

WJEC GCSE IN
BUILT ENVIRONMENT

GUIDANCE FOR TEACHING
UNIT 1 GUIDE



AIMS OF THE GUIDANCE FOR TEACHING

The principal aim of the Guidance for Teaching is to support teachers in the delivery of the WJEC GCSE in Built Environment specification and to offer guidance on the requirements of the qualification and the assessment process. The Guidance for Teaching is not intended as a comprehensive reference, but as support for professional teachers to develop stimulating and exciting courses tailored to the needs and skills of their own students in their particular institutions.

AIMS OF THE UNIT GUIDE

The principal aim of the Unit Guide is to support teaching and learning and act as a companion to the Specification. Each Unit Guide will offer detailed explanation of key points in the Specification and aim to explain complex areas of subject content. An overview of the whole course can be found in the Delivery Guide.

CONTENTS

Introduction	3
Additional ways that WJEC can offer support:	3
Overview of Unit 1	4
How to read the Specification	5
Explanation of the specification content	6
2.1.1: The sector	6
2.1.2: The built environment life cycle	7
2.1.3: Types of building and structure.....	11
2.1.4: Tools, technologies and materials	13
2.1.5: Building structures and forms	16
2.1.6: Sustainable construction methods.....	18
2.1.7 Trades, employment and careers	21
2.1.8 Health and Safety.....	24
Assessment of Unit 1	26
FAQs:	27
Glossary for Unit 1	29

INTRODUCTION

The **WJEC GCSE Built Environment** qualification, approved by Qualifications Wales for first teaching from September 2021, is available to:

- all schools and colleges in Wales
- subject to local agreement, it is also available to centres outside Wales, for example in the crown dependencies of the Isle of Man and the Channel Islands, and in British overseas territories, and to British forces schools overseas. It is not available to other overseas centres or in England or Northern Ireland.

It will be awarded for the first time in Summer 2023, using grades A*–G.

ADDITIONAL WAYS THAT WJEC CAN OFFER SUPPORT:

- sample assessment materials and mark schemes
- exemplar materials
- face-to-face CPD events
- examiners' reports on each question paper
- direct access to the subject officer
- free online resources
- Exam Results Analysis
- Online Examination Review.

OVERVIEW OF UNIT 1

Introduction to the built environment (35% of the qualification)

Overview of the unit

As the title suggests, this unit provides an introduction to the built environment with particular focus on:

- identifying and describing ideas and concepts in the built environment
- explaining concepts in the built environment
- evaluating evidence, ideas and concepts in the built environment
- comparing and contrasting ideas, concepts in, and evidence related to the built environment.

In studying for this unit, learners will develop knowledge, skills and understanding in the following areas of content:

2.1.1	The sector
2.1.2	The built environment life cycle
2.1.3	Types of building and structure
2.1.4	Tools, technologies and materials
2.1.5	Building structures and forms
2.1.6	Sustainable construction methods
2.1.7	Trades, employment and careers
2.1.8	Health and safety

HOW TO READ THE SPECIFICATION

The subject content is sub-divided into clear and distinct topic areas. Within each topic area the knowledge, understanding and skills are set out with an initial overview and then in two columns. The left-hand column identifies the content to be studied. The right-hand column provides amplification of the knowledge, understanding and skills that learners should develop in this area. Together, these two columns give the full content of the specification. There is no hierarchy implied by the order in which the content is presented, and the order does not imply a prescribed teaching order.

The amplification provided in the right-hand column uses the following four stems:

- 'learners should know' has been used for the recall of facts such as legislation and definitions
- 'learners should know and understand' has been used for the majority of the unit content where knowledge needs to lead to a sense of understanding
- 'learners should be aware of' has been used when the volume of content is quite extensive, and learners do not need to understand all aspects in detail
- 'learners should be able to' has been used when learners need to apply their knowledge to a scenario or practical situation.

The amplification provided in the right-hand column includes all of the assessable content for the relevant section, unless it states, 'e.g.', 'including' or 'such as'. In these cases, the amplification lists relevant content, which should be expanded upon in an appropriate way, taking account of learners' needs and interests.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.1: The sector

Content Amplification	Teacher Guidance
<p>(a)</p> <ul style="list-style-type: none"> • the main types of buildings and structures covered within the sector: residential and non-residential buildings, bridges and roads • typical component parts of buildings and structures, including walls, floors and openings. 	<p>The Built Environment encompasses a diverse range of industries, from mining, to the construction of infrastructure and buildings, the installation of services, the manufacture of building products, maintenance, operation, and disposal.</p>
<p>(b) Learners should be aware of the following facilities and systems:</p> <ul style="list-style-type: none"> • roads • railways • bridges • tunnels • water supply and sewerage systems • electrical grids • telecommunications. 	<p>Learners should be aware of this diversity and of the overall contribution industries involved in the built environment make to the UK, including over 3 million jobs and around 7% of GDP (over £100 Billion per annum).</p> <p>The specification lists examples of infrastructures ranging from roads to telecommunications. Learners would benefit from an awareness of the nature of the built environment sector, including that:</p>
<p>(c) Learners should be aware of the function of the following services in buildings, in order to ensure their safe, comfortable and environmentally friendly operation:</p> <ul style="list-style-type: none"> • mechanical services, i.e. escalators and lifts, heating, ventilation, air conditioning • electrical services, i.e. energy supply, lighting and low voltage (LV) systems, communication lines, telephones and IT networks, fire detection and protection, security and alarm systems • services that support public health, i.e., plumbing for water supply, and domestic hot water, drainage of waste water (sewage) and stormwater drainage. 	<ul style="list-style-type: none"> • Infrastructure projects generally account for 15% of output, residential construction 40% and commercial / social projects 45%. • Investment splits approximately 25% / 75% public sector / private sector. • 60% of construction work is new build and 40% refurbishment and maintenance. • In a new building project building services will typically account for 30 – 40% of the total cost. <p>Building and infrastructure projects are high cost, long term activities that are a good indicator of the overall health of the wider economy. Investment in building and infrastructure projects tends to dry up during economic downturns, but in times of recovery the sector will be one of the first to benefit and may not cope with the increase in demand.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.2: The built environment life cycle

Content Amplification	Teacher Guidance
<p>(a) Learners should know that the following industries extract raw materials:</p> <ul style="list-style-type: none">• oil and gas• forestry• quarrying	<p>This section of the specification provides an opportunity for learners to consider the impact these industries have on economies and the environment.</p> <p>Advantages will include revenue for local / national economies leading to improvements in schools, health service and transport etc. and employment.</p> <p>Disadvantages such air and water pollution, damage to the landscape and loss of habitat, noise from processes and transport and hazards such as waste tips and old mine workings that can cause subsidence.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.2 The built environment life cycle

- (b) Learners should be aware of the following means of transforming raw materials into finished goods:
- timber: felled logs are cut into 'boards' and then seasoned to remove excess water
 - engineered wood products (EWP): designed to overcome limitations on size of sawn timber, i.e. trussed rafters, structural sections and manufactured boards such as plywood and oriented strand board (OSB)
 - steel:
 - structural steel – made into standard column and beam sections
 - stainless steel – made into fixings and fastenings
 - lightweight mild steel sections – lintels, purlins and rails
 - profiled sheeting – wall and roof cladding.
 - copper: manufactured to produce building services products such as electric cable and water/gas pipes
 - plastic: manufactured to produce building services products such as water pipes
 - clay: natural clay minerals are crushed, shaped, dried and then fired in ovens to produce bricks
 - cement: raw materials such as limestone are crushed, blended and heated in a kiln to make cement
 - mortar: sand, cement and water are mixed to make a paste used to bind and point building blocks
 - concrete:
 - cement, water and aggregate (gravel, sand or rock) are mixed together to make concrete
 - combined with steel bars or mesh to make reinforced concrete lintels and pre-stressed products such as floor beams.

This section of the specification concentrates on the manufacture of the most commonly used building materials.

Learners should be aware of the basic processes involved in the preparation / manufacture of the common building materials listed in the content amplification.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.2: The built environment life cycle

Content Amplification	Teacher Guidance
<p>(c) Learners should understand the following forms of construction activities:</p> <ul style="list-style-type: none"> • new buildings and structures and the assembly on site of prefabricated elements. • alteration, conversion, and renovation of existing buildings and structures. • civil engineering works such as roads and bridges. • installation of mechanical, electrical, gas and communication services. 	<p>Learners should understand that:</p> <ul style="list-style-type: none"> • Construction includes the preparation of land and utilisation of materials, plant, and labour to carry out building work. • The construction industry is made up of developers, consultants, manufacturers, suppliers and contractors.
<p>(d) Learners should be aware that:</p> <ul style="list-style-type: none"> • operation can involve: <ul style="list-style-type: none"> • controlling and monitoring of heating, cooling and lighting systems • the provision of security, cleaning and other ancillary services, including testing and evacuation procedures. • maintenance may take the form of: <ul style="list-style-type: none"> • planned and preventive maintenance: carried out on a regular basis, in order to keep something in working order or extend its life • corrective maintenance: repairing something that has broken. <p>Learners should be aware that a Building Operation and Maintenance Manual:</p> <ul style="list-style-type: none"> • is given to the client or end user on completion • contains information regarding the operation, maintenance, decommissioning and subsequent demolition of a building. 	<p>This section of the specification is concerned with the operation and maintenance of a building in use.</p> <p>Learners should understand that:</p> <ul style="list-style-type: none"> • Operation refers to the management of a built environment to provide suitable and safe conditions for occupants and their activities. • Maintenance is the repair / prevention of decay, deterioration and damage caused by weather, aging and general so that a building retains a good appearance and operates efficiently.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.2: The built environment life cycle

Content Amplification	Teacher Guidance
<p>(e) Learners should understand that:</p> <ul style="list-style-type: none"> • a pre-demolition plan includes details of: <ul style="list-style-type: none"> • hazardous materials • utilities and disconnections • structures and party walls • site conditions and constraints. • statutory requirements need to be taken into account • demolition may involve the use of explosives, hand demolition or machine demolition • procedures include: <ul style="list-style-type: none"> • site security set up • disconnection of utilities • removal of hazardous materials • soft strip of non-structural elements • taking down superstructure • removal of slab and foundations • site finish. 	<p>The amplification in the specification is based on the CDM regulations which outline best practice measures and procedures for the planning and execution of demolition work.</p> <p>Learners should understand that:</p> <ul style="list-style-type: none"> • Demolition is the process of taking down a building or other structure and safely disposing of materials arising. • Demolition is the most hazardous activity in the construction sector that requires efficient risk control, environmental and site management, and careful planning.
<p>(f) Learners should understand that:</p> <ul style="list-style-type: none"> • waste materials may be sent directly to landfill or salvaged for reuse or for recycling. • construction can produce a significant amount of waste so there are benefits to be gained from encouraging more reuse or recycling, i.e. preservation of natural resources, creation of jobs and reduction in pollution. 	<p>Demolition waste can be broken down and used as foundations and sub-bases for new construction.</p> <p>More valuable building elements, such as stone blocks, bricks, roofing slates, and steel sections, can be recovered and re-cycled with the general aim of minimising resulting in a growing number of salvage centres where building items can be purchased for reuse.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.3: Types of building and structure

Content Amplification	Teacher Guidance
<p>(a) Learners should be aware that residential dwellings:</p> <ul style="list-style-type: none"> • are used as places of habitation • are among the smallest types of building • often vary by location with multi-dwelling structures such as apartment blocks in urban areas and single detached properties in rural areas • are often made of block or timber frame construction • are in demand because there is a shortage of available, affordable homes in the UK. 	<p>This section covers the basic characteristics and purpose of various types of building. The content is rudimentary, but awareness of these characteristics and functions will reinforce knowledge of the diverse nature of the industry and of its importance in supporting human activity.</p>
<p>(b) Learners should be aware that commercial buildings:</p> <ul style="list-style-type: none"> • are used to provide services or retail products to customers • accommodate business activities, usually undertaken to make a profit for the owners • are usually adapted to fulfil the purpose of the business • may be purpose-built or converted to enable a change of use • are often located in retail centres, in or out of town/city centres. 	
<p>(c) Learners should be aware that industrial buildings:</p> <ul style="list-style-type: none"> • are usually larger buildings, adapted to specific functions • are often used for storing, processing, engineering or manufacturing materials • may be part of a new development, such as in a modern industrial park, or a refurbished older building or site. 	
<p>(d) Agricultural buildings Learners should be aware that agricultural buildings:</p> <ul style="list-style-type: none"> • are associated with farming and the agricultural industry • may be older buildings constructed using traditional materials and techniques • may be large modern buildings, designed to suit a particular function and the rural landscape/environment in which they are situated. 	

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.3: Types of building and structure

Content Amplification	Teacher Guidance
<p>(e) Learners should be aware that communal buildings:</p> <ul style="list-style-type: none"> • are used by members of a community • are usually located in a convenient location for the community using the building • may be modern or older buildings, sometimes converted to enable a change of use. 	
<p>(f) Learners should be aware that religious buildings:</p> <ul style="list-style-type: none"> • usually serve as places of worship • vary considerably in terms of age, size and architectural style • often include elaborate architecture, with towers or domes, and may therefore be one of the most expressive and influential structures in the local built environment. 	
<p>(g) Learners should be aware that recreational buildings:</p> <ul style="list-style-type: none"> • vary considerably in terms of size and style • may be buildings in their own right or extensions to other buildings to enable an existing business to offer recreational activities • may be designed for a specific function or versatile to accommodate a range of functions. 	
<p>(h) Learners should be aware that infrastructure construction:</p> <ul style="list-style-type: none"> • covers a broad range of functions • may have a significant impact on the quality of life by providing economic and social benefits on a local or national scale • can be controversial because developers, planning authorities and communities have to weigh the benefits against drawbacks, including potential damage to the natural environment and increased carbon emissions. 	<p>This section of the specification provides an opportunity for learners to consider the economic and environmental impacts arising from major infrastructure projects, such as the channel tunnel, or HS2, that are of national importance, involve long lead-in times and provide significant business and employment opportunities.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.4: Tools, technologies and materials

Content Amplification	Teacher Guidance
<p>(a) Learners should know that the main elements and components of low-rise buildings are:</p> <ul style="list-style-type: none"> • foundations • substructure • ground floor • super structure: <ul style="list-style-type: none"> • walls • upper floors • frame • roof supports • wall cladding • roof finishes. 	<p>Learners should understand that:</p> <p>Foundations:</p> <ul style="list-style-type: none"> • Provide support for structures, by transferring their load to layers of soil or rock that have sufficient bearing capacity and suitable settlement characteristics to support them. • Can be categorised as shallow foundations, such as strip footings, trench fill, pads or rafts, or deep foundations such as piles, sheet piles and diaphragm walls. <p>Substructures:</p> <ul style="list-style-type: none"> • Provide support for superstructures by transferring their load to the foundations. • May include foundation, retaining and basement walls and any other work below the lowest floor construction. <p>Superstructures:</p> <ul style="list-style-type: none"> • Are designed to provide a controlled environment (in terms of shelter, comfort, privacy, and security) to suit the intended activities to be carried inside the building.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.4: Tools, technologies and materials

- (b) Learners should be aware that the following materials and components are used in the construction of walls, installing building services, fitting roofs and finishing interiors.
- External walls:
- structural element: load bearing masonry (insulating blockwork), structural frame (steel or timber), insulated panels (SIP)
 - insulation: mineral fibre rolls, sprayed foam, rigid foam slabs
 - external cladding: brick or rendered blockwork, steel sheeting, aluminium faced insulated panels, curtain walling.
- Internal walls and floors:
- block or stud (timber or steel) partitions
 - timber, concrete or steel floor joists.
- Secondary structures:
- steel lintels, joists and timber trussed rafters for masonry walls
 - sheeting rails and purlins for steel frames.
- Roof finishes:
- slate or concrete tiles for timber trussed rooves
 - steel sheeting over insulated lining trays for steel framed structures
 - rubber based sheeting or fibreglass for flat roofs.

Learners should understand the term building element and that components described in the amplification such as external walls, internal walls, secondary structures may all be referred as building elements.

Therefore elements are the main components of a structure e.g. foundations, piers, and deck will be the main elements of a bridge.

In a building a single element may be a multi-trade built object such as external walls, with performance attributes such as insulation values, that become steadily more defined as design decisions are made.

NRM1 (New Rules for Measurement) for cost estimating and cost planning for building work, defines hierarchies of elements, such as group element 3: Internal finishes comprising:

- 3.1: Wall finishes.
- 3.2: Floor finishes.
- 3.3: Ceiling finishes

A separate cost target can then be established for each element in the group.

- (b) Internal finishes:
- floor screeds and boards
 - plasterboard for walls and ceilings
 - wall plaster and decorations.
- Building services:
- incoming services run through sub-structure walls and then extended for internal distribution
 - internal drainage run through external walls for connection to underground systems.
- Building services materials:
- plastic and copper pipework for plumbing and heating services
 - plastic rainwater goods and drainage systems
- copper cable for electricity and communication systems.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.4: Tools, technologies and materials

Content Amplification	Teacher Guidance
<p>(c) Learners should know that energy may be generated or collected from renewable sources, as opposed to generated by burning finite resources such as fossil fuels.</p> <p>Learners should understand the main principles of the following forms of renewable technologies and be aware of the main benefits and limitations of their use:</p> <ul style="list-style-type: none"> • solar energy: <ul style="list-style-type: none"> • solar photovoltaic: conversion of sunlight into electricity using photovoltaic (PV) cells/panels • solar thermal: conversion of sunlight into thermal energy (or heat). • wind turbines: <ul style="list-style-type: none"> • harness the power of the wind to generate electricity • domestic wind turbines may be pole mounted or building mounted. • heat pumps: <ul style="list-style-type: none"> • ground source: uses pipes that are buried underground to transfer heat from the ground into the building • air source: transfers heat from the air outside of a building into the building • water source: transfers heat from a source of water outside of a building into the building. • water: <ul style="list-style-type: none"> • rainwater harvesting • grey water re-use <p>hydro-generation of electricity (tidal/electric).</p>	<p>Renewable energy technologies.</p> <p>Examples include Solar, wind power, and heat pumps.</p> <p>Learners, in their study of sustainability, will benefit from an awareness of other examples of renewable energy sources, including:</p> <ul style="list-style-type: none"> • Hydroelectric Power. Uses the energy of moving water, passing through water turbines. to generate electricity. The Dinorwig Power Station in Snowdonia is an example of a hydroelectric power plant. • Biomass and Biofuel. Bioenergy derived from burning waste organic matter (biomass), to generate electricity and heat, or to produce liquid fuels for transport. • Marine energy technologies refer to renewable energy derived from the sea generated by harnessing the energy within waves, or tides. <p>The specification also refers to sustainable water systems, including:</p> <ul style="list-style-type: none"> • Rainwater harvesting (RWH). A process of collecting and storing rainwater that falls on a catchment surface, used for non-potable purposes such as flushing toilets, supplying washing machines, landscape irrigation, etc. Sources indicate that approximately 50% of domestic and 85% of non-domestic mains water supply could be replaced by RWH. • Grey water reuse. Grey water is wastewater from showers, baths, washbasins and washing machines that is not considered to be potentially dangerous, It is possible to collect greywater and, after treatment, use it for purposes, such as flushing and garden watering. This greatly reduces the demand on mains water and reduces the volume of water discharged into sewage systems.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.5: Building structures and forms

Content Amplification	Teacher Guidance
<p>(a) Learners should know that in cellular constructions:</p> <ul style="list-style-type: none"> • load bearing walls provide the main vertical support and lateral stability for floors • external wall panels, lift shafts or staircases are used to provide stability • bridging components such as floors, roofs and beams are supported by load bearing walls. 	<p>Cellular construction methods create structurally efficient buildings with high levels of acoustic and fire separation between adjacent rooms. They are suitable for buildings that follow regular grids and repeating floor plans where internal separating or party walls are required, such as in blocks of flats and student accommodation.</p>
<p>(b) Learners should know that in rectangular frame constructions:</p> <ul style="list-style-type: none"> • weight is carried by a skeleton or framework of columns and beams, rather than being supported by walls. <p>Learners should be aware that:</p> <ul style="list-style-type: none"> • a lightweight timber-frame is a common structure used in the construction of contemporary housing • steel and reinforced concrete frames are used in larger structures • contemporary commercial framed buildings have replaced traditional external walls with the use of metal and glass screens, or curtain walls, as exterior cladding. 	<p>The specification content refers to a skeleton frame, a structure used for the construction of multi-storey buildings comprising a system of columns and connecting beams that support the internal floors and external walls and carries all loads to the foundations. Floor areas will be free of immovable walls resulting in more flexible spaces.</p> <p>A braced frame is a development of the skeleton frame used in structures subject to high lateral loads, such as wind pressure. The beams and columns carry vertical loads, and the bracing systems such as floor slabs and diagonal steel sections transfer lateral loads.</p>
<p>(c) Learners should know that in portal frame constructions:</p> <ul style="list-style-type: none"> • beams or rafters are supported at either end by columns • the joints between the beams and columns are 'rigid' so the beam can be reduced in size and can span large distances Learners should be aware that portal frame constructions are: • often fabricated from steel, reinforced pre-cast concrete, or laminated timber • lightweight and can be fabricated off-site, then bolted to a substructure. 	<p>Portal frames. A building structure can be formed using a series of parallel portal frames, typically 6m apart. A secondary framework of purlins fixed to the rafters and rails fixed to the columns is required to support cladding such as profiled sheeting or prefabricated composite metal panels, (masonry cladding is often included at low level to give greater resistance to damage and improve security). Bracing is required in at least one side bay per elevation to give the row of parallel frames lateral stability, Portal frames are a simple and rapid form of structure to erect, and create a wide, clear-span, weather-proof enclosure at low cost.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.5: Building structures and forms

Content Amplification	Teacher Guidance
<p>(d) Learners should be aware of the maintenance methods used by heritage and traditional trades:</p> <ul style="list-style-type: none"> • having a regular programme of maintenance to help prevent small problems escalating, or further deterioration occurring • matching existing materials and methods of construction where possible • retaining as much of the original fabric as possible in historically significant buildings. Learners should understand the importance of heritage and traditional methods in the maintenance of the historic built environment: • to maintain the history and character of a building • to preserve our heritage for the benefit of present and future generations • to reduce the need for new materials / preserve existing high-quality materials. 	<p>Heritage and traditional methods as practised by traditional trades include:</p> <ul style="list-style-type: none"> • Masonry and stone carving. • Timber framing / rafter and purlin roofs. Carpentry and joinery • Thatching and roofing using natural shingles. • Leadwork, including sheeting and ornamental work • Plasterwork, including mouldings and repairs • Blacksmithing, and ornamental metal working. <p>Learners should be aware that the work performed using traditional methods is essential to the conservation and maintenance of the historic built environment, as is the preservation of the trade skills and knowledge required to carry out this work.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.6: Sustainable construction methods

Content Amplification	Teacher Guidance
<p>(a) Learners should be aware of the following benefits of using sustainable construction methods:</p> <ul style="list-style-type: none">• financial benefits:<ul style="list-style-type: none">• minimising waste• reducing energy consumption• improving water efficiency• reducing operating costs• optimising the life cycle of buildings• cultural and social benefits:<ul style="list-style-type: none">• protection of the environment• helps avoid the depletion of natural resources• improving environmental quality may:<ul style="list-style-type: none">• improve occupants' comfort• create an aesthetically pleasing environment• reduce pressure on local infrastructure• improve productivity.	<p>Sustainable construction methods that:</p> <ul style="list-style-type: none">• Focus on renewable energy, sustainable materials, water conservation, site development and indoor environmental quality.• Aim to preserve the environment and avoid the depletion of natural resources.

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.6: Sustainable construction methods	
Content Amplification	Teacher Guidance
<p>(b) Learners should understand that construction methods should take account of factors including pollution, preservation of the natural environment and natural habitats.</p> <p>Learners should be aware of the following approaches to preserving the natural environment and natural habitats:</p> <ul style="list-style-type: none"> • limiting the pollution released into water, air or the ground during construction and use of the built environment • places may be made into protected areas by organisations such as Natural Resources Wales, which place restrictions on activities and developments • developers may try to reduce the impact on nature by building tunnels under roads for newts to use, or creating new roosts for bats when their original roosts are lost because of development • reducing carbon dioxide emissions during construction and use of the built environment. 	<p>Measures to Prevent Pollution.</p> <p>Good construction site practice can help to control and prevent pollution. This begins with the environmental risk assessment for all construction activities and materials likely to cause pollution. Specific measures can then be taken to mitigate these risks. Measures may include:</p> <ul style="list-style-type: none"> • Minimise land disturbance and leave maximum vegetation cover to prevent erosion and run-off. • Control dust through use mesh screens and fine water sprays to control dust and dampen down the site. • Cover stores of cement, sand, and other powders, and locate them where they will not be washed into waterways or drainage areas. • Use non-toxic paints, solvents, and other hazardous materials wherever possible • Segregate and monitor toxic substances to prevent spills and site contamination. • Collect any wastewater generated from site activities in settlement tanks and dispose according to environmental regulations. • Avoid any burning of materials on site. • Reduce noise pollution through careful handling of materials; and use modern, quiet power tools, equipment, and generators.
<p>(c) Learners should understand that:</p> <ul style="list-style-type: none"> • wood is a renewable construction material and is commonly used in homebuilding • steel used in construction contains recycled content and steel can be recovered and recycled again • recycled bricks may be used to create walls • straw bales can be used to create walls inside a frame • wool may be used as insulation instead of fibreglass or polyurethane. • reclaimed slates or tiles, thatch or timber shingles can be used on rooves. 	<p>The amplification lists several examples of sustainable materials. Sustainable materials are materials that do not deplete non-renewable (natural) resources and that have no adverse impact on the environment when used.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.6: Sustainable construction methods	
Content Amplification	Teacher Guidance
<p>(d) Learners should be aware of the following in relation to waste disposal, re-use and recycling of materials:</p> <ul style="list-style-type: none"> waste disposal <ul style="list-style-type: none"> includes the classification of waste materials: hazardous, non-hazardous, origin, properties the costs of landfill: financial, environmental, social. re-use <ul style="list-style-type: none"> salvaged construction products are re-used with little or no reprocessing, typically bricks, slates, steel sections the environmental impact of reprocessing is minimised. recycling <ul style="list-style-type: none"> processes typically include crushing, smelting, decontamination, sorting there are a wide variety of potential end uses of recycled concrete, wood, metals, glass and plastic. 	<p>Learners will benefit from an awareness of the financial and environmental benefits of reuse and recycling including:</p> <ul style="list-style-type: none"> Conservation of raw materials. Reduces the negative impact of material consumption, such as deforestation. Conservation of energy. The amount of energy required to create new products is frequently more than required for recycling. Reduction of pollution arising from reduced manufacturing. Reduction of landfill. Landfill sites harm the surrounding environment and habitats, particularly as a result of the chemicals that can be produced when waste breaks down, causing hazardous contamination of land and water.
<p>(e) Learners should know that:</p> <ul style="list-style-type: none"> planning permission is a system that enables Local Planning Authorities (LPA) to control the development of the built environment in their area. <p>Learners should understand that brownfield sites:</p> <ul style="list-style-type: none"> have been used before and tend to be disused or derelict land existing buildings may have to be demolished and there may be clean-up costs for land decontamination redevelopment of brownfield sites can clean up environmental health hazards and eyesores. <p>Learners should understand that greenfield sites:</p> <ul style="list-style-type: none"> have not been built upon previously tend to be cheaper to develop, subject to legal and planning constraints infrastructure works i.e. new roads and utility connections must be taken into account. 	<p>Subject to certain exceptions planning permission must be obtained from the LPA before a new building can be constructed, or an existing building can be altered or extended, or the use of an existing building can be changed.</p> <p>Learners will benefit from knowledge of the planning system for the control of development and from an understanding of the main characteristics of greenfield and brownfield sites so that they can begin to assess the potential of proposed building projects.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.7 Trades, employment and careers

Content Amplification	Teacher Guidance
<p>(a) Learners should be aware that an architect:</p> <ul style="list-style-type: none"> creates new buildings and/or renovates or changes existing buildings produces designs to meet client requirements along with regulations, legislation and environmental requirements produces detailed drawings for the contractor. 	<p>Qualified professionals that are registered with the ARB (Architects Registration Board) can offer their services as architects. The ARB has responsibility for:</p> <ul style="list-style-type: none"> Recognising qualifications. Maintaining a list of registered architects and ensuring that people not on the list do not offer their services as an architect. Monitoring standards and investigating complaints. <p>As with other professional bodies the ARB issues a code of conduct and can take action against those falling short of the code's standards.</p> <p>Architects can also become chartered members of the Royal Institute of British Architects (RIBA), although this is voluntary.</p>
<p>(b) Learners should be aware that a civil and structural engineer:</p> <ul style="list-style-type: none"> designs, plans and manages construction projects solves design and development problems assesses potential risks within a project. 	<p>Civil engineering as a profession encompasses a range of subjects that can be developed as specialisms.</p> <p>Structural engineering focuses on the design, assessment and inspection of structures to ensure that they are stable and safe.</p> <p>Structural engineering is a discipline of civil engineering. Qualified structural engineers will be members of the ICE (Institute of Civil Engineers).</p>
<p>(c) Learners should be aware that a construction site manager:</p> <ul style="list-style-type: none"> is responsible for most activities on a construction site manages the site and the workforce, including with regard to health and safety and quality liaises with clients and reports on progress. 	<p>The site manager is the senior construction company representative on site and will usually be responsible to an office-based 'contracts manager'.</p> <p>The site manager's role is the supervision and management of all site-based staff employed by the company to ensure that the project is delivered within their contractual obligations.</p> <p>A site manager will have considerable experience of working on construction sites. Most site managers have qualifications, such as HDN, foundation degree or a degree accredited by the Chartered Institute of Building (CIOB).</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.7 Trades, employment and careers

Content Amplification	Teacher Guidance
<p>Learners should be aware that a surveyor:</p> <ul style="list-style-type: none"> • surveys land, measuring existing features of the natural and built environment • produces data and drawings for architects and engineers. 	<p>Surveying is similar to engineering in that it covers a wide range of specialisms, including land surveying, estate management, building surveying and commercial work, involving valuations, sales, and rentals.</p> <p>A qualified surveyor will be a member of the RICS (Royal Institute of Chartered Surveyors) and must carry out their professional work in accordance with the RICS code of conduct.</p>
<p>Learners should be aware that a bricklayer:</p> <ul style="list-style-type: none"> • works from plans and specifications • constructs structures by spreading layers of mortar, placing bricks/blocks, checking vertical and horizontal alignment • seals foundations using damp-resistant materials 	<p>It would be incorrect to assume that all learners have this knowledge at the start of the course of study. Learners should develop understanding of the skills and scope of work carried out by the various trades and develop an awareness of their contributions to new build, refurbishment, and conservation / heritage projects.</p>
<p>(f) Learners should be aware that a plasterer:</p> <ul style="list-style-type: none"> • applies wet finishes and protective coverings on external walls • applies plaster to inside walls and ceilings • creates ornamental plasterwork using plaster, moulds and casts 	
<p>(g) Learners should be aware that a joiner:</p> <ul style="list-style-type: none"> • joins pieces of wood in a workshop, which a carpenter fixes on site. <p>Learners should be aware that a carpenter:</p> <ul style="list-style-type: none"> • installs floor joists, floorboards, roof trusses, wall partitions • fits interior woodwork – staircases, doors, skirting • boards, cupboards, kitchens. 	
<p>(h) Learners should be aware that an electrician:</p> <ul style="list-style-type: none"> • installs, inspects and tests electrical equipment • follows relevant safety regulations. 	
<p>(i) Learners should be aware that a gas engineer:</p> <ul style="list-style-type: none"> • installs, inspects and tests gas services and equipment • follows relevant safety regulations 	

- | | |
|---|--|
| <p>(j) Learners should be aware that a plumber:</p> <ul style="list-style-type: none">• installs cold water, hot water, sanitation (toilets), and central heating systems• follows relevant safety regulations. | |
| <p>(k) Learners should be aware that a painter and decorator:</p> <ul style="list-style-type: none">• prepares and applies paint, wallpaper and other finishes to interior surfaces• prepares and applies paint and other finishes to exterior surfaces. | |

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.8 Health and Safety

Content Amplification	Teacher Guidance
<p>(a) Learners should understand that construction sites are hazardous environments with many risks:</p> <ul style="list-style-type: none"> workers are at risk from working at height, manual handling and slips, trips and falls employers have the responsibility for the safe operation of sites and may be held to account in the case of accidents or incidents the public may be at risk when close to a construction site, or if they gain access to the site, from harmful materials and site traffic. 	<p>Learners should understand that the construction industry can be dangerous, ranking third in the UK's list of dangerous industries and with falls from height accounting for nearly half of all serious incidents. It is also the most improved UK industry in terms of recent reductions in serious incidents. This improvement being the result of the combined effort and acceptance of responsibility of all stakeholders to mitigate risk.</p>
<p>(b) Learners should understand the importance of following the correct procedures (rules) so that contractors and employees work safely and prevent accidents and injuries.</p> <p>Learners should know that risk assessments include:</p> <ul style="list-style-type: none"> general assessments of health and safety risks on construction sites specific assessments for particular hazards – working at height, manual handling, noise. 	<p>Learners will need to understand that:</p> <ul style="list-style-type: none"> Any career connected with the construction of the built environment will require knowledge of the hazards inherent in construction and of the risks arising from Risks from construction to employees, employers, and members of the public must all be considered and minimised. Health and safety requirements will involve knowledge and understanding of risk assessment, including reference to relevant legislation and associated regulations.
<p>(c) Learners should understand that regulations require employers to control exposure to hazardous substances to prevent illness or injury by:</p> <ul style="list-style-type: none"> assessing risks deciding what precautions are necessary preventing (or controlling) exposure ensuring that control measures are followed monitoring the level of exposure preparing procedures to deal with accidents training and supervising employees. 	<p>PPE includes:</p> <ul style="list-style-type: none"> Eye protection, gloves, harnesses and hearing protection. High-visibility and protective clothing. Respiratory equipment. Safety footwear and safety helmets <p>Employers are responsible for providing PPE in the workplace free of charge. It should be used only as a last resort, when exposure to risks cannot be adequately controlled in other ways.</p>
<p>(d) Learners should understand the importance of using the correct personal protective equipment (PPE) to protect the wearer from health and safety risks, including the risk of injury to the:</p> <ul style="list-style-type: none"> skin lungs head eyes ears. 	<p>PPE includes:</p> <ul style="list-style-type: none"> Eye protection, gloves, harnesses and hearing protection. High-visibility and protective clothing. Respiratory equipment. Safety footwear and safety helmets <p>Employers are responsible for providing PPE in the workplace free of charge. It should be used only as a last resort, when exposure to risks cannot be adequately controlled in other ways.</p>

EXPLANATION OF THE SPECIFICATION CONTENT

2.1.8 Health and Safety

Content Amplification	Teacher Guidance
<p>(e) Learners should understand the importance of applying the following safety procedures when working with gas, water, and electricity:</p> <ul style="list-style-type: none"> • should only be worked on by a competent person • follow appropriate procedures and precautions • use protective equipment • know the means of cutting off the supply of gas, water or electricity. 	<p>If gas appliances are not installed and maintained properly, there is a danger of fire, explosion, gas leaks and carbon monoxide poisoning.</p> <p>In domestic properties and workplaces such as shops, restaurants, schools and hospitals, It is illegal for an unregistered person (not qualified to be on the Gas Safe Register.) to carry out work on a gas appliance.</p> <p>Preventing damage during construction due to water leaks requires a focus on quality, planning and testing throughout the construction process and employing competent persons to carry out the work.</p> <p>Electrical work must also be carried out by a competent person who has the suitable training, skill and knowledge for the task to be undertaken to prevent injury to themselves and others. They will be aware of risks arising from overhead lines and underground cables and be able to mitigate other hazards of working with electricity, including:</p> <ul style="list-style-type: none"> • Electric shock and burns from contact with live parts • Injury from exposure to arcing, fire from faulty electrical equipment or installations • Explosion caused by unsuitable electrical apparatus or static electricity igniting flammable vapours or dusts.
<p>(f) Learners should understand that to ensure safety:</p> <ul style="list-style-type: none"> • those working at height must: <ul style="list-style-type: none"> • be appropriately trained and follow a properly planned and organised process • take account of weather conditions (if appropriate) • use equipment which is appropriately inspected • control risks from fragile surfaces and falling objects • those working in enclosed spaces must manage risks from: <ul style="list-style-type: none"> • exposure to fumes • reduced oxygen levels • flooding/drowning 	<p>Working at height remains one of the biggest causes of fatalities and major injuries. Common cases include falls from ladders and through fragile surfaces. Control measures include:</p> <ul style="list-style-type: none"> • Avoiding working at height where it is reasonably practicable to do so. • Where work at height cannot be easily avoided, prevent falls using the right type of equipment, such as guard rails. • Minimise the distance and consequences of a fall, by using the right type of equipment, such as a harness. <p>A confined space includes any place, such as a chamber, tank, silo, pit, trench, sewer, flue, well or similar space where there arises a reasonably foreseeable risk of the types listed</p>

- fire.

Learners should be aware that there must be arrangements in place to get the person out of the enclosed space safely and promptly if they become unwell.

in the amplification. Working in a confined space should be subject to a risk assessment completed following the standard 5 step process:

1. Identify the hazards and those affected by them?
2. Evaluate the risks – Low, Medium or High?
3. Record findings – and communicate them to those affected.
4. Introduce control measures; eliminate, substitute, reduce, control isolate, information, training, instruction, and last resort PPE
5. Review the findings – monitor the effectiveness of the assessment.

ASSESSMENT OF UNIT 1

Unit 1: Introduction to the built environment

On-screen examination: 1 hour 30 minutes

35% of qualification

70 marks: 105 UMS

An assessment (taken on-screen), comprising of a range of question types to assess specification content related to ideas and concepts in the built environment and evidence related to the built environment.

All questions are compulsory.

The assessment objective weightings for Unit 1 are:

AO1	AO2	AO3
25%	5%	5%
50 marks	10 marks	10 marks

FAQs:

Can learners resit the Unit 1 assessment?

Candidates may resit this unit once only. The better uniform mark score from the two attempts will be used in calculating the final overall qualification grade(s) subject to terminal assessment requirements being satisfied first.

What is the terminal assessment rule?

Candidates must complete 40% of the overall assessment in the series in which they are cashing in. If the assessment being re-taken contributes to the 40% terminal assessment requirement, the mark for the new assessment will count.

Is the assessment available on paper?

The assessment is available on-screen only. In the case of technical or other difficulties that might prevent a candidate from sitting the on-screen exam, centres should contact WJEC.

What is the entry code for this unit?

English-medium	3509U1
Welsh-medium	3509N1

Is this assessment compulsory?

Yes.

When can candidates sit the Unit 1 assessment?

Assessment opportunities will be available in May/June each year, until the end of the life of this specification.

Summer 2022 will be the first assessment opportunity for Unit 1.

Are candidates assessed on their written communication?

Yes, in one extended response question which is highlighted in the 'information for candidates' section of the examination paper. The quality of written communication, including appropriate use of punctuation and grammar is integrated into the banded

mark scheme for the specified question. Separate marks are not awarded for the quality of written communication.

Are candidates assessed on their use of specialist terminology?

Yes, in the same extended response question which is used to assess the quality of written communication. The use of specialist terminology is integrated into the banded mark scheme for the specified question. Separate marks are not awarded for the use of specialist terminology.

Will candidates be expected to answer questions about content in Unit 2 or Unit 3 in this exam?

No. Examination questions will be based on unit 1 content only.

Will the assessment objective weightings remain the same throughout the life of the specification?

Yes.

How is the qualification reported?

GCSE qualifications are reported on an eight-point scale from A*-G, where A* is the highest grade. Results not attaining the minimum standard for the award will be reported as U (unclassified).

GLOSSARY FOR UNIT 1

Term	Definition
Built Environment	The man-made surroundings that provide the setting for human activity that includes cities, infrastructures buildings, the spaces between them such as parks.
Infrastructure	The general term for a basic physical system that supports human activity, such as transportation systems, communication networks and energy distributions.
Primary Industries	Industries that extract raw materials from nature for use in their unprocessed state; such as coal, iron ore or for use in manufacturing.
Manufacturing	The processes required to transform raw materials into useful products.
Construction Industry	The term used to describe the sector of the national economy that carries out building and infrastructure projects.
Renewable energy technologies	Technologies involved in the generation or collection of energy from renewable sources, as opposed to generating energy by burning finite resources such as fossil fuels or natural gas.
Building trades	Trades that are essential to and practised in connection with building construction, such as carpentry, plumbing and bricklaying.
Hazard	Something that can cause harm, such as working at height and using heavy plant and machinery.
Risk	A risk is the chance, high, medium, or low, that any hazard will actually cause harm.
Risk assessment	A critical examination of health and safety hazards at a construction site, usually involving a five-step process.