

8042-02

Core in Construction and Building Services Engineering (Level 2)

C00/4414/0

Qualification Handbook

Version 1.3 – September 2023



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Version information

Version and publication date	Changes
v1 August 2021	Original Document
v1.1 January 2022	Support materials - website address updated (p14) Approach to assessment - Guided Discussion, and first availability dates for on-screen assessments updated (p17)
v1.2 June 2022	Qualification structure and Unit content - Unit titles 104 and 106 updated (p6, p59) Qualification outcome – Mark boundary for the on-screen assessment updated (p20)
v1.3 September 2023	- Terminology used for Mandatory units updated (removal of term “core” in reference to these) - Qualification Structure – GLH and TQT information updated - Unit 114 – Delivery outcomes (depth of content) 6.4 updated

Qualification purpose

Who is the qualification for?	The Core in Construction and Building Services Engineering (Level 2) provides a broad introduction to construction and the built environment. It has been developed for individuals working in or intending to work, in these sectors. This qualification is designed to be delivered as a post-16 qualification that will be a point of entry for learners wishing to begin their journey towards an occupational role in a construction or building services engineering trade. Its primary purpose is to be taken by learners who have secured a Construction or BSE Apprenticeship. This qualification will enable learners to go on to study a range of other Level 2 or 3 Construction and Building Services Engineering (BSE) courses relevant to their trade interest area. It may be taken either as a part-time programme of learning within an Apprenticeship framework; a full-time programme of learning that is usually delivered over one year; or for site operatives who want to widen their knowledge, understanding and skills in the sector more generally. It is suitable for: • learners aged 16+ currently working in or intending to work in the construction and built environment sector • site operatives who want to widen their knowledge, understanding and skills in the sector more generally.
What does the qualification cover?	It offers learners a broad introduction to, and develops their knowledge and understanding of, the construction and built environment sectors. All learners will complete six mandatory units which holistically cover an introduction to the construction and built environment sectors, employment and employability skills and health and safety. In addition to the mandatory units, learners will choose one trade area to spend additional time learning, which will include planning, performing and evaluating common tasks. The qualification equips learners with a broad, cross-cutting understanding of the sector, enabling them to make informed decisions about their own development.

What opportunities for progression are there?	On completion, the qualification will provide a broad foundational knowledge across the construction and built environment sector as well as introductory knowledge and skills in the chosen trade area. The qualification provides the knowledge, understanding and skills for learners to progress onto further study. This includes progression to the following qualifications: • City & Guilds Progression in Construction (Level 2) • EAL Progression in Building Services Engineering (Level 2) • City & Guilds Construction (Level 3) in a chosen trade area • EAL Building Services Engineering (Level 3) in a chosen trade area
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Who did we develop the qualification with?	The content has been developed by the Consortium ¹⁾ in conjunction with stakeholders, tutors, training providers and employers from across the sector.
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Qualification aims and objectives

The Core in Construction and Building Services Engineering (Level 2) qualification enables learners to begin to develop their:

- understanding of the buildings and structures that constitute the built environment and how they change, and have changed, over time
- understanding of the trades, roles and careers in the construction and built environment sector
- understanding of the life cycle of buildings and structures in the built environment and the associated principles and processes at each stage
- understanding of social, economic and environmental sustainability as appropriate to construction and the built environment
- knowledge of emerging technologies in the construction and built environment sector
- employability skills and their understanding of how these are relevant to, and important in, the workplace in the construction and built environment sector
- knowledge of and ability to apply the principles of working in ways which protect health, safety, well-being and the environment
- knowledge, skills and understanding required in planning, performing and evaluating common practical tasks in a chosen trade within the construction and built environment sector.

1) The Consortium consists of City & Guilds Limited and Excellence, Achievement and Learning (EAL) who worked jointly to develop and deliver all of the qualifications in the Construction and BSE suite.

Qualification structure

Rules of combination

To achieve the **Core in Construction and Building Services Engineering (Level 2)** learners must undertake:

- **6 mandatory units (101-106) and**
- **1 optional trade specific unit (107-116)**

achieving a Pass outcome in the three assessment methods, totalling 365-373 GLH depending on the trade specific unit chosen.

Unit	Unit title	GLH
Mandatory units		
<i>All units to be achieved from this group</i>		
101	Introduction to the Built Environment	15
102	Introduction to the Trades in the Construction and Built Environment Sector	30
103	Introduction to the Built Environment Life Cycle	55
104	Employability in the Construction and Built Environment Sector	30
105	Protecting Health, Safety and the Environment when working in the Construction and Built Environment Sector	48
106	Introduction to Emerging Technologies in the Construction and Built Environment Sector	20
Trade specific units		
<i>1 unit to be achieved from this group</i>		
107	Working with brick, block and stone	140
108	Wood occupations	140
109	Plastering and interior systems	140

Unit	Unit title	GLH
110	Decorative finishing and industrial painting occupations	140
111	Roofing occupations	140
112	Construction operations and civil engineering operations	140
113	Plumbing, heating and ventilation	140
114	Electrotechnical systems and equipment	140
115	Plant operations	140
116	Wall and floor tiling	140
Mandatory assessment across all units		
	<i>Assessment</i>	27-35
Total GLH		365-373
Average GLH		369

Guided Learning Hours (GLH) and Total Qualification Time (TQT)

Guided Learning Hours (GLH) gives an indication to centres of the amount of supervised learning and assessment that is required to deliver a unit and can be used for planning purposes.

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and undertaking some formative assessment activities.

Credit is calculated using a formula that equates to the TQT value divided by 10.

The TQT for this qualification is specified below.

Qualification	TQT	Credits
Core in Construction and Building Services Engineering (Level 2)	410	41

Centre requirements

This qualification will require centre and qualification approval. This will include desk-based assessment.

Centre approval is based upon an organisation's ability to meet the centre approval criteria. The approval for this qualification can be found detailed in the following documents:

- City & Guilds Centre Manual
- City & Guilds Our Quality Assurance Requirements
- Quality Assurance Model.

These documents can be accessed via City & Guilds Centre Document Library

<https://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library>

Prospective centres will be advised to seek centre and qualification approval, as appropriate, prior to starting to deliver the qualification.

City & Guilds aims to provide the centre and qualification approval decision within 30 working days of the submission of the completed application, with four possible outcomes:

- Centre approval and qualification approval granted
- Centre approval and qualification approval granted subject to action plan
- Centre approval and qualification approval withheld subject to action plan
- Centre approval and qualification approval denied.

Centre and qualification approval are deemed to have been granted when City & Guilds confirms the status in writing to the centre, and not before.

Centres will be required to apply for approval for this qualification and to meet the specific centre requirements outlined in this document related to delivery staff and assessor competence. These requirements will be checked and monitored as part of the qualification approval process and on-going monitoring of this qualification.

Registration, results issuing and certification

Please consult City & Guilds website for details on qualification registration and certification processes, timelines and procedures.

Centre staffing

Assessor requirements

Assessors of this qualification must:

- be occupationally competent; this means that each assessor must be capable of carrying out the full requirements of the trade area they are assessing to at least the same level. Occupational competence means that they are also occupationally knowledgeable. This could be verified by a combination of:
 - Curriculum vitae and employer endorsements or references
 - Possession of a relevant NVQ/SVQ, or vocationally related qualification
 - Membership of, or recognition by, a relevant professional body.
- maintain their occupational competence through relevant and clearly demonstrable continuing learning and professional development
- hold or be working towards (registered before carrying out any assessments) or have achieved the following units:
 - Understanding the Principles and Practices of Assessment*
 - Assess vocational skills, knowledge and understanding*

and continue to practice to that standard.

* Legacy Qualifications (D32/D32/D34, A1 and V1) will be accepted

Where assessors have legacy assessor qualifications, they must demonstrate that they are assessing in line with current assessment standards or another suitable qualification equivalent/alternative in the assessment of work-based performance. This must be agreed in advance with the centre's External Quality Assurer (EQA).

City & Guilds also accepts alternative nationally accredited assessor qualifications. A comprehensive list of these are available on the qualification webpage (<https://www.skillsforwales.wales/>).

Where working towards assessor qualifications, there must be a countersigning arrangement in place from a qualified assessor from the same or related occupational area.

Quality assurance

Internal Quality Assurance

The focus of internal quality assurance for this qualification is:

- the quality assurance of assessment procedures, including standardisation of assessment practice across different assessors within the centre
- internal standardisation of learner marks awarded for the Practical Project and Guided Discussion.

All centres approved to deliver this qualification must have robust internal quality assurance processes in place. This will help ensure that Internal Quality Assurance procedures:

- provide accuracy and consistency between Assessors in the use and interpretation of the guidance in the qualification and/or assessment documentation
- are efficient and cost effective.

Internal quality assurance evidence will be scrutinised as part of City & Guilds external quality assurance activities. Centres will be expected to retain evidence in-line with the requirements of City & Guilds' centre manual, and should be retained for a minimum of three years.

Internal Quality Assurers

The centre must provide City & Guilds with the details of personnel who they plan to undertake Internal Quality Assurance, so that they can be approved prior to them carrying out this role. Prior to the first assessments taking place, Internal Quality Assurer's (IQAs) must also complete City & Guilds training. This is to ensure the reliability of assessment at centres over time.

IQAs must:

- prepare for and participate in relevant City & Guilds meetings and events, such as induction, Continuing Professional Development (CPD)/training and standardisation events, and ensure any personal action/improvement plans are achieved, within agreed timescales and to the required standards
 - have a minimum level of occupational experience evidenced by having a building services engineering/construction related qualification or proven sector competence/experience at least equivalent to the level of the qualification, to enable them to conduct their role as an IQA. This evidence is quality assured by City & Guilds
 - be working towards (registered before completing any quality assurance activity), or have achieved the following units:
 - Understanding the Principles and Practices of Internally Assuring the Quality of Assessment*
 - Internally Assure the Quality of Assessment*
- * Legacy Qualifications (D32/D32/D34, A1 and V1) will be accepted
- be able to demonstrate evidence of being up to date with the relevant trade/industry. This can be evidenced, for example, by either accessing trade publications, undertaking courses of learning, attending networking events relevant to this qualification and/or attending industry events.

The IQA has a pivotal role in ensuring that centre-marked assessment is standardised. They should work with Assessors to ensure that the correct procedures are always being followed and ensure that assessment decisions taken by different assessors are consistent, fair and reliable. Key activities will include:

- meeting with assessors (individually and collectively) throughout the course to discuss quality assurance and standardisation issues and provide support and guidance where needed
- observing assessors and giving them feedback to help improve their assessment technique
- sampling evidence across different cohorts to ensure that appropriate standards have been met
- arranging cross-marking of assessments to compare results and agree benchmarks in line with City & Guilds training.

City & Guilds will provide guidance to centre IQAs throughout the change management process.

External Quality Assurance

The Practical Project and Guided Discussion must be internally assessed and externally verified. Quality assurance of internal assessment will be externally verified by our team of technically competent, External Quality Assurers (EQAs). EQAs are inducted, trained and regularly updated on changes to qualifications, ensuring a standardised approach. Thorough vetting ensures required knowledge, including attainment of EQA Training Assessment and Quality Assurance (TAQA) qualifications. All Building Services Engineering (BSE) and Construction EQAs will be briefed on the Sector Review including the new qualification suite. Our EQAs follow robust verification processes. They monitor centres' assessment systems, practice and outcomes in line with regulatory requirements. Their sampling strategies are based on 'CAMERA' (ensuring a representative sample of Candidates, Assessors, Methods of assessment, Evidence, Records, Assessment sites).

City & Guilds will:

- carry out necessary quality assurance of this assessment which can include direct observation, assessment sampling, and feedback from learners
- have a robust appeals procedure in place for learners.

External Quality Assurers

External Quality Assurers (EQAs) must:

- be accountable to City & Guilds
- have achieved or be working towards the TAQA award have achieved V2 or D35 and possess CPD evidence of practicing to the TAQA Standards
- and
- demonstrate an understanding of the assessment process
- have no connections with the assessment centre, in order to maintain objectivity

- have sufficient and relevant technical/occupational understanding in the qualification(s)/unit(s) being externally quality assured
- be able to provide centres with advice and guidance on assessment and internal quality assurance procedures.

They must be able to demonstrate evidence of being up to date with the relevant trade/industry. This can be evidenced, for example, by either accessing trade publications, undertaking courses of learning, attending networking events relevant to this qualification and/or attending industry events.

City & Guilds will:

- carry out necessary quality assurance of the assessment process which can include direct observation, assessment sampling, and feedback from learners
- have a robust appeals procedure in place for learners.

Roles, responsibilities and Quality Assurance

Internal Assessor profile

The centre must provide City & Guilds with the details of personnel who they plan to undertake assessment, so that they can be approved prior to them carrying out this role. Prior to the first assessments taking place, assessors must also complete City & Guilds training. This is to ensure the reliability of assessment at centres over time.

Assessors must be working towards or have achieved a relevant recognised assessor qualification such as a Level 3 Certificate in Assessing Vocational Achievement **and** continue to practice to that standard. Assessors who hold earlier qualifications (D32 or D33 or TQFE/TQSE) must have CPD evidence to the most current standards.

Assessors must be occupationally competent. Evidence which supports this is by the assessor holding a relevant NVQ or equivalent* to the full occupational competence threshold of the trade and/or having registration with a relevant trade body or having appropriate recognition which clearly evidences the assessor as competent in the trade.

*Assessors who qualified before NVQs were developed should provide evidence of how they are occupationally competent (such as through a CV or CPD Log together with any relevant references).

Internal Assessor requirements

Internal Assessors must:

- carry out and document assessment in line with City & Guilds and regulatory arrangements including:
 - acting in a professional and courteous manner at all times when conducting the assessment
 - marking the assessments, in accordance with marking criteria.
- maintain a knowledge of assessment policies and procedures
- maintain and document CPD (to be submitted on request)

- understand the sector, the qualification, and the assessment requirements
- be occupationally competent
- produce clear, accurate and concise documentation and relevant records (written and electronic), and ensure they are controlled and administered in accordance with City & Guilds's procedures
- make robust assessment decisions
- handle relevant information in accordance with GDPR requirements
- prepare for and participate in relevant City & Guilds meetings and events – such as induction, CPD/training and standardisation events, and ensure any personal action/improvement plans are achieved within agreed timescales and to required standards
- report to the IQA any suspicion of malpractice or maladministration, including academic misconduct
- declare any conflicts of interest (such as between the assessor and the learner)
- provide access to information and records when requested
- complete and submit all reports within specified timeframes.

External associates/appointees

Associates/appointees are the terms adopted by City & Guilds to refer to individuals appointed by City & Guilds or EAL to undertake specific roles on their behalf, for example, External Quality Assurers (EQAs).

There are criteria set by City & Guilds to ensure that all associates/appointees have the right occupational knowledge, experience and skills to perform the specific role.

City & Guilds will ensure that all associates/appointees undertaking a quality assurance role in centre approval, qualification approval and assessment decisions are trained, appropriately qualified and occupationally competent. Training and attendance at standardisation events is mandatory.

All associates/appointees are performance managed by staff within City & Guilds. If concerns are identified with an individual, each City & Guilds partner will take corrective action in line with organisational policies, which may result in the requirement of improvement actions and close monitoring or further actions as needed.

City & Guilds will ensure that sufficient bilingual associates/appointees are recruited to meet the needs of Welsh-medium centres and learners. The level of quality assurance activity will be consistent across provision in both English and Welsh mediums. Provision will be made for monitoring and standardisation to take place for both languages.

Welsh context

For individuals who have not previously conducted assessment activities in Wales, it is suggested that having an awareness of Welsh language and an understanding of Welsh culture, policy and context would be beneficial to support their roles.

Continuing Professional Development

Centres are expected to support their staff in ensuring that their knowledge and competence in the occupational area is current and of best practice in delivery, mentoring, training, assessment and quality assurance and that it takes account of any national or legislative developments.

Delivering the qualification

Learner entry requirements

City & Guilds does not set entry requirements for this qualification. However, centres must ensure that learners have the potential and opportunity to gain the qualification successfully.

Entries for the qualification can be made via the Walled Garden, see the City & Guilds website for further details.

Age restrictions

City & Guilds cannot accept any registrations for learners under 16 years of age as this qualification is not approved for those under 16.

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific training needs
- support and guidance they may need when working towards their qualification
- any units they have already completed, or credit they have accumulated which is relevant to the qualification
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the learner fully understands the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for this qualification:

Description	How to access
Assessment Pack	https://www.skillsforwales.wales/qualifications

Quality assurance of internal assessment arrangements

External Quality Assurance processes are in place for checking the validity and reliability of assessment decisions made by centre staff, as appropriate to this qualification.

The assessment will be internally assessed and subject to risk-based monitoring and sampling by EQAs to ensure the consistency and validity of centre assessment decisions. Quality assurance activities will be undertaken by appropriately qualified and trained assessment associates. In all instances of sampling for quality assurance purposes, formal written feedback will be provided by City & Guilds.

Significant non-compliance or areas of concern identified during external monitoring will be subject to investigation by City & Guilds. As a result of this activity appropriate improvement actions and/or sanctions may be put in place. In some instances, investigations may result in de-registration for the centre(s) in question.

Internal appeal

Centres must have an internal process in place for learners to appeal the marking of internally marked assessments. The internal process must include learners being informed of the results the centre has given for internally assessed components, as they will need these to make the decision about whether or not to appeal.

Malpractice

Please refer to the City & Guilds guidance notes *Managing cases of suspected malpractice in examinations and assessments*. This document sets out the procedures to be followed in identifying and reporting malpractice by learners and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of learner and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of learner malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another learner (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (e.g. disqualification from assessment) will be applied.

Please refer to the form in the document *Managing cases of suspected malpractice in examinations and assessments*.

Access arrangements and special consideration

Access arrangements are adjustments that allow learners with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before assessment takes place.

It is the responsibility of the centre to ensure at the start of a programme of learning that learners will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds* for more information. Both are available on the [City & Guilds website](#).

Special consideration

We can give special consideration to learners who have had a temporary illness, injury or indisposition at the time of assessment.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is available on the [City & Guilds website](#).

Summary of assessment

The **Core in Construction and Building Services Engineering (Level 2)** is assessed using 3 assessment methods:

Assessment type	Approach to assessment
On-Screen Assessment	Externally-set, externally-marked
Practical Project	Externally-set, internally-marked
Guided Discussion	Internally-set, internally-marked

An assessment pack detailing the requirements of the assessment can be downloaded from the [Skills for Wales website](#).

Details of coverage of each assessment can be found in the assessment specifications within the Assessment Pack.

Assessment timings and phasing

The following must be applied to the assessment of this qualification:

- all units must be undertaken and related requirements must be completed and assessed within the learner's period of registration.

Assessments can be taken on-demand, centres must ensure that learners have undertaken all required learning and are adequately prepared to undertake each assessment.

Learners must have completed the Practical Project assessment prior to undertaking the Guided Discussion assessment.

Result Release

On-screen assessment

The On-screen assessment is auto-marked and results will be received by the centre the same day the assessment is completed. A result release process will be followed by City & Guilds when new assessment versions are released.

Practical Project

The Practical Project is internally marked and externally verified. Provisional marks awarded following internal assessment inform whether a provisional Pass outcome has been achieved using the marking and outcome tables provided in the Assessment Pack. A provisional outcome is then submitted to City & Guilds via the Walled Garden.

Guided Discussion

The Guided Discussion is internally marked and externally verified. Provisional marks awarded following internal assessment inform whether a provisional Pass outcome has been achieved using the marking and outcome tables provided in the Assessment Pack. A provisional outcome is then submitted to City & Guilds via the Walled Garden.

Overall qualification results

Provisional outcomes for the Practical Project and Guided Discussion must be provided to learners within one week of completion of each assessment. Guidance should be given around the provisional nature of these results, with recognition that they will undergo internal and external quality assurance activities. Final qualification outcome will be issued by City & Guilds.

Centres will be notified of the final qualification outcome following completion of external quality assurance activities. This notification will be within eight weeks of centre submission of learner results for both the Practical Project and Guided Discussion (following successful completion of the On-screen assessment). More information on this process and timings can be found in the Introduction to Working with City & Guilds - centre administration guide for construction and building services engineering qualifications in Wales.

Resubmission/re-sit of assessment

If the learner fails to successfully achieve a Pass outcome in any of the assessments, they are permitted to re-sit/resubmit.

When re-sitting/resubmitting, learners can achieve the full range of marks available.

If a learner is required to re-sit or resubmit any of the assessments, appropriate feedback and support must be provided to enable the learner to do so within an appropriate time frame. If a learner does not meet the appropriate level required in the re-sit/resubmission, the centre should either:

- arrange additional support for the learner prior to any re-sit or resubmission
- or
- inform the learner of the right to appeal.

Centres must record any actions taken and/or any additional support given to the learner. There will be no limit on the number of re-sits or resubmissions which can take place.

For further information on the approach to resubmitting/re-sitting any specific assessments, please see information within the Assessment Pack.

Qualification outcome

This qualification is **Pass, Fail**.

Learners must achieve a Pass outcome in each assessment component to Pass the qualification.

Assessment Marking

On-Screen Test

The table below indicates the Pass/Fail threshold for the on-screen assessment, this may vary between versions of this assessment.

Mark boundary	Assessment Outcome
22 - 45	Pass
0 - 21	Fail

Practical Project

Mark boundary	Assessment Outcome
30 - 81	Pass
0 - 29	Fail

Guided Discussion

Mark boundary	Assessment Outcome
3 - 9	Pass
0	Fail

Content Key

The information below aims to provide an overview of how unit content is structured and how the areas of content relate to each other as well as qualification delivery and assessment.

Learning outcomes

Learning outcomes group together chunks of related practical skills and/or knowledge and are presented as the result of the learning process, i.e. what learners must understand or be able to do following teaching and learning. All learning outcomes are supported by a number of assessment criteria. In the example below, this learning outcome is about the different processes for stacking, storing and preparing.

Learning outcome:

2. Understand the processes of stacking, storing and preparing materials for building brick, block and stone walls.

Assessment criteria

Assessment criteria break down the learning outcome into smaller areas to be covered, these criteria are what will be assessed in connection with the learning outcome. In the example below, assessment criteria 2.1 is about the reasons for stacking and storing materials, which has been written and will be assessed against the learning outcome.

Criteria

2.1 Reasons for stacking and storing materials.

Range

Range contains information about the breadth required for a specific assessment criterion, for example, the actual reasons for stacking and storing materials. The range is not an exhaustive list, there may be other examples that could fit within that topic area, however those that are listed in the range are key for the delivery of the unit content – **all elements listed in the range must be covered as part of the delivery of the unit.**

Range:

Protection, efficiency, security.

Depth of content

Depth of content outlines the depth of coverage that needs to be covered. This allows the teaching to be focused at the right level in order for the learner to be ready for assessment. For example, 'learners should recognise the reasons' highlights that learners need to have some understanding of the 'how' or 'why' in relation to the range.

Delivery outcomes (depth of content)

2.1 Learners will recognise the reasons for **storing** materials prior to use to protect them from the weather, damage, and theft. Learners will also recognise the reasons for **stacking and storing** materials for efficiency in relation to **preparing** for work.

Delivery Guidance

The following definitions are used for specific terms used within the content of this qualification.

Modern buildings and construction

Buildings constructed using impermeable materials and incorporating barriers to external moisture, such as cavities, rain-screens, damp-proof courses, vapour barriers, and membranes. Often reliant upon mechanical extraction to remove water vapour formed by the activities of building occupants.

Historic buildings and structures

May be of traditional or modern construction. Often given statutory protection by being listed as buildings of special architectural or historic interest or scheduled as monuments. May also be protected by being locally listed or by being within a conservation area or World Heritage Site.

Repurposing

Adapting and modifying redundant buildings to extend the life of building or structure by investing in regeneration and repurposing to meet the needs of the local community.

Unit Content

Unit 101: Introduction to the Built Environment

Level: 2

GLH: 15

What is this unit about?

The purpose of this unit is for learners to recognise the different types and purposes of buildings from pre-1919 to the 21st century. The unit will also explore the interaction between the infrastructure and the modern working and living environment.

Learners will develop their knowledge and understanding of:

- The types and purpose of domestic, commercial, industrial and public buildings within the built environment
- Key design areas within traditional and heritage buildings
- The main design changes within traditional, commercial, industrial and public buildings within the built environment
- The main types of infrastructure and their purpose within the built environment.

Learners may be introduced to this unit by asking themselves questions such as:

- How have buildings changed over time?
- What are the different types of buildings within the built environment?
- What makes up the infrastructure within the built environment?

Learning outcome:

1. Understand the types and purposes of buildings in the built environment

Criteria

1.1 Types of buildings in the built environment.

Range: types, design features, purpose, differences.

1.2 Key construction design areas and changes over time.

Range: Traditional and modern forms of construction, historic buildings.

1.3 The main cultural requirements for different buildings and structures.

Range: religious, civic, arts.

1.4 Societal requirements for communities.

Range: Infrastructure and transport links; local development plan; purpose of building regulations.

Delivery outcomes (depth of content)

1.1 Learners will know the different types of buildings in the built environment, their differences, purpose and key design features:

Domestic: Bungalow, dormer bungalow, semi-detached, detached, terraced, high-rise apartments, chalet.

Public: Libraries, police stations, courts and prisons, schools, colleges and universities, hospitals, local and central government, places of worship, workmen's institutes, railway stations.

1.2 Learners will understand the main difference between traditional solid wall construction and modern forms of construction, including cavity wall. Learners will know the definitions of traditional and historic buildings and structures and understand how building design and construction materials and techniques have changed over time.

Common key design features:

Up to the mid-20th century:

- Often built of stone
- Brick or timber framing
- Slate, stone tiles or corrugated iron roofs.

After mid-20th century:

- Mainly steel frame, glass and concrete
- Large open spaces, internally flexible
- Driven by transport networks
- Newly constructed out of town
- Generally funded by private enterprise.

Learners will recognise the changes made over time to public buildings in relation to key design areas:

Earlier design (up to mid-20th century): Statement buildings, ornate, classical or gothic in design, funded by local/central government or philanthropists.

Modern design (post mid-20th century): Functional over aesthetics.

Future design (21st century): Renewable energy sources and use of sustainable low-carbon materials.

Commercial and industrial:

- Retail (from high street to shopping centres)
- Banks and other financial institutions
- Offices (more centralised in blocks)
- Leisure (greater number, more diverse, multi-purpose, centralised and strategically placed)
- Warehouse (expanded and increased in size)
- Factory (moved to designated industrial parks, connected to supply chains)
- Agricultural (scale increased, giant greenhouses, serving country and internationally from community, redundant farm buildings due to changes in agriculture practice and increased equipment size, financially unviable, opportunities for sensitive change of use).

1.3 Learners will understand how a range of cultural needs (religious, civic, the arts) can affect the design of a building, in terms of aesthetics, shapes, light and space.

1.4 Learners will understand how communities' needs for accessible, practical, safe and secure communities are met through the following:

- Infrastructure and transport links: planning of new developments to ensure social and cultural needs are met and linked together
- Local development plan: town planning (segregation of commercial, industrial, domestic)
- Purpose of the Building regulations.

Learning outcome:

2. Know the different types of structures in the built environment

Criteria

2.1 Know the types of infrastructure and their purpose.

Range: Highways, bridges, tunnels, dams, viaducts, canal and waterway structures, quays, docks and piers, towers, transport networks, service distribution, flood and coastal defences and renewable energy.

Delivery outcomes (depth of content)

2.1 Learners will know the types of infrastructure, features and their purpose in relation to civil engineering projects:

- Highways
 - M ways
 - A/ Trunk roads
 - B roads
 - Cycle paths.
- Bridges - arch, beam, truss, cantilever, suspension bridges
- Viaducts
- Tunnels - cut and cover, bored, immersed tube
- Towers - pylons and telecommunication towers
- Transport infrastructure - rail, road, air, water
- Service distribution - gas pipe, electric cable, power stations, drainage, reservoirs
- Flood and coastal defences
 - Dams
 - Temporary catchment area - floodplains
 - River defences - levees, bunds, weirs
 - Moveable gates and barriers
 - Coastal defences - groynes, sea walls, revetments, gabions.
- Canal and waterway structures
- Quays, docks and piers
- Renewable energy - wind farm, wave, biomass, solar farm, hydroelectric.

Learners will know that structures used in the built environment change over time and will know basic ways in which they have changed.

Unit 102: Introduction to the Trades in the Construction and Built Environment Sector

Level: 2

GLH: 30

What is this unit about?

The purpose of this unit is for learners to know the range of trades available within the construction and built environment sector and how they interact within a construction project. Learners will know the skills required to carry out traditional and modern construction practices, as well as understanding the materials used to carry out these tasks.

Learners will develop their knowledge of:

- Trowel occupations
- Wood occupations
- Plastering
- Decorative finishing and industrial painting occupations
- Roofing occupations
- Construction and civil engineering operations
- Electrotechnical installations
- Plumbing, heating and ventilation
- Gas installation engineering
- Refrigeration and air conditioning.

Learners may be introduced to this unit by asking themselves questions such as:

- What is the difference between construction and building service trades?
- What skills will I need/develop to work within the construction and built environment sector?
- What traditional techniques could I use in the construction industry today?

Learning outcome:

1. Know the trades in the construction and built environment sector

Criteria

1.1 The main trades in the construction industry.

Range: Trades, roles, activities associated with, career paths.

1.2 The main trades in the building services industry.

Range: Trades, roles, activities associated with, career paths.

Delivery outcomes (depth of content)

1.1 Learners will know the main activities associated with the following construction trades, as well as the different roles and career paths associated with each trade:

- Trowel occupations: Brickwork, blockwork, stonemasonry
- Wood occupations: Structural carcassing, first fix, second fix, bespoke carpentry
- Plastering: internal solid, external rendering, dry lining, floor surfaces, fibrous
- Decorative finishing and industrial painting occupations: Painting, decorating, specialist effects, spraying
- Roofing occupations: waterproof coverings to flat and pitched roofs
- Construction and civil engineering operations: setting out, groundworks, paving, drainage.

1.2 Learners will know the main activities associated with the following BSE trades, as well as the different roles and career paths associated with each trade:

- Electrotechnical: first and second fix wiring installations
- Plumbing: first and second fix of hot and cold-water systems; domestic heating systems; surface and waste-water systems
- Gas installation engineering: service, repairs, maintains and installs gas appliances
- Heating and ventilation: install oil, gas, and renewable industrial heating systems, heating and ventilation systems.

Learning outcome:

2. Know the traditional skills used in construction and building services

Criteria

2.1 The main traditional skills used in construction and building services today.

Range: Marking out, cutting, installing, finishing.

2.2 Appropriate materials for use in traditional and historic buildings and structures.

Range: Heritage materials - qualities, uses, importance of.

Delivery outcomes (depth of content)

2.1 Learners will know the traditional hand skills still used in construction and building services today. Learners will know how these skills are used to complete a range of construction, maintenance and repair tasks, to include marking out, measuring, cutting and fitting of components:

- Marking out - measuring; calculating areas, volumes, linear
- Cutting - sheets, components (pipes, bricks, blocks, sheet materials)
- Installing - fixing timber, masonry, electrical, plumbing components, sheet materials
- Finishing - plasters, floor screeds, tiling, painting, jointing and pointing (brick and stone).

2.2 Learners will know the materials used in traditional construction methods and understand the importance of using the appropriate skills and materials when working with traditional and historic buildings and structures.

Learners will know the heritage materials suitable for tasks used in traditional and historic buildings and structures, and know their qualities and uses:

Lime plasters and renders, Timber lath backgrounds, Timber, Slate, Stone, Copper, Lead, Locally sourced materials.

Unit 103: Introduction to the Built Environment Life Cycle

Level: 2

GLH: 55

What is this unit about?

The purpose of this unit is for learners to develop an understanding of the implications and impacts a building has on the environment.

Learners will develop their knowledge and understanding of:

- The designing and planning of buildings and structures
- The main stages of the construction and the installation of services
- The maintenance of buildings, structures and installed services
- Repurposing of buildings and structures
- Demolition and deconstruction of buildings and structures
- Promotion of services in the construction and built environment sector.

Learners may be introduced to this unit by asking themselves questions such as:

- What impact does building a structure have on the local environment and its wildlife?
- What are the stages involved in constructing a building?
- How is a building maintained and adapted to suit changes in its use?
- What types of demolition exists in the construction industry?

Learning outcome:

1. Understand the design of buildings and structures

Criteria

1.1 Surveying.

Range: Purpose, basic principles, equipment.

1.2 The environmental considerations that impact on construction.

Range: Precautionary measures, preventive measures, rectifying at source, integration within the environment, polluter pays principle.

1.3 Sustainability.

Range: Principles of sustainability, the importance of sustainability, the impact of sustainable and unsustainable practices.

1.4 Designing waste out of projects.

Range: Planning, ordering, storage, standardised development projects.

1.5 Plans and documentation used in construction.

Range: Types of drawings and scales, schedules, specifications, hatchings and symbols.

Delivery outcomes (depth of content)

1.1 Learners will know the purposes of surveying in construction:

- Set out levels for roads, drains foundations
- Calculate areas and volumes of spoil
- Determine position and locations of buildings
- Calculate spacings and angles between buildings.

Learners will know the definitions/meanings of the basic principles:

- Transferring levels and datums
- Chain surveying
- Compass surveying
- Ordnance survey benchmarks
- Temporary benchmarks.

Learners will know the equipment used in surveying, as well as the basic characteristics and uses of each:

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- Theodolites
- Staffs
- Compasses
- Automatic levels
- Lasers
- Scanners.

1.2 Learners will understand the different ways that construction activities can impact the environment – through pollution/damage to the air, land and/or water on or around a construction site.

Learners will understand the environmental considerations that must be taken when undertaking construction work. This includes the use of precautionary and preventative measures to be taken to limit any negative environmental impacts.

Learners will understand the role of minimising environmental impact, through the concepts of rectifying and integration within the environment.

Learners will understand the responsibilities of construction organisations to limit their environmental impacts, and the accountability of their actions through the 'polluter pays' principle – enacted to make the party responsible for producing pollution, responsible for paying for the damage done to the natural environment.

1.3 Learners will understand principles of sustainability in the context of building and structure design and the impact of sustainable/unsustainable practices on the environment. Learners will understand key sustainable practices:

- Conservation of ecosystems
- Optimise site potential
- Conservation of biodiversity
- Optimise energy use
- Protect and conserve water
- Optimise building space and material use,

Learners will know the importance of a development which meets the needs of a current generation without compromising the ability of future generations to meet their own needs.

1.4 Learners will understand the importance of designing buildings and structures to incorporate commercially available sizes of materials within standardised development projects:

- Using more sustainable materials
- Protection from waste: phased deliveries, storage to prevent damage to reduce waste
- Recycling materials/offcuts and repurposing.

1.5 Learners will understand the plans and documentation used in construction to include schedules and specifications. This includes the purpose and scales of:

- Location drawings (block plans, site plans)
- Detailed drawings (including setting out rods)

- Assemble drawings
- Range drawings.

Learners will know the main drawing types and their uses:

- orthographic projections
- isometric
- perspective
- wiring diagrams.

Learners will know how to identify hatchings, symbols and abbreviations within the main drawings used.

Learning outcome:

2. Know the planning process

Criteria

2.1 Roles and responsibilities.

Range: Sources of information, official guidance and advice.

2.2 Primary planning legislation and regulations.

Range: Main types of consent or approval, types of permitted development, implications of breaching legislation and regulations.

2.3 Heritage protection.

Range: Types of heritage protection.

Delivery outcomes (depth of content)

2.1 Learners will know the differences between and the roles of the development control officer, built heritage conservation officer and building control officer (local authority or Approved Inspector)

2.2 Learners will know the main types of consent or approval and how these support permitted developments:

- Planning permissions (outline, reserved matters, full, discharge/variation of conditions)
- Building Regulations approval
- Listed building consent
- Conservation area consent
- Scheduled monument consent.

Learners will know the implications of breaching legislation and regulations:

- Enforcement
- Prosecution
- Demolition.

2.3 Learners will know the different types of heritage protection for buildings and structures:

- Listed building (Grade I, II* and II)
- Scheduled monument
- Conservation area
- World Heritage Site
- Local listing
- Ecclesiastical Exemption.

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Learning outcome:

3. Understand the stages of construction and the installation of services

Criteria

3.1 Building structure.

Range: substructures, superstructures, internal components.

3.2 Typical sequence of tasks used to construct a two-storey building.

Range: Sequence of work, trades associated with each task in the sequence.

3.3 Effective and productive working relationships between trades.

Range: Methods of communication during the planning and construction process, ways of working.

Delivery outcomes (depth of content)

3.1 Learners will understand the materials and features of each part of the building structure.

Substructures:

Foundations: raft, strip, pad, pile, trench blocks, Damp Proof Course (DPC).

Superstructures:

External walls: brick bonds, stone, block, lintels (traditional, modern), cills, insulation, brick ties.

Cladding materials: timber, metal, plastic.

Floors: solid ground floor, suspended timber floors, upper timber floors, block and beam.

Roofs: flat, gable, hips and valleys, traditional and trussed, roof coverings.

Straight flight and with turns stairs: quarter turn, half-turn, winders, closed and cut string.

Internal components:

Load bearing and non-load bearing walls, internal wall finishes (plaster, paints, and papers), decorative mouldings, sanitary fittings and drainage, fitting units and kitchens.

3.2 Learners will know the sequence of construction of a two-storey building. Learners will be able to identify the stage when different trades are involved within the construction process and will also be able to identify when there is the need for multiple trades involvement at set stages within the construction process:

- Ground works
- Excavations
- Foundations sub-structure
- Brickwork DPC height
- Ground floors
- External super structure
- Upper floor construction
- Roof construction

- First fixing (construction and building services)
- Internal wall finishing
- Second fixing (construction and building services)
- Commissioning and testing plumbing and electrical systems
- Internal finishings
- Snagging
- Telecommunications.

3.3 Learners will understand the different methods of communication used in the planning and construction process. They understand the importance of communication between trades and with third parties (e.g. customers, members of the public, planning authorities etc) to ensure effective and productive working relationships. They understand effective methods of developing and maintaining working relationships (respect, time management, housekeeping).

Learning outcome:

4. Know the methods of promoting the services offered within the construction and built environment sector

Criteria

4.1 Methods of marketing.

Range: Methods, business types.

4.2 The impact of successful marketing on businesses.

Range: Financial, reputation, forward planning.

Delivery outcomes (depth of content)

4.1 Learners will know different methods of marketing, including traditional and modern methods:

Traditional methods: Word of mouth, newspaper advertisements, flyers, phone books, radio.

Modern methods: Social media, website, TV.

Learners will know the benefits of different methods of marketing, and how these impact different business types.

4.2 Learners will know a range of ways in which successful marketing can positively impact on a business, particularly in relation to financial stability, reputation of the business and ability to forward plan:

- Expansion
- Diversifying
- Employing staff
- Investing in IT systems
- Investing in office upgrades
- Increased return for investors.

Learning outcome:

5. Know types of and purposes of maintenance of buildings, structures and installed services

Criteria

5.1 Types of servicing, maintenance schedules and repairs for construction and BSE trades.

Range: buildings, structures, services, tradespeople.

5.2 The purposes of servicing and maintenance.

Range: maintaining safety, maintaining security, extend serviceable life, reduce running costs, maintain fabric of the building.

Delivery outcomes (depth of content)

5.1 Learners will know the types of servicing and repairs required within the construction and BSE industry.

- Planned maintenance
- Unplanned maintenance
- Service plans (Gas safe, electrical testing, scheduled air condition purifying)
- Repair of buildings and structures (including repairs needed as a pre-cursor to other works, such as change of use and retrofit).

Learners will know the types of servicing and repairs each trade would be required to complete.

Construction trades:

Wood occupations, Trowel occupations, Plastering, Roofing, Civil Engineering, Painting and decorating.

BSE trades:

Plumbing, Heating and Ventilation, Electrical, Gas engineer.

5.2 Learners will know the purposes of servicing, repair and maintenance and the potential consequences of not undertaking these works.

Maintaining safety: carbon monoxide, gas leaks, electrocution.

Maintaining security: telecommunications, alarms, locking systems.

Extend serviceable life: boilers, fixed appliances, regular servicing to help reduce breakdowns.

Reduce running costs: to prevent breakdowns, maintain efficient energy usage.

Maintaining the fabric of the building: water-tightness, wear and tear.

Learning outcome:

6. Understand repurposing of buildings and structures

Criteria

6.1 Repurposing and reinstatement of buildings and structures.

Range: Definition, change of use, refurbishment, system upgrades.

6.2 Recycling and reuse.

Range: Benefits, importance of, traditional and historic materials.

Delivery outcomes (depth of content)

6.1 Learners will understand the different methods and reasons for repurposing and reinstatement of buildings and structures including:

Change of use:

- Commercial (including barns, corner shops, large shopping area to small retail units) to domestic
- Single use occupancy to multiple occupancy
- Cultural buildings (including churches) to domestic
- Cultural buildings to public and community use
- Flexible design
- Industrial to commercial (factories/warehouses to leisure centers)
- Industrial to domestic (river/dock side warehouses to flats).

Refurbishment: including electrics, heating.

System upgrades: including boilers, internet, alarm systems.

6.2 Learners will know the importance of:

- Protecting natural resources
- Reduced carbon emissions
- Recycling metals
- Architectural salvage
- Aggregates.

Learners will know the:

- Benefits including up-cycling materials
- Recycling benefits (of modern and traditional/historic) including utilising current materials, cost effective, reducing carbon footprint, protecting cultural heritage and sense of place
- Reuse of traditional and historic materials including salvaged bricks, timber, slate, stone.

Learning outcome:

7 Know the process for demolition and destruction of buildings and structures

Criteria

7.1 Requirements in decommissioning.

Range: Environmental impact, Health and safety.

7.2 Methods of demolition.

Range: Methods, selection, risks.

7.3 Demolition waste removal.

Range: Stages of demolition waste removal, importance of stages, environmental considerations, benefits.

Delivery outcomes (depth of content)

7.1 Learners will know the process for considering the environmental impact of decommissioning, to include use of risk assessments. Learners will know the Health and Safety requirements for decommissioning to include:

- Safety of operatives, public, surroundings
- Isolation of services
- Planned sequence of operations
- Risk assessments and method statements.

7.2 Learners will know the types of demolition:

Selective demolition, dismantling/ deconstruction, crane and wrecking ball, implosion, mechanical demolition, total demolition.

Learners will know the factors that affect the selection of different demolition method. Learners will know the risks associated with different demolition methods and how to mitigate against those risks.

Risks include: explosion, entrapment, crushing, inhalation of gasses and hazardous dusts, asbestosis.

7.3 Learners will know the stages of demolition waste removal, the importance of these stages and their benefits:

- Planning
- Site security
- Isolation of services
- Removal and disposal of hazardous waste
- Removing reusable materials
- Architectural salvage
- On site crushing of brick and stone to produce aggregates

- Recycling metal waste.

Learners will know the environmental considerations around demolition of buildings:

- Minimise impact of landfill
- Reduce carbon footprint
- Reduction in pollution of the environment.

Unit 104: Employability in the Construction and Built Environment Sector

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand construction and the built environment, what it takes to become part of the industry and to progress within it. Throughout the unit, learners will be introduced to the Building team and the many roles available when looking to develop a career pathway.

Learners will develop their knowledge, understanding and skills of:

- The routes into the sector and entry onto each
- Types of employment
- How the learner can find roles to apply for
- Progression routes in the trade environment including the different career pathways and educational opportunities
- The behaviours employers count as being essential
- The basic economics of business and how successful businesses are run.

Learners may be introduced to this unit by asking themselves questions such as:

- How can I build a career within the industry?
- What are the career opportunities in construction and the built environment?
- What skills and behaviours will I need to show in order for me to succeed in the industry?

Learning outcome:

1. Know employment options and opportunities

Criteria

- 1.1 Employment contracts available in the industry.

Range: contracts, differences.

- 1.2 Finding current job opportunities and apprenticeship vacancies in the industry.

Range: research types, work preparation, work readiness, CV building, interview preparation.

Delivery outcomes (depth of content)

- 1.1 Learners will know the types of contracts (apprenticeships, labourers, contract work, maintenance, self-employment and progression routes including management and supervisory positions) that are available in the sector and the differences between each.

- 1.2 Learners will know what is meant by work preparation and work readiness.

Learners will know the process of entering the industry including

- the use of different research tools and techniques to search for vacancies
- building a CV
- application and interviewing skills.

Learning outcome:

2. Know about employability skills

Criteria

2.1 Behaviours and work ethic.

Range: Positive behaviours, negative behaviours.

2.2 Problem-solving techniques.

Range: materials, tools, safety and environment.

2.3 Team working and interpersonal skills.

Range: individual contribution, team contribution, communication skills.

Delivery outcomes (depth of content)

2.1 Learners will know the standards and behaviours required for work and used to create a positive work ethic.

Learners will know positive and negative behaviours related to work, including behaviours related to timekeeping, attitude, personal presentation, flexibility.

2.2 Learners will know problem-solving techniques used in the workplace. They will know which techniques to use when solving problems relating to time awareness, spatial awareness and managing resources. They will know the considerations when working in different environments and how to solve problems when completing a range of tasks using different materials and tools, whilst maintaining the health and safety of themselves and others.

2.3 Learners will know how an individual's performance and behaviours affects the wider team and the overall outcomes. Learners will know the ways to communicate effectively (verbal, written, listening/following instructions) and politely to all members of the team and the public. They will know different ways to work with consideration for others.

Learning outcome:

3. Understand the basic principles of business

Criteria

3.1 Basic principles of business.

Range: income, expenditure, book-keeping, overheads, business growth.

3.2 The importance of productivity and reputation.

Range: quality, reputation.

3.3 The importance of customer service.

Range: positive customer service, consequences of non-compliance, expectations, causes of disruption.

3.4 The consequences of loss of business.

Range: effects of poor planning, effects of loss of business.

Delivery outcomes (depth of content)

3.1 Learners understand the difference between profit and loss in relation to income, expenditure and overheads. They should be able to identify typical overheads of a business and basic methods of book-keeping. They should be able to recognise benefits of networking for business growth.

3.2 Learners will be able to recognise the link between productivity and reputation and the importance of maintaining quality. Learners will be able to understand how maintaining a positive reputation will support new custom and contracts, staff retention and profit.

3.3 Learners will be able to understand the need for positive customer service at each stage of a business contract and the consequences of non-compliance. They should recognise positive ways of working by setting clear expectations with customers including planning and scheduling, clear pricing and invoicing structure. Learners will be able to identify causes of disruption to the general public from traffic issues, access and pollution.

Learners will know these terms:

- Initial engagement
- Pricing and quoting
- Scheduling
- Fulfilment of contract
- Transparency
- Quality of work
- Considerate construction

- Penalties.

3.4 Learners will understand the effects of poor planning and execution of work as per contract. Learners will be able to recognise how loss affects the overall business including:

- Loss of earnings
- Loss of assets
- Delay in further growth
- Redundancy of staff
- Credit score
- Late payment fees
- Bankruptcy and retention of staff.

Learning outcome:

4. Be able to use basic business and employability skills

Criteria

4.1 Basic research skills.

Range: internet searches, literary searches, working with others.

4.2 Basic calculations and invoicing.

Range: profit and loss calculations, calculating basic invoices.

4.3 Problem-solving.

Range: working with others, materials, tools, safety and environment.

Delivery outcomes (depth of content)

4.1 Learners will be able to undertake basic research for simple tasks (such as searching for job opportunities for different trade areas, identifying suitable and reliable sources of planning documents and proformas). Learners will use a range of tools and techniques, to include internet searches, literary searches, and working with stakeholders.

4.2 Learners will be able to undertake basic calculations using information provided to them. This includes the ability to calculate prime costs and use profit margins in order to determine profit/loss. Learners will be able to understand the information used in basic invoices and how invoice values are calculated.

4.3 Learners will be able to demonstrate use of basic problem-solving techniques when planning for a range of tasks, particularly in relation to time awareness, spatial awareness and managing resources. Learners work in ways that allow them to execute tasks using different materials and tools within an environment that considers the health and safety of themselves and others at all times.

Unit 105: Protecting Health, Safety and the Environment when working in the Construction and Built Environment Sector

Level: 2

GLH: 48

What is this unit about?

The purpose of this unit is for learners to gain an understanding of construction and the built environment and what it means to work with consideration for protecting the environment, as well as protecting the health and welfare of themselves and others.

- Learners will develop their knowledge, understanding and skills of:
- Legislation that controls health and safety
- How regulations control the way in which work is carried out
- Common safety regulations and sources of guidance and how these affect the learners as individuals as well as their supervisors, the client, the public and construction organisations.
- Principles of health and welfare in the workplace such as accident management, common risks they may be exposed
- Fundamental considerations in terms of their personal well-being including mental health, bullying within the workplace and substance abuse.

Learners will apply this knowledge to the construction environment and will be able to identify hazards, assess risk and suggest appropriate actions. Learners will be introduced to working with a range of work equipment and will be taught to safeguard themselves and others from potential risks.

- Learners may be introduced to this unit by asking themselves questions such as:
- What risks are there on a construction site?
- What does health and safety best practice look like?
- How can I best protect myself, others and the environment when working on-site?

Learning outcome:

1. Know workplace health and safety

Criteria

1.1 The importance of health and safety.

Range: personal safety, site safety, consequences of non-compliance.

1.2 Regulations.

Range: purpose of the regulation, consequence of non-compliance for the regulation, who is affected by the regulation.

1.3 Roles and Responsibilities.

Range: individual, employer, client, Health and Safety Executive (HSE).

Delivery outcome (depth of content)

1.1 Learners will know the importance of health and safety, both for themselves and others on site. Learners will know the potential consequences of poor health and safety practices including non-compliance. They should know site safety procedures including toolbox talks, inductions, safe access and egress.

1.2 Learners will be introduced to the following pieces of legislation and regulations:

- The Health and Safety at Work Act (HASAWA)
- Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)
- Control of Substances Hazardous to Health (COSHH)
- Provision and Use of Work Equipment Regulations (PUWER)
- Manual Handling Regulations
- Personal Protective Equipment (PPE) at Work Regulations
- Work at Height Regulations
- Control of Noise at Work Regulation
- Control of vibration at Work Regulations
- Electricity at Work Regulations
- Lifting Operations and Lifting Equipment Regulations (LOLER)
- Construction (Design and Management) Regulations (CDM)
- Approved Code of Practice (ACOP)
- HSE information.

Learners will know the purpose of each of the listed regulations, who is affected by the regulation and the range of potential consequences of non-compliance with the regulation.

1.3 Learners will know their personal responsibility towards working safely on-site and being able to recognise the role and responsibility of their employer. They will know types of poor practice and their responsibilities for reporting through the correct channels. Learners will know the role of the HSE and their responsibility in governing non-compliance through the issuing of improvement notices, prohibition notices and subsequent powers of prosecution. Learners will have an awareness of the responsibilities of the client and the architect under the CDM regulations.

Learning outcome:

2. Know health and welfare considerations for working on-site

Criteria

2.1 Accidents and injuries at work.

Range: common accidents and injuries, causes, consequences, responsibilities, prevention.

2.2 Reporting procedures.

Range: roles and responsibilities; accident reporting; procedures.

2.3 Personal welfare.

Range: personal hygiene, physical health, mental health, substance abuse.

2.4 Site welfare.

Range: responsibilities, facilities.

Delivery outcome (depth of content)

2.1 Learners will know the following accidents that are common in the industry and how they are caused:

Trips, slips and falls, hand arm vibration, noise, respiratory illness, dermatitis, muscular skeletal problems, electric shock, bone fractures, working at height, minor burns, cuts, splinters, manual handling injuries and fatalities.

Learners will know how these accidents cause injuries and the consequences they have on both the employee and the organisation. Learners will know ways to determine how to respond and the appropriate way to respond to accidents and injuries in relation to their responsibilities. Learners will know how prevention strategies are determined.

2.2 Learners will know the roles and responsibilities of a first aider including the completion of an accident book. Learners will know the responsibilities of accident reporting in relation to RIDDOR and the relevant advice and guidance that is available. Learners will know how to identify the accident reporting procedures and who to escalate the reporting of accidents and injuries to. Learners must know the responsibilities and duties for reporting accidents, near misses, hazards and risks and the level of competence in reporting and recording.

2.3 Learners will know the techniques and support available for them to stay well at work. They will know how to recognise the importance of maintaining their own well-being, both their physical health through correct manual handling techniques such as the correct kinetic lifting methods either by hand or mechanisation that would prevent strains and sprains to the operator. Learners will know the importance of looking after their mental health and who they should report any issues to. They will know behaviour that is not acceptable at work and be aware of the signs of bullying. They will know how to identify where bullying behaviour is occurring, the support available to those being bullied and the appropriate means for escalations and raising awareness of inappropriate behaviours. Learners will be able to

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recognise the standards for personal hygiene and presentation when at work. Learners will know the enforcement and zero tolerance of use and abuse of both alcohol and drugs and the consequences of use to the individual and wider organisations.

2.4 Learners will know the range of welfare facilities that must be made available to them by employers as per the relevant legislation (toilet and washing facilities, drying facilities, canteen).

Learning outcome:

3. Understand principles of risk management

Criteria

3.1 Terminology.

Range: accident, near miss, hazard, risk, competence.

3.2 Risk assessment process.

Range: purpose, risk assessment completion, hazard identification, risk rating, method statements, permits to work.

3.3 Protective Equipment.

Range: use, application.

3.4 Emergency procedures.

Range: exit signs, fire extinguishers, assembly points, roles and responsibilities.

3.5 Safety signs.

Range: categories, mandatory, prohibition, hazard, information signs, fire, safe condition.

Delivery outcome (depth of content)

3.1 Learners will know the range of terminology associated with managing risk and understand their definitions and uses.

3.2 Learners will understand the purpose of risk assessments, how they are used in industry and who is responsible for producing them. Learners will be able to understand the legal requirements and consequences of failing to carry out a risk assessment, to both the employee and the employer. Learners will be able to determine appropriate risk ratings for common hazards and risks found in the workplace. They will understand how risk is categorised and how its rating represents the severity of a risk. Learners will be able to recognise how a risk assessment would inform a method statement and/or permit to work. Learners will understand the need for method statements and how these are common practice and a necessity in industry. Learners will understand the procedure for managing risk: Plan the schedule; identify the possible hazards; identify who is at risk; rate the severity of the risk; input control measures.

3.3 Learners will know the common pieces of personal protective equipment (PPE) and respiratory protective equipment (RPE) and understand when they should be used, including:

- Footwear

- Pads
- Harness
- Suits
- Gloves
- High visibility clothing
- Eye protection
- Ear protection
- Head protection
- Respiratory protection.

3.4 Learners will know their roles and responsibilities and how to respond in-line with these within an emergency situation, to include raising the alarm, contacting emergency services, evacuation procedures and assembly points. Learners will be able to recognise the different fire extinguishers and their uses in relation to the fire triangle.

3.5 Learners will be able to identify the range of signs (mandatory, prohibition, hazard, information signs, fire, safe condition) used on site and how they are categorised.

Learning outcome:

4. Know the equipment and associated risks within the construction and built environment

Criteria

4.1 Access equipment and working at height.

Range: types of equipment, storage of equipment, hazards, implications.

4.2 Power tools.

Range: selection of power tools, risk identification, risk controls, maintenance.

4.3 Plant and machinery.

Range: vehicles, lifting equipment, fixed machines and dangers associated.

4.4 Risks in construction and the built environment.

Range: areas of risk when working, working with hazardous substances, storage of hazardous substances, unsafe buildings.

Delivery outcome (depth of content)

4.1 Learners will know the types of access equipment used in the industry including steps, ladders, mobile scaffold towers, platforms, roof ladders, fixed scaffolds, Mobile Elevated Work Platforms (MEWPs), assisted lifting, cranes, and the hazards associated with working at height including slips, trips and falls, falling objects, overreaching, inexperienced workers, and incorrect access equipment.

They will be able to identify the different uses of the equipment and their suitability for carrying out tasks on site.

Learners will know methods of storing equipment safely and correctly.

Learners will define the term 'working at height'.

Learners will recognise the safety implications of using assisted lifting/cranes in relation to common Health and Safety practices and keeping themselves safe at work.

4.2 Learners will be able to recognise the considerations when using various types of power tools and tooling including pre-use checks that need to be carried out, how to select the most appropriate tool for the job, the controls to manage risk and the maintenance requirements for power tools. Learners will identify the risks associated with the general use of electricity-powered tools along with associated safety considerations such as leads, transformers and RCDs. Learners will recognise the risks associated with battery, fuel and compressed air operated power tools.

4.3 Learners will know the range of hazard and warning signs and control risks associated with stationary and moving plant and machinery being used in construction and the built environment.

Learners will understand the safe distances and walkways required for plant use and operations. Learners will be aware of implications due to poor visibility of the operator.

4.4 Learners will be able to identify areas of work that have high levels of risk and how special measures are put into place for these areas:

- Working in confined spaces
- Working in and around both overhead and underground services such as gas or electricity
- Working in trenches
- Working in fragile areas.

Learners will be able to identify services in the ground and what actions should be taken upon finding these services.

Learners will know the implications of building unsafe buildings, structures or products, what is meant by danger to these buildings and structures and how to stay safe when they have identified them.

Learners will know the main techniques of identification, isolation, protection, commissioning and decommissioning of services.

Learners will be able to determine how substances (powder, chemical, gas and including asbestos) that are hazardous to health can cause damage to the body such as ingestion, injection and inhalation.

Learners will know how to safely store hazardous substances including combustible materials and chemicals.

Learning outcome:

5. Know the principles of environmental protection

Criteria

5.1 Waste management and disposal.

Range: Segregation, recycling, landfill, incineration, hazardous waste disposal, dust.

5.2 Pollution.

Range: Land contamination, air contamination, noise pollution, water course pollution.

Delivery outcome (depth of content)

5.1 Learners will know the different types of waste commonly found on site and know how it should be correctly segregated and safely disposed of or re-used/recycled, to include waste that would go to landfill or for incineration. Learners will know the requirements to leave the site tidy on completion, devoid of potential hazards for future users of the building. Learners will understand the importance of dust control throughout the construction process and implications.

5.2 Learners will know the key causes of different types (land, air, noise, water) of pollution within construction and the built environment. Learners will know the different types of air contamination including smoke, dust and fumes. Learners will know the correct ways of working which can limit and reduce pollution. Learners will be able to state how adhering to agreed principles make construction more considerate to the wider community.

Learning outcome:

6. Be able to apply waste management principles when working in the Construction and Built Environment sector

Criteria

6.1 Apply basic waste management and disposal practices.

Range: segregation, recycling, landfill, incineration, hazardous waste disposal, dust.

Delivery outcome (depth of content)

6.1 Learners will be able to correctly dispose of different types of waste commonly found on site. They will demonstrate how it should be correctly segregated and safely disposed of or re-used/recycled. Learners will demonstrate the ability to leave the site tidy on completion, devoid of potential hazards for future users of the building/site. Learners will demonstrate the importance of dust control throughout the construction process.

Unit 106: Introduction to Emerging Technologies in the Construction and Built Environment Sector

Level:	2
GLH:	20

What is this unit about?

The purpose of this unit is for learners to be introduced to the emerging technologies that are currently being used in the construction and built environment, their uses and how they benefit the industry. They will also be introduced to future technologies that are being introduced to construction and the built environment.

Learners will develop their knowledge and understanding of:

- Introduction to Building Information Modelling (BIM) and how it is used widely throughout the construction and built environment by a range of stakeholders including tradespeople, project managers and the end point user.

Learners may be introduced to this unit by asking themselves questions such as:

- How can technology be used within construction and the built environment?
- What are the advantages of embracing new technology?
- What are the emerging considerations of using new technology?

Learning outcome:

1. Know the use of Building Information Modelling (BIM) within construction and the built environment

Criteria

- 1.1 Introduction to BIM.

Range: principles, process, main stages, collaboration.

- 1.2 Key terminology.

Range: definitions of key terminology, place in the process.

Delivery outcomes (depth of content)

- 1.1 Learners will be able to recognise the 3D and 4D outputs from BIM in relation to planning, designing, constructing, managing buildings, infrastructures, collaboration.

- 1.2 Learners will know the definition and location in the BIM lifecycle of: Common Data Environment (CDE), soft landings, digital plan of work, Project Information Modelling (PIM), Asset Information Modelling (AIM), COBie, Employer's Information Requirements (EIR), BIM Execution Plan (BEP), BIM Protocol, employer within the supply chain.

Learning outcome:

2. Know about emerging technologies and materials

Criteria

2.1 Introduction to 3D printing.

Range: uses, benefits, limitations.

2.2 Introduction to immersive technologies.

Range: simulations, collaboration, proof of concept and planning.

2.3 Evolving materials.

Range: use, benefits, advantages.

Delivery outcomes (depth of content)

2.1 Learners will have a basic knowledge of the concepts of 3D printing including its uses, benefits and limitations in relation to planning, designing, modelling and constructing.

2.2 Learners will know the characteristics of, and how to differentiate between Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR). Learners will have an awareness of the uses of these technologies within construction and the built environment through simulation and collaborative environments to show proof of concept and planning.

2.3 Learners will know the benefits and advantages of new evolving materials and their uses, including buildings using:

- Graphene
- Surface coverings
- Ventilated building materials
- Liquid roof
- Transparent aluminum
- Self-healing concrete.

Learning outcome:

3. Know about off-site construction

Criteria

3.1 Benefits of pre-fabricated construction.

Range: sustainability, value, efficiency.

3.2 Types of pre-fabrication work.

Range: types of pre-fabricated buildings, pre-fabricated sub-assemblies and components, uses, characteristics, construction materials.

Delivery outcomes (depth of content)

3.1 Learners will know the benefits of pre-fabricated construction in terms of sustainability, value and efficiency.

Sustainability: social, economic, environmental.

Value: technical, quality, customer satisfaction.

Efficiency: time, waste, flexibility.

3.2 Learners will know the types of pre-fabricated buildings, sub-assemblies and components and construction materials and their uses and characteristics in pre-fabricated construction.

Types of pre-fabricated buildings: panelised systems, volumetric, hybrid systems (including bathroom and kitchen pods).

Sub-assemblies and components: roof and wall systems, floor systems, components utilised within sub-assemblies (including hybrid bathroom pod).

Construction materials: concrete, steel, timber, hybrid.

Trade-specific units

Unit 107: Working with brick, block and stone

Level: 2

GLH: 140

What is this unit about?

The purpose of this unit is to provide the learner with the principles, knowledge and practical skills to allow them to understand the trade specific terminology used within the trowel occupations.

Learners will be introduced to the tools and equipment used in the trade and learn the safest way to work with them and relevant materials. Learners will be able to understand the use of documentation to communicate information relating to the work that will be carried out.

The learner will know how to select, store, and prepare materials for laying bricks, blocks and stone and will develop practical skills to allow them to mix materials, handle, store and stack materials ready for use. The learner will develop the skills required to lay bricks, blocks, and stone to a line and develop skills to gauge, level and plumb the work.

Learners may be introduced to this unit by asking themselves questions such as:

- What is the difference between brick, block and stone?
- What is the process of building a wall?
- How should I handle the materials used in trowel occupations?
- How can I work to ensure that I am safe when working with brick, block and stone?

Learning outcome:

1. The underlying principles of the trowel occupations

Criteria

1.1 Understanding work and roles in the trowel occupations trade area.

Range: planning work, preparing work area, covering, placing and protecting materials, bedding, levelling, lining, plumbing, gauging mortar, environmental considerations.

1.2 The tools and equipment used.

Range: for brick, block and stone walling activities, appropriate uses.

1.3 The materials used in trowel occupations.

Range: bricks, blocks, natural stone, reconstituted stone, sand, cement, plasticiser, lime, water, additives.

Delivery outcomes (depth of content)

1.1 Learners will be able to differentiate between the role and practices of bricklaying and masonry. They will understand the importance of segregating and disposing of waste safely in line with current regulations. They will be able to recognise the importance of sustainable, ethically and locally sourced materials.

1.2 Learners will be able to identify the range of tools and equipment and their appropriate uses for brick, block and stone walling activities:

Laying trowel, pointing trowel, lump hammer, brick hammer, scutch hammer, bolster, tape, line, pins and corner blocks, spirit level, boat level, jointing iron, gauge rod, shovel buckets, gauge box, site square, profiles

1.3 Learners will be able to identify a range of materials and their uses in trowel occupations.

Learning outcome:

2. Know the processes of stacking, storing and preparing materials for building brick, block and stone walls

Criteria

2.1 Reasons for stacking and storing materials.

Range: protection, efficiency, security.

2.2 Methods of preparing mortar for work.

Range: gauging and mixing mortar, ratios, hand and mechanical mixing.

2.3 Methods of preparing the area for work.

Range: position mortar boards ready for the work, move and stack bricks, blocks and stone ready for the work.

Delivery outcomes (depth of content)

2.1 Learners will recognise the reasons for storing materials prior to use to protect them from the weather, damage, and theft. Learners will also recognise the reasons for stacking and storing materials for efficiency in relation to preparing for work.

2.2 Learners will know how to prepare and position mortar for the construction of brick, block and stone walls. They will be able to identify the different methods of gauging and mixing, and recognise the most suitable ratio and method for a particular task.

2.3 Learners will know how to position materials in order to work efficiently. They will recognise the safety considerations for themselves and others when moving and stacking materials to ensure they are stable, on firm ground and at a safe height for use. Learners will be able to identify the suitable lifting aids, both physical and mechanical, used for moving different weights, shapes and consistencies of materials.

Learning outcome

3. Planning the completion of common tasks in brick, block and stone

Criteria

3.1 Planning the sequence of work.

Range: timescale, drawings, specifications, labour and material schedule, manufacturer's information, resources, instructions, problem solving, teamwork.

3.2 Calculating quantities.

Range: measure areas, linear measurements, allowances for waste.

3.3 Recording work.

Range: timesheets, job sheets, tools and materials list, snagging list, recording deliveries.

Delivery outcomes (depth of content)

3.1 Learners will be able to interpret the different types of technical information to set out and plan the sequence of work effectively in relation to the task. Learners will know how to effectively communicate information to other members of the team.

3.2 Learners will be able to calculate quantities of materials and allowances for waste using formula. They will be able to identify and demonstrate different methods of calculating areas and linear measurements.

3.3 Learners will be able to recognise the uses of different documents used to record and outline work. They will also be able to complete the documentation related to the task.

Learning outcome

4. Set out and build a range of walls using brick, block and stone

Criteria

4.1 Set out and build straight walls.

Range: stretcher bond, half bond, dry bonding.

4.2 Set out and build return quoins.

Range: racking back, stopped ends.

4.3 Carry out the work effectively and safely.

Delivery outcomes (depth of content)

4.1/4.2 Learners will be able to interpret information to effectively set out and build straight walls and return quoins. They will be able to use a range of tools, equipment and local materials. They will be able to accurately cut bricks, blocks and stone using hand tools.

4.3 Learners will be able carry out the work effectively and safely in line with regulations and agreed timescales.

Learning outcome

5. Understand performance criteria for the completion and evaluation of common brick, block and stone tasks

Criteria

5.1 Evaluation against standards.

Range: quality of finish, working to tolerances, ability to work to set timescales, safe working practice.

5.2 Performance analysis.

Range: self-evaluation, peer evaluation, oral discussion, written feedback, quality of work, grading.

Delivery outcomes (depth of content)

5.1 Learners will recognise the industry standards expected within trowel occupations and be able to effectively evaluate their own performance against set tolerances. Learners will understand the importance of completing tasks on time as scheduled and in a safe manner.

5.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by measuring their achievement.

Unit 108: Wood occupations

Level:	2
GLH:	140

What is this unit about?

The purpose of this unit is to enable learners to practice and develop key carpentry and joinery skills. Learners will also gain an understanding of the role, tools, materials and equipment used when performing wood working tasks.

Learners may be introduced to this unit by asking themselves questions such as:

- What does wood occupations cover?
- How should I plan wood working tasks?
- What tools will I use when completing wood working tasks?

Learning outcome:

1. Know the underlying principles used in wood occupations

Criteria

1.1 The main roles and tasks undertaken.

Range: Site Carpenter, Architectural Joinery, Shop fitter, Fitted Interiors.

1.2 Materials used.

Range: softwoods, hardwoods, sheet material, fixings, adhesives.

1.3 Hand tools used.

Range: hammers, mallets, saws, chisels, screwdrivers, marking tools, measuring tools, planes, pliers, pincers, oil/diamond stones.

1.4 Power tools used.

Range: drill drivers, drills (percussion), planer, routers, sanders, circular saws, chop saws, jigsaw.

Delivery outcomes (depth of content)

1.1 Learners will gain an understanding of the roles and tasks available in wood occupations.

- **Architectural joinery:** setting out, marking out, manufacturing.
- **Site carpentry:** structural, first fix, second fix, final fix.
- **Fitted interiors:** bedrooms, bathrooms, kitchens installation.

1.2 Learners will know the range of materials used within common wood working tasks and the differences between them and their qualities. The materials will cover a range of usages and identify materials suitable for internal and external use.

1.3 Learners will know and safely use a range of hand tools used for wood working tasks and their limitations.

1.4 Learners will know and safely use a range of common power tools used for wood working tasks.

Learning outcome:

2. Know how to plan and produce a sequence of work

Criteria

2.1 Planning a sequence of work.

Range: drawings, timescales, risk assessment.

2.2 Producing a sequence of work.

Range: setting out rods, cutting lists, resource lists, tool lists.

Delivery outcomes (depth of content)

2.1 Learners will be able to schedule all aspects of a task within the given timescales. Learners will be able to interpret drawings and risk assessments to plan and complete common wood working tasks.

2.2 Learners will be able to create a setting out rod for each joint (halving, bridle, mortice and tenon). Learners will be able to create a cutting list, resource list and tool list from a drawing for joints and common wood working tasks, taking into consideration wastage.

Learning outcome:

3. Be able to complete common wood working tasks

Criteria

3.1 Preparation of timber.

Range: square-edged timber, face and edge sides.

3.2 Production of wood working joints.

Range: housings, halvings, mortice and tenons.

3.3 Constructing common wood working tasks.

Range: stud partition with openings.

3.4 Installing mouldings.

Range: skirting and architrave.

3.5 Working safely.

Range: PPE use, housekeeping, maintaining equipment.

Delivery outcomes (depth of content)

- 3.1 Learners will be able to prepare timber from sawn to PSE (planed square edged); free from twist and wind.
- 3.2 Learners will be able to produce joints including housing, end-halving, t-halving, cross-halving, dovetail-halving; corner bridle; through, haunched and stubbed mortice and tenon.
- 3.3 Learners will be able to construct stud partition with door openings including linings. Learners will be able to construct stud partition with window openings including linings.
- 3.4 Learners will be able to install chamfered/splayed, pencil round and torus mouldings to internal and external corners and scribe mouldings to adjacent services and fit architrave around door/window openings.
- 3.5 Learners will be able to select appropriate PPE for the duration of the common wood working task. Learners will be able to keep work area clean and tidy. Learners will be able to safely store equipment and tools and maintain tools to a workable standard of use.

Learning outcome

4. Understand performance criteria and methods of evaluating performance

Criteria

4.1 Evaluation against set standards.

Range: working to tolerances, ability to work to set time scales, safe working.

4.2 Performance analysis.

Range: self-evaluation, oral discussion, written feedback, quality of work.

Delivery outcomes (depth of content)

4.1 Learners will recognise the standards expected within wood occupations and be able to effectively evaluate their own performance against this standard. Learners will understand the importance of completing tasks on time as scheduled and in a safe manner.

4.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by self-evaluation by demonstrating key reflection skills when reviewing the working stages and sequence required to plan, prepare, carry out and complete wood working tasks. They will also then reflect upon their practices and highlight areas for development

Unit 109: Plastering and interior systems

Level: 2

GLH: 140

What is this unit about?

The purpose of this unit is for learners to develop their knowledge, understanding and skills in different aspects of the plastering trade.

Learners will be introduced to the different plastering developments that have evolved over time, be able to recognise the different tools, equipment and resources used to prepare surfaces and gain practical experience in installing components such as plasterboards and beads, mixing materials such as sand and cement, and applying traditional and modern plastering systems.

Learners will need to understand technical information to plan and carry out a range of plastering activities, which include measuring, calculating quantities of materials and working out costs. They will be able to identify and recognise different background surfaces that require preparing before plastering.

Learners may be introduced to this unit by asking themselves questions such as:

- What are the different types of plastering systems?
- Why do we need to learn about the characteristics of different backgrounds?
- What skills will I need to learn and practise to develop and become a competent plasterer?

Learning outcome:

1. The underlying principles that guide the work of a plasterer

Criteria

1.1 The role of a plasterer.

Range: planning work, protecting surfaces, preparing backgrounds, mixing materials, applying plasters, environmental considerations, safe working.

1.2 The types of plastering systems and backgrounds.

Range: solid route, fibrous route, dry-lining, metal and timber partitioning and ceiling systems, rendering, solid brick and block, masonry, steel beams, lath and plaster.

1.3 The types of materials used in plastering.

Range: coarse sand, building sand, hydrated lime, hydraulic lime, lime putty, cement, pre-blended gypsum backing and setting plaster, dry wall adhesive, casting plasters, timber laths, plasterboards.

1.4 Additives.

Range: plasticiser, waterproofer, accelerator, retarder, salt inhibitor, pozzolans.

1.5 Components.

Range: types of standard and thin coat beads, self-adhesive scrim, paper tape, fixings, fibreglass strands, hessian.

Delivery outcomes (depth of content)

1.1 Learners will be able to recognise the role of a plasterer and their main responsibilities at each stage when completing different plastering related tasks. Learners will be able to recognise the different methods of disposing plastering materials correctly in line with current legislation.

1.2 Learners will be able to recognise the various skills required within the different areas of the plastering industry. They will be able to identify different types of background surfaces and recognise different plastering systems that can be applied. Learners will be able to recognise the reasons and benefits for installing plastering systems to include habitation and decoration, increasing building performance, thermal values, soundproofing, fire lining and air testing.

1.3 Learners will be able to identify the different types of materials associated with different plastering activities and systems.

1.4 Learners will be able to identify specific additives that improve the performance of plasters.

1.5 Learners will be able to identify appropriate components when preparing surfaces for plastering.

Learning outcome:

2. Know the requirements to prepare for applying plastering materials

Criteria

2.1 Preparing mixing and work areas for plastering.

Range: water, electricity, ventilation, waste area, setting up spot board and stand, access equipment, hand tools, power tools and accessories, cleaning equipment.

2.2 Preparation tools.

Range: brushes, roller and tray, bolster and chisel, scutch hammer, pick hammer, nail bar, scrapers.

2.3 Methods of preparation.

Range: controlling suction, cleaning, raking, stripping, forming a key by hacking, mechanical key, grit adhesive, SBR and PVA bonding agents, slurries, stipple, sealers, stabilizers.

Delivery outcomes (depth of content)

2.1 Learners will be able to identify the preparation methods, tools and materials for appropriately preparing different background surfaces to ensure plaster adhesion. Learners will recognise the necessary services needed when plastering and how to set up and clean down equipment.

2.2 Learners will be able to identify a range of tools for appropriately preparing different background surfaces.

2.3 Learners will be able to identify a range of methods for appropriately preparing different background surfaces. Learners will know how to use and prepare materials in order to work efficiently.

Learning outcome:

3. Planning the completion of common plastering tasks

Criteria

3.1 Planning the sequence of work.

Range: timescale, drawings, specifications, labour and material schedule, manufacturers information, resources, instructions, problem solving, teamwork.

3.2 Calculating quantities.

Range: measure areas, cubic measurements, linear measurements, allowances for waste.

3.3 Storing materials and components.

Range: stock rotation, shelf life, protection, limitation, ease of access and identification, transportation, types of materials.

Delivery outcomes (depth of content)

3.1 Learners will be able to interpret the different types of technical information to set out and plan the sequence of work effectively in relation to the task.

3.2 Learners will be able to calculate quantities of materials and allowances for waste using formula. They will be able to identify and demonstrate different methods of calculating areas, cubic metres and linear measurements with a percentage allowance for waste.

3.3 Learners will be able to recognise the importance of correct storage of a range of plastering related materials to avoid defects. Learners will be able to identify different types of materials, to include: loose materials, bagged materials, sheet materials, length materials, rolled materials, containers, accessories.

Learning outcome:

4. Carrying out common plastering tasks

Criteria

4.1 Using tools.

Range: application and installation, mixing.

4.2 Installing plasterboards and timber laths.

Range: setting out, measuring, cutting, rasping, fixing methods.

4.3 Preparing backgrounds.

Range: hacking, stripping, de-nailing, providing a key, controlling suction.

4.4 Installing beads.

Range: setting out, measuring, cutting, fixing methods.

4.5 Applying plaster systems.

Range: scratch coat, pricking up coats, backing floating coat, setting finishing coat.

4.6 Maintain safe working area.

Range: cleaning work area, cleaning tools and equipment, disposal of waste materials, hazards.

Delivery outcomes (depth of content)

4.1 Learners will be able to safely and effectively use as appropriate:

Application tools: trowels, hand board, bucket trowel, gauging trowel, small tool, angle trowels, float, comb scratcher, tape measure, snips, level, straight edge, utility knife, rasp, foot lift, saw, pad saw, service cutter.

Mixing tools: plunger, drill and whisk, drum mixer, shovel, bucket, measuring jug.

4.2-4.6 Learners will be able to effectively carry out and complete basic plastering related tasks in line with the drawings, specification and given instructions using the appropriate tools and equipment.

Learners will be able to work responsibly and safely to produce the appropriate standard of work in line with industry set standards. They will clean and maintain the work area, tools and equipment and store tools and materials appropriately after use. Learners will be aware that their work and performance will be evaluated on completion against the agreed performance criteria.

4.6 Learners will be able to maintain a clean, safe working area and recognise work related hazards ensuring they adhere to relevant information from sources such as data sheets, risk assessment, manufacturer's literature, method statements and toolbox talks to inform correct safe working methods. They should be able to identify and recognise signs and notices, use appropriate PPE and correct manual handling techniques.

Learning outcome:

5. Understand performance criteria for the completion and evaluation of common plastering tasks

Criteria

5.1 Evaluation against industry standards.

Range: quality of installation and application, performance of mixed plasters and plasterboards, working to tolerances, ability to work to set time scales.

5.2 Performance analysis.

Range: self-evaluation, oral discussion, written feedback, quality of work.

Delivery outcomes (depth of content)

5.1 Learners will recognise the industry set standards expected within the plastering environment and be able to evaluate their own performance against this standard. Learners will be able to recognise different plastering materials and a basic understanding of their effect on building performance in relation to the industry. Learners will understand the importance of completing tasks on time as scheduled.

5.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others.

Unit 110: Decorative finishing and industrial painting occupations

Level:	2
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GLH:	140
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What is this unit about?

The purpose of this unit is for learners to develop the skills and understanding required to carry out common tasks in the Painting and Decorating trade. Throughout the unit, learners will be encouraged to carry out safe working practices in line with current government and environment legislation guidelines.

This unit will introduce the basic principles of preparing bare and previously painted surfaces and applying water-based and solvent-based coatings by brush and roller to non-complex areas. Included within the unit will be how to use access equipment and working platforms to carry out these tasks.

Learners will then be able to safely apply these skills and enable them to achieve a standard of decorative finish acceptable within the industry.

Learners may be introduced to this unit by asking themselves questions such as:

- What are the different types of painted surfaces and how would I prepare them to be ready for painting?
- What are the different types of surface coatings and what application technique would I be using to apply them?
- How would I use access equipment to reach awkward, hard to reach areas?
- How do I work safely to promote the health and safety of myself and others around me?

Learning outcome:

1. Know the underlying principles that guide the work of a painter and decorator

Criteria

1.1 The role of the painter and decorator.

Range: role of a painter and decorator, relevant surfaces and finishes.

1.2 Types of painting and decorating work.

Range: domestic, commercial, industrial, heritage.

1.3 Reasons for painting surfaces.

Range: decoration, identification, preservation, sanitation.

1.4 Key legislation.

Range: HASAWA, COSHH, Control of Lead At Work Regulations (2002) (CLAW), Working at Height Regulations (WAHR).

1.5 Sustainability of resources.

Range: environmental impact, Volatile Organic Compounds (VOCs), recyclable, re-usable, disposal of waste.

Delivery outcomes (depth of content)

- 1.1 Learners will be able to define the role of a painter and decorator and show understanding of the relevant surfaces and finishes to include planning work, protecting surrounding areas, preparing surfaces, applying paint finishes, applying wallpapers, applying spray finishes, producing specialist decorative finishes and adopting safe working practices.
- 1.2 Learners will be able to identify the different types of painting and decorating work. Learners will be able to recognise the differences in the main areas of painting and decorating work, both interior and exterior. Learners will be able to identify the internal components of domestic buildings to include floor, ceiling, walls, doors, windows, skirting, architraves and dado rail. External structural components to include fascia boards, soffit, rainwater goods, gable ends, windows and doors.
- 1.3 Learners will be able to identify the main reasons for painting surfaces.
- 1.4 Learners will be able to identify the key legislation covering the painting and decorating trade. Learners will have an awareness of HASWA, COSHH, CLAW and WAHR, and their responsibility in compliance.
- 1.5 Learners will understand the sustainability of resources including VOCs, safe disposal and environmental impact.

Learning outcome:

2. Know common tools, equipment and materials used in the painting and decorating trade

Criteria

2.1 Painting tools and equipment.

Range: hand tools, power tools, application tools and equipment.

2.2 Preparation materials and surface coatings.

Range: abrasive papers, fillers, paints, varnishes.

2.3 Materials used to protect surrounding areas.

Range: protective sheeting, protective tape, protective board.

Delivery outcomes (depth of content)

2.1 Learners will be able to identify preparation and painting tools and equipment, and state their characteristics and uses to include:

Hand tools: scraper, dusting brush, nail punch, hammer, combination shave hook, paint kettle, filling knife, filling board, bucket, sponge, sanding block, skeleton gun.

Power tools: orbital sander, hot air gun.

Application tools: rollers with short/medium/long pile sleeves, synthetic filament paint brushes, natural bristle paint brushes.

2.2 Learners will be able to identify preparation and paint materials, and state their characteristics and uses to include:

Preparation materials: cleaning agents, abrasive papers, single-pack filler, ready mixed and fine surface fillers, decorators caulk, shellac and white knotting.

Paint materials: emulsion, acrylic primer undercoat, water-based eggshell, water-based gloss, aluminium wood primer, solvent-based wood primer, solvent-based eggshell.

Learners will be able to recognise the different sheens and finishes of coating materials as outlined in the range.

2.3 Learners will be able to identify the different materials used to protect surrounding areas.

Protective materials: standard, exterior and low tack masking tape, cotton and polythene dustsheets, tarpaulin, corrugated plastic protective board

Learning outcome:

3. Preparation for common painting and decorating tasks

Criteria

3.1 Planning the sequence of work.

Range: risk assessment, method statement, calculate material quantities, timescale, drawings, specifications, labour and material schedule, manufacturer's information, resources, instructions, problem-solving.

3.2 Preparing the work area and protecting surrounding areas.

Range: flooring, floor coverings, soft furnishings, ironmongery and electrical fittings.

3.3 Erecting and dismantling access equipment and working platforms.

Range: stepladders, ladders, platform/podium steps, hop-ups.

3.4 Preparing surfaces.

Range: new, bare, previously painted, defective paint coatings.

3.5 Making good surfaces.

Range: raking out, undercutting, wetting in, proud filling, flush filling, abrading, levelling, applying caulk.

3.6 Preparing water-based and solvent-based coatings.

Range: to the correct consistency for application without defects.

3.7 Storing materials before and after use.

Range: protection from effects of temperature, potential fire hazards, stock rotation, shelf life, handling limitations, ease of access, product identification, security.

Delivery outcomes (depth of content)

- 3.1 Learners will be able to read and interpret the given technical information to plan the sequence of work effectively in relation to the task.
- 3.2 Learners will be able to prepare work areas, using correct materials and protect the surrounding areas appropriately to complete the given task.
- 3.3 Learners will be able to inspect, erect and dismantle access equipment and working platforms safely.
- 3.4 Learners will be able to evaluate new, bare and previously painted surfaces, to include timber, plaster and plasterboard, and prepare them according to their current condition to include cleaning, abrading, filling and keying. Learners will be able to remove defective paint coatings safely and effectively using heat guns.
- 3.5 Learners will be able to make good surfaces effectively using single pack and pre-mixed fillers, and decorators' caulk.
- 3.6 Learners will be able to prepare water-based and solvent-based coatings to the correct consistency ready for application. Learners will know the process of preparing: dust off lid, open container, mix/stir, pour/decant, search/strain coatings, adjust viscosity.
- 3.7 Learners will be able to recognise the importance of correctly handling, retaining and storing unused paint materials for re-use on completion of the job.

Learning outcome:

4. Carry out common painting and decorating tasks

Criteria

4.1 Applying water-based and solvent-based paint systems without defects.

Range: surface areas, application by brush and roller, defects.

4.2 Cleaning, maintaining and storing application tools and equipment.

Range: paint brushes, paint rollers, associated equipment.

4.3 Maintaining a clean and safe work area.

Range: practice good housekeeping, protect surrounding area, wearing appropriate PPE, identifying hazards, cleaning work area, cleaning tools and equipment, disposal of waste materials.

Delivery outcomes (depth of content)

4.1 Learners will be able to apply water-based and solvent-based paint systems in the correct sequence without defects to include skirting boards and architraves, and the following:

Surface areas: ceilings, wall areas, linear trim work, panelled doors.

Application processes by brush and roller: load application equipment, cut-in, lay-on, spread, back-roll, lay-off/finish.

Defects: runs, sags, curtains, orange peel, misses, fat edges, brush marks, bits and nibs, paint on adjacent surfaces.

4.2 Learners will be able to clean, maintain and store application equipment correctly after use.

4.3 Learners will be able to maintain a clean and safe working area whilst carrying out the tasks by adopting safe working practices.

Learning outcome:

5. Understand performance criteria for the completion and evaluation of common painting and decorating tasks

Criteria

5.1 Evaluation against industry standards.

Range: quality of surface and material application, application of surface coating systems, cleanliness of work area, quality of finish, working within tolerances, ability to work to set timescales.

5.2 Performance analysis.

Range: self-evaluation, oral discussion, written feedback, quality of work.

Delivery outcomes (depth of content)

5.1 Learners will recognise the industry standards expected within the painting and decorating trade and be able to effectively evaluate their own performance against these standards.

Learners will understand the importance of completing tasks within given timescales.

5.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will be able to set their own performance criteria

Unit 111: Roofing occupations

Level:	2
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GLH:	140
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What is this unit about?

The purpose of this unit is for learners to understand the scope of the roofing industry, with an overview of traditional/heritage skills to modern methods, allowing learners to go on and work on a range of buildings from pre-1919 structures such as castles to new build housing. Learners will cover the use of different tools, equipment and resources to install backgrounds and coverings.

Learners will be introduced to installing underlay and battens to gauge as common tasks across the industry area. Learners will gain an introduction to the British standards, legislation such as Working at Heights, manual handling and contextualised health and safety.

Learners will gain a basic understanding of working drawings to be able to identify specific roof details in order to complete common tasks and evaluate their own performance as part of their progression.

Learners may be introduced to this unit by asking themselves questions such as:

- What is the difference between traditional and modern roofing methods?
- Why do we need to learn about the characteristics of different materials?
- What skills and behaviours will I need to become a slater and tiler?

Learning outcome:

1. Know the underlying principles used in roofing occupations

Criteria

1.1 Types of tiling and natural slating.

Range: natural slating, single lap interlocking tiling, double lap tiling.

1.2 The tools and equipment used.

Range: for slating tasks, for tiling tasks, appropriate uses.

Delivery outcomes (depth of content)

1.1 Learners will gain a basic understanding of the three different disciplines and be able to recognise the common skills, tools and materials used in all three areas. They will be able to identify the differences between the disciplines including headlaps, sidelaps and pitches. They will understand the correct method of fixing for each discipline.

1.2 Learners will be able to identify the range of tools and equipment used for slating and tiling tasks, and identify the appropriate uses for a range of tasks:

Claw hammer, trimming knife, nail pocket, tape measure, scissors, pencils, strike line, slate hammer, slate knife, guillotine, gauging trowel, buckets, brush and shovel, petrol saw, battery operated cut-off saw, battery drills and chargers.

Learning outcome:

2. Know the requirements to install slating and tiling tasks

Criteria

2.1 Understanding the role of a slater and tiler.

Range: planning work, preparing work area, loading materials, calculating gauges and datums.

2.2 Safety requirements for working at height.

Range: risk assessments, method statements, ladders, access platforms, scaffolds, fall arrest systems.

2.3 The roof structure.

Range: eaves, fascias, verges, rafters, hips, valleys, ridges, trussed roof construction, traditional roof construction.

2.4 Fixing requirements for battens, slate and tiles.

Range: head nailing, tail clipping, centre nailing, hook fixing.

Delivery outcomes (depth of content)

2.1 Learners will be able to identify the correct materials and tools for different tasks. Learners will be able to correctly calculate gauges and datums according to the task.

2.2 Learners will be able to recognise how to check ladders, access platforms and fall arrest systems. Learners will be able to recognise the difference between personal and collective fall arrest systems. Learners will be able to identify risks and hazards and follow the correct methods of work in line with written or verbal instructions.

2.3 Learners will be able to identify the different components of a roof structure. Learners will also be able to recognise the differences between traditional and trussed roof construction. Learners will be able to identify temporary and permanent external diagonal bracing and understand the differences in relation to safe removal process.

2.4 Learners will be able to recognise the different fixings used in roofing in relation to manufacturers fixing specifications.

Learning outcome:

3. Install roof coverings

Criteria

3.1 Ensure a safe working environment.

Range: site induction, site safety, safety signs, COSHH, appropriate PPE.

3.2 Prepare backgrounds.

Range: eave systems, calculate datum, calculate gauge.

3.3 Install underlay, measure and mark gauge and strike horizontal lines.

3.4 Calculate correctly.

Range: slate and tile widths, areas, perpendicular lines, load roof.

3.5 Cover the roof with slates or tiles using correct fixing methods.

3.6 Fit dry fix verge and ridge systems.

3.7 Evaluation and performance analysis.

Range: quality of installation and finish, performance of materials, working to tolerances, working to timescales, self-evaluation.

Delivery outcomes (depth of content)

3.1 Learners will be able to understand the importance of a site induction and be able to recognise how to implement the outcomes. Learners will be able to recognise different safety signs. Learners will understand the site safety considerations including designated walkways and emergency points. Learners will have an understanding of COSHH in relation to PPE and roofing tasks.

3.2 Learners will be able to remove any temporary diagonal bracing, check the surface and levels of rafters or trusses are fit for underlay installation. Learners will be able to fit a vented eave system in line with manufacturer's instructions, ensuring free airflow into the roof void. Learners will be able to calculate datum and even gauge by measuring the rafter length at various points to determine the number of courses in line with specifications.

- 3.3 Learners will be able to fit and securely fix underlay with a necessary drape, and with correct vertical and horizontal laps. Learners will be able to accurately mark the gauge, strike horizontal lines and fit battens.
- 3.4 Learners will be able to mark and strike perpendicular lines for accurate positioning using average slate and tile widths. Learners will be able to demonstrate area calculations for the selected covering to determine correct amounts and load the roof correctly and safely. Learners will be able to evenly load the roof with slates or tiles.
- 3.5 Learners will be able to cover the roof with the selected materials, correctly fixing as specified.
- 3.6 Learners will be able to fit dry fix verge and ridge systems. Learners will be able to fit dry fix components in line with manufacturer's guidance.
- 3.7 Learners will be able to recognise the importance of following specifications and standards for good quality of installation and finish and be able to self-evaluate against these relevant criteria.

Learning outcome

4. Understand performance criteria and methods of evaluating performance

Criteria

- 4.1 Evaluation against set standards

Range: Working to tolerances, ability to work to set time scales, safe working

- 4.2 Performance analysis

Range: Self-evaluation, oral discussion, written feedback, quality of work

Delivery outcomes (depth of content)

- 4.1 Learners will recognise the standards expected within roof occupations and be able to effectively evaluate their own performance against this standard. Learners will understand the importance of completing tasks on time as scheduled and in a safe manner.
- 4.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by self-evaluation by demonstrating key reflection skills when reviewing the working stages and sequence required to plan, prepare, carry out and complete roofing tasks. They will also then reflect upon their practices and highlight areas for development.

Unit 112: Construction operations and civil engineering operations

Level:	2
GLH:	140

What is this unit about?

The purpose of this unit is for learners to understand the knowledge requirements for, planning stages of and skills required in common tasks for construction operations and civil engineering. This will allow the learner to gain an awareness and understanding of what roles and typical activities a construction operative will undertake.

Introduction into plant, tools, equipment and materials used on a day to day basis. This unit will enable the learner to practice basic skills used in construction operations and civil engineering services: site protection, modular paving (block paving, slab laying), drainage and concreting.

Learners may be introduced to this unit by asking themselves questions such as:

- What is civil engineering and what activities does this cover?
- What tools and equipment are typically used in construction operations?
- What materials are used and laid in construction operations?

Learning outcome:

1. Know the underlying principles used in construction operations and civil engineering operations

Criteria

1.1 The main roles and tasks undertaken.

Range: site protection, drainage, modular paving, concreting.

1.2 Materials used.

Range: barrier protection, drainage material, modular paving material, concreting material.

1.3 Tools and equipment.

Range: Personal Protective Equipment (PPE), tools, equipment.

Delivery outcomes (depth of content)

1.1 Learners will gain an understanding of the roles and tasks available in Construction operations and Civil Engineering: site protection, drainage, modular paving, concreting.

1.2 Learners will know the range of materials used within Construction operations and civil engineering and understand the differences between them, their qualities and uses.

- Site Protection
- Barrier protection types: fencing, hoardings, sheeting, netting, pedestrian barriers
- Drainage: Gravel, sand, concrete.
- Modular paving: types of block paviour, types of paviour edging, sub base, sharp sand for bedding pavements, cement, kiln dried sand as joint filler
- Concreting: basic concrete mixes suitable for cast in-situ (4:2:1 mix ratio), sand, gravel, cement, timber formwork, mould oil.

1.3 Learners will know and safely use a range of tools and equipment used within construction operations and civil engineering tasks and know their limitations.

- Site protection
- Personal Protective Equipment (PPE): safety boots, hard hat, high visibility jackets, gloves.
- Tools: spanners, tape measures, hammer, spirit level, line, drill, electric screwdriver, handsaw.

Drainage:

Personal Protective Equipment (PPE): safety boots, hard hat, high visibility jackets, goggles, gloves.

Tools and equipment: shovel, wheelbarrow, pegs, pipe cutter, saw, level, tape measure.

Modular paving:

Personal Protective Equipment (PPE): safety boots, hard hat, high visibility jackets, goggles, gloves.

Tools and equipment: shovel, wheelbarrow, pegs, pins, trowel, straight edge, mallet, level, tape measure, building line, compaction plate.

Concreting:

Personal Protective Equipment (PPE): safety boots, hard hat, high visibility jackets, goggles, gloves.

Tools and equipment: shovel, wheelbarrow, pegs, trowel, straight edge, mallet, level, tape measure, formwork.

Learning outcome:

2. Know how to plan and produce a sequence of work

Criteria

2.1 Planning a sequence of work.

Range: drawings, timescales, risk assessment, specifications, manufacturers' information.

2.2 Calculating resources required.

Range: site protection; concreting; domestic drainage; modular paving.

Delivery outcomes (depth of content)

2.1 Planning a sequence of work: learners will know how to interpret drawings and risk assessments to plan and complete common construction operations and civil engineering, specifications, drawings, manufacturer's information.

2.2 Site Protection: linear, perimeter.
 Concreting: mix ratios, weight, volume.
 Domestic drainage: linear, volumes, tonnes.
 Modular paving: linear, area, volumes, tonnes.

Learning outcome:

3. Be able to complete common construction operations and civil engineering tasks

Criteria

3.1 Erect and remove site protection.

Range: barrier protection; health and safety.

3.2 Lay drainage.

Range: domestic drainage.

3.3 Lay modular paving.

Range: types of paving required, types of bond, laying methods.

3.4 Concreting work.

Range: mix, lay, finish.

3.5 Working safely.

Range: PPE use, housekeeping, maintaining equipment.

Delivery outcomes (depth of content)

3.1 Learners will erect and remove site protection to a given specification and protect work and surroundings as appropriate.

3.2 Learners will be able to prepare combined and separate drainage systems, Sustainable Urban Drainage System (SUDS) and lay drainage to a given specifications and protect work and surroundings as appropriate.

3.3 Learners will be able to plan and prepare areas for laying modular paving and lay, finish modular paving to a given specification, and protect work and surroundings as appropriate.

Types of bond: stretcher, basket weave, herring bone (45°, 90°).

Laying methods: hand lay, screed.

3.4 Learners will be able to plan and prepare area for common tasks in concreting work and mix, lay and finish a concrete slab to a given specification and protect work and surroundings as appropriate. Learners will be able to apply finishes to concrete: levelled, tamped, floated, brushed and trowelled surface finishes.

3.5 Learners will be able to select appropriate PPE for the duration of the common construction operations and civil engineering tasks.

Learners will be able to keep work area clean and tidy.

Learners will be able to safely store equipment and tools and maintain tools to a workable standard of use.

Learning outcome

4. Understand methods of evaluating performance

Criteria

4.1 Evaluation against set standards.

Range: quality of finish, working to tolerances, ability to work to set timescales, safe working.

4.2 Performance analysis.

Range: self-evaluation, peer evaluation, oral discussion, written feedback, quality of work, grading.

Delivery outcomes (depth of content)

4.1 Learners will recognise the standards expected within construction operations and civil engineering and be able to effectively evaluate their own performance against this standard. Learners will understand the importance of completing tasks on time as scheduled and in a safe manner.

4.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by self-evaluation by demonstrating key reflection skills when reviewing the working stages and sequence required to plan, prepare, carry out and complete construction operations and civil engineering tasks. They will also then reflect upon their practices and highlight areas for development.

Unit 113: Plumbing, heating and ventilation

Level:	2
GLH:	140

What is this unit about?

The purpose of this unit is for learners to obtain trade experience in plumbing and domestic heating systems.

The purpose of this unit is for learners to explore the cold, hot and heating systems within a domestic property and the basic pipework competences that underpin work on these systems. Learners will have the opportunity to plan and create their own pipework installation using a variety of materials, jointing methods and bending techniques.

Pipework installations are a key element in the plumbing and domestic heating industry and require different skills and techniques to enable the installation to meet the customer's needs as well as all the industry requirements.

Learners will develop skills to plan cold, hot and heating systems and implement pipework installations and demonstrate their practical and creative skills. Whilst creating their installation, they will demonstrate the ability to work on their own initiative and/or as part of a team

Learners may be introduced to this unit by asking themselves questions such as:

- What are the work responsibilities of a plumbing and domestic heating engineer?
- What types of water and heating systems are there in a domestic property?
- How will I be able to joint and manipulate various pipework materials?
- How can I apply my pipework skills in the plumbing and domestic heating industry?

Learning outcome:

1. Know the fundamental principles of plumbing and heating systems

Criteria

- 1.1 The key stages in the rainwater cycle.
- 1.2 The various sources of water and the typical properties of water from those sources.
Range: surface sources: lakes, reservoirs, rivers, streams.
- 1.3 Underground sources: deep and shallow wells, Artesian wells, bore-holes, springs.
- 1.4 The types and layout features of cold water systems.
Range: direct, indirect, boosted.
- 1.5 The types and layout features of hot water systems.
Range: open vented, indirect, unvented, secondary circulation, instantaneous.
- 1.6 The types and layout features of heating systems.

Delivery outcomes (depth of content)

- 1.1 Learners will understand the principles of the rainwater cycle.
- 1.2 Learners will understand the basic properties of water and be able to explain how water absorbs impurities. Learners will outline various water sources and describe each one in detail and understand hard and soft water and the relationship with its source.
- 1.3 Learners will have an understanding of the principles of direct and indirect systems used in both domestic dwellings and an industrial and commercial setting and be able to explain the advantages and disadvantages of direct and indirect systems and typical applications on site.
- 1.4 Learners will understand heat transfer and be able to illustrate the different types of direct hot water system and explain the advantages and disadvantages. They will understand the use of immersion heaters and the cost implications of using them, also the use of economy 7 and 10.
Learners will know the principles of indirect systems.
Learners will know the characteristics of the different water heaters listed and the advantages and disadvantage of each.
Learners will also be aware of open vented and unvented system types.
- 1.5 Learners will know the basic central heating system types and layouts of the controls and different heating systems used in domestic dwellings and in an industrial and commercial setting.

Learning outcome:

2. Know the underlying principles that guide the work of a plumbing and domestic heating engineer

Criteria

2.1 The work in the Building Services Engineering (BSE) occupations trade area.

Range: planning work, preparing work area, protecting property and furniture, system identification, bending, jointing, clipping, environmental considerations.

2.2 How to select and safely use hand tools and power tools.

Range:

Hand tools: screwdriver, hammer, chisel, grip, wrench, spanner, spirit, level, manual pipe threader, pipe cutter, hand saw, pliers, bending tool, blow torch, pipework soundness test equipment.

Power tools: power drill, portable pipe threading machine, hydraulic machine bender.

2.3 The pipework materials and sizes used in BSE.

Range: copper, low carbon steel (LCS), plastic pipework (hot, cold and heating).

2.4 The clip and bracket types used in BSE.

Range: munson rings, school board clips, plastic stand-off clips, nail on clips.

2.5 The fitting types used in BSE

Range: couplers, elbows and bends, equal tees, reducing tees, reducers, pressfit.

2.6 Common fixing devices for pipework.

Range: nails, screws, plastic plugs, expansion bolts.

Delivery outcomes (depth of content)

2.1 Learners will be able to recognise the work of a plumbing and domestic heating engineer and their main work-related responsibilities. They will understand the importance of segregating and disposing of waste safely in line with current regulations and will be able to recognise the importance of sustainable and ethically sourced materials.

2.2 Learners will be familiar with the basic principles of tool ownership, quality of tools selected for purchase, and why tool maintenance is important, including defects such as mushrooming. Highlight the 'basics' of health and safety when working with hand tools and emphasise the safety risks when using power tools.

Learners will know the typical hand and power tools found in a plumber's tool bag. They will understand the relationship with health and safety and the use of hand and power tools.

2.3 Learners will know that during their day to day activities they will use a variety of pipework materials and this will be defined by the activity they are undertaking and the environment in which it is being carried out and these materials will include:

- Copper
- Low carbon steel
- Plastic – pipework.

They will understand the different types of materials and their application in cold, hot and central heating systems.

2.4 Learners will understand that in the supporting of pipework a variety of clips and brackets can be used and will be dependent on the material being supported and the application and be able to give examples of the clips and brackets and the various types of clips and brackets and their different applications, looking at material types and how these can affect the clip and bracket choice:

- Electrolysis
- Corrosive effects of different materials (lime in plaster).

2.5 Learners will be familiar with the fittings identified and how these vary on different pipework materials and how these are identified when ordering them at a supply merchant, they will also be familiar with fittings used to connect pipework to terminal fittings and fittings that will adapt from one material type to another.

Learners will be able to select fittings for a given installation drawing and produce a fitting schedule.

Learners will be familiar with the fittings used on low carbon steel installations including:

- Threaded
- Compression.

Learners will be familiar with the fittings used on plastic pipework including hot and cold water, heating and sanitation systems (push fit, compression, proprietary, ring seal, solvent welded).

2.6 Learners will understand that within the BSE sector there is a need to fix appliances, components and pipework onto different structures and surfaces and that the

requirements of the fixings will be dependent on the weight of the intended appliances, components or pipework being fixed and the structure or surface it is going on.

Learners will know the fixing devices identified and the different applications for each and the factors that affect their use to include:

- Screws and fixings,
- Slotted head,
- Phillips head,
- Pozidrive Coach bolts,
- Rawlbolts,
- Expansion bolts.

Learning outcome:

3. Know the requirements for carrying out common plumbing and heating tasks

Criteria

3.1 How to measure and mark out for fixings to pipework and plumbing and heating components.

3.2 The sources of information for carrying out preparatory work.

Range: regulations, industry standards, manufacturer's technical instructions, building plans, specifications.

3.3 The methods for jointing of pipework used in BSE.

Range: copper pipe; solder ring and end feed, compression (type a and b), push-fit, press-fit; low carbon steel (LCS) pipe, threaded, welded; stainless steel pipe; Press fit, plastic pressure pipe, push fit, compression, proprietary - copper and MDPE.

3.4 The methods for the bending of pipework used in BSE.

Range: copper machine bending, copper spring bend, LCS Hydraulic machine bending, plastic pressure pipe.

3.5 The requirements for the installation of pipework.

Range: prefabrication of pipework, installing pipework in-situ, first and second fix.

Delivery outcomes (depth of content)

3.1 Learners will know the tools used for measuring and marking out, how to mark out accurately and know the procedures for setting out components.

3.2 Learners will know the different types of information sources and how they relate to each other, how to obtain these sources of information and what information they contain.

3.3 Learners will know techniques for jointing:

- Copper pipe to specifications
- LCS pipe to specifications
- Plastic pipe to specifications.

Learners will understand the importance of working to industry standards and tolerances.

3.4 Learners will understand that during the installation of pipework there will be a need to bend the pipework, they will know the different bending techniques and the advantages and disadvantages of each type.

Learners will know how bend dimensions are calculated for each method of bending and bend type and how they are set out.

Learners will know techniques for bending

- Copper pipe
- LCS pipe
- Plastic pipe.

They will understand the importance of working to industry standards and tolerances.

3.5 Learners will understand what the 'prefabrication of pipework' means in terms of on-site applications and be able to discuss the advantages and disadvantages of both prefabrication and installation of pipework in-situ.

Learners will know the methods of prefabricating pipework on site and be able to explain the process of installing pipework in-situ and how this compares with prefabrication.

Learners will know the difference between first and second fix and why this would be carried out.

Learning outcome:

4. Planning the completion of common plumbing and heating tasks

Criteria

4.1 Planning the sequence of work.

Range: timescale, drawings, specifications, labour and material schedule, manufacturer's information, resources, instructions, problem-solving, teamwork.

4.2 Calculating quantities.

Range: linear measurements, fittings and clips, allowances for waste.

4.3 Recording work.

Range: time sheets, job sheets, tools and materials list, snagging list, recording deliveries.

Delivery outcomes (depth of content)

4.1 Learners will be able to interpret the different types of technical information to set out and plan the sequence of work effectively in relation to the task.

4.2 Learners will be able to calculate quantities of materials and allowances for waste. They will be able to identify and demonstrate different methods of calculating areas, cubic metres and linear measurements with a percentage allowance for waste.

4.3 Learners will be able to recognise the uses of different documents used to record and outline work. They will also be able to complete the documentation related to the task.

Learning outcome:

5. Carry out a pipework installation task

Criteria

5.1 Follow safe working procedures.

Range: **adopting PPE and RPE appropriate to the task and working environment, working safely (and tidily) in accordance with the risk assessment, visual inspection of power tools, using the appropriate tools and equipment safely.**

5.2 Measure, mark and cut pipework materials for installation.

Range: no range information for this criterion.

5.3 Install pipework accurately to the specification.

Range: copper pipework, LCS pipework, plastic pipework.

5.4 Inspect work in accordance with the specification.

Range: no range information for this criterion.

5.5 Select the appropriate test instrument and accessories and prepare them for use.

Range: no range information for this criterion.

5.6 Carry out the appropriate tests.

Range: visual inspection and basic soundness test.

5.7 Record the test result accurately.

Range: no range information for this criterion.

Delivery outcomes (depth of content)

5.1 – 5.7 Through this practical learning outcome the learners will holistically apply the skills and knowledge gained throughout this unit. Learners will be able to plan and prepare for the installation activities through the production of the relevant drawings and diagrams. Learners will interpret these diagrams and follow safe working procedures whilst completing a pipework installation covering jointing and bending activities. Learners will then be able to verify their work through basic inspection and testing and record the outcomes and make judgments from the results.

Learning outcome:

6. Understand performance criteria for the completion and evaluation of common plumbing and heating tasks

Criteria

6.1 Evaluation against industry standards.

Range: quality of finish, working to tolerances, ability to work to set timescales, safe working.

6.2 Performance analysis.

Range: self-evaluation, peer evaluation, oral discussion, written feedback, quality of work, grading.

Delivery outcomes (depth of content)

6.1 Learners will recognise the industry standards expected within the plumbing and domestic heating and heating and ventilation trades and be able to effectively evaluate their own performance against this standard. Learners will understand the importance of completing tasks on time as scheduled.

6.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve own performance by measuring their achievement and agreeing action plans.

Unit 114: Electrotechnical systems and equipment

Level:	2
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GLH:	140
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What is this unit about?

The purpose of this unit is for learners to learn and undertake fundamental electrical work. Learners will have the opportunity to plan, perform and evaluate their work whilst utilising a range of materials, methods and techniques for basic electrical circuits including 1-way lighting circuits and radial circuits.

Learners may be introduced to this unit by asking themselves questions such as:

- What are the functions of common electrical circuits?
- What are the types of cables and materials used in electrical installations?
- What are the hazards associated with electricity?

Learning outcome:

1. Know the underlying principles for electrotechnical work

Criteria

1.1 The main roles and tasks in electrotechnical work.

Range: domestic, commercial, industrial.

1.2 The main electrical principles of a circuit.

Range: supply source (V), current flow (D.C, A.C), overcurrent protection, switches, loads, conductors, insulators, resistance, basic series and parallel circuits.

1.3 The quantities that apply to basic electrical work.

Range: electrical quantities; general quantities.

1.4 The use of formulas to calculate electrical quantities.

Range: voltage, current, resistance, power.

1.5 The key features of how electricity is generated, transmitted and distributed.

Range: no range information for this criterion.

1.6 The main industry documents associated with electrotechnical work.

Range: Electricity at Work Regulations, BS 7671, IET On-Site Guide, IET guidance notes.

Delivery outcomes (depth of content)

1.1 Learners will gain an understanding of the roles and tasks available in electrotechnical work.

1.2 Learners will know the basic characteristics of protons, neutrons and electrons in respect to their charge. They will know that electric circuits function by virtue of the 'flow' of negatively charged electrons, and 'conventional' current flow from + ive to -ive. They will know the types of materials which make good conductors, and good insulators. How basic circuits are created with a voltage source (potential difference), current (A), resistance (Ω), over-current protection, conductors, a switch, and a load. They will have knowledge of basic series and parallel circuits, resistance and how to perform simple calculations of these quantities.

1.3 This will cover:

Electrical quantities:

- electrical potential: Volt (V)
- resistance: Ohm (Ω)
- current: Ampere (A)
- power: Watt (W).

General quantities:

- length: Metre (M)
- area: Square metre (M^2).

- 1.4 Learners will be able to carry out calculations (using a scientific calculator) utilising the relevant formulae for Ohm's Law, and resistors in series and parallel (in a basic combination).
- 1.5 Learners will know that installations are typically supplied with alternating current and the voltages that are available in common installations, such as dwellings, and commercial installations 230 V single-phase and 400 V three-phase. They will gain an overview of types of generation methods.
- 1.6 Learners will know the main industry documents associated with electrotechnical work, their purpose and uses.

Learning outcome:

2. Know the main principles of standard circuits

Criteria

2.1 Lighting circuits.

Range: arrangements, components, polarity.

2.2 'Power' circuits.

Range: arrangements, components, polarity.

2.3 The overcurrent and earth fault protection used on standard circuits.

Range: fuses, circuit breakers, residual current devices.

2.4 The reason for the division of an installation into circuits.

Range: no range information for this criterion.

2.5 The key principles of standard circuits.

Range: no range information for this criterion.

2.6 The importance of earthing and protective conductors.

Range: no range information for this criterion.

Delivery outcomes (depth of content)

2.1 Arrangements; one-way, two-way, and intermediate.

Components: overcurrent protection, types of switches, and lighting outlets and lamps (traditional GLS, LED, Fluorescent), joint boxes, transformers (and 'drivers').

Polarity as per BS 7671/ IET On-site Guide

Learners will become familiar with the physical appearance of components including the various common switches: one-way, two-way and intermediate; and drivers, dimmers. They will recognise the typical fuses, circuit breakers (CBs) and residual current device (RCDs) used with domestic circuits.

2.2 Arrangements: ring final and radial final circuits.

Components: overcurrent protection, socket outlets, SFCU, FCU, and joint boxes.

Polarity as per BS 7671/ IET On-site Guide

Learners will become familiar with circuits for supplying sockets and connection units and fused connection units (switched and un-switched) to BS 1363. They will know and be able to interpret the circuit diagram and wiring of a radial final circuit and a ring final circuit. They will be able to determine the number of points, and number of fused and unfused spurs in relation to sockets, and the requirements for spurs. They will know the way in which spurs are achieved (e.g. from a joint box, socket etc.). They will know the key information from the IET On-site guide in relation to final circuits supplying socket outlets.

Learners will become familiar with the physical appearance of the components utilised in standard circuit supplying domestic socket outlets.

2.3 Learners will recognise the typical fuses, circuit breakers (CBs) and residual current devices (RCDs) used with typical domestic circuits.

2.4 Learners will know the key requirements from BS 7671 in relation to division of circuits in an installation. They will recognise the disadvantage of some older dwellings having 1 circuit for socket outlets. They will also gain an appreciation of overloading.

2.5 Learners will be able to select cables and conductor size utilising the IET On-site guide (or electricians guide) to determine relevant information.

2.6 Learners will gain an overview on earthing and protective bonding, circuit protective conductors, main protective bonding conductors, the earthing conductor, and supplementary protective bonding conductors. They will gain a fundamental knowledge of these conductors for safety.

Learning outcome:

3. Know defined wiring systems, equipment and components used in electrical installations

Criteria

3.1 The types of cables used within electrical installation work.

Range: properties, applications, advantages, limitations.

3.2 The features, applications, advantages and limitations of defined containment systems.

Range: conduit (PVC and metallic), trunking (PVC and metallic) and cable tray.

3.3 Common fixing and securing methods for cables and containment to the building fabric.

Range: plasterboard, partition walls, lath and plaster walls, ceramic materials, masonry, concrete, brick, wood, and metal.

Delivery outcomes (depth of content)

3.1 Learners will know the properties, applications, advantages and limitations of:

- Single core cable (singles),
- Multicore insulated cable (flex),
- PVC/PVC flat profile cable (twin and earth),

and have a general awareness of MICC and fire-resistant cable, SWA cable, and data cable.

3.2 Learners will gain an appreciation of the types of containment and wiring systems used within electrical installations together with their main advantages and applications and limitations. They will know the different types of electrical installations and the main reasons for using types of containment and wiring systems within them.

3.3 Learners will gain knowledge of the array of fixing and securing devices used for various building fabrics.

Learning outcome:

4. Know how to plan for common tasks in electrotechnical work

Criteria

4.1 Planning a sequence of work.

Range: Timescales, materials list, circuit diagram, wiring diagram, risk assessment method statement.

4.2 Interpret relevant sources of information which will inform the installation work.

Range: Installation specification, circuit diagram, wiring diagram, layout diagram, drawings/instructions provided by manufacturers.

Delivery outcomes (depth of content)

4.1 – 4.2 Learners will be able to plan installation wiring systems and equipment utilising a logical and safe approach. They will be able to produce a simple risk assessment and method statement to enable them to safely undertake installation activities.

Learning outcome:

5. Carry out common tasks in electrical installation

Criteria

5.1 Safe working procedures.

Range: selecting appropriate PPE, following risk assessment, carrying out safe isolation.

5.2 Tools and equipment.

Range: spirit level, tape measure, and basic hand tools.

5.3 The methods for installation, termination and connection of cables and conductors.

Range: single core cable (singles), multicore insulated cable (flex), PVC/PVC flat profile cable (twin and earth).

5.4 Install wiring systems and equipment.

Range: conduit, trunking, equipment and accessories.

5.5 Techniques and methods for termination and connection of cables.

Range: single core cable (singles), multicore insulated cable, PVC/PVC flat profile cable (twin and earth).

Delivery outcomes (depth of content)

5.1 – 5.5 Learners will gain essential hand skills to undertake practical electrical installation work safely. They will be able to check tools before use, utilise them appropriately and leave them in a safe condition after use (including correct storage). Learners will be able to install and terminate and connect the range of cables as specified.

Learning outcome

6. Understand methods of evaluating performance

Criteria

6.1 Inspect work in accordance with the specification.

Range: no range information for this criterion.

6.2 Test de-energised circuits.

Range: selecting instruments and accessories, continuity, insulation resistance, polarity, and functional checks, recording results.

6.3 Evaluation against set standards.

Range: working to tolerances, ability to work to set timescales, safe working.

6.4 Performance analysis.

Range: self-evaluation, oral discussion, written feedback, quality of work.

Delivery outcomes (depth of content)

6.1 Learners will be able to carry out inspections of their completed work to include termination and connection of conductors and cables, and the fixing and securing of equipment in accordance with the specification. They will be able to recognise fundamental acceptable standards and why these standards are important.

6.2 Learners will be able to select and use the appropriate test equipment and leads in a safe manner. They will carry out tests for continuity, insulation resistance, and polarity on their completed work and record the test results appropriately. They will know the expected test results in order to make judgements from the tests completed.

6.3 Learners will recognise the standards expected within electrical installation and be able to effectively evaluate their own performance against this standard. Learners will understand the importance of completing tasks on time as scheduled and in a safe manner.

6.4 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by self-evaluation by demonstrating key reflection skills when reviewing the working stages and sequence required to plan, prepare, carry out and complete tasks. They will also then reflect upon their practices and highlight areas for development.

Unit 115: Plant operations

Level:	2
GLH:	140

What is this unit about?

The purpose of this unit is for learners to obtain trade experience in plant operations.

Learners will develop skills to plan and implement plant operations and demonstrate their practical and creative skills. Whilst creating their installation, they will demonstrate the ability to work on their own initiative and/or as part of a team

Learners may be introduced to this unit by asking themselves questions such as:

- What are the work responsibilities of a plant operator?
- What types of plant or machinery are used within construction?
- How will I be able to operate plant or machinery?
- How can I apply my skills in the construction industry?

Learning outcome:

1. Know the underlying principles that guide the work of a Plant Operator required for common tasks

Criteria

1.1 Know what type of construction work requires Plant, equipment and machinery in construction.

Range: Work: Earthworks, Excavation, Road building, Compaction, Loading

Plant: 180, 360 excavators, Telehandlers, Dumpers, Road Rollers, Pedestrian Roller, Vibrating Plates, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps.

1.2 Skill requirements, Industry operator licences, safe systems of work appropriate to common tasks in plant operations in construction.

Range: Industry licenses requirements, health and safety legislation appropriate to types of plant used. Personal Protective Equipment (PPE) appropriate to types of plant used.

1.3 Recognition of Potential Hazards.

Range: Crushing, Flying debris, Fuel spills fumes, Noise, Vibration, Contamination of environment.

Delivery outcomes (depth of content)

1.1 Learners will know typical construction projects, programmes of work, plant that would be used at various stages of construction.

1.2-1.3 Learners should be able to identify what training would be needed and industry licenses required to operate plant used in construction. They will understand the importance of working to industry standards.

Learners should be able to identify the relevant health and safety legislation: Health & Safety at Work Act 1974, Restraining systems in accordance with risk assessment, PUWER Regulations, MHSWA Regulations, CDM Regulations, Vibration at Work Regulations, HSG150, risk assessment, method statements, codes of practice and other relevant legislation, PPE and the reasons to use them when operating construction plant.

Learning outcome:

2. Know the requirements for carrying out plant operation tasks

Criteria

2.1 Identify plant and attachments on plant and equipment used in construction.

Range: 180, 360 excavators, Telehandlers, Dumpers, Road Rollers, Pedestrian Roller, Vibrating Plates, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps.

Plant and Attachments: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps.

2.2 Know how to carry out pre-start inspections on plant and equipment used in construction.

Range: checks on: Tyre pressures, Fuel, Oil, Water, Hydraulic fluids, Grease points, signs of wear and tear.

2.3 Know how to identify deficiencies, defects and record the information and potential implications if not carried out.

Range: inspections of types of plant, pre-start checks, testing follow manufactures literature. mechanical damage wear, faulty gauges and controls, protection equipment.

2.4 Plant and Attachments: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps

2.5 Know how to carry out post-stop inspection on plant and equipment used in construction.

Range: Plant inspection on: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps, in accordance with manufacturer's instructions

Delivery outcomes (depth of content)

2.1 Learners will know how to identify plant and where they would be typically used within construction, how they could be used and be able to identify and select most appropriate type.

2.2 Learners will know the importance of pre-plant inspection, what literature and instructions to follow.

2.3 Learners will know techniques for inspecting, reinforce that they should always inspect equipment that they have been given and report any defects. Report immediately, only repair if authorised to do so and only if trained and competent.

2.4 Learners will know techniques how to close down plant in accordance with organisational and manufacturers instruction. Give a firm understanding of why plant should be left safely on firm level ground, removed ignition source or key, cleaned skip as necessary, re-fuelled (if applicable), and checked for defects. Left machine safe and secure.

Learning outcome:

3. Carry out plant operation tasks

Criteria

3.1 Carry out plant and equipment familiarisation in accordance with manufacturer's instructions.

Range: Plant: Pedestrian Roller, Vibrating Plates, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps.

3.2 Operate plant to complete tasks in accordance with manufacturer's instructions.

Range: Plant: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps.

3.3 Identify, record and report defects when operating plant.

Range: Damage: mechanical damage wear, faulty gauges and controls, protection equipment

3.4 Carry out post stop inspection on plant and equipment used in construction.

Range: Plant inspection on: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps, in accordance with manufacturer's instructions

3.5 Store plant and make ready for future use and complete reporting and record damage or deficiencies.

Range: Plant and Attachments: Vibrating Plates, Pedestrian Roller, Hydraulic Breakers, Air Tools, Compressors, Single or Double diaphragm pumps

Reporting: Maintaining records, follow service intervals

Storage: Follow manufacturer's instructions and best practice guidance, maintain a clean and safe working environment.

Delivery outcomes (depth of content)

3.1 Learner should be able to interpret the different types of technical information to set out and plan the sequence of work effectively in relation to the task.

3.2 Learners should be able to follow instructions and be able to perform and complete tasks using plant.

3.3 Learners will be able to identify basic defects when operating plant. They will identify when plant is not working as it should and will know the basic actions to take to identify the fault, report in line with roles and responsibilities and remove the plant from operation (if applicable).

Learners should be able to recognise the uses of different documents used to record and outline work. They should also be able to complete the documentation related to the task.

Learners should follow Best Practice and Health and Safety guidance, current environmental and relevant safety regulations and safe working environment.

3.4 Learners must be able to close down the plant as directed and in accordance with organisational and manufacturers instruction. Plant left safely on firm level ground,

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removed ignition source or key, cleaned skip as necessary, re-fuelled (if applicable), and checked for defects. Left machine safe and secure.

3.5 Learners will be able to store plant after use ensuring that its safe and stored as manufacturers guidelines, complete final checks prior to safe storage.

Learning outcome:

4. Understand performance criteria for the completion and evaluation of plant operation tasks

Criteria

4.1 Evaluation against industry standards.

Range: quality of finish, working to tolerances, ability to work to set time scales, safe working.

4.2 Performance analysis.

Range: self-evaluation, peer evaluation, oral discussion, written feedback, quality of work, grading.

Delivery outcomes (depth of content)

4.1 Learners should recognise the industry standards expected within the plant operations trade and be able to effectively evaluate their own performance against this standard. Learners should understand the importance of completing tasks on time as scheduled.

4.2 Learners should understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners should recognise the opportunity to improve own performance by measuring their achievement and agreeing action plans.

Unit 116: Wall and floor tiling

Level: 2

GLH: 140

What is this unit about?

The purpose of this unit is for learners to develop their knowledge, understanding, and skills within the wall and floor tiling industry.

Learners will be introduced to the context in which wall and floor tilers operate, and the range of materials, tools, equipment and resources used within wall and floor tiling. Learners will gain practical experience in fixing and finishing both wall and floor tiles.

Learners will need an understanding of technical information to plan and carry out a range of wall and floor tiling activities. This will include preparing backgrounds, setting out, calculating quantities of materials, cutting, fixing and finishing wall and floor tiles.

The unit introduces learners to safe working practices and the use of appropriate personal protection equipment within the wall and floor tiling environment.

This unit may be introduced by asking questions, such as:

- What are the requirements for fitting different types of wall and floor tiles?
- How do wall and floor tiles differ? How are they fixed and finished and why?
- Why do we need to learn about the characteristics of different backgrounds?
- What skills will I need to learn to become a competent wall and floor tiler?
- Why is health and safety important?

Learning outcome:

1. Know the underlying principles that guide the work of a wall and floor tiler

Criteria

1.1 The role of a wall and floor tiler.

Range: planning work, setting out, cutting, protecting surfaces, preparing backgrounds, mixing materials, applying and fixing tiling materials, handling and storing materials and accessories, waste disposal, environmental considerations, safe working practices.

1.2 The types of backgrounds used for fixing wall and floor tiles.

Range: new and existing areas, gypsum based, cement based, timber (flooring).

1.3 The types of materials used in wall and floor tiling.

Range: ceramic tiles, porcelain tiles, plastic trims, adhesives (ready mixed and powder), cementitious grout (ready mixed and powder), primers, bonding agents, levelling/ smoothing compounds, sealants and decoupling membranes.

1.4 The types of tools and equipment used in wall and floor tiling activities.

Range: preparation, setting out, mixing, application, fixing, finishing, cleaning.

1.5 The types of personnel protective equipment and clothing used in wall and floor tiling.

Range: hard hat, dust mask/respirators, eye protection, ear protection, high visibility vests, gloves, barrier cream, knee pads, safety footwear, overalls, protective clothing.

1.6 Key legislation.

Range: HASWA, RIDDOR, COSHH, PUWER.

Delivery outcomes (depth of content)

1.1 Learners will be able to identify the role of a wall and floor tiler and their main responsibilities at each stage when completing a variety of related tasks. Learners will be able to identify the various skills required within the different areas of the wall and floor tiling sector. Learners will be able to identify the different methods of disposing wall and floor tiling materials correctly in line with current legislation.

1.2 Learners will be able to identify different types of background surfaces and the different methods, systems and materials that can be applied to receive wall and floor tiles.

1.3 Learners will be able to identify the different types of materials associated with a variety of wall and floor tiling activities.

1.4 Learners will be able to identify wall and floor tiling tools and equipment to include:

- hand tools: hand operated tile cutter, tiling trowels (serrated, gauging/bucket trowel), tile wheel nippers/nippers, sealant gun, tile saws, hammer(s), carborundum stone/rubbing block, scribes, mitre block, spirit level, chisels, files, trimming tools ,

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hacksaws, screwdrivers, retractable knives, tape measure/rule, chalk line, straight edge, square, squeegee, grout float, wash boy and sponge float, scraper

- power tools: electric tile cutter, mixing paddle and drill, cordless drill
- ancillary equipment: sponge, roller and tray, brushes, fixing batten/rule, nails/screws, polishing cloths, buckets, moving and handling aids and protective sheets.

1.5 Learners will be able to identify the relevant personnel protective equipment and clothing used in wall and floor tiling.

1.6 Learners will be able to identify the key legislation relating to the wall and floor tiling trade. They will have an awareness of HASWA, RIDDOR, COSHH, PUWER and their responsibility in compliance.

Learning outcome:

2. Know the requirements in preparing for wall and floor tiling application

Criteria

2.1 Preparing mixing and work areas for wall and floor tiling.

Range: water, electricity, ventilation, waste area, setting up work area, hand tools, power tools and accessories, cleaning equipment, protective sheeting.

2.2 Preparing materials and resources for wall and floor tiling.

Range: tiles, trims, adhesives, grout, ancillary materials.

2.3 Preparing tools and equipment used for wall and floor tiling.

Range: hand and power tools, ancillary equipment.

2.4 Preparing backgrounds used for fixing wall and floor tiles.

Range: new and existing areas, gypsum based, cement based, timber (flooring).

2.5 Materials used to protect surrounding areas.

Range: protective sheeting, protective tape, protective board.

Delivery outcomes (depth of content)

2.1 Learners will be able to identify the preparation methods, tools and materials for appropriately setting up mixing and working areas, in readiness to mix adhesive and grout.

2.2 Learners will be able to describe the characteristics of materials and resources to include:

- ceramic tiles
- porcelain tiles
- plastic trims
- adhesives (ready mixed and powder)
- cementitious grout (ready mixed and powder)
- primers
- bonding agents
- levelling/smoothing compounds
- sealants
- decoupling membranes.

2.3 Learners will be able to identify a range of tools and equipment when preparing to undertake wall and floor tiling activities as listed in 1.4.

2.4 Learners will be able to identify a range of methods for appropriately preparing different background surfaces. Learners will be aware of the importance of compatibility between background and applied materials. They will be able to identify surface characteristics i.e. dryness, flatness, rigidity, true and square, plumb, level and soundness.

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2.5 Learners will be able to identify the different materials used to protect surrounding areas.

Protective materials to include:

- low tack masking tape
- cotton and polythene dustsheets
- tarpaulin
- corrugated plastic
- protective board and hard board.

Learning outcome:

3. Planning the completion of wall and floor tiling tasks

Criteria

3.1 Planning the sequence of work.

Range: timescale, drawings, specification, manufacturers' information, technical product data, material schedule, resources, instructions, problem solving, teamwork and risk assessment/method statements (RAMS).

3.2 Calculating quantities.

Range: measure areas, linear measurements, allowances for waste.

3.3 Storing materials and components.

Range: stock rotation, shelf life, protection, limitation, ease of access and identification, transportation, types of materials.

Delivery outcomes (depth of content)

3.1 Learners will be able to interpret the different types of technical information to plan and set out

the sequence of work effectively in relation to the task. Learners will be able to use common problem-solving techniques to ensure tasks can be carried out effectively and efficiently.

3.2 Learners will be able to calculate quantities of materials and allowances for waste and be able to identify and use different methods of calculating areas and linear measurements.

3.3 Learners will be able to identify the importance of correct storage of a range of wall and floor tiling and construction materials and components to avoid defects. Materials and components to include: loose, bagged, boxed, sheet, length, rolled materials, containers and accessories.

Learning outcome:

4. Carrying out wall and floor tiling tasks

Criteria

4.1 Using tools, equipment and materials.

Range: hand and power tools, ancillary equipment, tiles, trims, adhesives, grout, ancillary materials

4.2 Preparing backgrounds.

Range: use of primers and sealants, securing backgrounds, checking backgrounds.

4.3 Setting out for wall and floor tiling.

Range: measuring, calculating, tools.

4.4 Fixing a range of floor and wall tiles.

Range: measuring, marking, square, positioning and fixing of different types/sizes of tiles, cutting tiles, fixing and levelling trim and decoupling membrane.

4.5 Applying adhesives.

Range: fixing, securing methods and serrating technique.

4.6 Finishing to quality standards.

Range: use of appropriate grouting/silicone sealants.

4.7 Maintain safe working area.

Range: cleaning and maintaining safe work area, cleaning tools and equipment, disposal of waste materials, hazards.

Delivery outcomes (depth of content)

4.1-4.7 Learners will be able to safely and effectively carry out and complete wall and floor tiling tasks including preparing, applying adhesive or grout, fixing and finishing in line with drawings, specifications, industry standards and given instructions using the appropriate tools, equipment and materials. Materials to include:

- ceramic and porcelain tiles (wall and floor)
- adhesives and grouts (ready mix and powder)
- accessories: trims (edge, angle and sealing), tile spacers.

Learners will be able to check surface backgrounds are flat, level, rigid, plumb and clean.

Learners will be able to establish setting out points, do basic calculations and check dimensions using different tools and equipment to include builder's square, spirit level, straight edge, gauging rod for alignment and size variants of tiles.

Learners will be able to work responsibly and safely to produce the appropriate standard of work in line with required standards and specifications.

Learners will be able to maintain a clean, safe working area and identify work related hazards ensuring they adhere to relevant information from sources such as data sheets, risk assessment, manufacturer's literature. They will be able to identify signs and notices, use appropriate PPE and manual handling techniques.

Learning outcome:

5. Understand performance criteria for the completion and evaluation of wall and floor tiling tasks

Criteria

5.1 Evaluation against industry standards.

Range: quality of installation and application, working to tolerances, ability to work to set timescales and safety.

5.2 Performance analysis.

Range: self-evaluation, oral discussion, written feedback, quality of work.

Delivery outcomes (depth of content)

5.1 Learners will recognise the industry standards expected within the wall and floor tiling trade and be able to evaluate their own performance against these standards. Learners will understand the importance of completing tasks on time and as scheduled and in a safe manner.

5.2 Learners will understand the importance of self-evaluating their performance in completing work tasks and of receiving feedback from others. Learners will recognise the opportunity to improve their own performance by self-evaluation by demonstrating key reflection skills when reviewing the working stages and sequence required to plan, prepare, carry out and complete wall and floor tiling tasks. Learners will also then reflect upon their practices and highlight areas for development.