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# **GCSE MARKING SCHEME**

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**SUMMER 2023**

**GCSE  
INTRODUCTION TO THE BUILT ENVIRONMENT –  
UNIT 1  
3509U10-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2023 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

# WJEC GCSE INTRODUCTION TO THE BUILT ENVIRONMENT – UNIT 1

## SUMMER 2023 MARK SCHEME

### Guidance for examiners

#### Positive marking

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based, the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

Mark schemes often list points which may be included in candidates' answers. The list is not exhaustive. *The inclusion of 'Credit any other valid response.'* (or similar instruction) within mark schemes allows for the possible variation in candidates' responses. Credit should be given according to the accuracy and relevance of candidates' answers.

Appropriate terminology is reflected in exemplar responses in mark schemes. However, unless there is a specific requirement within a question, candidates may be awarded marks where the answer is accurate but expressed in their own words.

#### Banded mark schemes

For band marked questions, mark schemes are in two parts, the indicative content and the assessment grid.

The indicative content suggests the range of points and issues which may be included in candidates' answers. It can be used to assess the quality of the candidate's response. As noted above, indicative content is not intended to be exhaustive and candidates do not have to include all the indicative content to reach the highest level of the mark scheme.

However, in order to reach the highest level of the mark scheme a candidate must meet the requirements of the highest mark band. Where a response is not creditworthy, that is, it contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Candidates' responses to questions are assessed against the relevant assessment objectives. In GCSE Built Environment, each question will address one assessment objective.

The marking of banded mark questions should always be positive. This means that, for each candidate's response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding; they are not deducted from a maximum on the basis of errors or omissions.

Examiners should first read and annotate the candidate's answer to pick out the evidence that is being assessed in that question. The mark scheme can then be applied. This is done as a two-stage process.

## **Stage 1 – Deciding on the band**

Beginning at the lowest band, examiners should look at the candidate's answer and check whether it matches the descriptors for that band. If the descriptors at the lowest band are satisfied, examiners should move up to the next band and repeat this process for each band until the descriptors match the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the candidate's response should be used to decide on the mark within the band. For instance, if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

## **Stage 2 – Deciding on the mark**

During standardising (the marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a candidate's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Question	Answer	AO1	AO2	AO3	Total mark
1.	<i>Our homes, places of work and transport infrastructure all form part of the built environment.</i>				
(a)	State <b>two</b> load bearing elements within a house.	2			2
	Award one mark for each correct infrastructure product, for example: <ul style="list-style-type: none"> <li>• Floor joists</li> <li>• External walls</li> <li>• Lintels</li> <li>• Rafters, roof truss</li> <li>• Ceiling joists.</li> <li>• Foundations</li> <li>• Columns</li> <li>• Beams</li> </ul> <p>Credit any other valid response e.g. oak columns in oak frame.</p>				
(b)	Name <b>two</b> mechanical services used in public buildings.	2			2
	Award one mark for each correct mechanical service that supports the public, for example: <ul style="list-style-type: none"> <li>• Escalators</li> <li>• Lifts</li> <li>• Airconditioning</li> <li>• Heating</li> <li>• Ventilation</li> </ul> <p>Credit any other valid response.</p>				
(c)	State <b>two</b> civil engineering products that could be part of a railway network.	2			2
	Award one mark for each correct element (relevant to a railway), for example: <ul style="list-style-type: none"> <li>• Tunnels</li> <li>• Bridges</li> <li>• Cuttings</li> <li>• Embankments</li> <li>• Train Tracks</li> <li>• Train Stations</li> <li>• Power lines (Electrification)</li> </ul> <p>Credit any other valid response.</p>				

Question	Answer	AO1	AO2	AO3	Total mark
2.	<i>The UK construction industry uses products manufactured from extracted raw materials.</i>				
(a)	State <b>three</b> examples of engineered wood products.	3			3
	Award one mark for each correct product, for example: <ul style="list-style-type: none"> <li>• Eco joist</li> <li>• Glulam</li> <li>• Chipboard</li> <li>• O, Stramit board (OSB)</li> <li>• Plywood</li> <li>• Trussed rafters</li> <li>• Structural sections</li> <li>• MDF, medium density fibreboard</li> </ul> Credit any other valid response.				
(b)	Name <b>three</b> materials required to make concrete.	3			3
	Award one mark for each correct material, for example: <ul style="list-style-type: none"> <li>• cement</li> <li>• water</li> <li>• small/fine aggregate e.g. sand</li> <li>• large aggregate, e.g. gravel</li> <li>• admixtures</li> </ul> Credit any other valid response (including additives such as plasticizer).				
(c)	(i) Identify <b>one</b> material that can be combined with concrete to create 'Reinforced Concrete'.	1			1
	Award one mark for identifying a correct material, for example: <ul style="list-style-type: none"> <li>• steel</li> <li>• fibre-reinforced polymer (FRP)</li> <li>• bamboo</li> </ul> Credit any other valid response.				
	(ii) Identify <b>two</b> building products that are made using reinforced concrete.	2			2
	Award one mark for identifying each type of concrete product that is construction related such as: <ul style="list-style-type: none"> <li>• lintels</li> <li>• floor slabs</li> <li>• beam and block</li> <li>• precast concrete frame components</li> <li>• balcony's, stairs</li> </ul> Credit any other valid response				

Question	Answer	AO1	AO2	AO3	Total mark
3.	<p><i>The built environment includes many different types of building. Complete the table with an example of a building for each function. The first row has been completed for you.</i></p>	4			4
	<p>Award one mark for correctly identifying an example against each</p> <p>Agricultural:</p> <ul style="list-style-type: none"> <li>• farm buildings (do not accept 'farm')</li> <li>• portal frame sheds</li> <li>• barns</li> </ul> <p>Residential:</p> <ul style="list-style-type: none"> <li>• bungalows</li> <li>• detached homes</li> <li>• semi-detached</li> <li>• flats</li> </ul> <p>Religious:</p> <ul style="list-style-type: none"> <li>• mosque</li> <li>• churches</li> <li>• faith centres</li> </ul> <p>Commercial:</p> <ul style="list-style-type: none"> <li>• leisure centres</li> <li>• retail units</li> <li>• hotels/spas</li> <li>• shops</li> </ul> <p>Credit any other valid response.</p>	1			
		1			
		1			
		1			
		1			

Question	Answer	AO1	AO2	AO3	Total mark
4.	<i>Renewable technologies are now used in many buildings.</i>				
(a)	Identify <b>two</b> types of solar energy technology: one mark each.				2
	(i) solar thermal (ii) solar voltaic	1 1			
(b)	Using solar energy technology should reduce running costs. State <b>one other</b> benefit and <b>one</b> limitation of using solar energy technology.	2			2
	Award one mark for a benefit and limitation: (i) Benefits – reduces environmental impact, reduction on Co2 emissions (ii) Limitations – Planning reference conservation areas, when there is no sunshine then reduced output, roof direction is important, panels need cleaning, shade from trees, aesthetics, lack of sunshine Expensive to buy/install  Credit any other valid response.	1 1			

Question	Answer	AO 1	AO2	AO3	Total mark
5.	<i>Different types of buildings are often constructed using different types of structure.</i>				
	<p>(a) Identify <b>one</b> type of building commonly constructed using a timber frame and give <b>one</b> reason why this type of structure is appropriate.</p> <p>Award <b>one</b> mark for the identification of a type of building commonly constructed using a timber frame and <b>one</b> mark for an appropriate reason.</p> <p><i>Type of building:</i></p> <ul style="list-style-type: none"> <li>• residential dwellings</li> <li>• contemporary housing</li> <li>• portal frames</li> </ul> <p>Credit any other valid response.</p> <p><i>Appropriate reason:</i></p> <ul style="list-style-type: none"> <li>• timber frames can be relatively lightweight</li> <li>• timber is a sustainable/renewable material</li> <li>• speed of construction</li> <li>• cost – can be cheaper than other methods</li> </ul> <p>Credit any other valid response.</p>		2		2
	<p>(b) Identify <b>one</b> type of building commonly constructed using a rectangular frame made of steel and give <b>one</b> reason why this type of structure is appropriate.</p> <p>Award <b>one</b> mark for the identification of a type of building commonly constructed using a rectangular frame made of steel and <b>one</b> mark for an appropriate reason.</p> <p><i>Type of building:</i></p> <ul style="list-style-type: none"> <li>• large scale structures</li> <li>• tall buildings/skyscrapers</li> <li>• commercial buildings</li> <li>• portal frames</li> </ul> <p>Credit any other valid response.</p> <p><i>Appropriate reason:</i></p> <ul style="list-style-type: none"> <li>• strong and durable</li> <li>• withstand high winds and earthquakes</li> <li>• fire resistant</li> <li>• structural stability</li> <li>• resistant to corrosion</li> <li>• weight carried by frame rather than walls</li> <li>• glass screens/curtain walls can be supported by steel frame</li> </ul> <p>Credit any other valid response.</p>		2		2

Question	Answer	AO1	AO2	AO3	Total mark
6.	Many different people work on a construction site.				
(a)	Describe the role of a <b>site manager</b> .	3			3
	<p><b>Indicative content:</b></p> <p>A description will include some or all of the following content, accept any other acceptable role on site.</p> <p>A site manager</p> <ul style="list-style-type: none"> <li>• is responsible for most activities (1) on a construction site. Planning activities</li> <li>• manages the site and the workforce (1), including with regard to health and safety (1) and quality (1)</li> <li>• liaises with clients and reports on progress (1).</li> <li>• Workforce training</li> </ul> <p>Max three marks</p>				
(b)	Describe the role of a <b>bricklayer</b> .	3			3
	<p><b>Indicative content:</b></p> <p>A description will include some or all of the following content, accept any other acceptable role on site.</p> <p>A bricklayer</p> <ul style="list-style-type: none"> <li>• works from plans and specifications (1)</li> <li>• constructs structures by spreading layers of mortar (1), placing, lays bricks/blocks, checking vertical and horizontal alignment (1)</li> <li>• seals foundations using damp-resistant materials (1)</li> </ul> <p>Max three marks</p>				

Question	Answer	AO1	AO2	AO3	Total mark
7.	<i>Working at height is dangerous.</i>				
(a)	Name <b>two</b> hazards when working at height.	2			2
	Award one mark for a hazard: (i) falling from height (ii) falling objects (iii) fragile roof surfaces  Credit any other valid response.				
(b)	State <b>two</b> examples of people who may be put at risk from working at height.	2			2
	Award one mark for: <ul style="list-style-type: none"> <li>• operatives (1 mark each for any trade named)</li> <li>• subcontract trades (accept one trade only)</li> <li>• supervisors</li> <li>• visitors, e.g. delivery drivers</li> <li>• members of the public</li> </ul> Accept any other reasonable answer.				
(c)	Identify <b>four</b> measures (other than Personal Protective Equipment) that could be taken to help ensure the safety of workers working at height.	4			4
	Award one mark for each measure: <ul style="list-style-type: none"> <li>• fitting of handrails to scaffolding</li> <li>• fitting of toeboards to scaffolding</li> <li>• fitting of brick guards to the handrails</li> <li>• safety nets</li> <li>• scaffolding/work platform</li> <li>• appropriate signage</li> <li>• retro reels</li> <li>• training of operatives</li> <li>• scaffolding inspections</li> <li>• risk assessments and method statements</li> <li>• not working during severe weather</li> </ul> Credit any other acceptable response.				

Question	Answer	AO1	AO2	AO3	Total mark
(d)	<p>State <b>three</b> items of Personal Protective Equipment (PPE) that should be used when working on a site.</p> <hr/> <p>Award one mark for identifying:</p> <ul style="list-style-type: none"> <li>• a hard hat</li> <li>• steel toe capped boots</li> <li>• safety gloves</li> <li>• general protective clothing e.g. overalls</li> <li>• eye protection/safety glasses/safety goggles</li> <li>• ear protection</li> <li>• harness</li> <li>• hi viz jacket</li> </ul> <p>Credit any other valid response.</p>	3			3

Question	Answer	AO1	AO2	AO3	Total mark
8.	<i>A property developer is considering the purchase of a brownfield site. Several old slate-roofed, and red-brick buildings are located on the site.</i>				
(a)	State <b>two</b> advantages and <b>one</b> disadvantage of using brownfield sites for development.	3			3
(i)	Advantages – one mark each to a max of two marks <ul style="list-style-type: none"> <li>• Planning permission may be granted</li> <li>• Removes eyesore</li> <li>• Cheaper land purchase</li> <li>• Materials can be reused</li> <li>• Existing services can be used</li> </ul>				
(ii)	Disadvantage – one mark <ul style="list-style-type: none"> <li>• ground contamination</li> <li>• buildings have to be demolished carefully</li> <li>• existing services may be cut off</li> <li>• protected species may have moved into the site</li> </ul>				
(b)	Explain how the materials from the existing buildings could be reused or recycled. <p>Award one mark for any of the following up to max four marks, response must be in terms of an explanation of how they are reused.</p> <p>No marks for stating of slate and red brick but linked explanation can be awarded marks.</p> <ul style="list-style-type: none"> <li>• Recycling of bricks for reuse in the new development which saves resources and keeps character, aesthetics</li> <li>• Crushing of any waste concrete into useful fill materials</li> <li>• Reuse of any roof tiles as type one fill</li> <li>• Sale of roof slate tiles and purchase of new products</li> <li>• Credits back for any metals and or architectural elements that could then be used for sustainable purchases</li> <li>• Reduction in environmental impact of new materials</li> <li>• Existing timbers are machined into new products and or recycled into engineered products</li> <li>• Glass windows reused and or protected, upgraded</li> <li>• Architectural features saved and reused into the new building</li> </ul> <p>Any other appropriate response.</p>		4		4

Question	Answer	AO1	AO2	AO3	Total mark
9.	A housing developer is refurbishing a street of houses dating from the 1960s. The project brief is to improve the sustainability of the properties and make the exteriors look more modern.				
(a)	Name <b>three</b> insulation materials suitable for use in the external walls.	3			3
	Award one mark for each of the following to a max three marks <ul style="list-style-type: none"> <li>• mineral fibre rolls</li> <li>• sprayed foam</li> <li>• sprayed foam</li> <li>• wool</li> <li>• fibreglass</li> <li>• polyurethane</li> <li>• straw (do not accept 'hay')</li> </ul> <p>Credit any other valid response.</p>				
(b)	Suggest <b>three</b> types of external cladding, describing how each meets the requirements of the project brief.		6		6
	Award <b>one</b> mark for each suggestion of an appropriate type of external cladding and <b>one</b> mark for each linked description of how it meets the requirements of the brief. <p>Appropriate types of external cladding:</p> <ul style="list-style-type: none"> <li>• profiled sheeting</li> <li>• brick or rendered blockwork</li> <li>• steel sheeting</li> <li>• aluminium faced panels</li> <li>• curtain walling</li> <li>• timber cladding</li> <li>• slate</li> </ul> <p>Meeting requirements of brief: (Acceptable responses that describe how the cladding types suggested by the candidate meet the requirements of the brief). For example:</p> <ul style="list-style-type: none"> <li>• range of finishes/colours available</li> <li>• contemporary types of brick and pointing</li> <li>• gives a modern/contemporary look to the exterior of the houses</li> <li>• from a renewable/sustainable /recycled source</li> <li>• cladding material has insulating properties</li> <li>• reduces heating loss/saves household heating costs</li> </ul> <p>Credit any other valid responses.</p>				

Question	Answer	AO1	AO2	AO3	Total mark
10	<p>You are working for a developer that has been contracted to build an industrial unit. The unit is to be open plan with portal frames spanning 18 metres with an overall length of 36 metres. You have been asked to write a specification for external walls, secondary structures and roof finishes of the industrial unit. Discuss the materials and components you would specify giving reasons for your choices.</p>			10	10
	<p><b>Indicative content:</b></p> <p>Answers may refer to the following materials and components:</p> <ul style="list-style-type: none"> <li>• timber – a renewable resource that is energy efficient, stores carbon</li> <li>• insulation – sheep’s wool environmentally friendly material that is resists moisture</li> <li>• cavity wall construction using Aircrete blocks which hold in warmth</li> <li>• lime render and lime mortar which is better for the environment</li> <li>• slate roof tiles – natural product</li> <li>• recycled plastic elements</li> <li>• crushed recycled materials as filling for floors</li> <li>• clay drainage – a natural product that is not oil based</li> </ul> <p>Credit any other valid response.</p>				

Band	AO3
4	<p style="text-align: center;"><b>9-10 marks</b></p> <p>An excellent discussion which includes strong evidence of application of materials and components:</p> <ul style="list-style-type: none"> <li>• the evaluation contains justification statements such as benefits</li> <li>• Choices of materials and components is appropriate</li> <li>• Writing is very well structured and organised, using accurate grammar, punctuation and spelling.</li> <li>• A range of materials and components is discussed with accuracy.</li> </ul>
3	<p style="text-align: center;"><b>6-8 marks</b></p> <p>A good discussion which includes secure evidence of application of materials and components:</p> <ul style="list-style-type: none"> <li>• the evaluation contains some justification statements</li> <li>• Choices of materials and components is appropriate with some errors</li> <li>• Writing is very well structured and organised, using accurate grammar, punctuation and spelling.</li> <li>• At least two materials and components are discussed with some accuracy.</li> </ul>
2	<p style="text-align: center;"><b>3-5 marks</b></p> <p>A basic discussion which includes some evidence of application of materials and/or components:</p> <ul style="list-style-type: none"> <li>• more than one material and/or component is identified</li> <li>• Writing has some structure and some organisation, limited grammar, some punctuation and spelling errors.</li> <li>• limited linked descriptions on the selection of material(s) and/or component(s)</li> <li>• limited justification on choice</li> <li>• not discussed in any detail or depth</li> </ul>
1	<p style="text-align: center;"><b>1-2 marks</b></p> <p>A limited discussion which includes little evidence of application of materials and components:</p> <ul style="list-style-type: none"> <li>• only one material and/or component is identified</li> <li>• Writing has limited structure and organisation, errors in grammar, limited use of punctuation and some spelling errors.</li> <li>• limited descriptions on the selection of materials and/or component</li> <li>• no justification statements on choice</li> </ul>
	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>

## Mapping of questions to specification content and assessment objectives

### Unit 1

Question	Specification content (main focus)									Mark allocation				
	Section								Part	Total marks	AO1 marks	AO2 marks	AO3 marks	
	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8						
1	(a)	2								(a)	2	2	0	0
	(b)	2								(c)	2	2	0	0
	(c)	2								(b)	2	2	0	0
2	(a)		3							(b)	3	3	0	0
	(b)		3							(b)	3	3	0	0
	(c)		3							(b)	3	3	0	0
3			4						(a)(b) (d)(f)	4	4	0	0	
4	(a)			2						(c)	2	2	0	0
	(b)			2						(c)	2	2	0	0
5	(a)				2					(c)	2	2	0	0
	(b)				2					(b)	2	2	0	0
6	(a)						3			(c)	3	3	0	0
	(b)						3			(e)	3	3	0	0
7	(a)							2		(a)	2	2	0	0
	(b)							2		(a)	2	2	0	0
	(c)							4		(b)	4	4	0	0
	(d)							3		(d)	3	3	0	0
8	(a)					3				(e)	3	3	0	0
	(b)					4				(d)	4	0	4	0
9	(a)			3						(b)	3	3	0	0
	(b)			6						(b)	6	0	6	0
10				10						(a)(b)	10	0	0	10

Total marks	6	9	4	23	4	7	6	11		70	50	10	10
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