

**Level 2 - Principal Learning
Specification (2764-02)
Assessment 2013 onwards**



Construction and the Built Environment

This Principal Learning specification should be read in conjunction with:

- Specimen assessment materials and mark schemes for Principal Learning
- Teacher guidance materials for Principal Learning
- Examiners' Reports for Principal Learning

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1 Introduction

1.1 Why choose City & Guilds?

City & Guilds is a household name for vocational qualifications. City & Guilds offers over 500 awards across a range of industries. With over 8500 centres in over 100 countries, City & Guilds is recognised by employers worldwide. It works closely with employers and industry bodies to ensure that its qualifications provide the benchmark standard for workplace skills and knowledge.

Principal Learning is a blend of academic and vocational skills and that is why City & Guilds is the ideal choice for any school, college or consortium looking to offer them.

Why is City & Guilds so popular?

Specifications

These are designed to the highest standards, so that teachers, learners and learners' parents or guardians can be confident that a City & Guilds award provides an accurate measure of achievement. Assessment structures have been designed to achieve a balance between rigour, reliability and demands on learners and teachers.

Support

City & Guilds runs the most extensive programme of Principal Learning support meetings available in the UK; these are free of charge in the first years of a new specification and are offered at a very reasonable cost thereafter. These meetings explain the specification and suggest practical teaching strategies and approaches that really work.

Service

City & Guilds is committed to providing an efficient and effective service and we are at the end of a phone when you need information, advice or guidance. We will try to resolve issues the first time you contact us and will work with you to find the solution.

Ethics

City & Guilds is a registered charity. We have no shareholders to pay. We exist solely for the good of education. Any surplus income is ploughed back into educational research and our service to you, our customers. We don't profit from education, you do.

If you are an existing customer with City & Guilds, we thank you for your support. If you are thinking of adopting City & Guilds for Principal Learning, we look forward to welcoming you.

1.2 Why choose the Construction and the Built

Environment Principal Learning?

The Construction and the Built Environment Principal Learning provides a programme of applied and practical learning which introduces learners to the fabric of the world in which we live and its impact on individuals and communities. This Principal Learning gives learners the opportunity:

- to acquire knowledge of the construction and built environment industries
- to develop understanding of the extent and significance of the built environment and of the activities which shape, develop and influence it
- to develop skills relevant to the construction and built environment industries.

The Principal Learning will enable learners to progress into further and higher education and future employment.

1.3 How do I start using this specification?

You will need to register your centre with City & Guilds (see Section 5.2). This will enable us to ensure that you receive all the material needed to help you to deliver units, and to enter your learners for examinations. This is particularly important where examination material is issued before the entry deadline. You can let us know by completing the appropriate registration forms. We will send copies to your exams officer and they are also available on www.cityandguilds.com

If your centre is new to City & Guilds, please contact your local City & Guilds regional office.

2 Specification at a glance

2.1 Level 2 Construction and the Built Environment Principal Learning at a glance

All seven units are compulsory

Unit 1	60 GLH
Design the built environment: the design process Internally set and marked	
Unit 2	60 GLH
Design the built environment: materials and structures Internally set and marked	
Unit 3	60 GLH
Design the built environment: applying design principles Internally set and marked	
Unit 4	60 GLH
Create the built environment: structures Internally set and marked	
Unit 5	60 GLH
Create the built environment: using tools Internally set and marked	
Unit 6	60 GLH
Value and use of the built environment: communities Internally set and marked	
Unit 7	60 GLH
Value and use of the built environment: facilities management Externally assessed	

3 Principal learning

3.1 Personal, Learning and Thinking Skills

The Framework of Personal, Learning and Thinking Skills 11-19 comprises six groups of skills that, together with the Functional Skills of English, mathematics and ICT, are essential to success in learning, life and work. For each group there is a focus statement that identifies the main PLTS in that group. This is followed by a set of outcome statements that are indicative of behaviours and personal qualities associated with each group of skills.

Each group of skills is distinctive and coherent. The groups are also inter-connected. Learners are likely to encounter skills from several groups in any one learning experience.

Listed below are the PLTS that are integrated within the assessment criteria in each unit. A copy of the PLTS framework should be given to each learner. Following these descriptors is a table showing the PLTS in the seven units of the Level 2 Construction and the Built Environment Principal Learning.

Independent enquirers
Focus: Young people process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.
Young people: IE1 identify questions to answer and problems to resolve IE2 plan and carry out research, appreciating the consequences of decisions IE3 explore issues, events or problems from different perspectives IE4 analyse and evaluate information, judging its relevance and value IE5 consider the influence of circumstances, beliefs and feelings on decisions and events IE6 support conclusions, using reasoned arguments and evidence
Creative thinkers
Focus: Young people think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.
Young people: CT1 generate ideas and explore possibilities CT2 ask questions to extend their thinking CT3 connect own and others' ideas and experiences in inventive ways CT4 question own and others' assumptions CT5 try out alternatives or new solutions and follow ideas through CT6 adapt ideas as circumstances change

Reflective learners

Focus:

Young people evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.

Young people:

RL1 assess themselves and others, identifying opportunities and achievements

RL2 set goals with success criteria for their development and work

RL3 review progress, acting on the outcomes

RL4 invite feedback and deal positively with praise, setbacks and criticism

RL5 evaluate experiences and learning to inform future progress

RL6 communicate their learning in relevant ways for different audiences

Team workers

Focus:

Young people work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form trusting relationships, resolving issues to reach agreed outcomes.

Young people:

TW1 co-operate with others to work towards common goals

TW2 reach agreements, managing discussions to achieve results

TW3 adapt behaviour to suit different roles and situations

TW4 show fairness and consideration to others

TW5 take responsibility, showing confidence in themselves and their contribution

TW6 provide constructive support and feedback to others

Self-managers Focus:

Young people organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities.

Young people:

SM1 seek out challenges or new responsibilities and show flexibility when priorities change

SM2 work towards goals, showing initiative, commitment and perseverance

SM3 organise time and resources, prioritising actions

SM4 anticipate, take and manage risks

SM5 deal with competing pressures, including personal and work-related demands

SM6 respond positively to change, seeking advice and support when needed

Effective participators

Focus:

Young people actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves.

Young people:

EP1 discuss issues of concern, seeking resolution where needed

EP2 present a persuasive case for action

EP3 propose practical ways forward, breaking these down into manageable steps

EP4 identify improvements that would benefit others as well as themselves

EP5 try to influence others, negotiating and balancing diverse views to reach workable solutions

EP6 act as an advocate for views and beliefs that may differ from their own

This table shows the coverage of PLTS in the seven units of the Level 2 Construction and the Built Environment Principal Learning.

Level 2 Construction and the Built Environment Principal Learning						
PLTS	IE	CT	RL	TW	SM	EP
Unit 1	*		*	*	*	
Unit 2	*	*	*	*	*	*
Unit 3	*	*	*	*	*	*
Unit 4	*	*	*			*
Unit 5	*	*		*	*	
Unit 6	*	*				
Unit 7	*					

3.2 Functional Skills signposting

The units may use and/or contribute towards the underpinning skills and knowledge of the Functional Skills in the following areas, depending on the precise nature of the work done in the Principal Learning.

The Principal Learning	Functional Skills		
Unit 1 Design the built environment: the design process	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 	<ul style="list-style-type: none"> • Representing situations using Mathematics Level 2 • Analysing and processing using Mathematics Level 2 • Interpreting and presenting results Level 2 	<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2
Unit 2 Design the built environment: materials and structures	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 	<ul style="list-style-type: none"> • Representing situations using Mathematics Level 2 • Analysing and processing using Mathematics Level 2 • Interpreting and presenting results Level 2 	<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2
Unit 3 Design the built environment: applying design principles	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 	<ul style="list-style-type: none"> • Representing situations using Mathematics Level 2 • Analysing and processing using Mathematics Level 2 • Interpreting and presenting results Level 2 	<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2
Unit 4 Create the built environment: structures	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 		<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2
Unit 5 Create the built environment: using tools	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 		<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2

<p>Unit 6 Value and use of the built environment: communities</p>	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 	<ul style="list-style-type: none"> • Representing situations using Mathematics Level 2 • Analysing and processing using Mathematics Level 2 • Interpreting and presenting results Level 2 	<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2
<p>Unit 7 Value and use of the built environment: facilities management</p>	<ul style="list-style-type: none"> • Speaking and listening Level 2 • Reading Level 2 • Writing Level 2 	<ul style="list-style-type: none"> • Representing situations using Mathematics Level 2 • Analysing and processing using Mathematics Level 2 • Interpreting and presenting results Level 2 	<ul style="list-style-type: none"> • Use ICT systems Level 2 • Find and select information Level 2 • Develop, present and communicate information Level 2

3.3 The three themes of the Construction and the Built Environment Principal Learning

The Principal Learning of the Construction and the Built Environment Principal Learning is centred around three themes:

1. Design the built environment
2. Create the built environment
3. Value and use of the built environment

This thematic approach provides an opportunity to make explicit the whole built environment cycle and reflects its nature and complexity. The programme of learning provides the thematic approach to the built environment and includes: how solutions to needs are designed; what processes are involved in creating buildings and structures; the value and uses of those buildings and structures; and the impact they have on communities and individuals.

3.4 Level 2 Units

Level 2 Unit 1: Design the built environment: the design process

What is this unit about?

The purpose of this unit is for learners to explore the factors that affect the design process. Learners will develop an understanding of planning requirements and their impact on design. The unit also covers the nature and use of utilities in the design of the built environment, and the technical information used in the design of the built environment.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understand the factors that influence the design process
2. understand planning requirements and how they are applied to a wide range of different developments
3. know the technical information needed to support the design process
4. be able to accommodate primary service utilities in the design process.

Assessment criteria

1. Factors that influence the design process

The learner can:

- 1.1 identify and describe factors that influence the design process (IE5):
 - a. community needs
 - b. social impact of proposed buildings and structures
 - c. economic issues:
 - o project funding
 - o impact of good design
 - o anticipated lifespan of buildings and structures
 - o life-cycle costs
 - d. infrastructural requirements:
 - o transport
 - o utility services
 - e. legal controls on design:
 - o statutory
 - o regulatory
 - o developmental
 - f. environmental issues:
 - o minimisation of impact of the built environment on the natural environment
 - o protection of the natural environment by means of design
 - o sustainable construction techniques.

2. Planning requirements

The learner can:

- 2.1 outline main planning requirements in terms of:
 - a. buildings of different function
 - b. buildings of different size
 - c. legislative and regulatory requirements
 - d. ensuring decisions meet legislative and regulatory requirements
 - e. potential requirement for alternative design solutions to meet planning requirements
- 2.2 differentiate between the roles and responsibilities of:
 - a. designers
 - b. planners.

3. Technical information used in design

The learner can:

- 3.1 differentiate between the various forms of technical information used in design:
 - a. standards for material and component production
 - b. quality control issues
 - c. methods of working
 - d. manufacturers' product information
 - e. environmental information such as climatic information
 - f. local topography
 - g. local authority guidelines and requirements

- 3.2 select and use appropriate technical information to inform the design process
- 3.3 produce and interpret sketches, drawings, schedules and specifications, as part of a team, to support their exploration of the design cycle from the perspective of (IE3) (RL6) (SM3) (TW1,2):
 - a. designers
 - b. planners.

4. Primary services utilities

The learner can:

- 4.1 compare and contrast the way different services' utilities are integrated into a design (IE4, 6):
 - a. early checking of availability of services' utilities
 - b. early decision on intended location of services' utilities
 - c. distribution and scaling down for use
 - d. access for maintenance and repair
 - e. environmental impact.

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here.

Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit is assessed through a centre set and marked assignment. Internal assessments are subject to moderation by City & Guilds.

The learner will complete an assignment which should be based upon knowledge and understanding of the factors that influence the design process and the ways in which the planning process is used to control design for the benefit of the community. The assignment should also test the learner's knowledge and understanding of a wide range of the technical information used to inform and progress the design process, and of the ways in which the primary services utilities are provided to buildings and structures. The assignment should do all of this in a sustainable context, wherever possible.

The evidence submitted must be based on a building or other structure either at the design stage or under construction; an already constructed building or structure; or a realistic teacher-devised scenario.

If all, or part of, the evidence produced by a learner relates to outcomes produced as a result of working in a group, it must be clear which evidence is to be credited to the individual learner.

The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and witness testimony should be used to support the use of team work. Evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. In the assignment, the Learner will produce:

1. a report on the design process, including the provision of the primary services utilities
2. a graphical representation of the design cycle in terms of the stages of the cycle and the specific contributions made by designers and planners
3. a folder of supplementary technical evidence with text, sketches, drawings, schedules, specifications and references to supporting legislation and regulations
4. evidence of working as part of a team in relation to the design and planning process.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Identify and describe the various factors that influence, or have influenced, the design process in terms of community, social, economic, legal, environmental and infrastructural needs and issues.
- Describe and analyse how the planning system is/was used to control design in the built environment, with particular reference to the main legislative and regulatory requirements.
- Produce a simple flow diagram to show how the various stages of the design and planning processes integrate to create a design.
- Identify and describe a range of selected technical information used to support the design and planning process, and briefly explain how, when and where such information is/was used. Examples of such technical information may be enclosed with the work but should not be used to replace text and/or accompanying images.
- Identify the primary services utilities that are generally provided to buildings and outline the procedures used to plan the distribution and installation of such services, and the factors that must be taken into account, such as entry into buildings, access for maintenance and repair, and the environmental impact of providing services utilities.

Learners should produce a report covering the above tasks using drawings, photographs and other images to support their work. It is acceptable for them to work with others in a team and to use their opinions and judgements, and those of construction professionals, to support their work.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Factors that influence the design process	25%	12
2 Planning requirements	25%	12
3 Technical information used in design	25%	12
4 Primary services utilities	25%	12
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Factors that influence the design process	<p>0– 4 marks</p> <p>Demonstrated a basic knowledge and understanding of the factors that influence the design process by identifying and briefly describing a limited number of these factors.</p> <p>Related the factors to the building or structure under consideration in a superficial but generally accurate fashion.</p>	<p>5 – 8 marks</p> <p>Demonstrated a partial knowledge and understanding of the factors that influence the design process by identifying and briefly describing a wide range of these factors.</p> <p>Related the factors to the building or structure under consideration in a clear and accurate fashion.</p>	<p>9 – 12 marks</p> <p>Demonstrated an in-depth knowledge and understanding of the factors that influence the design process by identifying and briefly describing a comprehensive range of these factors.</p> <p>Related the factors to the building or structure under consideration in a thorough and detailed fashion.</p>
2. Planning requirements	<p>0 – 4 marks</p> <p>Demonstrated a basic knowledge and understanding of the requirements of the planning process by identifying a limited number of these requirements, briefly describing how they interact with the design process to produce design solutions.</p> <p>Produced a basic flow diagram of the interactive process.</p>	<p>5 – 8 marks</p> <p>Demonstrated a partial knowledge and understanding of the requirements of the planning process by identifying a wide range of these requirements, clearly describing how they interact with the design process to produce design solutions.</p> <p>Produced a clear and accurate flow diagram of the interactive process.</p>	<p>9 – 12 marks</p> <p>Demonstrated an in-depth knowledge and understanding of the requirements of the planning process by identifying a comprehensive range of these requirements, clearly and precisely describing how they interact with the design process to produce design solutions.</p> <p>Produced a detailed flow diagram of the interactive process.</p>

3. Technical information used in design	<p>0 – 4 marks</p> <p>Identified, as part of a team, some of the technical information used in design, and briefly described how, when and where such information is used.</p>	<p>5 – 8 marks</p> <p>Identified, as part of a team, most of the technical information used in design, and clearly described how, when and where such information is used</p>	<p>9 – 12 marks</p> <p>Identified, as part of a team, all of the technical information used in design, and clearly and precisely described how, when and where such information is used.</p>
4. Primary services utilities	<p>0 – 4 marks</p> <p>Identified a limited range of the primary services utilities generally provided to buildings, and briefly described the installation and distribution procedures used.</p> <p>Considered some of the important factors relating to primary services utilities, including a basic outline of the environmental issues associated with building services.</p>	<p>5 – 8 marks</p> <p>Identified a wide range of the primary services utilities generally provided to buildings, and clearly described the installation and distribution procedures used.</p> <p>Considered most of the important factors relating to primary services utilities, including an accurate and reasoned outline of the environmental issues associated with building services</p>	<p>9 – 12 marks</p> <p>Identified a comprehensive range of the primary services utilities generally provided to buildings, and clearly and precisely described the installation and distribution procedures used.</p> <p>Considered all or almost all of the important factors relating to primary services utilities, including a thorough and detailed treatment of the environmental issues associated with building services</p>

Guidance for delivery

This unit deals with the factors that influence design and planning decisions, the need to consider utilities when designing buildings, and the technical information needed to support the design process. The unit is important because it lays a foundation for all the subsequent units in the Principal Learning at Level 2. It has very close links with Level 2 Unit 2: Design the built environment: materials and structures, and joint delivery of the two units may be considered appropriate.

When delivering this unit, teachers should use a broad range of techniques including lectures, discussions, seminar presentations, case studies, site visits, supervised practical sessions and realistic work environments.

Teachers should encourage learners to undertake research using the Internet and/or local library resources. The use of personal and/or industrial experience will also prove invaluable and will reduce the time required for delivery.

Whatever teaching, learning and assessment strategies are employed, health, safety and welfare issues are paramount at all times. Risk assessments must be completed for all activities and should be strictly reinforced through close supervision in workshops, studios and classrooms. Design is not generally considered a high risk activity for those who do it, but the designs produced can have serious health, safety and welfare consequences for those charged with constructing the building, and for those who use the building after construction.

There are legal issues implicit in Assessment criteria 1av, 2aiii and 3avii, and ethical issues associated with Assessment criteria 1ai-ii, 1aiii (project funding), 1avi, 2aiv, 3aii and 4av. These should be signposted to the learner but there is no requirement for a detailed treatment of either at this stage.

The most realistic work environment would be a design or planning office, and any form of work placement, work experience or work shadowing in such an environment would prove invaluable.

If this is not available, and then presentations by design and/or planning professionals would be very useful. Should neither be feasible, the learner's home is suggested as a convenient and accessible 'work-related environment' (see 'Opportunities for applied learning' below).

Opportunities for applied learning

The main method of communication in construction design is sketching and drawing. Learners will need to be able to interpret and produce design sketches and drawings, but they are not required to demonstrate a professional level of competence at this stage.

A range of pre-prepared design sketches and drawings of all kinds should be made available for the learners to peruse. These could be either hard copy or electronic. Whichever kind is preferred, the learners will benefit from the use of design drawings at all stages of the cycle and photographs, or other images, of the actual construction project, again at every stage, or visits to the project, both during and after construction, to show how designs are realised.

The use of architectural models will aid understanding of what is meant by the terms 'elevation', 'section' and 'plan'. Flash cards of standard drawing conventions should be made available to support a variety of learning activities.

Teaching and learning will be enhanced by linking the content of the unit to a property that is both familiar and accessible to the learner. This suggests the use of the learner's own home, or the centre where they are a learner, as a theme. Learners could produce sketches and drawings of their own home or centre. These could include an elevation (1:100), a plan (1:50) and a section through a part of the building (1:20). They could attempt to trace the building services in their home or centre, and perform a simple environmental assessment.

All of the above should be used to generate discussions about why certain design decisions have been taken. This could include exploration of what is similar and what is different; the positioning of staircases; the relative positions of kitchen, bathroom and toilet; whether the home or centre is energy efficient; whether the methods used to construct the buildings are sustainable; and what changes and improvements could be made in the future.

Learners spend most of their lives surrounded by the built environment, which will have been designed to fulfil a specific function or purpose. This built environment is a valuable teaching resource. Learners should research what is meant by the phrase 'form follows function' and then try to fit this design concept to the buildings they see around them. They could take photographs of a sports stadium such as a football ground, and of shops, supermarkets, cinemas, various types of bridges and towers, leisure centres, builders' merchants, factories and office blocks. They could then compile these photographs into a presentation in which they explain in basic terms why, for example, a modern football stadium has cantilever stands and no columns, why a supermarket has portal frames that provide large areas of clear floor space, and why some bridges have cables and others do not.

Learners should comment upon how each building or structure fits in (or not) with surrounding buildings and structures, whether sustainable materials and techniques have been used in its design and Construction and how the design utilises space. Whole class discussions will prove useful here as the learners discuss each other's images. Teachers must be careful not to be critical, and careful steering of the discussion will be required to ensure that all feedback is encouraging. Learners must be motivated to think about design constructively.

An understanding of how the planning and design process is managed is essential, and learners would benefit from access to flow diagrams that show how an idea in the client's mind eventually becomes an approved design solution. There is no requirement for the learner to understand the 'RIBA Plan of Work' at this stage but they should recognise that there is order to the process, and that most designers will follow a structured procedure to arrive at a final design solution. Visits to the premises of design companies or to the local authority planning department, or a presentation by experienced designers and planning and building control officers, will help bring the subject to life. There is no requirement for this to be extended to the resource and project planning for the actual construction period. It is the initial planning and design that are important here.

What activities might be involved in this unit?

- Producing sketches and drawings, and taking photographs, of the local built environment.
- Visiting design and planning offices, construction sites and plumbers' merchants.
- Interviewing experienced design and planning professionals.
- Tracing the services in the learner's own home, school or college.
- Compiling a library of the technical information used in planning and design.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone. Alternative approaches could be selected.

The learner could develop PLTS by:

Independent enquirers

- planning and carrying out research into the factors that influence the design process
- exploring issues and problems from different perspectives in order to identify the main planning requirements for a range of designs.

Creative thinkers

- asking questions of experienced construction personnel to determine what type of technical information they use in their everyday work
- reflecting upon how design decisions regarding the form of a building or structure relate to the intended function of that building or structure

Reflective learners

- setting themselves targets and goals in the production of any sketches, drawings, schedules and specifications required
- monitoring and reviewing their progress towards targets and goals in the production of any sketches, drawings, schedules and specifications required

Team workers

- making effective contributions to group discussions when interviewing design and planning personnel and exploring design decisions

Self-managers

- organising their time and resources to achieve targets and goals when completing the assignment.

Suggested learning resources

Books

- Building Construction Handbook. 6th Edition - Chudley & Greeno - Published by: Butterworth - Heinemann, 2006 - ISBN 0750668229
- Architectural Graphics – 3rd Edition - Ching F D K - Published by: Van Nostrand Reinhold, 1996 - ISBN 0442022379
- Building Services Handbook - Hall, F & Greeno, R - Published by: Butterworth-Heinemann, 2001 - ISBN 0750646926
- Sustainable Practices in the Built Environment - 2nd Edition -Langston, Craig A & -Published by: -Butterworth-Heinemann, 2001 Ding Grace KC- ISBN 0750651539
- Reekie’s Architectural Drawing - 4th Edition - Reekie F & McCarthy T -Published by: Edward Arnold, -1995 -ISBN 0340573244
- Architect’s Job Book - RIBA- Published by: RIBA Publications, 1995 - ISBN 1 859460070
- Managing the Building Design Process- Tunstall, G -Published by: Butterworth-Heinemann Ltd, -2000 -ISBN 0750650699
- Architectural Design Procedures - 2nd Edition -Thompson A -Published by: Architectural Press, 1998 -ISBN 0340719419
- Green Building Handbook - Woodley, T et al - Published by: ACTAC, 1997 - ISBN: 0419226907

Journals and magazines

- Architects’ Journal - AJ
- Building Design

Videos, CDs and DVDs

- The Construction of Houses – eight in series, more on the way University of West of England Video Project
- Building History and Building Conservation – five in series University of West of England Video Project
- A Sampler of Alternative Homes – Approaching Sustainable Architecture (DVD) Kelly Hart
- E-resources for construction www.rsc-wales.ac.uk

Websites

- Royal Institute of British Architects www.riba.org
- Chartered Institute of Architectural Technologists www.ciat.org.uk
- Chartered Institute of Building www.ciob.org.uk
- Royal Town Planning Institute www.rtpi.org.uk
- ConstructionSkills www.citb.org.uk
- Constructive www.bconstructive.co.uk
- Carbon Trust www.actionenergy.co.uk
- Design Quality Indicator www.dqi.org.uk
- Ciria www.ciria.org.uk
- Building Connections www.buildingconnections.co.uk
- Commission for Architecture and the Built Environment www.cabe.org.uk/teachingresources
- Architecture Centre Network www.architecturecentre.net
- BBC www.bbc.co.uk

Level 2

Unit 2: Design the built environment: materials and structures

What is this unit about?

The purpose of this unit is to give learners an understanding of the properties and uses of construction materials. It will explore the influence of sustainable materials on the design process, as well as examining common structural forms and building elements.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. know about different construction materials and their properties, including sustainable materials
2. are able to test construction materials to establish their suitability for a particular job
3. understand structural forms and building elements
4. know about traditional and modern methods of construction.

Assessment criteria

1. Construction materials and their properties

The learner can:

- 1.1 identifies and describes the properties and uses of construction materials:
 - a. materials in common use:
 - o Timber
 - o Cements and concrete
 - o Metals
 - o Bricks
 - o Plastics
 - o plasters
 - o paints
 - o Glass
 - b. raw materials, including their location, extraction and/or harvesting
 - c. manufacture of construction materials and components from raw materials
 - d. properties of commonly specified construction materials:
 - o Strength
 - o Elasticity
 - o Porosity and water absorption
 - o Thermal and moisture movement
 - o Durability
 - o Workability
 - e. uses of commonly specified construction materials:
 - o Fitness for purpose
 - o Visual appearance
 - o Cost
 - o Resistance to degradation
 - o ease of working on-site
 - o Consideration of interrelationships between materials
 - f. typical failures of commonly specified construction materials:
 - o Corrosion
 - o Fungal attack
 - o Insect attack
 - o Frost attack
 - o Sulphate attack
 - o Efflorescence
 - o UV attack
 - g. prevention and remediation of failure
- 1.2 identifies and describes developments in the use of sustainable materials:
 - a. the influence of sustainable materials on the design process
 - b. recycling, reclamation, reusability (including packaging)
 - c. salvaged, refurbished or remanufactured materials
 - d. resource efficient manufacturing processes
 - e. the specification of natural, plentiful or renewable resources wherever possible
 - f. locally available materials specified wherever possible
 - g. durable materials specified wherever possible.

2. Testing construction materials

The learner can:

- 2.1 use appropriate personal protective equipment (PPE) and work as part of a team to perform simple tests on construction materials (IE2) (SM3) (TW1, 2, 6)
- 2.2 interprets results of tests on construction materials (IE4) (RL5)
- 2.3 specifies appropriate materials for given purposes on the basis of their properties-in-use (IE6).

3. Structural forms and building elements

The learner can:

- 3.1 compare and contrast structural forms and building elements used in design (IE4, 6):
 - a. structures:
 - o Traditional
 - o Crosswalk
 - o framed (steel, timber and reinforced concrete)
 - b. building elements:
 - o Foundations
 - o Ground floors
 - o Walls
 - o Frames
 - o Cladding
 - o Upper floors
 - o Roofs
 - o Doors and windows
- 3.2 produce sketches, drawings, schedules and specifications of structural forms and elements (CT1) (EP2, 3).

4. Traditional and modern methods of construction

The learner can:

- 4.1 compare and contrast traditional and modern methods of construction (IE4, 6)
- 4.2 explore on-site and off-site construction techniques in terms of (IE2) (CT2):
 - a. nature and use of prefabricated elements
 - b. common structural forms and materials used with above
 - c. scope for using sustainable materials and techniques
 - d. when to use traditional on-site construction processes
 - e. advantages and disadvantages of all the above.

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here.

Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit is assessed through a centre set and marked assignment. Internal assessments are subject to moderation by City & Guilds.

This method of assessment allows the centre to contextualise the assignment in their local area, using up-to-date information. The assignment should be based upon knowledge and understanding of the properties and uses of construction materials (and sustainable construction materials in particular) and the skills needed to perform simple tests on construction materials interpret the results correctly and specify the materials appropriately. The assignment should also test knowledge and understanding of the different building elements used in construction, the way these are brought together in the common structural forms, the differences between the traditional and modern methods of construction used to do this, and the perceived advantages of the latter.

Evidence must be based on a building or other structure either at the design stage or under construction; an already constructed building or structure; or a realistic teacher-devised scenario. If all, or part of, the evidence produced by a learner relates to outcomes produced as a result of working in a group, it must be clear which evidence is to be credited to the individual learner. The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and witness testimony should be used to support the use of team work. Evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. In the assignment, the Learner will produce:

1. a written report on the properties and uses of construction materials and, in particular, the contribution each makes to sustainability
2. evidence of performing simple tests on construction materials, as part of a team
3. results of the tests and an interpretation of the results
4. specifications of construction materials based on their properties-in-use
5. a written report on:
 - a. structural forms and building elements supported by sketches, drawings, schedules and specifications, as appropriate
 - b. the differences between traditional and modern methods of construction and the advantages and disadvantages of each.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Identify and describe the properties of materials specified for a given building or structure.
- Track what happens to any three of these materials from the extraction of their raw materials, through any manufacturing processes, to their specification based on their predicted properties-in-use, to their short- and/or long-term sustainability, to any anticipated modes of failure, through to the techniques used to prevent and/or remedy such failures.
- Perform, as part of a team, simple tests for any four properties of all three materials (identified above), interpret the results, and explain how their properties influenced their specification. Tabulate and interpret the results of the tests using calculations and graphs as appropriate.
- Identify both the building elements used in the construction of the building and its overall structural form. Compare the building elements used in this building with those used in another building or structure with a different structural form. Sketches, drawings, schedules and specifications should be Included wherever appropriate.
- Decide whether the building is being constructed using traditional or modern methods of construction and compare the methods and techniques used with another building or structure being constructed using different methods and techniques. Compare and contrast traditional and modern methods of construction in terms of the technical information required for each, the important differences between the two methods, and the perceived advantages and disadvantages of each.

It is acceptable for learners to use opinions gained from team discussions with other learners and construction professionals to support their work.

Each of the tasks in the assignment structure above offers an opportunity for experiential learning. The learner should plan their work and formulate their own initial findings. They should revisit these initial findings after discussions with other learners and construction professionals, and review the initial findings in light of the outcomes of such discussions.

A suitable period of reflection should follow upon completion of the assessment for this unit. The learner should evaluate what they have done, what went well, what went less well and how they would do things differently if they were to do the assessment again. The learning and assessment that comprise this unit can then be used by the learner to support study at a higher level.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Construction materials and their properties	25%	12
2 Testing construction materials	25%	12
3 Structural forms and building elements	25%	12
4 Traditional and modern methods of construction	25%	12
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Construction materials and their topics	<p>0 – 4 marks</p> <p>Demonstrated a basic knowledge and understanding of construction materials by identifying and briefly describing examples of the materials used in construction in terms of their manufacture, properties, specification, use, modes of failure, protection and associated sustainability issues.</p>	<p>5 – 8 marks</p> <p>Demonstrated a partial knowledge and understanding of construction materials by identifying and clearly describing all of the materials in general use in terms of their manufacture, properties, specification, use, modes of failure, protection and associated sustainability issues.</p>	<p>9 – 12 marks</p> <p>Demonstrated an in-depth knowledge and understanding of construction materials by identifying and fully describing a comprehensive range of available materials in terms of their manufacture, properties, specification, use, modes of failure, protection and associated sustainability issues.</p>
2. Testing construction materials	<p>0 – 4 marks</p> <p>Worked with others as part of a team to perform tests on a limited number of construction materials.</p> <p>Interpreted some of the test results correctly and made a tenuous link between properties and uses.</p>	<p>5 – 8 marks</p> <p>Worked with others as part of a team to perform tests on a wide range of the materials in common use.</p> <p>Effectively interpreted most of the test results correctly and made a sensible and logical link between properties and uses.</p>	<p>9 – 12 marks</p> <p>Worked with others as part of a team to perform tests on a comprehensive range of construction materials.</p> <p>Correctly interpreted all or nearly all of the test results and made a strong, clear and precise link between properties and uses.</p>
3. Structural forms and building elements	<p>0 – 4 marks</p> <p>Identified and described a limited range of building elements and structural forms, and briefly compared their use in different buildings or structures.</p>	<p>5 – 8 marks</p> <p>Identified and described a wide range of building elements and structural forms, and clearly and effectively compared their use in different buildings or structures.</p>	<p>9 – 12 marks</p> <p>Identified and described a comprehensive range of building elements and structural forms, and thoughtfully and precisely compared their use in different buildings or structures.</p>

4. Traditional and modern methods of construction	0 – 4 marks Briefly compared and contrasted traditional and modern methods of construction in terms of a limited range of their differences, and some of the perceived advantages and disadvantages.	5 – 8 marks Effectively compared and contrasted traditional and modern methods of construction in terms of a broad range of their differences and most of the perceived advantages and disadvantages.	9 – 12 marks Thoroughly and precisely compared and contrasted traditional and modern methods of construction in terms of a full range of their differences, and all or nearly all of the perceived advantages and disadvantages.
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Guidance for delivery

When delivering this unit, teachers should use a broad range of techniques including lectures, discussions, seminar presentations, case studies, visits to testing laboratories, supervised practical sessions, and realistic work environments.

Teachers should encourage learners to undertake research using the internet and/or local library resources. The use of personal and/or industrial experience will also prove invaluable and will reduce the time required for delivery.

The unit deals with the materials traditionally specified in the design process; the increased use of sustainable construction materials; their effectiveness in addressing environmental issues; and the structural forms and building elements that such materials are used to construct. The unit builds upon the design issues covered in Level 2 Unit 1: Design the built environment: the design process, and is important because, together with Unit 1 and Unit 3: Design the built environment: applying design principles, it sets the scene for all the subsequent units in the Principal Learning at Level 2. As this unit has very close links with Unit 1, joint delivery of the two units may be considered appropriate.

There are no legal issues implicit in any of the Assessment criteria, but 1b has ethical implications, given the current concerns about global warming and climate change. This should be signposted to the learner as an ethical issue but there is no requirement for an extended treatment beyond what is already in the unit specification.

It is difficult to achieve a thorough understanding of the properties of materials without undertaking some practical testing of materials. This should include tests for strength, elasticity, porosity, water absorption, and thermal and moisture movement. Specialist apparatus is available to assist with all of the above but it is possible to construct simple test rigs capable of obtaining approximate results. If a centre lacks such equipment, then a useful link could be made with a local further education college, university, or local authority testing laboratory.

When undertaking any practical activities, health, safety and welfare issues are paramount at all times. Risk assessments must be completed for all activities and should be strictly reinforced through close supervision in workshops, laboratories and classrooms.

The most realistic work environment would be a testing laboratory, and any form of work placement, work experience or work shadowing in such an environment would prove invaluable. If this is not available then a presentation by materials testing technician and/or a design professional with experience of specifying materials would be very useful. Even if none of the above are available, learners should be encouraged to closely examine their immediate surroundings, attempt to identify the materials that have been used, and ask questions about what the materials are intended to achieve and how well they appear to have achieved that purpose.

The most important thing the learner will take from this unit is an understanding that the use to which a material is put depends entirely upon how it will perform in the environment in which it is to be used.

Opportunities for applied learning

The key applied learning for this unit is that which tests a range of construction materials, both traditional and sustainable, and uses the results of such tests to guide the learner to the specification of the appropriate material for the appropriate task. In general, it is desirable to test structural materials such as timber, steel, brick and concrete (at various water-cement ratios) for strength; porous materials such as timber, brick and concrete for water absorption; metals for elasticity; metals and plastics for thermal movement; timber and bricks for moisture movement; and concretes for workability on-site. The results do not have to be precisely accurate as long as they are relative. Examples might include the following: steel is stronger than timber but timber is lighter; plastics produce the greatest thermal movement; high water-cement ratios mean weaker concrete mixes; and common bricks are more porous than engineering bricks.

The use of video, CD, DVD and secondary sources of information are acceptable. Whether practical opportunities are available or not, learners could examine their homes and other familiar buildings to which they have access and compare them with the homes of other learners, etc. They could identify the materials and structural forms used in each home. They could perform a simple environmental assessment on the materials and structural forms used in these buildings and link both to the period in which the building was constructed. This could be used to generate discussions about what is similar, what is different, why things are the way they are, whether the materials and methods used to construct the house are sustainable, what important changes have been made in the last decade or two, and what might happen in the future.

The built environment comprises more than houses, and learners need to consider the materials and structural forms used for other buildings such as offices, factories, supermarkets, schools and hospitals as well as structures such as bridges, dams, towers and retaining walls. Visits to design studios and offices, planning departments, and buildings and structures, either during the construction period or post-construction, will engage the learners more thoroughly than any amount of classroom work. Such visits will also offer opportunities to compare traditional and modern methods of construction and the materials used in each. In the absence of a full range of suitable opportunities for such visits, use could be made of video, CD and DVD sources. Visits by, and presentations from, design, planning and construction personnel at appropriate stages of the unit are strongly recommended.

Learners should be encouraged to develop individual portfolios of photographs, pictures and sketches or plans of local buildings and structures. These should be annotated with details of the materials specified by the designers and used in the construction. These images can be used to support class presentations and discussions.

Learners should be encouraged to consider the materials that are not visible to the naked eye. For example, they should not assume that a steel-framed building with brick cladding is entirely made out of brick. This is not always apparent to learners in the early stages of teaching and learning, and the teacher may need to lead the learner to the correct answers in certain cases.

A simple cost-benefit analysis of the comparative advantages and disadvantages of on-site and off-site construction techniques could be used to highlight the reason why the industry is moving towards the latter. There is no requirement for in-depth knowledge or accurate cost estimates but an approximate appraisal of different labour requirements, transport requirements, guarantees of quality, Health and Safety issues, speed of construction etc., will help inform a very useful discussion.

What activities might be involved in this unit?

- Producing sketches and drawings, and taking photographs, of the local area.
- Visiting construction sites and design and planning offices.
- Interviewing experienced design and planning professionals.
- Performing simple tests on construction materials and interpreting the results.
- Tracking the life-cycles of materials from their raw state to useful product to eventual deterioration.
- Producing basic cost-benefit analyses of traditional and modern methods of construction.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone.

Alternative approaches could be selected. The learner could develop PLTS by:

Independent enquirers

- planning and carrying out research into the factors that influence material specification
- analysing and evaluating information when considering results of tests on construction materials
- supporting conclusions, using reasoned arguments and evidence when specifying appropriate materials for given tasks

Creative thinkers

- connecting their ideas and experiences in making the link between the properties of construction materials and the uses to which they are put
- balancing the benefits of a given sustainable construction material against the energy cost associated with the manufacturing process used to make that material

Reflective learners

- setting themselves targets and goals in the production of any sketches, drawings, schedules and specifications associated with structural forms and building elements
- monitoring and reviewing their progress towards targets and goals in the production of any sketches, drawings, schedules and specifications associated with structural forms and building elements

Team workers

- working with others towards common goals when sharing information relating to performance of sustainable construction materials

Self-managers

- organising their time and resources to achieve targets and goals when completing the internally set assignment

Effective participators

- proposing practical and manageable ways forward to a small group after feedback from the teacher on progress with the internal assignment
- identifying improvements to the practical methods used to test construction materials that either produce more accurate results, shorten the test period or reduce the risks associated with testing.

Suggested learning resources

Books

- Design and Construction - Best, de Valence & Langston - Published by: Butterworth-Heinemann, 2002 - ISBN: 0-750-65149-0
- Building Construction Handbook. 6th Edition - Chorley & Greene - Published by: Butterworth-Heinemann, 2006 - ISBN 0-750-66822-9
- Building Ecology -Graham, Peter - First Principles for a Sustainable Built Environment - Published by: Blackwell Science (UK), 2002 - ISBN: 0-632-06413-7
- Green Building Bible - Hall, Keith - Published by: The Green Building Press, 2003 – ISBN: 1-898 13001-9
- Materials for Architects and Builders (An Introduction) - Lyons, Arthur - Published by: Butterworth-Heinemann, 2003 - ISBN: 0-750-65725-1
- Basic Construction Materials - Marta, Theodore - Published by: Prentice Hall, 2004 - ISBN: 0-131-43387-3
- Materials in Construction - Taylor, G D Principles, Practice and Performance - Published by: Longman, 2001 - ISBN: 0-582-36934-7
- Green Building Handbook - Woodley, T et al Published by: Spoon Press, 1997-ISBN: 0-419-226907

Journals and magazines

- Architects' Journal - AJ Building Design

Videos, CDs and DVDs

- The Construction of Houses – eight in series, more on the way University of West of England Video Project
- Building History and Building Conservation – five in series University of West of England Video Project
- A Sampler of Alternative Homes – Kelly Hart
- Approaching Sustainable Architecture (DVD)
- E-resources for construction www.rsc-wales.ac.uk

Websites

- Chartered Institute of Architectural Technologists www.ciat.org.uk
- Chartered Institute of Building www.ciob.org.uk
- Royal Town Planning Institute www.rtpi.org.uk
- Construction Skills www.citb.org.uk
- Constructive www.bconstructive.co.uk
- Carbon Trust www.actionenergy.co.uk
- Design Quality Indicator www.dqi.org.uk
- Construction Industry Research and Information Association www.ciria.org.uk
- Building Connections www.buildingconnections.co.uk
- Commission for Architecture and Building Environment www.cabe.org.uk/teachingresources
- Architecture Centre Network www.architecturecentre.net
- BBC www.bbc.co.uk

Level 2

Unit 3: Design the built environment: Applying design principles

What is this unit about?

The purpose of this unit is to explore the application of design principles. Learners will apply their knowledge by designing a complex structure. The unit also concentrates on the careers opportunities available in the design and planning of the built environment, the qualifications needed for progression, and the role of the Professional Institutions.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understands and be able to apply the design principles which affect the design of a complex structure
2. know how to plan a career in design and planning.

Assessment criteria

1. Design principles for the design of a complex structure

The learner can:

- 1.1 applies design principles to produce realistic designs for a complex structure within a team (TW1, 2, 3):
 - a. standard design principles
 - b. functions of structures
 - c. alternative design solutions
 - d. alternative material specifications
 - e. final design solution
 - f. 'build ability' of final design
 - g. skills needed to implement design
- 1.2 produce sketches, drawings, schedules and specifications to support their designs (CT1) (SM2)
- 1.3 use appropriate technical information to inform their design work
- 1.4 communicates design information using verbal and written techniques (RL6) (EP2)
- 1.5 select appropriate materials for given purposes (SM3).

2. Career opportunities within construction design

The learner can:

- 2.1 compare and contrast career development pathways for those involved in design in terms of (IE4, 6):
 - a. roles and responsibilities
 - b. career progression opportunities
 - c. the qualifications required to facilitate career progression
 - d. the range and role of Professional Institutions
- 2.2 produces a personal career development plan (CT1) (RL2) (SM3).

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit is assessed through a centre set and marked assignment. Internal assessments are subject to moderation by City & Guilds.

This method of assessment allows the centre to contextualise the assignment, by encouraging learners to apply design principles to design a complex structure in their own local area, using up-to-date information.

The learner will complete an assignment, the purpose of which is to develop their knowledge and understanding of standard design principles and to develop the design skills required to produce a realistic design for a complex structure. They will use the principles above and the learning provided in Level 2 Unit 1: Design the built environment: the design process, and Level 2 Unit 2: Design the built environment: materials and structures. The assignment also requires the learner to explore the career opportunities and progression routes available in the design of the built environment.

For guidance only, the assignment would meet the requirements of the unit if it were to be based upon the design of a small to medium-sized, single-storey structure with foundations, ground floor, walls, windows, doors and roof. The building or structure may have more than one intended function and the final design solution should be based upon a range of increasingly acceptable design solutions that address a range of issues including disabled access; how the building or structure fits in with its surroundings; provision of natural light and ventilation; the impact of the building or structure on the natural environment; the use of space (including circulation space); the relative positions of kitchen and bathroom; and other issues associated with where the primary services utilities enter and leave the building.

If all or part of, the evidence produced by a learner relates to outcomes produced as a result of working in a group, it must be clear which evidence is to be credited to the individual learner.

The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and witness testimony should be used to support the use of team work. Evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. In the assignment, the Learner will produce:

1. a realistic design for a complex structure, using basic construction design drawing techniques, with evidence, through witness testimony, of team work
2. supplementary textual material including an explanation of any sustainability and build ability issues that arose during the design process, together with material specifications and records of the team approach
3. a career development plan showing opportunities and progression routes available in the design of the built environment.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Employ standard design techniques to design a complex structure, using a sustainable approach throughout.
- Consider 'build ability' at all stages of the design in terms of the intended function of the building and any issues associated with its construction.
- Produce and include intermediate design solutions, material specifications and other documentation as appropriate, together with evidence of a team approach to the incremental improvement of the design. These might include notes and minutes of discussions with other learners and critiques of early design solutions by the teacher and any visiting design and planning professionals.
- Prepare a personal career development plan for careers in the design and planning of the built environment, including information on the training, development and qualifications needed to support progressive career development into a relevant Professional Institution.

This assignment offers an excellent opportunity for experiential learning in terms of the knowledge, understanding and skills required to produce a final design solution for a complex structure using the iterative process by which designs are planned, auctioned, reviewed with clients and planning authorities, and redone in the light of the outcomes of such reviews.

A suitable period of reflection should follow upon completion of the assessment for this unit. The learner should evaluate what was good about their design, what was less good and how they would improve the design if they were to redo the assessment.

The learning and assessment that comprise this unit can then be used by the learner to support study at a higher level, in particular:

- Level 3 Unit 1: Design the built environment: design factors
- Level 3 Unit 2: Design the built environment: stages in the design and planning process
- Level 3 Unit 3: Design the built environment: physical and environmental influences.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Design principles for the design of a complex structure	87.5%	42
2 Career opportunities within construction design	12.5%	6
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Design particles for the design of a complex structure	<p>0 – 14 marks</p> <p>Demonstrated a basic understanding of design principles by using a limited range of such principles, within a team approach, to design a complex structure</p> <p>Produced a design for a complex structure, which demonstrates some evidence of having addressed sustainability and buildability issues</p>	<p>15 – 28 marks</p> <p>Demonstrated a partial understanding of design principles by using a wide range of such principles, within a team approach, to design a complex structure</p> <p>Produced a design for a complex structure, which demonstrates clear evidence of having addressed sustainability and buildability issues</p>	<p>29 – 42 marks</p> <p>Demonstrated an in-depth understanding of design principles by using a comprehensive range of such principles, within a team approach, to design a complex structure</p> <p>Produced a design for a complex structure, which demonstrates detailed and in-depth evidence of having addressed sustainability and buildability issues</p>
2. Career opportunities within construction design	<p>0 – 2 marks</p> <p>Produced a basic plan to support individual career progression, up to professional level</p>	<p>3 – 4 marks</p> <p>Produced a clear and coherent plan to support individual career progression, up to professional level</p>	<p>5 – 6 marks</p> <p>Produced a precise and thoughtful plan to support individual career progression, up to professional level</p>

Guidance for delivery

When delivering this unit, teachers should use a broad range of techniques including lectures, discussions, professional presentations, and design studio and drawing office environments. Teachers should encourage learners to undertake research using the internet and/or local library resources. The use of personal and/or industrial experience will also prove invaluable and will reduce the time required for delivery.

This unit builds upon the design issues covered in other units in the Principal Learning such as Level 2 Unit 1: Design the built environment: the design process, and Level 2 Unit 2: Design the built environment: materials and structures. The unit is important because, together with the other two, it lays the foundation for following units in the Principal Learning at Level 2 and above. Legal issues are a key factor in the design process. Planning permission will not be granted for a design that does not conform to current planning and building control legislation. Therefore, all of Assessment criterion 1a can be considered to have legal implications: i, v and VI in particular. The qualifications required to support career development in design are underpinned by powerful professional institutions and this implies ethical issues throughout the content of the unit. In order to produce designs, the learner will need to understand and perform basic construction design drawing techniques as well as the fundamentals of building design. Learners with skills in using CAD may do so; however, use of CAD is not a requirement of this unit.

Considerations of 'build ability' should be kept simple but should be based on an accepted definition such as: 'the extent to which the design of a building facilitates the ease of construction, subject to the overall requirements of the building'. Learners should consider that 'form follows function'.

Career development is a straightforward topic but needs to be made interesting and relevant to learners. Visits from careers officers and building companies looking for staff will always be helpful, but learners should be encouraged to take an active role in their own learning. This could be done by issuing each learner with different 'you are here' and 'you could be there' cards and asking the learners to plan the journey from one to the other in terms of experience, qualifications and time.

When undertaking any practical activities, health, safety and welfare issues are paramount at all times. Risk assessments must be completed for all activities and should be strictly reinforced through close supervision in design studios, drawing offices and classrooms.

The most realistic work environment would be a drawing office, and any form of work placement, work experience or work shadowing in such an environment would prove invaluable. If this is not available then presentations by architects or another design or planning professional would be very useful. Learners should be encouraged to examine their immediate surroundings; to try to date the buildings, structures and styles that make up their built environment; to consider what materials have been used in their construction; and to ask questions.

Opportunities for applied learning

This unit will offer scope for imagination and creativity if the learner is allowed to choose the structure they wish to design. The teacher should, however, advise the learner on what is achievable in the time allowed and at this level of study. This will generally mean a small to medium-sized, single-storey structure with foundations, ground floor, walls, windows, doors and roof. Teaching and learning strategies for this unit should support designs for a building or structure with more than one intended function. The learner should decide what purpose the building or structure is intended to serve. They should then consider a design that will meet that purpose or purposes, and produce simple drawings and material specifications to support that design.

The learner could obtain ideas for their design through research using books, videos, CDs, DVDs and the internet, by looking at their locality or town, and by taking photographs of buildings and structures that interest them.

The initial designs should be discussed in class with other learners, the teacher, and visiting construction professionals. These discussions should lead to alternative, improved design solutions that address a range of issues including access; how the building or structure will fit in with its surroundings; provision of lighting and ventilation; the impact of the building or structure on the natural environment; and the use of space, including the relative positions of kitchen and bathroom. The entry of primary services utilities into the building should be considered but there is no requirement for details of how the services are internally distributed.

Learners should also think about 'build ability' and consider any foreseeable problems in the construction of this building, as well as identifying the skills that will be needed to implement the design. This will require guidance from the teacher and, once again, any input from experienced designers will prove invaluable.

What activities might be involved in this unit?

- Producing sketches and drawings, and taking photographs.
- Visiting construction sites and design and planning offices.
- Interviewing experienced design and planning professionals.
- Preparing a range of alternative design solutions under guidance.
- Agreeing a final design solution with a team of other learners.
- Gathering useful careers information from a variety of experienced personnel.

Suggested prior learning

- Level 2 Unit 1: Design the built environment: the design process
- Level 2 Unit 2: Design the built environment: materials and structures (see above).

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone.

Alternative approaches could be selected. The learner could develop PLTS by:

Independent enquirers

- planning and carrying out research into simple designs using key development factors
- exploring issues from different perspectives by seeking feedback from their peer group
- analysing and evaluating information to inform alternative design solutions
- using reasoned arguments and quantitative evidence to propose a final design solution

Creative thinkers

- generating ideas and exploring possibilities when considering alternative design solutions
- questioning their own and others' assumptions when attempting to balance the benefits of sustainable construction designs against initial costs

Reflective learners

- setting themselves targets and goals in the production of any sketches, drawings, schedules and specifications associated with the production of each design solution
- monitoring and reviewing their progress towards targets and goals in the production of any sketches, drawings, schedules and specifications associated with each design solution

Team workers

- working with others towards common goals when sharing information relating to performance of construction materials and 'build ability' of each design solution

Self-managers

- organising their time and resources to achieve targets and goals when completing the internally-set assignment
- proposing practical and manageable ways forward to a small group after feedback from the teacher on progress with the internal assignment

Effective participators

- identifying possible improvements to the methods used to implement the design
- contributing constructively to group discussions and debates.

Suggested learning resources

Books

- Design and Construction - Best, de Valence & Langston -Published by: Butterworth-Heinemann, 2002 -ISBN: 0750651490
- Building Construction Handbook. 6th Edition -Chorley & Greene - Published by: Butterworth -Heinemann, 2006 - ISBN 0750668229
- Building Ecology - Graham, Peter - First Principles for a Sustainable Built Environment - Published by: Blackwell Science (UK), 2002 -ISBN: 0632064137
- Green Building Bible - Hall, Keith - Published by: The Green Building Press, 2003 - ISBN: 1898130019
- How Designers Think -Lawson, Bryan - Published by: Architectural Press, 1997 -ISBN: 0750630736
- Basic Construction Materials - Marta, Theodore -Published by: Prentice Hall, 2004 -ISBN: 0131433873
- Green Building Handbook - Woodley, T et al - Published by: Spoon Press, 1997 -ISBN: 0419226907

Journals and magazines

- Architects' Journal - AJ Building Design

Videos, CDs and DVDs

- The Construction of Houses – eight in series, more on the way University of West of England Video Project
- Building History and Building Conservation – five in series University of West of England Video Project
- A Sampler of Alternative Homes – Kelly Hart
- Approaching Sustainable Architecture (DVD)
- E-resources for construction www.rsc-wales.ac.uk

Websites

- Royal Institute of British Architects www.architecture.com
- Chartered Instituted of Architectural Technologists www.ciat.org.uk
- Chartered Institute of Building www.ciob.org.uk
- Royal Town Planning Institute www.rtpi.org.uk
- Construction Skills www.citb.org.uk
- Constructive www.bconstructive.co.uk
- Carbon Trust www.actionenergy.co.uk
- Design Quality Indicator www.dqi.org.uk
- Construction Industry Research and Information Association www.ciria.org.uk
- Building Connections www.buildingconnections.co.uk
- Commission for Architecture and the Built Environment www.cabe.org.uk/teachingresources
- Architecture Centre Network www.architecturecentre.net
- BBC www.bbc.co.uk

Level 2

Unit 4: Create the built environment: Structures

What is this unit about?

The purpose of this unit is to help learners develop an understanding of groundwork's, substructure, superstructure and external works. Learners will use technical information and have the opportunity to investigate a range of methods, techniques, plant and tools used to construct the above. The unit also covers the work methods used to form foundations and erect the framework of a building, as well as on- site and off-site construction methods.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understands and explores the technical information used in the construction of the built environment
2. know about the construction methods, techniques and equipment used at different construction stages
3. understand when to use in-situ methods of construction and when to use partial pre-fabrication off-site.

Assessment criteria

1. Technical information used in construction and the built environment

The learner can:

- 1.1 identifies and describes a range of technical information used in the construction and the built environment sector:
 - a. construction drawings:
 - o Concept sketches
 - o Progress charts
 - o Plans
 - o Sections
 - o Elevations
 - o Details
 - b. specifications
 - c. schedules of work
 - d. standard drawing conventions and construction notes
 - e. architectural models
- 1.2 compares the ways in which technical information can be presented and accessed (IE4, 6):
 - a. 2D and 3D manual drawings (may include colour work)
 - b. 2D and 3D CAD drawings
 - c. electronic databases
 - d. digital and film photographs, videos, CDs and DVDs
 - e. 3D models
- 1.3 interprets and evaluates drawings, schedules and specifications to support their studies into the methods and techniques of construction (IE4, 6) (RL1) (EP4).

2. Construction methods, techniques and equipment

The learner can:

- 2.1 identifies and describes a range of methods and techniques used in construction:
 - a. groundwork
 - b. substructure
 - c. superstructure
 - d. external works
- 2.2 identifies and describes the plant, tools and other mechanical equipment used in the above
- 2.3 describes the work methods used to form foundations and erect frameworks.

3. On-site and off-site construction

The learner can:

- 3.1 compare on-site and off-site construction in terms of (IE4, 6):
 - a. wholly in-situ or partially fabricated off-site techniques
 - b. advantages and disadvantages of working at height:
 - o Methods and techniques
 - o Risks and control methods
 - c. advantages and disadvantages of working below ground level:
 - o Methods and techniques
 - o Risks and control methods

- 3.2 review whether on-site or off-site construction should be utilised in various situations (IE5, 6) (CT1)
- 3.3 produces method statements and risk assessments for working at height and working below ground (IE6) (EP2).

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit will be assessed through a centre set and marked assignment. Internal assessment is subject to moderation by City & Guilds.

The learner will complete an assignment, which should be based upon knowledge and understanding of the technical information that is used in the construction industry, an understanding of what it is used for, how it is used and the ways in which it can be accessed together with the skills required using such information. This ensures that the learner's outcome is relevant to the industry sector.

The assignment should also test the learner's knowledge and understanding of a broad range of the methods, techniques, plant, tools and other equipment used to perform construction work, and the characteristics of, differences between, and comparative advantages and disadvantages of, on-site and off-site construction methods. Learners should focus on construction projects within the local community, and the projects chosen must show a range of on-site and off-site construction techniques. The techniques in use should be classified as either on-site or off-site, and the two classes should be compared in terms of their inherent advantages and disadvantages.

This method of assessment allows the centre to contextualise the assignment, by encouraging learners to develop an understanding of groundwork's, substructure, superstructure and external works. The assignment should relate to the learners' local area and use up-to-date information.

The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and witness testimony should be used to support the use of team work. Evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. In the assignment, the learner will produce:

1. a report based on two construction projects that involve buildings or other structures under construction, and two construction projects that have already been completed.
2. drawings, specifications, schedules and models to support the report, as appropriate.
3. method statements and risk assessments an appropriate record of the delivery of a group presentation, supported by witness statements.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Working in a small group, collect examples of a variety of construction drawings, specifications, schedules, specifications and models relating to the selected construction projects. Use these to plan a group presentation and deliver the presentation to classmates, the teacher and any construction managers that can attend.
- Identify and describe the methods and techniques being used to construct the selected construction projects at each clearly defined stage of construction. Compare and contrast the plant, tools, and equipment and work methods used at each stage and try to match what is being used to the stage of construction in which it is being used.
- Evaluate the construction methods, materials, plant and tools in use on the two construction projects.
- Classify the above into two groups: traditional construction and modern construction. In some cases it will seem to be a mixture of both; ignore any examples where the decision is not clear. Compare the two groups in terms of labour requirements, speed, pre-fabrication and quality of work. Make a list of the advantages and disadvantages of each method.
- Look for any examples of working at height or working below ground level, and produce risk assessments and method statements, commenting upon how modern methods of construction have made both of these methods of work safer.

Learners should use a range of electronic databases, hard copies and multimedia in the presentation as appropriate. They do not have to produce any of the technical information themselves, but should make the following things clear in the presentation: the source of the information, why it is important, who would use it and what they would use it for. Learners must be prepared to answer questions both during and after the presentation.

Learners may use drawings, photographs and other images to support their work. If there is the opportunity to talk with or interview experienced construction workers, learners should ask them for their opinions, reflect on these and make changes as necessary, including these in the report. Examples of a suggested context for this assignment are given in the 'Guidance for delivery' section.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Technical information used in construction and the built environment	37.5%	18
2 Construction methods, techniques and equipment	37.5%	18
3 On-site and off-site construction	25%	12
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Technical information used in construction and the built environment	<p>0 – 6 marks</p> <p>Demonstrated a basic knowledge and understanding of the technical information used in two different projects by making a minor contribution to a team presentation.</p> <p>Used a limited range of technical information and presentational techniques to demonstrate some evidence of the provenance, importance and uses of such information.</p>	<p>7 – 12 marks</p> <p>Demonstrated a partial knowledge and understanding of the technical information used in two different projects by making an effective contribution to a team presentation.</p> <p>Used a wide range of technical information and presentational techniques to demonstrate clear evidence of the provenance, importance and uses of such information.</p>	<p>13 – 18 marks</p> <p>Demonstrated an in-depth knowledge and understanding of the technical information used in two different projects by making a major contribution to a team presentation.</p> <p>Used a comprehensive range of technical information and presentational techniques to demonstrate detailed evidence of the provenance, importance and uses of such information.</p>
2. Construction methods, techniques and equipment	<p>0 – 6 marks</p> <p>Demonstrated a basic knowledge and understanding of the different construction methods, techniques and equipment used in two different projects by identifying and briefly describing a limited range of examples of each.</p> <p>Related these examples to the appropriate stage of the construction process in a superficial but generally accurate fashion.</p>	<p>7 – 12 marks</p> <p>Demonstrated a partial knowledge and understanding of the different construction methods, techniques and equipment used in two different projects by identifying and clearly describing a wide range of examples of each.</p> <p>Related these examples to the appropriate stage of the construction process in a clear and accurate fashion.</p>	<p>13 – 18 marks</p> <p>Demonstrated an in-depth knowledge and understanding of the different construction methods, techniques and equipment used in two different projects by identifying and briefly describing a comprehensive range of examples of each.</p> <p>Related these examples to the appropriate stage of the construction process in a thorough and detailed fashion.</p>

3. On-site & off-site construction	<p>0 – 4 marks</p> <p>Correctly classified a limited range of on-site and off-site construction methods, techniques and equipment as being examples of either traditional construction or modern construction.</p> <p>Produced an elementary evaluation of the advantages and disadvantages of the two groups or classifications in terms of either the relative quality of the work done, or the savings in time and cost, using either simple risk assessments or method statements to support the work.</p>	<p>5– 8 marks</p> <p>Correctly classified a wide range Of on-site and off-site construction methods, techniques and equipment as being examples of either traditional or modern construction.</p> <p>Produced a clear and relevant evaluation of the advantages and disadvantages of the two groups or classifications in terms of both the relative quality of the work done and the savings in time and cost, using simple risk assessments and method statements to support the work.</p>	<p>9 – 12 marks</p> <p>Correctly classified a comprehensive range of on-site and off-site construction methods, techniques and equipment as being examples of either traditional or modern construction.</p> <p>Produced an in-depth evaluation of the advantages and disadvantages of the two groups or classifications in terms of both the relative quality of the work done and the savings in time and cost, using detailed risk assessments and method statements to support the work.</p>
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Guidance for delivery

Learners should be offered a wide variety of opportunities to see construction methods and techniques at every stage of the construction process. They will need access to builders of all kinds, whether in the classroom or on-site, to help them interpret technical information, to clarify when and where it would be used, and to link the information provided with the work being done at the time.

Delivery would also benefit from visiting speakers from organisations such as the National House Building Council (NHBC) or suppliers of building products.

Drawings, specifications and other similar technical information should have been passed by the Building Control Authority or an Approved Inspector if they are to be a suitable teaching resource.

Legal issues are a key factor in creating the built environment, particularly in terms of the health, safety and welfare of building workers, visitors to a construction site, and the general public.

Assessment Criteria topics 2 and 3 are considered to have legal implications.

The advice and guidance contained in ‘Opportunities for applied learning’ below applies throughout the unit.

Opportunities for applied learning

This unit divides neatly into two halves. The first half involves learners developing skills in interpreting technical information in both hard copy and electronic format, and the second involves learners using these skills to support their developing knowledge and understanding of construction. The learners should be provided with access to technical information in both formats. This technical information could relate to constructed buildings or those currently being planned or built. Designers, planners and builders may be willing to share or donate such information. Another highly effective way of learning about the technical information used by builders is to see it being used in a variety of real life situations.

Learners need to be exposed to real life construction situations in a similar way to that used in Level 1 Unit 4: Create the built environment: methods and materials. The situation is similar but the teaching and learning strategies will be more detailed and the assessment strategy will demand more of the learner.

Learners would benefit from visits to three very different construction sites. The first of these should provide examples of traditional methods of construction; the second, examples of higher levels of mechanisation, modularisation, off-site construction methods and new materials; and the third, examples of sustainable, 'Green' construction techniques. It should be noted that a construction plant is generally used to minimise the need for manual labour even on sites where the buildings are to be of traditional or sustainable construction.

Visits could be arranged to one site where a large building of traditional design and construction is being refurbished; another where a large project such as a hospital, college, supermarket or factory is being constructed using newer methods, techniques and materials; and a third where a new building is being constructed on sustainable principles. There are clear benefits from visiting the sites in the order they are listed. It would be an advantage if the second site involved work at height or below ground.

Ideally, the learners would visit each site at each of the stages of construction: groundwork, substructure, superstructure and external works. However, this would not be feasible in the time available for teaching. It is important, though, that the learners see each type of site at least once and each stage of construction at least once.

Particular attention should be paid to the methods, techniques, plant and equipment in use. The more mechanised the site is, the better it will lend itself to prefabrication techniques and off-site construction methods. If the construction company has risk assessments or method statements that they are willing to release to the teacher before the visit, these can be discussed prior to the visit and good practice will be more easily recognised.

Learners should be provided with a separate checklist for each visit. These checklists should separately identify the characteristics of traditional, modern and sustainable methods, at different stages of construction, in a 'tick-box plus comments' format. After the schedule of visits has been completed, the learners can produce posters and/or electronic presentations that compare what they have seen in terms of:

- the stage of construction the work was at when they visited the site
- methods, techniques, plant, tools and equipment in use
- construction trades on-site
- the different methods and techniques used on different sites
- the use of any off-site construction techniques
- control measures taken to reduce the risks of working at height or below ground.

What activities might be involved in this unit?

- Collecting technical information to support a presentation to other learners.
- Accessing technical information from electronic databases.
- Visiting construction sites to see traditional, modern and sustainable construction in action.
- Visually assessing the advantages and disadvantages of different construction methods.
- Producing risk assessments for different construction stages and methods.
- Producing method statements for different construction stages and methods.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone.

Alternative approaches could be selected. The learner could develop PLTS by:

Independent enquirers

- demonstrating the advantages and disadvantages of homes being part-fabricated off-site, including improved design, reductions in construction times, site costs and quality control

Creative thinkers

- adapting, extending and updating their understanding of the methods used to perform construction tasks as a result of exposure to new and emerging operations, processes, methods and materials

Reflective learners

- abstracting technical information from a range of sources including electronic databases

Team workers

- working with others towards common goals when sharing technical information to improve mutual understanding of how designs are used to create buildings and structures

Effective participators

- proposing practical, manageable ways forward, to a small group, after feedback from the teacher on progress with risk assessments for working at heights and below ground.

Suggested learning resources

Books

- Fundamentals of Building Construction -Allen, Edward & Ian, Joseph -Materials and Methods - Published by: John Wiley & Sons, 2004 -ISBN: 0471219037 (Note that this comes with a companion website)
- Building Construction Handbook. 6th Edition - Chorley & Greene -Published by: Butterworth-Heinemann, 2006 -ISBN 0 750 66822 9
- Building Regulations (complete set of Approved Documents) published by: TSO, 2006 -ISBN: 0117036552 - Approved documents can also be purchased individually as required.

Resource packs

- 'Be a safe learner. Aspects of health and safety' - DfES Published by: Standards Unit, DfES - Available from standards.unit@dfes.gsi.gov.uk and www.successforall.gov.uk
- 'Health and Safety: Skills for Construction' - DfES Published by: DfES -Available from dfes@prolog.uk.com

Journals and magazines

- Building Construction News

Videos, CDs and DVDs

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| • The Construction of Houses – eight in series, more on the way | University of West of England Video Project |
| • Building History and Building Conservation – five in series | University of West of England Video Project |
| • A Sampler of Alternative Homes - Approaching Sustainable Architecture (DVD) | Kelly Hart |
| • Money for Nothing and Your Waste Tips for Free | Environment Agency |
| • Building a Cleaner Future | CIRIA/ Environment Agency |
| • Designs that Hold Water | Urban Design Allowance |
| • E-resources for construction | www.rsc-wales.ac.uk |

Websites

- **Construction Skills** www.citb.co.uk
- Construction Industry Research and Information Association www.ciria.org.uk
- Forest Stewardship Council www.fsc-uk.info
- Health and Safety Executive Books www.hsebooks.co.uk
- Health and Safety Executive hseinformationservices@natbrit.com
- National House-Building Council www.nhbc.co.uk
- Royal Institute of British Architects www.architecture.com
- Peabody Trust www.peabody.org.uk/bedzed
- ZED factory www.zedfactory.com
- Wood for Good www.woodforgood.com
- Directorate-General for Energy and Transport www.managenergy.net
- Sustainable Construction www.newbuilder.co.uk
- Design Quality Indicator www.dqi.org.uk
- Carbon Trust www.actionenergy.co.uk
- Green Building Magazine www.buildingforafuture.co.uk
- Eden Frame www.edenframe.com
- Sustainable Construction Brief www.dti.gov.uk/files/file13939.pdf
- Chartered Institution of Building www.ciob.org.uk
- Huf Haus www.huf-haus.com
- Health and Safety Executive www.hse.gov.uk

Other

- Prepared drawings, specifications and schedules for domestic dwellings.
- Electronic database and/or online database and/or a virtual learning environment.
- Prepared architectural models of low-rise buildings and structures.
- Sales brochures for new housing developments.

Level 2

Unit 5: Create the built environment: using tools

What is this unit about?

The purpose of this unit is to make learners aware of the hazards and risks commonly encountered in constructing the built environment. It covers the appropriate selection and use of tools, materials and personal protective equipment (PPE) to perform craft activities. The unit also explores the career opportunities available in constructing the built environment.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understand health, safety and welfare issues associated with using construction equipment
2. be able to select appropriate tools, materials and PPE, and use hand tool skills for particular tasks
3. be able to work safely when using tools to perform craft tasks
4. know how to plan a career in constructing the built environment.

Assessment criteria

1. Health, safety and welfare issues associated with construction equipment

The learner can:

- 1.1 explain the importance of Health and Safety on construction sites in terms of (IE2, 3):
 - a. on-site inductions for employees
 - b. safe methods of working
 - c. good housekeeping
 - d. using the appropriate tools, materials, PPE and access equipment
- 1.2 identify and describe a range of hazards and risks associated with (IE3):
 - a. normal working practices
 - b. natural and manufactured materials
 - c. hazardous substances (COSHH)
 - d. working in confined spaces
 - e. working at height
 - f. working below ground
 - g. the provision and use of work equipment
- 1.3 analyse risk assessments for (IE4):
 - a. normal working practices
 - b. natural and manufactured materials
 - c. hazardous substances (COSHH)
 - d. working in confined spaces
 - e. working at height
 - f. working below ground
 - g. the provision and use of work equipment
- 1.4 select and use safe working methods to control hazards and minimise risks (SM4):
 - a. interpret risk assessments and method statements
 - b. select and use appropriate control measures.

2. Selection of tools, materials, PPE and hand tool skills

The learner can:

- 2.1 select a range of PPE in terms of (SM4):
 - a. intended purpose
 - b. intended use:
 - o general site wear
 - o specific work activities
- 2.2 describe and use skills using different hand tools with different materials in:
 - a. the construction crafts
 - b. the building services crafts
- 2.3 select the correct tools, access equipment and materials for given craft activities.

3. Working safely when using tools to perform craft tasks

The learner can:

- 3.1 use a range of different hand tools and equipment to work with different materials
- 3.2 apply safe working practices to the use of tools both independently and as part of a team (SM4) (TW1, 2, 5):
 - a. carpentry and joinery
 - b. bricklaying
 - c. painting and decorating
 - d. building services crafts:
 - o plumbing
 - o electrical.

4. Careers opportunities

The learner can:

- 4.1 compare and contrast career opportunities in construction and the built environment in terms of (IE6) (CT1):
 - a. the range and characteristics of career opportunities
 - b. the level of available career opportunities in the following fields:
 - o craft
 - o technical
 - o supervisory
 - o professional and management
 - c. the nature of interactions between those who work in construction
 - d. progression opportunities available in construction
 - e. the qualifications needed to support career progression.

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit is assessed through a centre set and marked assignment. Internal assessments are subject to moderation by City & Guilds.

Internal assessment allows the centre to provide an opportunity to use tools typical of those used in the construction and built environment sector, and to perform tasks typical of those performed in the construction industry. The focus should be on developing tool skills rather than demonstrating competence in the performance of construction craft tasks.

The learner will complete an assignment, the purpose of which is to develop the skills element in this unit but which also includes the application of the knowledge, understanding and PLTS gained by studying the unit. Although issues relating to health, safety and welfare, waste disposal, and the use of technical information are assessed separately, they should be related to the use of tools to perform practical tasks wherever appropriate. The assignment should also require the learner to explore the career opportunities and progression routes available in the creation of the built environment, and particularly in the construction and building services crafts.

If all, or part of, the evidence produced by a learner relates to outcomes produced as a result of working in a group, it must be clear which evidence is to be credited to the individual learner.

The assignment will take approximately 24 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. The evidence must be based on the skills needed to use tools to perform simple construction craft tasks. In the assignment, the learner will produce:

1. a report on:
 - a. the health, safety and welfare issues associated with the use of specified construction equipment
 - b. a summary of career development for a potential craftsperson, showing opportunities and progression routes available in the creation of the built environment
2. completed requisition forms demonstrating the selection of the appropriate tools, access equipment, materials and PPE
3. practical evidence of using tools, equipment and hand tool skills to perform a range of craft tasks, individually and as part of a team. These must be evidenced by witness statements and photographs of the finished tasks
4. evidence showing compliance with good health, safety and welfare practices. This must be evidenced by witness statements.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Explain the importance of health, safety and welfare on-site, and recognise and comply with good Health and Safety practices in the workshop.
- Identify a range of hazards and risks associated with natural and manufactured materials, hazardous substances (COSHH), working in confined spaces, working at height, working below ground and the provision and use of work equipment.
- Select and use safe working methods to control these hazards and minimise risks as appropriate.
- Select and use the correct hand tools and materials for specific craft tasks.
- Identify and select correct PPE and access equipment for specific craft tasks.
- Describe and use hand tool skills safely to perform a three craft tasks. Work in teams when appropriate.
- Produce a summary of career development for a potential craftsperson and indicate progression pathways into supervisory roles and site and project management.

Learners should be given technical information as needed to complete three of the following:

Carpentry and joinery

Frame

simple square frame with a different joint at each corner; possible joints include housing, through/corner halving, through/corner bridle and through/haunched mortice and tenon.

Shelving

three 600 mm shelves to be wall-mounted on shelf brackets in a single stack

Bricklaying

Brick wall

stretcher bond, six bricks long, four stretchers high, one stopped end, constructed using lime mortar.

Painting and decorating

Painting

old furniture, doors or windows

Decorating

hanging lining paper or woodchip paper to walls with no corners, light switches or sockets

Building services crafts

Electrical

wiring plugs and sockets and constructing simple lighting rigs with three fittings in parallel or a simple ring main with three sockets.

Plumbing

construction of a simple pipe rig with one capillary joint, one compression joint, one Tee junction and two 90° bends, and the connection of hot and cold water taps and a trap to a sink.

Guidance on acceptable tolerances

- Wood joints to be of a reasonable standard with a tolerance of ± 2 mm, shelving to be secure with shelves that are horizontal and brackets that are vertical.
- Bricks to be in line ± 3 mm with a maximum plane face deviation of ± 3 mm, stopped end maximum of 3 mm deviation from vertical.
- Limited painting defects such as misses, runs, sagging and curtaining; paper hung to a reasonable standard with limited number of bubbles and/or wrinkles, no gaps or overlaps > 4 mm.
- All wiring connections safe and correct, with light fittings and/or sockets securely mounted in regular arrays.
- Watertight joints and junctions, straight pipe runs, right-angle bends $\pm 5^\circ$, taps and traps fitted correctly.

The assignment offers an excellent opportunity for experiential learning in terms of the development of the skills required to use tools for performing construction tasks. The learner should plan their work, execute that work, and then review their performance in order to improve their future performance. There should be short periods of reflection between each session of practical work to allow the learner to monitor and improve their skills over time.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Health, safety and welfare issues associated with construction equipment	25%	12
2 Selection of tools, materials, PPE and hand tool skills	25%	12
3 Working safely when using tools to perform craft tasks	37.5%	18
4 Career opportunities	12.5%	6
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Health, safety and welfare issues associated with construction equipment	<p>0 – 4 marks</p> <p>Briefly explained a limited range of health, safety and welfare issues relating to construction.</p> <p>Identified and described a limited range of hazards and risks and selected appropriate safe methods of working.</p> <p>Complied with a limited range of good health, safety and welfare practices.</p>	<p>5 – 8 marks</p> <p>Explained a range of health, safety and welfare issues relating to construction.</p> <p>Identified and described a range of hazards and risks and selected appropriate safe methods of working.</p> <p>Complied with a range of good health, safety and welfare practices.</p>	<p>9 – 12 marks</p> <p>Explained a comprehensive range of health, safety and welfare issues.</p> <p>Identified and described an extensive range of hazards and risks and selected appropriate safe methods of working.</p> <p>Complied with a comprehensive range of good health, safety and welfare practices.</p>
2. Selection of tools, materials, PPE and hand tool skills	<p>0– 4 marks</p> <p>Selected some of the correct tools, materials, equipment and hand tools skills needed for specific craft tasks.</p>	<p>5 – 8 marks</p> <p>Selected most of the correct tools, materials, equipment and hand tools skills needed for specific craft tasks.</p>	<p>9 – 12 marks</p> <p>Selected all, or nearly all, of the correct tools, materials, equipment and hand tools skills needed for specific craft tasks.</p>
3. Working safely when using tools to perform craft tasks	<p>0 – 6 marks</p> <p>Worked safely some of the time when using tools to perform craft tasks to a variable standard of competence, in teams when appropriate.</p>	<p>7 – 12 marks</p> <p>Worked safely most of the time when using tools to perform craft tasks to a reasonable standard of competence, in teams when appropriate.</p>	<p>13 – 18 marks</p> <p>Worked safely all, or nearly all, of the time when using tools to perform craft tasks to a high standard of competence, in teams when appropriate.</p>
4. Career opportunities	<p>0 – 2 marks</p> <p>Produced a superficial comparison of career opportunities in construction and the built environment.</p>	<p>7 – 12 marks</p> <p>Clearly compared and contrasted career opportunities in construction and the built environment.</p>	<p>5 – 6 marks</p> <p>Offered a precise and in- depth comparison of career opportunities in construction and the built environment.</p>

Guidance for delivery

Health and Safety is always of paramount importance. Visits to college workshops, training providers and construction sites will help to motivate learners and illustrate to them the importance and complexity of the construction industry. Learners must, however, receive adequate preparation for site visits. The teacher should arrange for the company's Health and Safety officer to come to the centre beforehand to present a Health and Safety induction for the specific site or workplace being visited. Teachers should note that centres will have to comply with the Health and Safety workplace policy of the centre and any site being visited, and that COSHH regulations are adhered to when carrying out practical activities in workshops.

Following any site visit, learners could identify potential hazards and risks, then produce a safety poster. Alternatively, they could explore the factors behind a real construction site accident and suggest how it might have been avoided.

A developer or contractor could be asked to give learners a copy of a method statement or risk assessment and then give the learners an operation and ask them to develop their own method statement. Once again, the appropriate time to do this would be after a site visit.

Guest speakers who work in the industry could be invited to centres, and learners could interview them to find out what they enjoy about their work and how they prepared and trained for it. This should be supplemented by talks from the Connexions service, school and college careers officers, local employers and staff from the local further education college. It may also be useful to set class exercises in which learners create charts that show career pathways, and annotated drawings that show the contributions that the various sub-contractors make to the construction process.

There is a comprehensive range of legislation that underpins health, safety and welfare in the construction industry, and there are legal issues implicit in Assessment criteria topics 1, 2 and 3. All Professional Institutions and many trade associations have their own ethical codes and there are ethical issues throughout Assessment criterion 4, and especially in 4a(ii) (professional and management). These should be signposted to the learner as ethical issues but there is no requirement for an extended treatment beyond what is already in the unit specification.

The advice and guidance provided in 'Opportunities for applied learning' applies throughout.

Opportunities for applied learning

This unit involves the use of a range of practical skills. Whatever the craft activity undertaken, or the hand tools or materials used, the procedure will always be the same:

- Consideration of Health and Safety issues.
- Compliance with all risk assessments and method statements.
- Selection of appropriate materials, hand tools, access equipment and PPE.
- Safe use of tools to perform basic craft tasks.
- Maintenance of a clean and tidy workspace.

The learners should be supplied with exemplar risk assessments and method statements. They should use these for all the tasks they perform. It may still be helpful to use other documents which relate to tasks that learners will not undertake themselves but may have seen on-site or on-screen, for example working at height, working below ground or working in a confined space. They could then extend their learning by using the forms as templates for other tasks not covered by the documents provided.

Teachers must undertake thorough risk assessments prior to learners starting any practical work.

Teachers must also provide information to parents of school-age children about the risks and the control measures introduced. The risk assessments will support a teacher's decision as to whether or not a learner should undertake certain work activities.

Centres will need to pay close attention to the Provision and Use of Work Equipment Regulations 1998, even when only using hand tools. The Health and Safety Commission publication 'Safe Use of Work Equipment, Approved Code of Practice and Guidance' will be a very helpful guide for teachers. It follows that the electrical tasks should be performed without connection to a power supply and the plumbing tasks without connection to a water supply, except for the purposes of testing. Teachers should be reminded that, in their supervision of learners, they have the same duties under Health and Safety as employers.

What activities might be involved in this unit?

- Identifying hazards and risks associated with the use of tools.
- Interpreting Control of Substances Hazardous to Health (COSHH) risk assessments.
- Selecting and using appropriate control measures designed to reduce or eliminate risks.
- Using hand tools, natural and manufactured materials, and PPE to perform craft activities.
- Gathering useful career information from a variety of sources.

Suggested prior learning

Level 2 Unit 4: Create the built environment: structures.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone.

Alternative approaches could be selected. The learner could develop PLTS by:

Independent enquirers

- producing and interpreting risk assessments based on real life construction site situations

Creative thinkers

- asking questions of health, safety and welfare officers to extend their understanding of the important issues and good practices

Reflective learners

- reviewing their own tool skills, considering what they did well, what they did less well and how they could improve next time

Team workers

- carrying out practical tasks using tools in small groups

Self-managers

- working safely when using tools to carry out practical craft tasks

Effective participators

- producing and interpreting risk assessments and method statements when working safely as part of a group, and feeding back possible improvements to the method statement both during and after the task.

Suggested learning resources

Books

- Carpentry and Joinery for building craft learners 1, 2nd edition -Brett, Peter - Published by: Nelson Thornes,1981 - ISBN: 0748702873
- Construction Site Safety, 1999 Update Pack, GA 700/99 - CITB - Published by CITB, 1994 - ISBN: 1857510062
- Painting & Decorating: An Information Manual - Fulcher, A- Published by: Blackwell Science Ltd, 1998 - ISBN: 0632041595
- Safe Start, Safety Handbook, GE 707 - Hands, Denis &CITB- Published by: CITB- Construction Skills, 2005 - ISBN: 1857511093
- Safe use of work equipment, 4th edition - HSE Approved Code of Practice and Guidance - Published by: HSE, 1998 - ISBN: 0717616266
- DIY Home Maintenance for Dummies All-in-One - Howell, Jeff - Published by: John Wiley & Sons, 2005 - ISBN: 0764570544
- Introduction to Health and Safety in Construction - Hughes & Ferrett - Published by: Butterworth Heinemann, 2006 - ISBN: 075068111X
- Collins Complete DIY Manual - Jackson, Albert & Day, David - Published by: Collins, 2001 - ISBN: 0004141016
- Brickwork 1, 3rd edition - Nash, WG -Published by: Nelson Thornes Ltd, 1983 - ISBN: 0748702660
- Electrical Wiring: Domestic, 12th edition - Scaddan, Brian - Published by: Newnes - ISBN: 0750659157
- Basic Plumbing –Stanley - Published by: Meredith Corporation, 2002 - ISBN: 0696213206
- Principles of Construction Safety -St. John Holt, A -Published by: Blackwell Publishing, 2005 - ISBN: 1405134461

Resource packs

- 'Be a safe learner. Aspects of health and safety' - DfES - Published by: Standards Unit, DfES - Available from standards.unit@dfes.gsi.gov.uk and www.successforall.gov.uk
- 'Health and Safety: Skills for Construction' - DfES - Published by: DfES - Available from dfes@prolog.uk.com

Journals and magazines

Building Construction News Home DIY

Videos, CDs and DVDs

- How to DIY – the Complete Series - Video and DVD
Available from: Woolworths - Product ID:
50872428
- Teaching you DIY Skills with Tommy Walsh - CD-ROM
Published by: Focus Multimedia Ltd

Websites

- Chartered Institute of Building www.ciob.org.uk
- ConstructionSkills www.citb.org.uk
- Royal Town Planning Institute www.rtpi.org.uk
- Health and Safety Executive www.hse.gov.uk
- Institute of Occupational Safety and Health www.iosh.co.uk
- Royal Society of Prevention of Accidents www.rosipa.co.uk

Level 2

Unit 6: Value and use of the built environment: communities

What is this unit about?

The purpose of this unit is to explore the contribution the built environment makes to the physical, spiritual and emotional wellbeing, and economic prosperity, of individuals and the community. It also looks at the ways in which individuals and communities can contribute to sustainability and how property and housing services contribute to the wider community. The unit will help to make learners aware of the career opportunities available in valuing and using the built environment.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understand the benefits of sustainability in the built environment
2. understand how communities can be sustainable, and the effects of this
3. know how the built environment influences the wellbeing and prosperity of individuals and communities
4. understand how property and housing services make a social and economic contribution to communities
5. know about possible career opportunities within value and use of the built environment.

Assessment criteria

1. Benefits of sustainability

The learner can:

- 1.1 identify and describe the benefits of sustainability in terms of the following factors (IE3, 5, 6):
 - a. social
 - b. environmental
 - c. economic
- 1.2 explain how sustainable materials and processes (IE3, 6):
 - a. benefit the built environment and the local community
 - b. contribute to environmental protection
 - c. help reduce emissions and pollution
 - d. help create sustainable communities.

2. Sustainable communities

The learner can:

- 2.1 describe how sustainable communities can be created through (IE2):
 - a. the use of local materials
 - b. the use of renewable, re-usable and recycled materials
 - c. the procurement of local services
 - d. the contribution of individuals and community
 - e. effective management of local infrastructure and transport services
 - f. the development of a balance between social, environmental and economic impacts
- 2.2 analyse modern community development practices and suggest ways in which individuals and communities can act to exert a positive influence on their built environment (IE4) (CT1).

3. Enhancing the lives of communities and individuals

The learner can:

- 3.1 explain how the built environment can enhance individual and community life in terms of (IE3, 5):
 - a. physical wellbeing
 - b. spiritual wellbeing
 - c. emotional wellbeing
 - d. economic prosperity
 - e. health, safety and welfare.

4. Property and housing services

The learner can:

- 4.1 explain how property and housing services make a social and economic contribution by (IE3):
 - a. maintaining a balance between public and private housing
 - b. setting standards and requirements for property development
 - c. monitoring community aspects during the design and planning of developments
 - d. reviewing the residential, industrial and commercial property market
 - e. enhancing wealth through the purchase, control and disposal of assets
 - f. providing the local community with a valuable range of built assets to use
 - g. supporting the local economy both directly and indirectly.

5. Career opportunities

The learner can:

- 5.1 compare and contrast career opportunities in the value and use of the built environment in terms of (IE6) (CT1):
 - a. the range of available careers
 - b. the level of available careers:
 - o craft
 - o technical
 - o supervisory
 - o professional and management
 - c. the nature of interactions between those who value and use the built environment
 - d. the organisations involved in housing and property services, in terms of:
 - o housing associations
 - o local authorities
 - o estate agencies
 - o private and commercial letting agencies
 - o private and corporate property developers
 - e. the role of the Professional Institutions involved in value and use of the built environment
 - f. progression opportunities available to those who value and use the built environment
 - g. the qualifications needed to support career progression.

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

This unit is assessed through a centre set and marked assignment. Internal assessments are subject to moderation by City & Guilds.

The learner will complete an assignment, which should be based upon knowledge and understanding of the various benefits of sustainability to the community and how sustainable communities can be created; the ways in which the built environment can enhance individual and community life (and the individual, either alone or as part of a group, can influence the development of the built environment); and the social and economic contribution made by both public and private property and housing services.

The assignment should be firmly based in the local community, but there is considerable room for comparisons between the local community and other communities. In finding out about other communities, learners will develop an enhanced understanding of how their own community works, and this will lead to a better understanding of how communities work in general as a large number of people with similar interests working together to their mutual benefit. The learners must extend this reasoning into an understanding of how construction and the built environment can serve the community, and meet its ever-changing needs, particularly by providing buildings and structures to address property and housing needs.

The assignment will also require the learner to explore the career opportunities and progression routes available in the value and use of the built environment, and particularly in property and housing services.

The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.4 of this specification, and evidence should be kept for moderation purposes.

Evidence requirements

The learner must produce evidence of achievement of the assessment criteria. In the assignment, the learner will produce:

1. a report on:
 - a. the general benefits of sustainability in social, economic and environmental terms and the particular benefits of sustainable construction processes and materials
 - b. the principles and practices used to create sustainable communities
 - c. how a properly planned and managed built environment can enhance the life of everyone in the community in terms of wellbeing, security and prosperity
 - d. the differences between property services and housing services and between the private sector and the public sector in terms of aims and objectives, together with an explanation of the social and economic contribution made by each
 - e. career opportunities and progression routes available in the value and use of the built environment; in particular, in property and housing services.

In order to attain a high mark in this unit, learners must address all of the above. It may, however, be possible to achieve a pass mark without producing every one of the evidence requirements. A table showing how the Assessment criteria topics are weighted is included below, and learners should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow learners to meet the evidence requirements, may include the following steps:

- Identify and describe the various ways in which a sustainable approach to construction benefits the local community. Include examples from both traditional and sustainable communities.
- Describe the methods used to create sustainable communities.
- Explain the ways in which individuals can make a contribution to community life.
- Differentiate between property services and housing services in terms of the contribution each makes to community.
- Select two careers in the property and housing sector, one at technician level and the other at professional and management level. In each case, identify and describe the job roles and responsibilities involved and suggest ways in which individuals can progress within the sector.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Benefits of sustainability	25%	12
2 Sustainable communities	25%	12
3 Enhancing the lives of communities and individuals	12.5%	6
4 Property and housing services	25%	12
5 Career opportunities	12.5%	6
Total	100%	48

Assessment grid

Please note that the descriptions in this marking grid relate to the top of each band. Further guidance on using marking grids is available in the Assessment section of this specification.

Assessment criteria topic	Band 1	Band 2	Band 3
	The learner has:		
1. Benefits of sustainability	<p>0 – 4 marks</p> <p>Identified and briefly described a limited number of the benefits to the local community of a sustainable approach to construction.</p> <p>Supported this work with simple examples from either traditional or sustainable communities.</p>	<p>5 – 8 marks</p> <p>Identified and clearly described a wide range of the benefits to the local community of a sustainable approach to construction.</p> <p>Supported this work with clear and accurate examples from both traditional and sustainable communities.</p>	<p>9 – 12 marks</p> <p>Identified and clearly and precisely described a comprehensive range of the benefits to the local community of a sustainable approach to construction.</p> <p>Supported this work with detailed examples from both traditional and sustainable communities.</p>
2. Sustainable communities	<p>0 – 4 marks</p> <p>Produced a superficial explanation of a limited number of the principles and practices on which sustainable development depends.</p>	<p>5 – 8 marks</p> <p>Produced a clear and coherent explanation of a wide range of the principles and practices on which sustainable development depends.</p>	<p>9 – 12 marks</p> <p>Produced a thorough and detailed explanation of a comprehensive range of the principles and practices on which sustainable development depends.</p>

<p>3. Enhancing the lives of communities and individuals</p>	<p>0 – 2 marks</p> <p>Produced a superficial explanation of a limited number of the ways in which the built environment can enhance the lives of communities and individuals.</p> <p>Identified and briefly described some of the ways in which the individual can contribute to community life.</p>	<p>3 – 4 marks</p> <p>Produced a coherent explanation of a wide range of the ways in which the built environment can enhance the lives of communities and individuals.</p> <p>Identified and clearly described most of the ways in which the individual can contribute to community life.</p>	<p>5 – 6 marks</p> <p>Produced a detailed explanation of all or nearly all of the ways in which the built environment can enhance the lives of communities and individuals.</p> <p>Identified and precisely described all, or nearly all, of the ways in which the individual can contribute to community life.</p>
<p>4. Property and housing services</p>	<p>0 – 4 marks</p> <p>Produced a brief and elementary description of some of the differences between property services and housing services, and the private and public sector, along with a superficial explanation of the social and economic contribution of each.</p>	<p>5 – 8 marks</p> <p>Produced a clear and accurate description of most of the differences between property services and housing services, and the private and public sector, and a coherent and reasoned explanation of the social and economic contribution of each.</p>	<p>9 – 12 marks</p> <p>Produced a full and precise explanation of all of the important differences between property services and housing services, and the private and public sector, and a thorough and detailed explanation of the social and economic contribution of each.</p>
<p>5. Career opportunities</p>	<p>0 – 2 marks</p> <p>Produced a superficial comparison between any two of the careers available in the value and use sector of the built environment.</p> <p>Provided a brief and elementary summary of career progression for the above careers, up to professional level.</p>	<p>3 – 4 marks</p> <p>Produced a useful comparison between any two of the careers available in the value and use sector of the built environment.</p> <p>Provided a clear and coherent summary of career progression for the above careers, up to professional level.</p>	<p>5 – 6 marks</p> <p>Produced a detailed comparison between any two of the careers available in the value and use sector of the built environment.</p> <p>Provided a precise and accurate summary of career progression for the above careers, up to professional level.</p>

Guidance for delivery

This unit represents an opportunity for learners to explore how the built environment contributes to communities in terms of providing a basis for physical, spiritual and emotional wellbeing and economic prosperity.

One of the key themes of the unit is sustainability, and how important it is for the built environment to help provide sustainable communities. Sustainability is a process of making wise decisions which have positive benefits in economic, social and particularly environmental terms. The following factors should be explored with sustainability in mind.

Transport systems and provision

How the built environment is influenced by transport systems and provision in the learners' locality, whether this is a rural area or an urban area.

Provision of local amenities

This should include consideration of the provision of shops, postal services, doctors' surgeries, recreational areas, community centres and services, schools, places of worship and recycling facilities in the immediate locality. Learners will need to consider what amenities have been provided in different areas of the built environment and whether the provision of amenities is better in some areas than in others.

Features of different parts of the built environment

These include:

- housing (detached, semi-detached, terraced, bungalows, low-rise flats, high-rise flats, apartments, maisonettes, conversions)
- Agricultural (stables, farms, kennels)
- Industrial, public and commercial
- Construction engineering (landmarks, bridges, sea defences)
- Buildings of special interest (Earth Centre, Eden Project, Millennium Dome).

Environmental protection

Learners should be made aware of how the development of the built environment contributes to environmental protection, and of what is meant by 'greenfield' and 'brownfield' sites.

Emissions reduction strategies

This should include current initiatives to reduce CO Emissions from buildings to air, such as the provision of high efficiency central heating boilers, improved thermal insulation in properties (to minimise heat loss) and the utilisation of renewable energy sources in domestic and commercial buildings. Renewable sources should include some or all of the following:

- Solar power
- Wind power
- Ground source heat pumps
- Biomass and/or bio-fuel.

Historical implications

Learners should appreciate how the built environment is influenced by historical changes in the community. For example, housing communities were often built around industrial processes such as mining. As these industries declined, ownership and responsibility of the housing stock changed.

Some background information should be presented to encourage an appreciation of how communities evolve. This should involve studying rural communities, urban communities, a designated local community, and fully planned communities such as New Towns.

There are legal issues implicit in Assessment criteria 1a and 4a. These should be signposted to the learner but there is no requirement for an extended treatment beyond what is already in the unit specification. The very concept of living together in communities raises complex ethical implications and Assessment criteria topics 1, 2, 3, 4 and 5 should all be signposted.

Opportunities for applied learning

Learners should perform activities based on classifying the features of the local built environment around their school, college or home, and assessing how these features contribute to and affect individuals and the local community. The activities should focus on features of the learners' local communities and/or features of other communities.

A main activity should be developed in which learners are asked to design their ideal community. This should present the learner with the opportunity to be creative and apply some of the knowledge gained from their study of sustainable communities.

Property services

An understanding of how property development and property services can affect communities is essential to this unit. Learners can prepare for the applied learning by thinking about why property development is so popular and what causes a property boom. A simple introduction to the applied learning could involve watching videos of any of the many current TV series about property and property development; by discussing why government policies are encouraging the development of existing communities rather than expansion into the green belt; or by exploring other topical property issues highlighted in the local paper.

Learners should be encouraged to think about identifying Greenfield and brownfield development sites. Activities could be developed using programmes such as Google Earth, with learners asked to identify potentially suitable development sites in their local area. Case studies highlighting situations in which buildings such as churches and factories have been converted into housing could also be used to stimulate discussion as to how development of the built environment can impact upon communities.

An activity could be developed in which learners are asked to consider the following questions relating to property development:

- With whom would they need to engage? (Quantity surveyors, architects, structural engineers, estate agents)
- What consideration (if any) would they give to others in the community where their development would be situated?

Through this process, learners can also begin to assess the socio-economic reasons for investing in property and consider why an increasing number of people are choosing to invest in property rather than pensions.

As in every other unit, the importance of using the local community as a learning resource cannot be over-estimated. Work placements, work experience or work shadowing in local authority planning offices, housing developer planning offices and property service companies would be extremely useful and would help to clarify the importance of sustainability in the planning of built environment developments. Contact with, and visits to, the offices or premises of the following organisations should be encouraged, as should guest talks from experienced personnel from each of the types of organisation:

- Housing associations
- Local authorities
- Estate agencies
- Private and commercial letting agencies
- Private and corporate property developers.

Learners should also research the work done by the following professionals:

- planning officers
- Environmental officers
- Environmental architects.

This unit presents a number of opportunities for independent research and interrogation of media such as the internet, news programmes/journals and specialised television programmes.

What activities might be involved in this unit?

- Walking around the local community and classifying the features of the built environment in terms of community impact.
- Producing outline designs for an ideal community.
- Viewing TV programmes about property development and discussing their popularity.
- Visiting estate agents to review the property market and the sale and purchase of assets.
- Gathering useful careers information from a variety of sources.
- Planning a career in the value and use of the built environment, housing services or property services.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone. Alternative approaches could be selected.

The learner could develop PLTS by:

Independent enquirers

- planning and carrying out research into the features of the built environment associated with sustainable communities
- exploring issues and problems from individual and community perspectives

Creative thinkers

- asking questions of experienced personnel from property development and services organisations

Reflective learners

- inviting feedback to their specifications for sustainable communities and dealing positively with both praise and criticism

Team workers

- working with others towards preparing a summary of the economic benefits of sustainable communities

Self-managers

- organising their time and resources to achieve activity targets

Effective participators

- discussing their summaries of career development opportunities.

Suggested learning resources

Books

- The Handbook of Sustainable Building - An ink, D - First published by: James and James, 1996 - ISBN 1873936389
- Creative Neighbourhoods - Beedham & Wade - Published by: Aston Housing Consultancy, 2005 - ISBN 0955011000
- Approaching Urban Design: The Design Process - Roberts & Greed - Published by: Longman, 2001 - ISBN: 0582303001
- Managing the Building Design Process - Tunstall, G; Boonstra, C; & Morris, A - Published by: - Butterworth-Heinemann Ltd, 2000 - ISBN 0750650699

Journals and magazines

- Building Construction News
- Housebuilder Property Week Planning

Videos, CDs and DVDs

- The Construction of Houses – eight in series, more on the way University of West of England Video Project
- Building History and Building Conservation – five in series University of West of England Video Project
- E-resources for construction www.rsc-wales.ac.uk

Websites

- ConstructionSkills www.citb.org.uk
- Chartered Institute of Building www.ciob.org.uk
- Royal Town Planning Institute www.rtpi.org.uk
- Chartered Institute of Housing www.cih.org
- Environment Agency www.environment-agency.gov.uk
- Energy Saving Trust www.est.org.uk
- Health and Safety Executive www.hse.gov.uk
- Communities and Local Government www.communities.gov.uk

Level 2

Unit 7: Value and use of the built environment: Facilities management

What is this unit about?

The purpose of this unit is to introduce learners to facilities management and other support services. It will explore the contribution made by facilities management to maintenance and development of the built environment, and the economic benefits of facilities management to the wider community. The unit also covers contracting and delivery arrangements.

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow learners the opportunity to develop a range of Personal, Learning and Thinking Skills (PLTS), and to demonstrate these on more than one occasion. This approach will allow them to build towards a full range of PLTS.

Learning outcomes

The learner will:

1. understand the contribution of facilities management to the construction and maintenance of the built environment, and how it benefits buildings
2. understand how facilities management services are effectively contracted, delivered, operated and managed
3. know about the health, safety and welfare legislation that relates to facilities management.

Assessment criteria

1. The contribution of facilities management to the construction and maintenance of the built environment

The learner can:

- 1.1 identify and describe the contribution of facilities management and support services to (IE3):
 - a. maintenance of the built environment
 - b. development of the built environment
 - c. economic and financial benefits
 - d. wealth creation
 - e. quality of life
- 1.2 explain how facilities management enhances the efficiency and lifespan of buildings:
 - a. preservation
 - b. maintenance
 - c. hard facilities management (maintenance of built fabric and building services)
 - d. soft facilities management (catering, cleaning, security, communications, mail etc)
- 1.3 explain how facilities management has developed over recent years, including (IE2):
 - a. increased economic and social benefits
 - b. reduction in number of expensive emergency call-outs
 - c. ongoing maintenance (building does not reach a costly state of disrepair)
 - d. clients choosing the most cost-effective service providers for soft facilities management.

2. Contracting and delivery of facilities management services

The learner can:

- 2.1 describe how facilities management services are contracted and delivered:
 - a. in-house departments, responsible for covering all aspects associated with building maintenance, non-core business services and security
 - b. facilities managers/management team overseeing a range of specialist contractors
 - c. large multi-service companies providing full range of facilities management services
- 2.2 identify the ways in which structures in the built environment are:
 - a. operated
 - b. managed
 - c. protected
 - d. maintained
- 2.3 identify the various roles in facilities management, including:
 - a. managers
 - b. engineers
 - c. staff (eg grounds-keeping, security, catering and cleaning).

3. Health, safety and welfare legislation relating to facilities management

The learner can:

- 3.1 relate facilities management activities to health, safety and welfare legislation
- 3.2 analyse the documentation used to demonstrate that buildings and building engineering systems meet minimum Health and Safety requirements (IE4).

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available in Section 3.1 of this specification and also within this unit in the section on Personal, Learning and Thinking Skills.

Guided learning hours

It is recommended that a minimum of 60 guided learning hours be spent on this unit.

Assessment

The assessment method for this unit will be external assessment. Learners will take a written test. This unit focuses mainly on knowledge and understanding, and is therefore deemed to be an appropriate vehicle for the externally assessed component of Principal Learning at Level 2. The assessment is by means of a written test with 'short' answers, the purpose of which is to assess the learners' understanding of the learning outcomes, content and assessment criteria as indicated in the examination specification shown below.

There are opportunities for experiential learning during any formative assessment undertaken. Learners should make their own initial evaluations of the topics discussed during the unit, and refine those evaluations by revisiting them after discussion with other learners and/or construction professionals. These evaluations can be improved each time the matter is discussed. A suitable period of reflection should follow upon completion of the assessment for this unit. The learner should evaluate which questions they answered correctly, which they did not, why they sometimes chose the wrong answer and why the correct answer is correct.

Examination specification

Duration: 1½ hours / Assessment type: Short answer / No of marks: 48

Assessment criteria	Subtopic	No of marks	Total	%
1a The contribution of facilities management and support services	Maintenance of the built environment	3	12	25
	Development of the built environment	3		
	Economic, financial and wealth creation issues	3		
	Quality of life issues	3		
1b How facilities management enhances the efficiency and lifespan of buildings	Preservation	3	12	25
	Maintenance	3		
	Hard facilities management	3		
	Soft facilities management	3		
1c How facilities management has developed over recent years	Increased economic and social benefits	2	8	16.67
	Reduction in emergency call-outs	2		
	Prevention of costly disrepair	2		
	Market for most cost-effective providers	2		
2a How facilities management services are contracted and delivered	In-house departments covering all aspects of facilities management	2	6	12.5
	Facilities managers overseeing specialist contractors	2		
	Multi-service companies providing a full range of facilities management services	2		
2b The ways in which structures in the built environment are serviced	Operation	1	4	8.33
	Management	1		
	Protection	1		
	Maintenance	1		
2c Roles in facilities management	Range of job roles available in facilities management	3	3	6.25
3 Health, Safety and Welfare legislation	Legislation applicable to facilities management	3	3	6.25
	Total	48	48	100

Guidance for delivery

What is facilities management?

This unit represents an opportunity for learners to explore the area of facilities management and assess the benefits that effective facilities management can bring to the built environment. A key initial requirement of this unit will be for learners to fully understand what is meant by the term 'facilities management'. This could be achieved in the first instance through teacher-led group discussions and brainstorming sessions.

Learners should be encouraged to differentiate between hard facilities management and soft facilities management. Teachers will need to explain clearly to learners the different ways in which facilities management can be applied throughout the built environment.

At all times case studies and real-life examples should be used to help learners apply what is being covered to real-life situations. Independent research into the facilities management services offered by some of the larger construction/building services companies should be encouraged and sourcing information from websites can be particularly valuable.

Facilities management and building maintenance

An understanding of some of the essential elements relating to building maintenance is important in order for learners to recognise how the unit relates to the physical nature of the built environment. This should include looking into requirements for the inspection and maintenance of electrical, gas, water supply, air-conditioning and fire safety systems. Activities could be built around looking at how these services are used in the learner's own school or college environment. This aspect of the unit should include an introduction to the statutory requirements which cover the safe operation of some of these systems (gas is a particularly good example) and some of the potential risks if vigilant maintenance procedures are not followed (carbon monoxide poisoning, Legionnaires disease and so on).

Visits to or from school and/or college site managers, CORGI inspectors and building inspectors will help enhance learner understanding.

Examples of real life activities are provided in 'Opportunities for applied learning' below.

It is not necessary at this level for learners to fully comprehend the intricacies of contracts for the delivery of specific facilities management services, but they should have an overall understanding of the basic principles of contracting for services.

There are many diverse factors for teachers to cover in this unit. Facilities management is a relatively young industry that brings together many diverse strands relating to how the built environment is managed and maintained. It is important that each of these strands is covered in appropriate detail, while ensuring that learners also retain an awareness that the purpose of facilities management is to enhance the efficiency and lifespan of buildings.

Other activities to support this element of the unit could include:

- an assessment of the facilities management associated services provided in their school and other identified public buildings such as hospitals
- An exploration of the economic elements of this aspect of facilities management as related to the learner's centre and other managed buildings. Learners could determine if it is better value for the client to employ cleaning and catering staff directly, or to buy these services in from outside
- the use of a wide range of techniques and learning strategies including presentations, group discussions, lectures (possibly by representatives from industry) and case studies
- Site visits (schools, hospitals, large office facilities, shopping centres) and employer visits (especially to companies offering bespoke facilities management solutions) to engage with those directly involved in providing facilities management services.

Opportunities for applied learning

Arrangements should be made to utilise the services used in the school or college where the learners are studying. Learners should undertake some or all of the following tasks:

- preparing flow diagrams or charts explaining how facilities management and/or building maintenance is handled within their school or college
- producing and interpreting maintenance schedules for their school or college
- identifying the documentation that is required to demonstrate that the school or college buildings and building engineering systems meet minimum Health and Safety requirements
- analysing basic costing models showing the ways in which well-planned building maintenance can save money
- producing basic costing models showing economic factors and comparing the buying-in of services with direct employment
- visiting facilities management companies
- visiting public buildings such as hospitals
- discussing facilities management with experts such as building inspectors, maintenance managers and caretakers
- Producing organisational charts showing the various occupations which relate to the area of facilities management.

What activities might be involved in this unit?

- Visiting facilities management companies and public buildings such as hospitals.
- Interviewing building inspectors, maintenance managers and caretakers.
- Preparing flow charts showing how facilities management is used within the learner's school or college.
- Producing basic maintenance schedules for the learner's school or college.
- Preparing basic costing models showing how facilities management can save organisations money.

Suggested prior learning

Level 2 Unit 6: Value and use of the built environment: communities.

Personal, Learning and Thinking Skills

The list below is indicative of the way this unit supports the development of PLTS, as opposed to the achievement of PLTS that are possible through the assessment. The unit supports the development of more PLTS than are covered through the assessment criteria alone.

Alternative approaches could be selected. The learner could develop PLTS by:

Independent enquirers

- planning and carrying out research into the ways in which building maintenance and facilities management is carried out in their school or college
- exploring issues and problems concerned with the organisation of maintenance and facilities management

Creative thinkers

- asking questions of experienced personnel involved in the organisation of maintenance activities and Facilities management

Reflective learners

- inviting feedback on their project work and dealing positively with praise and criticism
- monitoring and reviewing their progress towards completion of unit activities and projects

Team workers

- working with others to develop the basic maintenance plan and the associated cost model
- making effective contributions to group discussions regarding the above

Self-managers

- organising their time and resources to achieve the above

Effective participators

- presenting their work and discussing the results with others.

Suggested learning resources

Books

- Total Facilities Management (Second Edition) - Atkin, B & Brooks, A - Published by: Blackwell Publishing, 2005 - ISBN: 1405127902
- Building Construction Handbook, 6th Ed - Chudley & Greeno - Published by: Butterworth-Heinemann, 2006 - ISBN: 0750668229
- Facilities Management: An Explanation (2nd edition) - Park, Alan - Published by: Palgrave Macmillan, 1998 - ISBN: 0333737989
- Building Care - Wood, Brian - Published by: Blackwell Science Ltd, 2003 - ISBN 0632060492

Journals and magazines

- Building Facilities Management Journal

Websites

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| • Asset Skills | www.assetskills.org.uk |
| • Construction Skills | www.citb.org.uk |
| • British Institute of Facilities Management | www.bifm.org.uk |
| • Facilities Management Association | www.fmassociation.org.uk |
| • Facilities Management Journal | www.fmj.co.uk |
| • Premises & Facilities Management magazine | www.pfmonthenet.net |
| • Health and Safety Executive | www.hse.gov.uk |
| • Communities and Local Government | www.communities.gov.uk |
| • Royal Institute of Chartered Surveyors | www.rics.org |
| • Technical Facilities Management and Energy | www.dalkia.co.uk |

4 Assessment

4.1 Aims

Principal Learning courses based on this specification should encourage learners to:

1. develops a broad understanding and knowledge of the construction and built environment industries
2. develop skills in the broad context of the construction and built environment industries
3. understand the fabric of the world in which we live and its impact on individuals and communities
4. apply:
 - 4.1 Functional Skills at Level 2 in Mathematics, English and ICT
 - 4.2 transferable Personal, Learning and Thinking Skills (PLTS) in independent enquiry, creative thinking, reflective learning, team working, self-managing and effective participation
 - 4.3 Investigative and project management skills through a Principal Learning project
 - 4.4 skills gained through work experience
5. learn through experience of applying knowledge and skills to tasks or contexts including those that have the characteristics of real work e.g. the minimum 10 days' work experience including:
 - 5.1 planning and reflecting on their experience
 - 5.2 drawing out and articulating lessons learnt
 - 5.3 applying their learning to new activities or situations.

4.2 National criteria

This Principal Learning Construction and the Built Environment specification comply with the following:

- Criteria for the specialised Principal Learning qualifications in construction and the built environment at levels 1, 2 and 3 (published QCA November 2006)
- Criteria for the accreditation of Principal Learning qualifications at levels 1, 2 and 3 (published QCA April 2007)

4.3 Prior learning

There are no prior learning requirements.

4.4 Internal assessment

Internally assessed units will comply with the Joint Council for Qualifications Instructions for conducting coursework/portfolios – please see JCQ website:

<http://www.jcq.org.uk>

Task setting

Clear guidance, with exemplars of suitable internal assessment, is available to all consortia centres in order to ensure that suitable tasks are set. City & Guilds will give guidance on task setting and the moderator will review a selection of proposed tasks to check that they are suitable at the early advisory visits.

The teacher at a centre with overall responsibility for internal standardisation is also responsible for the standardisation of task setting.

Guidance is provided on the total amount of time that a task should take, on the amount of time that specific activities within a task should take and on the form of supervision expected.

Control criteria for tasks

The internally assessed assignments are to be taken under controlled conditions and the forms of evidence required in each unit will drive the controls needed. Where specific guidance is required, it will be found in the assessment section of the unit concerned. The following controls should be in place where appropriate for individual tasks.

Activity – A video or DVD recording of the activity, or a witness testimony describing the activity, will be necessary as evidence of ephemeral work.

Research of relevant sources of material – A bibliography or list of sources e.g. museums, businesses, organisations, websites will provide evidence of research. The teacher may also question learners on their research and submit signed notes from these questions as evidence.

Record of interviews with business, industry or third party representatives – Transcripts or audio recordings (if permitted by the individual concerned), or the learner's own record of the interview and evidence of permission or observation or witness statement by an observer may be used as evidence of interactions with learners.

Outcome or production – Where this is produced over time, it is possible that the teacher may not supervise the whole of the process; however, sufficient supervision must take place to ensure that the material for assessment is the unaided work of the learner. Photographs, recordings and witness testimony can also be utilised to confirm that the work belongs to an individual learner.

Practical assignment – These must be conducted under supervision and the outcome should be submitted for moderation if possible.

Portfolio of evidence – This must be submitted for moderation.

The above controls are summarised for reference in the following table.

Form of evidence	Method of Control								
	Video/DVD recording	Photographs	Witness statement	Bibliography or list of sources	Signed notes evidencing activities	Transcript or audio recording	Learner's own record	Supervision	Submission of artefact or product
Activity	1		2						
Research of relevant sources of material				1	2				
Record of interviews with business, industry or third party representatives			2 with learner's own record			1 with evidence of permission	2 with witness statement		
Outcome or Production	2	2	2			2		1*	1*
Practical assignment	2	2	2			2		1*	1* if possible
Portfolio of evidence									1*

Please note:

Control methods rated 1 are the most preferable type to be used. Those rated 2 may be used if employing the favoured method is not practical, or as a way of providing additional evidence of the learner having met the assessment criteria

* Where the number 1 is followed by an asterisk, this indicates that any other control method may accompany but not substitute the use of this method.

Guidance by the teacher

The work assessed must be solely that of the learner. Any assistance given to an individual learner which is beyond that given to the group as a whole must be recorded.

Unfair practice

At the start of the course, the supervising teacher is responsible for informing learners of the City & Guilds Regulations concerning malpractice. Learners must not take part in any unfair practice in the preparation of work to be submitted for assessment, and must understand that to present material copied directly from books or other sources, without acknowledgement, will be regarded as deliberate deception. Centres must report suspected malpractice to City & Guilds.

Applying the assessment grid

When assessing learners' work, teachers/assessors should consider the level of attainment demonstrated in four broad areas within the demands and context of the specific unit being assessed:

- The depth and breadth of understanding
- The level of skills
- The level of synthesis, analysis and evaluation
- The level of independence and originality.

In the assessment grid for each unit, mark ranges are specified for each assessment criteria topic. When assessing a learner's work, teachers/assessors should use their professional judgement to identify for each assessment criteria topic, the mark band description within which that work falls and then the mark within that range that best describes the depth and quality of the work.

To achieve the higher mark bands, learners should show greater depth and breadth of understanding, higher level skills, higher levels of synthesis, analysis and evaluation and higher levels of independence and originality as required in the assessment criteria. Work that clearly meets all the requirements of the mark band description should be awarded the maximum mark identified.

Aspects of the work that might fall short of meeting, in full, the description but which do not, in the judgement of the teacher/assessor, sufficiently influence the overall level of achievement to merit the work being assigned to a lower mark band, will reduce the mark awarded within the identified range available. This can be expressed as identifying the 'best-fit' approach, where the areas of strength in the work submitted by the learner can be allowed to compensate for weaknesses in other areas.

Assessors will use archived exemplars as they become available as a reference point. By comparing their own learners' work with archive work which has an assessment commentary attached, the assessor will be able to position the work either on a higher or lower point.

Assessment of group work

Group work is a useful way of obtaining information for some activities but it is important that individual learners meet the assessment criteria requirements. Teachers/assessors assessing the evidence will need to be convinced of its individual authenticity. Questioning can be used in order to clarify the validity, authenticity and sufficiency of evidence and, under these circumstances, the teacher/assessor may wish to include a dated witness statement detailing this evidence. It is expected that the use of such statements will be kept to a minimum, so that they constitute a very minor part of the submitted evidence.

Annotation of written/photographic evidence can also be used to detail an individual's contribution.

It is recognised that there can be instances where learners are required to carry out tasks as part of a group and that group-working skills are an integral part of the assessment requirements. In such cases this general guidance on group work will be superseded by the specific requirements and instructions of the individual unit(s).

Internal standardisation of marking

The centre is required to standardise the assessment across different teachers and teaching groups, within and across units, to ensure that all work at the centre has been judged against the same standards. If two or more teachers are involved in marking units, one teacher must be designated as responsible for internal standardisation.

Common pieces of work must be marked on a trial basis and differences between assessments discussed at a training session in which all teachers involved must participate.

The teacher responsible for standardising the marking must ensure that the training includes the use of reference and archive materials such as work from a previous year or examples provided by City & Guilds.

4.5 Supervision and authentication of internally assessed work

The Head of Centre is responsible to City & Guilds for ensuring that internally assessed work is conducted in accordance with City & Guilds instructions and JCQ instructions.

City & Guilds requires:

- **Learners** to sign the record form to confirm that the work submitted is their own, and
- **Teachers/assessors** to confirm on the record form that the work assessed is solely that of the learner concerned and was conducted under the conditions laid down by the specification
- **the teacher/assessor responsible for internal standardisation** also to sign the Centre Declaration Sheet (CDS) to confirm that internal standardisation has taken place and that the work presented is that of the learners named. If only one teacher has undertaken the marking, that person must sign this form.

The completed record form must be attached to each learner's work and the Centre Declaration Sheet must be sent to the moderator. Failure to sign either or both the record form and the CDS may delay the processing of the learners' results.

The teacher should be sufficiently aware of the learner's standard and level of work to appreciate if the work submitted is beyond the ability of the learner.

In most centres teachers are familiar with learners' work through class and assignments. Where this is not the case, teachers should make sure that all internally assessed work is completed under direct supervision or controls listed in Section 4.4.

In all cases, some direct supervision is necessary to ensure that the work submitted can be confidently authenticated as the learner's own.

If it is believed that a learner has received additional assistance and this is acceptable within the guidelines for the internally assessed units, the teacher/assessor should award a mark which represents the learner's unaided achievement. The authentication statement should be signed and information given on the relevant form.

If the teacher/assessor is unable to sign the authentication statement for a particular learner, then the learner's work cannot be accepted for assessment.

4.6 Malpractice

Teachers should inform learners of the JCQ Regulations concerning malpractice. Learners must not:

- submit work which is not their own
- lend work to other learners
- allow other learners access to, or the use of, their own independently-sourced material (this does not mean that learners may not lend their books to another learner, but learners should be prevented from plagiarising other learners' research)
- include work copied directly from books, the Internet or other sources without acknowledgement or an attribution
- submit work typed or word processed by a third person without acknowledgement.
These actions constitute malpractice, for which a penalty (egg disqualification from the examination) will be applied.

If malpractice is suspected, the Examinations Officer should be consulted about the procedure to be followed.

Where suspected malpractice in internally assessed work is identified by a centre after the learner has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. The form, JQM/M1, should be used. Copies of the form can be found on the JCQ website: www.jcq.org.uk

Malpractice in internally assessed work discovered prior to the learner signing the declaration of authentication need not be reported to City & Guilds, but should be dealt with in accordance with the centre's internal procedures. City & Guilds would expect centres to treat such cases very seriously. Details of any work which is not the learner's own must be recorded on the cover sheet or other appropriate place.

4.7 Moderation

City & Guilds will ensure that in centres where learners from more than one centre are taught and assessed together, a single moderator for each Principal Learning qualification will be appointed subject to consideration of workload.

Moderation of internally assessed work will take place in two stages and the same moderator will be responsible for each.

Stage 1 – a visit from a moderator representing City & Guilds at a fairly early stage during the delivery of Principal Learning

The moderator will inspect some work and check such matters as:

- task setting against assessment criteria
- Understanding of controlled conditions
- taking and marking of internal assessments
- Arrangements for internal standardisation
- Coverage of PLTS
- Coverage of Applied Learning.

The moderator will give advice, feedback and guidance on each of the above. Stage 1 will be seen as a technical advisory visit and will cover the Principal Learning units.

Stage 2 – a check by the moderator on the taking and marking of samples of Principal Learning units

Internally assessed work will normally be reviewed at the centre but may be sent to the moderator. The samples to be moderated will be agreed with the centre for each identified unit in accordance with the moderation procedures. During the moderation visit, the moderator will normally assess samples of work with the teacher and discuss the standards in order to ensure that they are in line with the national standards for this qualification. If necessary, further samples may be requested and adjustments may be applied to the centre's marks. Mark adjustments will normally preserve the centre's order of merit, but if major discrepancies are discovered, City & Guilds reserves the right to alter the order of merit.

Centre marks for all units must be submitted to City & Guilds and to the moderator by the specified deadline. Claiming and moderation of internal assessment is only available in the summer term.

Further details will be given in moderation procedures documentation to be issued by City & Guilds.

4.8 Post-moderation procedures

On publication of the results for Principal Learning units, City & Guilds will provide centres with details of the final marks for the internally assessed units.

The learners' work will be returned to the centre after moderation has taken place. The centre will receive a report with, or soon after, despatch of published results giving feedback on the appropriateness of the task set, the accuracy of the assessments, and the reasons for any adjustment to the marks.

City & Guilds reserves the right to retain some learners' work for archive or standardising purposes.

4.9 Retaining evidence and re-using marks

The centre must retain the work of all learners for each internally assessed unit, with record forms attached, under secure conditions, from the time it is assessed, to allow for the possibility of an enquiry about results. The work may be returned to learners after the deadline for enquiries about results. If an enquiry about a result has been made; the work must remain under secure conditions in case it is required by City & Guilds.

4.10 External assessment

The external assessments will be timetabled twice a year, in January and June, and the dates will be published at the start of the academic year.

4.11 Factors affecting individual learners

Teachers should be able to accommodate the occasional absence of learners by ensuring that the opportunity is given for them to make up missed assessments.

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. If the move occurs early in the course, the new centre should take responsibility for assessment. If it occurs late in the course it may be possible to arrange for the moderator to assess the work through the 'Educated Elsewhere' procedure. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

5 Administration

5.1 Availability of Principal Learning units

All internally assessed Principal Learning units for this specification are available once a year only, commencing in June 2013. External assessments will be timetabled twice a year, in January and June, and the dates will be published at the start of the academic year.

5.2 Centre registration

Centres wishing to prepare learners for this specification should apply for approval to offer Principal Learning before teaching begins. Completed application forms should be submitted to your local City & Guilds regional office. Further details of the approval process are available on the website at: www.cityandguilds.com

5.3 Centre requirements

Resources

Centres must have access to sufficient equipment in the centre or in other centres within the consortium to ensure that learners have the opportunity to cover all the practical activities. Any requirement for specialised equipment is to be found in the description of the units themselves.

Health and safety

The importance of safe working practice and the demands of the Health and Safety at Work Act 1974 must be stressed to all learners. Learners have responsibilities for maintaining the safety of others as well as their own. Anyone behaving in an unsafe fashion must be stopped and a suitable warning given by the Teacher responsible. It is essential that all learners acquire habits required to promote health and safety in the workplace and that their learning avoids potentially unpleasant or dangerous consequences.

Centre staff

Centre staff should be technically competent in all the areas for which they are delivering education and training and/or should also have relevant experience of providing the necessary practical training.

Continuing Professional Development (CPD)

Centres are expected to support their staff in ensuring that their knowledge and skills in the vocational area remain current and take account of any national or legislative developments.

5.4 Quality assurance

Internal quality assurance

Registered centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centres and/or consortium's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance.

National standards and rigorous quality assurance are maintained by the use of:

- City & Guilds external examinations
- City & Guilds externally set briefs or assignments
- Internal quality assurance
- City & Guilds external moderation.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- The setting of appropriate tasks (see Section 4.4)
- The application of appropriate control of tasks (see Section 4.4)
- Training in the use of the assessment grid (see Section 4.4)
- Completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken place (see Sections 4.4 and 4.5)
- The completion by learners and teachers/assessors of the record form for each learner's work (see Section 4.5).

External quality assurance

External quality assurance is provided by the two stage moderation system described in Section 4.7. External moderation of internally assessed work is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres and that national standards are maintained.

In order to carry out their quality assurance role, external moderators must have appropriate teaching and vocational knowledge and expertise. City & Guilds will appoint external moderators and will ensure that they attend regular training and development meetings designed to keep them up to date, to ensure standardisation of all assessments and to share good practice.

External moderators:

- provide advice and support to staff in centres
- ensure the quality and consistency of assessments within and between centres and over time by the use of systematic sampling
- Regularly visit centres to ensure that they continue to meet the centre registration requirements of City & Guilds
- provide feedback to centres and to City & Guilds.

In order to monitor compliance with JCQ requirements, particularly for administering external tests, JCQ Inspectors will regularly visit centres.

City & Guilds requires the Head of Centre to:

1. facilitate any inspection of the Centre which is undertaken on behalf of City & Guilds
2. make secure arrangements to receive, check and keep examination material secure at all times, maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential and keeps scripts secure from the time they are collected from the candidates to their despatch to City & Guilds.

5.5 Irregularities

Centres must inform City & Guilds of any irregularity, including any candidate who arrives late for a test. For detailed instructions please refer to the current JCQ Instructions for Conducting Examinations which is available to view or to download from the JCQ's website:

<http://www.jcq.org.uk>

5.6 Awarding grades and reporting results

The Level 2 Construction and the Built Environment Principal Learning will be reported on a four-grade scale: A*, A, B and C. Learners who fail to reach the minimum standard for grade C will be recorded as U (Unclassified) and will not receive a qualification certificate.

5.7 Enquiries about results

The services available for enquiries about results include a clerical check re-mark of external assessments and re-moderation of internally assessed work. Requests must be submitted within the specified period after the publication of results for individual assessments.

In cases where a post-results enquiry reveals inaccurate assessment, the result may be confirmed, raised or lowered.

For further details of enquiries about results services, please consult the current version of the JCQ Post- Results Services booklet.

5.8 Re-sits and shelf-life of unit results

Unit results remain available to count towards certification, whether or not they have already been used, as long as the specification is still valid.

Learners may re-sit a unit any number of times within the shelf-life of the specification. The best result for each unit will count towards the final qualification.

Learners will be graded on the basis of the work submitted for assessment.

5.9 Access arrangements and special consideration

We have taken note of the provisions of the Disability Discrimination Act (DDA) 1995 in developing and administering this specification.

We follow the guidelines in the Joint Council for Qualifications (JCQ) document: Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examination GCSE, GCE, GNVQ, AEA, Entry Level, Basic Skills & Key Skills Access Arrangements and Special Consideration. This is published on the JCQ website: <http://www.jcq.org.uk/homepage.cfm>

Access arrangements

We can make arrangements so that learners with disabilities, special educational needs and temporary injuries can access the assessment. These arrangements must be made before the examination. For example, we can produce a Braille paper for a learner with visual impairment.

Special consideration

We can give special consideration to learners who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination. Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the center.

5.10 Language of examinations

We will provide units for this specification in English only.

5.11 Qualification titles

The qualification based on this specification is:
City & Guilds Level 2 Principal Learning in Construction and the Built Environment

Appendix 1 Other Issues

European Dimension

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units.

Environmental Education

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community and the Report Environmental Responsibility: An Agenda for Further and Higher Education 1993 in preparing this specification and associated specimen units.

Avoidance of Bias

City & Guilds has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.