

Level 1 Principal Learning for the Diploma in Construction and the Built Environment

Unit	Title	GLH	Assessment method
1.1	Design the built environment: design influences	30	Internal
1.2	Design the built environment: applying design principles	30	Internal
1.3	Create the built environment: using tools	30	Internal
1.4	Create the built environment: methods and materials	30	External
1.5	Value and use the built environment	60	Internal
1.6	Maintenance of the built environment	30	Internal
1.7	Modern methods of construction	30	Internal

What is this unit about?

The purpose of this unit is to explore the factors that affect the design process, including how the planning process can influence the final design. It also introduces students 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 students 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.

What are the Learning Outcomes of this unit?

The student 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.

Content details

Assessment criteria

1 Factors that influence the design process

The student can:

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

2 Factors that affect the planning process and how planning affects design

The student can:

- a identify the factors that affect the planning process (IE5):
 - i planning legislation
 - ii Local Area Plans
 - iii community requirements
 - iv environmental issues
 - v public opinion
- b identify and describe the impact of planning on the design process.

3 Design considerations for a sustainable environment

The student can:

- a explain how good design can help create a sustainable environment (IE3, 6):
 - i consideration of existing flora and fauna
 - ii sustainable sourcing of materials
 - iii local sourcing of materials
 - iv recycling techniques
 - v preservation of limited natural resources.

4 Material properties, uses and sustainability

The student can:

- a recognise material properties and their effect on design:
 - i appearance
 - ii strength
 - iii durability
 - iv sound insulation
 - v thermal insulation
 - vi fire resistance
 - vii fitness for purpose (or suitability for required function)
 - viii sustainability
 - ix cost
- b draw conclusions regarding how properties of materials determine their usage (IE4, 6).

5 Material testing

The student can:

- a perform simple tests on construction materials as part of a team (IE2) (SM3) (TW1, 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 on page x of the 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 AQA-City & Guilds.

This method of assessment allows the centre to contextualise the evidence requirements to meet the requirements of time and place by encouraging students to consider the relationship between the design and planning process, and the specification of construction materials to support a sustainable approach, in their own local area and using up-to-date information.

Students 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; and to develop an 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. This unit is about those things that influence design and the nature of the design process. The assignment should not require the student to actually do any design work, which follows next in Level 1 Unit 2: Design the built environment: applying design principles.

The assignment will take approximately 12 of the 30 guided learning hours available for this unit. The student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

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

- 1 produce 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 construction materials
 - e how the properties of materials influence their use and contribute to sustainability
- 2 perform simple tests on construction materials as part of a team, and interpret the results.

In order to attain a high mark in this unit, students 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 topics are weighted is included below, and students should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow students 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 materials 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.

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, or on a realistic teacher-devised scenario. As far as is reasonably practicable the building used should be of sustainable design. Students may take a general approach to the issues above 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.

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 student 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 student to directly inform the learning in Unit 2: Design the built environment: applying design principles, and to support study at a higher level and, 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	25%	12
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	12.5%	6
Total	100%	48 marks

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 4 marks	5 to 8 marks	9 to 12 marks
1 Factors that influence the design process	Identified a limited range of the factors that influence the design process.	Identified a range of the factors that influence the design process.	Identified a comprehensive range of the factors that influence the design process.
	Identified a limited range of the human factors or physical factors that influence the design process.	Identified a range of the human and physical factors that influence the design process.	Identified a comprehensive range of human and physical factors that influence the design process.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Factors that affect the planning process and how planning affects design	Identified a few of the factors that affect the planning process.	Identified a range of factors that affect the planning process.	Identified a comprehensive range of factors that affect the planning process.
	Identified some of the ways in which the planning process affects design.	Identified and briefly described many of the ways in which the planning process affects design.	Identified and fully described most of the ways in which the planning process affects design.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
3 Design considerations for a sustainable environment	Identified a few of the factors that designers must consider when designing a sustainable environment.	Identified many of the factors that designers must consider when designing a sustainable environment.	Identified most of the factors that designers must consider when designing a sustainable environment.
	Attempted to explain the factors.	Briefly explained the factors.	Explained the factors in comprehensive detail.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
4 Material properties, uses and sustainability	Identified the properties of a few common construction materials.	Identified and briefly described the properties of a range of common construction materials.	Identified and described, in comprehensive detail, the properties of a wide range of common construction materials.
	Attempted to relate some of the materials' properties to their uses.	Related the materials' properties to their uses.	Effectively related the materials' properties to their uses.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
5 Material testing	Attempted to perform, as part of a team, a limited range of simple practical tests on construction materials.	Performed, as part of a team, a range of simple practical tests on construction materials.	Performed, as part of a team, an extensive range of simple practical tests on construction materials.
	Attempted to interpret a few of the results.	Correctly interpreted some of the results.	Correctly interpreted and explained most of the results.

Guidance for teachers**Guidance for delivery**

For 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 students to research using the internet and/or local library resources. The use of personal and/or industrial experience will also prove invaluable and will reduce the time required for delivery.

The unit deals with the 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.

There are implicit legal and ethical issues in assessment criteria 1 and 2. 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.

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.

Materials testing should be performed in small groups with students 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. If neither is feasible, the student'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 student will have the opportunity to develop such skills.

Students 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 and architectural models of all kinds should be made available for the students to peruse. These could be either hard copy or electronic.

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

Students 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 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, and why towers are made of brick or concrete or steel.

Students 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 the design and construction, and how the design utilises space. Whole class discussions will prove useful here as the students discuss each other's images. Students 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 students would benefit from access to simple flow diagrams that show how the design and planning 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 student, as will guest presentations by experienced design personnel. The students 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 student at this stage. For example, steel is stronger than timber but timber is easier to work with on-site.

Students 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 they should visit the local further education college to see these materials being put to use in the craft workshops.

Students 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 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 student could demonstrate 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. 6 th Edition
Published by: Butterworth-Heinemann, 2006
ISBN 0 750 66822 9 | Chudley & Greeno |
| Intermediate GNVQ Construction & the Built Environment
Published by: Pearson, 1998
ISBN 0 582 31565 4 | Millward et al |
| Building Craft Foundation
Published by: Nelson Thorne, 2002
ISBN: 074876531 | Brett, Peter |
| Architecture for Beginners (For Beginners)
Published by: Writers and Readers, 1988
ISBN: 0863160417 | Hellman, Peter |
| The Home Expert
Published by: pbi publications
ISBN: 090350524X | Hessayon, DG |
| Form, Space and Order
Published by: John Wiley & Sons Inc, 1995
ISBN: 0471286168 | Ching, FDK |
| Basic Construction Materials
Published by: Pearce Education, 2001
ISBN: 013089625 | Marotta, Theodore |
| Sustainable Practices in the Built Environment - 2 nd Edition
Published by: Butterworth-Heinemann, 2001
ISBN 0 750 65153 9 | Langston, Craig A &
Ding Grace KC |
| Becta Teaching & Learning Resource Bank
• Building Design and Architecture
• Collaborative Learning in Town Planning and Construction | http://ferl.becta.org.uk |

Journals and magazines

Architects' Journal - AJ
Building Design

Videos, CDs and DVDs

The Construction of Houses – eight in series, more on the way

Building History and Building Conservation – five in series

E-resources for construction

University of West of
England Video Project
University of West of
England Video Project
www.rsc-wales.ac.uk

Websites

- www.riba.org.uk
- www.ciat.org.uk
- www.ciob.org.uk
- www.rtpi.org.uk
- www.citb.org.uk
- www.bconstructive.co.uk
- www.actionenergy.co.uk
- www.dqi.org.uk
- www.ciria.org.uk
- www.buildingconnections.co.uk
- www.cabe.org.uk/teachingresources
- www.architecturecentre.net
- www.bbc.co.uk

Unit 2 Design the built environment: applying design principles Level 1

What is this unit about?

The purpose of this unit is to explore the factors that affect the final design solution. Students 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 students 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.

What are the Learning Outcomes of this unit?

The student 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.

Unit 2 Design the built environment: applying design principles Level 1

Content details

Assessment criteria

1 The factors that affect design

The student can:

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

2 The design cycle and design principles

The student can:

- a identify the principles involved in creating realistic designs for buildings or structures:
 - i establish intended use of building or function of structure
 - ii consider alternative design solutions
 - iii select materials to be used
 - iv address buildability issues
 - v address sustainability issues
 - vi establish skills required to implement design
 - vii produce final design solution
- b adapt designs after informed feedback from others, including the need to take buildability and sustainability into account (CT5) (RL4)
- c produce a workable design solution for a simple structure (CT1).

3 Career opportunities in construction design

The student can:

- a recognise career opportunities in the design of buildings and other structures, with respect to:
 - i the range of available careers
 - ii the level of available careers

- technical
 - supervisory
 - professional and management
- iii the nature of interactions between those who work in design
- iv 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 on page x of the 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.

Unit 2 Design the built environment: applying design principles Level 1

Assessment

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

The student 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 should deal with 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 students 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 student 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 student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

The student must produce evidence of achievement of the assessment criteria. In the assignment, the student 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, students 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 topics are weighted is included below, and students should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow students 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 increasingly appropriate design options, leading to the production of a workable design solution. 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
Total	100%	48 marks

Unit 2 Design the built environment: applying design principles Level 1

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 4 marks	5 to 8 marks	9 to 12 marks
1 Factors that affect design	Identified a limited range of factors that influence the design of buildings and structures, and described a limited range of the purpose of designs.	Identified a wide range of factors that influence the design of buildings and structures, and described a limited range of the purpose of designs.	Identified a comprehensive range of factors that influence the design of buildings and structures, and described a comprehensive range of the purpose of designs.
	0 to 10 marks	11 to 20 marks	21 to 30 marks
2 The design cycle and design principles	Used a limited range of design principles to produce a range of design options leading to a design solution for a simple structure that partially meets the design brief.	Used a wide range of design principles to produce a range of realistic design options leading to a workable and functional, design solution for a simple structure. Listens to feedback from others.	Used an extensive range of design principles to produce a range of realistic design options leading to a workable and interesting design solution for a simple structure. Adapts designs after informed feedback from others.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
3 Career opportunities in construction design	Produced a basic flow diagram showing some of the careers available within the design sector and the nature of the interaction between these careers.	Produced a basic flow diagram showing most of the careers available within the design sector and the nature of the interaction between these careers.	Produced a complex flow diagram showing most of the careers available within the design sector at all levels, the nature of the interaction between these careers, and the progression opportunities available.

Unit 2 Design the built environment: applying design principles Level 1

Guidance for teachers

Guidance for delivery

For this unit, teachers should use a broad range of techniques including lectures, discussions, seminar presentations, case studies, site visits, site surveys, supervised drawing office sessions and realistic work environments.

Teachers should encourage the students to research using the internet and/or local library resources and the use of personal and/or industrial experience will prove invaluable and will shorten the time required for delivery.

Communication in construction design is largely done by sketching and drawing and it is anticipated that the student will have the opportunity to develop such skills. Students 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 students to consider. These could be either hard copies or in electronic form. Whichever kind is preferred, the students 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 criterion 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 students 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.

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.

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.

The most realistic work environment is 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 student, as will guest presentations by experienced design personnel. The students should be given the chance to ask 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

This unit is about the principles that are applied in the design process, the production of a simple design, and the careers available in construction design.

A visit to a proposed construction site before any work is done on-site is essential if students 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 students 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 students 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 student 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 student is allowed to choose the structure they wish to design. They must know what they want the building to do before they start.

The design is not restricted to buildings, and students 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. Students 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. Students 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 to the design. It is important that this process is clear to the students, 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 students through the design process if they are to complete in the time available.

It is important that students develop an understanding of the careers available in construction design, and how they can access such careers to supplement their 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 more than 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 students to understand how members of the design team interact with each other.

Students 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 students 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.

Unit 2 Design the built environment: applying design principles Level 1

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 student could demonstrate 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.

Unit 2 Design the built environment: applying design principles Level 1

Suggested learning resources

Books

- | | |
|---|--|
| Building Construction Handbook. 6 th Edition
Published by: Butterworth-Heinemann, 2006
ISBN 0-750-66822-9 | Chudley & Greeno |
| Intermediate GNVQ Construction & the Built Environment
Published by: Pearson, 1998
ISBN 0-582-31565-4 | Millward et al |
| Building Craft Foundation
Published by: Nelson Thorne, 2002
ISBN: 0-748-76531-X | Brett, Peter |
| Architecture for Beginners (For Beginners)
Published by: Writers and Readers, 1988
ISBN: 0-863-16041-7 | Hellman, Peter |
| Sustainable Practices in the Built Environment - 2 nd Edition
Published by: Butterworth-Heinemann, 2001
ISBN 0-750-65153-9 | Langston, Craig A &
Ding Grace KC |
| Green Building Bible
Published by: Green Building Press
ISBN: 1-898-13003-5 | Hall, KD (editor) |
| The Whole House Book
Ecological Building Design and Materials
Published by: Centre for Alternative Technology Publications, 2005
ISBN: 1-902-17522-0 | Harris, Cindy & Borer, Pat |
| Becta Teaching & Learning Resource Bank
• Building Design and Architecture
• Collaborative Learning in Town Planning and Construction | http://ferl.becta.org.uk |
| Journals and magazines
Architects' Journal - AJ
Building Design | |
| Videos, CDs and DVDs
The Construction of Houses – eight in series, more to follow
Building History and Building Conservation – five in series | University of West of
England Video Project
University of West of
England Video Project |

Websites

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

What is this unit about?

The purpose of this unit is to introduce students 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 students 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.

What are the Learning Outcomes of this unit?

The student 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.

Content details

Assessment criteria

1 Health, safety and welfare

The student can:

- a recognise the importance of health and safety on construction sites:
 - i on-site inductions for employees
 - ii safe methods of working
 - iii good housekeeping
 - iv correct access equipment
- b identify good practice in terms of welfare:
 - i adequate lighting and temperature
 - ii cleanliness on site
 - iii protection from bad weather
 - iv facilities
 - sanitary and washing
 - warm rest and relaxation areas
 - catering
 - storage and changing of clothing
- c comply with health and safety practices and anticipate risks when performing construction activities (SM4).

2 Selection of appropriate PPE, tools, equipment and materials

The student can:

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

3 Technical information

The student can:

- a recognise written and graphical technical information used at craft and operative level (IE4):
 - i specifications

- ii schedules
 - iii drawings
 - iv manufacturers' information
- b select and use appropriate technical information.

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

The student can:

- a identify a range of skills using hand tools with different materials as appropriate:
 - i construction crafts
 - ii building services crafts
- b apply safe working practices, and manage risks, to the use of tools with different materials in (SM4):
 - i carpentry and joinery
 - ii bricklaying
 - iii painting and decorating
 - iv building services crafts
 - plumbing work
 - electrical work
- c describe methods of maintaining hand tools:
 - i sharpening
 - ii cleaning
- d maintain hand tools to an acceptable standard
- e work as part of a team to prepare and maintain a clean and tidy work space (TW1)
- f identify safe and effective environmental protection techniques used to handle construction waste:
 - i segregation
 - ii 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 on page x of the 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 AQA-City & Guilds.

The student will complete an assignment, which is designed to focus particularly on the skills element in this unit but also includes the application of the knowledge, understanding, and personal learning and thinking skills gained by studying the unit.

The assessment will take the form of a practical assignment, allowing the student 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 use of technical information as related to the use of tools. Students should work as part of a team to prepare and maintain a clean and tidy workplace.

Copies of the task set, a simple production plan from the student and evidence of its completion should be kept for moderation purposes. The latter evidence may take the form of photographs.

The assignment will take approximately 18 of the 30 guided learning hours available for this unit. The assignment tasks should be performed when the student and the tutor agree that the student is ready to attempt the selected tasks, but should take place within the above time scale. The student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

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

- 1 a record of the different types of technical information used to support the practical tasks and a short description of how each was used
- 2 completed requisition forms demonstrating selection of the appropriate tools and materials required for specific craft tasks
- 3 practical outcomes of using tools to perform a range of craft tasks. These must be evidenced by witness statements and photographs of the finished tasks
- 4 witness statements testifying to 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.

In order to attain a high mark in this unit, students 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 topics are weighted is included below, and students 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 students to meet the evidence requirements, may include the following steps:

- Select the correct tools and materials for specific craft tasks.
- Identify and select the correct PPE for specific craft tasks.

- Identify good practices in terms of on-site welfare.
- Recognise and use different forms of technical information.
- Identify and use good practice when disposing of construction waste.
- Identify hand tool skills and work safely to perform a range of craft tasks.
- Describe and perform techniques for maintaining hand tools.

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 the health, safety and welfare issues and the need for proper waste disposal techniques.

Students should be given technical information as needed to complete one 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
- jointing 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 them to demonstrate skills with hand tools that are used and of use in the Construction and the Built Environment industry. Students 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 tools, equipment and materials	12.5%	6
3 Understanding technical information	12.5%	6
4 Working safely whilst:	62.5%	30
a Using tools	[31.25%]	[15]
b Maintaining hand tools	[18.75%]	[9]
c Disposing of waste	[12.5%]	[6]
Total	100%	48 marks

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 1 mark	3 to 4 marks	5 to 6 marks
1 Health, safety and welfare issues associated with construction	Recognised a limited range of good Health, Safety and Welfare practices, and complied with most, and made a limited contribution, as part of a team, to a safe and tidy workplace.	Recognised a good range of Health, Safety and Welfare practices, and complied with all, and made an effective contribution, as part of a team, to a safe and tidy workplace.	Recognised a comprehensive range of Health, Safety and Welfare practices, and complied with all, and made an important contribution, as part of a team, to a safe and tidy workplace.
	0 to 1 mark	3 to 4 marks	5 to 6 marks
2 Selection of tools, equipment and materials	Selected some of the correct tools, materials and equipment needed for specific tasks and used most of them correctly.	Selected most of the correct tools, materials and equipment needed for specific tasks and used most of them correctly.	Selected a comprehensive range of the correct tools, materials and equipment needed for specific tasks, rejected others that were not needed, and used everything correctly.
	0 to 1 mark	3 to 4 marks	5 to 6 marks
3 Understanding technical information	Selected some of the technical information needed and used it to variable effect.	Selected most of the technical information needed and used it correctly in most cases.	Selected a comprehensive range of the technical information needed and used it correctly in most cases.
4 Working safely whilst:	0 to 10 marks	11 to 20 marks	21 to 30 marks
	[0 to 5 marks]	[6 to 10 marks]	[11 to 15 marks]
a Using tools	Worked safely some of the time when using a range of tools to produce some acceptable outcomes.	Worked safely most of the time when using a range of tools to produce good outcomes.	Consistently worked safely when using a range of tools to produce high quality outcomes.
	[0 to 3 marks]	[4 to 6 marks]	[7 to 9 marks]
b Maintaining hand tools	Briefly described, and then performed to a variable standard, a limited range of the techniques used to maintain tools to an acceptable standard.	Briefly described, and then performed competently, a wide range of the techniques used to maintain tools to an acceptable standard.	Described in detail, and then performed with skill, a comprehensive range of the techniques used to maintain tools to an acceptable standard.
	[0 to 2 marks]	[3 to 4 marks]	[5 to 6 marks]
c Disposing of waste	Identified very few good practices and used them to dispose of waste some of the time.	Identified many good practices and used same to dispose of waste most of the time.	Identified almost all good practice and used same to dispose of waste all of the time.

Guidance for teachers

Guidance for delivery

It is strongly advised that the entire unit be planned around the use of common hand tools to 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 to decide is which practical activities the students need to undertake 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 students need to use the hand tools to do something, and that something should be basic craft activities typical of those carried out by craftsmen, craftswomen and operatives on construction sites and in customers' homes.

The teacher must be careful not to overload the student. The student will benefit from using the widest possible range of tools but this implies that 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
- jointing pieces of copper tube using a capillary joint and a compression joint.

The important thing is that, whatever tools the students use, and whatever basic craft activities they undertake, the procedure outlined in the 'Opportunities for applied learning' section below must be followed. The procedure is repeated below:

- 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, as ever, of paramount importance. Students must receive adequate preparation for site visits in advance. 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 using hand tools. The HSC publication 'Safe use of work equipment, Approved Code of Practice and Guidance' will be a very helpful guide. Teachers should be reminded that 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 inexperience, lack of awareness of potential risks and their immaturity. 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 students and help them to appreciate the importance and complexity of the industry.

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

Students 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, 2c, 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

This unit provides many opportunities for applied learning. Whatever the craft activity undertaken, or the hand tools or materials used, the procedure will always be the same:

- consideration of health and safety issues
- 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.

Access to craft workshops may not always be available, but opportunities exist for practical experience through work-shadowing of the estate staff of the centre or through charities, sports clubs and similar organisations or even the students' own homes. See 'Guidance for delivery' below for a menu of suggested craft activities. Statements of authenticity or observation statements will be required where activities take place outside the centre.

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 students 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 student 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 student could demonstrate 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 Published by: Nelson Thorne, 2002 ISBN: 074876531	Brett, Peter
Carpentry and Joinery for building craft students 1, 2 nd edition Published by: Nelson Thornes, 1981 ISBN: 0748702873	Brett, Peter
Brickwork 1, 3 rd edition Published by: Nelson Thornes, 1983 ISBN: 0748702660	Nash, WG
Painting & Decorating: An Information Manual Published by: Blackwell Science Ltd, 1989 ISBN: 0632041595	Fulcher, A
Basic Plumbing Published by: Meredith Corporation, 2002 ISBN: 0696213206	Stanley
Electrical Wiring: Domestic, 12 th edition Published by: Butterworth–Heinemann ISBN: 0750661437	Scaddan, Brian
DIY Home Maintenance for Dummies All-in-One Published by: John Wiley & Sons, 2005 ISBN: 0764570544	Howell, Jeff
Collins Complete DIY Manual Published by: Collins, 2001 ISBN: 0004141060	Jackson, Albert & Day, David
Safe Start, Safety Handbook, GE 707 Published by CITB-ConstructionSkills, 2005 ISBN 0902029746	Hands, Denis & CITB
Construction Site Safety, 1999 Update Pack, GA 700/99 Published by CITB, 1994 ISBN 1 85751 006 2	CITB

Safe use of work equipment, 4th edition
Approved Code of Practice and Guidance
Published by: HSE, 1998
ISBN: 0717616266

HSE

Journals and magazines

Home DIY

Videos, CDs and DVDs

How to DIY – the Complete Series
Available from: Woolworth
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
- Health and Safety Executive
- Institution of Occupational Safety and Health
- Royal Society for the Prevention of Accidents

www.citb.co.uk
www.hse.gov.uk
www.iosh.co.uk
www.rospa.co.uk

Unit 4 Create the built environment: methods and materials Level 1

What is this unit about?

The purpose of this unit is to explore the changes that have taken place in construction methods and materials over time. It will give students 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 students 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.

What are the Learning Outcomes of this unit?

The student 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.

Unit 4 Create the built environment: methods and materials Level 1

Content details

Assessment criteria

1 Power tools, mechanisation and prefabrication

The student can

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

2 New materials and benefits of mechanisation

The student can:

- a recognise examples of where new materials have influenced construction methods (IE5):
 - i glass-reinforced cement
 - ii glass-reinforced plastics
 - iii polymer-fibre-reinforced cement and concrete
 - iv carbon fibres
- b identify the benefits of using mechanisation and new materials (IE6):
 - i speedier erection
 - ii increased productivity
 - iii improved quality control
 - iv mass production
 - v elimination of heavy manual work
 - vi improved performance-in-use
 - vii improved sustainability.

3 Sustainable materials and processes

The student can:

- a discuss sustainable construction issues in terms of materials and processes (IE3, EP1):
 - i manufacture of sustainable materials and components
 - ii incorporation of sustainable and renewable materials into the build process
 - iii concept of embodied energy

- iv techniques to reduce waste such as recycling and reuse
- v use of materials with good thermal insulation properties
- vi air-tightness of buildings
- vii recycling of materials and components
- viii utilising advances in material technologies

4 How to plan a career in creating the built environment

The student can:

- a recognise career opportunities in the construction of buildings and other structures:
 - i range of available careers
 - ii level of available careers
 - operative
 - craft
 - technical
 - supervisory
 - professional and management
 - iii nature of interactions between those who work in the construction industry
 - iv 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 on page x of the 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.

Unit 4 Create the built environment: methods and materials Level 1

Assessment

The assessment method for this unit will be external assessment. Students will take a multiple choice test.

This unit largely comprises knowledge and understanding and is therefore deemed to be an appropriate vehicle for the externally assessed component of Principal Learning at Level 1. The external assessment is by multiple choice questions which is deemed to be an appropriate technique to be used with students at Level 1. The purpose of the externally-set multiple choice test is to assess the learning outcomes, content and assessment criteria that comprise the unit under the headings indicated in the test 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. Students should make their own suggestions for suitable materials and processes and refine those suggestions by revisiting their suggestions after discussion with other students and/or construction professionals. These suggestions can be revisited and improved each time the matter is discussed.

A suitable period of reflection should follow upon completion of the assessment for this unit. The student should evaluate which questions they answered correctly, which they did not, why they chose the wrong answer and why the correct answer is correct. The learning and assessment that comprise this unit can then be used by the student to directly inform the learning in Level 1 Unit 7: Modern methods of construction and to support study at a higher level and, in particular, Level 2 Unit 2: Design the built environment: materials and structures.

Unit 4 Create the built environment: methods and materials Level 1

Examination Specification

Duration: 1 hour

Assessment type: Multiple Choice

Number of items: 48

Assessment criteria topics	Subtopics	No of items	Total	%
1 Mechanisation of construction methods	Hand held power tools	4	12	25
	Construction plant	4		
	Off-site prefabrication of components	4		
2a Influence of new materials on construction methods	Glass reinforced cement	1	4	8.33
	Glass reinforced plastic	1		
	Polymer fibre reinforced cement and concrete	1		
	Carbon fibres	1		
2b Benefits of 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 construction issues	Manufacture of materials and components	2	16	33.33
	Embodied energy	2		
	Techniques to reduce waste	2		
	Sustainable and renewable materials	2		
	Improved thermal insulation	2		
	Air-tightness of buildings	2		
	Recycling of materials and components	2		
	Advanced material technologies	2		
4 Career opportunities	Range of careers available	2	8	16.67
	Level of careers available	2		
	Interactions between personnel	2		
	Progression opportunities	2		
Totals		48	48	100

Unit 4 Create the built environment: methods and materials Level 1

Guidance for teachers

Guidance for delivery

This unit does not require the student 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 students 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 students. The opportunity to see old and new methods in practice is worth many hours in the classroom. It is however important that the student 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 student 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 i.e. 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 above 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 who and who is responsible for who. The teacher should attempt to steer the student towards developing a career plan that it is within his or her ability to achieve and should help the student link their future career aspirations to the qualifications and experience they will need to gain.

This unit is all about going to see things and listening to and asking questions of experienced construction workers and careers staff. Information should be given to the students 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 Criterion 1 and ethical issues in Assessment Criteria 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

The students 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.

Students should be provided with a separate check list for each of the three visits. These check lists 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 students 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 and present these to their peers. This should then form the basis of a whole-group discussion.

It is important that students develop an understanding of the careers available in construction, and how they can access such careers, to supplement their developing understanding of what builders 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 will be more than happy to visit the centre and explain what careers are available, what are the opportunities for progression, what qualifications are required to support progression and what is available locally. Contact with experienced builders will help students to understand how builders interact with others.

Students could use all of this to produce individual career development plans that extend, say, five years into the future and that specify career goals, supporting qualifications, time needed to achieve such qualifications and anything else relevant.

Craft roles should include a simple treatment of the roles and responsibilities of the main crafts 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, lest we forget their importance to the construction and built environment sector. 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 and the like.

Technical and supervisory roles should include site managers, site agents, gangers, team leaders, civil engineering technicians and so forth.

Professional roles should include chartered builder, project manager, contract manager, civil engineer, building services engineer, quantity surveyor, land surveyor and so forth.

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 sources.

Unit 4 Create the built environment: methods and materials Level 1

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 student could demonstrate 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 Construction Handbook. 6 th Edition
Published by: Butterworth-Heinemann, 2006
ISBN 0 750 66822 9 | Chudley & Greeno |
| Intermediate GNVQ Construction & the Built Environment
Published by: Pearson, 1998
ISBN 0 582 31565 4 | Millward et al |
| Building Craft Foundation
Published by: Nelson Thorne, 2002
ISBN: 074876531 | Brett, Peter |
| Introduction to Building – 2 nd Edition
Published by: Pearson, 1997
ISBN 0 582 30200 5 | Osbourn D & Greeno R |
| Sustainable Practices in the Built Environment - 2 nd Edition
Published by: Butterworth-Heinemann, 2001
ISBN 0 750 65153 9 | Langston, Craig A &
Ding Grace KC |
| The Whole House Book
Ecological Building Design and Materials
Published by: Centre for Alternative Technology Publications, 2005
ISBN: 1902175220 | Harris, Cindy & Borer, Pat |

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 |

Websites

- www.citb.co.uk
- www.ciria.org.uk
- www.hsebooks.co.uk
- www.riba.org.uk
- www.woodforgood.com
- www.dqi.org.uk
- www.ciob.org.uk
- www.rtpi.org.uk

- www.bconstructive.co.uk
- www.building4jobs.co.uk
- www.info4study.co.uk
- www.bbc.co.uk
- or email hseinformationservices@natbrit.com.

What is this unit about?

The purpose of this unit is to help students to recognise the visual and social impact of the built environment, and to consider the welfare and wellbeing of those who use the built environment. 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 students 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.

What are the Learning Outcomes of this unit?

The student will:

- 1 be able to assess the effect of the built environment on community wellbeing 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.

Content details

Assessment criteria

1 The effect of the built environment on community wellbeing and welfare in terms of visual, social and economic impact

The student can:

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

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

The student can:

- a recognise and explain the life-cycle of buildings and other structures:
 - i pre-construction (planning, design)
 - ii construction
 - iii use (facility management)
 - iv maintenance and repair
 - v re-use (conversion, refurbishment, adaptation)
 - vi removal (demolition)
- b describe the use of, and select, appropriate sustainable materials, techniques and processes in the maintenance of the built environment (CT1) (SM3):
 - i issues of land use (greenfield and brownfield sites)
 - ii reduced use of scarce natural resources
 - iii increased use of renewable materials

- iv improved waste management techniques
- v increased use of recycling and re-use techniques.

3 Career opportunities in value and use of the built environment

The student can:

- a recognise career opportunities in the value and use of the built environment:
 - i range of available careers
 - ii level of available careers:
 - craft
 - technical
 - supervisory
 - professional and management
 - iii nature of interactions between those who value and use the built environment
 - iv progression opportunities available to those who value and use 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 on page x of the 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 AQA-City & Guilds.

The student 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, together with an understanding of 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 student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

The student must produce evidence of achievement of the assessment criteria. In the assignment, the student 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, students 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 topics are weighted is included below, and students 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 students 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 wellbeing, 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 second to last 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 Impact of built environment on local community	37.5%	18
2 Life-cycle of buildings and structures and sustainability issues	37.5%	18
3 Career opportunities	25%	12
Total	100%	48 marks

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 6 marks	7 to 12 marks	13 to 18 marks
Impact of built environment on local community	<p>Classified a limited range of local buildings and structures in basic terms.</p> <p>Identified the visual, social and economic impacts of the buildings.</p> <p>Identified how some of the above affects the wellbeing or the health, safety and welfare of people in the community.</p>	<p>Classified a range of local buildings and structures appropriately and correctly.</p> <p>Briefly described the visual, social and economic impacts of the buildings.</p> <p>Briefly explained how some of the above affects the wellbeing or the health, safety and welfare of people in the community.</p>	<p>Classified a comprehensive range of local buildings and structures appropriately and correctly.</p> <p>Described, in comprehensive detail, the visual, social and economic impacts of the buildings.</p> <p>Explained in comprehensive detail how each of the above affects both the wellbeing and the health, safety and welfare of people in the community.</p>
	0 to 6 marks	7 to 12 marks	13 to 18 marks
2 Life-cycle of buildings and structures and sustainability issues	<p>Identified some of the stages in the life-cycle of a studied building up to the present day.</p> <p>Identified a few sustainability issues as they affect either land use issues or the maintenance of buildings.</p>	<p>Briefly described the stages in the life-cycle of a studied building up to the present day.</p> <p>Identified and briefly described a limited range of sustainability issues as they affect either land use issues or the maintenance of buildings.</p>	<p>Described in detail the stages in the life-cycle of a studied building up to the present day and into the future.</p> <p>Identified and fully described a wide range of sustainability issues as they affect both land use issues and the maintenance of buildings.</p>
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3 Career opportunities	<p>Stated job roles and responsibilities within the maintenance sector, briefly described some of the interactions between job roles, and identified one of the requirements for progression.</p>	<p>Identified and described job roles and responsibilities within the maintenance sector, and the main interactions between job roles, and identified requirements for progression.</p>	<p>Identified and clearly described job roles and responsibilities within the maintenance sector, and all the main interactions between job roles, and identified both the qualifications and the experience required for progression.</p>

Guidance for delivery

For 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 the students to research using the internet and/or local library resources and the use of personal and/or industrial experience will prove invaluable and will shorten the time required for delivery.

There are opportunities for students 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, public houses and Post Offices
- offices, factories, warehouses, call centres and other commercial units/developments
- agricultural buildings such as stables, farms and kennels
- industrial buildings
- public buildings
- transport links such as bus/tram stops, railway/underground/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.

Students 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.

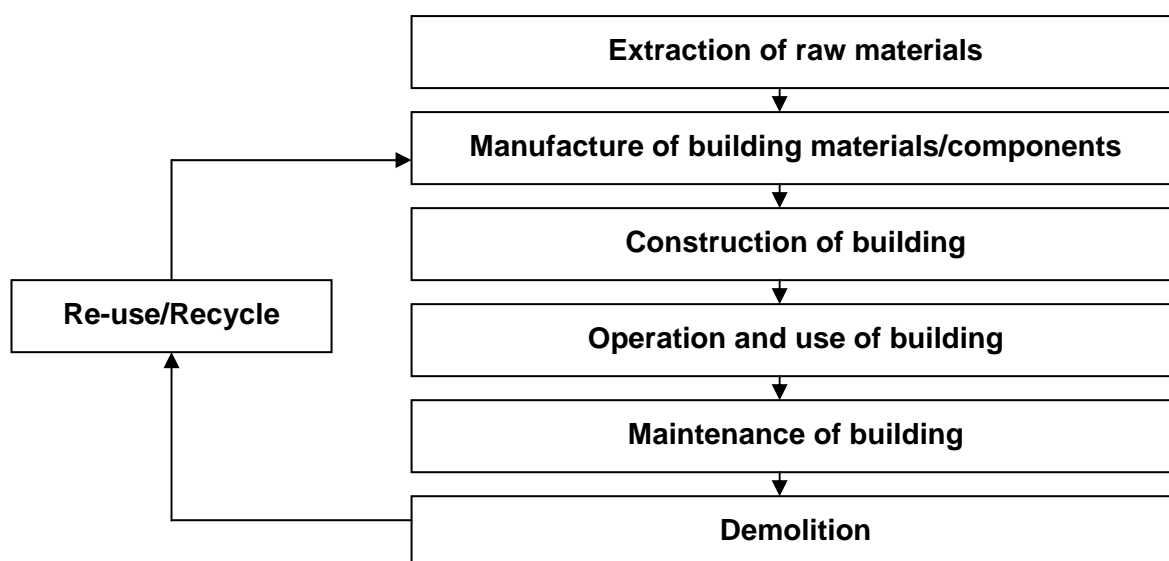
Students will need to be aware of the ways in which the built environment can be developed to add to the wellbeing, happiness, safety, security and wealth of people. This should include looking at aspects such as:

- environmental protection (recycling strategies – how are these applied at home, in the community and in school)
- community improvements such as regeneration of town centres, shopping facilities, community sporting and leisure facilities including community stadium initiatives

- road safety/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 CO₂ emissions
- provision of CCTV cameras on roads and in towns and built-up areas to help improve safety and security
- improving access to buildings for disabled people.

Students 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.

Students are required to recognise the life-cycle of buildings. This will help reinforce their understanding of the stages of design, planning, construction, maintenance/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/recycled.



There are implicit legal issues in Assessment Criteria 1a(ii) (economic) and 1b(ii) and ethical issues in Assessment Criteria 1a(ii) (social and economic), 1b, 2b, 3a(iii) and 3a(iv). These should be signposted, but there is no requirement for a detailed treatment at this stage.

Teachers should access 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 students 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 student will have the opportunity to develop such skills in every unit.

Students 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 students to peruse. These could be either hard copy or electronic. Whichever kind is preferred, the students 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 each group a given area of the local community. The groups should be provided with a pro forma designed to supplement the following exercise. This will require each group to identify local buildings, categorise them as residential, commercial etc, and seek the opinion of their family 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), what has been added to the building and what has been taken away. 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 students 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 to life for the student, as will guest presentations by experienced building and estate managers.

The students should be given the chance to talk to and question the following:

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

It is particularly important that the students 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 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 sources.

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 student could demonstrate 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/thoughts with others in small and whole group situations.

Suggested learning resources

Teachers should ensure that students 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

Creative Neighbourhoods
Published by: Aston Housing Consultancy, 2005
ISBN 0955011000
Beedham, Graeme

Managing the Building Design Process
Published by: Elsevier, 2000
ISBN 0750650699
Tunstall, G

The Handbook of Sustainable Building
Published by: James and James, 1996
ISBN 1873936389
Anink, David

Journals and magazines

Building
Construction News
Housebuilder
Property Week
Planning

Videos, CDs and DVDs

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

Websites

- www.citb-constructionskills.co.uk
- www.ciob.org.uk
- www.environment-agency.gov.uk
- www.est.org.uk
- www.hse.gov.uk
- www.communities.gov.uk
- www.fmb.org.uk
- www.wrap.org.uk
- www.nhbc.co.uk
- www.cnplus.co.uk
- www.building.co.uk
- www.bmf.org.uk

What is this unit about?

The purpose of this unit is to demonstrate to students the need for building maintenance and the importance of good design and workmanship. On completion of the unit, students 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 students 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.

What are the Learning Outcomes of this unit?

The student 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 student can:

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

2 Basic common building defects

The student can:

- a identify basic common building defects such as (IE1):
 - i cracked ceilings and walls
 - ii doors not shutting correctly
 - iii dripping taps and overflows
 - iv noise in plumbing systems
 - v blocked above and below ground discharge pipework
 - vi defective central heating systems
 - vii uneven floor surfaces
 - viii rotten wooden window frames
 - ix loose or defective floor boards
 - x loose glass window panes
 - xi cracked glass in windows with metal frames
 - xii delaminated and slipping roof-tiles
 - xiii ponding on flat roofs
 - xiv blocked gutters
 - xv efflorescence
 - xvi damaged brickwork
 - xvii rising and penetrating damp
 - xviii wet and dry rot
 - xix insect infestation
 - xx flaking and defective paintwork
- b identify and describe basic maintenance procedures used to remedy common building defects.

3 Health, safety and welfare issues and basic building maintenance

The student can:

- a describe appropriate safety measures to be taken when undertaking basic building maintenance tasks:
 - i basic requirements of health and safety legislation related to the construction industry
 - ii use of personal protective equipment (PPE)
 - iii clean and tidy work space
 - iv safe working practices
 - v safe use of access equipment and tools
- b work safely, with others, to perform basic building maintenance tasks such as (SM2)(SM4)(TW1):
 - i replace a washer or unblock a sink or guttering
 - ii bleed central heating systems to remove trapped gases
 - iii change a light bulb or a fluorescent tube
 - iv rewire a plug
 - v replace a fuse
 - vi repaint a door or a window
 - vii install shelving
 - viii oil hinges to external and internal doors
 - ix repoint brickwork
 - x 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 on page x of the 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 AQA-City & Guilds.

The student will complete an assignment, which should be based upon the maintenance of an existing building or structure, preferably one with which the students are familiar, or on a realistic teacher-devised scenario. The familiar building or structure could be the school or college where the students 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.

The assignment will take approximately 12 of the 30 guided learning hours available for this unit. The student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

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

- 1 produced a report identifying the different types of maintenance and the methods used to control maintenance costs
- 2 identified simple building defects and described the techniques to be used to remedy such defects
- 3 identified, described and assessed health and safety issues applicable to maintenance.
- 4 performed a range of maintenance tasks safely, as part of a team. This should be evidenced by witness statements.

In order to attain a high mark in this unit, students 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 topics are weighted is included below, and students should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure is as follows. Students should be asked to complete the following tasks.

- 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 Types of building maintenance and methods used to control maintenance costs	25%	12
2 Recognition of basic common building defects	37.5%	18
3 Performing basic maintenance tasks safely, and associated health, safety and welfare issues	37.5%	18
Total	100%	48 marks

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 4 marks	5 to 8 marks	9 to 12 marks
1 Types of building maintenance and methods used to control maintenance costs	Identified a few of the different types of building maintenance.	Identified some of the different types of building maintenance and described how those methods differed.	Identified the different types of building maintenance and described how each method differed from the others.
	Identified a few of the ways in which long term maintenance costs are controlled.	Identified some of the ways in which long term maintenance costs are controlled.	Identified the different ways in which long term maintenance costs are controlled and explained in detail how each was effective.
	0 to 6 marks	7 to 12 marks	13 to 18 marks
2 Recognition of basic common building defects	Identified a few common building defects.	Identified a wide range of common building defects.	Identified a comprehensive range of common building defects.
	0 to 6 marks	7 to 12 marks	13 to 18 marks
3 Performing basic maintenance tasks safely, and associated health, safety and welfare issues	Worked safely with others to perform basic building maintenance tasks to an acceptable standard.	Described health and safety measures to be used when performing specific tasks and worked safely with others to a good standard.	Described health and safety measures to be used when performing specific tasks and worked safely with others to a high standard.

Guidance for delivery

Importance of building maintenance

Students 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.

Students 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

Students 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, workshop or simulated working environment.

Wherever possible the students should shadow the school/college site maintenance staff, in the performance of a condition survey of the 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 students 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, and students 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 student 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. It is a simple task for students 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 students are not required to understand the different forms of fungal attack just yet.

Assessment Criterion 2a provides a menu of typical building defects to which the student 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 and DVD and internet material available to support this activity where the full menu of building defects is not easily accessible.

Assessment Criterion 3b provides a menu of typical maintenance activities for the student to 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 estate staff of the centre or through charities, sports clubs and similar organisations or even the students' own homes.

Visits to a variety of buildings where maintenance activities are performed by qualified and experienced workers will help students 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.

Unit 6 Maintenance of the built environment

Personal, Learning and Thinking Skills

Level 1

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 student could demonstrate 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 students 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
Published by: Blackwell Science Ltd, 2000
ISBN: 0632057661
Chanter & Swallow

Building Maintenance, 2nd Ed
Published by: Palgrave MacMillan, 1997
ISBN: 0333457016
Seeley, Ivor

Understanding Housing Defects, 2nd Ed
Published by: Estates Gazette Ltd, 2002
ISBN: 0728204177
Marshall, Worthing & Heath

DIY Home Maintenance for Dummies All-in-One
Published by: John Wiley & Sons, 2005
ISBN: 0764570544
Howell, Jeff

Collins Complete DIY Manual
Published by: Collins, 2001
ISBN: 0004141060
Jackson, Albert & Day, David

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

- www.citb.org.uk
- www.iphe.org.uk
- www.imbm.org.uk
- www.hse.gov.uk
- www.communities.gov.uk

What is this unit about?

The purpose of this unit is to explore both traditional and modern construction methods. Students will learn about 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 students 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.

What are the Learning Outcomes of this unit?

The student 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.

Content details

Assessment criteria

1 Traditional methods of construction

The student can:

- a identify and describe traditional construction methods and their uses, including:
 - i deep concrete foundations
 - ii single and double skin brick walls
 - iii brick and block cavity walls
 - iv timber framed structures.

2 Modern methods of construction

The student can:

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

3 Differences between traditional methods and modern methods of construction

The student can:

- a identify and describe the differences between modern and traditional methods of construction such as:
 - i speed of erection
 - ii quality of work
 - iii labour requirements
 - iv project costs
- b 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 on page x of the 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 AQA-City & Guilds.

The student 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.

Internal assessment allows the centre to contextualise the evidence requirements to meet the requirements of time and place by encouraging students to investigate both traditional and modern methods of construction, and the advantages and disadvantages of each in terms of technology and costs, in their own local area, using up-to-date information. Traditional methods of construction need not always imply old buildings. Many new buildings are constructed in a traditional manner, using materials that have been in use for many decades, and 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 student should work under controlled conditions in accordance with the guidance on page xx of the specification, and evidence should be kept for moderation purposes.

Evidence requirements

The student must produce evidence of achievement of the assessment criteria. In the assignment, the student 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, students 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 topics are weighted is included below, and students should be shown this in order that they understand how the final mark is determined.

Assignment structure

A suggested assignment structure, which would allow students 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 comparing 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 students and with experienced construction personnel will allow students 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 student 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 student 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) and to support study at a higher level and, in particular, Level 2 Unit 4: Create the built environment: structures.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks available
1 Traditional methods of construction	25%	12
2 Modern methods of construction	25%	12
3 a Differences between traditional and modern methods of construction b Practical implications of these differences	50%	12 + 12
Total	100%	48 marks

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 4 marks	5 to 8 marks	9 to 12 marks
1 Traditional methods of construction	<p>Identified a few traditional methods of construction.</p> <p>Provided a weak outline of the uses of traditional methods of construction.</p>	<p>Identified a range of traditional methods of construction and briefly described these traditional methods.</p> <p>Provided a basic outline of the uses of traditional methods of construction.</p>	<p>Identified a comprehensive range of traditional methods of construction and described these traditional methods in detail.</p> <p>Provided a detailed outline of the uses of traditional methods of construction.</p>
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Modern methods of construction	<p>Identified a few of the basic features associated with modern construction methods.</p> <p>Identified a few modern construction materials and attempted to provide a description of them.</p>	<p>Identified and briefly described a range of the basic features associated with modern construction methods.</p> <p>Identified a range of modern construction materials and provided a clear description of them.</p>	<p>Identified and described in detail, a comprehensive range of the basic features associated with modern construction methods.</p> <p>Identified a comprehensive range of modern construction materials and provided a detailed description of them.</p>
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3a Differences between traditional and modern methods of construction	<p>Identified a few of the differences between traditional and modern methods of construction.</p> <p>Attempted to provide a description of the differences.</p>	<p>Identified many of the differences between traditional and modern methods of construction.</p> <p>Briefly described the differences.</p>	<p>Identified most of the differences between traditional and modern methods of construction.</p> <p>Described the differences in detail.</p>
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3b Practical implications of these differences	<p>Identified a few of the practical implications of the differences.</p>	<p>Identified and described many of the practical implications of the differences.</p>	<p>Compared and contrasted most of the practical implications of the differences.</p>

Guidance for delivery

Traditional construction methods

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

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 by demonstration and/or practice of basic practical techniques where time allows.

Modern methods of construction

After the students 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. These could include:

- 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

Students should be given the opportunity to visit a range of sites, builders' merchants, manufacturers' premises and the like 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 student presentations and group discussions as part of the debriefing that should follow each visit.

Speakers from industry will make a very useful contribution, as ever. 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 always keen to recruit good staff, and the industry is still a long way from having a full complement of the workers needed to service the work to be done. These employers should not take much convincing to come and debate their preferred methods at your centre.

The students could also perform simple practical activities designed to compare and contrast traditional techniques 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 utilising each technique. The practical tasks should not take precedence over the visits and should be performed where time permits. Typical comparisons could be made between the installation of wooden skirting boards and moulded plastic skirting boards, or between laying blocks in the traditional way and by the use of thin joint technology, or 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 the advantages of modern methods and materials.

Unit 7 Modern methods of construction

Personal, Learning and Thinking Skills

Level 1

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 student could demonstrate 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 students 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
Published by: Butterworth-Heinemann, 2006
ISBN: 0750668229

Chudley & Greeno

Offsite construction: an introduction
Published by: BRE Press, 2003
ISBN: 186081624X

Stirling, C

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
www.rsc-wales.ac.uk

E-resources for construction

Websites

- www.citb.org.uk
- www.bre.co.uk
- www.kingspanoffsite.com
- www.yorkon.co.uk
- www.celcon.co.uk
- www.homein.org.uk
- www.hse.gov.uk
- www.communities.gov.uk
- www.ibstock.com
- www.constructingexcellence.org.uk
- www.idea-knowledge.gov.uk