

**Level 1 – Principal Learning  
Specification (2764-01)  
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.

## 1.2 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 thinking of adopting City & Guilds for Principal Learning, we look forward to welcoming you.

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 you need 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 at **[www.cityandguilds.com](http://www.cityandguilds.com)**

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

## 2 Specification at a glance

### 2.1 Level 1 Construction and the Built Environment

#### Principal Learning at a glance

All seven units are compulsory.

<b>Unit 1</b>	<b>30 GLH</b>
<b>Design the built environment: design influences</b> Internally set and marked	

<b>Unit 2</b>	<b>30 GLH</b>
<b>Design the built environment: applying design principles</b> Internally set and marked	

<b>Unit 3</b>	<b>30 GLH</b>
<b>Create the built environment: using tools</b> Internally set and marked	

<b>Unit 4</b>	<b>30 GLH</b>
<b>Create the built environment: methods and materials</b> Externally assessed	

<b>Unit 5</b>	<b>60 GLH</b>
<b>Value and use the built environment</b> Internally set and marked	

<b>Unit 6</b>	<b>30 GLH</b>
<b>Maintenance of the built environment</b> Internally set and marked	

<b>Unit 7</b>	<b>30 GLH</b>
<b>Modern methods of construction</b> Internally set and marked	

## 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 1 Construction and the Built Environment Principal Learning.

<b>Independent enquirers</b>
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

<b>Creative thinkers</b>
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 1 Construction and the Built Environment Principal Learning.

<b>Level 1 Construction and the Built Environment Principal Learning</b>						
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.

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

Unit	English	Mathematics	Information and Communication Technology
Unit 5 Value and use the built environment	<ul style="list-style-type: none"> <li>• Speaking and listening Level 1</li> <li>• Reading Level 1</li> <li>• Writing Level 1</li> </ul>	<ul style="list-style-type: none"> <li>• Representing situations using Mathematics Level 1</li> <li>• Analysing and processing using Mathematics Level 1</li> <li>• Interpreting and presenting results Level 1</li> </ul>	<ul style="list-style-type: none"> <li>• Use ICT systems Level 1</li> <li>• Find and select information Level 1</li> <li>• Develop, present and communicate information Level 1</li> </ul>
Unit 6 Maintenance of the built environment	<ul style="list-style-type: none"> <li>• Speaking and listening Level 1</li> <li>• Reading Level 1</li> <li>• Writing Level 1</li> </ul>		<ul style="list-style-type: none"> <li>• Use ICT systems Level 1</li> <li>• Find and select information Level 1</li> <li>• Develop, present and communicate information Level 1</li> </ul>
Unit 7 Modern methods of construction	<ul style="list-style-type: none"> <li>• Speaking and listening Level 1</li> <li>• Reading Level 1</li> <li>• Writing Level 1</li> </ul>	<ul style="list-style-type: none"> <li>• Representing situations using Mathematics Level 1</li> <li>•</li> <li>• Analysing and processing using Mathematics Level 1</li> <li>•</li> <li>• Interpreting and presenting results Level 1</li> </ul>	<ul style="list-style-type: none"> <li>• Use ICT systems Level 1</li> <li>• Find and select information Level 1</li> <li>• Develop, present and communicate information Level 1</li> </ul>

### 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 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 1 Units**

## **Level 1 Unit 1: Design the built environment: design influences**

### **What is this unit about?**

The purpose of this unit is for learners to explore the factors that affect the design process, including how the planning process can influence the final design. It also introduces learners to the stages of the design and planning cycle, the importance of sustainability in good design, and the properties of a range of construction materials.

This unit, alongside the others within the Level 1 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 the factors that influence the design process
2. know the factors that affect the planning process and how planning affects design
3. understand how a sustainable approach can be used in good design
4. understand how the properties of construction materials determine their use
5. be able to perform simple tests on construction materials.

## **Assessment criteria**

### **1. Factors that influence the design process**

The learner can:

- 1.1 identify the main factors that influence the design process:
  - a. social
  - b. economic
  - c. infrastructural
  - d. legal
- 1.2 identify the human and physical factors that influence the design process:
  - a. size and composition of community
  - b. role of existing infrastructure and transport services
  - c. intended use and users
  - d. economic influences:
    - o materials
    - o labour
    - o land costs.

### **2. Factors that affect the planning process and how planning affects design**

The learner can:

- 2.1 identify the factors that affect the planning process (IE5):
  - a. planning legislation
  - b. local area plans
  - c. community requirements
  - d. environmental issues
  - e. public opinion
- 2.2 identify and describe the impact of planning on the design process.

### **3. Design considerations for a sustainable environment**

The learner can:

- 3.1 explain how good design can help create a sustainable environment (IE3, 6):
  - a. consideration of existing flora and fauna
  - b. sustainable sourcing of materials
  - c. local sourcing of materials
  - d. recycling techniques
  - e. preservation of limited natural resources.

#### **4. Material properties, uses and sustainability**

The learner can:

- 4.1 recognise material properties and their effect on design:
  - a. appearance
  - b. strength
  - c. durability
  - d. sound insulation
  - e. thermal insulation
  - f. fire resistance
  - g. fitness for purpose (or suitability for required function)
  - h. sustainability
  - i. cost
- 4.2 draw conclusions regarding how properties of materials determine their usage (IE4, 6).

#### **5. Material testing**

The learner can:

- 5.1 a perform simple tests on construction materials as part of a team (IE2) (SM3) (TW1, 2)
- 5.2 b interpret results of simple tests on construction materials.

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 30 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.

Learners will complete an assignment, the purpose of which is to investigate the basic social, legal, economic, infrastructural, human and physical factors that influence design and the planning process. It will also develop learners' understanding of how such factors influence design, the ways in which good design can help create a sustainable environment, and how material properties and specification affect design. The assignment should not require the learner to actually do any design work, which follows next in Level 1 Unit 2: Design the built environment: applying design principles.

This method of assessment allows the centre to contextualise the assignment, by encouraging learners to consider the relationship between the design and planning process, and the specification of construction materials to support a sustainable approach. The assignment should relate to the learners' local area and use up-to-date information.

The evidence should be based upon an existing design that has been granted planning permission and which is currently under construction or on an existing building, preferably in the local area. If this is not feasible, a realistic teacher-devised scenario would suffice. As far as is reasonably practical, the building used should be of sustainable design. Learners may take a general approach to the issues being covered, but should note that they are required to extend their general answers and address the more specific issues associated with the selected building or scenario provided.

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 12 of the 30 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:
  - a. the factors that affect the design and planning processes
  - b. the ways in which planning affects design
  - c. the importance of designing for a sustainable environment
  - d. the important properties of common construction materials
  - e. how the properties of materials influence their use and contribute to sustainability
2. results of simple tests performed on construction materials as part of a team
3. an interpretation of the test results.

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 the factors that influence the design process.
- Identify and describe the factors that affect the planning process and describe how the planning process influences the design process.
- Explain the various considerations that the designers have to take into account in order to design a sustainable environment.
- Identify and describe the important properties of common construction materials (timber, concrete, brick, metal and plastic) and explain how these properties determine how materials are used.
- Select sustainable materials for specific purposes.
- Perform, as part of a team, simple tests on construction materials for strength, durability, water absorption, thermal movement and moisture movement.
- Interpret the results of these tests.

The first three tasks offer an opportunity for experiential learning in terms of knowledge and understanding of the iterative process by which designs are planned, actioned, 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 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 directly inform the learning in Level 1 Unit 2: Design the built environment: applying design principles. It can also support study at a higher level: in particular, Level 2 Unit 1: Design the built environment: the design process.

## Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. Factors that influence the design process	18.75%	9
2. Factors that affect the planning process and how planning affects design	25%	12
3. Design considerations for a sustainable environment	12.5%	6
4. Material properties, uses and sustainability	25%	12
5. Material testing	18.75%	9
<b>Total</b>	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><b>0 – 3 marks</b></p> <p>Demonstrated a basic understanding of the factors that affect the design process by correctly identifying a limited number of factors, and relating those factors to the design of the building or structure under consideration in a superficial but generally accurate fashion.</p>	<p><b>4 – 6 marks</b></p> <p>Demonstrated a partial understanding of the factors that affect the design process by correctly identifying many of the factors, classifying them as main, human or physical, and relating the factors to the design of the building or structure under consideration in a clear and accurate fashion.</p>	<p><b>7 – 9 marks</b></p> <p>Demonstrated an in-depth understanding of the factors that affect the design process by correctly identifying all or nearly all of the factors, clearly and accurately classifying them as main, human or physical, and relating the factors to the design of the building or structure under consideration in a thorough and detailed fashion.</p>
2. Factors that affect the planning process and how planning affects design	<p><b>0 – 4 marks</b></p> <p>Demonstrated a basic understanding of the factors that affect the planning process by correctly identifying a limited number of factors, and relating those factors to the building or structure under consideration in a superficial but generally accurate fashion.</p>	<p><b>5 – 8 marks</b></p> <p>Demonstrated a partial understanding of the factors that affect the planning process by correctly identifying many of the factors, describing clearly the impact of planning on the design process, and relating the factors to the building or structure under consideration in a clear and accurate fashion.</p>	<p><b>9 – 12 marks</b></p> <p>Demonstrated a detailed understanding of the factors that affect the planning process by correctly identifying all or nearly all of the factors, describing fully the impact of planning on the design process, and relating the factors to the building or structure under consideration in a thorough and detailed fashion.</p>

<p>3. Design considerations for a sustainable environment</p>	<p><b>0 – 2 marks</b></p> <p>Provided a basic explanation of the factors that should be considered when designing a sustainable environment, and supported this explanation with a limited number of examples and a superficial description of how these relate to the design of the building or structure under consideration.</p>	<p><b>3 – 4 marks</b></p> <p>Provided a partial explanation of the factors that should be considered when designing a sustainable environment, and supported this explanation with several appropriate examples and a clear and accurate description of how these relate to the design of the building or structure under consideration.</p>	<p><b>5 – 6 marks</b></p> <p>Provided an in-depth explanation of the factors that should be considered when designing a sustainable environment, and supported this explanation with suitable and wide-ranging examples and a thorough and detailed description of how these relate to the design of the building or structure under consideration.</p>
<p>4. Material properties, uses and sustainability</p>	<p><b>0 – 4 marks</b></p> <p>Identified the basic properties of common construction materials, provided a brief explanation of how these properties determine their use, and considered sustainability issues in a superficial manner.</p>	<p><b>5 – 8 marks</b></p> <p>Identified most of the important properties of common construction materials and provided a reasoned account of how their properties determine their use, with a brief explanation of their impact in sustainability terms.</p>	<p><b>9 – 12 marks</b></p> <p>Identified all the important properties of common construction materials and provided an in-depth account of how their properties determine their use, with a detailed explanation of their impact in sustainability terms.</p>
<p>5. Material testing</p>	<p><b>0 – 3 marks</b></p> <p>Made a minor contribution to a team performing practical tests on construction materials, and produced basic, but accurate, interpretations of some results.</p>	<p><b>4 – 6 marks</b></p> <p>Made a useful contribution to a team performing practical tests on construction materials, and produced clear and accurate interpretations of most results</p>	<p><b>7 – 9 marks</b></p> <p>Made a significant contribution to a team performing practical tests on construction materials, and produced thoughtful and accurate interpretations of all results.</p>

## Guidance for delivery

This unit deals with the key factors that affect design and planning decisions; the need to consider local community opinion and the natural environment; the properties and uses of the common construction materials (timber, concrete, brick, metal and plastic will suffice); and the technical information needed to support the design process. The unit is important because it sets the scene for all the subsequent units in the Principal Learning at Level 1.

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, laboratories 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 implicit legal and ethical issues in Assessment criteria topics 1, 2 and 3. These should be signposted, but there is no requirement for a detailed treatment of either at this stage. This unit has very close links with Level 1 Unit 2: Design the built environment: applying design principles. Joint delivery of the two units may be considered appropriate.

Sustainability will be the biggest issue facing designers in the future and should therefore be a focus of all visits and presentations. There are a number of useful videos, CD-ROMs and DVDs available on the subject. Many of these are available from the websites listed in the 'Suggested learning resources' section.

Materials testing should be performed in small groups with learners sharing the testing duties and the data produced, but performing their own calculations and drawing their own conclusions. The test procedures may be demonstrated by the teacher if the testing procedure requires maturity or if legislation prevents younger persons from operating testing equipment. See 'Opportunities for applied learning' for further guidance.

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, then a presentation by a design or planning professional 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

As the unit title implies, this unit is about the factors that influence design and planning decisions rather than about design principles or producing an actual design, both of which appear in Level 1 Unit 2: Design the built environment: applying design principles. However, communication in construction design is largely done by sketching and drawing, and it is anticipated that the learner will have the opportunity to develop such skills.

Learners will need to be able to interpret and produce simple design sketches and presentational drawings, but they are not required to demonstrate competence in the production of working drawings at this stage. A range of pre-prepared drawings of all kinds should be made available for the learners to consider. These could be either hard copies or in electronic form.

Learners spend most of their lives surrounded by the built environment and this environment is a valuable teaching resource. Learners should collect details of domestic properties from local estate agents. It would be best if this were a shared activity, with each learner visiting a different estate agent, so that the estate agents do not weary of the process.

Learners could also take photographs of sports stadiums, supermarkets, cinemas, bridges and towers, leisure centres, factories, and office blocks, or download suitable images from the internet. They could then compile these images into a presentation in which they explain to their class, for example:

- why a modern football stadium has no columns
- why a supermarket has large areas of clear floor space
- why some bridges have cables and some have not
- why towers are made of brick or concrete or steel.

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. Learners must be encouraged to think about design in a constructive way.

An understanding of how the planning and design process is managed is essential, and learners would benefit from access to simple flow diagrams that show how these processes are structured. Visits to design studios, drawing offices, construction sites, manufacturers' premises, builders' merchants and local authority town planning offices will help bring the design process to life for the learner, as will guest presentations by experienced design personnel. The learners should be given the chance to talk to, and ask pre-prepared questions of, such personnel.

Timber, steel, brick and concrete should be tested for strength, durability, water absorption, thermal movement and moisture movement. The appearance, sound insulation, thermal insulation, fire resistance, sustainability and cost can be taken from secondary sources including books, videos, CD-ROMs and DVDs. All observations could be relative as this would mean more to the learner at this stage. For example, steel is stronger than timber but timber is easier to work with on-site.

Learners should be provided with a list of all the materials in general use in the construction industry, and asked to find three examples of the use of each in the construction of their own home or the centre in which they are studying. They may not find three examples of everything but they do not need to cite more where they do exist. They should visit builders' merchants to see what is available (and how much it costs), and also the local further education college to see these materials being put to use in the craft workshops.

Learners could perform a simple environmental assessment on their home and discuss the link between the sustainability of their homes and the period in which it was constructed. They could discuss the design of stairs, the height of sockets and light switches and the height and depth of work surfaces in the kitchen, simply to develop the idea that buildings are designed for use by people, and people are more or less the same size. They may wish to give consideration to how all this can change when considering design issues associated with disability.

All of the above could be used to generate discussions about the factors that affect planning and design: how the materials specified have changed over time; the energy efficiency or otherwise of the house; whether the methods used to construct the house are sustainable; and what changes and improvements could be made in the future.

### **What activities might be involved in this unit?**

- Producing sketches and drawings, and taking photographs.
- Visiting design and planning offices and construction sites.
- Interviewing experienced design and planning professionals.
- Performing simple environmental assessments.
- Performing tests on construction materials.

### **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**

- carrying out research into the key factors that influence the design process, using a variety of media to provide source material

#### **Creative thinkers**

- talking with and asking questions of experienced designers, planners and builders in order to understand how the design and planning process works in real life

#### **Team workers**

- making effective contributions to group discussions and presentations
- working together to test construction materials
- drawing conclusions regarding how the properties of materials determine their usage

#### **Self-managers**

- organising time and resources to complete the assignment.

## Suggested learning resources

### Books

- Building Construction Handbook - Chudley, R & Greeno, -Published by: Butterworth-Heinemann, 2006 - ISBN: 0-750-66822-9
- Architecture: Form, Space, and Order - Ching, F D K - Published by: John Wiley & Sons, 2007 – ISBN: 0-471-75216-9
- Sustainable Practices in the Built Environment - ed. Langston- Published by: Butterworth-Heinemann, 2001- ISBN: 0-750-65153-9

### Journals and magazines

- Architects' Journal - AJ Building Design

### Videos, CDs and DVDs

- The Construction of Houses
- The Video Project UWE Building History and Building Conservation
- The Video Project UWE E-resources for construction
- **[www.rsc-wales.ac.uk](http://www.rsc-wales.ac.uk)**

### Websites

- Architecture Centre Network **[www.architecturecentre.net](http://www.architecturecentre.net)**
- Constructive **[www.bconstructive.co.uk](http://www.bconstructive.co.uk)**
- British Broadcasting Corporation **[www.bbc.co.uk](http://www.bbc.co.uk)**
- Building Connections **[www.buildingconnections.co.uk](http://www.buildingconnections.co.uk)**
- The Carbon Trust **[www.thecarbontrust.co.uk/energy](http://www.thecarbontrust.co.uk/energy)**
- Chartered Institute of Architectural Technologists **[www.ciat.org.uk](http://www.ciat.org.uk)**
- Chartered Institute of Building **[www.ciob.org.uk](http://www.ciob.org.uk)**
- Commission for Architecture and the Built Environment **[www.cabe.org.uk/teachingresources](http://www.cabe.org.uk/teachingresources)**
- Construction Industry Research and Information Association **[www.ciria.org.uk](http://www.ciria.org.uk)**
  
- ConstructionSkills **[www.citb.org.uk](http://www.citb.org.uk)**
- Design Quality Indicator **[www.dqi.org.uk](http://www.dqi.org.uk)**
- Royal Institute of British Architects (RIBA) **[www.architecture.com](http://www.architecture.com)**
- Royal Town Planning Institute **[www.rtpi.org.uk](http://www.rtpi.org.uk)**
- Becta Teaching & Learning Resource Bank: Building Design and Architecture **<http://ferl.qia.org.uk/display.cfm?page=628&catID=59>**
- Property Surveying, Planning and Development: Collaborative Learning in Town Planning and Construction **<http://ferl.qia.org.uk/display.cfm?resID=5122&page=628&catID=58>**

## Level 1

## Unit 2: Design the built environment: applying design principles

### What is this unit about?

The purpose of this unit is to explore the factors that affect the final design solution. Learners will apply this knowledge to create a realistic design for a specific building or structure. The unit will also focus on the career opportunities available in the design of the built environment.

This unit, alongside the others within the Level 1 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 the factors that affect design and how designs achieve their function
2. understand the design cycle and the application of design principles to the design of a simple building or structure
3. know about career opportunities in the design of the built environment.

## Assessment criteria

### 1. Factors that affect design

The learner can:

- 1.1 identify the main factors that influence the way buildings and structures are designed:
  - a. topography:
    - o levels and natural contours of land
    - o existing waterways, lakes and ponds
    - o existing vegetation and trees
  - b. ground conditions and ground movement
  - c. area and shape of available land
  - d. access to land
  - e. availability of services
  - f. weather conditions
  - g. community needs viii population density
- 1.2 describe how the design of buildings and other structures is affected by the need for them to (IE3):
  - a. achieve their intended function
  - b. minimise environmental damage
  - c. address sustainability issues
  - d. be affordable.

### 2. The design cycle and design principles

The learner can:

- 2.1 identify the principles involved in creating realistic designs for buildings or structures:
  - a. establishing intended use of building or function of structure
  - b. considering alternative design solutions
  - c. selecting materials to be used
  - d. addressing buildability issues
  - e. addressing sustainability issues
  - f. establishing skills required to implement design
  - g. producing final design solution
- 2.2 adapt designs after informed feedback from others, including the need to take buildability and sustainability into account (CT5) (RL4)
- 2.3 produce a workable design solution for a simple structure (CT1).

### 3. Career opportunities in construction design

The learner can:

- 3.1 recognise career opportunities in the design of buildings and other structures, with respect to:
  - a. the range of available careers
  - b. the level of available careers:
    - o technical
    - o supervisory
    - o professional and management
  - c. the nature of interactions between those who work in design
  - d. progression opportunities available in design.

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 30 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 the principles that are applied in the design process, the production of a simple design, and the careers available in construction design. It will cover the factors that influence the way buildings and structures are designed; the intended function of the building or structure; how form follows function; financial cost matters; and buildability, sustainability and environmental issues. It should provide an opportunity for the learner to create a realistic design for a simple building or structure, using the factors identified above and the learning provided in Level 1 Unit 1: Design the built environment: design influences. Lastly, the assignment should require the learner to explore the career opportunities and progression routes available in the design of the built environment.

The evidence must be based on the design of the simple building or structure referred to above. This will generally mean a small, single-storey building with a foundation, a ground floor, walls, two windows, a door and a pitched roof. There is no requirement for primary services utilities or surface water drainage at this stage but some consideration should be given to compatibility with its surroundings, access, room size, circulation areas, ventilation and daylight.

The assignment will take approximately 12 of the 30 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 factors that influence the design cycle at each stage of the process
  - b. the issues to be addressed in the design cycle for a simple building or structure
  - c. the careers available in the design sector and how individuals interact and progress within that sector
2. a series of design sketches leading to a workable design solution.

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 the factors that influence design in the construction and built environment.
- Identify and describe the important issues that the design cycle must address. Drawings, photographs and other images may be used to support this work.
- Outline the main stages of the design process or cycle.
- Use basic design principles within an iterative design process to produce a series of design options, improving them until a workable design solution is reached. Simple design sketches, presentational drawings, schedules and specifications may be used to support this work. All intermediate design solutions should be presented to show progression towards the final design solution.
- Select two careers in the design sector, one at technical level and the other at professional and management level. In each case, identify and describe the job roles and responsibilities involved, explain the nature of the interactions between the two jobs, and suggest ways in which individuals can progress within the sector.

## Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. Factors that affect design	25%	12
2. The design cycle and design principles	62.5%	30
3. Career opportunities in construction design	12.5%	6
<b>Total</b>	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 affect design	<p><b>0 – 4 marks</b></p> <p>Demonstrated a basic understanding of the factors that affect design by correctly identifying a limited number of factors, briefly describing the issues that should be addressed in the design cycle.</p> <p>Related these factors and issues to the design of a simple building or structure in a superficial but generally accurate fashion.</p>	<p><b>5 – 8 marks</b></p> <p>Demonstrated a partial understanding of the factors that affect design by correctly identifying many of the factors, clearly describing the issues that should be addressed in the design cycle.</p> <p>Related these factors and issues to the design of a simple building or structure in a clear and accurate fashion.</p>	<p><b>9 – 12 marks</b></p> <p>Demonstrated an in-depth understanding of the factors that affect design by correctly identifying all or nearly all of the factors, clearly and accurately describing the issues that should be addressed in the design cycle.</p> <p>Related these factors and issues to the design of a simple building or structure in a thorough and detailed fashion.</p>
2. The design cycle and design principles	<p><b>0 – 10 marks</b></p> <p>Demonstrated a basic knowledge and understanding of design principles and the stages of the design cycle by correctly identifying most of the stages of the design cycle.</p> <p>Used basic design principles to produce a limited range of elementary design options for a simple building or structure.</p> <p>Displayed limited improvements in succeeding design options.</p>	<p><b>11 – 20 marks</b></p> <p>Demonstrated a partial knowledge and understanding of design principles and the stages of the design cycle by correctly identifying all or nearly all of the stages of the design cycle.</p> <p>Used clear and relevant principles to produce a wide range of workable design options for a simple building or structure.</p> <p>Displayed clear improvements in succeeding design options.</p>	<p><b>21 – 30 marks</b></p> <p>Demonstrated an in-depth knowledge and understanding of design principles and the stages of the design cycle by correctly identifying all of the stages of the design cycle.</p> <p>Used design principles to produce a range of detailed design options for a simple building or structure.</p> <p>Displayed significant and continuous improvements in succeeding design options.</p>

<p>3. Career opportunities in construction design</p>	<p><b>0 – 2 marks</b></p> <p>Correctly identified two careers at different levels in construction design, produced a brief description of the associated roles and responsibilities, and provided a superficial explanation of how the two job roles interact and how individuals may progress from one job role to the other.</p>	<p><b>3 – 4 marks</b></p> <p>Correctly identified two careers at different levels in construction design, produced a full description of the associated roles and responsibilities, and provided a clear explanation of how the two job roles interact and how individuals may progress from one job role to the other.</p>	<p><b>5 – 6 marks</b></p> <p>Correctly identified two careers at different levels in construction design, produced a complete and accurate description of the associated roles and responsibilities, and provided a detailed explanation of how the two job roles interact and how individuals may progress from one job role to the other.</p>
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## Guidance for delivery

This unit has very close links with Level 1 Unit 1: Design the built environment: design influences, and joint delivery of the two units may be appropriate.

When delivering this unit, teachers should use a broad range of techniques including lectures, discussions, seminar presentations, case studies, site visits, supervised drawing office 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 drawing offices 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.

Communication in construction design is largely done by sketching and drawing and the learner will have the opportunity to develop such skills. Learners will need to be able to interpret and produce simple sketches and drawings, and they will need to do so to a level of competence that allows their designs to be interpreted by others. There is no formal requirement for the sketches and drawings to conform to established conventions (although these are preferred) or any requirement for advanced competence at this stage.

A range of pre-prepared drawings of all kinds should be made available for the learners to consider. These could be either hard copies or in electronic form. Whichever kind is preferred, the learners will benefit from the use of construction drawings linked to photographs of actual construction projects, or visits to projects both during and after construction.

There are implicit legal and ethical issues in Assessment criteria topic 1. These should be signposted, but there is no requirement for a detailed treatment of either at this stage.

Sustainability will be the biggest issue facing designers in the future and should therefore be a focus of all visits and presentations. There are a number of useful videos, CD-ROMs and DVDs available on the subject. Many of these are available from the websites listed in the 'Suggested learning resources' section.

It is important that the learners focus on why buildings are built the way they are. This implies an understanding of 'buildability' and how 'form follows function', although this should be kept simple at this level. An accepted definition of buildability could be loosely interpreted as 'how easy it will be to build'. The specification of materials should be restricted to those in common use which are readily available, affordable and, wherever possible, sustainable.

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. Visits to design studios, drawing offices, construction sites, manufacturers' premises, builders' merchants and local authority town planning offices will help bring the design process to life for the learner, as will guest presentations by experienced design personnel. The learners should be given the chance to talk to, and ask pre-prepared questions of, such personnel.

There is no requirement for the learning in this unit to be extended to the resource and project planning for the actual construction period. It is understanding design principles and creating a simple design that are important, underpinned by knowledge of the career structure.

Further guidance is included in the 'Opportunities for applied learning' section below and the two sections should be read together as guidance on how to deliver applied learning.

### **Opportunities for applied learning**

A visit to a proposed construction site before any work is done on-site is essential if learners are to gain knowledge of factors to be considered in the design of any buildings to be erected on that site. A pro-forma should be provided by the teacher that allows the learners to undertake a simple site survey and to report on the relevant factors in a structured manner. Data on population density and prevailing climatic conditions can be obtained from secondary sources or provided by the teacher. Ground conditions can be reported in a general way and there is no requirement for a soil survey at this stage. The teacher may need to point out the location of any existing services.

The best way for learners to develop their knowledge and understanding of how design principles are applied is by applying those principles in the design of a simple building or structure. The teacher should lead the learner towards something achievable in the time allowed and at this level of study. A 'simple structure' will generally mean a small, single-storey building with a foundation, a ground floor, walls, two windows, a door and a pitched roof. There is no requirement for primary services utilities or surface water drainage at this stage but some consideration should be given to access, room size, circulation areas, ventilation and daylight. A small free-standing garage would be the acceptable minimum but the unit will offer more scope for enthusiasm, imagination and creativity if the learner is allowed to choose the structure they wish to design. They must know the purpose they want the building to serve before they start.

The design is not restricted to buildings, and learners may consider designing structures such as grandstands, bridges and towers. What is important is that the design is related to the function of the building or structure and that consideration is given to access; aesthetics (where relevant); the surrounding natural and built environment; the materials to be used (sustainable or otherwise); and local flora, fauna and habitats.

Sustainability issues should be considered at an early stage of the design. Learners should use the information gathered during the site survey to consider what aspects of the natural environment need to be protected. A checklist of common sustainability issues should be provided by the teacher. Learners should complete the checklist individually. The lists can then be used to inform a whole class discussion at a later stage.

The design process generally involves starting with an original design, working to improve that design by consideration of a number of alternative (improved) designs and ending with a final design solution agreed by all parties. It is important that this process is clear to the learners, but it is also important that the number of alternative design solutions is kept to the minimum required. This unit only has 30 guided learning hours and the teacher may be required to lead the learners through the design process if they are to complete it in the time available.

It is important that learners develop an understanding of the careers available in construction design, and how they can access such careers to supplement their developing understanding of what construction designers actually do in their day-to-day work. There is a wealth of information available from the websites listed in the 'Suggested learning resources' section below. The local further education college and/or Connexions should be happy to visit the centre and explain what careers are available, what the opportunities for progression are, what qualifications are required to support that progression and what is available locally. Contact with experienced designers will help learners to understand how members of the design team interact with each other.

Learners could use all of this information to produce individual career development plans that extend five years or so into the future and that specify career goals, supporting qualifications, time needed to achieve such qualifications, and any other relevant details. It would be useful if the teacher could direct some of the learners to choose a job role other than 'architect'. Architectural technologists, structural engineers, building services engineers, highways engineers and landscape architects all contribute to the design of the built environment.

### **What activities might be involved in this unit?**

- Producing sketches and drawings, and taking photographs.
- Visiting design and planning offices, and construction sites.
- Interviewing experienced design and planning professionals.
- Preparing a range of alternative design solutions under guidance.
- Gathering useful careers information from a variety of experienced sources.

### **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**

- carrying out research into principles applied in the design process and the factors that influence the way buildings and structures are designed

#### **Creative thinkers**

- asking questions of experienced designers, planners and builders to enhance their understanding of how these people contribute to the development of the final design solution

#### **Reflective learners**

- inviting feedback on their initial design solutions and dealing positively with criticism

#### **Team workers**

- making effective contributions to group discussions regarding the way to improve their initial designs in light of advice and comments received

#### **Self-managers**

- organising time and resources in the production of the final design solution
- seeking advice and support from teachers and other more experienced persons when needed

#### **Effective participators**

- proposing practical ways forward and breaking the design project into manageable steps.

## Suggested learning resources

### Books

- Building Craft Foundation - Brett, Peter - Published by: Nelson Thorne, 2002 -ISBN: 0-748-76531-X
- Building Construction Handbook. 6th Edition - Chudley & Greeno - Published by: Butterworth-Heinemann, 2006 - ISBN: 0-750-66822-9
- Green Building Bible - Hall, KD (editor) - Published by: Green Building Press - ISBN: 1-898-13003-5
- The Whole House Book - Harris, Cindy & Borer, Pat -Ecological Building Design and Materials - Published by: Centre for Alternative Technology Publications, 2005 -ISBN: 1-902-17522-0
- Architecture for Beginners Hellman, Louis -Published by: Writers and Readers, 1988 - ISBN: 0-863-16041-7
- Sustainable Practices in the Built Environment - 2nd Edition Langston, Craig A & Published by: Butterworth-Heinemann, 2001 -Ding Grace KC -ISBN: 0-750-65153-9
- Intermediate GNVQ Construction & the Built Environment -Millward, Des; Ahmet -Published by: Longman, 1999 - Kemal & Attfield, Jeff -ISBN: 0-582-31560-3

### Journals and magazines

- Architects' Journal - AJ Building Design

### Videos, CDs and DVDs

- The Construction of Houses – eight in series, more to follow University of West of England Video Project
- Building History and Building Conservation – five in series University of West of England Video Project

### Websites

- **Royal Institute of Building Architects** [www.riba.org.uk](http://www.riba.org.uk)
- Chartered Institute of Architectural Technologists [www.ciat.org.uk](http://www.ciat.org.uk)
- Chartered Institute of Building [www.ciob.org.uk](http://www.ciob.org.uk)
- Royal Town Planning Institute [www.rtpi.org.uk](http://www.rtpi.org.uk)
- Construction Industry Training Board [www.citb.co.uk](http://www.citb.co.uk)
- bConstructive [www.bconstructive.co.uk](http://www.bconstructive.co.uk)
- Carbon Trust [www.carbontrust.co.uk](http://www.carbontrust.co.uk)
- Design Quality Indicator [www.dqi.org.uk](http://www.dqi.org.uk)
- Construction Industry Research and Information Association [www.ciria.org.uk](http://www.ciria.org.uk)
- Building Connections [www.buildingconnections.co.uk](http://www.buildingconnections.co.uk)
- Commission for Architecture and the Built Environment [www.cabe.org.uk](http://www.cabe.org.uk)
- The Architecture Centre [www.architecturecentre.co.uk](http://www.architecturecentre.co.uk)
- The BBC [www.bbc.co.uk](http://www.bbc.co.uk)
- Regional Support Centre – Wales [www.rsc-wales.ac.uk](http://www.rsc-wales.ac.uk)
- Building4jobs [www.building4jobs.co.uk](http://www.building4jobs.co.uk)
- Info4study [www.info4study.co.uk](http://www.info4study.co.uk)

## Level 1

## Unit 3: Create the built environment: using tools

### What is this unit about?

The purpose of this unit is to introduce learners to the technical information and skills used in the creation of the built environment. They will become familiar with good Health and Safety practices and environmental protection. They will use hand tools and construction equipment safely to undertake basic operations within the built environment.

This unit, alongside the others within the Level 1 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 health, safety and welfare issues associated with construction
2. be able to select appropriate personal protective equipment (PPE), tools, materials and access equipment
3. know what kind of technical information is needed to complete given tasks
4. be able to work safely when using and maintaining tools and disposing of construction waste.

## Assessment criteria

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

The learner can:

- 1.1 recognise the importance of Health and Safety on construction sites:
  - a. on-site inductions for employees
  - b. safe methods of working
  - c. good housekeeping
  - d. correct access equipment
- 1.2 identify good practice in terms of welfare:
  - a. adequate lighting and temperature
  - b. cleanliness on-site
  - c. protection from bad weather
  - d. facilities:
    - o sanitary and washing
    - o warm rest and relaxation areas
    - o catering
    - o storage and changing of clothing
- 1.3 comply with Health and Safety practices and anticipate risks when performing construction activities (SM4)
- 1.4 work as part of a team to prepare and maintain a clean and tidy work space (TW1).

### 2. Selection of appropriate PPE, tools, equipment and materials

The learner can:

- 2.1 identify and describe a range of personal protective equipment (PPE) in terms of:
  - a. purpose
  - b. use:
    - o general site wear
    - o specific work activities
- 2.2 select and organise the correct tools, access equipment, materials and PPE for a given craft activity, such as (SM3):
  - a. carpentry and joinery
  - b. bricklaying
  - c. painting and decorating
  - d. building services crafts:
    - o plumbing work
    - o electrical work.

### 3. Technical information

The learner can:

- 3.1 recognise written and graphical technical information used at a craft and operative level (IE4):
  - a. specifications
  - b. schedules
  - c. drawings
  - d. manufacturers' information
- 3.2 select and use appropriate technical information.

#### **4. Working safely when using and maintaining tools and disposing of construction waste**

The learner can:

- 4.1 identify a range of skills using hand tools with different materials as appropriate:
  - a. construction crafts
  - b. building services crafts
- 4.2 apply safe working practices, and manage risks, to the use of tools with different materials in (SM4):
  - a. carpentry and joinery
  - b. bricklaying
  - c. painting and decorating
  - d. building services crafts:
    - o plumbing work
    - o electrical work
- 4.3 describe methods of maintaining hand tools:
  - a. sharpening
  - b. cleaning
- 4.4 maintain hand tools to an acceptable standard
- 4.5 identify safe and effective environmental protection techniques used to handle construction waste:
  - a. segregation
  - b. disposal.

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 30 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 a practical assignment, which is designed to focus particularly on the skills element in this unit but also includes the application of the knowledge, understanding, and PLTS gained by studying the unit.

This method of assessment will allow the learner to demonstrate the selection and use of tools for a particular purpose. This would also include the demonstration of their knowledge of health, safety and welfare, waste disposal, and the use of technical information as related to the use of tools. Learners should work as part of a team to prepare and maintain a clean and tidy workplace.

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 30 guided learning hours available for this unit. The assignment tasks should be performed when the learner and the teacher agree that the learner is ready to attempt the selected tasks, but should take place within the above timescale. 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. completed requisition forms demonstrating the selection of the appropriate tools, PPE, equipment and materials required for specific craft tasks
2. a record of the different types of technical information used to support the practical tasks and a short description of how each was used
3. practical evidence of using tools to perform a range of craft tasks. These must be evidenced by witness statements and photographs of the finished tasks
4. evidence showing compliance with good health, safety and welfare practices including working as part of a team to prepare and maintain a clean and tidy workplace, correct use of any PPE, maintenance of tools, and safe waste disposal. 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**

Evidence must be based on the skills needed to use tools to perform simple construction craft tasks.

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

- Identify good practices in terms of on-site welfare.
- Prepare a clean and tidy workplace.
- Identify and select the correct PPE for specific craft tasks.
- Select the correct tools and materials for specific craft tasks.
- Recognise and use different forms of technical information.
- Identify hand tool skills and work safely to perform two craft tasks.
- Describe and perform techniques for maintaining hand tools.
- Identify and adhere to good practice when disposing of construction waste and maintaining a clean and tidy workplace.

All tasks should be performed whilst recognising and complying with good Health and Safety practices. The practical assignment should take the form of at least two of the following practical exercises with, in each case, a simple method statement which identifies the tools and materials selected, as well as a record of the health, safety and welfare issues and the need for proper waste disposal techniques.

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

- forming simple wood joints such as housing, through/corner halving or mortice and tenon
- constructing a simple straight brick panel in stretcher bond, three and a half bricks long by four courses high
- painting pre-prepared flat surfaces such as walls and doors
- wiring plugs and simple lighting rigs
- joining pieces of copper tube using a capillary joint and a compression joint.

### Guidance on acceptable tolerances

- Wood joints to be of a reasonable standard with a tolerance of  $\pm 3\text{mm}$ .
- Bricks to be in line  $\pm 5\text{mm}$  with a maximum plane face deviation of  $\pm 5\text{mm}$ .
- Limited painting defects such as misses, runs, sagging and curtaining.
- All wiring connections safe and correct, with light fittings securely mounted in regular array.
- Watertight joints and straight pipe runs.

All these tasks allow learners to demonstrate skills with hand tools that are used and of use in the construction and built environment industry. Learners should be made aware of how these smaller tasks contribute overall to larger tasks or projects in the sector.

### Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. Health, safety and welfare issues associated with construction	12.5%	6
2. Selection of appropriate tools, PPE, equipment and materials	12.5%	6
3. Technical information	12.5%	6
4. Working safely when:	62.5%	30
4.1 Using tools	[31.25%]	[15]
4.2 Maintaining hand tools	[18.75%]	[9]
4.3 Disposing of construction waste	[12.5%]	[6]
<b>Total</b>	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	<p><b>0 – 2 marks</b></p> <p>Recognised and complied with a limited range of good health, safety and welfare practices and made a limited contribution, as part of a team, to a safe and tidy workplace.</p>	<p><b>3 – 4 marks</b></p> <p>Recognised and complied with a wide range of good health, safety and welfare practices and made an effective contribution, as part of a team, to a safe and tidy workplace.</p>	<p><b>5 – 6 marks</b></p> <p>Recognised and complied with a comprehensive range of good health, safety and welfare practices and made an important contribution, as part of a team, to a safe and tidy workplace</p>
2. Selection of appropriate tools, PPE, equipment and materials	<p><b>0 – 2 marks</b></p> <p>Selected some of the correct tools, PPE, equipment and materials needed for specific tasks</p>	<p><b>3 – 4 marks</b></p> <p>Selected most of the correct tools, PPE, equipment and materials needed for specific tasks</p>	<p><b>5 – 6 marks</b></p> <p>Selected all of the correct tools, PPE, equipment and materials needed for specific tasks and rejected others that were not needed</p>
3. Technical information	<p><b>0 – 2 marks</b></p> <p>Selected some of the technical information needed and used it to variable effect</p>	<p><b>3 – 4 marks</b></p> <p>Selected most of the technical information needed and used it correctly in most cases</p>	<p><b>5 – 6 marks</b></p> <p>Selected a comprehensive range of the technical information needed and used it correctly in most cases</p>
4. Working safely when: 4.1 Using tools	<p><b>0 – 10 marks</b></p> <p>[0 – 5] marks</p> <p>Worked safely some of the time when using a range of tools to produce acceptable outcomes</p>	<p><b>11 – 20 marks</b></p> <p>[6 – 10] marks</p> <p>Worked safely most of the time when using a range of tools to produce good outcomes</p>	<p><b>21 – 30 marks</b></p> <p>[11 – 15] marks</p> <p>Consistently worked safely when using a range of tools to produce high quality outcomes</p>

4.2 Maintaining hand tools	[0 – 3] marks  Briefly described, and performed to a variable standard, a limited range of techniques used to maintain tools to an acceptable standard	[4 – 6] marks  Briefly described, and competently performed, a wide range of techniques used to maintain tools to an acceptable standard	[7 – 9] marks  Described in detail, and skilfully performed, a comprehensive range of techniques used to maintain tools to an acceptable standard
4.3 Disposing of construction waste	[0 – 2] marks  Identified a few good practices and used them to dispose of waste some of the time	[3 – 4] marks  Identified many good practices and used them to dispose of waste most of the time	[5 – 6] marks  Identified a comprehensive range of good practices and used them to dispose of waste all of the time

### Guidance for delivery

It is strongly advised that the entire unit be planned around the use of common hand tools to carry out basic craft activities, so that learners may experience the core skills of all the main construction and building services crafts. Any underpinning knowledge and understanding should be integrated into the practical use of the tools to perform tasks, as far as is possible.

The first thing for teachers to decide is which practical activities the learners need to undertake in order to develop their skills in using hand tools and to complete the internal assessment. The title of the unit is 'using tools' not 'learning craft skills', but obviously the learners need to use the hand tools to carry out an activity or task typical of those carried out by craftspeople and operatives on construction sites and in customers' homes.

The teacher must be careful not to overload the learner. The learner will benefit from using the widest possible range of tools, but the tasks undertaken should be basic in nature. These tasks could include:

- forming simple wood joints such as housing, through/corner halving or mortice and tenon
- constructing a simple straight brick panel in stretcher bond, three and a half bricks long by four courses high
- painting pre-prepared flat surfaces such as walls and doors
- wiring plugs, and simple lighting rigs
- joining pieces of copper tube using a capillary joint and a compression joint.

It is important that, whatever tools the learners use, and whatever basic craft activities they undertake, they always follow the same procedure:

- Consideration of Health and Safety issues.
- Selection of appropriate materials, hand tools, access equipment and PPE.
- Safe use of tools.
- Maintenance of a clean and tidy workspace.
- Disposal of any waste in a safe and effective manner.
- Cleaning of tools and equipment before return to their rightful place.

When undertaking external visits and working with guest speakers, it is critical that all parties are clear about their aims and objectives. They should be aware of the knowledge and understanding involved and should tailor their delivery to the appropriate level for the course.

Health and Safety is always of paramount importance. Learners must 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. 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. Teachers should be reminded that, in their supervision of learners, they have the same duties under Health and Safety as employers.

Teachers must assess risks to young people before they start any practical work, taking into account their age and inexperience. Employers must provide information to parents of school-age children about the risks and the control measures introduced, and take account of the risk assessment in determining whether the young person should undertake certain work activities or not. Teachers should not be deterred by the bureaucracy involved as site visits and practical activities motivate learners and help them to appreciate the importance and complexity of the industry.

On returning from site visits, learners should compile individual lists of the potential hazards spotted whilst on the visit. They should then use these to produce safety posters which could be affixed to the classroom wall for the duration of the unit.

Learners could also build up a library of samples from local builders' merchants and make a display of the samples in the classroom or workshop. These could be annotated with short descriptions of the properties and uses of each material.

There are implicit legal and ethical issues in every Assessment criterion that deals with health, safety and welfare such as 1a, 1b, 2a, 2b, 4a, 4b and 4d. These should be signposted, but there is no requirement for a detailed treatment of either at this stage.

### **Opportunities for applied learning**

Access to craft workshops may not always be available, but opportunities exist for practical experience through work shadowing of the centre's estate staff, through charities, sports clubs and similar organisations, or even in the learners' own homes.

Visits to construction sites, where craft activities are performed by qualified and experienced workers, or a training centre or further education college where the same tool skills are being practised by young apprentices, will help learners to see the importance of Health and Safety, consideration for others, appropriate behaviour, and attention to detail when on-site. Such visits will also provide the learner with an opportunity to recognise the welfare arrangements provided for the on-site workforce and to appreciate how these contribute to the safety and effectiveness of the work that is done on-site.

### **What activities might be involved in this unit?**

- Visiting construction sites and college workshops to see tools being used properly.
- Selecting and interpreting a range of technical information.
- Applying safe working practices in the use of tools to perform construction activities.
- Maintaining a clean and tidy work space and disposing safely of all waste produced.

### **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 craft activities and selecting appropriate tools, materials and PPE

#### **Creative thinkers**

- asking questions about the technical information they use

#### **Reflective learners**

- reviewing their own skills when using hand tools to perform craft activities

#### **Team workers**

- contributing to the preparation and maintenance of a clean and tidy work space

#### **Self-managers**

- organising time and resources to complete practical craft activities

#### **Effective participators**

- identifying ways to improve their practical skills.

## Suggested learning resources

### Books

- Building Craft Foundation - Brett, Peter - Published by: Nelson Thorne, 2002 - ISBN: 074876531X
- 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 & Rhodes -Published by: Blackwell Science Ltd, 1998 - ISBN: 0632041595
- Safe Start, Safety Handbook, GE 707 -Hands, Denis & CITB -Published by CITB-ConstructionSkills, 2005 - ISBN: 1857511093
- DIY Home Maintenance for Dummies All-in-One -Howell, Jeff - Published by: John Wiley & Sons, 2005 - ISBN: 0764570544
- Safe Use of Work Equipment, 4th edition -HSE Approved Code of Practice and Guidance -Published by: HSE, 1998-ISBN: 0717616266
- Collins Complete DIY Manual - Jackson, Albert & Day, David -Published by: Thorsons, 2007 -ISBN: 0007252609
- Brickwork 1, 3rd edition -Nash, WG - Published by: Nelson Thornes, 1983 -ISBN: 0748702660
- Basic Plumbing Stanley -Published by: Meredith Corporation, 2002 -ISBN: 0696213206
- Electrical Wiring: Domestic, 2003 Scaddan, Brian -Published by: Newnes -ISBN: 0750659157

### Journals and magazines

- Home DIY

### Videos, CDs and DVDs

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

### Websites

- Construction Industry Training Board [www.citb.co.uk](http://www.citb.co.uk)
- Health and Safety Executive [www.hse.gov.uk](http://www.hse.gov.uk)
- Institution of Occupational Safety and Health [www.iosh.co.uk](http://www.iosh.co.uk)
- Royal Society for the Prevention of Accidents [www.rosa.co.uk](http://www.rosa.co.uk)

## Level 1

# Unit 4: Create the built environment: methods and materials

### What is this unit about?

The purpose of this unit is for learners to explore the changes that have taken place in construction methods and materials over time. It will give learners an understanding of the best ways to use new materials and methods to help sustain the built environment, as well as showing the benefits associated with modern methods of construction. The unit will also focus on the career opportunities available in the creation of the built environment.

This unit, alongside the others within the Level 1 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 how power tools, mechanisation and prefabrication have changed the way we build
2. understand the influence of new materials on construction methods, and the benefits of mechanisation and new materials
3. understand why sustainable materials and processes are important
4. be able to plan a career in creating the built environment.

## **Assessment criteria**

### **1. Power tools, mechanisation and prefabrication**

The learner can:

- 1.1 identify examples of where mechanisation has influenced construction methods (IE5):
  - a. hand-held power tools:
    - o electrical tools
    - o compressed-air tools
  - b. construction plant (mechanisation):
    - o bulldozers
    - o scrapers
    - o excavators
    - o tractor shovels
    - o hoists
    - o cranes
    - o concreting plant
  - c. off-site prefabrication of components:
    - o roof trusses
    - o reinforced concrete floors and beams
    - o universal columns and beams
    - o pods.

### **2. New materials and benefits of mechanisation**

The learner can:

- 2.1 recognise examples of where new materials have influenced construction methods (IE5):
  - a. glass-reinforced cement
  - b. glass-reinforced plastics
  - c. polymer-fibre-reinforced cement and concrete
  - d. carbon fibres
- 2.2 identify the benefits of using mechanisation and new materials (IE6):
  - a. cost savings
  - b. speedier erection
  - c. increased productivity
  - d. improved quality control
  - e. mass production
  - f. elimination of heavy manual work
  - vii improved performance-in-use
  - g. improved sustainability.

### **3. Sustainable materials and processes**

The learner can:

- 3.1 discuss sustainable construction issues in terms of materials and processes (IE3, EP1):
  - a. the manufacture of sustainable materials and components
  - b. the incorporation of sustainable and renewable materials into the building process
  - c. the concept of embodied energy
  - d. techniques to reduce waste such as recycling and reuse
  - e. the use of materials with good thermal insulation properties
  - f. the air-tightness of buildings
  - g. recycling of materials and components
  - h. utilising the advances in material technologies.

### **4. Planning a career in creating the built environment**

The learner can:

- 4.1 recognise career opportunities in the construction of buildings and other structures:
  - a. the range of available careers
  - b. the level of available careers:
    - o operative
    - o craft
    - o technical
    - o supervisory
    - o professional and management
  - c. the nature of interactions between those who work in the construction industry
  - d. progression opportunities available in construction.

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 30 guided learning hours be spent on this unit.

## **Assessment**

The assessment method for this unit will be external assessment. Learners will take a multiple choice 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 1. The assessment is by means of a multiple choice test, 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 in connection with discussions concerning how a sustainable approach can be taken to materials and processes. Learners should make their own suggestions for suitable materials and processes, and refine those suggestions by revisiting them after discussion with other learners and/or construction professionals. These suggestions 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. The learning and assessment can then be used by the learner to inform the learning in Level 1 Unit 7: Modern methods of construction.

## Examination specification

Duration: 1 hour

Assessment type: Multiple choice test

Choice/ Number of items:48

Assessment criteria topic	Subtopic	No of items	Total	%
1. Power tools, mechanisation and prefabrication	Hand held power tools	4	12	25
	Construction plant	4		
	Off-site prefabrication of components	4		
2. Examples of where new materials have influenced construction methods	Glass-reinforced cement	1	4	8.33
	Glass-reinforced plastic	1		
	Polymer-fibre-reinforced cement and concrete	1		
	Carbon fibres	1		
2.2 The benefits of using mechanisation and new materials	Cost savings	1	8	16.67
	Speedier erection	1		
	Increased productivity	1		
	Improvements in quality control	1		
	Mass production	1		
	Elimination of heavy manual work	1		
	Improved performance-in-use	1		
	Improved sustainability	1		
3. Sustainable materials and processes	The manufacture of sustainable materials and components	2	16	33.33
	Embodied energy	2		
	Techniques to reduce waste	2		
	The incorporation of sustainable and renewable materials into the building process	2		
	The use of materials with good thermal insulation properties	2		
	The air-tightness of buildings	2		
	Recycling of materials and components	2		
	Utilising the advances in material technologies	2		
4. Planning a career in creating the built environment	Range of careers available	2	8	16.67
	Level of careers available	2		
	Interactions between personnel	2		
	Progression opportunities	2		
<b>Total</b>		48	48	100

## **Guidance for delivery**

This unit does not require the learner to use tools or perform a range of practical skills. The unit deals with the way the construction industry is changing. This is primarily reflected in the use of new methods of construction, standardisation and modularisation, increased mechanisation, off-site prefabrication of components, and the emergence and use of a new generation of materials. This ties in well with the movement towards sustainability in construction and leads logically to an understanding of the roles that today's learners will occupy in tomorrow's construction industry. Discussion of sustainability issues should include a simple treatment of what is meant by 'embodied energy' and why it is important.

The 'Opportunities for applied learning' section below suggests ways in which the content can best be communicated to learners. The opportunity to see old and new methods in practice is worth many hours in the classroom. It is, however, important that the learner appreciates the advantages (and any disadvantages) of the new ways of working. They may need leading towards an appropriate level of knowledge and understanding of this by the teacher.

A building site has been described as a 'temporary factory' and comparisons of modern construction sites with factories that make cars, electronic goods, sweets, drinks and other similar goods will help the learner understand how mechanisation reduces construction time and labour costs, how standardisation and modularisation streamline construction processes and improve quality, and how new materials can help address the sustainability agenda.

When discussing career development within the construction industry, the teacher should focus on job roles within the actual construction stage of a building, ie after design and planning. Job roles in design and planning are covered in Level 1 Unit 2: Design the built environment: applying design principles.

A broad range of job roles is covered at operative, craft, supervisory, technical and professional level and delivery suggestions are included below in 'Opportunities for applied learning'. The teacher will need to clarify the messages sent out by presenters from the local further education college or careers service in terms of who reports to whom and who is responsible for whom. The teacher should help learners towards developing a career plan that links their future career aspirations to the qualifications and experience they will need to gain.

This unit is about going to see things and listening to and asking questions of experienced construction workers and careers staff. Information should be given to the learners in handout form, so as to free up the maximum time possible for such activities and yet still provide the information needed to successfully complete the assessment.

There are legal issues in Assessment criteria topic 1 and ethical issues in Assessment criteria topics 3 and 4. These should be signposted, but there is no requirement for a detailed treatment of either at this stage.

## **Opportunities for applied learning**

Learners would derive great benefit from visits to three very different construction sites. The first of these should provide examples of traditional methods of construction; the second of higher levels of mechanisation, modularisation, off-site construction methods and new materials; and the third of sustainable, 'green' construction techniques. It should be noted that 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.

The obvious answer is to visit 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.

Learners should be provided with a separate checklist for each of the three visits. These checklists should separately identify the characteristics of traditional, modern and sustainable methods in a 'tick-box plus comments' format. After all three visits have been completed the learners can produce posters, displays of photographs taken during the visit, and/or electronic presentations that compare the three ways of building in terms of their advantages and disadvantages. They can present these to their peers, and this should then form the basis of a whole-group discussion.

It is important that learners develop an understanding of the careers available in construction, and how they can access such careers, to supplement their developing understanding of what personnel in the construction industry actually do in their day-to-day work. There is a wealth of information available from the websites listed in the 'Suggested learning resources' section below. The local further education college and/or Connexions should be happy to visit the centre and explain what careers are available, what the opportunities for progression are, what qualifications are required to support that progression and what is available locally. Contact with experienced builders will help learners to understand how builders interact with others.

Learners could use all of this information to produce individual career development plans that extend five years or so into the future and that specify career goals, supporting qualifications, time needed to achieve such qualifications, and any other relevant details.

Craft roles should include a simple treatment of the roles and responsibilities of the main craftspeople such as bricklayers, carpenters and joiners, painters and decorators, plumbers, electricians, stonemasons, plasterers, and roofers. There is however a much wider range of specialist occupations that should also be identified at this stage. These specialist roles and their importance to the construction and built environment sector should be emphasized. These include trades and crafts such as ceiling fixing, re-locatable partitioning, dry lining, kitchen fitting, tunnelling, wall and floor tiling, floor covering, façade preservation, etc.

Technical and supervisory roles should cover site manager, site agent, ganger, team leader, civil engineering technician, etc.

Professional roles should cover chartered builder, project manager, contract manager, civil engineer, building services engineer, quantity surveyor, land surveyor, etc.

### **What activities might be involved in this unit?**

- Producing sketches and drawings, and taking photographs.
- Visiting construction sites, workshops, builders' merchants and training facilities.
- Collecting information on traditional and modern methods of construction.
- Interviewing experienced design and planning professionals.
- Gathering useful careers information from a variety of experienced personnel.

### **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**

- carrying out research into how construction impacts upon the environment

#### **Creative thinkers**

- asking questions about career routes and progression within a career

#### **Reflective learners**

- communicating their understanding of the advantages and disadvantages of new methods and materials to a variety of audiences

#### **Self-managers**

- showing initiative and creativity when selecting new methods and materials for specified tasks.

## Suggested learning resources

### Books

- Building Craft Foundation - Brett, Peter -Published by: Nelson Thorne, 2002 ISBN: 074876531
- Building Construction Handbook. 6th Edition - Chudley, R & Greeno, R - Published by: Butterworth-Heinemann, 2006 -ISBN: 0750668229
- The Whole House Book -Harris, Cindy & Borer, Pat - Ecological Building Design and Materials - Published by: Centre for Alternative Technology Publications, 2005 - ISBN: 1902175220
- Sustainable Practices in the Built Environment - 2nd Edition Langston, Craig A & - Published by: Butterworth-Heinemann, 2001 Ding Grace KC- ISBN: 0750651539

### Journals and magazines

- Building Construction News

### 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](http://www.rsc-wales.ac.uk)

### Websites

- **ConstructionSkills** [www.citb.co.uk](http://www.citb.co.uk)
- Construction Industry Research and Information Association [www.ciria.org.uk](http://www.ciria.org.uk)
- Health and Safety Executive Books [www.hsebooks.co.uk](http://www.hsebooks.co.uk)
- Royal Institute of British Architects [www.architecture.com](http://www.architecture.com)
- Building Sustainably [www.woodforgood.com](http://www.woodforgood.com)
- Design Quality Indicator [www.dqi.org.uk](http://www.dqi.org.uk)
- Chartered Institute of Building [www.ciob.org.uk](http://www.ciob.org.uk)
- Royal Town Planning Institute [www.rtpi.org.uk](http://www.rtpi.org.uk)
- bConstructive [www.bconstructive.co.uk](http://www.bconstructive.co.uk)
- Building for Jobs [www.building4jobs.co.uk](http://www.building4jobs.co.uk)
- Information for Built Environment Students and Practitioners [www.info4study.co.uk](http://www.info4study.co.uk)
- BBC [www.bbc.co.uk](http://www.bbc.co.uk)
- National Britannia [www.hseinformationservices@natbrit.com](mailto:www.hseinformationservices@natbrit.com)

## **Level 1**

## **Unit 5: Value and use the built environment**

### **What is this unit about?**

The purpose of this unit is to help learners to recognise the visual and social impact of the built environment, and to consider the welfare and well-being of those who use it. The unit also explores the life-cycle of buildings and other structures, and the use of sustainable materials and methods in the maintenance of the built environment. Learning about career opportunities available in the value and use of the built environment will be integral to the unit.

This unit, alongside the others within the Level 1 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. be able to assess the effect of the built environment on community well-being and welfare
2. understand the life-cycle of buildings and structures, and sustainability issues
3. know about career opportunities in the value and use of the built environment.

## Assessment criteria

### 1. The effect of the built environment on community well-being and welfare

The learner can:

- 1.1 identify and explain the ways in which the existing built environment impacts on people and places (IE5):
  - a. existing built environment:
    - o commercial buildings
    - o public buildings
    - o residential buildings
    - o industrial buildings
    - o infrastructures
    - o transport services
    - o landmark buildings and structures
  - b. nature of impact:
    - o visual
    - o social
    - o economic
  - c. impact on the welfare of people in terms of (IE3) (CT3):
    - o well-being
    - o happiness
    - o health
    - o safety
    - o security
    - o wealth
- 1.2 appreciate the contribution made by the built environment to the local community:
  - a. social
  - b. economic.

### 2. The life-cycle of buildings and structures, and sustainability issues

The learner can:

- 2.1 recognise and explain the life-cycle of buildings and other structures:
  - a. pre-construction (planning, design)
  - b. construction
  - c. use (facility management)
  - d. maintenance and repair
  - e. re-use (conversion, refurbishment, adaptation)
  - f. removal (demolition)
- 2.2 describe the use of, and select, appropriate sustainable materials, techniques and processes in the maintenance of the built environment (CT1) (SM3):
  - a. issues of land use (greenfield and brownfield sites)
  - b. reduced use of scarce natural resources
  - c. increased use of renewable materials
  - d. improved waste management techniques
  - e. increased use of recycling and re-use techniques.

### **3. Career opportunities in the value and use of the built environment**

The learner can:

- 3.1 recognise career opportunities in the value and use of the built environment, in terms of:
  - 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 work in the value and use of the built environment
  - d. progression opportunities available to those who work in the value and use of the built environment.

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 the existing built environment, preferably in the local area, or on a realistic teacher-devised scenario. The assignment should deal with the effect of the built environment on people and places, and the contribution made by the existing environment to the community. It should also address the life-cycle of buildings, the use of sustainable materials, techniques and processes in the maintenance of buildings, and career opportunities in the value and use of the built environment.

The assignment will take approximately 8 of the 30 guided learning hours available for this unit. The learner should work under controlled conditions in accordance with the guidance in Section 4.1 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 various ways in which the component parts of the built environment impact on and contribute to the local community and the welfare of local people
  - b. the life-cycle of an important local building or structure
  - c. how sustainability issues are taken into consideration throughout the maintenance process
  - d. the careers available in the maintenance sector and how individuals interact and progress within that sector.

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.

The evidence must be based on a work-based project or teacher-devised scenario.

## Assignment structure

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

- Classify the various component parts of the local built environment as either commercial, public, residential or industrial, or as part of the local infrastructure or transport system. Identify any landmark buildings or structures.
- Describe one example of each of the above in terms of the visual, social and economic impact they have on the local community.
- Use the selected examples to explain how each of the above can impact upon people in the local community in terms of their general well-being, health, safety and welfare.
- Consider a major construction development in the local area and predict how this will impact on, and contribute to, the local community.
- Explain what is meant by the term 'life-cycle', as applied to buildings and structures. Research the history of a local landmark building or structure in terms of the life-cycle of the building or structure from the planning and design stage to the present day. Consider possible future uses of the building and the implications of the eventual demolition of the building.
- Explain how sustainable materials, techniques and processes issues are taken into consideration throughout the maintenance of the built environment.
- Select two careers in the maintenance sector, one at either craft or technical level and the other at either supervisory or professional and management level. In each case, identify and describe the job roles and responsibilities involved, explain the nature of the interactions between the two jobs and suggest ways in which individuals can progress within the sector.

A possible context for the penultimate step could be:

A planning department of the local authority has rejected planning applications to convert a local landmark building into luxury flats and build a replacement for the landmark building on fields outside the town. They consider that the building requires nothing more than regular planned maintenance. Explain why this course of action is preferable to the greenfield development, and select sustainable materials, techniques and processes to be used in the maintenance of the landmark building.

Photographs, drawings and other images may be used to support this work. It is also acceptable to use the opinions and judgements of family, friends, construction professionals and other members of the community to support this work.

## Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. The effect of the built environment on community well-being and welfare	37.5%	18
2. The life-cycle of buildings and structures, and sustainability issues	37.5%	18
3. Career opportunities in the value and use of the built environment	25%	12
<b>Total</b>	<b>100%</b>	<b>48</b>

## 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. The effect of the built environment on community well-being and welfare	<p><b>0 – 6 marks</b></p> <p>Demonstrated a basic understanding of the impact of the existing built environment by correctly identifying a limited number of the component parts of the built environment, briefly explaining the ways in which they impact on people</p> <p>Briefly described the contribution made by the built environment to the local community in either social or economic terms</p>	<p><b>7 – 12 marks</b></p> <p>Demonstrated a partial understanding of the impact of the existing built environment by correctly identifying many of the component parts of the built environment, clearly explaining the ways in which they impact on people</p> <p>Clearly described in some detail the contribution made by the built environment to the local community in either social or economic terms</p>	<p><b>13 – 18 marks</b></p> <p>Demonstrated a detailed understanding of the impact of the existing built environment by correctly identifying all or nearly all of the component parts of the built environment, fully explaining the ways in which they impact on people</p> <p>Clearly identified in some detail the contribution made by the built environment to the local community in both social and economic terms</p>
2. The life-cycle of buildings and structures, and sustainability issues	<p><b>0 – 6 marks</b></p> <p>Provided a basic explanation of the various stages of the life-cycle of buildings and other structures, a brief description of a limited number of sustainable maintenance methods, and a superficial explanation of how this all relates to a local landmark building or structure</p>	<p><b>7 – 12 marks</b></p> <p>Provided a clear explanation of the various stages of the life-cycle of buildings and other structures, a clear description of many of the common sustainable maintenance methods, and an acceptable explanation of how this all relates to a local landmark building or structure</p>	<p><b>13 – 18 marks</b></p> <p>Provided an in-depth explanation of the various stages of the life-cycle of buildings and other structures, a thorough description of sustainable maintenance methods and a detailed explanation of how this all relates to a local landmark building or structure</p>

<p>3. Career opportunities in the value and use of the built environment</p>	<p><b>0 – 4 marks</b></p> <p>Correctly identified two careers at different levels in the maintenance sector, produced a brief description of the associated roles and responsibilities, and provided a superficial explanation of how the two job roles interact and how individuals may progress from one job role to the other</p>	<p><b>5 – 8 marks</b></p> <p>Correctly identified two careers at different levels in the maintenance sector, produced a full description of the associated roles and responsibilities, and provided a clear explanation of how the two job roles interact and how individuals may progress from one job role to the other</p>	<p><b>9 – 12 marks</b></p> <p>Correctly identified two careers at different levels in the maintenance sector, produced a complete and accurate description of the associated roles and responsibilities, and provided a detailed explanation of how the two job roles interact and how individuals may progress from one job role to the other</p>
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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, 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.

There are opportunities for learners to work in small groups to investigate and identify the different functions of structures located in the built environment. This should include:

- commercial buildings
- local amenities such as shops, supermarkets, restaurants, pubs and Post Offices
- offices, factories, warehouses, call centres and other commercial units and/or developments
- agricultural buildings such as stables, farms and kennels
- industrial buildings
- public buildings
- transport links such as bus or tram stops; railway, underground or metro stations; and airports
- car parks, car parking schemes and traffic calming features
- police stations and fire stations
- community facilities such as community centres, libraries, parks, sports centres and swimming pools
- schools, colleges and universities
- doctors' surgeries and hospitals
- places of worship
- construction engineering such as roads, bridges and sea defences
- buildings of special interest (Earth Centre, Eden Project, Millennium Dome)
- residential buildings such as detached, semi-detached and terraced houses, bungalows, low-rise flats, high-rise flats, apartments, maisonettes and conversions.

Learners should be asked to express an opinion on how these buildings affect them in terms of how they look and what they add to the wider community.

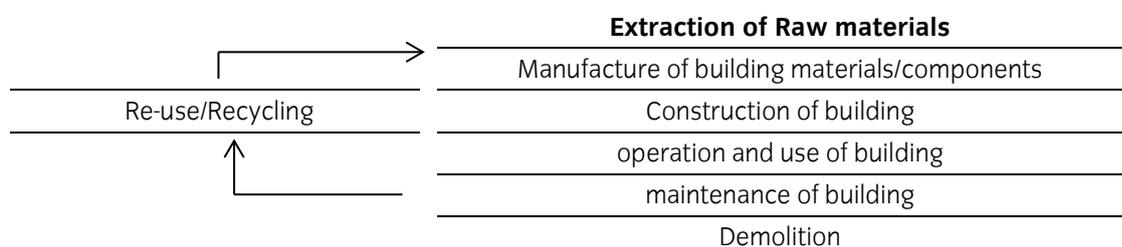
This would link well with the activity suggested in ‘Opportunities for applied learning’ below.

Learners will need to be aware of the ways in which the built environment can be developed to add to the well-being, happiness, safety, security and wealth of the public. This should include looking at aspects such as:

- environmental protection (recycling strategies – how these are applied at home, in the community and in school)
- community improvements such as regeneration of town centres, shopping facilities, and community sporting and leisure facilities including community stadium initiatives
- road safety and/or traffic calming measures to reduce traffic speed in built up areas, parking schemes, park and ride schemes, schemes to encourage people to car-share or use public transport– good links to helping to reduce CO2emissions
- provision of CCTV cameras on roads and in towns and built-up areas to help improve safety and security
- improving access to buildings for people with disabilities.

Learners should be encouraged to consider these factors in terms of the relationship between the buildings and how they enhance the general quality of life for the community.

Learners are required to recognise the life-cycle of buildings. This will help reinforce their understanding of the stages of design, planning, construction, maintenance or operation, and demolition of building structures. Becoming familiar with the following process chart will also help to demonstrate how materials from the built environment can be re-used or recycled.



There are implicit legal issues in Assessment criteria 1 aii (economic) and 1 bii and ethical issues in Assessment criteria 1 aii (social and economic), 1 b, 2 b, 3 aiii and 3 aiv. These should be signposted, but there is no requirement for a detailed treatment at this stage.

Teachers are advised to access [www.constructionawards.co.uk](http://www.constructionawards.co.uk). This contains a range of useful teaching and learning aids at Key Stages 1-3. If this material is carefully selected and combined, the learners will find the tasks both meaningful and enjoyable.

## **Opportunities for applied learning**

As the unit title implies, this is all about the value and use of the built environment. Those working in the construction industry communicate by sketching and drawing, and it is anticipated that the learner will have the opportunity to develop such skills in every unit.

Learners will need to be able to interpret and produce simple sketches and drawings, but they are not required to demonstrate competence at this stage. A range of pre-prepared drawings of all kinds should be made available for the learners to consider. These could be either hard copies or in electronic form. Whichever kind is preferred, the learners will benefit from the use of construction drawings linked to photographs of actual construction projects or visits to projects, both during and after construction.

The teacher should divide the whole group into a number of smaller groups and allocate a given area of the local community to each group. The groups should be provided with a pro forma designed to supplement the following exercise. This will require each group to identify local buildings and categorise them as residential, commercial etc. Group members will then seek the opinion of their families and friends regarding their perception of each building and how each has impacted, or not, upon their lives in a variety of ways. Each group should also comment upon any examples of good practice in sustainable construction noted during the exercise. This could form the basis of a short presentation to the whole group, followed by group discussion. This could be further developed into predictions of how future changes might impact upon the community and how the community can influence future decisions.

Each group should also be given a single 'landmark' building to research through the local library, local archives and the internet, in terms of the changes that have been made to that building during its lifetime, the various purposes to which it has been put, what it replaced (if anything), and anything that has been added to or taken away from the building. This will give them a sense of the 'life-cycle' of that building and hence of all buildings. This too could lead to a short presentation followed by a group discussion. Individual learners could compile flow diagrams (or any other form of chart) showing the life-cycle of their selected building.

Field trips and visits to construction sites, existing buildings from a range of historical periods, architectural salvage merchants, builders' merchants and waste recycling facilities will help bring the issues in this unit to life for the learner, as will guest presentations by experienced building and estate managers.

Learners should be given the chance to talk to and question the following:

- building and/or estate managers
- caretakers
- building maintenance engineers
- cleaners
- waste management operatives.

It is particularly important that the learners understand how these job roles relate to the wider construction and built environment sector.

What activities might be involved in this unit?

- Producing and interpreting sketches and drawings, and taking photographs.
- Visiting construction sites, architectural salvage yards and waste recycling facilities.
- Walking around the local area to classify the built environment by usage and change over time.
- Researching the life-cycle of a local landmark building or structure in libraries and archives.
- Gathering useful careers information from a variety of experienced personnel.

### **Suggested prior learning**

Geography, Design and Technology and Science at Key Stage 2 of the National Curriculum.

### **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 analysing information relating to how the built environment impacts upon people

### **Creative thinkers**

- exploring ideas linked to increased use of re-usable/recyclable materials

### **Reflective learners**

- communicating learning relating to the life-cycle of buildings in relevant ways

### **Team workers**

- working with others towards completing work in small groups

### **Self-managers**

- organising time and resources in their production of work to ensure deadlines are met

### **Effective participators**

- presenting and discussing findings and thoughts with others in small and whole group situations.

## Suggested learning resources

Teachers should ensure that learners can access a wide range of resources including textbooks, journals, industry literature, government and regulatory authority publications.

Electronic media resources in the form of CD-ROMs, DVDs, videos and suitable online internet applications should also be available.

### Books

- The Handbook of Sustainable Building -Anink, David & Boonstra, Chiel - Published by: James and James, 1996- ISBN: 1873936389
- Creative Neighbourhoods Beedham, Graeme & Wade, S Aluim - Published by: Aston Housing Consultancy, 2005 -ISBN: 0955011000
- Managing the Building Design Process Tunstall, G - Published by: Butterworth-Heinemann, 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](http://www.rsc-wales.ac.uk)

### Websites

- ConstructionSkills [www.citb-constructionskills.co.uk](http://www.citb-constructionskills.co.uk)
- Chartered Institute of Building [www.ciob.org.uk](http://www.ciob.org.uk)
- Environment Agency [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)
- Energy Saving Trust [www.energysavingtrust.org.uk](http://www.energysavingtrust.org.uk)
- Communities and Local Government [www.communities.gov.uk](http://www.communities.gov.uk)
- Federation of Master Builders [www.fmb.org.uk](http://www.fmb.org.uk)
- Waste & Resources Action Programme [www.wrap.org.uk](http://www.wrap.org.uk)
- National House Building Council [www.nhbc.co.uk](http://www.nhbc.co.uk)
- Construction News [www.cnplus.co.uk](http://www.cnplus.co.uk)
- Construction Business Magazine [www.building.co.uk](http://www.building.co.uk)
- Builders Merchants Federation [www.bmf.org.uk](http://www.bmf.org.uk)

## Level 1

## Unit 6: Maintenance of the built environment

### What is this unit about?

The purpose of this unit is to demonstrate to learners the need for building maintenance and the importance of good design and workmanship. On completion of the unit, learners will be able to identify common building defects and work safely to perform basic building maintenance activities.

This unit, alongside the others within the Level 1 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 types of building maintenance, and methods used to control maintenance costs
2. know about basic, common building defects
3. understand health, safety and welfare issues when performing building maintenance tasks.

## Assessment criteria

### 1. Building maintenance and methods used to control maintenance costs

The learner can:

- 1.1 identify and describe different types of basic building maintenance:
  - a. routine maintenance
  - b. planned preventative maintenance
  - c. emergency maintenance
- 1.2 identify and describe ways to control long-term maintenance costs (CT1):
  - a. good design
  - b. good specification
  - c. good workmanship
  - d. good planning.

### 2. Basic, common building defects

The learner can:

- 2.1 identify basic, common building defects such as (IE1):
  - a. cracked ceilings and walls
  - b. doors not shutting correctly
  - c. dripping taps and overflows
  - d. noise in plumbing systems
  - e. blocked above- and below-ground discharge pipework
  - f. defective central heating systems
  - g. uneven floor surfaces
  - h. rotten wooden window frames
  - i. loose or defective floor boards
  - j. loose glass window panes
  - k. cracked glass in windows with metal frames
  - l. delaminated and slipping roof tiles
  - m. ponding on flat roofs xiv blocked gutters
  - n. efflorescence
  - o. damaged brickwork
  - p. rising and penetrating damp xviii wet and dry rot
  - q. insect infestation
  - r. flaking and defective paintwork
- 2.2 identify and describe basic maintenance procedures used to remedy common building defects.

### **3. Performing basic maintenance tasks safely, and associated health, safety and welfare Issues**

The learner can:

- 3.1 describe appropriate safety measures to be taken when undertaking basic building maintenance tasks:
  - a. basic requirements of Health and Safety legislation related to the construction industry
  - b. use of personal protective equipment (PPE)
  - c. clean and tidy work space
  - d. safe working practices
  - e. safe use of access equipment and tools
- 3.2 work safely with others to perform basic building maintenance tasks such as (SM2, 4) (TW1):
  - a. replace a washer or unblock a sink or guttering
  - b. bleed central heating systems to remove trapped gases
  - c. change a light bulb or a fluorescent tube
  - d. rewire a plug
  - e. replace a fuse
  - f. repaint a door or window
  - g. install shelving
  - h. oil hinges of external and internal doors
  - i. repoint brickwork
  - j. replace broken or cracked wall tiles.

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 30 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 the maintenance of an existing building or structure, preferably one with which the learners are familiar, or on a realistic teacher-devised scenario. The familiar building or structure could be the school or college where the learners are studying or a nearby hospital, residential home or similar. The assignment should deal with the different types of maintenance; the techniques and methods used to control and/or minimise maintenance costs; the benefits of effective maintenance; the identification of simple defects; and the performance of simple maintenance tasks in a realistic environment.

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 12 of the 30 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 identifying the different types of building maintenance and the methods used to control maintenance costs
2. an identification of simple building defects with a description of the techniques to be used to remedy such defects
3. a description of appropriate safety measures to be taken when undertaking basic building maintenance tasks
4. evidence that a range of maintenance tasks has been performed safely and as part of a team.

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 routine, planned and emergency maintenance, and appreciate the main differences between them.
- Identify the methods used to achieve good practice in maintenance and to control maintenance costs, and recognise what makes such good practice effective.
- Identify a range of basic common building defects that can be remedied using basic building maintenance techniques.
- Describe the health, safety and welfare measures to be taken when performing maintenance tasks, including risk assessments and method statements.
- In a realistic environment, work safely with others when using tools, equipment and access equipment to perform a range of basic maintenance tasks, maintain a clean and tidy workspace, dispose of any waste produced, and clean tools and equipment after use.

The evidence must be based on the work-based project or teacher-devised scenario referred to above.

## Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. Building maintenance and methods used to control maintenance costs	25%	12
2. Basic, common building defects	37.5%	18
3. Performing basic maintenance tasks safely, and associated health, safety and welfare issues	37.5%	18
<b>Total</b>	<b>100%</b>	<b>48</b>

## 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. Building maintenance and methods used to control maintenance costs	<p><b>0 – 4 marks</b></p> <p>Demonstrated a basic understanding of the factors that affect building maintenance by correctly identifying a limited number of different types of building maintenance and the methods used to control maintenance costs</p> <p>Related this to the maintenance of the existing building or structure under consideration in a superficial but generally accurate fashion</p>	<p><b>5 – 8 marks</b></p> <p>Demonstrated a partial understanding of the factors that affect building maintenance by correctly identifying most of the different types of building maintenance and the methods used to control maintenance costs</p> <p>Related this to the maintenance of the existing building or structure under consideration in a clear and accurate fashion</p>	<p><b>9 – 12 marks</b></p> <p>Demonstrated an in-depth understanding of the factors that affect building maintenance by correctly identifying all of the different types of building maintenance and a full range of the methods used to control maintenance costs</p> <p>Related this to the maintenance of the existing building or structure under consideration in a thorough and detailed fashion</p>
2. Basic, common building defects	<p><b>0 – 6 marks</b></p> <p>Demonstrated a basic understanding of building defects by correctly identifying a limited number of common building defects and briefly describing the techniques used to remedy such defects</p>	<p><b>7 – 12 marks</b></p> <p>Demonstrated a partial understanding of building defects by correctly identifying a wide range of common building defects and clearly describing the techniques used to remedy such defects</p>	<p><b>13 – 18 marks</b></p> <p>Demonstrated an in-depth understanding of building defects by correctly identifying all of the common building defects and clearly and precisely describing the techniques used to remedy such defects</p>

	Related this to the maintenance of the existing building or structure under consideration in a superficial but generally accurate fashion	Related this to the maintenance of the existing building or structure under consideration in a clear and accurate fashion	Related this to the maintenance of the existing building or structure under consideration in a thorough and detailed fashion
3. Performing basic maintenance tasks safely, and associated health, safety and welfare issues	<p><b>0 – 6 marks</b></p> <p>Identified and briefly described a limited range of Health and Safety measures associated with building maintenance tasks</p> <p>Worked safely with others to perform these building maintenance tasks to a variable standard, with a significant level of supervision and guidance</p>	<p><b>7 – 12 marks</b></p> <p>Identified and clearly described a wide range of Health and Safety measures associated with building maintenance tasks</p> <p>Worked safely with others to perform these building maintenance tasks to an acceptable standard with some supervision and guidance</p>	<p><b>13 – 18 marks</b></p> <p>Identified and fully described a comprehensive range of Health and Safety measures associated with building maintenance tasks</p> <p>Worked safely with others to perform these building maintenance tasks to a high standard without supervision or guidance</p>

## Guidance for delivery

### Importance of building maintenance

Learners should be furnished with the background knowledge and understanding of the reasons for building maintenance and the common ways in which building maintenance is addressed within different areas of the built environment. This should include:

- requirements for routine domestic maintenance
- requirements for maintenance on larger residential, commercial and public buildings
- routine maintenance
- planned preventative maintenance
- emergency maintenance.

Learners should also be encouraged to explore the links between good design, good workmanship and building maintenance. This should include knowledge and understanding of how poor design and bad workmanship will generally result in building defects.

### Identification of common building defects

Learners should be given the opportunity to view actual examples of common building defects and should be given clear explanations of how the defect can come about. Basic maintenance procedures designed to address these defects should also be explained and demonstrated in a safe simulated working environment or workshop.

Wherever possible the learners should shadow site maintenance staff at the school or college, in the performance of a condition survey of a building to identify any building defects.

## **Working safely when completing basic building maintenance**

Whichever basic maintenance procedures are covered, they must be demonstrated in full by the teacher prior to the learners commencing work. This demonstration must cover the safe use of all hand tools and equipment (including access equipment) that will be used.

Risk assessments must be completed for all activities and should be strictly monitored through close supervision of all activities in workshops and simulated working environments.

Teaching and learning could be enhanced by inviting industry specialists in this particular field to participate in presentations, group work and projects.

## **Opportunities for applied learning**

This unit offers many opportunities for applied learning and has three main areas. The first involves identification of defects, the second involves performing the basic building maintenance required to remedy those defects, and the third involves working safely in both of these areas. The last can and should be integrated into the first two activities.

The teacher should arrange visits to a range of properties, some unoccupied and in disrepair and some in daily use, where learners should perform very simple condition surveys by identifying defects that could be rectified using basic building maintenance techniques. A risk assessment must be prepared for each visit and particular care should be taken when visiting unoccupied properties in disrepair. A small prize could be awarded to the learner who spots the most defects. The teacher may, however, need to be firm about what constitutes a defect!

There is no requirement for a detailed understanding of building surveying procedures and construction defects. This is a simple task for learners to spot dripping taps, blocked gutters, efflorescence and fungal attacks on timber. It is spotting the defects that is important here and understanding that the defects need to be attended to properly. Terms such as dry rot and wet rot, and the difference between the two, can be explained by the teacher during the visit, but learners are not required to understand the different forms of fungal attack at this stage.

Assessment criterion 2a provides examples of typical building defects to which the learner should be exposed, but this list is neither comprehensive nor exclusive and teachers should not ignore anything else of importance they may come across during the visits.

There is a wealth of video, CD-ROM, DVD and internet material available to support this activity where the full list of building defects is not easily accessible.

Assessment criterion 3b provides a list of typical maintenance activities from which the learner can select activities to perform. Whatever the maintenance activity undertaken, the procedure will always be the same:

- Consideration of Health and Safety issues.
- Selection of appropriate materials, hand tools, access equipment and PPE.
- Use of safe working methods to perform basic maintenance activities.
- Maintenance of a clean and tidy workspace.
- Disposal of any waste in a safe and effective manner.
- Cleaning of tools and equipment before return to their rightful place.

Opportunities exist for practical experience through work shadowing of the centre's estate staff; through charities, sports clubs and similar organisations; or even in the learners' own homes.

Visits to a variety of buildings where maintenance activities are performed by qualified and experienced workers will help learners to see the importance of Health and Safety, consideration for others, appropriate behaviour and attention to detail.

### **What activities might be involved in this unit?**

- Visiting properties, some unoccupied and in disrepair and some in daily use.
- Performing simple condition surveys by identifying defects requiring maintenance.
- Identifying risks and hazards associated with building maintenance.
- Interpreting risk assessments and method statements and complying with them.
- Applying safe working practices in the use of tools to perform maintenance activities.

### **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**

- identifying building defects as problems to be resolved

#### **Creative thinkers**

- generating ideas that might help to reduce future building defects

#### **Reflective learners**

- reviewing building maintenance activities carried out by self and other group members

#### **Team workers**

- working with others towards completion of basic building maintenance activities

#### **Self-managers**

- anticipating and managing risks associated with basic maintenance activities

#### **Effective participators**

- discussing issues of concern regarding building defects and maintenance activities.

## Suggested learning resources

Teachers should ensure that learners can access a wide range of resources including textbooks, journals, industry literature, government and regulatory authority publications.

Electronic media resources in the form of CD ROMs, DVDs, videos and suitable online internet applications should also be available.

### Books

- Building Maintenance and Management -Chanter & Swallow -Published by: Blackwell Science Ltd, 2000 - ISBN: 0632057661
- DIY Home Maintenance for Dummies All-in-One -Howell, Jeff - Published by: John Wiley & Sons, 2005 - ISBN: 0764570544
- Collins Complete DIY Manual -Jackson, Albert & Day, David - Published by: Collins, 2001 -ISBN: 0004141016
- Understanding Housing Defects, 2nd Ed -Marshall, Worthing & Heath -Published by: Estates Gazette Ltd, 2002 - ISBN: 0728204177
- Building Maintenance, 2nd Ed -Seeley, Ivor - Published by: Palgrave Macmillan, 1997 - ISBN: 0333457013

### Journals and magazines

- Home DIY

### Videos, CDs and DVDs

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

### Websites

- ConstructionSkills [www.citb.org.uk](http://www.citb.org.uk)
- Institute of Plumbing and Heating Engineering [www.iphe.org.uk](http://www.iphe.org.uk)
- Institute of Maintenance and Building Management [www.imbm.org.uk](http://www.imbm.org.uk)
- Health and Safety Executive [www.hse.gov.uk](http://www.hse.gov.uk)
- Communities and Local Government [www.communities.gov.uk](http://www.communities.gov.uk)

## Level 1

## Unit 7: Modern methods of construction

### What is this unit about?

The purpose of this unit is to explore both traditional and modern construction methods. Learners will discover the reasons for the changes in construction methods over time and the advantages of modern methods of construction.

This unit, alongside the others within the Level 1 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 traditional methods of construction
2. know about modern methods of construction and the materials used
3. understand the differences between traditional methods and modern methods of construction, and the practical implications of these differences.

## Assessment criteria

### 1. Traditional methods of construction

The learner can:

- 1.1 identify and describe traditional construction methods and their uses, including:
  - a. deep concrete foundations
  - b. single and double skin brick walls
  - c. brick and block cavity walls
  - d. timber framed structures.

### 2. Modern methods of construction

The learner can:

- 2.1 identify and describe basic features associated with modern construction materials and methods:
  - a. modern construction materials:
    - o lightweight blocks
    - o plastic moulded skirting and coving
    - o plastic pipe for plumbing connections
  - b. modern construction methods:
    - o the use of modules or 'pods' pre-fabricated off-site and positioned using cranes
    - o the use of panels, manufactured off-site
    - o ready-made walls and floors
    - o trussed rafters.

### 3. Differences between traditional methods and modern methods of construction

The learner can:

- 3.1 identify and describe the differences between modern and traditional methods of construction, such as:
  - a. speed of erection
  - b. quality of work
  - c. labour requirements
  - d. project costs
- 3.2 compare and contrast the practical implications of these differences (IE3, 6).

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 30 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.

Learners will complete an assignment, the purpose of which is to describe a range of traditional and modern methods of construction, and to compare the advantages and disadvantages of such methods. This method of assessment allows the centre to contextualise the assignment, by encouraging learners to investigate both traditional and modern methods of construction, and the advantages and disadvantages of each in terms of technology and costs. The assignment should relate to the learners' local area and use up-to-date information. Traditional methods of construction need not always imply old buildings. Many new buildings are constructed in a traditional manner with materials that have been in use for many decades. Most repair, maintenance, conservation and restoration projects use traditional methods and materials by definition, but may use modern tools, equipment and plant - and even modern methods and techniques - where they do not harm the integrity of the project.

The assignment will take approximately 8 of the 30 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. traditional construction methods and their uses
  - b. modern methods of construction and the materials used
  - c. the differences between traditional and modern methods of construction
  - d. the practical implications of the differences between traditional and modern methods of construction. 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 a range of traditional construction methods and their uses.
- Identify and describe a range of features associated with modern construction methods and materials.
- Identify the differences between modern and traditional methods of construction in terms of speed of erection, quality of work and overall project costs, including labour requirements and associated costs.
- Compare the differences between traditional and modern methods of construction by investigating the methods and materials used in specific examples of each, such as traditional houses and pre-fabricated buildings such as fast-food outlets.
- Contrast the practical implications of the above differences by estimating the savings in time and money associated with modern methods of construction. Cost savings may be approximate and relative.

The last two steps offer an opportunity for experiential learning in terms of knowledge and understanding of how, when and where each method of construction is appropriate, and the advantages in time and money associated with each method. Discussions with other learners and with experienced construction personnel will allow learners to revisit and fine tune their original findings in the 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 directly inform the learning in Level 1 Unit 4: Create the built environment: methods and materials (if not done previously or if done simultaneously). It can also support study at a higher level: in particular, Level 2 Unit 4: Create the built environment: structures.

### Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1. Traditional methods of construction	25%	12
2. Modern methods of construction	25%	12
3.	50%	12 + 12
3.1 Differences between traditional and modern methods of construction		
3.2 Practical implications of these differences		
<b>Total</b>	<b>100%</b>	<b>48</b>

### 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. Traditional methods of construction	<p><b>0 – 4 marks</b></p> <p>Demonstrated a basic understanding of traditional methods of construction by correctly identifying a limited number of different methods and briefly describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a superficial but generally accurate fashion</p>	<p><b>5 – 8 marks</b></p> <p>Demonstrated a partial understanding of traditional methods of construction by correctly identifying a wide range of different methods and clearly describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a clear and accurate fashion</p>	<p><b>9 – 12 marks</b></p> <p>Demonstrated an in-depth understanding of traditional methods of construction by correctly identifying a comprehensive range of different methods, and clearly and precisely describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a thorough and detailed fashion</p>

<p>2. Modern methods of construction</p>	<p><b>0 – 4 marks</b></p> <p>Demonstrated a basic understanding of modern methods of construction by correctly identifying a limited number of different methods, briefly describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a superficial but generally accurate fashion</p>	<p><b>5 – 8 marks</b></p> <p>Demonstrated a partial understanding of modern methods of construction by correctly identifying a wide range of different methods, clearly describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a clear and accurate fashion</p>	<p><b>9 – 12 marks</b></p> <p>Demonstrated an in-depth understanding of modern methods of construction by correctly identifying a comprehensive range of different methods, clearly and precisely describing such methods and the use to which they are put</p> <p>Related the above work to given examples of construction projects in a thorough and detailed fashion</p>
<p>3. 3.1 Differences between traditional and modern methods of construction</p>	<p><b>0 – 4 marks</b></p> <p>Identified a limited range of the differences and provided a brief and basic description of the differences</p>	<p><b>5 – 8 marks</b></p> <p>Identified a wide range of the differences and provided a clear and accurate description of the differences</p>	<p><b>9 – 12 marks</b></p> <p>Identified a comprehensive range of the differences and provided a thorough and detailed description of the differences</p>
<p>3.2 Practical implications of these differences</p>	<p><b>0 – 4 marks</b></p> <p>Identified and briefly described a limited range of the practical implications of such differences in terms of either time or money</p>	<p><b>5 – 8 marks</b></p> <p>Identified and briefly described a wide range of the practical implications of such differences in terms of both time and money</p>	<p><b>9 – 12 marks</b></p> <p>Identified and briefly described a comprehensive range of the practical implications of such differences and differentiated precisely between savings in time and money</p>

## Guidance for delivery

This unit represents an opportunity for learners to identify the different building techniques associated with traditional and modern methods of construction. This will help contribute to the learner's wider knowledge of construction and the built environment.

### Traditional construction methods

Teaching and learning could be enhanced by inviting construction managers with experience of traditional methods of construction to participate in presentations and group project work. The overview of traditional methods of construction should concentrate on:

- strip and raft foundations
- single and double skin walls
- brick and block cavity walls
- timber framed structures.

Practical techniques employed in each of these disciplines should be covered briefly and supported, where time allows, by demonstration and/or practice of basic practical techniques where time allows.

### Modern methods of construction

After the learners have been given the opportunity to practice the traditional methods of construction, an overview of modern methods of construction should be given. This should focus on:

- the use of panels, manufactured off-site and possibly including ready-made walls, floors and roofs, transported to the site and assembled quickly, often within a day (such panels can have wiring and plumbing, so making overall construction faster)
- the use of modules or 'pods' – ready-made rooms that can be pieced together to make a whole house or flat, but used more frequently for bathrooms and kitchens, where all the fittings are added in the factory
- proprietary thin joint systems – these enable load-bearing walls to be built very quickly, without having to wait one day before further loading can be applied.

Examples of the potential cost savings associated with modern methods of construction should also be given and could include the following:

- Modern materials such as plastic skirting and plastic tube are cheaper than traditional wood and copper alternatives and do not require painting.
- Off-site pre-fabrication is more cost effective because fewer special contractors are needed on-site.

### Opportunities for applied learning

Learners should be given the opportunity to visit a range of sites, builders' merchants, manufacturers' premises, etc, to take photographs, make notes, interview staff working on a range of tasks both on- and off-site, and build up a library of materials and components provided by on-site personnel, builders' merchants, and manufacturers. The range of sites should include both those using traditional methods and those using modern methods of construction. Particular importance is attached to a visit to a site that uses sustainable modern methods of construction.

This can be supported by the production of sketches and diagrams to show the use and assembly of modern methods of construction, such as pre-fabricated modules, pods and panels, and by learner presentations and group discussions as part of the debriefing that should follow each visit.

Speakers from industry will make a very useful contribution. The Yellow Pages or local trade guides can be used to identify those construction companies that specialise in traditional work, those that utilise modern methods of construction and those that specialise in 'green' construction and use a wide range of sustainable methods and materials. Such firms are usually keen to recruit good staff, and these employers should be willing to come and debate their preferred methods at your centre.

The learners could also perform simple practical activities designed to compare and contrast traditional and modern techniques. The list of activities need not be a long one; the idea is simply to compare how long each task takes, the quality of the work done and the full cost of employing each technique. The practical tasks should not take precedence over the visits and should be performed where time permits.

Typical examples of comparisons could be made between the installation of wooden skirting boards and moulded plastic skirting boards; between laying blocks in the traditional way and by the use of thin joint technology; between using compression and/or capillary joints to join two pieces of copper tube and using push-fit fittings to join plastic tubes; or anything else that should occur to the teacher.

What activities might be involved in this unit?

- Producing sketches and drawings, and taking photographs.
- Visiting traditional, modern and sustainable construction sites.
- Interviewing construction professionals with vast experience of each method.
- Performing simple activities to reinforce in the learner's mind the advantages of modern methods and materials.

### **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 modern methods of construction
- researching information on a variety of modern methods of construction

#### **Creative thinkers**

- asking questions of experienced construction personnel about the nature of the changes they have seen during their career and their perception of any associated benefits

#### **Reflective learners**

- reviewing the modern and traditional practical activities to determine which methods and/or techniques are the easiest to learn and which lead to the most reliable end product

#### **Team workers**

- making effective contributions to group discussions regarding choice of construction methods to meet the requirements of given construction projects

#### **Self-managers**

- organising their time and resources to achieve activity goals

#### **Effective participators**

- discussing differences between the methods used to achieve activity goals.

## Suggested learning resources

Teachers should ensure that learners can access a wide range of resources including textbooks, journals, industry literature and government regulatory authority publications. Electronic media resources in the form of CD-ROMs, DVDs, videos and suitable online internet applications should also be available. Industry information from some of the larger organisations involved in off-site fabrication such as Kingspan and Yorkon will be particularly useful in support of this unit.

### Books

- Building Construction Handbook, 6th Ed -Chudley & Greeno -Published by: Butterworth Heinemann, 2006 -ISBN: 0750668229
- Offsite construction: an introduction - Stirling, C - Published by: IHS BRE, 2003 -ISBN: 186081624X

### Journals and magazines

- Building Construction News

### Videos, CDs and DVDs

- The Construction of Houses – eight in series, more on the way                      University of West of England Video Project
- E-resources for construction                      [www.rsc-wales.ac.uk](http://www.rsc-wales.ac.uk)

### Websites

- Construction Skills                      [www.citb.org.uk](http://www.citb.org.uk)
- Building Research Establishment Ltd                      [www.bre.co.uk](http://www.bre.co.uk)
- Kingspan Group                      [www.kingspanoffsite.com](http://www.kingspanoffsite.com)
- Yorkon                      [www.yorkon.co.uk](http://www.yorkon.co.uk)
- H + H UK                      [www.celcon.co.uk](http://www.celcon.co.uk)
- Pipex Group                      [www.homein.org.uk](http://www.homein.org.uk)
- Health and Safety Executive                      [www.hse.gov.uk](http://www.hse.gov.uk)
- Communities and Local Government                      [www.communities.gov.uk](http://www.communities.gov.uk)
- Iberstock Brick Ltd                      [www.ibstock.com](http://www.ibstock.com)
- Constructing Excellence Ltd                      [www.constructingexcellence.org.uk](http://www.constructingexcellence.org.uk)
- Idea Knowledge                      [www.idea.gov.uk](http://www.idea.gov.uk)

## 4 Assessment

### 4.1 Aims

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

1. develop 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 1 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 eg 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 complies 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: [www.jcq.org.uk](http://www.jcq.org.uk)

#### Task setting

Clear guidance, with exemplars of suitable internal assessment, is available to all 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 eg 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.



**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 (eg 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](http://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 centres' 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. 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](http://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 centre's and/or centres 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 will:

- 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 keep 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: [www.jcq.org.uk](http://www.jcq.org.uk)

## 5.6 Awarding grades and reporting results

The Level 1 Construction and the Built Environment Principal Learning will be reported on a three-grade scale:

A\*, A and B. Learners who fail to reach the minimum standard for grade B 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 equalities legislation 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 centre.

### **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 1 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.