

Level 2 Principal Learning for the Diploma in Construction and the Built Environment

Unit	Title	GLH	Assessment method
2.1	Design the built environment: the design process	60	Internal
2.2	Design the built environment: materials and structures	60	Internal
2.3	Design the built environment: applying design principles	60	Internal
2.4	Create the built environment: structures	60	External
2.5	Create the built environment: using tools	60	Internal
2.6	Value and use of the built environment: communities	60	Internal
2.7	Value and use of the built environment: facilities management	60	Internal

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 factors that influence the design process
- 2 understand planning requirements and how they are applied to a wide range of different developments
- 3 know the technical information needed to support the design process
- 4 be able to accommodate primary service utilities in the design process.

Content details

Assessment criteria

1 Factors that influence the design process

The student can:

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

2 Planning requirements

The student can:

- a outline main planning requirements in terms of:
 - i buildings of different function
 - ii buildings of different size
 - iii legislative and regulatory requirements
 - iv ensuring decisions meet legislative and regulatory requirements
 - v potential requirement for alternative design solutions to meet planning requirements
- b differentiate between the roles and responsibilities of:
 - i designers
 - ii planners.

3 Technical information used in design

The student can:

- a differentiate between the various forms of technical information used in design:
 - i standards for material and component production
 - ii quality control issues
 - iii methods of working
 - iv manufacturers' product information

- v environmental information such as climatic information
- vi local topography
- vii local authority guidelines and requirements
- b select and use appropriate technical information to inform the design process
- c produce and interpret sketches, drawings, schedules and specifications, as part of a team, to support their exploration of the design cycle from the perspective of (IE3) (RL6) (SM3) (TW1, 2):
 - i designers
 - ii planners.

4 Primary services utilities

The student can:

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

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available 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 knowledge and understanding of the factors that influence the design process and the ways in which the planning process is used to control design for the benefit of the community. The assignment should also test the knowledge and understanding of a wide range of the technical information used to inform and progress the design process, and the ways in which the primary service utilities are provided to buildings and structures. It should do all of this in a sustainable context, wherever possible.

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

The assignment will take approximately 18 of the 60 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 the design process, including the provision of the primary services utilities
- 2 a graphical representation of the design cycle in terms of the stages of the cycle and the specific contributions made by designers and planners
- 3 a folder of supplementary technical evidence with text, sketches, drawings, schedules, specifications and references to supporting legislation and regulations
- 4 witness statements to support evidence of working as part of a team in relation to the design and planning process.

In order to attain a high mark in this unit, 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 the various factors that influenced the design process in terms of community, social, economic, legal, environmental and infrastructural needs and issues.
- Describe and analyse how the planning system was used to control design in the built environment, with particular reference to the main legislative and regulatory requirements.
- Produce a simple flow diagram to show how the various stages of the design and planning processes integrate to create a design.
- Identify and describe a range of selected technical information used to support the design and planning process and briefly explain how, when and where such information was

used. Examples of such technical information may be enclosed with the student's work but should not be used to replace text and/or accompanying images.

- Identify the primary services utilities that are generally provided to buildings and outline the procedures used to plan the distribution and installation of such services, and the factors that must be taken into account such as entry into buildings, access for maintenance and repair, and the environmental impact of providing services utilities.

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

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Factors that influence the design process	25%	12
2 Planning requirements	25%	12
3 Technical information used in design	25%	12
4 Primary services utilities	25%	12
Total	100%	48 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 some of the factors that influence the design process and described one or two of the factors using either drawings, photographs or other images to support their answers.	Identified most of the factors that influence the design process, and accurately and effectively described most of these factors, using either drawings and photographs or other images to support their answers.	Identified the factors that influence the design process, and accurately and effectively described these factors using drawings, photographs and other images to support their answers.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Planning requirements	Identified some of the important requirements of the planning system and provided a basic description of how the design and planning processes interact to produce a design. Supported their answer with a basic flow diagram and one or two comments from experienced designers and planners.	Identified most of the important requirements of the planning system and briefly analysed how the design and planning processes interact to produce acceptable designs. Supported their answer with a clear flow diagram and several pertinent comments from experienced designers and planners.	Identified the important requirements of the planning system and analysed in full how the design and planning processes interact to produce an acceptable design. Supported their answer with a clear and accurate flow diagram and a wide range of pertinent comments from experienced designers and planners.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3 Technical information used in design	Identified, as part of a team, some of the technical information used in design, and briefly described how, when and where that information is used.	Identified as part of a team and described most of the technical information used in design, and briefly explained how, when and where that information is used.	Identified, as part of a team and described the technical information used in design, and briefly explained how, when and where that information is used.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
4 Primary services utilities	Identified one or two of the services utilities generally provided to buildings, and outlined the processes and procedures used to distribute and install those services.	Identified a good range of the services utilities generally provided to buildings, and outlined the processes and procedures used to distribute and install those services.	Identified a broad range of the services utilities generally provided to buildings, and outlined the processes and procedures used to distribute and install them, with due consideration of environmental impact.

Guidance for teachers**Guidance for delivery**

For this unit, teachers should use as wide a range of techniques as possible, including lectures, discussions, seminar presentations, case studies, site visits, supervised practical sessions and realistic work environments. Teachers should encourage the students to undertake research using the internet and/or local library resources. The use of personal and/or industrial experience will prove invaluable and could reduce the time required for delivery.

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

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

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

The ideal work environment for this unit 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 presentations by design and/or planning professionals 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

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

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

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

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

Students could examine the layout of their home and compare it with layouts of the homes of other students. They could attempt to trace the building services in each home. They could interview their parents about the annual cost of running the house. They could perform a simple environmental assessment on their home. All of the above should be used to generate discussions about why certain design decisions have been taken. This could include exploration of what is similar and what is different; the positioning of staircases; the relative positions of kitchen, bathroom and WC; how purchase costs compare to running costs; whether the home is energy efficient; whether the methods used to construct the house are sustainable; and what changes and improvements could be made in the future.

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

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 photographs. Teachers must be careful not to be critical, and careful steering of the discussion will be required to ensure that all feedback is positive. Students must be encouraged to think about design constructively.

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

What activities might be involved in this unit?

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

Personal, Learning and Thinking Skills

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

Alternative approaches could be selected.

The student could demonstrate PLTS by:

Independent enquirers

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

Creative thinkers

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

Reflective learners

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

Team workers

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

Self-managers

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

Suggested learning resources**Books**

Building Construction Handbook. 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
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
Building Services Handbook Published by: Butterworth-Heinemann, 2001 ISBN 0 750 64692 6	Hall, F & Greeno, R
Architect's Job Book Published by: RIBA Publications, 1995 ISBN 1 85946 007 0	RIBA
Managing the Building Design Process Published by: Elsevier, 2000 ISBN 0750650699	Tunstall, G
Architectural Design Procedures - 2 nd Edition Published by: Architectural Press, 2004 ISBN 0340719419	Thompson A
Reekie's Architectural Drawing - 4 th Edition Published by: Edward Arnold, 1995 ISBN 0 340 5732244	Reekie F & McCarthy T
Architectural Graphics – 3 rd Edition Van Nostrand Reinhold , 1996 ISBN 0 442 02237 9	Ching F D K
Green Building Handbook Published by: ACTAC, 1997 ISBN: 0419226907	Woodley, T et al

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

A Sampler of Alternative Homes -
Approaching Sustainable Architecture (DVD)
E-resources for construction

University of West of
England Video Project
University of West of
England Video Project
Kelly Hart

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

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 different construction materials and their properties, including sustainable materials
- 2 be able to test construction materials to establish their suitability for a particular job
- 3 understand structural forms and building elements
- 4 be able to compare traditional and modern methods of construction.

Content details

Assessment criteria

1 Construction materials and their properties

The student can:

- a identify and describe the properties and uses of construction materials:
 - i materials in common use:
 - timber
 - cements and concrete
 - metals
 - bricks
 - plastics
 - plasters
 - paints
 - glass
 - ii raw materials, including their location, extraction and/or harvesting
 - iii manufacture of construction materials and components from raw materials
 - iv properties of commonly specified construction materials:
 - strength
 - elasticity
 - porosity and water absorption
 - thermal and moisture movement
 - durability
 - workability
 - v uses of commonly specified construction materials:
 - fitness for purpose
 - visual appearance
 - cost
 - resistance to degradation
 - ease of working on-site
 - consideration of interrelationships between materials
 - vi typical failures of commonly specified construction materials:
 - corrosion
 - fungal attack
 - insect attack
 - frost attack
 - sulphate attack
 - efflorescence
 - UV attack
 - vii prevention and remediation of failure

- b identify and describe developments in the use of sustainable materials:
 - i influence of sustainable materials on the design process
 - ii recycling, reclamation, reusability (including packaging)
 - iii salvaged, refurbished or remanufactured materials
 - iv resource efficient manufacturing processes
 - v specification of natural, plentiful or renewable resources wherever possible
 - vi locally available materials specified wherever possible
 - vii durable materials specified wherever possible.

2 Testing construction materials

The student can:

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

3 Structural forms and building elements

The student can:

- a compare and contrast structural forms and building elements used in design (IE4, 6):
 - i structures:
 - traditional
 - crosswall
 - framed (steel, timber and reinforced concrete)
 - ii building elements:
 - foundations
 - ground floors
 - walls
 - frames
 - cladding
 - upper floors
 - roofs
 - doors and windows
- b produce sketches, drawings, schedules and specifications of structural forms and elements (CT1) (EP2, 3).

4 Traditional and modern methods of construction

The student can:

- a compare and contrast traditional and modern methods of construction (IE4, 6)
- b explore on-site and off-site construction techniques (IE2) (CT2):
 - i nature and use of prefabricated elements
 - ii common structural forms and materials used with above
 - iii scope for using sustainable materials and techniques
 - iv when to use traditional on-site construction processes
 - v advantages and disadvantages of all the above.

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

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 materials and structures; the advantages and disadvantages of different types of both; the sustainability or otherwise of traditional and modern methods and materials of construction; and the specification of all of the above in terms of fitness-for-purpose, economy and sustainability, in their own local area, using up-to-date information.

The student will complete an assignment, as specified in the section 'Evidence requirements'. The assignment will also test knowledge and understanding of the different building elements used in construction, the way these are brought together in the common structural forms, the differences between the traditional and modern methods of construction used to do this, and the perceived advantages of the latter.

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

The assignment will take approximately 18 of the 60 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 written report on the properties and uses of construction materials and, in particular, the contribution each makes to sustainability
- 2 perform simple tests on construction materials as part of a team. This can be evidenced using witness statements
- 3 present results of the tests and shown interpretation of the results
- 4 produce specifications of construction materials based on their properties-in-use
- 5 produce a report on structural forms and building elements supported by sketches, drawings, schedules and specifications as appropriate
- 6 differentiate between traditional and modern methods of construction, and commented upon the advantages and disadvantages of each.

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 the properties of materials specified for a given building or structure.
- Identify any three of these materials and track what happens to them from the extraction of their raw materials, through any manufacturing processes, to their specification based on their predicted properties-in-use, to their short- and/or long-term sustainability, to any anticipated modes of failure, through to the techniques used to prevent and/or remedy such failures.
- Identify both the building elements used in the construction of the building and its overall structural form. Students should compare the building elements used in this building with those used in another building or structure with a different structural form. Sketches, drawings, schedules and specifications should be included wherever appropriate.
- Decide whether the building is being constructed using traditional or modern methods of construction and compare the methods and techniques used with another building or structure being constructed using different methods and techniques. Students should compare and contrast traditional and modern methods of construction in terms of the technical information required for each, the important differences between the two methods and the perceived advantages and disadvantages of each.

Students should be asked to perform, as part of a team where appropriate, simple tests for any four properties of all three materials (identified above), interpret the results, and explain how their properties influenced their specification. They could tabulate the results of the tests and present their interpretation using calculations and graphs as appropriate.

Students should produce a report covering the above tasks using drawings, photographs and other images to support their work on this assignment. It is acceptable for them to use opinions gained from team discussions with other students and construction professionals to support their work.

Each of the tasks in the assignment structure above offers an opportunity for experiential learning in terms of knowledge and understanding of the properties of materials and the difference between various methods of construction, and the developing skills needed to recognise how this knowledge and understanding influences the specification and selection of materials and methods, particularly in terms of sustainability. The student should plan and action their report and formulate their own initial findings, revisit these initial findings after discussions with other students and construction professionals, and review the initial findings in light of the outcomes of such discussions.

A suitable period of reflection should follow upon completion of the assessment for this unit. The 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 support study at a higher level.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Construction materials and their properties	25%	12
2 Testing construction materials	25%	12
3 Structural forms and building elements	25%	12
4 Traditional and modern methods of construction	25%	12
Total	100%	48 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 Construction materials and their properties	Identified and described a limited range of construction materials and their properties, including sustainability, and briefly tracked one or two materials from raw material to possible failure.	Identified and described a wide range of construction materials and their properties, including sustainability, and effectively tracked three materials from raw material to possible failure.	Identified and described a comprehensive range of construction materials and their properties, including sustainability, and effectively and accurately tracked three materials from raw material to possible failure.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Testing construction materials	Worked with others and performed tests on three materials for four properties, correctly interpreted minimal results, and made a tenuous link between some of their properties and their uses.	Worked with others and performed tests on three materials for four properties, correctly and effectively interpreted most of the results, and made a clear link between their properties and their uses.	Worked with others and successfully performed tests on three materials for four properties, correctly and effectively interpreted the results, and made a strong, clear and precise link between their properties and uses.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3 Structural forms and building elements	Identified and described a limited range of building elements and structural forms, and briefly compared different forms of both in two different buildings or structures.	Identified and described a wide range of building elements and structural forms, and effectively compared a wide range of different forms of both in two different buildings or structures.	Identified and described a comprehensive range of building elements and structural forms, and effectively compared the different forms of both in two different buildings or structures.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
4 Traditional and modern methods of construction	Briefly compared and contrasted traditional and modern methods of construction in terms of a limited range of their differences, and some of the perceived advantages and disadvantages.	Effectively compared and contrasted traditional and modern methods of construction in terms of a good range of their differences, and most of the perceived advantages and disadvantages.	Effectively compared and contrasted traditional and modern methods of construction in terms of a comprehensive range of their differences, and the perceived advantages and disadvantages.

Guidance for teachers

Guidance for delivery

For this unit, teachers should use as wide a range of techniques as possible including lectures, discussions, seminar presentations, case studies, visits to testing laboratories, supervised practical sessions and realistic work environments. Teachers should encourage the students to undertake research using the internet and/or local library resources and the use of personal and/or industrial experience will prove invaluable and reduce delivery time.

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

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

It is difficult to achieve a thorough understanding of the properties of materials without doing some practical testing of materials. This should include tests for strength, elasticity, porosity, water absorption and thermal and moisture movement. Specialist apparatus is available to assist with all of the above but it is possible to construct simple test rigs capable of obtaining approximate results. If a centre lacks such equipment, then a useful link could be made with a local further education college, university or local authority testing laboratory. If this should prove impractical, then video, CD and DVD resources can be used as an alternative. When undertaking such practical activities, health, safety and welfare issues are paramount at all times. Risk assessments must be completed for all activities and should be strictly reinforced through close supervision in workshops, laboratories and classrooms.

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

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

Opportunities for applied learning

The key applied learning for this unit is that which tests a range of construction materials, both traditional and sustainable, and uses the results of such tests to guide the student to the specification of the appropriate material for the appropriate task. In general, it is desirable to test structural materials such as timber, steel, brick and concrete (at various water-cement ratios) for strength; porous materials such as timber, brick and concrete for water absorption; metals for elasticity; metals and plastics for thermal movement; timber and bricks for moisture movement and concretes for workability on-site.

The results do not have to be precisely accurate as long as they are relative. This might include the following: steel is stronger than timber but timber is lighter; plastics produce the greatest thermal movement; high water-cement ratios mean weaker concrete mixes; common bricks are more porous than engineering bricks, etc.

The use of video, CD, DVD and secondary sources of information are acceptable. Whether practical opportunities are available or not, students could examine their homes and other familiar buildings to which they have access and compare them with the homes of other students etc. They could identify the materials and structural forms used in each home. They could perform a simple environmental assessment on the materials and structural forms used in these buildings and link both to the period in which the building was constructed.

This could be used to generate discussions about what is similar, what is different, why things are the way they are, whether the materials and methods used to construct the house are sustainable, what important changes have been made in the last decade or two, and what might happen in the future.

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

Students should be encouraged to develop individual portfolios of photographs, pictures and images of local buildings and structures. These should be annotated with details of the materials specified by the designers and used in the construction. These can be used to support class presentations and discussions. Students should be encouraged to consider the materials that are not visible to the naked eye. For example, they should not assume that a steel-framed building with brick cladding is entirely made out of brick. This is not always apparent to students in the early stages of teaching and learning, and the teacher may need to lead the student to the correct answers in certain cases.

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

What activities might be involved in this unit?

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

Personal, Learning and Thinking Skills

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

Alternative approaches could be selected.

The student could demonstrate PLTS by:

Independent enquirers

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

Creative thinkers

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

Reflective learners

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

Team workers

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

Self-managers

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

Effective participators

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

Suggested learning resources

Books

Building Construction Handbook. 6th 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

Design and Construction
Published by: Architectural Press, 2002
ISBN: 0-750-65149-0
Best, de Valence & Langstone

Basic Construction Materials
Published by: Pearce Education, 2001
ISBN: 0-131-43387-3
Marotta, Theodore

Materials for Architects and Builders (An Introduction)
Published by: Butterworth-Heinemann, 2003
ISBN: 0-750-65725-1
Lyons, Arthur

Materials in Construction
Principles, Practice and Performance
Published by: Longman, 2001
ISBN: 0-582-36934-7
Taylor, G D

Building Ecology
First Principles for a Sustainable Built Environment
Published by: Blackwell Science (UK), 2002
ISBN: 0-632-06413-7
Graham, Peter

Green Building Bible
Published by: The Green Building Press, 2003
ISBN: 1-898-13001-9
Hall, Keith

Green Building Handbook
Published by: ACTAC, 1997
ISBN: 0-419-22690-7
Woodley, T et al

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

A Sampler of Alternative Homes -
Approaching Sustainable Architecture (DVD)
E-resources for construction

University of West of
England Video Project
University of West of
England Video Project
Kelly Hart

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

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 and be able to apply the design principles which affect the design of a complex structure
- 2 know how to plan a career in design and planning.

Unit 3 Design the built environment: applying design principles

Level 2

Content details

Assessment criteria

1 Apply design principles to the design of a complex structure

The student can:

- a apply design principles to produce realistic designs for a complex structure within a team (TW1, 2, 3):
 - i standard design principles
 - ii functions of structures
 - iii alternative design solutions
 - iv alternative material specifications
 - v final design solution
 - vi 'buildability' of final design
 - vii skills needed to implement design
- b produce sketches, drawings, schedules and specifications to support their designs (CT1) (SM2)
- c use appropriate technical information to inform their design work
- d communicate design information using verbal and written techniques (RL6) (EP2)
- e select appropriate materials for given purposes (SM3).

2 Explore career opportunities within construction design

The student can:

- a compare and contrast career development pathways for those involved in design (IE4, 6):
 - i roles and responsibilities
 - ii career progression opportunities
 - iii qualifications required to facilitate career progression
 - iv range and role of professional institutions
- b produce a personal career development plan (CT1) (RL2) (SM3).

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

Internal assessment allows the centre to contextualise the evidence requirements to meet the requirements of time and place by encouraging students to apply design principles to design a complex structure in their own local area, using up-to-date information.

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

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

The assignment will take approximately 18 of the 60 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 realistic design for a complex structure, using basic construction design drawing techniques, with evidence, through witness testimony, of team work
- 2 supplementary textual material including an explanation of any buildability issues that arose during the design process together with material specifications, minutes of meetings and discussions, and records of design critiques
- 3 a career development plan showing opportunities and progression routes available in design of the built environment.

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:

- Employ standard design techniques to design a complex structure, using a sustainable approach throughout.
- Consider 'buildability' at all stages of the design in terms of the intended function of the building and any issues associated with its construction..
- Produce and include intermediate design solutions, material specifications and other documentation as appropriate, together with evidence of a team approach to the incremental improvement of the design, such as notes and minutes of discussions with other students and critiques of early design solutions by the teacher and any visiting design and planning professionals.
- Select two careers in the design sector, one at technician level and the other at professional and management level. In each case, identify and describe the job roles and responsibilities involved and suggest ways in which individuals can plan their career development within the sector.

In addition, students should prepare a career development plan for careers in the design and planning of the built environment, including information on the training, development and qualifications needed to support progressive career development into a relevant professional institution.

This assignment offers an excellent opportunity for experiential learning in terms of the knowledge, understanding and skills required to produce a final design solution for a complex structure using the iterative process by which designs are planned, 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 was good about their design, what was less good and how they would improve the design if they were to redo the assessment. The learning and assessment that comprise this unit can then be used by the student to support study at a higher level and, in particular; Unit 1, Design the built environment: design factors, Level 3; Unit 2, Design the built environment: stages in the design and planning process, Level 3; and Unit 3, Design the built environment: physical and environmental influences, Level 3.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Apply design principles to the design of a complex structure	87.5%	42
2 Explore career opportunities within construction design	12.5%	6
Total	100%	48 marks

Unit 3 Design the built environment: applying Level 2 design principles

Assessment grid

Assessment criteria topic	Band 1	Band 2	Band 3
	The student has:		
	0 to 14 marks	15 to 28 marks	29 to 42 marks
1 Apply design principles to the design of a complex structure	Used a limited range of design principles, within a team approach, to design a complex structure, with no consideration of sustainable principles or buildability issues.	Used a good range of design principles, within a team approach, to design a complex structure, based upon limited consideration of sustainability and buildability issues.	Effectively used a broad range of design principles, within a team approach, to design a complex structure based upon in-depth consideration of sustainability principles and buildability issues.
	0 to 1 marks	2 to 4 marks	5 to 6 marks
2 Explore career opportunities within construction design	Produced a basic career development plan showing some of the careers available in design and planning of the built environment.	Produced a detailed career development plan showing most of the careers available in design and planning of the built environment and a flow diagram showing the nature of the interaction between these careers.	Produced a comprehensive career development plan and a complex flow diagram showing a broad range of the careers available in design and planning of the built environment, the nature of the interaction between these careers, and the progression opportunities available into professional bodies.

Guidance for teachers

Guidance for delivery

Teachers should use as wide a range of techniques as possible including lectures, discussions, professional presentations, and design studio and drawing office environments.

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

This unit builds upon the design issues covered in other units in the Principal Learning such as Level 2 Unit 1: Design the built environment: the design process, and Level 2 Unit 2: Design the built environment: materials and structures. The unit is important because, together with the other two, it lays the foundation for following units in the Principal Learning at Level 2 and above.

Legal issues are a key factor in the design process. Planning permission will not be granted for a design that does not conform to current planning and building control legislation. Therefore, all of assessment criterion 1 can be considered to have legal implications: (i), (v) and (vi) in particular. The qualifications required to support career development in design are underpinned by powerful professional institutions and this implies ethical issues throughout the content of the unit.

In order to produce designs without drawings of some kind, the student will need to understand and perform basic construction design drawing techniques as well as the fundamentals of building design. Students with skills in using CAD may do so; however, use of CAD is not a requirement of this unit.

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

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

When undertaking any practical activities, health, safety and welfare issues are paramount at all times. This is especially true when working with visual display units. Risk assessments must be completed for all activities and should be strictly reinforced through close supervision in design studios, drawing offices and classrooms.

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

Opportunities for applied learning

This unit will offer scope for enthusiasm, imagination and creativity if the student is allowed to choose the structure they wish to design. The teacher should however advise the student on what is achievable in the time allowed and at this level of study.

This will generally mean a small to medium sized, single-storey structure with foundations, ground floor, walls, windows, doors and roof. Teaching and learning strategies for this unit should support designs for a building or structure with more than one intended function.

The student should decide what purpose the building or structure is intended to serve. They should then consider a design that will meet that purpose or purposes and produce simple drawings and material specifications to support that design.

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

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

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

What activities might be involved in this unit?

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

Suggested prior learning

Unit 1 and Unit 2 at Level 2 (see above).

Personal, Learning and Thinking Skills

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

Alternative approaches could be selected.

The student could demonstrate PLTS by:

Independent enquirers

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

Creative thinkers

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

Reflective learners

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

Team workers

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

Self-managers

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

Effective participators

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

Suggested learning resources

Books

Building Construction Handbook. 6th 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

Basic Construction Materials
Published by: Pearce Education, 2001
ISBN: 013089625
Marotta, Theodore

How Designers Think
Published by: Architectural Press, 1997
ISBN: 0750630736
Lawson, Bryan

Design and Construction
Published by: Architectural Press, 2002
ISBN: 0750651490
Best, de Valence & Langstone

Building Ecology
First Principles for a Sustainable Built Environment
Published by: Blackwell Science (UK), 2002
ISBN: 0632064137
Graham, Peter

Green Building Bible
Published by: The Green Building Press, 2003
ISBN: 1898130019
Hall, Keith

Green Building Handbook
Published by: ACTAC, 1997
ISBN: 0419226907
Woodley, T et al

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

A Sampler of Alternative Homes -
Approaching Sustainable Architecture (DVD)
E-resources for construction

University of West of
England Video Project
University of West of
England Video Project
Kelly Hart

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

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 and explore the technical information used in the construction of the built environment
- 2 know about the construction methods, techniques and equipment used at different construction stages
- 3 understand when to use in-situ methods of construction and when to use partial pre-fabrication off-site.

Content details

Assessment criteria

1 Technical information used in construction and the built environment

The student can:

- a identify and describe a range of technical information used in the construction and the built environment sector:
 - i construction drawings:
 - concept sketches
 - progress charts
 - plans
 - sections
 - elevations
 - details
 - ii specifications
 - iii schedules of work
 - iv standard drawing conventions and construction notes
 - v architectural models
- b compare the ways in which technical information can be presented and accessed (IE4, 6):
 - i 2D and 3D manual drawings (may include colour work)
 - ii 2D and 3D CAD drawings
 - iii electronic databases
 - iv digital and film photographs, videos, CDs and DVDs
 - v 3D models
- c interpret and evaluate drawings, schedules and specifications to support their studies into the methods and techniques of construction (IE4, 6) (RL1) (EP4)

2 Construction methods, techniques and equipment

The student can:

- a identify and describe a range of methods and techniques used in construction:
 - i groundwork
 - ii substructure
 - iii superstructure
 - iv external works
- b identify and describe the plant, tools and other mechanical equipment used in the above
- c understand the work methods used to form foundations and erect frameworks.

3 On-site and off-site construction

The student can:

- a compare on-site and off-site construction in terms of (IE4; 6):
 - i wholly in-situ or partially fabricated off-site techniques
 - ii advantages and disadvantages of working at height:

- methods and techniques
 - risks and control methods
- vi advantages and disadvantages of working below ground level:
- methods and techniques
 - risks and control methods.
- b review whether on-site or off-site construction should be utilised in various situations (IE5; 6) (CT1)
- c produce method statements and risk assessments for working at heights and working below ground (IE6) (EP2)

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available 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 will be assessed through a centre set and marked assignment. Internal assessment is subject to moderation by AQA-City & Guilds.

Internal assessment allows the centre to contextualise the evidence requirements to meet the requirements of time and place by encouraging students to develop an understanding of groundworks, substructure, superstructure and external works in their own local area, using up-to-date information.

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

The assignment should also test the knowledge and understanding of a broad range of the methods, techniques, plant, tools and other equipment used to perform construction work and the characteristics of, differences between and comparative advantages and disadvantages of, on-site and off-site construction methods.

The assignment will take approximately 18 of the 60 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, based on two construction projects that involve buildings or other structures under construction, and two construction projects that have already been completed. These should be within the local community and the projects chosen must show a range of on-site and off-site construction techniques. The techniques in use should be classified as either on-site or off-site, and the two classes should be compared in terms of their inherent advantages and disadvantages
- 2 drawings, specifications, schedules and models to support the report, as appropriate
- 3 method statements and risk assessments.

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 final report can be presented through what ever media is seen as suitable, as long as all of the evidence requirements are met and the task can be moderated by AQA-City & Guilds.

Assignment structure

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

- Working in a small group, collect examples of a variety of construction drawings, specifications, schedules, specifications and models relating to the selected construction projects. Use these to plan a group presentation made to classmates, the teacher and any construction managers that can attend. Use a range of electronic databases, hard copies and multi-media in the presentation as appropriate. Students do not have to produce any of the technical information themselves, but should make the following things clear in the presentation: the source of the information, why it is important, who would use it and what they would use it for. Students must be prepared to answer questions both during and after the presentation.
- Identify and describe the methods and techniques being used to construct the selected construction projects at each clearly defined stage of construction. Compare and contrast the plant, tools, equipment and work methods used at each stage and try to match what is being used to the stage of construction in which it is being used.
- Evaluate the construction methods, materials, plant and tools in use on the two construction projects. Classify the above into two groups: traditional construction and modern construction. In some cases it will seem to be a mixture of both, so ignore any examples where the decision is not clear. Compare the two groups in terms of labour requirements, speed, pre-fabrication and quality of work. Make a list of the advantages and disadvantages of each method. Looking for any examples of working at height or working below ground level, students should produce risk assessments and method statements and comment upon how modern methods of construction have made both of these methods of work safer.

Students may use drawings, photographs and other images to support their work. If there is the opportunity to talk with or interview experienced construction workers, students should ask them for their opinions, reflect on these and make changes as necessary, including these in the report.

Examples of a suggested context for this assignment are given in the Guidance section.

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Technical information used in construction and the built environment	37.5%	18
2 Construction methods, techniques and equipment	37.5%	18
3 On-site and off-site construction	25%	12
Total	100%	48 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
1 Technical information used in construction and the built environment	Made a minor contribution to a group presentation, using information from a limited range of sources without clarifying any issues of relevance.	Made an effective contribution to a group presentation, using information from a wide range of sources and clarifying some issues of relevance.	Made a considerable contribution to a group presentation, using information from an extensive range of sources and clarifying many highly relevant issues.
	0 to 6 marks	7 to 12 marks	13 to 18 marks
2 Construction methods, techniques and equipment	Identified some of the main stages of construction and a limited number of the tools, equipment, materials and plant used in construction but failed to relate the latter to the former with any success.	Accurately identified the main stages of construction and most of the tools, equipment, materials and plant used in construction, and related the latter to the former with partial success.	Accurately identified the main stages of construction and the tools, equipment, materials and plant used in construction, and related the latter to the former both clearly and appropriately.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
3 On-site and off-site construction	Successfully classified a limited range of construction methods as traditional or modern but has not identified any benefits of modern methods of construction.	Successfully classified a wide range of construction methods as traditional or modern and correctly identified some of the benefits of modern methods of construction.	Successfully classified a comprehensive range of construction methods as traditional or modern and correctly identified the benefits of modern methods of construction.

Guidance for teachers

Guidance for delivery

Students should be offered a wide variety of opportunities to see construction methods and techniques at every stage of the construction process.

The students will need access to builders of all kinds, whether in the classroom or on site, to help them interpret technical information, clarify when and where it would be used, and link the information provided with the work being done at the time.

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

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

Craft skills can be seen in action on site and in colleges and training providers. Colleges should use their workshops as a teaching resource and schools should make arrangements to visit such centres for at least a day to see all the workshops and other resources in use.

Legal issues are a key factor in creating the built environment especially in terms of the health, safety and welfare of building workers, visitors to a construction site and the general public. Assessment Criteria 2 and 3 are considered to have legal implications.

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

Opportunities for applied learning

This unit divides neatly into two halves. The first half involves developing skills in interpreting technical information in both traditional hard copy and electronic format, and the second involves using these skills to support their developing knowledge and understanding of construction.

The students should be provided with access to technical information in both formats. This technical information could relate to constructed buildings. Designers, planners and builders may be willing to share or donate such information. This could be done in a classroom. Another highly effective way of learning about the technical information used by builders is to see it being used in a variety of real life situations.

Students need to be exposed to real life construction situations in a similar way to that used in Level 1 Unit 4. The situation is similar, but the teaching and learning strategies will be more detailed and the assessment strategy will demand more of the student.

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

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

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

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

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

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

What activities might be involved in this unit?

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

Personal Learning and Thinking Skills

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

Alternative approaches could be selected.

The student will use PLTS by:

Independent enquirers

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

Creative thinkers

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

Reflective students

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

Team workers

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

Effective participators

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

Suggested learning resources**Books**

Building Construction Handbook. 6th 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

Vocational A-level Construction and the Built Environment
Published by: Pearson, 2000
ISBN: 0582418836
Millward et al

Fundamentals of Building Construction
Materials and Methods
Published by: John Wiley & Sons, 2003
ISBN: 0471219037
Allen, Edward & Iano, Joseph
(Note that this comes with a companion website)

Reclaimed and Recycled Construction Materials Handbook
Published by: CIRIA, 1999
ISBN: 0860175238
CIRIA

Building Regulations (complete set of Approved Documents)
Published by: TSO, 2006
ISBN: 0117036552
Approved documents can also be purchased individually as required.

Resource packs

'Be a safe learner. Aspects of health and safety'
Published by: Standards Unit, DfES
Available from standards.unit@dfes.gsi.gov.uk and www.successforall.gov.uk
DfES

'Health and Safety: Skills for Construction'
Published by: DfES
Available from dfes@prolog.uk.com
DfES

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
Kelly Hart

A Sampler of Alternative Homes -

Approaching Sustainable Architecture (DVD)

Money for Nothing and Your Waste Tips for Free

Building a Cleaner Future

Designs that Hold Water

E-resources for construction

Environment Agency
CIRIA/ Env't Agency
Urban Design Allowance
www.rsc-wales.ac.uk

Websites

- www.citb.co.uk
- www.ciria.org.uk
- www.fsc-uk.info
- www.hsebooks.co.uk
- hseinformationservices@natbrit.com
- www.nhbc.co.uk
- www.riba.org.uk
- www.peabody.org.uk/bedzed
- www.zedfactory.com
- www.woodforgood.com
- www.managenergy.net
- www.newbuilder.co.uk
- www.dqi.org.uk
- www.actionenergy.co.uk
- www.buildingforafuture.co.uk
- www.edenframe.com
- www.dti.gov.uk/files/file13939.pdf
- www.ciob.org.uk
- www.huf-haus.com
- www.hse.gov.uk

Other

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

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 Health, Safety and Welfare issues associated with using construction equipment
- 2 know how to select appropriate tools, materials, PPE and hand tool skills for particular tasks
- 3 be able to work safely when using tools to perform craft tasks
- 4 know how to plan a career in constructing the built environment.

Content details

Assessment criteria

1 Health, safety and welfare issues associated with construction equipment

The student can:

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

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

The student can:

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

3 Working safety when using tools to perform craft tasks

The student can:

- a use a range of different hand tools and equipment to work with different materials

- b apply safe working practices to the use of tools both independently and as part of a team (SM4) (TW1, 2, 5):
 - i carpentry and joinery
 - ii bricklaying
 - iii painting and decorating
 - iv building services crafts:
 - plumbing
 - electrical.

4 Careers opportunities

The student can:

- a compare and contrast career opportunities in construction and the built environment (IE6) (CT1):
 - i range and characteristics of career opportunities
 - ii level of available career opportunities in the following fields:
 - craft
 - technical
 - supervisory
 - professional and management
 - iii nature of interactions between those who work in construction
 - iv progression opportunities available in construction
 - v qualifications needed to support career progression.

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

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

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

The assignment will take approximately 24 of the 60 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. The evidence must be based on the skills needed to use tools to perform simple construction craft tasks. In the assignment, the student will:

- 1 produce a report on
 - a the health, safety and welfare issues associated with the use of specified construction equipment
 - b the selection of appropriate tools, materials, PPE and hand tool skills
 - c a career development plan showing opportunities and progression routes available in the creation of the built environment
- 2 work safely, in teams when appropriate, when using tools to perform craft tasks. 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:

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

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

Weighting of assessment criteria topics

Assessment criteria topic	Weighting	Marks
1 Health, safety and welfare issues associated with construction equipment	25%	12
2 Selection of tools, materials, PPE and hand tool skills	25%	12
3 Working safety when using tools to perform craft tasks	37.5%	18
4 Career opportunities	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 Health, safety and welfare issues associated with construction equipment	Identified and complied with very few Health, Safety & Welfare issues; identified a limited range of hazards and risks; and selected appropriate safe methods.	Identified and complied with a variety of Health, Safety & Welfare issues; identified a wide range of hazards and risks; and selected appropriate safe methods.	Identified and complied with most Health, Safety & Welfare issues; identified an extensive range of hazards and risks; and independently selected appropriate safe methods of work.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Selection of tools, materials, PPE and hand tool skills	Selected very few of the appropriate tools, materials, PPE and hand tool skills.	Selected many of appropriate tools, materials, PPE and hand tool skills.	Selected, when requested, the appropriate tools, materials, PPE and hand tool skills.
	0 to 6 marks	7 to 12 marks	13 to 18 marks
3 Working safety when using tools to perform craft tasks	Worked safely in some tasks to use tools with a variable level of competence, in teams as and when appropriate.	Worked safely in most tasks to use tools correctly in a reasonably competent manner, in teams as and when appropriate.	Worked safely in the set tasks to use tools correctly in a highly competent manner throughout, in teams as and when appropriate.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
4 Career opportunities	Produced a basic career development plan showing a limited number of careers available in construction and building services crafts, and a flow diagram showing the nature of the interaction between these careers.	Produced a detailed career development plan showing a good range of the careers available in construction and building services crafts, and a detailed flow diagram showing the nature of the interaction between these careers.	Produced a comprehensive career development plan and a complex flow diagram showing a broad range of the careers available in construction and building services crafts at all levels, the nature of the interaction between these careers, and the progression opportunities available into supervisory and management roles.

Guidance for teachers

Guidance for delivery

Health and safety is of paramount importance. Visits to college workshops, training providers and construction sites will help to motivate students and illustrate to them the importance and complexity of the construction industry. Students must however 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 to 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 the site being visited, and that COSHH regulations are adhered to when carrying out practical activities in workshops.

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

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

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

There is a comprehensive range of legislation that underpins health, safety and welfare in the construction industry. It follows that there are legal issues implicit in Assessment Criteria 1, 2 and 3. All professional institutions and many trade associations have their own ethical codes and it follows that there are ethical issues throughout Assessment Criterion 4, and especially in 4a(ii) (professional and management). This should be signposted to the student as an ethical issue but there is no requirement for an extended treatment beyond what is already in the unit specification.

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

Opportunities for applied learning

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

- consideration of health and safety issues
- compliance with all risk assessments and method statements
- selection of appropriate materials, hand tools, access equipment and PPE
- safe use of tools to perform basic craft tasks
- maintenance of a clean and tidy workspace.

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

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

Suggested tasks that would involve the students in the use of a wide range of tools:

Carpentry and joinery

- Frame - simple square frame with a different joint at each corner; possible joints include housing, through/corner halving, through/corner bridle and through/haunched mortice and tenon.
- Shelving - three 600 mm shelves to be wall-mounted on shelf brackets in a single stack.

Bricklaying

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

Painting and decorating

- Painting - old furniture, doors or windows.
- Decorating - hanging lining paper or woodchip paper to walls with no corners, light switches or sockets.

Building services crafts

- Electrical - wiring plugs and sockets and constructing simple lighting rigs with three fittings in parallel or a simple ring main with three sockets.
- Plumbing - construction of a simple pipe rig with one capillary joint, one compression joint, one Tee junction and two 90° bends and the connection of hot and cold water taps and a trap to a sink.

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

Guidance on acceptable tolerances

- wood joints to be of a reasonable standard with a tolerance of $\pm 2\text{mm}$, shelving to be secure with shelves that are horizontal and brackets that are vertical
- bricks to be in line $\pm 3\text{mm}$ with a maximum plane face deviation of $\pm 3\text{mm}$, stopped end maximum of 3mm deviation from vertical
- limited painting defects such as misses, runs, sagging and curtaining, paper hung to a reasonable standard with limited number of bubbles and/or wrinkles, no gaps or overlaps $> 4\text{mm}$
- all wiring connections safe and correct, with light fittings and/or sockets securely mounted

in regular arrays

- watertight joints and junctions, straight pipe runs, right-angle bends $\pm 5^\circ$, taps and traps fitted correctly.

What activities might be involved in this unit?

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

Suggested prior learning

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

Personal, Learning and Thinking Skills

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

Alternative approaches could be selected.

The student could demonstrate PLTS by:

Independent enquirers

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

Creative thinkers

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

Reflective learners

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

Team workers

- carrying out practical tasks using tools in small groups

Self-managers

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

Effective participators

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

Suggested learning resources

Books

- | | |
|--|---------------------|
| 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 |
| 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, 4 th edition
Approved Code of Practice and Guidance
Published by: HSE, 1998
ISBN: 0717616266 | HSE |
| Introduction to Health and Safety in Construction
Published by: Butterworth Heinemann, 2004
ISBN: 075066343 | Hughes & Ferrett |

Principles of Construction Safety Published by: Blackwell Publishing, 2005 ISBN: 1405134461	St. John Holt, A
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
'Be a safe learner. Aspects of health and safety' Published by: Standards Unit, DfES Available from standards.unit@dfes.gsi.gov.uk and www.successforall.gov.uk	DfES

Resource packs

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

Building
Construction News
Home DIY

Videos, CDs and DVDs

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

- www.ciob.org.uk
- www.citb.org.uk
- www.rtpi.org.uk
- www.hse.gov.uk
- www.iosh.co.uk
- www.rosipa.co.uk

Unit 6 Value and use of the built environment: communities

Level 2

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 benefits of sustainability in the built environment
- 2 understand how communities can be sustainable, and the effects of this
- 3 know how the built environment influences the well-being and prosperity of individuals and communities
- 4 understand how property and housing services make a social and economic contribution to communities
- 5 know about possible career opportunities within value and use of the built environment.

Unit 6 Value and use of the built environment: communities

Level 2

Content details

Assessment criteria

1 Benefits of sustainability

The student can:

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

2 Sustainable communities

The student can:

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

3 Enhancing the lives of communities and individuals

The student can:

- a explain how the built environment can enhance individual and community life (IE3, 5):
 - i physical well-being
 - ii spiritual well-being
 - iii emotional well-being
 - iv economic prosperity
 - v health, safety and welfare.

4 Property and housing services

The student can:

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

5 Career opportunities

The student can:

- a compare and contrast career opportunities in the value and use of the built environment (IE6) (CT1):
 - 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 organisations involved in housing and property services:
 - housing associations
 - local authorities
 - estate agencies
 - private and commercial letting agencies
 - private and corporate property developers
 - v role of the professional institutions involved in value and use of the built environment
 - vi progression opportunities available to those who value and use the built environment
 - vii qualifications needed to support career progression.

Where the assessment criteria show a direct link to an area of the PLTS framework, it is referenced here. Further information on PLTS is available 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 knowledge and understanding of the various benefits of sustainability to the community and how sustainable communities can be created, the ways in which the built environment can enhance individual and community life (and the individual, either alone or as part of a group, can influence the development of the built environment) and the social and economic contribution made by both public and private property and housing services. The assignment should be firmly based in the local community when accessing local opinions and judgements, but there is considerable room for comparisons between the local community and other communities. In learning about other communities, students will develop an enhanced understanding of how their own community works and this will lead to a better understanding of how communities work in general, as a large number of people with similar interests working together to their mutual benefit. The students must extend this reasoning into an understanding of how construction and the built environment can serve the community, and meet its ever-changing needs, particularly by providing buildings and structures to address property and housing needs. The assignment should also require the student to explore the career opportunities and progression routes available in the value and use of the built environment, and particularly in property and housing services.

The assignment will take approximately 18 of the 60 guided learning hours available for this unit. The 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 general benefits of sustainability in social, economic and environmental terms and the particular benefits of sustainable construction processes and materials. Examples from both traditional and sustainable communities will have been used to support the answer
 - b the principles and practices used to create sustainable communities
 - c how a properly planned and managed built environment can enhance the life of everyone in the community in terms of well-being, security and prosperity
 - d the differences between property services and housing services and between the private sector and the public sector in terms of aims and objectives together with an explanation of the social and economic contribution made by each
 - e a career development plan showing opportunities and progression routes available in the value and use of the built environment, and in particular, property and housing services.

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

Weighting of assessment criteria topics

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

Unit 6 Value and use of the built environment: communities

Level 2

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 Benefits of sustainability	Identified and described few of the general benefits of sustainability and few of the benefits of a sustainable construction approach.	Identified and described a variety of the general benefits of sustainability and a variety of the benefits of a sustainable construction approach.	Identified and described the general benefits of sustainability and the benefits of a sustainable construction approach.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
2 Sustainable communities	Explained a limited number of the principles and practices on which sustainable development depends.	Explained many of the principles and practices on which sustainable development depends.	Explained the principles and practices on which sustainable development depends.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
3 Enhancing the lives of communities and individuals	Effectively explained one way in which the built environment can enhance the lives of individuals and communities.	Effectively explained three different ways in which the built environment can enhance the lives of individuals and communities.	Effectively explained five different ways in which the built environment can enhance the lives of individuals and communities.
	0 to 4 marks	5 to 8 marks	9 to 12 marks
4 Property and housing services	Differentiated clearly between either property or housing services, or between the private and public sector, but not both, but has not clearly explained the social and economic contribution of any.	Differentiated clearly between property and housing services, and between the private and public sector, and clearly explained either the social or economic contribution made by one or the other.	Differentiated clearly between property and housing services, and between the private and public sector, and clearly explained both the social and the economic contribution made by each.
	0 to 2 marks	3 to 4 marks	5 to 6 marks
5 Career opportunities	Produced a basic career development plan showing some of the careers available in value and use of the built environment.	Produced a detailed career development plan showing most of the careers available in value and use of the built environment, and property and housing services, and a flow diagram showing the nature of the interaction between these careers.	Produced a comprehensive career development plan and a complex flow diagram showing a broad range of the careers available in value and use of the built environment, and property and housing services, the nature of the interaction between these careers, and the progression opportunities available into professional bodies.

Unit 6 Value and use of the built environment: communities

Level 2

Guidance for teachers

Guidance for delivery

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

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

Transport systems and provision

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

Provision of local amenities

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

Features of different parts of the built environment

Including:

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

Environmental protection

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

Emissions reduction strategies

This should include current initiatives to reduce CO₂ emissions from buildings to air, such as the provision of high efficiency central heating boilers, improved thermal insulation in properties (to minimise heat loss) and the utilisation of renewable energy sources in domestic and commercial buildings. Renewable sources should include some or all of solar power, wind power, ground source heat pumps, biomass and/or bio-fuel.

Historical implications

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

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

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

Opportunities for applied learning

Students should perform activities based on classifying the features of the local built environment around their school, college or home and assessing how these features contribute to and affect individuals and the local community. The activities should include:

- features of the local community, or
- features of other communities, or
- a mixture of both.

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

Property Services

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

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

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

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

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

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

- housing associations
- local authorities
- estate agencies
- private and commercial letting agencies
- private and corporate property developers.

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

- planning officers
- environmental officers
- environmental architects.

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

What activities might be involved in this unit?

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

Unit 6 Value and use of the built environment: communities

Level 2

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

Creative thinkers

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

Reflective learners

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

Team workers

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

Self-managers

- organising their time and resources to achieve activity targets

Effective participators

- presenting and discussing their career development plans.

Unit 6 Value and use of the built environment: communities

Level 2

Suggested learning resources

Books

Creative Neighbourhoods
Aston Housing Consultancy, 2005
ISBN 0955011000
Beedham, Graeme

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

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

Introducing Urban Design: A Design Primer
Published by: Longman, 2001
ISBN: 0582303001
Roberts & Greed

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.org.uk
- www.ciob.org.uk
- www.rtpi.org.uk
- www.cih.org
- www.environment-agency.gov.uk
- www.est.org.uk
- www.hse.gov.uk
- www.communities.gov.uk

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

Level 2

What is this unit about?

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

This unit, alongside the others within the Level 2 Principal Learning in Construction and the Built Environment, has been designed to allow 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 contribution of facilities management to the construction and maintenance of the built environment, and how it benefits buildings
- 2 understand how facilities management services are effectively contracted, delivered, operated and managed
- 3 know about the Health, Safety and Welfare legislation that relates to facilities management.

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

Level 2

Content details

Assessment criteria

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

The student can:

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

2 How facilities management services are contracted and delivered

The student can:

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

3 Health, Safety and Welfare legislation relating to facilities management

The student can:

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

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

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

Level 2

Assessment

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

This unit focuses mainly on knowledge and understanding and is therefore deemed to be an appropriate vehicle for the externally assessed component of Principal Learning at Level 2. Students will complete a written test, with 'short' answers as opposed to the multiple choice format used at Level 1 and the 'extended' answer format used at Level 3. This is deemed to be an appropriate technique to be used with students at Level 2. The purpose of the written test paper 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. Students should make their own initial evaluations of the topics discussed during the course and refine such initial evaluations by revisiting their suggestions after discussion with other students and/or construction professionals. These evaluations 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 sometimes chose the wrong answer and why the correct answer is correct.

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

Level 2

Test Specification

Duration: 1.5 hours

Assessment type: Short answer

No of marks: 48

Assessment Criteria Topics	Subtopics	No of marks	Total	%
1a Contribution of facilities management (FM)	Maintenance of built environment	3	12	25
	Development of built environment	3		
	Economic, financial and wealth creation issues	3		
	Quality of life issues	3		
1b How FM benefits buildings	Preservation	3	12	25
	Maintenance	3		
	Hard facilities management	3		
	Soft facilities management	3		
1c Development of FM over time	Increased range of benefits	2	8	16.67
	Reduction in emergency call-outs	2		
	Prevention of costly disrepair	2		
	Market for most cost-effective providers	2		
2a Contracting and delivering FM	In-house team covering all aspects of FM	2	6	12.5
	In-house management only, contracting work in	2		
	Service companies contracted to do everything	2		
2b Different ways in which structures are serviced	Operated	1	4	8.33
	Managed	1		
	Protected	1		
	Maintained	1		
2c Roles in FM	Range of job roles available in FM	3	3	6.25
3 Health, Safety and Welfare	Legislation applicable to FM	3	3	6.25
Totals		48	48	100

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

Level 2

Guidance for teachers

Guidance for delivery

What is facilities management?

This unit represents an opportunity for students to explore the area of facilities management and assess the benefits effective facilities management can bring to the built environment. A key initial requirement of this unit will be for students to fully understand what is meant by the term 'facilities management'.

This could be achieved in the first instance through teacher-led group discussions and brainstorming sessions.

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

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

Facilities management and building maintenance

An understanding of some of the essential elements relating to building maintenance is important to show how the unit relates to the physical nature of the built environment. This should include looking into requirements for the inspection and maintenance of electrical, gas, water supply, air-conditioning and fire safety systems.

Activities could be built around looking at how these services are utilised in the student's own school or college environment. This aspect of the unit should include an introduction to the statutory requirements which cover the safe operation of some of these systems (gas is a particularly good example) and some of the potential risks if vigilant maintenance procedures are not followed (carbon monoxide poisoning, Legionnaires disease and so on).

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

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

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

There are many diverse factors for teachers to cover in this unit. Facilities management is a relatively young industry that brings together many diverse strands relating to how the built environment is managed and maintained. It is important that each of these strands is covered

in appropriate detail while ensuring that students also retain an awareness of the purpose of facilities management being to enhance the efficiency and lifespan of buildings.

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

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

Opportunities for applied learning

Arrangements should be made to utilise the services used in the school or college where the students are studying.

Students should undertake some or all of the following tasks:

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

What activities might be involved in this unit?

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

Suggested prior learning

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

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

Level 2

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

Creative thinkers

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

Reflective learners

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

Team workers

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

Self-managers

- organising their time and resources to achieve the above

Effective participators

- presenting their work and discussing the results with others.

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

Level 2

Suggested learning resources

Books

- | | |
|---|----------------------|
| Building Construction Handbook, 6 th Ed
Published by: Butterworth-Heinemann, 2006
ISBN: 0750668229 | Chudley & Greeno |
| Facilities Management: An Explanation (2nd edition)
Published by: Palgrave Macmillan, 1998
ISBN: 0333737989 | Park, Alan |
| Total Facilities Management (Second Edition)
Published by: Blackwell Publishing, 2005
ISBN: 1405127902 | Atkin, B & Brooks, A |
| Building Care
Published by: Blackwell Science, 2003
ISBN 9780632060498 | Wood, Brian |

Journals and magazines

Building
Facilities Management Journal

Websites

- www.assetskills.org.uk
- www.citb.org.uk
- www.bifm.org.uk
- www.fmassociation.org.uk
- www.fmj.co.uk
- www.pfmonthenet.net
- www.hse.gov.uk
- www.communities.gov.uk
- www.rics.org
- www.dalkia.co.uk