- Safe working and use of PPE.

B3 Knowledge and techniques

These include:

- preparing wood to receive screws – clearance hole, pilot hole, counter sinking
- how to make and use a joinery rod
- purpose and use of a joinery rod, taking-off techniques, scale 1:1
- purpose of a rebated timber section
- making a stepped mortice and tenon
- making a bare-faced tenon
- door assembly
- importance of position of a brace on a framed and braced door in relation to hinges
- finishing techniques – filling and sanding.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore health and safety practice in performing joinery tasks		
A.P1 Describe health and safety good practice for employees and employers when performing a practical task in joinery.	A.M1 Explain health and safety good practice for employees and employers when performing a practical task in joinery.	A.D1 Justify the health and safety good practice in use for a practical task in joinery.
Learning aim B: Demonstrate practical skills and safe working techniques to carry out joinery tasks		
<p>B.P2 Select the resources required for a framed, ledged and braced door, to include:</p> <ul style="list-style-type: none"> calculating the resources required, including allowance for wastage scheduling the resources. <p>B.P3 Measure, mark out and produce a setting-out rod for a timber door to a given specification:</p> <ul style="list-style-type: none"> ± 3 mm overall dimensions. <p>B.P4 Measure, mark out and produce a timber door with joints to a given specification:</p> <ul style="list-style-type: none"> joint gaps not exceeding 3 mm ± 3 mm overall dimensions smooth finish complying with safe working practices, including the use of personal protective equipment. 	<p>B.M2 Discuss the resources required for a framed, ledged and braced door, to include:</p> <ul style="list-style-type: none"> their advantages and disadvantages the appropriateness of the resources selected the resource calculation, including allowance for wastage scheduling the resources. <p>B.M3 Measure, mark out and produce a setting-out rod for a timber door to a given specification:</p> <ul style="list-style-type: none"> ± 2 mm overall dimensions. <p>B.M4 Measure, mark out and produce a timber door with joints to a given specification:</p> <ul style="list-style-type: none"> joint gaps not exceeding 2 mm ± 2 mm overall dimensions square not twisted smooth, true and neat finish complying with safe working practices, including the use of personal protective equipment. 	<p>B.D2 Measure, mark out and produce a setting-out rod for a timber door to a given specification:</p> <ul style="list-style-type: none"> ± 1 mm overall dimensions. <p>B.D3 Measure, mark out and produce a timber door with joints to a given specification:</p> <ul style="list-style-type: none"> joint gaps not exceeding 1 mm ± 1 mm overall dimensions square not twisted smooth, true and neat finish complying with safe working practices, including the use of personal protective equipment.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.P4, B.M2, B.M3, B.M4, B.D2, B.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped joinery workshop suitable for the production of the practical outcome.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of good health and safety practice appropriate for adoption within a joinery workshop or manufacturing environment. In doing so they will exemplify and justify safe practices to adopt during the production of joinery artefacts. Their work will be detailed and fully meet the needs of the target audience.

For Merit standard, learners will demonstrate good knowledge and understanding of good health and safety practice appropriate for adoption within a joinery workshop or manufacturing environment. In doing so they will explain appropriate safe practices to adopt during the production of joinery artefacts. Their work will mostly meet the needs of the target audience.

For Pass standard, learners will demonstrate basic knowledge and understanding of good health and safety practice appropriate for adoption within a joinery workshop or manufacturing environment. In doing so they will describe appropriate safe practices to adopt during the production of joinery artefacts. Their work will meet some of the needs of the target audience.

Learning aim B

For Distinction standard, learners will demonstrate developed knowledge, understanding and skills when undertaking practical joinery work. They will produce a fully appropriate and highly accurate setting-out rod to assist them in the production of their joinery artefact. They will demonstrate a high level of skill in the production of a high-quality joinery outcome. In doing so they will demonstrate full compliance with safe working practice.

For Merit standard, learners will demonstrate good knowledge, understanding and skills when undertaking practical joinery work. They will produce an appropriate and accurate setting-out rod to assist them in the production of their joinery artefact. They will demonstrate a good level of skill in the production of a good-quality joinery outcome. In doing so they will demonstrate compliance with safe working practice.

For Pass standard, learners will demonstrate basic knowledge, understanding and skills when undertaking practical joinery work. They will produce a setting-out rod to assist them in the production of their joinery artefact. They will demonstrate a basic level of skill in the production of a joinery outcome. In doing so they will demonstrate compliance with safe working practice.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 8: Exploring Carpentry and Joinery
- Unit 10: Performing Carpentry Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop health and safety skills, including safe working practices.

Unit 10: Performing Carpentry Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand safety procedures and safe working practice when using tools, materials and equipment to safely complete carpentry tasks.

Unit introduction

Working with wood and associated timber products on site requires a great number and variety of tools, many more than other occupations in the construction industry. Carpenters work with a huge number of different tools, some of which can be used only for a specific purpose or task.

In this unit you will build upon the skills and knowledge gained from *Unit 8: Exploring Carpentry and Joinery*. You will learn about safe practices when working in a site-based carpentry environment. You will also undertake practical activities, making sure that you work safely at all times. Your practical activities will include calculating the amount of materials and equipment you need and scheduling them for use.

The carpentry task requires the cutting and fitting of a mortice deadlock and a pair of hinges, which will be attached to a door and frame to allow the door to freely open and close.

Note: *Unit 8: Exploring Carpentry and Joinery* is a prerequisite for this unit. Evidence from Unit 8 cannot be used for this unit. Unit 10 requires you to select personal protective equipment and the resources required (materials and equipment), and to schedule these for more demanding practical tasks.

Learning aims

In this unit you will:

- A** Explore health and safety practice in performing carpentry tasks
- B** Demonstrate practical skills and safe working techniques to carry out carpentry tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Explore health and safety practice in performing carpentry tasks</p>	<p>A1 Health and safety practice and the impact upon employers and employees</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to prepare a presentation or report into health and safety good practices when applied to carpentry work within a site-based carpentry environment.</p>
<p>B Demonstrate practical skills and safe working techniques to carry out carpentry tasks</p>	<p>B1 Resources and equipment used for carpentry</p> <p>B2 Safety equipment, its use and safety measures when undertaking carpentry tasks</p> <p>B3 Knowledge and techniques</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to fit a pair of hinges and hang a door followed by the fitting of a mortice lock. This will include preparatory work such as the scheduling of materials and equipment required.</p>

Content

Learning aim A: Explore health and safety practice in performing carpentry tasks

A1 Health and safety practice and the impact upon employers and employees

A range of established safe working practice applies to construction activities in a site-based carpentry environment, including changes and updates to key health and safety practice in accordance with guidance and national legislation in the host country when undertaking carpentry work.

Generic health and safety at work

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - ensure the health and safety of all employees
 - provide and maintain plant and system of work
 - provide safe systems of work, including ensuring safety and the control of risk in connection with the use, handling, storage and transport of substances
 - provide information, instruction, training and supervision
 - produce a health and safety policy (in line with national legislation)
 - provide (and not charge for) equipment required for safety
 - provide facilities for employees' welfare at work
 - consult and cooperate with employees on health and safety.
- Employee good practice to:
 - take reasonable care for the health and safety of themselves and others
 - cooperate with employers to enable the employer to perform or comply with their duties under any national health and safety legislation in the host country
 - correctly use anything provided for health and safety
 - not misuse or damage anything provided for health and safety reasons.

Working safely at height

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - avoid work at height where possible
 - properly plan and organise all work at height
 - ensure all work at height takes account of weather conditions that could endanger employees' health and safety
 - provide work equipment or other measures to prevent falls when working at height cannot be avoided
 - provide work equipment or other measures to minimise the distance and consequences of a fall, if risk of fall cannot be eliminated
 - ensure those involved in work at height are trained and competent
 - ensure the place where work at height is done is safe
 - inspect equipment for working at height at suitable intervals and when exceptional circumstances may jeopardise safety
 - properly control the risks from fragile surfaces
 - properly control the risks from falling objects.

- Employee good practice to:
 - report any safety hazard to the employer
 - not continue working if they think it is unsafe
 - follow any training or instruction
 - properly use the equipment supplied (including safety devices) following any training and instruction.

Planning for site-based safety

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - plan, manage and monitor own work and that of others
 - check the competence of all employees
 - train employees and provide relevant information
 - ensure employees have adequate welfare facilities
 - cooperate and coordinate work with others to ensure the health and safety of all.
- Employee good practice to:
 - cooperate with employers to enable the employer to perform or comply with good health and safety practice or with national health and safety legislation in the host country.

Manual handling of materials and equipment in a site-based carpentry environment

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - avoid manual handling so far as reasonably practicable if there is a possibility of injury
 - assess manual handling operations that cannot be avoided and reduce the risk where practicable and possible
 - avoid the requirement for manual handling or limit loads
 - provide mechanical means of handling, where practicable and possible
 - reduce the risk of injury so far as reasonably practicable.
- Employee good practice to:
 - follow appropriate systems of work laid down for their safety
 - make proper use of equipment provided for their safety during manual handling
 - not misuse or damage anything provided for manual handling
 - cooperate with their employers on manual handling health and safety matters
 - inform the employer if they identify hazardous handling activities
 - take care to ensure that their activities do not put others at risk.

Learning aim B: Demonstrate practical skills and safe working techniques to carry out carpentry tasks

B1 Resources and equipment used for carpentry

The correct selection and use of materials and equipment, their properties and advantages and disadvantages, including calculating and scheduling the quantities of materials and equipment required to hang a framed timber door.

- Setting-out tools.
- Hand tools and equipment.
- Woodscrews.
- Hinges.
- Door furniture.
- Types of abrasive papers.

B2 Safety equipment, its use and safety measures when undertaking carpentry tasks

Safe working and use of PPE.

B3 Knowledge and techniques

The development of knowledge and techniques to carry out specified carpentry tasks.

- How to read and use:
 - door schedules
 - location drawings.
- How to fit steel butt hinges.
- How to fit a mortice deadlock.
- Industry practice on the positioning of hinges on a standard domestic door.
- Knowledge of cause of binding (hinge plates recessed too deep/screw sizes) and how to rectify.
- Finishing techniques – filling and sanding.
- How to use a cordless drill:
 - safety considerations
 - torque settings
 - different speeds.
- Selection of woodscrew size with respect to hinge holes/countersink size.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore health and safety practice in performing carpentry tasks		
A.P1 Describe health and safety good practice for employees and employers when performing a practical task in carpentry.	A.M1 Explain health and safety good practice for employees and employers when performing a practical task in carpentry.	A.D1 Justify the health and safety good practice in use for a practical task in carpentry.
Learning aim B: Demonstrate practical skills and safe working techniques to carry out carpentry tasks		
<p>B.P2 Select the resources required to hang a timber door and fit a mortice lock, to include:</p> <ul style="list-style-type: none"> · scheduling the resources required. <p>B.P3 Measure, mark out and fit a pair of steel butt hinges to a timber door and frame:</p> <ul style="list-style-type: none"> · hinge positions as per specification · gaps around hinges not to exceed 3 mm · hinges do not bind · complying with safe working practices, including the use of personal protective equipment. 	<p>B.M2 Discuss the resources required to hang a timber door and fit a mortice lock, to include:</p> <ul style="list-style-type: none"> · their advantages and disadvantages · scheduling the resources required. <p>B.M3 Measure, mark out and fit a pair of steel butt hinges to a timber door and frame:</p> <ul style="list-style-type: none"> · hinge positions as per specification · gaps around hinges not to exceed 2 mm · hinges do not bind · smooth, true and neat finish · complying with safe working practices, including the use of personal protective equipment. 	<p>B.D2 Measure, mark out and fit a pair of steel butt hinges to a timber door and frame:</p> <ul style="list-style-type: none"> · hinge positions as per specification · gaps around hinges not to exceed 1 mm · hinges do not bind · closing tolerance is consistent · smooth, true and neat finish · complying with safe working practices, including the use of personal protective equipment.

Pass	Merit	Distinction
<p>B.P4 Measure, mark out and fit a mortice deadlock to a timber door and its frame:</p> <ul style="list-style-type: none"> · which works the fore plate and keep · gaps not to exceed 3 mm · correct position of lock keep · complying with safe working practices, including the use of personal protective equipment. 	<p>B.M4 Measure, mark out and fit a mortice deadlock to a timber door and its frame:</p> <ul style="list-style-type: none"> · which works the fore plate and keep · gaps not to exceed 2 mm · correct position of lock keep · smooth and true finish · complying with safe working practices, including the use of personal protective equipment. 	<p>B.D3 Measure, mark out and fit a mortice deadlock to a timber door and its frame:</p> <ul style="list-style-type: none"> · which works the fore plate and keep · gaps not to exceed 1 mm · correct position of lock keep · smooth and true finish · complying with safe working practices, including the use of personal protective equipment.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.P4, B.M2, B.M3, B.M4, B.D2, B.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped workshop or practical environment suitable for the completion of the practical activity.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of good health and safety practice appropriate for adoption within a site-based carpentry environment. In doing so they will exemplify and justify safe practices to adopt during the completion of carpentry work on site. Their work will be detailed and fully meet the needs of the target audience.

For Merit standard, learners will demonstrate good knowledge and understanding of good health and safety practice appropriate for adoption within a site-based carpentry environment. In doing so they will explain appropriate safe practices to adopt during the completion of carpentry work on site. Their work will mostly meet the needs of the target audience.

For Pass standard, learners will demonstrate basic knowledge and understanding of good health and safety practice appropriate for adoption within a site-based carpentry environment. In doing so they will describe appropriate safe practices to adopt during the completion of carpentry work on site. Their work will meet some of the needs of the target audience.

Learning aim B

For Distinction standard, learners will demonstrate developed knowledge, understanding and skills when undertaking practical carpentry work. They will demonstrate a high level of skill when fitting hinges, hanging the door and fitting the mortice lock, including accurate cutting of the rebates and the mortice in the door. In doing so they will demonstrate full compliance with safe working practice.

For Merit standard, learners will demonstrate good knowledge, understanding and skills when undertaking practical carpentry work. They will demonstrate a good level of skill when fitting hinges, hanging the door and fitting the mortice lock, including mostly accurate cutting of the rebates and the mortice in the door. In doing so they will demonstrate compliance with safe working practice.

For Pass standard, learners will demonstrate basic knowledge, understanding and skills when undertaking practical carpentry work. They will demonstrate a basic level of skill when fitting hinges, hanging the door and fitting the mortice lock, including some accurate cutting of the rebates and the mortice in the door. In doing so they will demonstrate compliance with safe working practice.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 8: Exploring Carpentry and Joinery
- Unit 9: Performing Joinery Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop health and safety skills, including safe working practices.

Unit 11: Exploring Trowel Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand the use of tools, materials and equipment used in brickwork and blockwork and will develop skills in the construction of brick and blockwork walls.

Unit introduction

Did you know that bricklaying is one of the oldest construction crafts, and structures exist in the Near East and India that are more than 5000 years old? This unit will introduce you to the safe selection and use of tools and equipment in order to develop the skills needed to construct basic brickwork and blockwork structures.

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

Bricklayers use bricks and mortar to build structures such as external and internal walls, bridges and chimneys, using a variety of specialist tools to carry out precise and accurate work from architectural drawings.

As bricklaying is such an old craft, specific terminology, varying techniques, patterns and processes have developed. Bricks themselves are made to standard sizes out of clay that has been either formed in a mould or extruded and wire cut, 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 both its regular and attractive appearance and its strength and stability.

This unit will introduce you to 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, and on working safely.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used for brickwork and blockwork
- B** Develop practical skills using safe techniques to construct brickwork and blockwork.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Understand tools, materials and equipment used for brickwork and blockwork</p>	<p>A1 Tools and equipment used to construct brickwork and blockwork</p> <p>A2 Materials used for constructing brickwork and blockwork</p> <p>A3 Safe use and storage of tools, materials and equipment for brickwork and blockwork</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would have to explain the safe use and storage of tools, materials and equipment. This could take the form of a written or oral report.</p>
<p>B Develop practical skills using safe techniques to construct brickwork and blockwork</p>	<p>B1 Health and safety</p> <p>B2 Cavity walls</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would need to complete a risk assessment and a materials and equipment requisition sheet prior to producing a cavity wall to a given size and specification.</p>

Content

Learning aim A: Understand tools, materials and equipment used for brickwork and blockwork

A1 Tools and equipment used to construct brickwork and blockwork

Purpose and use of tools and equipment for quality brickwork and blockwork.

- Setting-out tools and equipment including:
 - measuring tape
 - gauge rod
 - spirit level
 - builders' line and pins
 - corner blocks
 - tingle plate
 - building profiles.
- Hand tools and equipment including:
 - walling trowel
 - pointing trowel
 - jointing iron
 - wheeled recessed jointer
 - brick hammer
 - club hammer
 - bolster chisel
 - tools used for masonry work unique to the region or host country.

A2 Materials used for constructing brickwork and blockwork

Types of materials used for brickwork and blockwork and their properties.

- Bricks, including facing bricks, common bricks and engineering bricks:
 - locations where the different types of bricks are used:
 - external skins of cavity walls, external walls, manholes, structural work, internal feature walls, unseen work
 - the properties that make them fit for purpose within that location:
 - structural strength, durability, aesthetics, porosity.
- Blocks, including solid blocks, insulation blocks, fairfaced blocks, terracotta blocks:
 - locations where the different types of blocks are used:
 - internal skins of cavity walls, external single-skin walls, external single-skin rendered walls, internal plastered walls, internal unplastered walls, sub-structures
 - the properties that make them fit for purpose within that location:
 - structural strength, insulation, aesthetics, porosity, thermal mass, thermal resistance.
- Materials used for the preparation of mortar, including building sand, cement, lime and water:
 - typical mortar mixes and proportions, their properties and uses:
 - 1:3 cement/sand and 1:1:6 cement/lime/sand
 - specific mortars used in the region or host country.
- Materials used for the forming of cavities:
 - wall ties: wire, double triangular, butterfly, fishtail, polypropylene.

A3 Safe use and storage of tools, materials and equipment for brickwork and blockwork

Appropriate practices when working with brickwork and blockwork.

- Use of general personal protective equipment (PPE) needed in the workplace, e.g. safety boots, hard hat, high-visibility jacket, sun screen, sun protection.
- Use of task-specific PPE when cutting and laying bricks, e.g. barrier cream, gloves, eye protection.
- The need for appropriate behaviour and a positive attitude towards health and safety.
- Maintaining a clean and tidy work area.
- Safe manual handling when lifting, moving and stacking materials.
- Correct use of tools and equipment.
- Cleaning tools immediately after use to prevent the build-up of mortar deposits.
- Returning tools to appropriate storage upon completion of practical work.
- Appropriate storage methods for bricks, blocks, sand, cement.

Learning aim B: Develop practical skills using safe techniques to construct brickwork and blockwork

B1 Health and safety

Risk assessment prior to starting the activities and procedures during the practical activity.

- Hazard identification and risks associated with the practical activity:
 - 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
 - flying particles from cutting operations
 - exposure to sunlight
 - working in high-temperature climates.
- Identification of people at risk.
- Use of control measures to remove or minimise the risk.
- Adoption of safe working practices, including using PPE.

B2 Cavity walls

Setting out and constructing cavity walls using brickwork and blockwork.

- Preparing and setting up the work area.
- Setting out the work, including the use of a gauge rod or corner profiles for brickwork and blockwork.
- Trowel skills including:
 - rolling mortar
 - spreading and preparation of the bed joint
 - application of mortar to vertical joints
 - simple tooled 'bucket handle' jointing.
- Bonding method: stretcher bond.
- Laying and bedding bricks and blocks to line.
- Half brick wall to line in stretcher bond.
- Block walling to straight lengths in stretcher bond.
- Forming cavities and methods of maintaining a clean cavity.
- Correct placement and spacing of wall ties.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used for brickwork and blockwork		A.D1 Evaluate the use of alternative materials for a specified brickwork and blockwork task.
A.P1 Explain the selection and use of appropriate tools, materials and equipment for brickwork and blockwork. A.P2 Explain the safe use and storage of brickwork and blockwork tools, materials and equipment.	A.M1 Justify the selection of tools, materials and equipment for a specified brickwork and blockwork task.	
Learning aim B: Develop practical skills using safe techniques to construct brickwork and blockwork		B.D2 Construct a cavity wall to a given specification, with a central feature in the brick face using contrasting or recessed bricks, where: <ul style="list-style-type: none"> · brickwork is clean with bricks selected, blended and laid with an appropriate joint · both faces of the wall are plumb to a tolerance of ± 5 mm per m height and length · face plane deviation is accurate to ± 5 mm.
B.P3 Carry out a risk assessment prior to commencing brickwork and blockwork activities. B.P4 Comply with safe working practices, including using appropriate personal protective equipment. B.P5 Construct a cavity wall to a given specification with a minimum of nine courses of bricks and three courses of blocks (675 mm high).	B.M2 Construct cavity walls to a given specification, with a minimum of nine courses of bricks and three courses of blocks (675 mm high), with an appropriate joint, where: <ul style="list-style-type: none"> · both faces of the wall are plumb to a tolerance of ± 10 mm per m height and length · face plane deviation to both faces of the wall is accurate to ± 10 mm. 	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aims: A and B (A.P1, A.P2, B.P3, B.P4, B.P5, A.M1, B.M2, A.D1, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped brickwork shop with mortar-mixing facilities.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of the selection, safe use and correct storage of bricklaying tools, materials and equipment. They will be able to justify their selection and evaluate choice of materials against possible alternatives that could be used for a specified practical task.

For Merit standard, learners will demonstrate good knowledge and understanding of the selection, safe use and correct storage of bricklaying tools, materials and equipment. They will be able to justify their selection for a specified practical task.

For Pass standard, learners will demonstrate basic knowledge and understanding of the selection, safe use and correct storage of bricklaying tools, materials and equipment. They will be able to explain their selection for a specified practical task.

Learning aim B

For Distinction standard, learners will demonstrate developed knowledge, understanding and skills when undertaking practical brickwork and blockwork. They will carry out a risk assessment and then, working safely, construct a brick and block cavity wall to a given specification to a high degree of accuracy and quality within a tolerance of +/-5mm.

For Merit standard, learners will demonstrate good knowledge, understanding and skills when undertaking practical brickwork and blockwork. They will carry out a risk assessment and then, working safely, construct a brick and block cavity wall to a given specification to a good level of accuracy and quality within a tolerance of +/-10mm.

For Pass standard, learners will demonstrate basic knowledge, understanding and skills when undertaking practical brickwork and blockwork. They will carry out a risk assessment and then, working safely, construct a brick and block cavity wall following a given specification.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 12: Performing Blockwork Operations
- Unit 13: Performing Brickwork Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop hazard identification and safe working skills.

Unit 12: Performing Blockwork Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand safe working practice when developing skills in the use of tools, materials and equipment to safely complete demanding blockwork tasks.

Unit introduction

Did you know that blockwork is an integral part of the construction industry and is responsible for much of the world's built environment? Blockwork forms a major element of the superstructure of many construction projects, although it is often hidden from view behind applied finishes. However, it can have a visual finish and is then known as fairfaced blockwork.

Blockwork has been an integral part of the construction industry around the world with the use of clay or terracotta blocks, but since the introduction of concrete blocks in the early twentieth century, the use of blockwork has increased. Blocks are now one of the most common materials used in construction and are generally used in preference to bricks for unseen work when building and/or forming walls. Blocks are larger than bricks so fewer are required in any given structure, and this saves labour, time and money. Blocks are normally made from either clay (terracotta) or concrete. There are several different grades of concrete block, including dense concrete blocks used for their structural properties and considered to be weather resistant, and lightweight concrete blocks used primarily for their thermal insulation properties and which are not considered weather resistant, so are used where weather resistance is not a primary requirement.

In this unit you will build on the skills and knowledge gained from *Unit 11: Exploring Trowel Operations* and learn more about building walls using blocks. This unit will offer you the opportunity to explore some of the health and safety practices that apply to blockwork activities, and to explore the common bonding arrangements for raising corners and junctions using concrete blocks, including the processes and techniques used in their construction. You will also have the opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

Note: *Unit 11: Exploring Trowel Operations* is a prerequisite for this unit. Evidence from Unit 11 cannot be used for this unit. Unit 12 requires you to select personal protective equipment and the resources required (materials and equipment), and to schedule these for more demanding practical tasks.

Learning aims

In this unit you will:

- A** Explore health and safety practice in blockwork operations
- B** Demonstrate practical skills and safe techniques to construct blockwork walls.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Explore health and safety practice in blockwork operations</p>	<p>A1 Health and safety practice and the impact on employers and employees</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report covering good health and safety practice, with a specific focus on hazardous substances and manual handling.</p>
<p>B Demonstrate practical skills and safe techniques to construct blockwork walls</p>	<p>B1 Materials used to construct blockwork walls</p> <p>B2 Construction of solid walls in blockwork</p> <p>B3 Safety equipment, its use and safety measures when constructing blockwork</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would undertake a demanding blockwork task constructing a wall to drawings and details provided. In preparation for the task, the learner will calculate and schedule the required resources. On completion of the practical task the learner will undertake quality control checks on the completed wall.</p>

Content

Learning aim A: Explore health and safety practice in blockwork operations

A1 Health and safety practice and the impact on employers and employees

A range of established good safe working practice applies to construction activities on site, including changes and updates to key health and safety practice in accordance with guidance and national legislation in the host country when undertaking blockwork.

Generic health and safety at work

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - ensure the health and safety of all employees
 - provide and maintain plant and system of work
 - provide safe systems of work, including ensuring safety and the control of risk in connection with the use, handling, storage and transport of substances
 - provide information, instruction, training and supervision
 - produce a health and safety policy (in line with national legislation)
 - provide (and not charge for) equipment required for safety
 - provide facilities for employees' welfare at work
 - consult and cooperate with employees on health and safety.
- Employee good practice to:
 - take reasonable care for the health and safety of themselves and others
 - cooperate with employers to enable the employer to perform or comply with their duties under any national health and safety legislation in the host country
 - correctly use anything provided for health and safety
 - not misuse or damage anything provided for health and safety reasons.

Manual handling of materials and equipment in a joinery workshop

Understand the good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - avoid manual handling so far as reasonably practicable if there is a possibility of injury
 - assess manual handling operations that cannot be avoided and reduce the risk where practicable and possible
 - avoid the requirement for manual handling or limit loads
 - provide mechanical means of handling, where practicable and possible
 - reduce the risk of injury so far as reasonably practicable.
- Employee good practice to:
 - follow appropriate systems of work laid down for their safety
 - make proper use of equipment provided for their safety during manual handling
 - not misuse or damage anything provided for manual handling
 - cooperate with their employers on manual handling health and safety matters
 - inform the employer if they identify hazardous handling activities
 - take care to ensure that their activities do not put others at risk.

Control of substances hazardous to health

Understand the good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - conduct risk assessments for hazardous materials present in the workplace
 - provide control measures to prevent harm to health and maintain these measures in good working order
 - ensure that the control measures are adopted and used
 - provide information, instruction and training for employees and others
 - provide health monitoring and surveillance in appropriate cases
 - plan for emergencies.
- Employee good practice to:
 - attend relevant training provided by the employer
 - report hazards and risks
 - use control measures.

Learning aim B: Demonstrate practical skills and safe techniques to construct blockwork walls

B1 Materials used to construct blockwork walls

Correct selection of materials used in blockwork, including calculating and scheduling the materials required, their properties and uses, together with their advantages and disadvantages.

- Blocks:
 - trench blocks
 - hollow blocks:
 - terracotta
 - concrete
 - solid blocks:
 - dense
 - lightweight
 - insulation blocks:
 - aerated blocks
 - keyed blocks
 - fairfaced blocks.
- Mortars, including mix proportions, strength requirements and required quantities of constituent parts:
 - cement mortars
 - sand-lime mortars
 - ready-mixed retarded mortars.

B2 Construction of solid walls in blockwork

- Preparation, calculating material quantities, setting out and constructing walls in blockwork.
- Calculating materials required:
 - number of blocks, including a waste allowance for cutting and damage
 - quantity of mortar required to complete the wall.

- Setting out the work, including the use of a gauge rod or corner profiles:
 - types and methods of bonding:
 - half bond
 - indents and toothings for junction walls
 - types and methods of jointing fairfaced blockwork, including advantages and disadvantages:
 - flush
 - tooled (bucket handle)
 - weathered.
- Constructing blockwork walls:
 - quality control checks:
 - main dimensions to appropriate tolerances
 - face plane deviation
 - level and plumb to appropriate tolerances
 - vertical joints (perps) in line
 - quality of jointing (for fairfaced work)
 - general cleanliness of the completed blockwork.

B3 Safety equipment, its use and safety measures when constructing blockwork

- Selection and use of personal protective equipment.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore health and safety practice in blockwork operations		A.D1 Justify the health and safety good practices in use for a practical task in blockwork.
A.P1 Describe the health and safety good practice used by employees and employers when performing a practical task in blockwork.	A.M1 Explain the health and safety good practice used by employees and employers for a practical task in blockwork.	
Learning aim B: Demonstrate practical skills and safe techniques to construct blockwork walls		B.D2 Set out and construct blockwork walls to given specifications, to include corners and junctions, with a minimum height of four courses (900 mm): <ul style="list-style-type: none"> with blockwork plumb to a tolerance of ± 5 mm per m height with blockwork dimensionally accurate to a tolerance of ± 5 mm per m height and length with face plane deviation accurate to ± 5 mm complying with safe working practices, including the use of appropriate personal protective equipment.
B.P2 Select the resources required for a specified task in blockwork to include: <ul style="list-style-type: none"> calculating the resources required scheduling the resources. B.P3 Set out and construct blockwork walls to given specifications, to include corners and junctions, with a minimum height of four courses (900 mm): <ul style="list-style-type: none"> with the blockwork dimensionally accurate to a tolerance of ± 10 mm per m height and length complying with safe working practices, including the use of appropriate personal protective equipment. B.P4 Undertake and record dimensional quality control checks on the completed blockwork, to include: <ul style="list-style-type: none"> length (including error) height (including error) level plumb face plane deviation. 	B.M2 Discuss the resources required for a specified task in blockwork to include: <ul style="list-style-type: none"> their advantages and disadvantages the resource calculation, including allowances for wastage scheduling the resources. B.M3 Set out and construct blockwork walls to given specifications, to include corners and junctions, with a minimum height of four courses (900 mm): <ul style="list-style-type: none"> with blockwork plumb to a tolerance of ± 10 mm per m height with blockwork dimensionally accurate to a tolerance of ± 10 mm per m height and length with face plane deviation accurate to ± 10 mm complying with safe working practices, including the use of appropriate personal protective equipment. 	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.P4, B.M2, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped blockwork shop with mortar-mixing facilities.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of good health and safety policy and practice appropriate for adoption within blockwork operations. In doing so they will exemplify and justify safe practices and methodologies to adopt during the completion of blockwork, focusing on, in addition to generic safety practice, safe manual handling and the control of substances hazardous to health. Their work will be detailed and will justify good practice in order to fully meet the needs of the target audience.

For Merit standard, learners will demonstrate good knowledge and understanding of good health and safety policy and practice appropriate for adoption within blockwork operations. In doing so they will detail safe practices and methodologies to adopt during the completion of blockwork, focusing on, in addition to generic safety practice, aspects of safe manual handling and the control of substances hazardous to health. Their work will contain some detail and will consider good practice in order to meet the needs of the target audience.

For Pass standard, learners will demonstrate basic knowledge and understanding of good health and safety policy and practice appropriate for adoption within blockwork operations. In doing so they will consider safe practice to adopt during the completion of blockwork, focusing on, in addition to some generic safety practice, aspects of safe manual handling or the control of substances hazardous to health. Their work will consider good practice in order to meet some of the needs of the target audience.

Learning aim B

For Distinction standard, learners will calculate accurately the resource requirements for blockwork activities and demonstrate good knowledge of the materials used. They will demonstrate developed skills when accurately setting out and constructing a demanding blockwork task to a high standard of accuracy and quality. In doing so they will demonstrate full compliance with safe working practice. They will complete dimensional quality control checks on their work.

For Merit standard, learners will calculate with some accuracy the resource requirements for blockwork activities and show good knowledge of the materials used. They will demonstrate good skills when accurately setting out and constructing a demanding blockwork task to a good standard of accuracy and quality. In doing so they will demonstrate full compliance with safe working practice. They will complete dimensional quality control checks on their work.

For Pass standard, learners will calculate the resource requirements for blockwork activities. They will demonstrate basic skills when setting out and constructing a demanding blockwork task to a basic standard of accuracy and quality. In doing so they will demonstrate compliance with safe working practice. They will complete basic dimensional quality control checks on their work.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 11: Exploring Trowel Operations
- Unit 13: Performing Brickwork Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop hazard identification and safe working skills.

Unit 13: Performing Brickwork Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will understand safe working practice when developing skills in the use of tools, materials and equipment to safely complete demanding brickwork tasks.

Unit introduction

Did you know that bricklayers are an integral part of the construction industry and are responsible for much of the built environment in many countries around the world? Brickwork continues to form a major external element of the superstructure of many construction projects and often provides a major aesthetic contribution to the built environment.

Bricks were first used around 7000 BC; however, the Romans introduced brickwork to many countries approximately 2000 years ago. It was not until the nineteenth century that brickwork became widely adopted. While construction methods have continued to evolve, building with bricks remains a key activity within the construction industry. There are different types and grades of bricks, including facing bricks, common bricks and engineering bricks.

In this unit you will build on the skills and knowledge gained from *Unit 11: Exploring Trowel Operations* and learn more about building walls using bricks. This unit will offer you the opportunity to explore some of the health and safety regulations that apply to blockwork activities, and to explore the common bonding arrangements for raising corners and junctions using blocks, including the processes and techniques used in their construction. You will also have the opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

Note: *Unit 11: Exploring Trowel Operations* is a prerequisite for this unit. Evidence from Unit 11 cannot be used for this unit. Unit 13 requires you to select personal protective equipment and the resources required (materials and equipment), and to schedule these for more demanding practical tasks.

Learning aims

In this unit you will:

- A** Explore health and safety practice in brickwork operations
- B** Demonstrate practical skills and safe techniques to construct brickwork walls.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Explore health and safety practice in brickwork operations</p>	<p>A1 Health and safety practice and the impact on employers and employees</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report covering good health and safety practice with a specific focus on planning operations for health and safety and working at height.</p>
<p>B Demonstrate practical skills and safe techniques to construct brickwork walls</p>	<p>B1 Materials used to construct brickwork walls</p> <p>B2 Construction of solid walls in brickwork</p> <p>B3 Safety equipment, its use and safety measures when constructing brickwork</p>	<p>This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would undertake a demanding brickwork task constructing a wall to drawings and details provided. In preparation for the task the learner will calculate and schedule the resources required for the task. The learner will undertake quality control checks on the completed wall.</p>

Content

Learning aim A: Explore health and safety practice in brickwork operations

A1 Health and safety practice and the impact on employers and employees

A range of established safe working practice applies to construction activities on site, including changes and updates to key health and safety practice in accordance with guidance and national legislation in the host country when undertaking brickwork.

A1.1 Generic health and safety at work

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - ensure the health and safety of all employees
 - provide and maintain plant and system of work
 - provide safe systems of work, including ensuring safety and the control of risk in connection with the use, handling, storage and transport of substances
 - provide information, instruction, training and supervision
 - produce a health and safety policy (in line with national legislation)
 - provide (and not charge for) equipment required for safety
 - provide facilities for employees' welfare at work
 - consult and cooperate with employees on health and safety.
- Employee good practice to:
 - take reasonable care for the health and safety of themselves and others
 - cooperate with employers to enable the employer to perform or comply with their duties under any national health and safety legislation in the host country
 - correctly use anything provided for health and safety
 - not misuse or damage anything provided for health and safety reasons.

A1.2 Working safely at height

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - avoid work at height where possible
 - properly plan and organise all work at height
 - ensure all work at height takes account of weather conditions that could endanger employees' health and safety
 - provide work equipment or other measures to prevent falls when working at height cannot be avoided
 - provide work equipment or other measures to minimise the distance and consequences of a fall, if risk of fall cannot be eliminated
 - ensure those involved in work at height are trained and competent
 - ensure the place where work at height is done is safe
 - inspect equipment for working at height at suitable intervals and when exceptional circumstances may jeopardise safety
 - properly control the risks from fragile surfaces
 - properly control the risks from falling objects.

- Employee good practice to:
 - report any safety hazard to the employer
 - not continue working if they think it is unsafe
 - follow any training or instruction
 - properly use the equipment supplied (including safety devices), following any training and instruction.

A1.3 Planning for site-based safety

Understand the generic good practice and any national legislation that applies in the host country.

- Employer good practice to:
 - plan, manage and monitor own work and that of others
 - check the competence of all employees
 - train employees and provide relevant information
 - ensure employees have adequate welfare facilities
 - cooperate and coordinate work with others to ensure the health and safety of all.
- Employee good practice to:
 - cooperate with employers to enable the employer to perform or comply with good health and safety practice or with national health and safety legislation in the host country.

Learning aim B: Demonstrate practical skills and safe techniques to construct brickwork walls

B1 Materials used to construct brickwork walls

Correct selection of materials used in brickwork, including calculating and scheduling the quantity of materials required, their properties and uses, together with their advantages and disadvantages.

- Bricks:
 - machine-made facing bricks
 - hand-made facing bricks
 - engineering bricks:
 - class A
 - class B
 - common bricks:
 - concrete commons
 - reject facings used as commons
 - special bricks:
 - copings and cappings
 - bullnose bricks
 - angle and cant bricks
 - plinth bricks
 - solid, frogged or perforated bricks
 - surface finish:
 - smooth
 - dragwire
 - sand faced
 - rustic
 - tooled.

- Mortars including mix proportions and required quantities of constituent parts:
 - cement mortars
 - sand-lime mortars
 - coloured mortars
 - ready-mixed retarded mortars.

B2 Construction of solid walls in brickwork

Preparation, calculating material quantities, setting out and constructing walls in brickwork.

- Calculating wall sizes and materials required:
 - size of bricks, including modular sizes
 - standard wall lengths in half-brick multiples
 - wall heights based on number of courses
 - number of bricks, including a waste allowance for cutting and damage
 - quantity of mortar required to complete the wall.
- Setting out the work, including the use of a gauge rod or corner profiles:
 - types and methods of bonding:
 - stretcher bond
 - English bond – including English garden wall bond
 - Flemish bond – including Flemish garden wall bond
 - types and methods of jointing, including advantages and disadvantages:
 - flush
 - tooled (bucket handle)
 - recessed
 - weathered.
- Constructing brickwork wall:
 - half-brick walling to corners in stretcher bond
 - one-brick walling to corners and attached piers.
- Quality control checks:
 - main dimensions to appropriate tolerances
 - face plane deviation
 - level and plumb to appropriate tolerances
 - vertical joints (perps) in line
 - selection and blending of bricks
 - quality of jointing
 - general cleanliness of the completed brickwork.

B3 Safety equipment, its use and safety measures when constructing brickwork

- Selection and use of personal protective equipment (PPE).

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore health and safety practice in brickwork operations		
A.P1 Describe the health and safety good practice used by employees and employers when performing a practical task in brickwork.	A.M1 Explain the health and safety good practice used by employees and employers for a practical task in brickwork.	A.D1 Justify the health and safety good practices in use for a practical task in brickwork.
Learning aim B: Demonstrate practical skills and safe techniques to construct brickwork walls		
B.P2 Select the resources and jointing techniques required for a specified task in brickwork, to include: <ul style="list-style-type: none"> calculating the resources required scheduling the resources. B.P3 Set out and construct one brick wall to given specifications with a minimum area of 1 m ² and a minimum height of nine courses (675 mm): <ul style="list-style-type: none"> with the brickwork dimensionally accurate to a tolerance of ±10 mm per m height and length complying with safe working practices, including the use of appropriate personal protective equipment. 	B.M2 Discuss the resources and jointing techniques required for a specified task in brickwork, to include: <ul style="list-style-type: none"> their advantages and disadvantages the resource calculation, including allowances for wastage scheduling the resources. B.M3 Set out and construct one brick wall to given specifications with a minimum area of 1 m ² and a minimum height of nine courses (675 mm), with an appropriate joint to both faces: <ul style="list-style-type: none"> with brickwork plumb to a tolerance of ±10 mm per m height 	B.D2 Set out and construct one brick wall to given specifications with a contrasting or recessed bricks central feature, a minimum area of 1 m ² and a minimum height of nine courses (675 mm), with an appropriate joint to both faces: <ul style="list-style-type: none"> with brickwork plumb to a tolerance of ±5 mm per m height with brickwork dimensionally accurate to a tolerance of ±5 mm per m height and length with face plane deviation accurate to ±5 mm

Pass	Merit	Distinction
<p>B.P4 Undertake and record dimensional quality control checks on the completed brickwork, to include:</p> <ul style="list-style-type: none"> · length (including error) · height (including error) · level · plumb · face plane deviation. 	<ul style="list-style-type: none"> · with brickwork dimensionally accurate to a tolerance of ± 10 mm per m height and length · with face plane deviation accurate to ± 10 mm · complying with safe working practices, including the use of appropriate personal protective equipment. 	<ul style="list-style-type: none"> · complying with safe working practices, including the use of appropriate personal protective equipment.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.P4, B.M2, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a fully equipped brickwork shop with mortar-mixing facilities.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of good health and safety policy and practice appropriate for adoption within brickwork operations. In doing so they will exemplify and justify safe practices and methodologies to adopt during the completion of brickwork, focusing on, in addition to generic safety practice, planning for health and safety and safe working at height. Their work will be detailed and will justify good practice in order to fully meet the needs of the target audience.

For Merit standard, learners will demonstrate good knowledge and understanding of good health and safety policy and practice appropriate for adoption within brickwork operations. In doing so they will detail safe practices and methodologies to adopt during the completion of brickwork, focusing on, in addition to generic safety practice, planning for health and safety and safe working at height. Their work will contain some detail and will consider good practice in order to meet the needs of the target audience.

For Pass standard, learners will demonstrate basic knowledge and understanding of good health and safety policy and practice appropriate for adoption within brickwork operations. In doing so they will consider safe practice to adopt during the completion of brickwork, focusing on, in addition to generic safety practice, planning for health and safety or safe working at height. Their work will consider good practice in order to meet some of the needs of the target audience.

Learning aim B

For Distinction standard, learners will calculate accurately the resource requirements for brickwork activities and demonstrate good knowledge of the materials used. They will demonstrate developed skills when accurately setting out and constructing a demanding brickwork task to a high standard of accuracy and quality. In doing so they will demonstrate full compliance with safe working practice. They will complete dimensional quality control checks on their work.

For Merit standard, learners will calculate with some accuracy the resource requirements for brickwork activities and show good knowledge of the materials used. They will demonstrate good skills when accurately setting out and constructing a demanding brickwork task to a good standard of accuracy and quality. In doing so they will demonstrate full compliance with safe working practice. They will complete dimensional quality control checks on their work.

For Pass standard, learners will calculate the resource requirements for brickwork activities. They will demonstrate basic skills when setting out and constructing a demanding brickwork task to a basic standard of accuracy and quality. In doing so they will demonstrate compliance with safe working practice. They will complete basic dimensional quality control checks on their work.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 11: Exploring Trowel Operations
- Unit 12: Performing Blockwork Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop hazard identification and safe working skills.

Unit 14: Exploring Painting and Decorating

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will acquire knowledge of painting tools, equipment and materials to prepare and apply paint and wallpaper finishes to surfaces.

Unit introduction

Did you know that painting and decorating skills have been practised throughout history? Early man painted pictures on cave walls, telling the modern world the stories of how they lived. Since then, people from all cultures have used paint, wallpaper and other decorative finishes to enhance their environment – their homes, workplaces, social places or places of worship. The right combinations of colour and texture can transform a room to make it feel warmer or cooler, more lively or calmer, more comfortable and welcoming.

Decoration is not the only reason why surfaces are painted. In industrial settings, such as factories and warehouses, paint is often used to colour-code pipes and fire extinguishers or to identify hazardous areas. In hospitals and other sterile environments, paint is used to produce hygienic surfaces that are easy to keep clean. Sometimes paint is used outside to protect a surface from the weather so that doors, windows, bridges and external surfaces are kept in good condition for longer. Decorating is about more than painting. Many people like to decorate their homes using wallpaper. It can be applied to walls and ceilings, it can be smooth or textured, and it can be plain or patterned. Being able to produce a good finish with paint, or hang wallpapers to a high standard, are valuable skills that could help you gain employment.

In this unit you will learn some of the basics about painting and decorating. You will familiarise yourself with some of the tools, materials and equipment that painters and decorators use in their work and develop some basic painting and wallpapering skills. You will learn how to use these skills safely by assessing the risks and planning to reduce them. Achieving a high-quality finish when painting and hanging wallpaper is dependent upon preparing the surface properly and thus you will learn how to prepare surfaces that have cracks, holes and other imperfections. All these skills will help to prepare you for further learning in painting and decorating.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used in painting and decorating
- B** Develop practical skills using safe working techniques to complete surface preparation tasks
- C** Develop practical skills using safe working techniques to apply surface finishes.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand tools, materials and equipment used in painting and decorating	A1 Tools in painting and decorating A2 Materials in painting and decorating A3 Equipment for painting and decorating	A presentation justifying the selection of tools, materials and equipment for a given decorating task, and evaluating the risks associated with the activity.
B Develop practical skills using safe working techniques to complete surface preparation tasks	B1 Health and safety B2 Preparing surfaces	An observed practical task preparing and applying decorative finishes to a given surface.
C Develop practical skills using safe working techniques to apply surface finishes	C1 Applying paints C2 Hanging wallpaper	

Content

Learning aim A: Understand tools, materials and equipment used in painting and decorating

A1 Tools in painting and decorating

Purpose and properties of each tool and the appropriate methods of use and storage required to ensure the safety of users, the security of tools and the prevention of injury to personnel, loss or damage through incorrect use or storage.

- Surface preparation tools, including:
 - sizes of scraper, filling knife, putty knife, shavehook, caulking board, hacking knife, hot air stripper, dusting brush, sanding block.
- Paint application tools, including:
 - paint kettle, paintbrush sizes and different filling types, paint roller frames and sleeve options, paint roller tray, scuttle.
- Wallpaper hanging tools, including:
 - paperhanging brush sizes, paperhanging shears knife, decorators straight edge, paste bucket, paste brush, paste table, spirit level, plumb line, decorators sponge, seam roller, tape rule, pencil.

A2 Materials in painting and decorating

Purpose and properties of each material and the appropriate methods of use and storage required to ensure the safety of users, security of materials and prevention of loss or damage through incorrect use or storage.

- Surface preparation materials: coated abrasives papers (aluminium oxide, sand, wet and dry), abrasive powders and compounds, liquid paint removers, detergents and washing materials (sugar soap, surface cleaners), fillers (powder-based, ready-mixed).
- Types of paint and use: water-based paints, solvent-based paints, acrylic, undercoat, paint finishes (soft sheen, satin, gloss, matt, silk), non-drip, solid emulsion.
- Wallpaper types and use: lining papers, relief coverings (anaglypta, foamed vinyl, woodchip), standard wallpapers, washable wallpapers, paper-backed vinyl, flock.
- Wallpaper adhesives and use: pastes (cellulose, universal grade, fungicidal, grade).

A3 Equipment for painting and decorating

Know the purpose of each item of equipment and the appropriate methods of use and storage required to ensure the safety of users, the security of equipment and the prevention of injury to personnel, loss or damage through incorrect use or storage.

- Personal protective equipment (PPE): safety footwear, overalls, hand protection, barrier cream, eye protection, dust masks.
- Access equipment: stepladders, hop-ups, trestle working platforms.

Learning aim B: Develop practical skills using safe working techniques to complete surface preparation tasks

B1 Health and safety

Risk assessment prior to starting and procedures to follow during the practical activity.

- Identification of hazards and risks associated with the practical activity, including:
 - slips, trips and falls
 - cuts, injuries or ailments caused by tools and equipment
 - abrasive materials, solvents, fungicidal pastes, dust
 - falling objects
 - untidy work areas
 - musculoskeletal injuries caused by bending or stretching.
- Identification of people at risk.
- Identification of appropriate control measures to minimise the risks.
- Adoption of safe working practices, including use of PPE.

B2 Preparing surfaces

Develop practical skills by preparing previously painted surfaces to receive paints and wallpapers using appropriate techniques, including:

- washing, cleaning and dusting surfaces
- filling large surface defects, including holes, cracks and dents
- filling minor surface imperfections, including nail holes, scratches, minor dents and score marks
- abrading filled and unfilled surfaces to ensure a smooth finish prior to the application of paints and wallpapers.

Learning aim C: Develop practical skills using safe working techniques to apply surface finishes

C1 Applying paints

Develop practical skills by selecting and applying appropriate water-based and solvent-based paints to previously painted wall areas and skirting boards by roller and brush using appropriate techniques, including:

- applying paint to a flat wall area by roller
- using paintbrushes to cut in around the edges of a roller-painted wall area
- applying paint to skirting boards by brush.

C2 Hanging wallpaper

Develop practical skills by hanging simple patterned wallpaper to previously prepared straight walls using appropriate techniques, including:

- measuring and cutting wallpaper to the required length prior to hanging
- applying paste to wallpaper prior to hanging
- hanging wallpaper to a straight wall with no internal or external angles and no switches, sockets or other obstacles
- ensuring that adjacent surfaces are left clean and free from paste.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used in painting and decorating		A.D1 Evaluate the use of alternative materials for a specified painting and decorating task.
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment in painting and decorating.</p> <p>A.P2 Explain the safe use and storage of painting and decorating tools, materials and equipment.</p>	A.M1 Justify the selection of tools, materials and equipment for a specified painting and decorating task.	
Learning aim B: Develop practical skills using safe working techniques to complete surface preparation tasks		BC.D2 Prepare surfaces to receive undercoat, gloss and emulsion surface finishes, with imperfections, scoring or scratching. Apply undercoat, gloss and emulsion surface finishes by brush and roller with no visible defects. Hang patterned wallpaper to straight walls with no visible defects and no pattern mismatch greater than 1 mm.
<p>B.P3 Carry out a risk assessment prior to commencing painting and decorating tasks.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Prepare surfaces to receive undercoat, gloss and emulsion surface finishes by filling and sanding large surface defects.</p>	B.M2 Prepare surfaces to receive undercoat, gloss and emulsion surface finishes by filling and sanding large and minor surface imperfections.	
Learning aim C: Develop practical skills using safe working techniques to apply surface finishes		
<p>C.P6 Apply undercoat, gloss and emulsion surface finishes by brush and roller with:</p> <ul style="list-style-type: none"> no bristles or roller skid marks visible on the finished surface. <p>C.P7 Measure and cut wallpaper to required length, allowing 50 mm at each end for trimming, prior to hanging.</p> <p>C.P8 Hang patterned wallpaper to straight walls with:</p> <ul style="list-style-type: none"> no gaps or overlaps >3 mm no air bubbles, creases or wrinkles no pattern mismatch >3 mm. 	C.M3 Apply undercoat, gloss and emulsion surface finishes by brush and roller with neat cutting in, no application marks and no more than one run or sag visible on the finished surface. Hang patterned wallpaper to straight walls with no visible defects and no gap or pattern mismatch greater than 2 mm.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, B.P5, C.P6, C.P7, C.P8, B.M2, C.M3, BC.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a range of decorating tools, materials, personal protective equipment (PPE) and access equipment. A working area with a previously painted wall and previously painted skirting board 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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must evaluate alternative materials that could be used for the specific task. Learners must explain which alternative materials would be suitable for the selection of specific tools and equipment and why. If alternative tools or equipment are required, learners should give full reasons why any adjustment is necessary.

For Merit standard, learners must justify why they have selected specific tools, materials and items of equipment for the specified task. Learners will be expected to state why each item has been selected and justify why it is the most appropriate tool, material or item of equipment.

For Pass standard, learners must describe the purpose and safe use of tools, materials and equipment for painting and decorating for different situations. This may include describing the correct handling of tools that have sharp blades in order to minimise the risk of injury; following appropriate safe working practices when handling substances that might harm health, such as solvent-based paints or powder-based fillers; and when working at height. Learners should consider a minimum of three preparation tools, three wallpapering tools and three painting tools, three different surface preparation materials, three different types of paint, three different types of wallpaper and two different types of equipment.

Learning aims B and C

For Distinction standard, learners will prepare the wall and skirting board to a higher standard than the Pass and Merit. Learners will make good all surface defects and imperfections when preparing the wall, sanding it smooth with no visible scoring or surface scratching. There will be no runs or sags, brush marks, bristles or orange peel effect on the finished painted surfaces. Wallpaper hanging will have no gaps or overlaps, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 1 mm.

For Merit standard, learners will prepare the wall and skirting board to a higher standard than for the Pass standard. During preparation they will make good any minor surface imperfections in their work by filling and sanding using ready-mixed fillers and fine-grade abrasives. Learners will leave only minor visible orange peel effect on the surface after painting with a roller and will neatly cut in around the edges using a brush, leaving no bristles. There should be a maximum of only one run or sag visible on any finished surface. Learners will hang simple patterned wallpaper to the wall, with no gaps or overlaps greater than 2 mm, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 2 mm.

For Pass standard, learners must complete a risk assessment that clearly identifies hazards, risks, persons at risk and control measures for a painting and decorating task. Learners will work in an area with a previously painted flat straight wall (with no internal or external angles, switches, sockets or obstacles) and skirting board. They will fill and sand these surfaces ready to receive surface finishes, including paint and wallpaper. The type of surface defect that learners will make good will include large cracks, holes and dents. Learners are expected to use powder-based fillers that they will mix prior to use. Once prepared, learners will apply emulsion paint to the wall using a roller, leaving no visible roller skid marks on the finished surface, and cut in around the edges using a brush, leaving no bristles. Learners will also apply undercoat and gloss finish to the length of skirting board using a brush and leaving no bristles on the finished surface. Finally, learners will hang simple patterned wallpaper to the wall. Upon completion there should be no gaps or overlaps greater than 3 mm, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 3 mm. Learners must complete these activities demonstrating that they can work safely using appropriate PPE.

Links to other units and curriculum subjects

This unit links to:

- Unit 15: Performing Paperhanging Operations
- Unit 16: Performing Decorating Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop measurement and mathematics skills.

Unit 15: Performing Paperhanging Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used to perform wallpaper hanging and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop wallpapering skills to produce good quality finishes.

Unit introduction

Painters and decorators have valuable skills that are needed in the construction and maintenance of buildings. They apply decorative and appealing finishes to the surfaces of the construction fabric and help to create comfortable living, working and leisure environments. Good decoration, with the tasteful use of colour and texture, can contribute to making a room or space feel right for its intended purpose. For example, kitchens and hospitals need surfaces that can be easily cleaned to maintain high standards of hygiene; restaurants need colour schemes that make a customer feel welcome and comfortable; and industrial settings use colours to identify hazardous areas or substances.

In addition to paints and the use of colour, painters and decorators use texture to create a suitable ambience for the environment and this is often done with wallpaper. While some wallpapers are plain and smooth, others have patterns and texture to create an atmosphere. The use of patterned wallpaper can make a room appear larger or smaller, depending on the pattern size. A heavily textured wallpaper will help to mask imperfections in a wall, while others, such as flock, will add a touch of elegance and make a room feel lavish and expensive.

In this unit you will build on the skills and knowledge gained from *Unit 14: Exploring Painting and Decorating* and learn more about hanging wallpapers. You will learn about the resources required, including the tools, materials and equipment needed to perform these tasks, how to estimate the required quantities of materials, and how to work safely. You will develop wallpapering skills that will help you to produce good quality finishes.

Learning aims

In this unit you will:

- A** Explore working safely in paperhanging
- B** Demonstrate practical skills and safe working techniques to complete paperhanging operations.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Explore working safely in paperhanging	A1 Keeping construction sites safe A2 Controlling substances hazardous to health A3 Working at height A4 Manual handling operations	Presentation and notes explaining how to work safely during paperhanging.
B Demonstrate practical skills and safe working techniques to complete paperhanging operations	B1 Resources needed for paperhanging operations B2 Hanging wallpaper	An observed practical task to demonstrate paperhanging.

Content

Learning aim A: Explore working safely in paperhanging

A1 Keeping construction sites safe

General provisions for managing construction safety on site.

- Management and arrangement of the work, including:
 - site-specific health and safety goals
 - site security
 - site rules
 - fire and emergency procedures
 - accident/near-miss reporting
 - site welfare/first aid
 - waste disposal and good housekeeping
 - gate and entrance signage and notices
 - minimising noise and vibration.
- Use, isolation, inspection, maintenance and certification of plant and equipment.
- Issuing, care and maintenance of PPE.
- Safe stacking and storage of materials and flammable substances.
- Safe working procedures near overhead power lines.
- Management of open excavations.
- Precautions necessary to prevent falling materials.
- Precautions necessary when working in adverse weather conditions.
- Checks for buried services.

A2 Controlling substances hazardous to health

Aspects of the use of substances and chemicals during construction activities on site:

- main classification of substances hazardous to health – irritant, corrosive, harmful, toxic or carcinogenic
- forms of substances hazardous to health, including dusts, fibres, fumes, gases, mists, vapours and liquids
- health effects of substances hazardous to health, both acute and chronic
- risk assessment of all substances used in the workplace – highlighting precautionary methods to be employed before and during use
- control measures, use, maintenance, examination and testing – reducing the risk to an acceptable level
- exposure limits in the long and short term
- monitoring and health surveillance of employees using substances at work.

A3 Working at height

The approach to working safely at height:

- avoid work at height where possible and practicable
- ensure all work at height is properly planned and organised
- ensure all work at height takes account of weather conditions that could endanger health and safety
- provide and use correctly work equipment or other measures to prevent falls when working at height cannot be avoided

- provide and use correctly work equipment or other measures to minimise the distance and consequence of a fall, if risk of fall cannot be eliminated
- ensure those involved in work at height are trained and competent
- ensure the place where work at height is done is safe
- inspect the equipment for work at height at suitable intervals and when exceptional circumstances may jeopardise safety
- properly control the risk from fragile surfaces
- ensure the risks from falling objects are properly controlled
- stop and do not continue working at height if conditions make it unsafe after work has commenced.

A4 Manual handling operations

Explore methods of handling manual loads to avoid personal injuries:

- typical manual handling injury, including chronic and acute
- safe manual load
- assessment of manual handling risk by considering the task, load, individual and work environment
- means of eliminating or mitigating manual handling risk, including design, automation and mechanisation
- methods of carrying manual load to mitigate injury owing to lifting, poor posture, repetitive or awkward movement.

Learning aim B: Demonstrate practical skills and safe working techniques to complete paperhanging operations

B1 Resources needed for paperhanging operations

The correct selection and use of materials and equipment for paperhanging operations, their properties, uses, advantages and disadvantages, including calculating the quantities and scheduling of materials and equipment required.

- Tools used for paperhanging:
 - wall paper hanging brush, stripping knife, seam roller, plumb bob, paste brush, scissors.
- Materials used for paperhanging:
 - wallpaper types and uses
 - wallpaper adhesives and uses.
- Safety equipment and its use when paperhanging:
 - personal protective equipment (PPE)
 - access equipment.

B2 Hanging wallpaper

Practical skills for the hanging of simple patterned wallpapers to prepared walls, where there is one internal and one external corner and an obstacle (switch, socket) using appropriate techniques.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore working safely in paperhanging		
<p>A.P1 Describe the general health and safety arrangements required for a live construction site.</p> <p>A.P2 Describe the health and safety requirements when performing a practical task in paperhanging.</p>	<p>A.M1 Explain the health and safety requirements when performing a practical task in paperhanging.</p>	<p>A.D1 Justify the health and safety requirements for a practical task in paperhanging.</p>
Learning aim B: Demonstrate practical skills and safe working techniques to complete paperhanging operations		
<p>B.P3 Select the resources required for a specified paperhanging task, including calculating the resources required, allowing for wastage and scheduling the resources.</p> <p>B.P4 Prepare walls and materials for a paperhanging task:</p> <ul style="list-style-type: none"> preparing surfaces to receive wallpaper by filling and sanding large and minor surface imperfections complying with safe working practices, including the use of PPE measuring and cutting wallpaper to required length, allowing 50 mm at each end for trimming, prior to hanging. <p>B.P5 Hang patterned wallpaper to walls, including one internal and one external corner and one obstacle:</p> <ul style="list-style-type: none"> complying with safe working practices, including the use of PPE no gaps or overlaps > 3 mm no air bubbles, creases or wrinkles no pattern mismatch > 3 mm. 	<p>B.M2 Discuss the resources required for a specified paperhanging task, including their advantages and disadvantages, the resource calculation with allowance for wastage, and scheduling the resources required.</p> <p>B.M3 Hang patterned wallpaper to walls, including one internal and one external corner and one obstacle:</p> <ul style="list-style-type: none"> complying with safe working practices, including the use of PPE no gaps or overlaps > 2 mm no air bubbles, creases or wrinkles no pattern mismatch >2 mm. 	<p>B.D2 Hang patterned wallpaper to walls, including on internal and one external corner and one obstacle:</p> <ul style="list-style-type: none"> complying with safe working practices, including the use of personal protective equipment no gaps or overlaps no air bubbles, creases or wrinkles no pattern mismatch > 1 mm.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.M2, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

The special resources required for this unit include a range of decorating tools, materials, PPE and access equipment. A working area with a previously painted wall 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.

A competent supervisor must carry out an induction for all learners on 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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must justify the health and safety requirements for a practical task in paperhanging. They should set out the required health and safety steps and provide reasons with evidence as to why they are necessary, e.g. bending knees when undertaking manual handling to avoid the possibility of a muscular skeletal accident. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

For Merit standard, learners must explain the health and safety requirements that apply to a paperhanging activity. They should provide reasons why key health and safety steps are taken, e.g. bending knees when undertaking manual handling or the provision of an access platform when working at height. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

For Pass standard, learners must describe the general health and safety arrangements required for a construction site and that apply to a paperhanging activity. This should include site welfare arrangements and the need for site inductions, as well as general provisions for the safe use of plant and equipment. For paperhanging activities learners should describe how to safely use substances and chemicals, and outline provisions for safely working at height and manual handling techniques. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

Learning aim B

For Distinction standard, learners will hang patterned wallpaper to previously prepared walls, including one internal and one external corner, with at least one switch, socket or other obstacle. There should be no gaps or overlaps, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 1 mm. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate. It is expected that this will be evidenced through a teacher observation record including a quality control sheet and photographs.

For Merit standard, learners must discuss the resources required to complete the specified paperhanging task, including their advantages and disadvantages, how they have calculated material quantities, the allowances for wastage, and why they have scheduled tools, materials or items of equipment at various stages of the task. Learners will be able to evidence this through a word-processed document or via a record of discussion with their teacher. Learners will hang patterned wallpaper to prepared walls, including one internal and one external corner, with at least one switch, socket or other obstacle. There should be no gaps or overlaps greater than 2 mm, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 2 mm. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate. It is expected that this will be evidenced through a teacher observation record including a quality control sheet and photographs.

For Pass standard, learners must select the resources required to complete the specified paperhanging task, including calculating the material quantities and schedule of what tools, materials or items of equipment will be needed at various stages of the task. Learners will then prepare walls to receive wallpaper, including filling and sanding to correct large and minor surface imperfections. Learners must measure and cut wallpaper to the required length prior to hanging, allowing 50 mm at each end for trimming. Finally, learners will hang patterned wallpaper to previously prepared walls, including one internal and one external corner, with at least one switch, socket or other obstacle. There should be no gaps or overlaps greater than 3 mm, no air bubbles, creases or wrinkles, and no pattern mismatch greater than 3 mm. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate. Learners could evidence this through the completion of a stores requisition with a quality control sheet and photographs, by teacher observation, or by a teacher record of oral questioning.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 14: Exploring Painting and Decorating
- Unit 16: Performing Decorating Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop measuring skills and mathematical skills in relation to calculating quantities of materials. Learners will also gain transferable skills in working safely.

Unit 16: Performing Decorating Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used to perform painting and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop painting skills to produce good quality finishes.

Unit introduction

Painters and decorators have valuable skills that are needed in the construction and maintenance of buildings. They apply decorative and appealing finishes to the surfaces of the construction fabric and help to create comfortable living, working and leisure environments. Good decoration, with the tasteful use of colour and texture, can contribute to making a room or space feel right for its intended purpose. For example, kitchens and hospitals need surfaces that can be easily cleaned to maintain high standards of hygiene; restaurants need colour schemes that make a customer feel welcome and comfortable; and industrial settings use colours to identify hazardous areas or substances.

There are many different types of paint finish for walls and ceilings with an uneven surface. You might choose matt emulsion, with its flat, non-reflective appearance which helps to hide unevenness. For trims such as skirtings and window surrounds, you might use gloss or the modern alternatives, eggshell and satin finish. If you wanted to upcycle wooden furniture, chalky matt paint is popular – the finish is dead flat, and it is used often to create a shabby chic or distressed appearance.

In this unit you will build on the skills and knowledge gained from *Unit 14: Exploring Painting and Decorating* and learn more about applying paint. You will learn about the resources required, including the tools, materials and equipment needed to perform these tasks, how to estimate the required quantities of materials, and how to work safely. You will develop painting skills that will help you to produce good quality finishes.

Learning aims

In this unit you will:

- A** Explore working safely in painting operations
- B** Demonstrate practical skills and safe working techniques to complete painting operations.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Explore working safely in painting operations	A1 Keeping construction sites safe A2 Controlling substances hazardous to health A3 Working at height A4 Manual handling operations	Presentation and notes explaining how to work safely during painting.
B Demonstrate practical skills and safe working techniques to complete painting operations	B1 Resources needed for painting operations B2 Applying paints	An observed practical task to demonstrate painting.

Content

Learning aim A: Explore working safely in painting operations

A1 Keeping construction sites safe

General provisions for managing construction safety on site.

- Management and arrangement of the work, including:
 - site-specific health and safety goals
 - site security
 - site rules
 - fire and emergency procedures
 - accident/near-miss reporting
 - site welfare/first aid
 - waste disposal and good housekeeping
 - gate and entrance signage and notices
 - minimising noise and vibration.
- Use, isolation, inspection, maintenance and certification of plant and equipment.
- Issuing, care and maintenance of PPE.
- Safe stacking and storage of materials and flammable substances.
- Safe working procedures near overhead power lines.
- Management of open excavations.
- Precautions necessary to prevent falling materials.
- Precautions necessary when working in adverse weather conditions.
- Checks for buried services.

A2 Controlling substances hazardous to health

Aspects of the use of substances and chemicals during construction activities on site:

- main classification of substances hazardous to health – irritant, corrosive, harmful, toxic or carcinogenic
- forms of substances hazardous to health, including dusts, fibres, fumes, gases, mists, vapours and liquids
- health effects of substances hazardous to health, both acute and chronic
- risk assessment of all substances used in the workplace – highlighting precautionary methods to be employed before and during use
- control measures, use, maintenance, examination and testing – reducing the risk to an acceptable level
- exposure limits in the long and short term
- monitoring and health surveillance of employees using substances at work.

A3 Working at height

The approach to working safely at height:

- avoid work at height where possible and practicable
- ensure all work at height is properly planned and organised
- ensure all work at height takes account of weather conditions that could endanger health and safety
- provide and use correctly work equipment or other measures to prevent falls when working at height cannot be avoided

- provide and use correctly work equipment or other measures to minimise the distance and consequence of a fall, if risk of fall cannot be eliminated
- ensure those involved in work at height are trained and competent
- ensure the place where work at height is done is safe
- inspect the equipment for work at height at suitable intervals and when exceptional circumstances may jeopardise safety
- properly control the risk from fragile surfaces
- ensure the risks from falling objects are properly controlled
- stop and do not continue working at height if conditions make it unsafe after work has commenced.

A4 Manual handling operations

Explore methods of handling manual loads to avoid personal injuries:

- typical manual handling injury, including chronic and acute
- safe manual load
- assessment of manual handling risk by considering the task, load, individual and work environment
- means of eliminating or mitigating manual handling risk, including design, automation and mechanisation
- methods of carrying manual load to mitigate injury owing to lifting, poor posture, repetitive or awkward movement.

Learning aim B: Demonstrate practical skills and safe working techniques to complete painting operations

B1 Resources needed for painting operations

The correct selection and use of materials and equipment for painting operations, their properties, uses, advantages and disadvantages, including calculating and scheduling the quantities of materials and equipment required.

- Tools used for painting:
 - surface preparation tools
 - paint application tools.
- Materials used in painting:
 - surface preparation materials
 - types of paint and use.
- Safety equipment and its use when paperhanging:
 - personal protective equipment (PPE)
 - access equipment
 - ventilation requirements when working with solvents.

B2 Applying paints

Practical skills for room decoration to a given specification using brushes and rollers to apply water-based and solvent-based paints.

- Specification:
 - applying emulsion paint to a ceiling area by roller, including cutting in around a ceiling rose
 - applying emulsion paint to walls by roller, including cutting in around electrical switches and sockets
 - applying undercoat and gloss paints to skirting boards and architraves by brush, including cutting in to adjacent surfaces
 - applying undercoat and gloss to a panelled door.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore working safely in painting operations		
<p>A.P1 Describe the general health and safety arrangements required for a live construction site.</p> <p>A.P2 Describe the health and safety requirements when performing a practical painting task.</p>	<p>A.M1 Explain the health and safety requirements when performing a practical painting task.</p>	<p>A.D1 Justify the health and safety requirements for a painting task.</p>
Learning aim B: Demonstrate practical skills and safe working techniques to complete painting operations		
<p>B.P3 Select the resources required for a specified emulsion and gloss painting task, including calculating the resources required, allowing for wastage and scheduling the resources.</p> <p>B.P4 Carry out emulsion painting to walls and ceilings by:</p> <ul style="list-style-type: none"> preparing surfaces to receive an emulsion surface finish by filling and sanding large surface defects applying paint by brush and roller complying with safe working practices, including the use of PPE and ensuring adequate ventilation when using solvent-based paints. <p>On the visible finished surface:</p> <ul style="list-style-type: none"> no bristles or roller skid marks visible on the finished surface. 	<p>B.M2 Carry out emulsion painting to walls and ceilings by:</p> <ul style="list-style-type: none"> preparing surfaces to receive an emulsion surface finish by filling and sanding large and minor surface imperfections applying paint by brush and roller complying with safe working practices, including the use of PPE and ensuring adequate ventilation when using solvent-based paints. <p>On the visible finished surface:</p> <ul style="list-style-type: none"> no bristles or roller skid marks minimal brush marks minimal orange peel effect neat cutting in no more than one run or sag. 	<p>B.D2 Carry out emulsion painting to walls and ceilings by:</p> <ul style="list-style-type: none"> preparing surfaces to receive an emulsion surface finish by filling and sanding large and minor surface imperfections, with no visible scoring or scratching of the surface applying paint by brush and roller complying with safe working practices, including the use of PPE and ensuring adequate ventilation when using solvent-based paints. <p>On the visible finished surface:</p> <ul style="list-style-type: none"> no bristles or roller skid marks no brush marks minimal orange peel effect neat cutting in no runs or sags.

Pass	Merit	Distinction
<p>B.P5 Carry out undercoat and gloss paint finishes to skirtings, architraves and doors by brush:</p> <ul style="list-style-type: none"> · preparing surfaces to receive an undercoat and gloss emulsion surface finish by filling and sanding large and minor surface defects · complying with safe working practices, including the use of PPE and ensuring adequate ventilation when using solvent-based paints. <p>On the finished surface:</p> <ul style="list-style-type: none"> · no visible bristles · no visible brush marks · no more than one run or sag visible. 	<p>B.M3 Carry out undercoat and gloss paint finishes to skirtings, architraves and doors by brush:</p> <ul style="list-style-type: none"> · preparing surfaces to receive an undercoat and gloss emulsion surface finish by filling and sanding large and minor surface defects, with no visible scoring of the surface · complying with safe working practices, including the use of PPE and ensuring adequate ventilation when using solvent-based paints. <p>On the finished surface:</p> <ul style="list-style-type: none"> · no visible bristles · no visible brush marks · no runs or sags visible. 	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.M2, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

The special resources required for this unit include a range of decorating tools, materials, PPE and access equipment. A working area with a painted wall, ceiling, door architrave and skirting board 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.

A competent supervisor must carry out an induction for all learners on 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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must justify the health and safety requirements or a practical task in decorating. They should set out the required health and safety steps and provide reasons with evidence as to why they are necessary, e.g. bending knees when undertaking manual handling to avoid the possible of a muscular skeletal accident. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

For Merit standard, learners must explain the health and safety requirement that apply to a decorating activity. They should provide reasons why key health and safety steps are taken, e.g. bending knees when undertaking manual handling or the provision of an access platform when working at height. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

For Pass standard, learners must describe the general health and safety arrangements required for a construction site and that apply to a decorating activity. This should include site welfare arrangement and the need for site inductions, as well as general provisions for the safe use of plant and equipment. For decorating activities learners should describe how to safely use substances and chemicals, and outline provisions for safely working at height and manual handling techniques. Evidence for this could be in the form of a word-processed document or through a record of oral questioning by the teacher.

Learning aim B

For Distinction standard, learners must prepare walls and a ceiling with a ceiling rose to receive emulsion finishes, including the correction of large and minor surface imperfections by filling and sanding, with no visible scoring or scratching of the surface. Learners must apply emulsion paint to walls and ceilings by brush and roller with no bristles or roller skid marks, leaving no brush marks, minimal orange peel effect, with neat cutting in and no runs or sags visible on the finished surface. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate, and must ensure adequate ventilation when using solvent-based paints. It is expected that this will be evidenced through a teacher observation record including a quality control sheet and photographs.

For Merit standard, learners must prepare walls and a ceiling with a ceiling rose to receive emulsion finishes, including the filling and sanding of surfaces to correct large and minor surface imperfections. Learners must apply emulsion paint to walls and ceilings by brush and roller with no bristles or roller skid marks, leaving only minimal brush marks, minimal orange peel effect, with neat cutting in and no more than one run or sag visible on the finished surface. Learners will prepare skirting, architraves and doors to receive undercoat and gloss surface finishes by correcting large and minor surface defects through filling and sanding, with no visible scoring of the surface. Learners will then apply undercoat and gloss finishes to the skirtings, architraves and doors by brush, leaving no visible bristles, brush marks, runs or sags on the finished surface. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate, and must ensure adequate ventilation when using solvent-based paints. It is expected that this will be evidenced through a teacher observation record including a quality control sheet and photographs.

For Pass standard, learners must select the resources required to complete the specified painting task, including calculating the material quantities and schedule of what tools, materials or items of equipment will be needed at various stages of the task. Learners must prepare walls and a ceiling with a ceiling rose to receive emulsion finishes, including filling and sanding of surfaces to correct large surface defects. Learners must apply emulsion paint to walls and ceilings by roller, leaving no visible skid marks on the finished surface. Learners will prepare skirting, architraves and doors to receive undercoat and gloss surface finishes by correcting large and minor surface defects through filling and sanding, with no visible scoring of the surface. Learners will apply undercoat and gloss finishes to the skirtings, architraves and doors by brush, leaving no visible bristles, brush marks, runs or sags on the finished surface. Learners must comply with safe working practices, including the use of protective overalls, safety footwear and barrier cream as appropriate, and must ensure adequate ventilation when using solvent-based paints. Learners could evidence this through the completion of a stores requisition with a quality control sheet and photographs, by teacher observation, or by a teacher record of oral questioning.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 14: Exploring Painting and Decorating
- Unit 15: Performing Paperhanging Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop measuring skills and mathematical skills in relation to calculating quantities of materials. Learners will also gain transferable skills in working safely.

Unit 17: Exploring Building Services Techniques in Construction

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

This unit allows learners to explore techniques that are used in building services by carrying out practical electrical and plumbing work using industry-standard hand tools and equipment.

Unit introduction

The houses in which we live and the buildings in which we learn all include building services to provide electricity, gas and water to the places where they are needed. In this unit you will learn how to carry out some practical aspects of building services in construction. To prepare for this you will learn how to select the right tools and equipment for carrying out building services tasks and be able to assess the hazards that are present and possible safety measures that will be required when carrying out these tasks. You will see how electrical cabling and wiring are fitted and how circuits are connected. You will also learn how copper pipes and fittings are used to deliver water services by completing some of these operations yourself.

Building services form a large part of any construction project and tend to be carried out by specialist subcontractors in each services field. In modern buildings they often use complex systems to provide heating, lighting and ventilation that are not visible as they are hidden within the structure of the building.

Safety is very important, especially when working with electricity and water. You will gain appropriate skills to enable you to install and operate systems safely.

Building services are crucial to the smooth functioning of any building. In more complex buildings they distribute heat, energy and light around the building system and remove waste products through ventilation, extraction and disposal. Services might also include the movement of occupants, for example the use of elevators and escalators, and protective measures, for example security systems, 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.

Learning aims

In this unit you will:

- A** Explore hand tools and materials commonly used to perform simple building services tasks
- B** Explore important health, safety and welfare issues associated with building services tasks
- C** Demonstrate safe working practices when carrying out basic elements of building services installations.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Explore hand tools and materials commonly used to perform simple building services tasks	A1 Hand tools used for building services tasks A2 Mechanical building services tasks A3 Electrical building services tasks	A written report that covers the tools and materials used during the completion of simple building services tasks and the importance of health, safety and welfare when carrying out these tasks.
B Explore important health, safety and welfare issues associated with building services tasks	B1 Health, safety and welfare B2 Safe use of tools and equipment B3 Personal protective equipment (PPE)	
C Demonstrate safe working practices when carrying out basic elements of building services installations	C1 Basic building services C2 Marking out C3 Safe installation of basic building services systems	Practical assessment to include the safe completion of basic building services installations. Evidence to include quality of completed installation supported by observation records, photographs and written reports.

Content

Learning aim A: Explore hand tools and materials commonly used to perform simple building services tasks

A1 Hand tools used for building services tasks

Purpose and use of hand tools for building services tasks and their scheduling for a given task.

- Marking out and measuring tools, including:
 - pencil
 - tape measure
 - spirit level.
- Cutting tools, including:
 - tube cutters
 - junior hacksaw
 - half round file
 - cable cutters
 - stripping knife.
- Holding tools, including:
 - pipe grips
 - bench vice
 - blowtorch
 - grips.
- Joining and forming tools, including:
 - screwdrivers
 - ball pein hammer
 - tube bending machine.

A2 Mechanical building services tasks

Purpose and use of materials and components for mechanical building services tasks.

- Basic pipe joints:
 - compression type A fittings
 - solder end feed types
 - solder ring type fittings.
- Materials and consumables used for mechanical building services tasks, including:
 - flux
 - steel wool
 - push fit plastic joints.
- Cutting pipe to correct length.
- Bending pipe.
- Horizontal or vertical installation of pipe runs as per industrial standards.

A3 Electrical building services tasks

Purpose and use of materials and components for electrical building services tasks.

- Basic electrical connections:
 - spade connectors
 - screw terminals
 - solder type
 - push-fit or clip-in connectors.
- Cutting cable to correct length.
- Stripping cable.
- Suitable terminations.
- Cables installed correctly in line with industrial standards.

Learning aim B: Explore important health, safety and welfare issues associated with building services tasks

B1 Health, safety and welfare

Appropriate safe work practices when carrying out building services tasks:

- relevant local, national and international legislation/regulations
- using the correct tool for the task
- procedures for safe isolation of building services:
 - gas
 - water
 - electricity
- identification of hazards
- control measures to reduce risks
- maintaining a clean and tidy work area
- use of safe manual handling techniques when lifting and moving tools and materials.

B2 Safe use of tools and equipment

Appropriate safe work practices when using tools and equipment:

- access equipment:
 - safe checking, erection, use, dismantling and storage of:
 - mobile scaffold
 - extending ladders
 - stepladders
- portable power tools:
 - cordless drill
 - cordless screwdriver
 - hammer action drill.

B3 Personal protective equipment (PPE)

- Appropriate use of personal protective equipment when carrying out building services tasks, including:
 - safety boots
 - hand protection
 - goggles
 - other PPE as appropriate.

Learning aim C: Demonstrate safe working practices when carrying out basic elements of building services installations

C1 Basic building services

- Basic distribution systems:
 - water
 - gas
 - electricity.

C2 Marking out

Marking out layouts of basic building services systems:

- from building services drawings (pipework, electrical circuits)
- use of scale measurements
- use of associated simple calculations for material quantities.

C3 Safe installation of basic building services systems

- Preparation and use of materials:
 - 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.
- Use clips and brackets to support pipes and cables.
- Fix appliances and components to a variety of surface finishes.
- Safe working practices:
 - following relevant legislation/regulations in home country
 - using the right tool for the job
 - procedures for safe isolation of building services
 - maintenance of clean and tidy workplace
 - identification of hazards
 - use of control measures to reduce risks.
- Safe use of access equipment:
 - safe checking, erection, dismantling and storage of access equipment
 - safe use of mobile scaffold, extending ladders, stepladders.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore hand tools and materials commonly used to perform simple building services tasks		AB.D1 Justify the selection and use of tools, materials, PPE and safe working practices when performing given building services tasks.
A.P1 Select hand tools needed to perform given building services tasks.	A.M1 Explain how selected tools and materials minimise health, safety and welfare risks when performing given building services tasks.	
A.P2 Select materials needed to perform given building services tasks.		
Learning aim B: Explore important health, safety and welfare issues associated with building services tasks		
B.P3 Describe safety requirements for performing building services operations.	B.M2 Explain how selected PPE and safe working practices minimise health, safety and welfare risks when performing given building services tasks.	C.D2 Complete the installation of an electrical circuit and a plumbing installation to high levels of precision and accuracy safely.
B.P4 Select the PPE required for carrying out simple building services operations.		
Learning aim C: Demonstrate safe working practices when carrying out basic elements of building services installations		
C.P5 Install a simple electrical circuit using industry-standard connections safely.	C.M3 Complete the installation of an electrical circuit and a plumbing installation to acceptable tolerances safely.	
C.P6 Install a simple pipework installation using industry-standard connections safely.		

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aims: A and B (A.P1, A.P2, B.P3, B.P4, A.M1, B.M2, AB.D1)

Learning aim: C (C.P5, C.P6, C.M3, C.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have 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 require an appropriately equipped workshop. Centre health and safety risk assessments should be available and implemented as a learning resource.

Essential information for assessment decisions

Learning aims A and B

For Distinction standard, learners must justify their selection and use of tools, materials, PPE and good health, safety and welfare practices to perform given building services 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 and techniques to be used when performing the given building services tasks. Learners should include low-level access equipment that would be used when carrying out tasks in addition to the hand tools and power tools required.

For Merit standard, learners must explain how selected tools and materials are used to reduce risks to health, safety and welfare when performing the given building services tasks. They must explain how the correct use of tools for the task allows the activity to be completed safely and why these tools are suitable for the materials being used. Learners will also need to explain how selected PPE and other control measures are appropriate for the materials and techniques to be used when performing the given building services tasks, for example why gloves should be worn when handling materials. Learners should include details of safe working practices to be followed when using low-level access equipment.

For Pass standard, learners must describe the hand tools that are needed to perform at least two simple building services tasks, including one mechanical task and one electrical task. They must also describe the materials that will be needed to perform these same building services operations, for example installing a one-way switched lighting circuit or plumbing hot and cold water supplies for a wash basin. This could be evidenced by completion of material identification sheets. Learners must then describe the basic health and safety requirements that need to be considered before performing the given building services operations. Descriptions should cover processes such as producing a risk assessment, use of a method statement, the safe isolation of the services that are being worked on and requirements to protect the public. Learners must also select suitable items of PPE for performing the given building services tasks, for example safety glasses, gloves and overalls.

Learning aim C

For Distinction standard, learners must complete the two installations to high levels of precision and accuracy. The installations of both the electrical circuit and the plumbing must meet the requirements specified for Merit level. Additionally, sockets, switches and plumbing fixtures must be level and within a tolerance of ± 1 mm of the locations in the given drawings and specifications for the work. Pipes and cables should meet the requirements of the drawings and should be horizontal and vertical where specified. Learners should work safely at all times and have minimal guidance from teachers when completing the tasks.

For Merit standard, learners must complete the installation of both the electrical circuit and plumbing to an acceptable tolerance. To achieve this, in addition to the requirements for Pass level, switches, sockets and plumbing fixtures must be within ± 2 mm of their specified location. Most of the cables and pipes must be horizontal and/or vertical as appropriate. Bends also need to be produced with accuracy. Learners must carry out the building services installation tasks safely and to good industrial standards. A limited amount of guidance is acceptable.

For Pass standard, 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. They must also 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. Learners must then mark out and measure the materials they will be using as well as the locations of switches, sockets and plumbing fittings. Pipes and cables must be fixed securely to a suitable supporting structure using suitable clips and brackets. When complete, the level of fittings must be in position to within ± 5 mm of the specification. Learners must carry out the building services installation tasks safely. Teacher guidance may be required.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 18: Performing Plumbing Operations
- Unit 19: Performing Electrical Operations
- Unit 26: Exploring Building Services Engineering

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers
- site visits
- work experience.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to:

- select the most appropriate tools and equipment to complete the measuring, marking out and installation of an electrical circuit and a plumbing installation.
- collect, interpret and use working instructions and drawings appropriately.
- develop practical skills relating to measuring, marking out and installing systems which will be self-managed by learners.

Unit 18: Performing Plumbing Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used to perform plumbing operations and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop practical skills in undertaking plumbing tasks.

Unit introduction

How does water arrive at the tap when you turn it on? Plumbing is an important operation. It is used to distribute both hot and cold water for a variety of purposes. Piped water provides the supply for drinking, washing, heating, cleaning and appliances using water within a property. The safe distribution of water must be ensured so that it is suitable for human consumption, and so the cleanliness of an installation is essential.

This unit will give you the opportunity to explore the different tools and equipment used for plumbing operations and to learn how they are used to cut and bend pipework and fasten fittings together. The safe use of tools and equipment is essential as plumbing often takes place within tight and enclosed spaces.

Health and safety are important when working with plumbing materials as jobs can involve hot work – for instance, when using a gas torch to solder together plumbing joints. In this unit, you will understand the hazards associated with plumbing operations and the safe techniques that can be employed when installing pipework, appliances and fittings.

Within this unit you will learn about the different materials that are used in plumbing operations, from copper tubing to the new coiled plastic pipework, and the equipment that is used to install these. Most plumbing services are hidden from view within the service spaces of a building. Attention to detail and accurate jointing are therefore essential to prevent any leaks and maintenance issues in the future.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used for plumbing operations
- B** Develop practical skills using safe techniques to undertake plumbing operations.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand tools, materials and equipment used for plumbing operations	A1 Tools and equipment used for undertaking plumbing operations A2 Materials used for undertaking plumbing operations A3 Safe use and storage of tools, materials and equipment	A safety pack containing a risk assessment and information about materials for completing a plumbing task.
B Develop practical skills using safe techniques to undertake plumbing operations	B1 Health and safety B2 Develop pipe bending and jointing skills	An observed practical task constructing a pipe test rig.

Content

Learning aim A: Understand tools, materials and equipment used for plumbing operations

A1 Tools and equipment used for undertaking plumbing operations

Purpose and use of tools and equipment for plumbing operations.

- Hand tools, power tools and equipment, including:
 - measuring tape
 - tube cutters
 - wheel cutters
 - junior hacksaw
 - hand saw
 - power tools
 - spanners
 - wrench
 - half round file
 - pipe grips
 - pipe cutters
 - screw drivers
 - bench vice
 - tube bending machine
 - blowtorch
 - spirit level.

A2 Materials used for undertaking plumbing operations

Types of materials used for plumbing operations and their in-situ properties.

- Copper and brass fittings:
 - copper tube, different diameters and uses
 - standard copper jointing fittings, straights, 90° elbows, T-junctions, pre-soldered ring and plain-end feed types
 - solders and fluxes.
- Brass fittings, compression and ancillary fittings.
- Plastic pipe and fittings:
 - plastic pipework, different diameters, water supply and waste pipework
 - standard jointing fittings, push fit, solvent welded.
- Appliances:
 - different types of user appliances – sinks, wash hand basins (whb), toilets, bath, showers
 - service and waste systems connections to appliances.

A3 Safe use and storage of tools, materials and equipment

Appropriate practices when working with plumbing tools, materials, equipment and water-using appliances.

- Use of general personal protective equipment (PPE) needed in the workplace, e.g. safety boots, hard hat, high-visibility jacket, safety gloves, safety glasses, barrier cream.
- Use of task-specific PPE when cutting and for hot work.

- The need for appropriate behaviour and a positive attitude towards health and safety.
- Maintaining a clean and tidy work area.
- Safe manual handling when lifting and moving.
- Correct use of tools and equipment.
- Cleaning tools and reporting any defects.
- Returning tools to appropriate storage upon completion of practical work.
- Appropriate storage methods for pipework, appliances and fittings.

Learning aim B: Develop practical skills using safe techniques to undertake plumbing operations

B1 Health and safety

Risk assessment prior to starting activities and procedures during the practical activity.

- Hazard identification and risks associated with the practical activity:
 - hot working
 - use of bottled gas
 - cuts, injuries and risk of infection caused by tools and equipment.
- Untidy work area causing slips, trips and falls, musculoskeletal injuries resulting from working in cramped environments, identification of people at risk.
- Use of control measures to remove or minimise the risk.
- Adoption of safe working practices.

B2 Develop pipe bending and jointing skills

- Marking out manual bending of pipework:
 - reading and interpreting the drawn information for the practice piece to be constructed
 - marking out the lengths of pipework required
 - cutting to length
 - forming bends in pipework using pipe benders.
- Formation of soldered joint:
 - preparation of pipework
 - flux application
 - soldering processes.
- Formation of a compression joint:
 - preparation of pipework
 - connection using brass fittings
 - pressure testing of the completed pipe rig
 - preparation of test equipment
 - pressure test.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used for plumbing operations		
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment for plumbing operations.</p> <p>A.P2 Explain the safe use and storage of plumbing operation tools, materials and equipment.</p>	<p>A.M1 Justify the selection of tools, materials and equipment for a specified plumbing operation task.</p>	<p>A.D1 Evaluate the use of alternative materials for a specified plumbing operation task.</p>
Learning aim B: Develop practical skills using safe techniques to undertake plumbing operations		
<p>B.P3 Carry out a risk assessment prior to commencing plumbing operations.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Measure and mark out materials for a pipe rig framework to give spec, accurate to 5 mm.</p> <p>B.P6 Construct a simple pipe rig framework with:</p> <ul style="list-style-type: none"> · compression fitting · manual bends · soldered joints · test to 1 × the operating pressure. 	<p>B.M2 Measure and mark out materials for a pipe rig framework to a given spec, accurate to 3 mm.</p> <p>B.M3 Construct a simple pipe rig framework to:</p> <ul style="list-style-type: none"> · ±5 mm in length and ±5 mm in height measured against the rig drawing · tested to 1.5 × the operating pressure. 	<p>B.D2 Measure and mark out materials for a pipe rig framework to a given spec, accurate to 2 mm.</p> <p>B.D3 Construct a simple pipe rig framework to:</p> <ul style="list-style-type: none"> · ±5 mm length and ±5 mm in height measured against the rig drawing · pass a pressure test standard 2 × operating pressure.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.P6, B.M2, B.M3, B.D2, B.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a plumbing workshop with a hot working area and with hand tools and materials of a nature and to standards typical of a real industrial work environment. A set of pipe benders must be made available for the manual bending of the copper pipework using a former. It is recommended that 15 mm diameter pipework is used for the construction of the test rig frame.

Personal protective equipment, including safety boots, barrier cream, gloves and eye protection, will be required, along with other PPE that may be specific to the working environment.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners should evaluate alternative materials they could use for the same specific construction situation and expand their responses to which alternative materials would be suitable and appropriate to their selection and why.

For Merit standard, learners should apply their understanding to a specific construction situation and justify which tools, materials and equipment they would use for this task. Learners should explain, with reasons, why they selected items.

For Pass standard, learners should explain how tools, materials and equipment are used for plumbing operations and give supported reasons as to when these would be selected for different situations. Learners should include in their explanations a minimum of seven hand tools, power tools or items of equipment, three types of metal fittings, three types of plastic fittings and three types of appliances. Learners should describe how to safely use and store tools, materials and equipment. Evidence might take the form of a presentation to peers and the teacher, and a requisition order that compiles all the items needed to complete the practical task.

Learning aim B

For Distinction standard, learners should improve their accuracy and precision further and measure and mark up to within 1 mm. Learners must produce work that has an acceptable level of quality, constructing a pipe test rig within 5 mm of the design drawing dimensions which will hold a pressure of $2 \times$ the operating pressure (+). For the pressure test, the highest operating pressure should be used, for example if the mains water pressure is 5 bar, then the pressure test standard should be 7 bar.

For Merit standard, learners should improve the accuracy and precision within the measurement and mark-up in order to demonstrate their ability at Merit level. For this criterion, their measurements and mark-up will be accurate to within 2 mm. Similarly, learners must construct the pipe test rig to within 5 mm of the design drawing dimension provided. This dimensional tolerance must be applied to the overall height of the rig and the length. The completed assessment piece must be pressure tested to $1.5 \times$ the operating pressure (+).

For Pass standard, learners should produce a risk assessment prior to commencing the simple pipe test rig activity. This should include identifying hazards and the risks associated with the practical activity, the people at risk and appropriate control measures to minimise the risk.

The learners will measure and mark up materials to produce a pipe test rig. The accuracy of their measurement and mark-up could be evidenced by photographs or observation records. The measurement and mark-up will be accurate to within 3 mm. Learners will then construct a practical pipe test rig to a drawn specification. This needs to include at least two made bends, one soldered bend, one soldered T-junction and one compression fitting. The completed assessment piece must be pressure tested to $1 \times$ the operating pressure (+). Learners should comply with safe working practices, wear appropriate PPE and behave appropriately, with a positive attitude towards health and safety, during the pipe test rig framework activity.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop mathematics and English skills.

Unit 19: Performing Electrical Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

This unit will give learners the basic skills needed to carry out the safe installation of electrical circuits for power and lighting using current industry-standard techniques.

Unit introduction

The way in which we live, work and socialise relies heavily on electrical power, for example our home appliances, manufacturing processes and global communications all need electricity to work. It is important for our everyday lives that an adequate and reliable supply of electrical power is available.

Electrical installation in construction is usually carried out by a specialist electrical subcontractor. In this unit you will investigate some of the activities that are completed during electrical installations. You will also look at health and safety related to working with electricity.

Electric shock can injure or be fatal, so all wiring must be insulated and installed safely to meet the needs of current electrical regulations and must be tested before it is made live to make sure it is safe for users. This unit will give you the opportunity to explore relevant local, national and international health and safety legislation and regulations that apply to the practical tasks you will carry out.

All exposed wiring must be encased in an insulator or conduit to prevent damage or physical contact. An electrical wiring system uses a series of colours for live, neutral and earth conductors. Being able to correctly recognise the colour-coded wires and controls that you will encounter when completing an electrical installation is essential, so electricians must pass a colour blindness test before completing their study and training.

In this unit, your practical activity will include working safely to mark out, measure and install a two-way switching circuit and light fitting, a ring final circuit and electrical power outlets. You will need to select personal protective equipment and the resources required (materials and equipment) and to schedule these for more demanding practical tasks.

This unit does *not* fulfil the requirements of occupational competence in electrical operations. You will need to undertake further study and gain experience to meet the current requirements for electrical installations for practising electricians.

Learning aims

In this unit you will:

- A** Explore the principles of safe working practice for electrical operations
- B** Demonstrate practical skills and safe techniques to carry out electrical operation tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
<p>A Explore the principles of safe working practice for electrical operations</p>	<p>A1 Health and safety regulations and legislation and their impact on employers and employees.</p> <p>A2 Regulations and standards relevant to electrical installations.</p>	<p>A written report that covers the health and safety responsibilities of employers and employees for the completion of electrical operations on a construction project.</p>
<p>B Demonstrate practical skills and safe techniques to carry out electrical operation tasks</p>	<p>B1 Tools and equipment used for undertaking electrical operations.</p> <p>B2 Materials used for undertaking electrical operations.</p> <p>B3 Safety equipment, its use and safe work practices when undertaking specified electrical operations.</p> <p>B4 Develop electrical operation skills.</p>	<p>Practical assessment to include the selection of materials and components for a lighting circuit and a ring final circuit and the installation and testing of the two circuits.</p> <p>Evidence to include quality of completed installation supported by observation records, photographs and written reports.</p>

Content

Learning aim A: Explore the principles of safe working practice for electrical operations

A1 Health and safety regulations and legislation and their impact on employers and employees

A range of current local, national and international health and safety regulations and legislation relevant to electrical installation, including roles of employers and employees as appropriate.

- Health and safety at work:
 - employee duties to:
 - take due care of themselves and others
 - cooperate with employers on health and safety matters
 - correctly use PPE and equipment provided for health and safety
 - not misuse or damage anything provided for health and safety.
- Working at height:
 - employee duties to:
 - report any safety hazards to their employer
 - not continue if they think it is unsafe
 - follow training or instructions provided
 - use any equipment, including safety devices, provided by the employer.
- Safety in construction, design and management:
 - contractor and employer duties to:
 - plan, manage and monitor own work and that of others
 - check competence of all employees
 - train employees and provide relevant information
 - ensure employees have adequate welfare facilities
 - cooperate and coordinate work with others to ensure the health and safety of all.
- Safe provision and use of work equipment:
 - employer duties to:
 - make sure that all work equipment is safe and suitable for its intended purpose
 - maintain and regularly inspect all work equipment
 - train employees and provide relevant information and instruction
 - ensure employees have written instructions and training for the safe use of equipment.

A2 Regulations and standards relevant to electrical installations

The content of applicable local, national and international regulations and standards that cover basic protection against electric shock and the safety requirements that must be followed in their installation to ensure compliance.

- Requirements for basic protection against electric shock, consisting of:
 - insulation
 - barriers and/or enclosures
 - circuit protection conductor (earth)
 - bonding
 - automatic disconnection of the supply.
- How basic protection measures prevent electric shock.

Learning aim B: Demonstrate practical skills and safe techniques to carry out electrical operation tasks

B1 Tools and equipment used for undertaking electrical operations

Purpose and use of tools and equipment for electrical operations and their scheduling for a given task.

- Hand tools and equipment, including:
 - measuring equipment: measuring tape, steel rule
 - cable cutters
 - cable strippers
 - junior hacksaw
 - pliers
 - ball peen hammer
 - stripping knife
 - screwdrivers
 - spirit level
 - electrical testing equipment.
- Portable power tools, including:
 - cordless drill/screwdriver
 - hammer action drill.

B2 Materials used for undertaking electrical operations

Materials used for electrical operations, including calculating and scheduling the quantity of materials required and their in-situ properties.

- Cable:
 - 1.5 mm² lighting circuit cable
 - 2.5 mm² final circuit power cable
 - radial circuit cable
 - cable clips.
- Electrical fittings:
 - single and double sockets, switched
 - fused spur units, switched
 - ceiling rose and lamp holder
 - light fitting
 - light switches, single
 - cooker connection unit and outlet plate
 - cooker switch
 - four-way consumer unit with RCD fitted.
- Miscellaneous fittings:
 - surface boxes
 - equipment fixing materials: screws, cable clips.

B3 Safety equipment, its use and safe work practices when undertaking specified electrical operations

Appropriate safe work practices when working with electricity:

- use of general personal protective equipment (PPE) needed in the workplace, e.g. safety boots, hard hat, high-visibility jacket, eye protection, dust mask, hand protection

- the need for appropriate behaviour and a positive attitude towards health and safety
- maintaining a clean and tidy work area
- use of safe manual handling techniques when lifting and moving
- correct use of tools and equipment
- maintaining tools and reporting any defects
- returning tools to appropriate storage upon completion of practical work
- safe use of access equipment.

B4 Develop electrical operation skills

Marking out electrical runs and sockets:

- interpret the circuit requirements from a circuit diagram
- mark out the lengths of cable required
- cut cable to required length
- mark out the conduit required, cut to length and install.

Installation of a ring final circuit to include two double socket outlets with one switched fuse spur from one double socket, one single socket, one cooker supply connector with switch to the consumer unit connections using clipped cables:

- isolation of the supply
- laying out cable runs and cutting cables
- installation of socket back boxes
- wiring of socket faces
- wiring of switched fused spur.

Installation of a two-way switching lighting circuit with ceiling rose and domestic light fitting using clipped cables:

- isolation of the supply
- laying out cable runs and clipping cables
- installation of lighting back boxes
- wiring of lighting circuit
- fitting of switches
- fitting of light fitting.

Testing of the completed power ring final circuit and lighting circuit:

- isolation of circuit
- power connection
- visual inspection, tests for continuity, insulation resistance and polarity
- functional testing
- use of appropriate documentation to record the testing of electrical circuits in accordance with local/national procedures and regulations in relation to installation requirements in force for electrical installation at the time of learner assessment.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the principles of safe working practice for electrical operations		
<p>A.P1 Describe the health and safety requirements for employees and employers when performing a practical task in electrical operations.</p> <p>A.P2 Describe three aspects of protection from electric shock applied to electrical operations.</p>	<p>A.M1 Explain the health and safety requirements for employees and employers, including protection from electric shock, when performing a practical task in electrical operations.</p>	<p>A.D1 Justify the health and safety requirements, including protection from electric shock, when performing a practical task in electrical operations.</p>
Learning aim B: Demonstrate practical skills and safe techniques to carry out electrical operation tasks		
<p>B.P3 Select the resources required for the installation of a specified lighting circuit and a specified ring final circuit.</p> <p>B.P4 Mark out, measure and safely install a two-way switching lighting circuit to a given specification.</p> <p>B.P5 Mark out, measure and safely install a ring final circuit to a given specification.</p>	<p>B.M2 Describe the resources required for the installation of a specified lighting circuit and a specified ring final circuit.</p> <p>B.M3 Mark out, measure and safely install with accuracy a two-way switching lighting circuit and a ring final circuit to a given specification.</p>	<p>B.D2 Justify the resources used for a specified two-way switching lighting circuit and a specified ring final circuit and complete the safe installation of the two circuits to a high level of precision and accuracy.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.M2, B.M3, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment. The materials should be sufficient for learners to complete each of the specified installations:

- two-switch circuit: switches, ceiling rose, light fitting, cable clips, bulb and cable
- ring final circuit: two switched double socket outlets, single socket, switched fused spur outlet, cooker supply unit with isolation switch, consumer unit with an RCD device and outlet plate, cable.

The learning environment must be a safe place to work, with adequate space, washing facilities and access to first-aid facilities. Learners are advised to have completed *Unit 26: Exploring Building Services Engineering* prior to undertaking this unit so that they have some knowledge and understanding of electrical principles and techniques. However, it is considered sensible for all electrical installations to be connected to a power pack, so that the voltage can be stepped down to a safe level, rather than directly to the mains.

A competent supervisor must carry out an induction for all learners on 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.

Training and supervision of young people are particularly important because of their age and their unfamiliarity with the working environment. Learners and centres must comply with appropriate local and national regulations for the provision and use of work equipment and other recognised codes of practice that would apply to young people in the workplace.

Teachers should at all times supervise learners working with electrical equipment.

The teacher will perform tests on the circuit for continuity, insulation resistance and polarity.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must justify the health and safety requirements in use when carrying out electrical operations, drawing from relevant local and national regulations and legislation for health and safety at work, working at height, safety in construction, design and management, and the safe provision and use of work equipment. Their justification must include details of the requirements of at least two current and relevant regulations or pieces of legislation. Learners must also justify appropriate methods of providing basic protection against electric shock during the installation and use of electrical circuits.

For Merit standard, learners must explain the health and safety requirements with regard to the role of the employee and the employer when undertaking electrical operations. Their explanation must include the requirements of any two relevant local or national regulations and pieces of legislation, such as for health and safety at work, working at height, safety in construction, design and management or the safe provision and use of work equipment. This explanation must include an applied electrical installation example against each of the employee's responsibilities for the regulations covered. Learners must also include an explanation of three aspects of protection from electric shock and an example for each applied to electrical installations.

For Pass standard, learners must describe the health and safety requirements with regard to the duties of the employee and the employer when undertaking electrical operations. Their description must include the requirements of any two relevant local or national regulations and pieces of legislation, such as for health and safety at work, working at height, safety in construction, design and management or the safe provision and use of work equipment. Learners should always refer to regulations or legislation that are in force at the time of learner assessment. They must also describe three aspects of protection from electric shock and include an example of how each is applied to electrical installations.

Learning aim B

For Distinction standard, learners must justify their selection of components for the specified two-way switched lighting circuit and the ring final circuit. As part of their justification learners must give reasons why they have selected specific components and why they have rejected others. Both the two-way switched lighting circuit and the ring final circuit must be completed to a high level of accuracy and precision using hand tools and appropriate power tools. The installations must meet the requirements specified for Merit level and additionally sockets and switches must be level and within a tolerance of ± 1 mm of the locations specified in drawings and specifications. There must also be no exposed copper conductors or electrical conductor. All required tests for continuity, insulation resistance and polarity must be passed first time. To record the outcome of circuit testing, learners must complete a centre-devised or modified document with accuracy and precision to show their awareness of the safety paperwork requirements for electrical installations. Learners must comply with safe working practices at all times and select and use appropriate PPE.

For Merit standard, learners must describe suitable alternative methods of cable distribution, for example surface-mounted conduit or cable trays that could be used for electrical distribution. Their description must cover the advantages and disadvantages of alternative methods that could be used for lighting circuit and ring final circuit installations. Learners must produce a detailed description of how the components they specify meet the material requirements for the two circuits. Learners must accurately mark out and measure cable lengths and install a two-way switched lighting circuit, including a ceiling rose, a light fitting and a bulb. In addition to the requirements for pass level, switches must be within ± 2 mm of their specified location and clipped cables must be horizontal and/or vertical as appropriate. Cables will need to be clipped to a suitable supporting structure.

Learners must also complete the installation of the specified ring final circuit. In addition to the requirements for Pass level, all sockets and switches must be level and within ± 2 mm of their specified location. Clipped cables must again be horizontal and/or vertical as appropriate. Both circuits must have no exposed electrical conductors and must pass tests for continuity, insulation resistance and polarity.

To record the outcome of circuit testing, learners must accurately complete a centre-devised or modified document to show their awareness of the safety paperwork requirements for electrical installation. Learners must comply with safe working practices and use appropriate PPE.

For Pass standard, learners must select and schedule the resources required for a specified two-way switching lighting circuit and a specified ring final circuit. Learners should produce a list of all resources required, to include the specification of materials,

quantities, tools, equipment and plant. Learners must then mark out and measure cable lengths and install a two-way switched lighting circuit, including a ceiling rose, a light fitting and a bulb and clipped cables. Cables will need to be clipped to a suitable supporting structure. When complete the switches must be in position to within ± 5 mm of the specification and the ceiling rose must be flush with the ceiling. Switch wires must be correctly identified.

Learners must also install a ring final circuit using clipped cables. The circuit needs to be installed to meet the given specification of a ring final circuit containing two double sockets, one single socket, one switched fuse spur and one cooker connector with an isolation switch. The cooker connection and switch need to be supplied and installed in accordance with the cable design size provided by the teacher. A suitable consumer unit and outlet plate will need to be supplied to terminate all connection within, that is isolated from any supply. The consumer unit must contain an RCD device. The fused spur must be supplied from one of the double sockets. Learners will need to use a suitable dimensioned drawing to take measurements and install the circuit. As with the lighting circuit, all sockets and switches need to be level and within ± 5 mm of the specified height. For both circuits the correct colour coding must be used for cables and there must be no exposed electrical conductors. Earth sleeving must be correctly fitted, and at all times safe working practices must be followed, including the use of appropriate PPE.

On completion, both circuits must pass tests for continuity, insulation resistance and polarity. To record the outcome of circuit testing, learners must complete a centre-devised or modified document to show their awareness of the safety paperwork requirements for electrical installation. To evidence the practical work, learners' work can be photographed, the photograph endorsed with the learner's name on the back and accompanied by a teacher observation record including a quality control sheet.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 17: Exploring Building Services Techniques in Construction
- Unit 26: Exploring Building Services Engineering

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and demonstrations
- work experience.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to:

- select the most appropriate tools and equipment to complete the measuring, marking out, installation and testing of a range of electrical circuits
- collect, interpret and use working instructions, drawings and test procedures appropriately
- develop practical skills relating to measuring, marking out, installing and testing electrical circuits which will be self-managed by learners.

Unit 20: Exploring Plastering and Dry Lining Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used to perform plastering and dry lining operations and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop practical skills in undertaking plastering and dry lining tasks.

Unit introduction

Did you know that plasterwork is one of the most ancient of handicrafts employed in connection with building operations? The earliest evidence shows that dwellings 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 4000 years ago, probably much earlier, and yet it remains hard and durable.

The collective term 'plastering and dry lining' covers a range of skills that are employed by skilled workers in the construction industry to provide a finished surface for final decoration. Plastering requires the development of techniques to produce 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.

Plasterwork refers to construction or ornamentation done with plaster. 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 will enable you to explore the basic skills and materials involved in plastering and dry lining. You will learn how to use plastering hand tools safely and understand the different materials and techniques involved in applying basic craft skills needed to stud partitions and apply plaster coats. You will also learn about materials such as gypsum plaster, sand and cement, and sand and lime mixes. You will be able to correctly select and safely use appropriate tools and equipment.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used for plastering and dry lining tasks
- B** Develop practical skills using safe techniques to carry out plastering and dry lining tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand tools, materials and equipment used for plastering and dry lining tasks	A1 Tools and equipment used for plastering and dry lining A2 Materials used to carry out plastering and dry lining tasks A3 Safe use and storage of tools, materials and equipment for plastering and dry lining	A safety pack containing a risk assessment and information about materials for completing a plastering and dry lining task.
B Develop practical skills using safe techniques to carry out plastering and dry lining tasks	B1 Health and safety B2 Undertake plastering and dry lining tasks	An observed practical plastering and dry lining task.

Content

Learning aim A: Understand tools, materials and equipment used for plastering and dry lining tasks

A1 Tools and equipment used for plastering and dry lining

Purpose and use of tools and equipment in plastering and dry lining.

- Hand tools and equipment:
 - hawk
 - plastering trowel (steel float)
 - plastic float
 - wood float
 - gauging trowel
 - square mouth trowel
 - cutting knife
 - hand mixer
 - featheredge
 - Darby
 - wet brush
 - scratcher
 - mixing tub
 - tape measure
 - club hammer
 - mixing shovel
 - tin snips
 - claw hammer
 - spirit level
 - electric mixing tools.
- Access equipment (including safe checking, erection, use, dismantling and storage):
 - low-level access platforms
 - hop-ups
 - ladder
 - tower scaffolds.

A2 Materials used to carry out plastering and dry lining tasks

Types and purposes of materials used to carry out plastering and dry lining tasks, including the reasons why specific materials are used for different tasks and alternatives available.

- Plasterboard: composition of plasterboard, different types of plasterboard and advantages compared with traditional plastering.
- Browning plaster: a backing plaster or undercoat, where it is used, i.e. on absorbent surfaces, and the thickness of layers applied.
- Bonding plaster: a backing plaster or undercoat, where it is used, i.e. on dense and less absorbent surfaces and those treated with Polyvinyl Acetate (PVA), and thickness of layer applied.
- PVA: the use of PVA, i.e. application to the walls to create a barrier, improve bonding and prevent the plaster from drying out too fast.

- Finishing plaster: application as a final coat over bonding/browning or over plasterboard and thickness applied.
- Scrim tape: used to strengthen joints in plasterboards before applying skim finish.
- Angle bead and corner beads used to strengthen and define square edges.

A3 Safe use and storage of tools, materials and equipment for plastering and dry lining

Appropriate practices when working on plastering and dry lining.

- Use of general PPE needed in the workplace, e.g. safety boots, hard hat, and high-visibility jacket.
- Appropriate storage of tools and equipment.
- Appropriate storage methods for plasters and plasterboards.
- Use of task-specific PPE, e.g. gloves, eye protection, dust mask.
- The need for appropriate behaviour and a positive attitude towards health and safety.
- Maintaining a clean and tidy work area.
- Safe manual handling when lifting, moving and stacking materials.
- Correct use of tools and equipment.
- Cleaning tools immediately after use to prevent the build-up of deposits.
- Returning tools to appropriate storage upon completion of practical work.

Learning aim B: Develop practical skills using safe techniques to carry out plastering and dry lining tasks

B1 Health and safety

Risk assessment prior to starting activities and procedures during the practical activity.

- Hazard identification and risks associated with the practical activity:
 - working at height
 - electric shock caused by contact with defective equipment
 - injuries caused by flying debris
 - slips, trips and falls
 - cuts and injuries caused by tools and equipment
 - abrasive materials
 - falling objects
 - untidy work area
 - musculoskeletal injuries resulting from lifting and moving heavy loads.
- Identification of people at risk.
- Use of control measures to remove or minimise the risk.
- Adoption of safe working practices, including using PPE.

B2 Undertake plastering and dry lining tasks

Plastering and dry lining tasks.

- Methods used:
 - dry lining onto stud walls (timber studs, metal studs)
 - dot and dab on masonry walls
 - wet finishes
 - render and set.
- Preparing and setting up the work area.
- Mixing materials:
 - standard ration mixes
 - sand and cement (lime can be used as a substitute), render
 - plaster skim coat finishes.
- Wet finishes:
 - apply rendering and plaster skim to block walls.
- Dry finishes:
 - Measure, cut and fix plasterboard, scrim joints and apply finish coat.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used for plastering and dry lining tasks		
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment for plastering and dry lining.</p> <p>A.P2 Explain the safe use and storage of tools, materials and equipment for plastering and dry lining.</p>	<p>A.M1 Justify the selection of tools, materials and equipment for a specified plastering and dry lining task.</p>	<p>A.D1 Evaluate the use of alternative materials for a specified plastering and dry lining task.</p>
Learning aim B: Develop practical skills using safe techniques to carry out plastering and dry lining tasks		
<p>B.P3 Carry out a risk assessment prior to commencing plastering and dry lining tasks.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Prepare and set up working area.</p> <p>B.P6 Apply render and skim finishes to a wall area of 4 m² to a given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background · flat to within ±4 mm. <p>B.P7 Measure and cut plasterboard correct to within 5 mm.</p> <p>B.P8 Apply plasterboard dry lining finishes, fully bonded or fixed to wall areas.</p>	<p>B.M2 Apply render and skim finishes to a wall area of 4 m² to a given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background · flat to within ±3 mm. <p>B.M3 Measure and cut angle beads for a corner correct to within 4 mm.</p> <p>B.M4 Produce finished work with:</p> <ul style="list-style-type: none"> · finishes fully bonded or fixed to wall areas · angle beads fixed to an external plasterboard corner. 	<p>B.D2 Apply render and skim finishes to a wall area of 4m² to given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background · flat to within ±2 mm · with no trowel marks. <p>B.D3 Produce finished work with:</p> <ul style="list-style-type: none"> · finishes fully bonded or fixed to wall areas · angle beads fixed to an external plasterboard corner · all angle beads plumb · the work ready for decoration.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.P6, B.P7, B.P8, B.M2, B.M3, B.M4, B.D2, B.D3)

Further information for teachers and assessors

Resource requirements

The special resources required for this unit are suitable wall areas 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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners should evaluate alternative materials they could use for the same specific construction situation and expand their responses to which alternative materials would be suitable and appropriate to their selection and why.

For Merit standard, learners should apply their understanding to a specific construction situation and justify which tools, materials and equipment they would use for this task. Learners should explain, with reasons, why they selected items.

For Pass standard, learners should explain how tools, materials and equipment are used in plastering and dry lining and give reasons as to when they would be selected for different situations. Learners should include in their explanations a minimum of 16 tools, four types of plaster, one type each for tape and angle bead, and three different types of equipment. Learners should describe how to safely use and store tools, materials and equipment. Evidence might take the form of a presentation to peers and the teacher, and a requisition order that compiles all the items needed to complete the practical task.

Learning aim B

For Distinction standard, learners must apply render and skim finishes to a wall area of 4 m² to a given specification. Learners will carry out the plastering tasks using trowel skills to produce work that is fully bonded to the background and is flat to within ± 2 mm, as specified in the brief provided by the teacher. The work at this level will have no trowel marks. Learners must produce finished work with angle beads fixed plumb vertically and/or horizontally to a plasterboard corner. Taping and jointing work should be of a standard that leaves the surface ready for decoration.

For Merit standard, learners must apply render and skim finishes to a wall area of 4 m² to a given specification. Learners will carry out the plastering tasks to produce work that is fully bonded to the background and is flat to within ± 3 mm, as specified in the brief provided by the teacher. Learners must correctly measure an external corner, transfer this measurement and cut an angle bead correctly as specified in the brief provided by the teacher, to a tolerance of 4 mm. Learners must correctly fix an angle bead to a plasterboard corner, as specified in the brief provided by the teacher.

For Pass standard, learners should produce a risk assessment prior to commencing the practical plastering and dry lining operation. This should include identifying hazards and the risks associated with the practical activity, the people at risk and appropriate control measures to minimise the risk. Learners should prepare and set out the working area for the plastering and dry lining task. Centres can decide whether their learners will use ready-mixed materials or whether to mix materials for the task. Centres where learners are mixing their own materials should check and approve the mix before the plastering

assessment begins. Learners must apply render and skim finishes to a wall area of 4 m² to a given specification. Learners will carry out the plastering tasks to produce work that is fully bonded to the background and is flat to within ± 4 mm, as specified in the brief provided by the teacher. Learners must measure and cut plasterboard to the given areas as specified in the brief. The measured and cut plasterboard should be accurate to within 5 mm. Learners must apply plasterboard dry lining finishes as specified in the brief provided by the teacher. The brief should include fixing plasterboard to given areas, scrimming joints and applying finish coat to solid or partition backgrounds, with all joints being completed. Learners should comply with safe working practices, wear relevant PPE and behave appropriately, with a positive attitude towards health and safety, during the activity.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop mathematics and English skills.

Unit 21: Exploring Roofing Operations

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used to perform roofing tasks and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop practical skills in undertaking roofing tasks.

Unit introduction

In this unit, you will learn about hand tools, access equipment, personal protective equipment (PPE) and safe working techniques used to perform roofing operations. You will learn about the potential health and safety hazards in roofing, how to carry out a risk assessment, and safe working practices in the use of common tools and equipment. You will also develop the knowledge, skills and techniques to determine and select appropriate materials to carry out roofing tasks.

You will also carry out a practical task involving preparing a sloping roof to receive plain tiles and the fixing of plain tiles to that surface. You will develop an understanding of the issues associated with working at height. You will know the requirements for the safe use of access equipment, including extension ladders, mobile scaffold towers and mobile elevated working platforms.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used for roofing tasks
- B** Develop practical skills using safe techniques to carry out roofing tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand tools, materials and equipment used for roofing tasks	A1 Structure of a roof A2 Tools and equipment used to carry out roofing tasks A3 Materials used to carry out sloping roof tasks A4 Safe use and storage of tools, materials and equipment for roofing	Presentation explaining how tools, materials and equipment are used in roofing.
B Develop practical skills using safe techniques to carry out roofing tasks	B1 Health and safety B2 Fix plain roof tiles to a sloping roof surface	An observed practical task fixing plain tiles to a sloping roof slope.

Content

Learning aim A: Understand tools, materials and equipment used for roofing tasks

A1 Structure of a roof

Structure of sloping roofs, including terminology for parts of roofs.

A2 Tools and equipment used to carry out roofing tasks

Purpose and use of tools and equipment for roofing tasks.

- Hand tools and equipment, including:
 - claw hammer
 - tile cutter
 - slate cutter
 - felt cutting knife
 - tape measure
 - level
 - trowel
 - lead dresser.
- Access equipment, including safe checking, erection, use, dismantling and storage:
 - extending ladders
 - mobile scaffold towers
 - mobile elevated working platforms.

A3 Materials used to carry out sloping roof tasks

Types of materials used to carry out roofing tasks and their purpose:

- underlay – a material used to make the roof windproof and watertight, including sarking and roofing felts
- wooden battens – counter battens run down the roof from the ridge to the eaves while tile battens are horizontal timbers fixed over the counter battens
- plain tile fixings and nails
- roof slates and tiles – often made of clay or concrete, slates and tiles are used to cover the roof surface to make the roof weatherproof
- ridge tiles – used at the top or ridge of the roof
- sand and cement mortar mixes – used on a tiled roof to bed and joint a tiled ridge and fill the gaps at the edge of the verge.

A4 Safe use and storage of tools, materials and equipment for roofing

Appropriate practice when working on roofing tasks:

- use of general PPE needed in the workplace, e.g. safety boots, hard hat and high-visibility jacket
- use of task-specific PPE, e.g. safety belts, safety harnesses, gloves and eye protection
- the need for appropriate behaviour and a positive attitude towards health and safety
- maintaining a clean and tidy work area
- safe manual handling when lifting, moving and stacking materials

- correct use of tools and equipment
- cleaning tools immediately after use to prevent the build-up of mortar deposits
- returning tools to appropriate storage upon completion of practical work.

Learning aim B: Develop practical skills using safe techniques to carry out roofing tasks

B1 Health and safety

Risk assessment prior to starting the activities and procedures during the practical activity, including:

- hazard identification and risks associated with the practical activity:
 - working at height:
 - hazards associated with working in icy, wet and windy conditions
 - falls from roofs, through gaps in roofs and through fragile roof materials
 - falls from roofs while ascending and descending
 - being struck by falling roofing elements
 - electric shock caused by contact with defective equipment
 - injuries caused by flying debris
 - slips, trips and falls
 - cuts and injuries caused by tools and equipment
 - abrasive materials
 - cement: burns and inhalation
 - falling objects
 - untidy work area
 - musculoskeletal injuries resulting from lifting and moving heavy loads
- identification of people at risk
- use of control measures to remove or minimise the risk:
 - use of edge protection when working on sloping roofs
 - use of enclosed rubbish chutes to protect people working below
- adoption of safe working practices, including using PPE, e.g. safety belts, safety harnesses and non-slip shoes.

B2 Fix plain roof tiles to a sloping roof surface

Fixing plain roof tiles to a sloping roof surface using slates or tiles:

- preparing and setting up the work area
- calculating the pitch and gauge
- applying underlay, e.g. sarking felt, roofing felt
- fixing battens to roof – counter battens and tile softwood battens, spacing to suit tiles used
- fixing plain tiles to battens, including half bonds at verges
- considering lap and gauge.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used for roofing tasks		
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment for roofing.</p> <p>A.P2 Explain the safe use and storage of roofing tools, materials and equipment.</p>	<p>A.M1 Justify the selection of tools, materials and equipment for a specified roofing task.</p>	<p>A.D1 Evaluate the use of alternative materials for a specified roofing task.</p>
Learning aim B: Develop practical skills using safe techniques to carry out roofing tasks		
<p>B.P3 Carry out a risk assessment prior to commencing roofing tasks.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Calculate gauge and number of courses from technical or manufacturer's specification.</p> <p>B.P6 Prepare and set up a sloping roof surface.</p> <p>B.P7 Fix plain roof tiles to a sloping roof surface to produce a watertight roof finish.</p>	<p>B.M2 Produce a watertight finished sloping roof surface with all tiles laid to the correct lap and gauge and all joints correctly bonded.</p>	<p>B.D2 Produce a watertight finished sloping roof surface with all tiles laid to correct lap and gauge, all joints correctly bonded and a half-bond bedded at both verges.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.P6, B.P7, B.M2, B.D2)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to hand tools, materials, personal protective equipment 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 or training area. The roofing activity must be attempted at ground level only.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners should evaluate alternative materials they could use for the specified roofing task. They should evaluate which alternative materials would be suitable and appropriate to use with their selected tools and equipment, providing a clear explanation as to why.

For Merit standard, learners should justify which tools, materials and equipment they would use for a specified roofing task. Learners should explain, with reasons, why they have selected items.

For Pass standard, learners should explain how tools, materials and equipment are safely used for roofing and stored. They should give reasons as to when items would be selected for different situations. The range of hand tools and materials should be wider than that to be used for the practical roofing task.

Learning aim B

For Distinction standard, learners must produce work as for Merit level with all tiles laid to the correct lap and gauge, but also with a half-bond properly bedded at both verges.

For Merit standard, learners must produce work as for Pass level, but with all tiles laid to the correct lap and gauge. The lap and gauge will depend on the type of covering (plain, concrete, slate) and the pitch, as recommended by the tile manufacturer.

For Pass standard, learners will fix plain tiles to a sloping roof surface in accordance with a given specification. Prior to commencing the task they should produce a risk assessment. This risk assessment should identify the hazards, the risks associated with the practical activity (especially working at height), the people at risk and the appropriate control measures to minimise the risk. Learners must prepare and set out a sloping roof surface with a minimum area of 3m² and a minimum pitch of 30°. They should apply underlay and fix tile battens to the roof. The underlay should be neat and laid without ridges. The battens should be of appropriate size and correctly spaced to take the tiles to be used, fixed firmly and within 5 mm of parallel. Learners must fix plain roof tiles to the sloping roof surfacing, producing a watertight roof finish. All work must be correctly bonded, with all joints properly formed. Learners must calculate the gauge and the number of courses using the given specification. Learners must complete the practical task complying with safe working practice, wearing appropriate PPE and with a positive attitude towards health and safety.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 5: Construction Processes and Operations for low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 8: Exploring Carpentry and Joinery
- Unit 9: Performing Joinery Operations
- Unit 10: Performing Carpentry Operations
- Unit 11: Exploring Trowel Operations

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop measuring skills and mathematical skills in relation to calculating quantities of materials. Learners will also gain transferable skills in working safely.

Unit 22: Exploring Wall and Floor Tiling

Level: 2

Unit type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners will gain knowledge of the working techniques used for wall and floor tiling and will familiarise themselves with the relevant tools and equipment. They will apply techniques to develop practical skills in completing wall and floor tiling tasks.

Unit introduction

Did you know that tiling requires specialist skills and is very important to produce visually pleasing spaces? Wall and floor tiling is usually undertaken by specialist subcontractors. These subcontractors employ skilled tilers who can work in a wide range of contexts, from domestic showers to public swimming baths. Skilled tilers can work with a variety of 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. It 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.

In this unit, you will learn about hand tools, personal protective equipment (PPE) and the safe working techniques used to perform wall and floor tiling tasks. You will learn about the potential health and safety hazards involved in wall and floor tiling, how to carry out a risk assessment, and safe working practices in the use of common tools and equipment.

You will also develop the knowledge, skills and techniques to determine and select appropriate materials to carry out an activity where wall and floor tiles are bonded to the background surface. Wall tiling involves working at height so you will develop an understanding of the issues associated with this, together with the requirements for the safe use of access equipment.

Learning aims

In this unit you will:

- A** Understand tools, materials and equipment used for wall and floor tiling tasks
- B** Develop practical skills using safe techniques to carry out wall and floor tiling tasks.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand tools, materials and equipment used for wall and floor tiling tasks	A1 Tools and equipment used to carry out wall and floor tiling tasks A2 Materials used to carry out wall and floor tiling tasks A3 Safe use and storage of tools, materials and equipment for wall and floor tiling	A safety pack containing a risk assessment and information about materials for completing a wall and floor tiling task.
B Develop practical skills using safe techniques to carry out wall and floor tiling tasks	B1 Health and safety B2 Fix tiles to wall and floor areas	An observed practical wall and floor tiling task.

Content

Learning aim A: Understand tools, materials and equipment used for wall and floor tiling tasks

A1 Tools and equipment used to carry out wall and floor tiling tasks

Purpose and use of tools and equipment for a tiling task.

- Hand tools and equipment:
 - tile cutter
 - paddle mixer
 - power sander
 - grout tool
 - adhesive spreader
 - tile drill
 - scraper
 - sponge
 - tape measure
 - level
 - trowel
 - plumb line
 - chalk line
 - pencil.

A2 Materials used to carry out wall and floor tiling tasks

Types of materials used to carry out wall and floor tiling tasks and their purpose.

- Surface preparation materials:
 - abrasives paper
 - filler
 - battens
 - surface primer
 - sealer.
- Tiles for walls and floors, e.g. ceramic, porcelain, quarry, slate, stone, concrete, terrazzo, marble, glass, metal.
- Trims, finishing edges, cover beads.
- Appliances:
 - wall and floor adhesives
 - flexible adhesives and their use for different backgrounds.
- Grout:
 - pre-mixed
 - dry powder
 - coloured
 - combined adhesive and grout
 - tile spacers.

A3 Safe use and storage of tools, materials and equipment for wall and floor tiling

Appropriate practices when working with plumbing tools, materials, equipment and water-using appliances.

- Use of general PPE needed in the workplace, e.g. safety boots, hard hat, high-visibility jacket.
- Use of task-specific PPE, e.g. gloves, eye protection.
- The need for appropriate behaviour and a positive attitude towards health and safety.
- Maintaining a clean and tidy work area.
- Safe manual handling when lifting, moving and stacking materials.
- Correct use of tools and equipment.
- Cleaning tools immediately after use to prevent the build-up of mortar deposits.
- Returning tools to appropriate storage upon completion of practical work.

Learning aim B: Develop practical skills using safe techniques to carry out wall and floor tiling tasks**B1 Health and safety**

Risk assessment prior to starting activities and procedures during the practical activity.

- Hazard identification and risks associated with the practical activity:
 - working at height
 - electrical shock caused by contact with defective equipment
 - injuries caused by flying debris
 - slips, trips and falls
 - cuts and injuries caused by tools and equipment
 - hazardous materials (cement, adhesives)
 - falling objects
 - untidy work area
 - musculoskeletal injuries resulting from lifting and moving heavy loads.
- Identification of people at risk.
- Use of control measures to remove or minimise the risk.
- Adoption of safe working practices, including using PPE.

B2 Fix tiles to wall and floor areas

Fixing tiles to wall and floor areas:

- preparing and setting up the work area
- setting out using spirit level, plumb line, chalk line, pencil and tape measure
- applying adhesive:
 - using pre-mixed adhesive or mixing adhesive
 - spreading adhesive
 - quality checks
- fixing tiles and finishing:
 - tile spacers
 - horizontal and vertical adjustment
 - grouting
 - polish off.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand tools, materials and equipment used for wall and floor tiling tasks		
<p>A.P1 Explain the selection and use of appropriate tools, materials and equipment for wall and floor tiling.</p> <p>A.P2 Explain the safe use and storage of wall and floor tiling tools, materials and equipment.</p>	<p>A.M1 Justify the selection of tools, materials and equipment for a specific wall and floor tiling task.</p>	<p>A.D1 Evaluate the use of alternative materials for a specific wall and floor tiling task.</p>
Learning aim B: Develop practical skills using safe techniques to carry out wall and floor tiling tasks		
<p>B.P3 Carry out a risk assessment prior to commencing wall and floor tiling tasks.</p> <p>B.P4 Comply with safe working practices including using appropriate personal protective equipment.</p> <p>B.P5 Prepare areas for tiling:</p> <ul style="list-style-type: none"> · set out wall and floor areas · prepare background surface. <p>B.P6 Fix tiles and finish to wall and floor areas to a given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background for 1 m² of wall and 1 m² of floor area, including grout and trim. 	<p>B.M2 Fix tiles and finish to wall and floor areas to a given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background for 1 m² of wall and 1 m² of floor area · tiles fixed with full beds · a joint tolerance of ±5 mm · cutting trim within 3 mm · grout uniform for 1 m² of wall and 1 m² of floor area. 	<p>B.D2 Fix tiles and finish to wall and floor areas to a given specification:</p> <ul style="list-style-type: none"> · fully bonded to the background for 1 m² of wall and 1 m² of floor area · tiles fixed with full beds · a joint tolerance of ±3 mm · cutting trim within 2 mm · grout uniform for 1 m² of wall and 1 m² of floor area.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.P6, B.M2, B.D2)

Further information for teachers and assessors

Resource requirements

The special resources required for this unit are suitable wall and floor areas in order to set out work in preparation for tiling operations. Appropriate hand tools and equipment will be required for learners to be able to identify the correct equipment to use. A mixing area is necessary 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.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners should evaluate alternative materials they could use for the same specific tiling situation and expand their responses to which alternative materials would be suitable and appropriate to their selection and why.

For Merit standard, learners should apply their understanding to a specific tiling situation and justify which tools, materials and equipment they would use for this task. Learners should explain, with reasons, why they selected items.

For Pass standard, learners should explain how tools, materials and equipment are used in wall and floor tiling and when they would be selected for different situations. The range of hand tools and materials should be wider than that to be used for the practical tasks. Learners should explain how to safely use and store the tools, materials and equipment. Evidence might take the form of a presentation to peers and the teacher, and a requisition order that compiles all the items needed to complete the practical task.

Learning aim B

For Distinction standard, learners must fix tiles to wall and floor areas, to a given specification, with tiles fixed with full beds, joint tolerance of ± 3 mm, cutting trim within 2 mm and grout uniform for 1 m² of wall and 1 m² of floor area.

For Merit standard, learners must fix tiles to wall and floor areas, to a given specification, with tiles fixed with full beds, joint tolerance of ± 5 mm, cutting trim within 3 mm and grout uniform for 1 m² of wall and 1 m² of floor area.

For Pass standard, learners should produce a risk assessment prior to commencing the practical tasks. This should include identifying hazards and the risks associated with the practical activity, the people at risk and appropriate control measures to minimise the risk. Learners must set out and prepare the wall and floor areas for tiling. Learners must fix tiles to both wall and floor areas, to a given specification, fully bonded to the background for 1 m² of wall and 1 m² of floor area, including grout. Learners are not required to work to specific joint tolerances, though every tile joint must have been grouted. Learners should include a trim in their work. They should comply with safe working practices, wear appropriate PPE and behave appropriately, with a positive attitude towards health and safety, during the activity.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop mathematics and English skills.

Unit 23: Tendering and Estimating

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will understand the underlying principles of tendering and estimating and develop skills to produce estimates.

Unit introduction

Tendering and estimating is an important aspect of construction. Estimators have to accurately calculate the cost of construction projects – these could be new-build projects, maintenance projects, refurbishment work, extensions, or alterations and renovations. The calculated cost is presented in the form of a tender.

The estimate is converted into a tender by the addition of overheads and potential profit, taking into account market forces, supply and demand, the contractor's workload and the approach their competitors may take to the project. Estimators therefore have to skilfully apply mathematical techniques and exercise sound judgement in order to produce accurate estimates of project costs for the tender document. If the tender is too high, they may not win the work; if the estimate is too low, they may win the work but cause the company to lose money. Inaccurate estimates and poorly written tenders could lead to companies not winning any projects or losing money.

If in the future you would like to work for a company, understand what tendering and estimating is, run your own construction company, be a self-employed sole trader or develop a career in construction management, this unit will give you an introduction to the methods you would need to use to price work effectively and operate a profitable enterprise.

In this unit, you will learn about the different types of documentation and information that the estimator has to use to complete the estimate and some of the techniques used to calculate the cost of construction work. You will also learn how the estimate is converted into a tender, taking into account market forces and other factors, and how this makes estimating an exciting and competitive area of construction.

Learning aims

In this unit you will:

- A** Investigate types of tender documentation and how they are used
- B** Understand the information required to produce an estimate and submit a tender
- C** Develop skills to produce estimates.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Investigate types of tender documentation and how they are used	A1 Tenders A2 Bills of quantities (building price calculation documents) A3 Drawings and specifications	This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report advising a client on the benefits and drawbacks of different types of tender documentation.
B Understand the information required to produce an estimate and submit a tender	B1 Preliminaries and general conditions B2 Measured work B3 Market analysis, risk and workload considerations	This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce estimate calculations or spreadsheets for preliminary items or unit rates. Additionally, they would produce a report advising senior managers of factors that will influence the tender decision.
C Develop skills to produce estimates	C1 Pricing preliminary items C2 Calculating unit rates for measured work items	

Content

Learning aim A: Investigate types of tender documentation and how they are used

Investigate the use of tendering to procure construction work, including the standard form and tender envelope used to ensure consistency and fair and open competition.

A1 Tenders

A tender is an offer to complete the work detailed in the tender documents, in the specified contract period, for a fixed sum of money known as the tender sum.

- Information pre-printed on the form of tender:
 - project title and brief details
 - legal offer wording
 - form of contract
 - contract period
 - period for which the tender is to be open for acceptance.
- Information completed by the contractor tendering for the work:
 - the legal name of the contracting organisation
 - the tender sum in figures and words
 - signature by a senior member of the company (normally a director) who is authorised to sign tenders on behalf of the company
 - the date the form is completed
 - details of any surety, default insurance or bond required by the client.
- Submission of the tender:
 - tender envelope
 - fixed date and time
 - non-acceptance of late tenders.

The benefits of using a standard tender form and envelope to ensure:

- the offer is for the work detailed in the tender documents
- the offer complies with the proposed contract terms and conditions
- the offer is to complete the project within the specified contract period
- offers are consistent across the contractors tendering for the work
- a fair and open process

and to:

- prevent late tenders being accepted by the client
- reduce the risk of unfair practice.

A2 Bills of quantities (building price calculation documents)

Investigate the contents and purpose of the two main types of tender documentation, i.e. bills of quantities (building price calculation documents) and drawings and specifications.

Bill of quantities (building price calculation document) sections:

- preliminaries:
 - general conditions
 - contract particulars
 - contractor's accommodation
 - site management and supervision
 - insurances
 - temporary works, services and facilities
 - site security
 - items that are not covered in the measured work sections
- preambles containing specifications for:
 - materials
 - standards and quality control
- measured work:
 - produced using a standard method of measurement:
 - the New Rules of Measurement (NRM)
 - the Civil Engineering Standard Method of Measurement (CESMM4)
 - International Construction Measurement Standards (ICMS)
 - International Property Measurement Standards (IPMS)
 - national and local standard methods of measurement used in the host country
 - typical sections within measured work sections:
 - sub-structures
 - superstructures (trade or elemental)
 - external works
 - external services
 - drainage
- prime cost and provisional sums including dayworks:
 - prime cost (PC sums):
 - nominated subcontractors
 - nominated suppliers
 - additions for attendance and profit
 - provisional sums:
 - contingency sums
 - works not yet fully detailed, designed or specified.

The form of tender that must be completed, including:

- the use of the official tender envelope
- adhering to the tender submission deadline
- submission methods used in the host country.

The advantages and disadvantages of bills of quantities (building price calculation documents) as methods of:

- tendering for construction work (contractor's viewpoint)
- procuring construction work (client's viewpoint).

A3 Drawings and specifications

Information provided to enable the contractor to produce a tender and how this is dependent upon the size and scale of the project:

- a full set of detailed drawings and schedules
- site investigation and bore hole reports
- a 'specification' containing:
 - preliminaries
 - preambles
 - a description of the works with individual items for pricing
 - the prime cost and provisional sums including dayworks
 - a general summary.

Why companies tendering for the works will need to produce their own version of bills of quantities (or approximate quantities) (building price calculation documents) in order to tender for the work.

The advantages and disadvantages of drawings and specifications as a method of:

- tendering for construction work (contractor's viewpoint)
- procuring construction work (client's viewpoint).

Learning aim B: Understand the information required to produce an estimate and submit a tender

B1 Preliminaries and general conditions

Key information required to price preliminary items:

- hire costs of temporary site accommodation:
 - offices
 - welfare facilities, e.g. canteens, drying rooms, toilets, first aid
 - stores and storage facilities
- site management and supervision, salary and cost to employ:
 - a project/site manager
 - site supervisors (general, trade, gangers)
 - site engineers
 - the buyer, quantity surveyor and planner (when site based and not part of general overheads)
 - general operatives involved in storage
- insurances:
 - contractor's all-risk insurance
 - public liability insurance
 - contract bonds or default insurance
- scaffolding and access:
 - general access scaffolding
 - access platforms and equipment
- temporary works:
 - fencing
 - temporary roads and access
 - site compound
 - signage

- materials distribution:
 - tower crane
 - forklifts and telehandlers
 - dumpers
- temporary services:
 - electricity
 - water
 - telephone
 - drainage
- transportation to site of operatives employed on the project
- site security.

B2 Measured work

Unit rates that are applied in bills of quantities (building price calculation documents) and the information that is needed in order to calculate them:

- cost of materials, materials enquiries
- offloading and distribution costs
- coverage rates (from manufacturers' data and historical cost information)
- waste percentages (appropriate to the material and project from historical cost data)
- plant and power tool costs (hire rates and analysis of hourly cost to own)
- labour constants (historical information, price books)
- 'all in' labour rates
- addition of overheads and profit (when not using net rates)
- use of subcontract rates, subcontract enquiries.

B3 Market analysis, risk and workload considerations

- State of the local or regional market and recent tender levels.
- Size of the project and the type and scale of companies invited to tender.
- Commercial intelligence, including the workload of competitors.
- Locality and the likelihood of theft, vandalism and nuisance.
- Availability of a local skilled workforce.
- Local infrastructure.
- Rate of inflation and likely future pay settlements.
- Credit rating of the client.
- Current need for the project to contribute to overhead costs.
- Potential profit.

How the final tender figure is decided, considering the net cost of construction, gross profit and an adjustment to take into account the above considerations.

Learning aim C: Develop skills to produce estimates

C1 Pricing preliminary items

Calculating items that are time related:

- site management and supervision
- general access equipment
- plant hire
- transportation to site
- site security.

Calculating items that have setting-up costs, time-related costs and dismantling and removal costs:

- site accommodation
- tower cranes
- temporary supplies and services
- fencing
- security alarms.

Calculating items that have setting-up costs and removal costs:

- temporary roadways and access
- site signage.

C2 Calculating unit rates for measured work items

Calculating unit rates for typical measured work items, e.g. concreting work, brickwork and blockwork, and carpentry and joinery, by:

- calculating cost of materials using coverage rates
- application of appropriate waste percentages
- inclusion of charges relating to sundry power tools and small plant as appropriate
- use of labour constants and 'all in' labour rates to calculate the cost of labour
- addition of overheads and profit.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate types of tender documentation and how they are used		
<p>A.P1 Describe the information provided and inserted on a form of tender.</p> <p>A.P2 Describe the contents and purpose of bills of quantities (building price calculation documents).</p> <p>A.P3 Describe the contents and purpose of tender documents based on drawings and specifications.</p>	<p>A.M1 Explain the advantages of using a form of tender and tender envelope for both the client and the contractor.</p> <p>A.M2 Explain the advantages and disadvantages of different types of tender documentation.</p>	<p>A.D1 Evaluate the advantages and potential issues and problems if a form of tender is not used.</p> <p>A.D2 Justify the use of different types of tender documentation for two different projects of differing size and complexity.</p>
Learning aim B: Understand the information required to produce an estimate and submit a tender		
<p>B.P4 Describe the information needed to calculate the cost of preliminary items for a given project.</p> <p>B.P5 Describe the information needed to calculate a unit rate for measured work for a trade area.</p> <p>B.P6 Describe the factors that would contribute to a final tender.</p>	<p>B.M3 Explain how the information needed to calculate unit rates and preliminary items for measured work is obtained and analysed.</p>	<p>B.D3 Analyse the factors and considerations taken into account when converting the estimated project cost into a tender sum.</p>
Learning aim C: Develop skills to produce estimates		
<p>C.P7 Calculate the cost of two separate preliminary items.</p> <p>C.P8 Calculate the cost of materials for a simple project utilising appropriate coverage rates and waste percentages.</p>	<p>C.M4 Calculate unit rates, including waste percentages, for measured items from different trade areas.</p>	<p>C.D4 Evaluate the use of different waste percentages for similar materials in different situations when calculating unit rates.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.P3, A.M1, A.M2, A.D1, A.D2)

Learning aims: B and C (B.P4, B.P5, B.P6, C.P7, C.P8, B.M3, C.M4, B.D3, C.D4)

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of the different types of tender documentation and their appropriate use on projects of different size and complexity. They will evaluate the use of tender documentation for differing project scenarios and will be able to explain the need for, and use of, different aspects of the tender documents. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge and understanding of the different types of tender documentation and how they are used on projects of different size and complexity. They will explain the use of tender documentation for differing project scenarios and will be able to explain the need for different aspects of the tender documents. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of the different types of tender documentation. They will describe the content and use of tender documentation and will be able to outline the purpose for different aspects of the tender documents. They will make limited use of technical vocabulary within their work.

Learning aims B and C

For Distinction standard, learners will demonstrate developed knowledge of the estimating and tendering process. They will be able to accurately calculate unit rates, selecting appropriate data to use, and apply vocationally appropriate techniques. They will demonstrate understanding of how external and internal factors are taken into account when deciding upon a final tender sum. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge of the estimating and tendering process. They will be able to calculate unit rates, selecting appropriate data to use, and apply vocationally appropriate techniques. They will demonstrate understanding of the processes involved in the building up of both unit rates and preliminary items. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of the estimating and tendering process. They will be able to calculate material costs, mostly selecting appropriate data to use. They will demonstrate some understanding of the processes involved in the building up of both unit rates and preliminary items and will apply this knowledge to the pricing of preliminary items. They will make limited use of technical vocabulary within their work.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 24: Exploring Surveying

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities
- tender documents as exemplars.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop analytical and mathematical skills.

Unit 24: Exploring Surveying

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will understand the regulation and underlying principles of the differing surveying disciplines to undertake a specialist task in a chosen surveying discipline.

Unit introduction

Surveying is a profession that covers a number of different disciplines. In this unit you will be introduced to the work of the building surveyor, the land surveyor and the quantity surveyor/commercial manager. You will choose one of these disciplines to carry out an applied surveying task as part of this unit's assessment.

You will learn how the building surveyor produces measured and condition surveys of existing buildings, and develop skills such as collecting data, accurate measuring, taking photographs, using electronic surveying equipment, producing drawings and recording building defects.

You will learn how the land surveyor measures existing features on the natural and the built environment and presents the data for use by architects, designers and engineers to design construction projects.

A quantity surveyor (QS)/commercial manager is an expert in construction costs and finance. You will learn how they work for either the contractor or the client and are involved both pre- and post-contract. In the pre-contract phase, quantity surveyors/commercial managers are involved in measuring in order to produce bills of quantities (building price calculation documents) that are used by the contractor to tender for the project and by the QS/commercial manager to produce monthly valuations and the final account.

In completing this unit you will gain an understanding of the surveying professions and how they contribute to the development of the built environment.

Learning aims

In this unit you will:

- A** Understand compliance with legislation, professional regulations, industry guidance and codes of practice for surveying
- B** Explore the principles that underpin surveying
- C** Explore knowledge, understanding and skills used in surveying.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand compliance with legislation, professional regulations, industry guidance and codes of practice for surveying	A1 Legislation A2 Professional regulations A3 Codes of practice and industry guidance	This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report covering the use of regulation, legislation and guidance relevant to surveying in the region/country where the learner is based.
B Explore the principles that underpin surveying	B1 Mensuration B2 Levelling	This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would measure and calculate areas and volumes as part of a survey of land or buildings.
C Explore knowledge, understanding and skills used in surveying	C1 Building surveying C2 Land surveying C3 Quantity surveying or commercial management of construction projects	This learning aim is assessed by learners being given an assignment brief produced by the centre or the adoption and contextualisation of an authorised assignment brief. Typically, the learner would produce a report into the surveying services provided by the different surveying disciplines and then carry out and evaluate a specified surveying task.

Content

Learning aim A: Understand compliance with legislation, professional regulations, industry guidance and codes of practice for surveying

A1 Legislation

A range of legislation applied by surveyors:

- statutory control of building works, including:
 - building control or methods of controlling building standards within the region/country
 - planning or methods of controlling the type, place and scale of development within the region/country
- enforcement controls on unauthorised building works
- legislation relating to building access
- health and safety as it affects the construction industry
- the law and practice of dilapidations
- the law and practice of building contracts.

A2 Professional regulations

Chartered and international surveying professions' regulations and disciplinary codes and their purpose.

- Royal Institution of Chartered Surveyors (RICS) regulations:
 - professional indemnity insurance including 'run-off' insurance
 - RICS rules of conduct that apply to individuals
 - professional and ethical standards
 - continuous professional development (CPD)
 - RICS rules of conduct that apply to surveying firms.
- Chartered Institution of Civil Engineering Surveyors (CICES)
 - rules of professional conduct
 - professional competencies
 - CPD.
- International Federation of Surveyors (FIG):
 - national professional body membership
 - professional standards and practice.

A3 Codes of practice and industry guidance

How surveyors use guidance to work to consistent standards of service across the profession.

- The need for a standardised method of measurement:
 - New Rules of Measurement (NRM1 and NRM2)
 - Civil Engineering Standard Method of Measurement 4th Edition (CESMM4)
 - standard methods or rules of measurement used regionally or within the host country.
- The need for codes of practice and guidance:
 - RICS guidance notes and codes of practice
 - Chartered Institute of Building (CIOB) codes of practice
 - practice and guidance used regionally or within the host country.

Learning aim B: Explore the principles that underpin surveying

B1 Mensuration

Measuring land and buildings, taking measurements from drawings, using drawing dimensions or scale rules, and using recorded information to calculate:

- enumerated (itemised) quantities
- linear quantities:
 - perimeters
 - circumferences
- area quantities:
 - regular shapes: rectangle including triangle, circle, trapezium
 - composite shapes
 - irregular shapes
- volume:
 - regular solids including cuboid, prism, sphere.

B2 Levelling

Determining the height above sea level at any point on the Earth's surface:

- OS benchmarks
- temporary benchmarks
- use of optical and laser levels
- use of total station
- global positioning systems (GPS)
- spot levels
- contouring.

Learning aim C: Explore knowledge, understanding and skills used in surveying

C1 Building surveying

Expert services provision for new buildings, existing buildings or specialist services such as building defects or in a specific market sector such as residential property.

- Building pathology:
 - analysing building failures and defects
 - developing solutions to building failures and defects.
- Building surveys:
 - preparing condition surveys of existing buildings
 - dilapidations
 - energy performance assessments
 - property valuations.
- Project management:
 - managing the design and delivery of construction projects
 - acting as the supervising officer, employer's agent
 - contract administration.
- Property management:
 - preparing management plans for property portfolios
 - facilities management.

Conducting a condition survey of an existing building:

- property details
- photographs:
 - elevations
 - specific elements and components
 - defects
- summary of accommodation
- general description:
 - type/method of construction
 - services
 - heating and electrical installations
 - outside facilities
- recording of:
 - structural fabric condition and deterioration
 - building elements' and components' condition and deterioration
 - dampness
 - structural movement:
 - evidence of
 - extent of
 - flood risk and precautions
- health and safety issues:
 - means of escape
 - fire control
 - structural instability
 - other issues to include radon gas, lead pipes, asbestos.

C2 Land surveying

Expert service provision including measurement, levelling, mapping and data collection covering the existing and proposed use of land, and specialist services.

- Geomatics:
 - measurement of land and property
 - engineering surveying, including:
 - setting out and providing levels
 - checking the work of others
 - producing 'as built' drawings and information
 - mapping
 - ground engineering and subsidence, including:
 - monitoring the effect of ground movement on a building/structure
 - investigating and reporting on the cause of ground movement
 - reporting on slope instability.
- Environmental surveying:
 - environmental assessment
 - environmental audit and monitoring
 - environmental management.
- Minerals and waste management:
 - providing advice in respect of contaminated land
 - environmental impact assessments

- ground engineering and subsidence
- mapping
- minerals management
- waste management
- sustainability.
- Planning and development:
 - cadastre and land management
 - compulsory purchase and compensation
 - development appraisals and project briefs
 - housing strategy and provision
 - management of the built environment
 - mapping and measurement of land and property
 - planning and development control
 - purchase and sale including valuation.
- Rural surveying, providing advice to farmers and landowners on:
 - rural estate management
 - agriculture
 - planning
 - valuation
 - auctioneering
 - asset management
 - capital taxation
 - dispute resolution.
- Setting out a building and establishing levels for construction work.
- Use of surveying equipment:
 - measuring tapes
 - site squares
 - optical and laser levels
 - theodolites
 - total stations
 - GPS.
- Setting out:
 - use of site datum
 - checking drawn information
 - use of lines, pegs and profile boards
 - measuring
 - use of instruments
 - methods of checking for accuracy.
- Establishing levels:
 - use of datum
 - transferring levels
 - use of 'rise and fall', 'collimation' methods
 - setting up a temporary site datum
 - setting levels for construction work
 - checking levels for construction work.

C3 Quantity surveying or commercial management of construction projects

Expert service provision:

- design economics and cost planning:
 - producing estimates and cost plans
 - carrying out life cycle costing exercises
 - evaluating building design efficiency
 - assessing/evaluating market factors and trends in construction costs
 - analysing risk
- measurement:
 - production of bills of quantities or building price calculation documentation in a format used regionally or in the host country
 - re-measurement of construction work
- contract administration and practice:
 - providing procurement advice
 - producing contract documentation
 - dealing with payment provisions
 - issuing valuation certificates
 - advising on contractual implications, including rights and obligations
 - assessing entitlement to extensions of time
 - assessing entitlement to loss and expense claims
- monthly valuation and final account procedures:
 - agreement of monthly valuations:
 - preliminaries
 - measured work
 - dayworks
 - variations
 - retention
 - previous payments
- commercial management of construction:
 - cash flow forecasting
 - cost/value comparisons and profit forecasting
 - cost to completion exercises
- dispute resolution:
 - contractual advice and evidence compilation
 - production and agreement of contractual claims
 - involvement and adjudication of dispute resolution procedure.

How to measure construction work:

- use of a standard method of measurement (SSM7, NRM2, CESMM4 or standard methods or rules of measurement used regionally or within the host country)
- mensuration:
 - itemised
 - linear
 - square
 - volume
 - centre-line calculation
 - drawing dimensions
 - use of a scale rule

- recording and 'working up' dimensions using industry-standard methodology:
 - dimension paper
 - cut and shuffle
 - direct billing
 - spreadsheets
- sub-structure measurement of a simple domestic strip foundation:
 - excavation
 - concrete
 - brickwork and blockwork
 - fill
 - damp-proof course (DPC) and damp-proof membrane (DPM)
 - insulation.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand compliance with legislation, professional regulations, industry guidance and codes of practice for surveying		A.D1 Evaluate how professional surveying guidance and regulation promotion ensures a consistent methodology is used across the surveying profession.
A.P1 Describe legislation, professional regulations and guidance used by surveyors. A.P2 Describe how professional surveying standards are promoted and maintained.	A.M1 Explain how professional surveying standards are promoted and maintained by professional guidance and regulations.	
Learning aim B: Explore the principles that underpin surveying		
B.P3 Calculate perimeters, areas and volumes of regular shapes and solids.	B.M2 Calculate areas of irregular shapes.	
Learning aim C: Explore knowledge, understanding and skills used in surveying		C.D2 Evaluate the range of surveying services provided by the surveying profession. C.D3 Evaluate a completed surveying task.
C.P4 Describe the surveying services provided by the building surveyor. C.P5 Describe the surveying services provided by the land surveyor. C.P6 Describe the surveying services provided by the quantity surveyor. C.P7 Describe equipment and resources required to complete a specified surveying task. C.P8 Provide the outcome of carrying out a specified surveying task in an appropriate format.	C.M3 Compare surveying services provided by the building surveyor, land surveyor and quantity surveyor. C.M4 Explain techniques used, including effective use of equipment, when carrying out a specified surveying task.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of three summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.M2)

Learning aim: C (C.P4, C.P5, C.P6, C.P7, C.P8, C.M3, C.M4, C.D2, C.D3)

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will demonstrate developed knowledge and understanding of how the different types of legislation, professional regulations and guidance impact professional standards, methods and practice adopted by surveyors. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge and understanding of how the different types of legislation, professional regulations and guidance impact professional standards, methods and practice adopted by surveyors. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge of how the different types of legislation, professional regulations and guidance impact methods and practice adopted by surveyors. They will make limited use of technical vocabulary within their work.

Learning aim B

For Merit standard, learners will demonstrate good mensuration skills, to high levels of accuracy, to calculate areas of irregular shapes, perimeters and volumes of regular shapes and solids.

For Pass standard, learners will demonstrate basic mensuration skills, to good levels of accuracy, to calculate areas, perimeters and volumes of regular shapes and solids.

Learning aim C

For Distinction standard, learners will demonstrate developed knowledge and understanding of the services provided by the different surveying disciplines and will be able to complete an effective and thorough evaluation of a surveying task. In doing so they will be able to explain the effective use of equipment when completing a specified surveying task. They will make good use of technical vocabulary within their work.

For Merit standard, learners will demonstrate good knowledge of the services provided by the different surveying disciplines. They will be able to explain the effective use of equipment when completing a specified surveying task. They will make some use of technical vocabulary within their work.

For Pass standard, learners will demonstrate basic knowledge and understanding of the services provided by the different surveying disciplines. They will be able to complete a specified surveying task in an appropriate vocational format. They will make limited use of technical vocabulary within their work.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 23: Tendering and Estimating

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities
- work experience
- surveying documentation as exemplars.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop numeracy skills.

Unit 25: Exploring Civil Engineering

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will develop an understanding of the civil engineering industry and of the sub-structures and superstructures in civil engineering projects, and will explore the data required to analyse and design civil engineering works.

Unit introduction

The unit aims to develop your knowledge of the processes and operations used in the construction and design of civil engineering works. It will also develop your understanding of the context in which the civil engineering industry operates.

You will gain an understanding of the roles and responsibilities of civil engineers, relevant legislative frameworks, and codes and practices. You will also explore how the role of a civil engineer is changing due to a number of factors, such as the sustainability agenda, legislative changes, construction process changes, technological changes and economic factors. The civil engineering industry requires a workforce that is flexible, creative, highly skilled and technically competent. Civil engineering construction underpins all civil engineering activities.

You will learn about the techniques, processes and materials used in the construction of civil engineering works, and the factors that affect such works, plus earthwork activities and the methods and techniques used in sub-structures and superstructures, including foundations, drainage, external works, frames and bridges. You will learn how civil engineering structures are designed. This includes how structural elements behave under load and the skills needed to analyse simple structural problems. You will develop an understanding that loads include, or are caused by, the self-weight of the materials used, the use to which the components or structures are put, and wind pressure. You will also consider below-ground drainage such as the types of drainage systems and the requirements to design these, and the approaches to, and features of, a sustainable drainage system (SuDS).

Learning aims

In this unit you will:

- A** Understand the context within which the civil engineering industry operates
- B** Understand the construction of sub-structure and superstructure civil engineering works
- C** Explore concepts and data required to analyse and design civil engineering works.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the context within which the civil engineering industry operates	A1 Health and safety A2 Best practices and industry initiatives A3 Dynamics of the industry	A report or presentation to include text and diagrams. In addition, supporting materials to include teacher observation confirming the learner's contribution against assessment criteria.
B Understand the construction of sub-structure and superstructure civil engineering works	B1 Sub-structure works B2 Superstructure works B3 Factors affecting civil engineering work	A report or presentation to include text and diagrams. In addition, supporting materials to include teacher observation confirming the learner's contribution against assessment criteria.
C Explore concepts and data required to analyse and design civil engineering works	C1 Concepts and behaviour of structural elements C2 Drainage systems C3 Factors affecting analysis and design	A report or presentation to include text and diagrams. In addition, supporting materials to include teacher observation confirming the learner's contribution against assessment criteria.

Content

Learning aim A: Understand the context within which the civil engineering industry operates

A1 Health and safety

The health and safety requirements associated with civil engineering works (this must be as in force at the time of learner assessment).

- Legislative framework.
- Adoption of safe working practices:
 - risk assessments
 - method statements
 - use of control measures to remove or minimise the risk
 - use of personal protective equipment (PPE).
- Ensuring a clean and tidy work area.
- The need for appropriate behaviour and a positive attitude towards health and safety.

A2 Best practices and industry initiatives

Best practices and industry initiatives, and intended outcomes in civil engineering, including dissemination by guidance notes as in force at the time of learner assessment.

- Industry-produced guidance to comply with the health and safety regulations.
- Professional organisation 'best practices' documents and guidance notes:
 - Best Practices in Ground Engineering (Institution of Civil Engineers)
 - SuDS manual (CIRIA)
 - Good Practices in Site Investigation (Association of Geotechnical and Geoenvironmental Specialists)
 - other applicable Institution of Civil Engineers (ICE) manuals.
- Industry initiatives:
 - minimising waste production through site waste management plans (SWMP): sources of waste, minimisation, segregation
 - certification schemes.

A3 Dynamics of the industry

Factors driving change in civil engineering and the effect on job roles.

- Role and responsibilities of civil engineers:
 - design and construction of:
 - tall buildings and large structures, industrial and commercial buildings
 - infrastructure including bridges, roads, tunnels, waterways, railways, utilities, power stations
 - development:
 - provision of utilities on new developments
 - adoption of roads and drainage
 - maintenance and repair of infrastructure works.

- Job roles:
 - development engineers – provision and management of utilities on new developments, adoption of highways, sewers and public open space
 - ground workers – earthwork activities, external works
 - site managers – management of the construction work
 - project managers – management of the overall project
 - structural engineers – design of structural elements
 - highway engineers – design, construction and maintenance of highways
 - geotechnical engineers – site investigations, soil testing
 - drainage engineers – design, construction and maintenance of drainage systems
 - site engineers – setting out and alignment of buildings, roads and other infrastructure.
- Factors affecting job roles:
 - sustainability agenda including waste minimisation, energy use, pollution, SuDS
 - changes in legislation
 - construction process changes, including offsite manufacture, modular construction
 - technology changes to include computer-aided drafting and design (CADD), virtual reality (VR), satellite navigation systems such as geographical positioning system (GPS) and global navigation satellite systems (GNSS), geographic information systems (GIS), software applications
 - plant and equipment to include surveying equipment, earthmoving plant including those using GPS and/or GNSS
 - economic factors to include global recession, emerging markets, movement of labour.

Learning aim B: Understand the construction of sub-structure and superstructure civil engineering works

B1 Sub-structure works

Processes, materials and construction plant required. Learners will need to be able to demonstrate the use of sketching techniques.

Earthwork activities:

- site clearance and general excavation:
 - clearing undergrowth and underground obstructions to include tree roots, old foundations
 - stripping topsoil
 - demolition of existing structures
- bulk excavation:
 - cuttings
 - shallow cut and fill
 - reducing levels
 - grading

- trench excavation:
 - purpose including construction of foundations, drainage works, laying of services
 - types including vertical and batter sides, cable trenching
 - supporting trenches:
 - traditional methods including timbering, aluminium walling, steel sheets
 - trench boxes
 - proprietary systems
- groundwater exclusion – temporary, permanent
- plant required – graders, 180° and 360° excavators, bulldozers, dumpers, pumps
- disposal – on site, off site.

Sub-structure works:

- foundations – isolated pad foundations for reinforced concrete and steel
- external works – flexible and rigid pavement construction
- drainage – installation of sewers, methods of jointing, bedding, backfill, depth of cover, testing for alignment.

B2 Superstructure works

The processes, materials and construction plant required. Learners will need to be able to demonstrate the use of sketching techniques.

- Superstructures:
 - frames:
 - steel, reinforced concrete
 - connections: beam to column connections including bolted, built-in and welded
 - erection of frames
 - bridges:
 - beams
 - arch
 - suspension and cable-stayed
 - components
 - abutments
 - decking.
- Types of superstructure: precast and cast-in-situ.
- Plant and equipment required: mobile and static cranes, concrete pumps, access equipment.

B3 Factors affecting civil engineering work

- Physical conditions:
 - ground conditions
 - climatic conditions including wind speed and direction, intensity of rainfall, extremes of temperatures.
- Financial considerations:
 - timescale
 - cost including labour, plant, materials
 - quality of materials and workmanship.

- Environmental factors:
 - noise
 - aesthetics
 - pollution.
- Life cycle issues:
 - future requirements
 - maintenance and repair
 - re-use, deconstruction and demolition.

Learning aim C: Explore concepts and data required to analyse and design civil engineering works

C1 Concepts and behaviour of structural elements

- Types of loads to include self-weight, live, impact, wind, snow.
- Load configuration to include point loads, distributed loads, direct loads, eccentric load.
- Types of supports:
 - simply supported – pinned
 - fixed – welded, riveted, bolted, built-in
 - cantilever – fixed at one end only
 - continuous – over more than two supports.
- Behaviour under load of:
 - beams – bending, shear, deflection
 - columns – compression, buckling.
- Analysis of a structural element – simply supported beam:
 - beams in compression
 - beams in tension.

C2 Drainage systems

- Purpose: disposal of foul and surface water.
- Types:
 - combined systems
 - totally separate systems
 - partially separate systems.
- Design:
 - design flow (rainwater, foul water)
 - ventilation of drainage systems: use of open vents
 - access for maintenance: rodding points, manholes
 - minimum size of drain
 - maximum depth of flow
 - self-cleansing velocity
 - gradients or falls.

- Sustainable drainage systems (SuDS):
 - reasons for use:
 - changes in the natural water flow patterns
 - reduced supply of rainfall due to hard standing areas
 - water quality issues
 - flooding
 - approaches:
 - manage pollution at source
 - protect water resources
 - features:
 - porous surfaces to include paving, filter trenches
 - soakaways, balancing and retention ponds
 - green roofs
 - rainwater harvesting
 - estimation of surface water run-off from impermeable areas by use of HR Wallingford methods including $Q_p = 2.78 \times A_p \times i$

C3 Factors affecting analysis and design

- Design brief: functional and life cycle requirements, time and budget.
- Sustainability goals.
- Materials selection.
- Type of soil.
- Ground-bearing capacity.
- Structural loading.
- Climatic conditions.
- Serviceability requirements.
- National standards.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the context within which the civil engineering industry operates		
<p>A.P1 Describe the purpose of the health and safety legal framework applicable to civil engineering works.</p> <p>A.P2 Describe the role of best practices and industry initiatives in civil engineering.</p> <p>A.P3 Describe the factors that drive change in the context of three civil engineering job roles.</p>	<p>A.M1 Analyse the role of codes of practice, best practices and industry initiatives in civil engineering.</p> <p>A.M2 Analyse the factors that drive change in the context of three civil engineering job roles.</p>	<p>A.D1 Evaluate the factors that drive change and affect the job roles in the civil engineering industry.</p>
Learning aim B: Understand the construction of sub-structure and superstructure civil engineering works		
<p>B.P4 Describe the processes, plant and materials required in the construction of civil engineering sub-structure works for a given brief.</p> <p>B.P5 Describe the processes, plant and materials required in the construction of civil engineering superstructure works for a given brief.</p> <p>B.P6 Describe factors that affect the construction of civil engineering works.</p>	<p>B.M3 Explain the processes, plant and materials required in the construction of civil engineering sub-structure works for a given brief.</p> <p>B.M4 Explain the processes, plant and materials required in the construction of civil engineering superstructure works for a given brief.</p> <p>B.M5 Analyse factors that affect the construction of civil engineering works.</p>	<p>B.D2 Evaluate factors that affect the construction of civil engineering works in terms of processes, materials and plant required for a given brief.</p>

Pass	Merit	Distinction
Learning aim C: Explore concepts and data required to analyse and design civil engineering works		
<p>C.P7 Describe the behaviour of structural elements under given loading conditions.</p> <p>C.P8 Describe the requirements to design drainage systems.</p> <p>C.P9 Describe the factors to be considered when designing civil engineering works.</p>	<p>C.M6 Explain the requirements to design drainage systems.</p> <p>C.M7 Analyse the factors to be considered when designing civil engineering works.</p>	<p>C.D3 Evaluate the factors that affect the design of civil engineering works.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of three summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.P3, A.M1, A.M2, AB.D1)

Learning aim: B (B.P4, B.P5, B.P6, B.M3, B.M4, B.M5, B.D2)

Learning aim: C (C.P7, C.P8, C.P9, C.M6, C.M7, C.D3)

Further information for teachers and assessors

Resource requirements

The essential resources required for this unit include the provision of civil engineering case studies to illustrate processes involved in the construction of sub-structures and superstructures.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must evaluate factors that drive change and how these affect job roles in the civil engineering industry. Their evaluation should take into account a range of factors, such as industry initiatives, best practices, changes in legislation, technology, construction methods, plant and equipment, as well as financial considerations.

For Merit standard, learners need to analyse the role of best practices and industry initiatives. This should be an in-depth analysis focusing specifically on industry initiatives and best practices, including the rationale and details of what is being proposed and the likely outcomes. Learners should analyse factors that could change the job roles in the civil engineering industry. Their analysis should be in depth and must include factors relevant to the three job roles described for the Pass level criteria.

For Pass standard, learners need to describe the purpose of the health and safety legislation relating to duties of various parties, including safe working practices and industry initiatives, and also describe three job roles in the civil engineering industry, the factors that drive role change and the role change that results. The roles could be drawn from three different industrial sectors, such as structural designing, highways engineering, bridge engineering and geotechnical, or from three different functions, such as project managers, site managers and ground workers.

Learning aim B

For Distinction standard, learners need to evaluate the factors that affect the construction of civil engineering works for a given project/brief. They must relate the factors with the construction processes, plant and materials covered earlier. They should consider both sub-structure and superstructure works.

For Merit standard, learners need to build on the Pass level criteria by explaining the processes involved, including plant and materials, to construct civil engineering sub-structure works for a given project/brief. Their explanation must be supported with construction details of sub-structure works. Learners also need to explain the processes required to construct civil engineering superstructure works for a given brief by providing details of and reasons for the processes, including plant and materials. Their explanation must be supported with construction details of superstructure works. Learners need to analyse the factors that affect the construction of civil engineering works. The analysis is to be detailed and learners must use their knowledge and understanding of sub-structures and superstructures.

For Pass standard, learners need to describe the processes involved, including plant and materials, to construct civil engineering sub-structure works for a given project/brief. Learners also need to describe the processes involved, including plant and materials, to construct civil engineering superstructure works for a given project/brief. They need to describe the factors that could affect the construction of civil engineering works. They should consider both sub-structure and superstructure works and should include all the factors as indicated in topic B3.

Learning aim C

For Distinction standard, learners need to evaluate the factors that could affect the design of civil engineering works. Learners must use their knowledge and understanding regarding design requirements for civil engineering structures and drainage systems. They must relate the factors to the design requirements covered earlier.

For Merit standard, learners need to explain the requirements to design drainage systems. The analysis should include reasons, approaches and features of a SuDS as detailed in topic C2. Learners must also be able to estimate surface water run-off from impermeable areas of a site using a given HR Wallingford method. Learners need to analyse the factors to be considered when designing civil engineering works. They should consider both civil engineering structures and drainage systems, and should include all the factors as indicated in topic C.3. Learners must use their knowledge and understanding regarding design requirements for civil engineering structures and drainage systems.

For Pass standard, learners need to describe the behaviour of structural elements under given loading conditions. Two structural elements – beams and columns – should be considered. Learners should include types of loads and load configurations, as well as types of supports provided for these elements. They should describe the behaviour of beams under point and distributed loads, as well as behaviour of columns under direct and eccentric loading. Learners need to describe the requirements to design drainage systems. They are not required to carry out any calculations for this criterion. They should include types of drainage systems and the requirements as laid out in the content of topic C2. Learners need to describe the factors to be considered when designing civil engineering works. They should consider both civil engineering structures and drainage systems, and should include all the factors as indicated in topic C.3 of the unit content.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-rise Domestic Buildings

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers – a civil engineering site manager, a consultant civil engineer
- work experience
- employer case studies
- site visits to civil engineering construction projects and civil engineering design consultancies.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills.

Unit 26: Exploring Building Services Engineering

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will apply the principles of local legislation and regulations that underpin building services engineering in low-rise domestic buildings.

Unit introduction

We tend to take building services for granted as long as they are working properly, but the provision of high-quality building services is essential. Today, domestic buildings have as a minimum a supply of cold water, electrical power and drainage. Many also have a gas supply. These provide a comfortable, safe and hygienic environment for the building's occupants.

In this unit, you will explore the building services generally provided to low-rise domestic buildings (of 5.2 metres or less) and learn how these services are used to improve the occupants' quality of life.

You will be introduced to legislation and guidance which ensure the safe distribution, installation and use of building services. You will investigate the principles that underpin the safe and effective provision and use of cold water, hot water, electricity and drainage and their integration into domestic buildings. As part of this unit, you will discover how each of these services enters, and is used in, low-rise domestic buildings.

This unit does not provide competence in building services engineering.

Learning aims

In this unit you will:

- A** Understand compliance with legislation and guidance applicable to building services engineering
- B** Understand the principles that underpin building services engineering for low-rise domestic buildings
- C** Explore how building services are integrated into low-rise domestic buildings.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand compliance with legislation and guidance applicable to building services engineering	A1 Local and national codes of practice and guidance A2 Need for compliance with legislation and guidance	A report or presentation to include text and diagrams that evaluates local codes of practice and the most commonly encountered forms of non-compliance.
B Understand the principles that underpin building services engineering for low-rise domestic buildings	B1 Cold water B2 Hot water B3 Electricity	A report or presentation to include text and diagrams that evaluates the provision of building services in low-rise domestic buildings and the standards they must comply with. The report should also evaluate building services efficiency, cost, health and safety requirements and sustainability factors.
C Explore how building services are integrated into low-rise domestic buildings	C1 Cold water C2 Hot water C3 Electricity	

Content

Learning aim A: Understand compliance with legislation and guidance applicable to building services engineering

A1 Local and national codes of practice and guidance

- Water regulations.
- Code of practice for building drainage.
- Electrical standards and approved codes of practice.

A2 Need for compliance with legislation and guidance

- Legal requirement, possibility of prosecution, penalties for non-compliance.
- Use of qualified staff, regular training and updating, use of external consultants (design engineers).
- Human, financial, and corporate consequences of non-compliance.
- Good practice in terms of energy efficiency, pollution control, sustainability, health and safety of users and installers.

Learning aim B: Understand the principles that underpin building services engineering for low-rise domestic buildings

The standard building services and how to meet the needs of building users during their design.

B1 Cold water

- Uses: drinking, cooking, flushing toilets, watering plants and gardens.
- Prevention of waste, undue consumption, contamination, corrosion, freezing.

B2 Hot water

- Uses: cooking, bathing, laundry, cleaning, washing dishes, low-pressure hot water heating systems.
- Principles: including water heated within building, fuels used to heat water, flow by gravity and convection, pumping only for central heating purposes.

B3 Electricity

- Uses: power for lighting, heating, and appliances such as televisions, washing machines, dishwashers, tumble driers, heating water.
- Principles including supply voltage, capacity, isolation.
- Prevention of excess current, fire, shock.

Learning aim C: Explore how building services are integrated into low-rise domestic buildings

C1 Cold water

- Entry into buildings: below ground for frost protection, above foundations or encased in mass concrete, pipe insulation, rising main.
- Distribution within buildings:
 - indirect systems: advantages, layout and components (no requirement for materials, dimensions or capacities)
 - direct systems: advantages, layout and components (no requirement for materials, dimensions or capacities)
 - direct supply of drinking water.

C2 Hot water

- Distribution within buildings, type of system advantages, layout and components (excluding materials, dimensions or capacities requirement):
 - indirect system
 - direct system
 - unvented system.

C3 Electricity

- Entry into buildings: below ground to avoid disturbance or accidental cutting of cable, incoming service cable through wall and floor or via the cavity, plastic protective duct on cable, mastic seal at entry point.
- Distribution within buildings: layout and components only of single-phase supply, ring final circuit and radial circuits.
- Protection of electrical circuits to include:
 - miniature circuit breaker (MCB)
 - residual current device (RCD).

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand compliance with legislation and guidance applicable to building services engineering		
<p>A.P1 Describe the purpose of two pieces of codes of practice or guidance used in building services engineering.</p> <p>A.P2 Describe how organisations can monitor building services design and installation procedures to promote compliance.</p>	<p>A.M1 Explain how organisations can monitor building services design and installation procedures to promote compliance.</p>	<p>A.D1 Evaluate local codes of practice or guidance in terms of general requirements, target audience and commonly encountered forms of non-compliance.</p>
Learning aim B: Understand the principles that underpin building services engineering for low-rise domestic buildings		
<p>B.P3 Describe two applications for each building service provided to low-rise domestic buildings.</p>	<p>B.M2 Explain how the principles that influence the provision of two building services are used to meet the needs of low-rise domestic buildings.</p>	<p>B.D2 Evaluate the provision and integration of cold water, hot water or electricity services for the provision of low-rise, low-pressure heating and hot water systems.</p>
<p>B.P4 Describe two requirements of successful building services systems that comply with legislation.</p>		
Learning aim C: Explore how building services are integrated into low-rise domestic buildings		
<p>C.P5 Describe how two of the standard building services provided to a low-rise domestic building enter or exit a building.</p>	<p>C.M3 Explain the factors that influence the methods by which two of the standard building services enter or exit low-rise domestic buildings.</p>	<p>C.D3 Evaluate the methods of integrating building services into buildings in terms of efficiency, cost, health and safety and sustainability.</p>
<p>C.P6 Produce a scaled drawing of the building services provided to a low-rise domestic building.</p>	<p>C.M4 Produce a scaled drawing of the building services provided to a low-rise domestic building with all components in their correct position.</p>	<p>C.D4 Produce a scaled drawing of the building services provided to a low-rise domestic building with all components in correct position and with clear and accurate annotation.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, C.M4, B.D2, C.D3, C.D4)

Further information for teachers and assessors

Resource requirements

Access to an organisation with a range of in-house and contracted-out building service engineers would be beneficial. The organisation will need to be willing to support the provision of a site visit, resources and time for learners to question engineers.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will build upon their evidence and evaluate one code of practice or guidance in terms of general requirements, target audience and commonly encountered forms of non-compliance.

For Merit standard, learners will need to explain how organisations can monitor building services design and installation procedures to promote compliance.

For Pass standard, learners will need to describe the purpose of two pieces of codes of practice or guidance used in building services engineering. Learners also need to be able to describe how organisations can monitor building services design and installation procedures to promote compliance.

Learning aims B and C

For Distinction standard, learners will need to evaluate the methods of integrating building services into buildings in terms of efficiency, cost, health and safety, and sustainability. Learners will also need to produce a scaled drawing of the building services provided to a low-rise domestic building with all components in correct position and with clear and accurate annotation.

For Merit standard, learners will need to explain how the principles that influence the provision of two building services are used to meet the needs of low-rise domestic buildings. Learners will also need to be able to explain the factors that influence the methods by which two of the standard building services enter or exit low-rise domestic buildings.

For Pass standard, learners will need to describe two applications for each building service provided to low-rise domestic buildings. They will need to be able to describe two requirements of successful building services systems that comply with legislation.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 2: Exploring Health, Safety and Welfare in Construction
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings
- Unit 17: Exploring Building Services Techniques in Construction
- Unit 18: Performing Plumbing Operations
- Unit 19: Performing Electrical Operations
- Unit 27: Exploring Facilities Management

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers and interview opportunities
- work experience
- case studies
- visits to appropriate construction sites.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills.

Unit 27: Exploring Facilities Management

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will develop an understanding of facilities management and legislation and regulations that apply to the use, operation and maintenance of buildings. Learners will explore the main principles and the organisation of facilities management.

Unit introduction

Building functions have to be maintained by the estates or facilities management team, to ensure the buildings are comfortable and safe for any occupants or visitors. Facilities management covers the use and operation of a building or structure. This includes any aspect from the roles of security, cleaning and catering staff, reception and lettings, through to the maintenance and operation of air conditioning, fire alarms, lifts, telephone and IT services.

In this unit you will explore the legislation, regulations and industry guidance that the facilities management team have to follow when operating and running a building. You will understand the principles of facilities management, what it covers and how facilities management operates in a building. You will make a site visit to an organisation that uses facilities management principles, to undertake an audit of their provision. This audit will allow you to illustrate the different areas and functions that facilities management operates.

Learning aims

In this unit you will:

- A** Understand compliance with legislation, regulations, guidance and codes of practice (or home country equivalent) for facilities management
- B** Explore principles that underpin facilities management
- C** Explore organisational facilities management provision.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand compliance with legislation, regulations, guidance and codes of practice (or home country equivalent) for facilities management	A1 Legislation and regulations A2 Guidance and codes of practice	A detailed report or presentation indicating the health and safety provisions to cover health and safety legislation, application of equality, applicable codes of practice (or home country equivalent) and guidance.
B Explore principles that underpin facilities management	B1 How services are provided	A detailed report or presentation to include the use of directly employed staff versus contracted out, the benefits of each, and the types of maintenance each would undertake.
C Explore organisational facilities management provision	C1 The benefits of facilities management C2 Organisational facilities management	A detailed report or presentation for the company which includes details of the facilities management of the building and the benefits it currently offers.

Content

Learning aim A: Understand compliance with legislation, regulations, guidance and codes of practice (or home country equivalent) for facilities management

A1 Legislation and regulations

- Health and safety legislative framework covering:
 - provisions for employees and visitors to a public or private building:
 - what needs to be provided for its safe use
 - access and egress from a building
 - general duty of care to all.
- Equality and its application to the design and access provision for all users:
 - protected characteristics as defined under legislation
 - adjustments that may need to be made for disabled persons.

A2 Guidance and codes of practice

- Guidance and codes of practice (or home country equivalent) for the facilities management of a building of multiple occupation, student accommodation, housing associations, schools and colleges, commercial offices.
- National facilities management good practice guides.

Learning aim B: Explore principles that underpin facilities management

B1 How services are provided

- The use of directly contracted labour and contracted-out services for:
 - clearing undergrowth and underground obstructions to include tree roots, old foundations
 - general repairs, carpentry and joinery
 - electrical maintenance
 - mechanical maintenance
 - plumbing maintenance
 - cleaning and housekeeping
 - catering
 - waste disposal
 - security
 - fire-alarm systems maintenance
 - lettings
 - grounds maintenance.
- Maintenance management and organisation of:
 - in-house directly employed teams, how maintenance is managed, teamworking aspects, lone working, working at height, permits to work, safe systems of work
 - specialist contracted services, organisation and management.
- The different types of maintenance; typically maintained items that each type of maintenance would cover during maintenance:
 - planned maintenance functions
 - reactive maintenance and procedures involved
 - cyclical maintenance planning.

- The classifications for facilities management and what each would typically cover for an organisation:
 - soft facilities
 - hard facilities.

Learning aim C: Explore organisational facilities management provision

C1 The benefits of facilities management

Facilities management contribution to the maintenance, development and economic benefit of the built environment:

- extending the useful life cycle of a building due to maintenance
- enhancing building safety record during occupancy
- ensuring compliance with legislation and regulations
- maintaining an aesthetical facade
- adding security to the local built environment
- reducing vandalism damage
- employment opportunities
- enhancing sustainable and environmental benefits
- providing for feedback to the design teams for future feasibility of building materials and design
- improving the working environment for occupants.

C2 Organisational facilities management

Investigation of an organisation's facilities management functions:

- the facilities management functions and the processes or operations conducted
- function of the business and the facilities management it requires:
 - location
 - facilities or services provided
 - facilities or services are maintained in-house
 - facilities or services are contracted out
 - how the facilities are managed
 - documentation used to manage and organise maintenance
 - typical maintenance works undertaken
 - contribution of facilities management to the comfort, health and safety of building occupants
- planned maintenance requirements:
 - budgeting, planning and organisation of major maintenance expenditure
- typical reactive maintenance items for health and safety reasons
- services maintenance, methods used, personnel involved:
 - type of service, frequency of maintenance, what needs to be undertaken, who can undertake the work
- how services are managed and organised:
 - maintenance manager, facilities manager, estate manager

- services provision and management when in-house or contracted out:
 - lift maintenance
 - fire alarms
 - telephones
 - IT
 - air conditioning
 - refrigeration
 - soft services to include cleaning and catering
 - security
 - CCTV
 - general maintenance items and emergency repairs
 - hard services to include estate management, landscaping, service upgrading
- how life cycle costing is managed in the facilities management process:
 - use of better-quality materials, use of low-maintenance materials
- sustainability incorporation during maintenance:
 - use of renewable maintenance materials when upgrading facilities
 - use of durable, long-lasting replacement materials to reduce need for future repair.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand compliance with legislation, regulations, guidance and codes of practice (or home country equivalent) for facilities management		A.D1 Evaluate a piece of health and safety legislation and a code of practice (or home country equivalent) or industry guidance on building service provision requirements for employees and visitors and facilities management.
A.P1 Describe the purpose of health and safety legislation, regulation and guidance on building service provision requirements for employees and visitors. A.P2 Describe the purpose of provisions contained within a given code of practice for facilities management.	A.M1 Explain the impact of a piece of legislation and a code of practice (or home country equivalent) or industry guidance on building service provision requirements for employees and visitors and facilities management.	
Learning aim B: Explore principles that underpin facilities management		B.D2 Evaluate the use of directly employed and contracted-out services.
B.P3 Describe the use of directly employed services for the maintenance of a building. B.P4 Describe the use of contracted-out services for the maintenance of a building. B.P5 Describe the three types of maintenance classifications.	B.M2 Compare the use of directly employed and contracted-out services.	
Learning aim C: Explore organisational facilities management provision		C.D3 Evaluate the organisational and wider built environment benefits provided by an organisation's facilities management provision.
C.P6 Describe an organisation's facilities management provision. C.P7 Describe the organisational and wider built environment benefits of an organisation's facilities management provision.	C.M3 Explain the organisational and wider built environment benefits provided by an organisation's facilities management provision.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of three summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.P5, B.M2, B.D2)

Learning aim: C (C.P6, C.P7, C.M3, C.D3)

Further information for teachers and assessors

Resource requirements

Access to an organisation with a range of in-house and contracted-out facilities management provision will be required. The organisation will need to be willing to support the provision of a site visit, resources and time for learners to question the in-house and contracted-out facilities management provision. The learners' education institution facilities management may be suitable for this purpose.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will build upon their evidence and evaluate one piece of legislation and one code of practice (or home country equivalent) or piece of guidance in terms of requirements for employees, visitors and the management of facilities in a premises.

For Merit standard, learners will need to build on the evidence and explain the impact of a piece of legislation and a code of practice (or home country equivalent) or guidance on employees, visitors and the management of facilities in a premises.

For Pass standard, learners will need to describe the purpose of provisions contained within health and safety legislation for employees and visitors to premises. They will need to describe guidance that covers what would need to be provided within a building for access, egress and safe use, and what typical adjustments would be needed in refurbishment of a building to comply with equality legislation. Learners also need to describe the purpose of a code of practice (or home country equivalent) applying facilities management provisions to an organisation's premises or building. A description of the purpose of the code of practice (or home country equivalent) or guidance for facilities management is required.

Learning aim B

For Distinction standard, learners need to evaluate the information gathered on the use of directly employed and contracted-out facilities management services.

For Merit standard, learners need to directly compare the research obtained in B.P3 and B.P4 and describe the similarities and differences between the two and the benefits and disadvantages of each.

For Pass standard, learners should include a description of the use of directly employed maintenance teams and their activities within a typical organisation or building. They should also describe the use of services that are contracted out by an organisation to support its facilities management of a building.

Learning aim C

The host organisation will need to be briefed prior to the visit to ensure that learners have the opportunity to meet assessment criteria requirements.

For Distinction standard, building on their evidence, learners should evaluate an organisation's facilities management in terms of the benefits provided to the organisation, including the building's occupants and the wider built environment.

For Merit standard, learners should give an explanation of the organisational and wider built environment benefits provided by the organisation's facilities management drawn from the Pass level content.

For Pass standard, learners need to identify the key features of an organisation's facilities management in-house and contracted-out provision. This may be presented through a bulleted list. They should also describe the facilities management provision benefits for the organisation, including the building occupants, and to the wider built environment.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 3: Scientific and Mathematical Applications for Construction
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-rise Domestic Buildings
- Unit 25: Exploring Civil Engineering

Employer involvement

This unit would benefit from employer involvement in the form of:

- a guest speaker – a facilities manager
- employer case studies
- site visits to organisations with a range of in-house and contracted-out facilities management provision.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills.

Unit 28: Maintenance and Adaptation of Buildings

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will gain an understanding of the maintenance and adaptation of domestic properties.

Unit introduction

Is the property you live in constructed from bricks, stone, timber or even steel? Have you wondered how it stays in good condition, or what would happen if you needed more space?

Across the world domestic properties range in type, size and methods of construction. Regardless of the method of construction, there will always be a need to maintain the elements of the fabric for the use and enjoyment of future generations. In addition to the need to maintain properties, there is an increasing need to adapt, alter and extend properties to provide more space for the ever-changing needs of modern society.

By the end of this unit, you will be able to inspect a property and consider what repairs are needed and what maintenance may be required in the future. You will also be able to design adaptations for properties that will meet the requirements of your client, users and the regulators who monitor and check this kind of work.

Learning aims

In this unit you will:

- A** Understand the factors influencing the maintenance and adaptation of buildings
- B** Explore the maintenance of buildings
- C** Explore the requirements for the adaptation of buildings.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the factors influencing the maintenance and adaptation of buildings	A1 Maintenance and adaptation A2 Levels of intervention to a property A3 Regulatory requirements for the maintenance and adaptation projects	A presentation explaining why a specified property requires maintenance and adaptation, the different levels of intervention and the regulatory considerations for a scheme.
B Explore the maintenance of buildings	B1 Building maintenance and preservation approaches B2 Building element maintenance interventions B3 Property inspection and schedule of maintenance	A report with supporting schedule of maintenance for a client, outlining the different types of property maintenance options and the specific maintenance requirements for a given property.
C Explore the requirements for the adaptation of buildings	C1 Surveying properties for adaptation C2 Adaptation C3 The client brief and feasibility C4 Sustainable adaptation C5 Adaptation proposals	A portfolio of plans, elevations, sections and written report setting out proposals for the adaptation of a building.

Content

Learning aim A: Understand the factors influencing the maintenance and adaptation of buildings

A1 Maintenance and adaptation

Reasons why buildings may require maintenance and adaptation:

- ageing housing stock
- building material deterioration including effect of age, weather, use and misuse
- preservation of the historic environment
- government requirements for increased use of brownfield sites
- building obsolescence due to:
 - social factors – change in societal needs, desires, fashions, demographics
 - technological factors – change in technology, construction methods
 - organisation factors – building closure due to business reorganisation, rationalisation
- improve sustainability performance
- changed building needs due to demographic and social factors:
 - an ageing population
 - an increase in single-person households
 - children living with parents for a longer period of time
 - elderly relatives living with the family
- financial:
 - a lack of affordable property
 - preservation of property value through cost-effective maintenance
- adaptation for specific use:
 - disability adaptation
 - elderly residents
 - property improvements
- the need to comply with regulations during maintenance and adaptation works.

A2 Levels of intervention to a property

The levels of maintenance and adaptation interventions for a property, the relative increase in the amount of work required progressing through the levels, the stages when each would be undertaken, the advantages and disadvantages of each, and the benefits of regular maintenance.

- Planned maintenance to halt the general deterioration of the fabric.
- Upgrade of a specific space to include kitchen, bathroom, living spaces.
- Modernisation and renovation.
- Extension to add more useable space.
- Restoration to put the property back to its original condition.

A3 Regulatory requirements for the maintenance and adaptation projects

The implications of specific regulations relating to planning, designing and constructing buildings.

- Planning requirements:
 - scope of planning control
 - planning applications
 - policies – local and government
 - laws and legislations
 - planning permission and conditions
 - planning appeal
 - enforcement of planning
 - control of advertising.
- Design and construction standards relating to:
 - the structure and fire safety
 - resistance to the passage of sound
 - site preparation and resistance to contaminants and moisture
 - use of toxic substances in the fabric of buildings
 - sanitation, hot water safety and water efficiency
 - drainage and waste disposal
 - electrical safety
 - materials and workmanship
 - conservation of fuel and power
 - access to buildings.
- Requirement for building inspection by regulatory bodies.
- Construction stages of regulatory building inspections at:
 - commencement
 - excavation – prior to excavations being filled in
 - foundations
 - laying of damp-proof courses
 - installation of new drains – prior to covering up
 - construction of the primary structure
 - installation of insulation
 - roof construction.
- Health and safety requirements:
 - legislation
 - risk assessments
 - welfare requirements.

Learning aim B: Explore the maintenance of buildings

B1 Building maintenance and preservation approaches

Approaches to maintain the fabric of a structure.

- Planned maintenance: organised or managed.
- Preventative maintenance: at specified to predetermined criteria.
- Scheduled maintenance after set period of time: for plant, for machinery.
- Condition-based maintenance.
- Reactive and unplanned (emergency) maintenance.
- Consequences and implications of a lack of regular maintenance:
 - materials: failure, degradation, performance reduction
 - loss of structural integrity
 - occupant health issues due to:
 - damp
 - cold
 - heat and humidity
 - poor ventilation
 - potential for carbon monoxide poisoning
 - wider neighbourhood issues:
 - building collapse
 - rodent infestation
 - blight
 - squatters
 - vandalism.

B2 Building element maintenance interventions

Identification of elements and possible problems that will require maintenance during the lifetime of a building.

- Building elements:
 - roof and chimney stacks:
 - loose, slipped, missing ridge tiles and roof covering
 - loose, missing point and flashing
 - mortar flashings at abutments or roof penetrations
 - leaning stacks and chimney pots
 - loose, badly fitted aerials
 - rainwater goods:
 - loose, missing, blocked or defective gutters and downpipes
 - loose, missing or defective fixings and brackets
 - blocked, damaged outlets and pipes
 - flashings:
 - loose, missing flashing details
 - deteriorated flashings
 - external masonry:
 - loose, defective pointing
 - spalling masonry
 - loose masonry, damaged masonry

- external woodwork:
 - rotten, damaged timber
 - loose, defective timbers and fixings
 - unpainted, untreated timber
- external concrete:
 - spalling concrete
 - cracks
- external steelwork:
 - rusting, damaged steelwork
 - loose, defective steelwork and fixings
 - unpainted, ungalvanized steelwork
- windows:
 - loose and poorly fixed frames and glazing
 - rotten, damaged frames
 - unpainted, untreated timber windows
 - unpainted, untreated metal windows
- doors:
 - loose and poorly fixed frames and glazing
 - rotten, damaged frames
 - unpainted, untreated timber doors
 - unpainted, untreated metal doors
- internal walls:
 - cracking and damage from movement, impact
 - loose, defective plaster and wall finish
- internal floors:
 - uneven floor structure
 - loose boards, finish
 - excessive deflection
- inspection of services, including regular inspection by suitable qualified personnel in line with regulatory requirements and manufacturers' recommendations:
 - electrical
 - gas
 - water
 - drainage
 - oil.

B3 Property inspection and schedule of maintenance

How to undertake a property inspection to identify and report maintenance requirements.

- Systematic inspection and recording.
- Schedule of maintenance to include:
 - immediate maintenance requirements
 - ongoing maintenance requirements
 - maintenance planning for future maintenance of the property.

Learning aim C: Explore the requirements for the adaptation of buildings

Understand the practical requirements of adapting a property to meet the needs of the client, end user and regulators to produce sketch schemes.

C1 Surveying properties for adaptation

How to undertake a building survey of a property to assess its viability for adaptation.

- Inspection of the structure to ascertain general condition, material use, methods of construction and suitability for adaptation/alteration.
- Inspection of the area surrounding the building to include:
 - space available for lateral extension
 - general ground conditions
 - location of services
 - location of trees
 - location of built components and natural physical features.
- Building survey reporting requirements to record inspection findings.
- Measured surveys to produce existing plans, elevations, sections and site plans.

C2 Adaptation

Different options for adapting and altering a property.

- Structural adaptation:
 - removing walls, doors to create larger rooms
 - removing chimney breast
 - structural alterations to floors
 - location of trees.
- Lateral adaptation:
 - extensions
 - inserting walls to divide the space
 - garage or swimming pool extensions
 - conservatories or patio pergolas.
- Vertical adaptation:
 - additional floors
 - loft conversions
 - building above existing single-storey extension.

C3 The client brief and feasibility

The client brief and interpreting the client's requirements.

- Assessing the feasibility of the client's requirements:
 - practicability – can it be done within budget, time, quality constraints?
 - functionality – will it satisfy the client's requirements?
 - viability – is it economically viable?

C4 Sustainable adaptation

Adapting properties to improve their environmental performance.

- Insulation:
 - roof, cavity wall, internal, external
 - windows and doors: use of thermally efficient materials, low-E Argon-filled double glazing, low-E Argon-filled triple glazing.
- Energy production: use of photovoltaic panels, wind turbines, combined heat and power systems.
- Energy conservation: use of air and ground heat pumps, solar thermal systems, biomass heating systems, energy-efficient lighting, building management systems.
- Water conservation: use of rainwater harvesting, grey water recycling, SuDS (sustainable drainage systems), low-flush WCs, spray heads in taps, self-timing controls.
- Sustainable design use: passive solar, Trombe walls, brise soleil.

C5 Adaptation proposals

Producing annotated sketch plans for alterations and adaptations to a property to meet client and legislative requirements, to include:

- floor plans
- sections
- elevations.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the factors influencing the maintenance and adaptation of buildings		
<p>A.P1 Describe why properties require maintenance and adaptation.</p> <p>A.P2 Describe different levels of maintenance and adaptation interventions.</p> <p>A.P3 Describe legislative implications for maintenance and adaptation works on properties.</p>	<p>A.M1 Explain the different levels and reasons why properties require maintenance and adaptation, including the legislative implications.</p>	<p>A.D1 Justify the reasons why properties require maintenance and adaptation.</p>
Learning aim B: Explore the maintenance of buildings		
<p>B.P4 Describe the different approaches to maintaining the fabric of a specified property, and the consequences of not undertaking regular maintenance and preservation.</p> <p>B.P5 Describe the elements of a specified property that require regular maintenance.</p> <p>B.P6 Describe the reactive and short-term maintenance requirements for a specified property following a property inspection.</p>	<p>B.M2 Explain the maintenance requirements for a specified property following a property inspection.</p>	<p>B.D2 Evaluate the maintenance requirements for a specified property following a property inspection.</p>

Pass	Merit	Distinction
Learning aim C: Explore the requirements for the adaptation of buildings		
<p>C.P7 Describe the requirements of a client brief, including an assessment of their feasibility.</p> <p>C.P8 Describe methods of improving the environmental performance of a specified property.</p> <p>C.P9 Assess options available for adaptation and alteration from the property survey findings to meet client requirements.</p> <p>C.P10 Produce a sketch scheme for the alteration and adaptation of a property in line with the client brief and regulatory considerations.</p>	<p>C.M3 Produce a detailed sketch scheme for the alteration and adaptation of a property, in line with the client brief and complying with legislative considerations.</p>	<p>C.D3 Produce a justified detailed sketch scheme for the alteration and adaptation of a property, in line with the client brief and complying with legislative considerations.</p>

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a maximum number of three summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.P3, A.M1, A.D1)

Learning aim: B (B.P4, B.P5, B.P6, B.M2, B.D2)

Learning aim: C (C.P7, C.P8, C.P9, CP.10, C.M3, C.D3)

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will justify why maintenance is required for a property and why it is so important. Their justification will include consideration of the consequences of not undertaking regular maintenance and the impact this would have on the structure of the fabric. Learners will also consider various reasons for adapting a property, providing suitable and appropriate justification of when and how an owner would adapt a property.

For Merit standard, learners will provide reasoned argument as to why it is important to maintain the fabric of a property and the possible consequences of failure to do so, giving examples where appropriate. Learners should also consider how a property can be adapted to suit the needs of the occupier. Examples of how a property has been adapted should be used to illustrate the explanation. Learners will consider each stage of the maintenance and adaptation process, providing examples of when each might be carried out as part of the life cycle of a property. Finally, learners will be able to differentiate between the different aspects of the key areas of regulatory compliance. Learners will give examples to show a thorough understanding.

For Pass standard, learners should provide a clear, coherent description that identifies and considers why a property will require regular maintenance and adaptation through its life cycle. The discussion should identify relevant reasons as identified in topic A.1 and could be broken into two clear areas: maintenance to uphold the integrity of the fabric and adaptation to alter the space to suit changing needs. Learners will describe different levels of intervention for maintenance and adaptation. Their description should show how each level of intervention typically increases the amount of work required and will consider the stages at which each will be undertaken. Learners will also describe the implications of regulatory requirements on maintenance and adaptation. Their description will consider the elements identified in topic A3 but does not need to consider these in detail.

Learning aim B

For Distinction standard, learners will justify the contents of their maintenance schedule. For each element that requires maintenance, learners will justify their maintenance recommendations. This will consider the existing condition, the immediate, short-, medium- and long-term maintenance requirements, the consequences should the maintenance not be carried out and the longer-term implications for the property.

For Merit standard, learners will build upon the Pass level, explaining the elements of the specified property that will require regular maintenance, including the areas of the element which may fail and require subsequent maintenance. Learners should be able to identify how an element could fail during its life cycle as outlined in topic B2.

For Pass standard, learners will produce a schedule of maintenance which identifies and describes reactive and short-term maintenance requirements following an inspection of a specified property. Learners are not required to carry out the property inspection themselves. Their description should detail all aspects of the property that require maintenance interventions. They should identify and describe the element and what the defect/maintenance requirement is. Learners should also identify on the schedule which elements will require regular maintenance and state why. Where appropriate, photographic evidence can be used to confirm the maintenance requirement.

The schedule of maintenance will be accompanied by a report, which will consider each of the different approaches to the maintenance and preservation of the specified property. Each aspect will be considered, with an outline of the key features and when each could be used, and any benefits from implementing this type of approach. The discussion will extend to consider the consequences of not undertaking regular maintenance and the impact this could have on the property, the property user and the wider neighbourhood.

Learning aims C

For Distinction standard, learners will justify the design proposal in line with the client's brief, regulatory issues and the property used for the assessment. Learners will demonstrate that they have considered several alternatives and produced the best available option, stating why it is better than the alternatives. Their justification will be based on several factors and not just on specific issues, such as design or structural limitations.

For Merit standard, learners will produce a detailed sketch scheme proposal to satisfy the client's brief. The scheme will maximise the potential of the property, fully satisfy the client's brief and demonstrate all relevant regulatory compliance. Learners will demonstrate good analytical and application skills to produce detailed, accurate and annotated drawings and supporting descriptive notes. There is no requirement for a specification, but learners will show an understanding of how the adaptation would be undertaken, including structural considerations. This may include items such as inserting a lintel into a new opening or upgrading a floor structure to increase its strength and rigidity.

For Pass standard, learners will require a client's brief with supporting property survey report. The brief will have specific requirements for the adaptation of a specified property. The brief could include alterations to a place of residence, converting a classroom into a flat/apartment or the adaptation of another suitable property available to the centre. Learners will describe the client's requirements and their wishes, then apply these to a specific property to ascertain whether they are feasible. They will apply the client's requirements to the findings of the property survey report and consider whether the adaptations required can be undertaken.

Learners will produce an outline sketch scheme that satisfies the client's requirements and is possible within the specified property. This will include plans, sections and elevation drawings. The drawings do not have to be of professional standard, but they should be rule assisted, legible, utilise standard construction language and be clearly annotated to enable the reader to fully understand the scheme. The drawings should show how the client's brief has been met and how regulatory compliance can be achieved.

The brief should be written to prompt learners to describe the different methods of improving the environmental performance of the property. The methods considered will be suitable for the property but may include some methods that may not be the most appropriate or viable. Learners must identify the specific mechanism for sustainable improvement and state how it will improve the property's performance. This discussion is expected to be limited to the reduction in heat loss or energy consumption, or the specific benefit from the method suggested.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Construction Technology
- Unit 4: Construction and Design
- Unit 5: Construction Processes and Operations for Low-Rise Domestic Buildings
- Unit 6: Construction Methods and Techniques for Low-Rise Domestic Buildings

Employer involvement

This unit would benefit from employer involvement in the form of:

- a guest speaker to act as a client.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop report writing, sketching and drawing skills.

4 Planning your programme

How do I choose the right BTEC International Level 2 qualification for my learners?

BTEC International Level 2 qualifications come in a range of sizes, each with a specific purpose. You will need to recruit learners very carefully to ensure that they start on the right size of qualification to fit into their study programme and that they take the right pathways or optional units to allow them to progress to the next stage.

Some learners may want to take a number of complementary qualifications or keep their progression options open. These learners may be suited to taking a BTEC International Level 2 Award or Certificate. Learners who then decide to continue with a fuller vocational programme can transfer to a BTEC International Level 2 Extended Certificate or Diploma.

Some learners are sure of the sector in which they wish to work and are aiming for progression into that sector via higher education. These learners should be directed to the two-year BTEC International Level 2 Diploma as the most suitable qualification.

Is there a learner entry requirement?

As a centre, it is your responsibility to ensure that the learners you recruit have a reasonable expectation of success on the programme. There are no formal entry requirements but we expect learners to have sufficient learning to study at this level.

If learners are studying in English we recommend that they have attained at least Level B2 in the Common European Framework of Reference for Languages or Pearson Global Scale of English 51. Please see resources available from Pearson at www.pearson.com/english.

What is involved in becoming an approved centre?

All centres must be approved before they can offer these qualifications – so that they are ready to assess learners and so that we can provide the support that is needed. Further information is given in *Section 8 Quality assurance*.

What level of sector knowledge is needed to teach these qualifications?

We do not set any requirements for teachers but recommend that centres assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date. This will give learners a rich programme to prepare them for employment in the sector.

What resources are required to deliver these qualifications?

As part of your centre approval, you will need to show that the necessary material resources and work spaces are available to deliver BTEC International Level 2 qualifications. For some units, specific resources are required.

How can Pearson Progress help with planning for these qualifications?

Pearson Progress is a digital support system that supports the delivery, assessment and quality assurance of BTECs in centres. It supports teachers with activities such as course creation, creating and verifying assignments and creating assessment plans and recording assessment decisions.

For further information, see *Section 10 Resources and support*.

Which modes of delivery can be used for these qualifications?

You are free to deliver BTEC International Level 2 qualifications using any form of delivery that meets the needs of your learners. We recommend making use of a wide variety of modes, including direct instruction in classrooms or work environments, investigative and practical work, group and peer work, private study and e-learning.

What are the recommendations for employer involvement?

BTEC International Level 2 qualifications are vocational qualifications and, as an approved centre, you are encouraged to work with employers on design, delivery and assessment to ensure that it is engaging and relevant, and that it equips learners for progression. There are suggestions in many of the units about how employers could become involved in delivery and/or assessment but these are not intended to be exhaustive and there will be other possibilities at local level.

What support is available?

We provide a wealth of support materials, including curriculum plans, delivery guides, sample Pearson Set Assignments, authorised assignment briefs and examples of marked learner work.

You will be allocated a Standards Verifier early on in the planning stage to support you with planning your assessments. There will be extensive training programmes as well as support from our Subject Advisor team.

For further details see *Section 10 Resources and support*.

5 Assessment structure

Introduction

BTEC International Level 2 qualifications are assessed using a combination of *internal assessments*, which are set and marked by teachers, and *Pearson Set Assignments*, which are set by Pearson and marked by teachers.

- Mandatory units have a combination of internal and Pearson Set Assignments.
- All optional units are internally assessed.

In developing an overall plan for delivery and assessment for the programme, you will need to consider the order in which you deliver units, whether delivery is over short or long periods and when assessment can take place. You must plan the assignments so that learners can demonstrate learning from across their programme.

In administering an internal assignment or a Pearson Set Assignment, the centre needs to be aware of the specific procedures and policies that apply, for example to registration, entries and results. An overview, with signposting to relevant documents, is given in *Section 7 Administrative arrangements*.

Internal assessment

Our approach to internal assessment for these qualifications will be broadly familiar to experienced centres. It offers flexibility in how and when you assess learners, provided that you meet assessment and quality assurance requirements. You will need to take account of the requirements of the unit format, which we explain in *Section 3 Units*, and the requirements for delivering assessment given in *Section 6 Internal assessment*.

Pearson Set Assignment units

A summary of the set assignments for this qualification is given in *Section 2 Structure*. You should check this information carefully, together with the details of the unit being assessed, so that you can timetable learning and assessment periods appropriately.

Learners must take the authorised Pearson Set Assignment for the set assignment unit. Teachers are not permitted to create their own assessments for set assignment units. Some assignments may need to be taken in controlled conditions. These are described in each unit.

Please see *Section 6* for resubmission and retaking regulations.

6 Internal assessment

This section gives an overview of the key features of internal assessment and how you, as an approved centre, can offer it effectively. The full requirements and operational information are given in the *BTEC International Quality Assurance Handbook*.

All members of the assessment team need to refer to this document.

For BTEC International Level 2 qualifications, it is important that you can meet the expectations of stakeholders and the needs of learners by providing a programme that is practical and applied. Centres can tailor programmes to meet local needs and use links with local employers and the wider vocational sector.

When internal assessment is operated effectively, it is challenging, engaging, practical and up to date. It must also be fair to all learners and meet international standards.

All units in these qualifications are internally assessed but Pearson sets the assignments for some of the units.

Principles of internal assessment (applies to all units)

Assessment through assignments

For all units, the format of assessment is an assignment taken after the content of the unit, or part of the unit if several assignments are used, has been delivered.

An assignment may take a variety of forms, including practical and written types.

An assignment is a distinct activity, completed independently by learners, that is separate from teaching, practice, exploration and other activities that learners complete with direction from teachers.

An assignment is issued to learners as an assignment brief with a defined start date, a completion date and clear requirements for the evidence that they need to provide.

There may be specific observed practical components during the assignment period.

Assignments can be divided into tasks and may require several forms of evidence.

A valid assignment will enable a clear and formal assessment outcome, based on the assessment criteria. For most units, teachers will set the assignments. For Pearson Set Assignment units, Pearson will set the assignment.

Assessment decisions through applying unit-based criteria

Assessment decisions for BTEC International Level 2 qualifications are based on the specific criteria given in each unit and set at each grade level. To ensure that standards are consistent in the qualification and across the suite as a whole, the criteria for each unit have been defined according to a framework. The way in which individual units are written provides a balance of assessment of understanding, practical skills and vocational attributes appropriate to the purpose of qualifications.

The assessment criteria for a unit are hierarchical and holistic. For example, if a Merit criterion requires the learner to show 'analysis' and the related Pass criterion requires the learner to 'explain', then to satisfy the Merit criterion, a learner will need to cover both 'explain' and 'analyse'. The unit assessment grid shows the relationships between the criteria so that assessors can apply all the criteria to the learner's evidence at the same time. In *Appendix 2: Glossary of terms used*, we have set out a definition of terms that assessors need to understand.

Assessors must show how they have reached their decisions using the criteria in the assessment records. When a learner has completed all the assessment for a unit, then the assessment team will give a grade for the unit. This is given according to the highest level for which the learner is judged to have met all the criteria. Therefore:

- to achieve a Distinction, a learner must have satisfied all the Distinction criteria (and therefore the Pass and Merit criteria); these define outstanding performance across the unit as a whole
- to achieve a Merit, a learner must have satisfied all the Merit criteria (and therefore the Pass criteria) through high performance in each learning aim
- to achieve a Pass, a learner must have satisfied all the Pass criteria for the learning aims, showing coverage of the unit content and therefore attainment at Level 2 of the qualification.

The award of a Pass is a defined level of performance and cannot be given solely on the basis of a learner completing assignments. Learners who do not satisfy the Pass criteria should be reported as Unclassified.

The assessment team

It is important that there is an effective team for internal assessment. There are three key roles involved in implementing assessment processes in your centre, each with different interrelated responsibilities; the roles are listed below. There is detailed information in the *BTEC International Quality Assurance Handbook*.

- The Lead Internal Verifier (the Lead IV) has overall responsibility for the programme, its assessment and internal verification, record keeping and liaison with the standards verifier, ensuring our requirements are met. The Lead IV acts as an assessor, standardises and supports the rest of the assessment team, making sure that they have the information they need about our assessment requirements and organises training, making use of our standardisation, guidance and support materials.
- Internal Verifiers (IVs) oversee all assessment activities in consultation with the Lead IV. They check that assignments and assessment decisions are valid and that they meet our requirements. IVs will be standardised by working with the Lead IV. Normally, IVs are also assessors but they do not verify their own assessments.
- Assessors set or use assignments to assess learners. Before making any assessment decisions, assessors participate in standardisation activities led by the Lead IV. They work with the Lead IV and IVs to ensure that the assessment is planned and carried out in line with our requirements.

Effective organisation

Internal assessment needs to be well organised so that the progress of learners can be tracked and so that we can monitor that assessment is being carried out. We support you through, for example, providing training materials and sample documentation.

Our online Pearson Progress service can help support you in planning and record keeping. Further information on using Pearson Progress can be found in *Section 10 Resources and support*, and on our website.

It is particularly important that you manage the overall assignment programme and deadlines to make sure that learners are able to complete assignments on time.

Learner preparation

To ensure that you provide effective assessment for your learners, you need to make sure that they understand their responsibilities for assessment and the centre's arrangements.

From induction onwards, you will want to ensure that learners are motivated to work consistently and independently to achieve the requirements of the qualifications. Learners need to understand how assignments are used, the importance of meeting assignment deadlines and that all the work submitted for assessment must be their own.

You will need to give learners a guide that explains how assignments are used for assessment, how assignments relate to the teaching programme and how learners should use and reference source materials, including what would constitute plagiarism. The guide should also set out your approach to operating assessment, such as how learners must submit work and request extensions.

Making valid assessment decisions

Authenticity of learner work

Once an assessment has begun, learners must not be given feedback on progress towards fulfilling the targeted criteria.

An assessor must assess only learner work that is authentic, i.e. learners' own independent work. Learners must authenticate the evidence that they provide for assessment through signing a declaration stating that it is their own work.

Assessors must ensure that evidence is authentic to a learner through setting valid assignments and supervising them during the assessment period. Assessors must take care not to provide direct input, instructions or specific feedback that may compromise authenticity.

Assessors must complete a declaration that:

- to the best of their knowledge the evidence submitted for this assignment is the learner's own
- the learner has clearly referenced any sources used in the work
- they understand that false declaration is a form of malpractice.

Centres can use Pearson templates or their own templates to document authentication.

During assessment, an assessor may suspect that some or all of the evidence from a learner is not authentic. The assessor must then take appropriate action using the centre's policies for malpractice. Further information is given in *Section 7 Administrative arrangements*.

Making assessment decisions using criteria

Assessors make judgements using the criteria. The evidence from a learner can be judged using all the relevant criteria at the same time. The assessor needs to make a judgement against each criterion that evidence is present and sufficiently comprehensive. For example, the inclusion of a concluding section may be insufficient to satisfy a criterion requiring 'evaluation'.

Assessors should use the following information and support in reaching assessment decisions:

- the *Essential information for assessment decisions* section in each unit gives examples and definitions related to terms used in the criteria
- the explanation of key terms in *Appendix 2: Glossary of terms used*
- examples of assessed work provided by Pearson
- your Lead IV and assessment team's collective experience.

Pass and Merit criteria relate to individual learning aims. The Distinction criteria as a whole relate to outstanding evidence across the unit. Therefore, criteria may relate to one learning aim (for example A.D1) or to several learning aims (for example DE.D3). Distinction criteria make sure that learners have shown that they can perform consistently at an outstanding level across the unit and/or that they are able to draw learning together across learning aims.

Issuing assessment decisions and feedback

Once the assessment team has completed the assessment process for an assignment, the outcome is a formal assessment decision. This is recorded formally and reported to learners.

The information given to the learner:

- must show the formal decision and how it has been reached, indicating how or where criteria have been met
- may show why attainment against criteria has not been demonstrated
- must not provide feedback on how to improve evidence
- must be validated by an IV before it is given to the learner.

Planning and record keeping

For internal processes to be effective, an assessment team needs to be well organised and keep effective records. The centre will work closely with us so that we can ensure that standards are being satisfied and achieved. This process gives stakeholders confidence in the assessment approach.

The programme must have an assessment plan validated by the Lead IV.

When producing a plan, the assessment team needs to consider:

- the time required for training and standardisation of the assessment team
- the time available to undertake teaching and carry out assessment, taking account of when learners may complete assessments and when quality assurance will take place
- the completion dates for different assignments and the name of each Assessor
- who is acting as the Internal Verifier for each assignment and the date by which the assignment needs to be internally verified

- setting an approach to sampling assessor decisions through internal verification that covers all assignments, assessors and a range of assessment decisions
- how to manage the assessment and verification of learners' work so that they can be given formal decisions promptly
- how resubmission opportunities can be scheduled.

The Lead IV will also maintain records of assessment undertaken. The key records are:

- internal verification of assignment briefs
- learner authentication declarations
- assessor decisions on assignments, with feedback given to learners
- internal verification of assessment decisions
- assessment tracking for the unit.

There are examples of records and further information in the *BTEC International Quality Assurance Handbook*.

Setting effective assignments (applies to all units without Pearson Set Assignments)

Setting the number and structure of assignments

This section does not apply to set assignment units. In setting your assignments, you need to work with the structure of assignments shown in the *Essential information for assignments* section of a unit. This shows the structure of the learning aims and criteria that you must follow and the recommended number of assignments that you should use. For these units we provide sample authorised assignment briefs and we give you suggestions on how to create suitable assignments. You can find these materials on our website. In designing your own assignment briefs, you should bear in mind the following points:

- The number of assignments for a unit must not exceed the number shown in *Essential information for assignments*. However, you may choose to combine assignments, for example, to create a single assignment for the whole unit.
- You may also choose to combine all or parts of different units into single assignments, provided that all units and all their associated learning aims are fully addressed in the programme overall. If you choose to take this approach, you need to make sure that learners are fully prepared so that they can provide all the required evidence for assessment and that you are able to track achievement in the records.
- A learning aim must always be assessed as a whole and must not be split into two or more assignments.
- The assignment must be targeted to the learning aims but the learning aims and their associated criteria are not tasks in themselves. Criteria are expressed in terms of the outcome shown in the evidence.
- For units containing synoptic assessment, the planned assignments must allow learners to select and apply their learning, using appropriate self-management of tasks.
- You do not have to follow the order of the learning aims of a unit in setting assignments but later learning aims often require learners to apply the content of earlier learning aims and they may require learners to draw their learning together.

- Assignments must be structured to allow learners to demonstrate the full range of achievement at all grade levels. Learners need to be treated fairly by being given the opportunity to achieve a higher grade if they have the ability.
- As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning aims. The specified content is compulsory. The evidence for assessment need not cover every aspect of the teaching content as learners will normally be given particular examples, case studies or contexts in their assignments. For example, if a learner is carrying out one practical performance, or an investigation of one organisation, then they will address all the relevant range of content that applies in that instance.

Providing an assignment brief

A good assignment brief is one that, through providing challenging and realistic tasks, motivates learners to provide appropriate evidence of what they have learned.

An assignment brief should have:

- a vocational scenario – this could be a simple situation or a full, detailed set of vocational requirements that motivates the learner to apply their learning through the assignment
- clear instructions to the learner about what they are required to do, normally set out through a series of tasks
- an audience or purpose for which the evidence is being provided
- an explanation of how the assignment relates to the unit(s) being assessed.

Forms of evidence

BTECs have always allowed for a variety of forms of evidence to be used – provided that they are suited to the type of learning aim being assessed. For many units, the practical demonstration of skills is necessary and, for others, learners will need to carry out their own research and analysis. The units give you information on what would be suitable forms of evidence to give learners the opportunity to apply a range of employability or transferable skills. Centres may choose to use different suitable forms of evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

Full definitions of types of assessment are given in *Appendix 2: Glossary of terms used*.

These are some of the main types of assessment:

- written reports
- projects
- time-constrained practical assessments with observation records and supporting evidence
- recordings of performance
- sketchbooks, working logbooks, reflective journals
- presentations with assessor questioning.

The form(s) of evidence selected must:

- allow the learner to provide all the evidence required for the learning aim(s) and the associated assessment criteria at all grade levels
- allow the learner to produce evidence that is their own independent work
- allow a verifier to independently reassess the learner to check the assessor's decisions.

For example, when you are using performance evidence, you need to think about how supporting evidence can be captured through recordings, photographs or task sheets. Centres need to take particular care that learners are enabled to produce independent work. For example, if learners are asked to use real examples, then best practice would be to encourage them to use their own or to give the group a number of examples that can be used in varied combinations.

Late completion, resubmission and retakes (applies to all units including Pearson Set Assignment units)

Dealing with late completion of assignments for internally-assessed units

Learners must have a clear understanding of the centre policy on completing assignments by the deadlines that you give them. Learners may be given authorised extensions for legitimate reasons, such as illness at the time of submission, in line with your centre policies.

For assessment to be fair, it is important that learners are all assessed in the same way and that some learners are not advantaged by having additional time or the opportunity to learn from others. Therefore, learners who do not complete assignments by your planned deadline or by the authorised extension deadline may not have the opportunity to subsequently resubmit.

If you accept a late completion by a learner, then the assignment should be assessed normally when it is submitted, using the relevant assessment criteria.

Resubmission of improved evidence for internally-assessed units

An assignment provides the final assessment for the relevant learning aims and is normally a final assessment decision, except where the Lead IV approves one opportunity to resubmit improved evidence based on the completed assignment brief.

The Lead IV has the responsibility to make sure that resubmission is operated fairly. This means:

- checking that a learner can be reasonably expected to perform better through a second submission, for example, that the learner has not performed as expected
- making sure that giving a further opportunity can be done in such a way that it does not give an unfair advantage over other learners, for example, through the opportunity to take account of feedback given to other learners
- checking that the assessor considers that the learner will be able to provide improved evidence without further guidance and that the original evidence submitted has been authenticated by both the learner and assessor and remains valid.

Once an assessment decision has been given to the learner, the resubmission opportunity must have a deadline within 15 working days after the timely issue of assessment feedback to learners, which is within term time in the same academic year.

A resubmission opportunity must not be provided where learners:

- have not completed the assignment by the deadline without the centre's agreement
- have submitted work that is not authentic.

We recognise that there are circumstances where the resubmission period may fall outside of the 15-day limit owing to a lack of resources being available, for example, where learners may need to access a performance space or have access to specialist equipment. Where it is practical to do so, for example, evaluations, presentations, extended writing, resubmission must remain within the normal 15-day period.

Retake of internal assessment

A learner who has not achieved the level of performance required to pass the relevant learning aims after resubmission of an assignment may be offered a single retake opportunity using a new assignment. The retake may be achieved at a Pass only.

The Lead Internal Verifier must authorise a retake of an assignment only in exceptional circumstances where they believe it is necessary, appropriate and fair to do so.

The retake is not timebound and the assignment can be attempted by the learner on a date agreed between the Lead IV and assessor within the same academic year.

For further information on offering a retake opportunity, you should refer to the *BTEC Centre Guide to Internal Assessment*. Information on writing assignments for retakes is given on our website (www.btec.co.uk/keydocuments).

7 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It is of particular value to Quality Nominees, Lead IVs, Programme Leaders and Examinations Officers.

Learner registration and entry

Shortly after learners start the programme of learning, you need to make sure that they are registered for the qualification and that appropriate arrangements are made for internal assessment. You need to refer to the *International Information Manual* for information on making registrations for the qualification.

Learners can be formally assessed only for a qualification on which they are registered. If learners' intended qualifications change, for example, if a learner decides to choose a different pathway specialism, then the centre must transfer the learner appropriately.

Access to assessment

Assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to their chosen progression opportunities.

Our equality policy requires that all learners should have equal opportunity to access our qualifications and assessments, and that our qualifications are awarded in a way that is fair to every learner. We are committed to making sure that:

- learners with a protected characteristic are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational Qualifications*.

Administrative arrangements for assessment

Records

You are required to retain records of assessment for each learner. Records should include assessments taken, decisions reached and any adjustments or appeals. Further information can be found in the *International Information Manual*. We may ask to audit your records, so they must be retained as specified.

Reasonable adjustments to assessment

To ensure that learners have fair access to demonstrate the requirements of the assessments, a reasonable adjustment is one that is made before a learner takes an assessment. You are able to make adjustments to internal assessments to take account of the needs of individual learners. In most cases, this can be achieved through a defined time extension or by adjusting the format of evidence. We can advise you if you are uncertain as to whether an adjustment is fair and reasonable. You need to plan for time to make adjustments if necessary.

Further details on how to make adjustments for learners with protected characteristics are given on our website, in the document *Guidance for reasonable adjustments and special consideration in vocational internally assessed units*.

Special consideration

Special consideration is given after an assessment has taken place for learners who have been affected by adverse circumstances, such as illness. You must operate special consideration in line with our policy (see above). You can give special consideration related to the period of time given for evidence to be provided or for the format of the assessment if it is equally valid. You may not substitute alternative forms of evidence to that required in a unit or omit the application of any assessment criteria to judge attainment. Pearson can consider applications for special consideration if they are in line with the policy.

Appeals against assessment

Your centre must have a policy for dealing with appeals from learners. These appeals may relate to assessment decisions being incorrect or assessment not being conducted fairly. The first step in such a policy could be a consideration of the evidence by a Lead IV or other member of the programme team. The assessment plan should allow time for potential appeals after assessment decisions have been given to learners. If there is an appeal by a learner, you must document the appeal and its resolution. Learners have a final right of appeal to Pearson but only if the procedures that you have put in place have not been followed. Further details are given in the document *Enquiries and appeals about Pearson vocational qualifications and end point assessment policy*.

Conducting set assignments

Centres must make arrangements for the secure delivery of Pearson Set Assignments.

At least one Pearson Set Assignment will be available each year for each unit with an additional one provided for resit. Centres must not select an assignment that learners have attempted already.

Each set assignment unit will contain instructions in the *Essential information for assignments* section on how to conduct the assessment of that unit.

Some set assignments will need to be taken with limited controls. Limited controls are described in each unit and may include the following conditions:

- Time: each assignment has a recommended time period. This is for advice only and can be adjusted depending on the needs of learners.
- Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.
- Resources: all learners should have access to the same types of resources to complete the assignment.
- Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Schools and colleges must be able to confirm that learner evidence is authentic.

Dealing with malpractice in assessment

Malpractice means acts that undermine the integrity and validity of assessment, the certification of qualifications, and/or that may damage the authority of those responsible for delivering the assessment and certification.

Pearson does not tolerate actions (or attempted actions) of malpractice by learners, centre staff or centres in connection with Pearson qualifications. Pearson may impose penalties and/or sanctions on learners, centre staff or centres where incidents (or attempted incidents) of malpractice have been proven.

Malpractice may arise or be suspected in relation to any unit or type of assessment within the qualification. For further details regarding malpractice and advice on preventing malpractice by learners, please see Pearson's *Centre guidance: Dealing with malpractice and maladministration in vocational qualifications*, available on our website.

Centres are required to take steps to prevent malpractice and to investigate instances of suspected malpractice. Learners must be given information that explains what malpractice is for internal assessment and how suspected incidents will be dealt with by the centre. The *Centre Guidance: Dealing with malpractice and maladministration in vocational qualifications* document gives comprehensive information on the actions we expect you to take.

Pearson may conduct investigations if we believe that a centre is failing to conduct internal assessment according to our policies. The above document gives further information and examples, and details the penalties and sanctions that may be imposed.

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Learner malpractice

Learner malpractice refers to any act by a learner that compromises or which seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

Learner malpractice in examinations **must** be reported to Pearson using a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice). The form should be emailed to candidatemalpractice@pearson.com. Please provide as much information and supporting documentation as possible. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Staff/centre malpractice

Staff and centre malpractice includes both deliberate malpractice and maladministration of our qualifications. As with learner malpractice, staff and centre malpractice is any act that compromises or which seeks to compromise the process of assessment, or which undermines the integrity of the qualifications or the validity of results/certificates.

All cases of suspected staff malpractice and maladministration **must** be reported immediately, before any investigation is undertaken by the centre, to Pearson on a *JCQ Form M2* (available at www.jcq.org.uk/exams-office/malpractice).

The form, supporting documentation and as much information as possible should be emailed to pqsmalpractice@pearson.com. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice itself constitutes malpractice.

More-detailed guidance on malpractice can be found in the latest version of the document *JCQ Suspected Malpractice Policies and Procedures*, available at www.jcq.org.uk/exams-office/malpractice.

Sanctions and appeals

Where malpractice is proven, we may impose sanctions or penalties.

Where learner malpractice is evidenced, penalties may be imposed such as:

- disqualification from the qualification
- being barred from registration for Pearson qualifications for a period of time.

If we are concerned about your centre's quality procedures, we may impose sanctions such as:

- working with you to create an improvement action plan
- requiring staff members to receive further training
- placing temporary blocks on your certificates
- placing temporary blocks on registration of learners
- debarring staff members or the centre from delivering Pearson qualifications
- suspending or withdrawing centre approval status.

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from Heads of Centres (on behalf of learners and/or members of staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our document *Enquiries and appeals about Pearson vocational qualifications and end point assessment policy*, which is on our website. In the initial stage of any aspect of malpractice, please notify the Investigations Team by email via pqsmalpractice@pearson.com, who will inform you of the next steps.

Certification and results

Once a learner has completed all the required components for a qualification, the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures, please refer to our *International Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Changes to qualification requests

Where a learner who has taken a qualification wants to resit a unit to improve their qualification grade, you firstly need to decline their overall qualification grade. You may decline the grade before the certificate is issued.

Additional documents to support centre administration

As an approved centre, you must ensure that all staff delivering, assessing and administering the qualifications have access to the following documentation. These documents are reviewed annually and are reissued if updates are required.

- *BTEC International Quality Assurance Handbook*: this sets out how we will carry out quality assurance of standards and how you need to work with us to achieve successful outcomes.
- *International Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations and claiming certificates.
- *Regulatory policies*: our regulatory policies are integral to our approach and explain how we meet internal and regulatory requirements. We review the regulated policies annually to ensure that they remain fit for purpose. Policies related to this qualification include:
 - adjustments for candidates with disabilities and learning difficulties, access arrangements and reasonable adjustments for general and vocational qualifications
 - age of learners
 - centre guidance for dealing with malpractice
 - recognition of prior learning and process.

This list is not exhaustive and a full list of our regulatory policies can be found on our website.

8 Quality assurance

Centre and qualification approval

As part of the approval process, your centre must make sure that the resource requirements listed below are in place before offering the qualification.

- Centres must have appropriate physical resources (for example equipment, IT, learning materials, teaching rooms) to support the delivery and assessment of the qualification.
- Staff involved in the assessment process must have relevant expertise and/or occupational experience.
- There must be systems in place to ensure continuing professional development for staff delivering the qualification.
- Centres must have in place appropriate health and safety policies relating to the use of equipment by learners.
- Centres must deliver the qualification in accordance with current equality and diversity legislation and/or regulations.
- Centres should refer to the *Further information for teachers and assessors* section in individual units to check for any specific resources required.

Continuing quality assurance and standards verification

On an annual basis, we produce the *BTEC International Quality Assurance Handbook*. It contains detailed guidance on the quality processes required to underpin robust assessment and internal verification.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre, and must have approval for the programmes or groups of programmes that it is delivering
- the centre agrees, as part of gaining approval, to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; the centre must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres resources and processes that exemplify assessment and appropriate standards. Approved centres must use these to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers, for the planning, monitoring and recording of assessment processes, and for dealing with special circumstances, appeals and malpractice.

The approach of quality-assured assessment is through a partnership between an approved centre and Pearson. We will make sure that each centre follows best practice and employs appropriate technology to support quality-assurance processes, where practicable. We work to support centres and seek to make sure that our quality-assurance processes do not place undue bureaucratic processes on centres. We monitor and support centres in the effective operation of assessment and quality assurance.

The methods we use to do this for BTEC Level 2 include:

- making sure that all centres complete appropriate declarations at the time of approval
- undertaking approval visits to centres
- making sure that centres have effective teams of assessors and verifiers who are trained to undertake assessment
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- an overarching review and assessment of a centre's strategy for delivering and quality assuring its BTEC programmes, for example, making sure that synoptic units are placed appropriately in the order of delivery of the programme.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for all BTEC Level 2 programmes. An approved centre must make certification claims only when authorised by us and strictly in accordance with requirements for reporting.

Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

9 Understanding the qualification grade

Awarding and reporting for the qualification

This section explains the rules that we apply in awarding a qualification and in providing an overall qualification grade for each learner. It shows how all the qualifications in this sector are graded.

Eligibility for an award

In order to be awarded a qualification, a learner must complete all units, AND achieve a Pass or above in all mandatory units unless otherwise specified. Refer to the structure in *Section 2 Structure*.

To achieve any qualification grade, learners must:

- complete and have an outcome (D, M, P or U) for all units within a valid combination
- achieve the **required units at Pass or above** shown in *Section 2*, abiding by the minimum requirements in the compensation table below
- achieve the **minimum number of points** at a grade threshold.

It is the responsibility of a centre to ensure that a correct unit combination is adhered to. Learners who do not achieve the required minimum grade (P) in units shown in the structure will not achieve a qualification.

Learners who do not achieve sufficient points for a qualification or who do not achieve all the required units may be eligible to achieve a smaller qualification in the same suite, provided they have completed and achieved the correct combination of units and met the appropriate qualification grade points threshold.

Calculation of the qualification grade

These qualifications are Level 2 qualifications and the certification may show a grade ranging from Level 2 Pass to Level 2 Distinction*. Please refer to the *Calculation of qualification grade* table for the full list of grades. Each individual unit will be awarded a grade of Level 2 Pass, Merit, Distinction. Learners whose level of achievement is below a Level 2 Pass will receive an unclassified (U) for that unit. Distinction* is not available at unit level. Award of Distinction* (D*) D* is an aggregated grade for the qualification, based on the learner's overall performance. In order to achieve this grade, learners will have to demonstrate a strong performance across the qualification as a whole.

To achieve a Level 2 qualification, learners must:

- complete and report an outcome for all units within the permitted combination (NB Unclassified is a permitted unit outcome), and
- achieve the minimum number of points at a grade threshold – see the *Calculation of qualification grade* table with the following allowable tolerances.

Qualification	Units required at Pass or above	Unit equivalence
Award (120 GLH)	All units must be achieved at Pass or above	0 units
Certificate (240 GLH)	All units must be achieved at Pass or above	0 units
Extended Certificate (360 GLH)	Mandatory units must be achieved at Pass or above, 60 GLH only at U grade permitted from optional units	e.g. 1 ´ 60 GLH unit
Diploma (480 GLH)	Mandatory units must be achieved at Pass or above, 120 GLH only at U grade permitted from optional units	e.g. 2 ´ 60 GLH units OR 1 ´ 120 GLH unit

Points available for unit size and grades

The table below shows the **number of points scored per 10 guided learning hours** at each grade.

Points per grade per 10 Guided Learning Hours			
Unclassified	Level 2 Pass (P)	Level 2 Merit (M)	Level 2 Distinction (D)
0	4	6	8

We will automatically calculate the qualification grade for your learners when your learner unit grades are submitted. Learners will be awarded qualification grades for achieving the sufficient number of points within the ranges shown in the *Calculation of qualification grade* table.

Example

A learner achieves a Level 2 Pass grade for a unit. The unit size is 30 guided learning hours (GLH). Therefore, they gain 12 points for that unit, i.e. 4 points for each 10 GLH, so 12 points for 30 GLH.

Calculation of qualification grade

Award		Certificate		Extended Certificate		Diploma	
120 GLH		240 GLH		360 GLH		480 GLH	
Grade	Points threshold	Grade	Points threshold	Grade	Points threshold	Grade	Points threshold
U	0	U	0	U	0	U	0
Level 2 Pass	48	Level 2 PP	96	Level 2 PP	144	Level 2 PP	192
		Level 2 MP	114	Level 2 MP	174	Level 2 MP	234
Level 2 Merit	66	Level 2 MM	132	Level 2 MM	204	Level 2 MM	276
		Level 2 DM	150	Level 2 DM	234	Level 2 DM	318
Level 2 Distinction	84	Level 2 DD	168	Level 2 DD	264	Level 2 DD	360
		Level 2 D*D	174	Level 2 D*D	270	Level 2 D*D	366
Level 2 Distinction*	90	Level 2 D*D*	180	Level 2 D*D*	276	Level 2 D*D*	372

This table shows the minimum thresholds for calculating grades. The table will be kept under review over the lifetime of the qualification. The most up to date table will be issued on our website.

Pearson will monitor the qualification standard and reserves the right to make appropriate adjustments.

The tables below give examples of how the overall grade is determined.

Examples used are for illustrative purposes only. Other unit combinations are possible, see *Section 2 Structure*.

Example 1

Achievement of a Certificate with a Level 2 MM grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	30	3	Level 2 Merit	6	18
Unit 2	30	3	Level 2 Pass	4	12
Unit 3	30	3	Level 2 Merit	6	18
Unit 4	30	3	Level 2 Merit	6	18
Unit 5	30	3	Level 2 Merit	6	18
Unit 6	30	3	Level 2 Pass	4	12
Unit 7	60	6	Level 2 Distinction	8	48
Qualification grade totals	240	24	Level 2 MM		144

The learner has sufficient points for a Level 2 MM grade.

Example 2

Achievement of a Certificate with a Level 2 D*D grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	30	3	Level 2 Merit	6	18
Unit 2	30	3	Level 2 Distinction	8	24
Unit 3	30	3	Level 2 Merit	6	18
Unit 4	30	3	Level 2 Distinction	8	24
Unit 5	30	3	Level 2 Merit	6	18
Unit 6	30	3	Level 2 Distinction	8	24
Unit 7	60	6	Level 2 Distinction	8	48
Qualification grade totals	240	24	Level 2 D*D		174

The learner has sufficient points for a Level 2 D*D grade.

Example 3

Achievement of an Extended Certificate with a Level 2 MP grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	30	3	Level 2 Pass	4	12
Unit 2	30	3	Level 2 Pass	4	12
Unit 3	30	3	Level 2 Merit	6	18
Unit 4	30	3	Level 2 Pass	4	12
Unit 5	30	3	Level 2 Merit	6	18
Unit 6	30	3	Level 2 Distinction	8	24
Unit 7	60	6	Level 2 Pass	4	24
Unit 8	30	3	Level 2 Merit	6	18
Unit 9	30	3	Level 2 Merit	6	18
Unit 10	60	6	Level 2 Pass	4	24
Qualification grade totals	360	36	Level 2 MP		180

The learner has sufficient points for a Level 2 MP grade.

Example 4

Achievement of a Diploma with a Level 2 MM grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	30	3	Level 2 Merit	6	18
Unit 2	30	3	Level 2 Pass	4	12
Unit 3	30	3	Level 2 Merit	6	18
Unit 5	30	3	Level 2 Merit	6	18
Unit 9	30	3	Level 2 Pass	4	12
Unit 18	60	6	Level 2 Merit	6	36
Unit 19	60	6	Level 2 Distinction	8	48
Unit 23	60	6	Level 2 Distinction	8	48
Unit 25	60	6	Level 2 Pass	4	24
Unit 27	60	6	Level 2 Pass	4	24
Unit 30	30	3	Level 2 Merit	6	18
Qualification grade totals	480	48	Level 2 MM		276

The learner has sufficient points for a Level 2 MM grade.

Example 5

Achievement of a Diploma with a Level 2 DD grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	30	3	Level 2 Merit	6	18
Unit 2	30	3	Level 2 Distinction	8	24
Unit 3	30	3	Level 2 Distinction	8	24
Unit 5	30	3	Level 2 Merit	6	18
Unit 9	30	3	Level 2 Distinction	8	24
Unit 18	60	6	Level 2 Merit	6	36
Unit 19	60	6	Level 2 Distinction	8	48
Unit 23	60	6	Level 2 Distinction	8	48
Unit 25	60	6	Level 2 Distinction	8	48
Unit 27	60	6	Level 2 Distinction	8	48
Unit 30	30	3	Level 2 Distinction	8	24
Qualification grade totals	480	48	Level 2 DD		360

The learner has sufficient points for a Level 2 DD grade.

10 Resources and support

Our aim is to give you a wealth of resources and support to enable you to deliver BTEC International Level 2 qualifications with confidence. You will find a list of resources to support teaching and learning, and professional development on our website.

Support for setting up your course and preparing to teach

Specification

The specification (for teaching from September 2022) gives you details of the administration of the qualifications and information on the units for the qualifications.

Pearson Progress

Pearson Progress is a digital support system that helps you to manage the assessment and quality assurance of the Pearson BTEC International Level 2 Construction qualifications. It supports delivery, assessment and quality assurance of BTECs in centres and supports teachers and students as follows:

- course creation
- creating and verifying assignments
- creating assessment plans and recording assessment decisions
- upload of assignment evidence
- tracking progress of every learner

The system is accessible for teachers and learners so that both teachers and learners can track their progress.

Support for teaching and learning

Pearson Learning Services provide a range of engaging resources to enable you to start teaching BTEC International Level 2 qualifications. These may include the following free materials:

- delivery guides, which give you important advice on how to choose the right course for your learners and how to ensure you are fully prepared to deliver the course. They explain the key features of the BTEC International Level 2 Construction qualifications, for example employer involvement and employability skills. They also cover guidance on assessment and quality assurance.
- sample schemes of work are provided for each mandatory unit as well as a selection of optional units. These are available in Word™ format for ease of customisation
- slide presentations for use in your teaching to outline the key concepts of a unit
- delivery plans that help you structure delivery of a qualification.

We also provide paid for resources and courseware which may include:

- teacher resource packs developed by Pearson including materials and activities to fully support your teaching of units
- student books, designed to support the teaching and learning journey. These include case studies, discussion prompts, key content and supporting images to help learners develop their understanding. Items from the student books will link with other resources, which will support teaching and learning.

Support for assessment

Sample assessment materials for internally-assessed units

For internal units assessed with a Pearson Set Assignment we will provide a sample assignment as an example of the form of assessment for the unit. For the remaining internally set units, we allow you to set your own assignments, according to your learners' preferences and to link with your local employment profile.

We provide a service in the form of Authorised Assignment Briefs and sample Pearson Set Assignments, which are approved by Pearson Standards Verifiers. They are available via our website.

Pearson English

Pearson provides a full range of support for English learning including diagnostics, qualifications and learning resources. Please see www.pearson.com/english

Training and support from Pearson

People to talk to

There are many people available to support you and give you advice and guidance on delivery of your BTEC International Level 2 qualifications. They include the following.

- Subject Advisors – available for all sectors. They understand all Pearson qualifications in their sector and can answer sector-specific queries on planning, teaching, learning and assessment.
- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, and support you in preparing learner work and providing quality assurance through sampling.
- Regional teams – they are regionally based and have a full overview of the BTEC qualifications and of the support and resources that Pearson provides. Regions often run network events.
- Customer Services – the 'Support for You' section of our website gives the different ways in which you can contact us for general queries. For specific queries, our service operators can direct you to the relevant person or department.

Training and professional development

Pearson provides a range of training and professional development events to support the introduction, delivery, assessment and administration of BTEC International Level 2 qualifications. These sector-specific events, developed and delivered by specialists, are available both face to face and online.

'Getting Ready to Teach'

These events are designed to get teachers ready for delivery of the BTEC International Level 2 qualifications. They include an overview of qualification structures, planning and preparation for internal assessment, and quality assurance.

Teaching and learning

Beyond the 'Getting Ready to Teach' professional development events, there are opportunities for teachers to attend sector- and role-specific events. These events are designed to connect practice to theory; they provide teacher support and networking opportunities with delivery, learning and assessment methodology.

Details of our training and professional development programme can be found on our website.

Appendix 1: Transferable employability skills

The need for transferable skills

In recent years, higher-education institutions and employers have consistently flagged the need for learners to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

The Organisation for Economic Co-operation and Development (OECD) defines skills, or competencies, as 'the bundle of knowledge, attributes and capacities that can be learned and that enable individuals to successfully and consistently perform an activity or task and can be built upon and extended through learning'.^[1]

To support the design of our qualifications, the Pearson Research Team selected and evaluated seven global 21st-century skills frameworks. Following on from this process, we identified the National Research Council's (NRC) framework^[2] as the most evidence-based and robust skills framework, and have used this as a basis for our adapted skills framework.

The framework includes cognitive, intrapersonal skills and interpersonal skills.

The NRC framework is included alongside literacy and numeracy skills.



The skills have been interpreted for this specification to ensure that they are appropriate for the subject. All of the skills listed are evident or accessible in the teaching, learning and/or assessment of the qualifications. Some skills are directly assessed. Pearson materials will support you in identifying these skills and in developing these skills in learners.

The table overleaf sets out the framework and gives an indication of the skills that can be found in BTEC International Level 2 in Construction, it indicates the interpretation of the skills in this area. A full interpretation of each skill, with mapping to show opportunities for learner development, is given on the subject pages of our website: <http://qualifications.pearson.com>.

¹ OECD – *Better Skills, Better Jobs, Better Lives* (OECD Publishing, 2012)

² Koenig, J. A. (2011) *Assessing 21st Century Skills: Summary of a Workshop* (National Academies Press, 2011)

Cognitive skills	Cognitive processes and strategies	Critical thinking Problem solving Analysis Reasoning/argumentation Interpretation Decision making Adaptive learning Executive function
	Creativity	Creativity Innovation
Intrapersonal skills	Intellectual openness	Adaptability Personal and social responsibility Continuous learning Intellectual interest and curiosity
	Work ethic/ conscientiousness	Initiative Self-direction Responsibility Perseverance Productivity Self-regulation (metacognition, forethought, reflection) Ethics Integrity
	Positive core self-evaluation	Self-monitoring/ self-evaluation/ self-reinforcement
Interpersonal skills	Teamwork and collaboration	Communication Collaboration Teamwork Cooperation Empathy/perspective taking Negotiation
	Leadership	Responsibility Assertive communication Self-presentation

Developing the ability to make a persuasive case in the fields of construction, civil engineering and building services, supporting one or more arguments, including the ability to create a balanced and evaluated argument.

Taking responsibility for finding and correcting errors in construction plans and mathematical calculations.

Advocating the position of another in an oral presentation.

Appendix 2: Glossary of terms used

This is a summary of the key terms used to define the requirements in the units.

Term	Definition
Explore	Learners apply their skills and/or knowledge to practical testing or trialling.
Examine	Learners are expected to select and apply knowledge to less familiar contexts.
Explain	Learners' work shows clear details and gives reasons and/or evidence to support an opinion, view or argument. It could show how conclusions are drawn.
Investigate	Learners' work tests the following through practical exploration: <ul style="list-style-type: none"> · qualities of materials · techniques · processes or contexts.
Understand	Learners perceive the intended meaning of (words, a language, or speaker).

This is a key summary of the types of evidence used for BTEC International Level 2 qualifications.

Type of evidence	Definition and purpose
Case study	A specific example to which all learners must select and apply knowledge. Used to show application to a realistic context where direct experience cannot be gained.
Individual project	A self-directed, large-scale activity requiring planning, research, exploration, outcome and review. Used to show self-management, project management and/or deep learning, including synopticity.
Development log	A record kept by the learner to show the process of development. Used to show method, self-management and skill development.

For information about Pearson Qualifications, including Pearson Edexcel and BTEC qualifications visit qualifications.pearson.com

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