VOCATIONAL

WJEC LEVEL 1 / 2 AWARD in PLANNING AND MAINTAINING THE BUILT ENVIRONMENT

TEACHERS’ GUIDE

Teaching from 2014
# Contents

WJEC Level 1/2 Award in Planning and Maintaining the Built Environment Teachers’ Guide

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1 INTRODUCTION

Welcome to your WJEC teacher guide, which has been designed to assist you in the delivery of the Level 1/2 Award in Planning and Maintaining the Built Environment.

It is the intention of this guide to be one of several ways in which WJEC provides assistance to teachers delivering the specification, sitting alongside the specimen papers and CPD. WJEC provides the following as part of its support for all specifications:

- Examiners’ reports on each examination series
- Free access to past question papers via the WJEC secure website
- Easy access to the specification and other key documents on the main website
- CPD
- Easy access to both the Subject Officer and to administrative sections.

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2 MAKING TEACHING APPLIED AND PURPOSEFUL

Ofqual defines applied learning as ‘the acquisition and application of knowledge, skills and understanding through tasks set in sector contexts that have many of the characteristics of real work or are set within the workplace. Most importantly, the purpose of the task must be relevant to real work in the sector’. Source: [http://www.ofqual.gov.uk/501.aspx](http://www.ofqual.gov.uk/501.aspx)

It is important that learners recognise that the knowledge, understanding and skills they develop are vocationally relevant. Applied learning can give learners ‘real-life’ purposeful experiences within and outside the school/college environment.

The activities within this teacher guide where possible adopt an applied and purposeful approach to learning.
3 MAXIMISING EMPLOYER LINKS

The suggested approaches and activities in this guide are designed to enable learners to work on 'live' projects, situations and environments. Links with construction organisations and stakeholder organisations involved with potential redevelopment projects are recommended to enhance the learning experience. Learning involving different aspects of the construction industry is highly desirable. The WJEC Award in Planning and Maintaining the Built Environment is very diverse, spanning complex sustainability issues to the completion of minor repairs. It would be highly beneficial if the links to industry reflected this diversity with the involvement of a broad spectrum of appropriate organisations. The table below gives some examples of the benefits of working with employers for this qualification.

<table>
<thead>
<tr>
<th>Benefits to the learner</th>
<th>Benefits to the school/college</th>
<th>Benefits to the employer</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More enjoyable and purposeful</td>
<td>• More motivated learners</td>
<td>• Free research</td>
</tr>
<tr>
<td>• Improved and better informed aspirations</td>
<td>• Improved attainment and achievement</td>
<td>• Can improve the flow of young people into the Construction Industry</td>
</tr>
<tr>
<td>• Ability to apply skills, knowledge and understanding in future contexts and situations</td>
<td>• Better links with employers</td>
<td>• Cuts recruitment costs</td>
</tr>
<tr>
<td>• Prepared for future research</td>
<td>• Community involvement</td>
<td>• Become an employer of choice</td>
</tr>
<tr>
<td>• Better prepared for the assessment</td>
<td></td>
<td>• Brand awareness</td>
</tr>
<tr>
<td>• Develops employability skills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 FORMATIVE AND SUMMATIVE ASSESSMENT

**Formative** – assessment for learning. This should be used throughout the learning process to analyse the learning and feedback progress to learners.

**Summative** – assessment of learning. This is used once learning of the unit is complete. This assessment certifies the individual achievement of learners. Each unit is assessed using one summative assignment.
The purpose of this unit is to enable learners to recommend how the value of built environments can be improved. The unit is split into three separate learning outcomes which are, that the learner will:

- Know the built environment of different areas
- Understand how the built environment affects its value
- Recommend ways of adding value to built environments.

The emphasis of the course rationale is to encourage applied learning, this is intended to encourage, motivate and stimulate the learners so they can achieve their potential in the subject. Every effort should be made by schools to make each learning experience as real as possible and to avoid making teaching purely fact based. The activities outlined in this guide have used these principles where possible and it is envisaged that much of the teaching will be undertaken in the same way, using case studies local to the learners that are both known and/or accessible to them. These activities can be used to create a scheme of work to suit your centre, your learners and the local context.

The activities do not attempt to cover all of the learning required for this unit and individual teachers should refer to the unit to ensure all learning outcomes and assessment criteria have been covered before the learners undertake the controlled assessment for this unit.

A sample external assessment has been produced by WJEC, which centres are welcome to use and adapt where they feel necessary. The document illustrates to learners what type of evidence they might produce to meet the requirements of the tasks in the assignment. Each section of the tasks is matched to the relevant assessment criteria. Guidance is provided to indicate the grade they can achieve on each of the assessment criteria.

Even though the actual external assessment will be of a fictitious location, the local area should be the focus of the teaching. There are so many examples wherever you are in the country of environments that need improving. To be able to successfully complete the external assessment, learners need to fully demonstrate their understanding of any of the assessment criteria being tested. There are many approaches that can be taken to do this both in and outside of the classroom, but it will be highly beneficial to consider different sorts of areas and buildings, preferably with different problems and potential solutions. Through this method much of the teaching and learning can be completed.

Let us say the first practice assignment is about a proposal for improving a certain area. For example, one lesson could be based around photos taken in a local area or from resources found on the internet and a discussion can be conducted about how to describe the environment being looked at (AC1.1). The teacher may choose to start by explaining the different types of built environment directly or through the course of the activity but the result should be the same, that of the learners being able to identify the different types of buildings in a given situation. Likewise a piece of homework could be given to do the same for the
village or street they live in, using their class notes to help them. Remember, learners may well need to cover the assessment criteria in a variety of ways and for different built environments to ensure they cover the content and become proficient in describing it.

One way of making lessons more interesting is to get an expert in. When looking at different types of ownership (AC1.2) an outside speaker could be invited to speak; this could be a surveyor, local councillor, housing association representative, estate agent or someone from National Parks. Giving assignments set on key owners like, for example, the Crown Estate, where learners are asked to find key pieces of information from their website or comparing one type of owner with another can also be very useful.

When going on to study how the built environment is used by the community (AC1.3) it may be useful for the learners to be out of the class, possibly just outside the school grounds in order to survey who is there and how they are using it. Different groups could be given different community member types or age groups or be interviewed to find out what their view or needs are in that environment. Bringing that information together could help all learners fully understand the aspects of the community they are looking at and spark discussion, further helping learners to pull the different strands of the topic together. In some cases visits are not possible and where that is the case, TV programmes or video clips can be used instead. A carefully chosen inner city soap episode can be used to address a significant amount of the unit content. A quick search on urban renewal or regeneration on YouTube brings up many short and long clips that may help explain key points (e.g. search Sheffield - A City of Regeneration).
5.1.2 Suggested learning activities

Activity 1(a) (AC 1.1) – Describe the Built Environment.

Using Google maps on satellite setting – show the learners an area near to your centre – the following link is to an area of South Wales called Porthcawl:

https://www.google.co.uk/maps/@51.4787072,-3.6893073,2015m/data=!3m1!1e3

The questions can be posed –

What is the difference between the built environment and the natural environment?

Identify and highlight the following on the satellite image:

- Commercial property
- Housing
- Spaces
- Buildings
- Services

(All of these titles could be extended depending on the level of your learners, e.g. housing could be split into detached, semi-detached, flats etc.)

This could also be done by providing links to the Google maps imagery and asking learners to classify the different properties that they see. e.g.

1. https://goo.gl/qJMb28
2. https://goo.gl/aZNBJm
This could also be completed without a computer suite if one is not available just by providing the images and a form to complete. To simplify further, a series of tick boxes could be added to aid the learner.

<table>
<thead>
<tr>
<th>Environment</th>
<th>Description</th>
<th>Further description</th>
</tr>
</thead>
</table>
|             | • Commercial Property  
             | • Housing  
             | • Spaces  
             | • Buildings  
             | • Services  |

**Activity 1(b) (AC 1.2)** - Describe ownership of the built environment

An extension to the above project is to get the learners to add a further column onto the above table headed ‘ownership’ and perhaps the main headings of:

- Freehold
- Leasehold
- Landlord
- Private
- Public
The correct box can then be ticked for each image. This forms a visual guide to learners who need to be able to identify similar environments and ownerships during the external assessment tasks. Further similar forms could be provided that explore the ownership in more depth.

**Activity 2 (AC 1.2) - Describe Ownership of the built environment**

To help with the finer detail of ownership, particular projects can be set on different types of landlords or types of public ownership. To help with the topic of Landlords, watch the following video on Social Enterprise (go to the link provided and scroll down to Media Centre to access ‘Join the Revolution’)

http://www.socialenterprise.org.uk

After watching, ask the learners to discuss what they think social enterprise is. Agree a definition using learner and teacher input and then they can explain what it is for with plenty of examples. Now suggest what the landlord may own who is running a social enterprise.

**Activity 3 (AC 1.2) - Describe Ownership of the built environment**

Learners should watch the following video:

https://vimeo.com/54412105

Use this for a case study of the bicycle recycle scheme and have the learners construct a report explaining what the scheme does, what the benefits of it are and who the landlord is.

**Activity 4 (AC 1.2) - Describe Ownership of the built environment**

Using the nearest high street ask the learners to visit some key commercial properties (class could be split to one property or more per learner). They could then conduct a short piece of research using a questionnaire on details such as the time that the business has been operating, the type of business, the type of ownership etc. (questionnaire to be compiled by learner and checked by teacher). To unify the approach, it is likely that agreement should be sought on the key questions and the learners sent to gather information. The information could then be shared amongst their group and some statistics, in the form of tables and bar charts, created.

**Activity 5 (AC 1.1, 1.2 and 1.3) - Describe how the environment is used by its community**

Invite an outside speaker. This could be from the local authority planning department, chamber of commerce, local historical society or museum to give a presentation on the past of a local area. Failing this, a brief search on Google images for old photos/maps will quickly bring a wealth of information on an area’s history. Under the main titles of the assessment criteria a slide show presentation could be created or a report written individually (or in groups) for each of the areas with emphasis on the changes that have occurred in the area. Leading questions can be set to help break this down.
a) Find five photos, postcards or maps and one map of your local area taken at least fifty years ago (look at activity c to help choose them).

b) Describe what you see in them under the subheadings of Commercial property, Housing, Spaces, Buildings, and Services.

c) Choose five pictures and one map of the same area that are no older than ten years old. Try, as best you can, to find pictures that are of the same building, street or outside space to correspond to an equivalent older one from (a).

d) Again describe what you see in them, but now comment on the changes that have taken place in terms of the built environment.

e) Now comment on the changes that you think have taken place in ownership and community.

This project could be undertaken for just one of the assessment criteria or encompass all three.

Another approach could be to be to split learners into teams or even give individuals topics by splitting the 26 content titles (the varying degrees of difficulty could be used for differentiation within any given cohort) and set the additional task of investigating each topic in greater detail and subsequently delivering a five minute presentation on each.

Links

Social issues  www.truetube.co.uk
Social Enterprises www.socialenterprise.org.uk
Crown estate www.thecrownestate.co.uk
National parks www.nationalparks.gov.uk
Liverpool regeneration www.youtube.com/watch?v=zWLkP2A5sK0
Sheffield regeneration www.youtube.com/watch?v=kTlmhNs1E9I
Swansea regeneration down load www.geogonline.org.uk/cc_y11_SA1.ppt
Housing associations www.housing.org.uk
Engaging public in the community www.publicengagement.ac.uk
The purpose of this unit is for learners to plan, carry out and report on the maintenance of built environments. The unit is split into four separate learning outcomes in which the learner will:

- Know causes of defects in built environments
- Understand relationship between maintenance and protection of the built environment
- Be able to repair defects to the built environment
- Be able to report on maintenance activities.

As the internal assessment brief will be based on what could be a real life example, the content of this unit is again best taught in a similar way. Visits and projects focused on each of the assessment criteria will bring the topic to life and make the teaching more memorable. Each educational establishment will have its own maintenance issues and nearby there will be other easily accessible built environments that can be used as a basis for learner work. For example when looking at causes and detection of defects (AC1.1 and AC1.2), zones could be created for groups and learners asked to record various defects and explain their causes. If this is difficult to manage effectively, the defects can be photographed or video clips made for a class discussion. Each centre will have caretakers and site managers involved on a daily basis in many of the issues covered here and could be used in helping deliver this unit in a thoughtful way.

Subsequent sessions can then cover the impacts that the defects have (AC2.1) and could lead on to a maintenance plan for the property or zone covered. The final summary of the report could be delivered as a presentation to the establishment's site manager or selected governors. To ensure all types of environment (AC1.1) are studied and to ensure learners will be able to display the required level of knowledge for the internal assessment, many different examples should be given and looked at, and wherever possible, real environments should be used. Local housing associations or the Local Authority may well be a good source of information here and visits to maintenance projects may be organised to help to show what happens in the industry. These trips are an excellent way of tackling AC2.2, where the different types of maintenance are explored. Alternatively visiting speakers can be invited to the centre. Building maintenance firms, construction firms and local authorities may be willing to come in and use resources they already use for training purposes.

As the course is aimed at applied learning, it would be good for the learner, wherever possible, to be put in a similar position to that of someone working within the industry. If some of the teacher set assignments are using local industries or services, for example a local shopping centre or swimming pool, then the investigation and report can actually be of use to that business, making the benefits of this many layered.

LO3 is designed to be a very hands-on learning outcome and many centres may feel very comfortable delivering it. It is likely, however, that a different approach will need to be taken.
to that usually associated with practical tasks. It is anticipated that panels or rigs be set up for the practical elements to be taught, learners need to be able to individually demonstrate all the repair tasks in the content list and each centre must be adequately equipped to do this. It is ultimately up to individuals as to how the centre does this, be it portable boards, panels on walls or a whole area being made available. There is no need for large pieces of work, for example when showing repair of flaking scuffed paintwork a small 300mm by 300mm area of emulsion with a simple skirting board that is to be gloss painted is sufficient. There is an opportunity here to combine some of the skills onto one board or panel. For example, a panel could combine holes and cracks in plaster, damaged skirting, damaged paintwork, cracked tile and a defective socket. A sink can be mounted in a suitable position in a classroom or workshop that has some pipework leading to it that can be isolated for repair; the connection to it can be via a flexible pipe from a tap and easily allow the system to be tested. Evidence can be recorded photographically throughout the course. It is not intended that products be made that try and display making skills, the element is about repair not manufacture. However, if time allows more creativity can be incorporated, for example, in revamping a chair and using the project to teach about repairing fabric and painting.
5.2.2 Suggested learning activities

**Activity 1 (AC 1.1) - Describe causes of defects in built environments**

After some teacher exposition of the main causes of defects the learners are given the worksheet below containing photos of problems found in buildings.

<table>
<thead>
<tr>
<th>Image</th>
<th>What is the defect?</th>
<th>How has this been caused?</th>
<th>How could it be avoided?</th>
</tr>
</thead>
</table>
| ![Subsidence](image1) | Subsidence | Poor specification  
Poor plans  
Poor materials or workmanship  
Extreme weather | Correctly specified materials and plans  
Better work training and material checks/quality control  
Increased foundation strength to allow for extreme conditions |
| ![Image 2](image2) | | | |
| ![Image 3](image3) | | | |
| ![Image 4](image4) | | | |
Working in groups, learners are asked to first describe the defect as they see it. They are then encouraged to discuss and suggest possible causes of the problem - in many there could be more than one reason. The learners then go on to suggest their ways to prevent each defect happening in the first place. During this process it may be best not to give too many answers but to help with clues such as “what metal has been used for the pipe that has rusted?” When the whole table has been completed, as best as possible, the teacher could give correct answers with further explanation and learners could mark their work (one mark per correct answer, corrected answers in green). The topic is part knowledge and part investigation, and by going through the process in multiple ways the knowledge will be learnt by repetition and assessment marks will increase.
Activity 2 (AC 1.2) - Describe how defects in built environments are detected.

This activity concentrates on one type of detection method, specifications.

Using images of defects and the links to corresponding specifications, ask learners to see if there are possible reasons for the problem given in the specification.

For example:

- A white deposit occurring on recently applied masonry render - is there a reason or cause given in the link?

Routine Maintenance

a) When is it done?

b) Who is it done by?

c) What are its advantages?

d) What are its disadvantages?

e) Some example of routine maintenance are cleaning out gutters, window washing and grass cutting. Give three other examples.

f) Take one of your examples and re-answer questions a) to d) below.

http://travisperkins.scene7.com/is/content/travisperkins/K0065_456441_COSHH_0

- A building has a damp problem in its walls. Is there anything that shows what should be in the wall to help prevent damp rising up the wall?

http://www.solidearth.co.nz/files/Adobe-Wall-Detail.jpg

Activity 3 (AC2.1) - Explain the impacts of poor maintenance of built environments

Using your centre, or any other accessible building, set your learners the task of reporting on the impacts of maintenance. This can be in terms of a positive impact, if maintenance is done or negative if it is not done. Organisational members could be invited to give a brief talk and field pre-prepared learner questions to aid the completion of the task. The health and safety officer could also be invited for safety considerations, the bursar for financial etc. The teacher delivering the unit could provide information for the other areas as a source for discussion. Once the report is completed it could be split into sections and delivered by learner groups as a verbal report to the Principle, Governors of the learning centre or the site manager.
Activity 4 (AC2.2) - Explain different types of maintenance of built environments

This is a very sector specific topic and one that is best suited for industry to deliver (site visit or expert speaker) or to provide information or resources for the teacher to use. There is a wealth of information on many building companies and housing association websites with useful links e.g.

http://www.mountjoy.co.uk/case-studies.php?filter=Planned%20Maintenance
https://www.mearsgroup.co.uk/social-housing/repairs/

It may be relatively easy to get a visiting speaker to help with this topic, for instance local authorities and housing associations will be able to deliver 30 minutes and cover the main areas with examples. A suggested outcome would be a slideshow with a page explaining each type, for lower ability groups this could be aided with some type of writing framework with leading sentences, questions or just headings. Again, the lack of a computer suite could be worked around with a work sheet for each heading.

Activity 5 (AC2.3) - Explain how building protection methods minimise maintenance activities.

Invite your centre's site manager (or person with that responsibility) to talk to your learners under the title of 'Building Protection Measures' in order for them to outline the main areas listed in the content. Then, set the learners the task of touring the centre's buildings and grounds to find examples of each control measure and taking a picture of each. They can then e-mail their pictures to their centre e-mail address in order to then build a table covering each protection measure. The absence of a computer suite could be worked around by compiling photos and sending to the teacher and then printing them out as hard copies. Another alternative would be to produce a poster sized version in groups.

In case of some learners not having a phone or camera, this could be addressed in pairs and the pictures shared or sent to two addresses. The resulting work could also be used to bolster AC2.1 and AC2.2 to produce what is essentially a summary of the whole topic.

<table>
<thead>
<tr>
<th>Protection Method</th>
<th>Example Picture</th>
<th>How it protects the building</th>
<th>What happens without it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rules of use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Activity 6 (AC3.1) – Use tools in completion of repair tasks**

This activity may be best done after the completion of AC3.2. For any number of the 3.2 repair tasks a worksheet should be produced that learners have to complete by putting in a picture and name of the tool used for each repair. This could form part of instruction booklet for each task (see AC 3.2 and 3.3) and on the example below another column for PPE has been added for learners to fill in where appropriate. If enough practical work is done on each task the learners will be well versed in the names of tools and this should be a relatively easy task but provides written evidence of their learning and serves as reference for the learner in other areas of the course.

<table>
<thead>
<tr>
<th>Repair Task- e.g. rotten door post</th>
<th>Tool Name</th>
<th>Tool Image</th>
<th>PPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handsaw</td>
<td></td>
<td><img src="image1.png" alt="Handsaw Image" /></td>
<td></td>
</tr>
<tr>
<td>Power Drill</td>
<td><img src="image2.png" alt="Power Drill Image" /></td>
<td>Goggles Ear Defenders</td>
<td></td>
</tr>
<tr>
<td>Try Square</td>
<td><img src="image3.png" alt="Try Square Image" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional tools:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Activity 7(a) (AC3.2) - Apply techniques in completion of repair tasks

The most likely way of developing the learners in the application of techniques is by enabling them to practice what has been demonstrated by the teaching staff. This type of work, however, may not fit the centres’ usual way of doing things. Centres may be used to delivering Design and Technology, where learners work on a product that is relatively easy to store and transport. It is not expected for learners to do repairs on real walls, fixtures and fittings (although this could be acceptable if safe). A small test panel is adequate. A simple diagonally braced 300mm square panel can be made in stud work. Plaster board can be attached to one side. and skimmed (and defect hole made), a cracked electric socket installed complete with wires and a skirting board fitted to the front and mitred around one corner.

This now gives multiple areas for learners to demonstrate their ability. The plaster can be repaired, the socket replaced and reconnected and the short edge of the skirting replaced. Many centres have the old beech woodwork benches; if a plate is incorporated on the bottom edge of the panels then they can be held in the woodwork vices when worked on. A similar approach could be taken for perhaps a task of plumbing and tiling.

Peer marking could be incorporated into this activity as it could help learners understand the success criteria for each skill.

Activity 7(b) (AC3.2) - Apply techniques in completion of repair tasks

Once the repairs have been made learners can produce a leaflet providing step by step instructions of each repair task. This can include pictures of their actual work and diagrams of key stages. This piece of work could, in fact, form the evidence for all LO3 as it brings together the three elements.

Activity 7(c) (AC3.3) - Apply health and safety requirements to completion of repair tasks

As part of the above document, each repair task can have a health and safety section. This could be tagged on to AC 3.1 as above with further columns covering the content for each stage.

For the risk assessment aspect, it is best that learners are involved in writing their own risk assessments. Some basic exercises on previously taught skills can be used as examples before assessing the risk of harm and how to reduce those risks with safe working practices and PPE.

Links

Construction Industry Training Boards - www.citb.co.uk
Royal Institute of British Architects – www.architecture.com
Institution of Civil Engineers - www.ice.org.uk
5 UNIT 3: SUSTAINABLE BUILT ENVIRONMENTS

5.3.1 Introduction to the unit

Through this synoptic unit learners will be able to use their knowledge and understanding of the value of built environments and how they are maintained to research community views regarding options for sustainable development. The unit is split into three separate learning outcomes in which the learner will:

- Understand construction practice used to contribute to sustainability in the built environment
- Understand issues related to sustainable development
- Be able to research community perceptions of sustainable options for the built environment.

Sustainability pervades all areas of the built environment and is now a commonplace element in building, civil engineering, interior design and building services. Driven by economics, the demand for materials and the environmental necessity for change there is no project that this issue does not affect. A visit to an ongoing project or a completed one is an excellent starting point, the bigger the better but even small housing projects can assist learners in the identification of sustainable materials (AC1.1), explain how they can be used (AC1.2), show basic measures used to minimise energy use (AC2.1) and show construction practices and how to minimise impacts (AC2.2).

There are a plethora of television programmes that showcase this type of construction although many are housebuilding based, e.g. Kevin McCloud's Grand Designs. Case studies on the topic are easily set up, where teachers ask learners to select properties (or are allocated them) and asked to assess their current likely energy use, how it has been built and the resulting impacts. The learner can then be asked to suggest ways of improving the building's sustainability and this could easily be linked into a unit on adding value to the built environment.

A common method used in the evaluation of the sustainability of a product, process or project is 'life cycle analysis' where a project is closely audited to show what is being used and how it impacts either locally, nationally or globally. This could be addressed one element at a time, for example, if learners were asked to think about a standard concrete block wall, then they would have to consider the extraction and processing of the raw materials and how there would be inevitable impacts on the surrounding area in terms of noise and air pollution, loss of habitat and energy use adding to the CO2 emissions and therefore global warming. The stages can be followed through to construction of the wall and its possible lifetime and end with the question - what happens to the wall once it is of no further use? Another way of approaching this is to look at 'winners and losers' at each stage. For example, the builder may be a winner in that the wall uses well known and practiced techniques that require no new training to the workforce. The end user may have higher energy bills and so is a loser on one hand, but a low cost and strong wall with little maintenance means they are a winner on the other. An alternative focus could be suggested and the process repeated. This can help provide an overview of topics including - evaluate
sustainability of construction methods (AC1.3) and assessing the benefits of sustainable construction (AC2.3), as the key stakeholders can be identified and the benefits or impacts on them noted.

When discussing the properties of sustainable materials (AC1.1) the learners could conduct simple experiments where they are asked to insulate an item with organic and man-made materials and comparisons made between them or a wood from sustainable source could be compared with one that is not. The benefits of sourcing locally, nationally or importing can also be addressed through the lifecycle/ winner/ looser method.

Using case studies in consideration of community perceptions can provide learners with experience in the different design research tools (AC3.1). This can include some role play whereby groups of learners take different sides over a community project. For example, they may be given a proposal for a new environmental education unit, on school grounds, that is to be made and constructed with a sustainable approach and a limited budget. The meeting would act as a focus group and could act as a way of capturing the data generated. Likewise, a teacher-led discussion on the class's views on sustainable design can be used to show how question phrasing needs to be considered, an open question such as “do you like green homes” having too wide a response variation whilst more selective questioning that involves scoring on say a 1 -4 scale give more usable data. Learners could be given homework to question local residents on certain proposals. Learners studying drama could be involved in role playing for interviews or experts could be brought in for learners to use for their research into possible options.

Analysis and presentation (AC3.2 and AC3.3) of the findings can be in report form or as a verbal presentation, but care needs to be taken in the setting of the work so as to ensure that the audience is considered. It is of course vital that the learners cannot only use the information they have been taught, but can transfer and apply it to the set internal assessment.

5.3.2 Suggested learning activities

Activity 1 (AC1.1) - Identify sustainable materials used in construction and the built environment

Arrange a visit to a local building supplier, some of the bigger national companies may be best to start with but you may have links with smaller independents. Get a sales manager to show what they have on offer in terms of green materials, what they are used for and what their properties are. When back in the class they can make a leaflet on selected products based on the notes they have made during the visit. Alternatively this could be undertaken with a specialist supplier e.g. [http://www.greenbuildingstore.co.uk/page--energy-saving-windows-doors.html](http://www.greenbuildingstore.co.uk/page--energy-saving-windows-doors.html). However, a building yard would possibly enthuse the learners more, making the subject ‘real’ and giving the opportunity of handling the products available. An alternative is to invite a sales representative to your centre with samples.
**Activity 2 (AC1.2) - Explain how sustainable processes are used in construction and the built environment**

There are currently in existence many sustainable building projects, both completed or under construction. This qualification strives to enthuse learners and provides a realistic set of experiences. Getting learners out of the classroom for a site visit can help emphasise, reinforce and enliven class based learning. The Open Doors scheme that has the involvement of many large organisations, invites the public in to see construction sites in many areas including defence and civil engineering projects, those taking part have included Kier, Lend Lease, Mace Group, Midas Group, Morgan Sindall Group plc., Osborne, Seddon, Severfield, Shepherd Construction and Sir Robert McAlpine. Many large companies actively encourage links with the community and education, so a visit may not be as hard to organise as you think.

To help the learners stay focused on chosen elements of the project, pre-prepared sheets could be used with key questions or headings for them to fill in. These sheets could be issued, identically, to all class members or varied, to gain a wider spectrum of observation if deemed appropriate.

**Activity 3 (AC1.3) - Evaluate sustainability of construction methods**

Lifecycle analysis, or cradle to grave analysis, is a common industry process used to assess impacts. This could initially be taught by example, first covering the main areas of materials ‘extraction and processing, through to final disposal showing the possible impacts on local and global environments. Lifecycle analysis would be an ideal basis for researching the differences between the main building methods and building types.

Traditional New Build  [https://www.youtube.com/watch?v=ax4X1z-SBjM](https://www.youtube.com/watch?v=ax4X1z-SBjM)

Modern  [https://www.youtube.com/watch?v=zZwu0ZFpZHz](https://www.youtube.com/watch?v=zZwu0ZFpZHz)

Eco  [https://www.youtube.com/watch?v=8JqDo8cVzR4](https://www.youtube.com/watch?v=8JqDo8cVzR4)

Renovation  [https://www.youtube.com/watch?v=sJNoTsTcpUQ](https://www.youtube.com/watch?v=sJNoTsTcpUQ)
### e.g. Renovation

<table>
<thead>
<tr>
<th></th>
<th>Local Impacts</th>
<th>Global Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material extraction</strong></td>
<td>Low but mainly traditional building materials could be extracted locally. This could scar landscape, cause loss of habitat, add noise, traffic and visual pollution and dust.</td>
<td>Low, little materials used in comparison to the methods but mainly traditional materials used like concrete that are not good for the environment.</td>
</tr>
<tr>
<td><strong>Material production</strong></td>
<td>Low, some traditional building materials could be made locally. For example timber could be processed or paint made but as relatively little is used then it is relatively low.</td>
<td>Medium, many traditional materials cause CO₂ through high energy use in their production, e.g. concrete.</td>
</tr>
<tr>
<td><strong>Construction activities</strong></td>
<td>Medium, there will inevitably be noise, dust and more traffic but generally there is less to do than a new build site.</td>
<td>Medium - construction uses energy and therefore contributes to the problems of global warming.</td>
</tr>
<tr>
<td><strong>Energy use when built</strong></td>
<td>Low - Medium. Depending on the type of renovation, it could be a renovation that is intended to cut future energy use but equally it could just be altering the look and facilities in the building.</td>
<td></td>
</tr>
<tr>
<td><strong>Reliability (will it need a lot of maintenance?)</strong></td>
<td>Medium - High. It depends on the renovation.</td>
<td>Medium - High. It depends on the renovation - the better planned and executed the more likely it will be to last a long time, however due to the nature of older materials maintenance will be an issue at some point.</td>
</tr>
</tbody>
</table>
### e.g. Renovation

<table>
<thead>
<tr>
<th>End of life. (what will happen to it - how difficult is it to recycle the materials)</th>
<th>Local Impacts</th>
<th>Global Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium - High. Time-consuming to take apart often using extreme methods like bulldozing and wrecking ball.</td>
<td>Low - older materials tend to be easier to separate so can be reused but are expensive to take apart therefore some could inevitably go to land fill. However, the fact that the renovation project does not need demolishing before start is an obvious saving.</td>
</tr>
</tbody>
</table>

### Activity 4 (AC2.1) - Describe measures used by the construction sector to minimise impacts of energy use

Watch the low emission Grand Design videos:

- Passive housing [https://www.youtube.com/watch?v=V9SrAGvhBbU](https://www.youtube.com/watch?v=V9SrAGvhBbU)

Get the learners to create a bullet list of key points for construction that minimise energy use. Now ask them to make a model, maybe out of hardboard glue gunned together, labelling all their features for energy conservation.
Activity 5 (AC2.2) - Explain how construction practices reduce environmental impacts on the built environment

Find a local sustainable construction project - it could be one that you have or are able to visit but could also be one that you choose online. By giving the learners a writing frame that asks questions about key practices on that site, most areas can be covered. Below is an online version of the same technique but a visit to a sustainable project would be much more advisable. Many eco-projects have some government or lottery funding and they get paid to take visitors and groups so often are very happy to arrange a visit.

Read [http://www.sustainablebuild.co.uk/EcoFriendlyConstructionMethodsMaterials.html](http://www.sustainablebuild.co.uk/EcoFriendlyConstructionMethodsMaterials.html)

a) What construction methods does this website suggest we should use?

b) Explain three environmental benefits of this.


c) Why is traditional concrete not very good for the environment?

d) Describe an alternative to traditional concrete.

e) Explain how it makes less environmental impact.

Read [http://www.sustainablebuild.co.uk/insulationmaterials.html](http://www.sustainablebuild.co.uk/insulationmaterials.html)

f) Why is traditional insulation not very good for the environment?

g) Describe an alternative to traditional insulation.

h) Explain how it makes less environmental impact.

Read [http://www.sustainablebuild.co.uk/PollutionFromConstruction.html](http://www.sustainablebuild.co.uk/PollutionFromConstruction.html)

i) How could waste materials cause problems for the environment?

j) How could this be reduced?

Read [http://www.sustainablebuild.co.uk/reclaimedmaterials.html](http://www.sustainablebuild.co.uk/reclaimedmaterials.html)

k) What are the possibilities for re-using materials on building projects?

l) What are the benefits when doing this?

As follow-up to understanding these points. An imaginary scenario could now be set to plan for a building project locally near their teaching centre where the impacts need to be reduced to a minimum. This can pick up the rest of the content points as well as allowing the learners to put into practice what they have learnt. Again, lead-in questions can help the report writing greatly and ensure the all areas are covered e.g. What are the environmental benefits of employing local subcontractors or, what are the benefits to the environment in choosing a subcontractor from the green register? [http://www.greenregister.org.uk/search](http://www.greenregister.org.uk/search)
**Activity 6 (AC2.3) - Assess benefits of sustainable construction practices to key stakeholders**

Again, the best people to deliver this are the people who make a living from sustainable construction and regularly have to tender for a job often highlighting the benefits that their method brings. However, before this it is worth making sure that the learners fully understand what a stakeholder is and what the benefits are. A good approach to this would be to split the class into groups: construction company, residents, businesses, and local authority in order to prepare for a discussion on a scheme to be built in their locality.
In order to help learners, they could be given some titles to discuss amongst themselves before the debate/meeting. The sheet below may help.

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic (anything to do with money)</td>
<td></td>
<td></td>
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<tr>
<td>Employment (will it make jobs or cut jobs)</td>
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<tr>
<td>Aesthetic (all about the look of the project)</td>
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<tr>
<td>Environmental (how is the environment affected)</td>
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<tr>
<td>Disruption (will the project cause local noise or traffic problems - think long and short term here)</td>
<td></td>
<td></td>
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<tr>
<td>Community (will the project bring any positive or negative effects to the way people interact in the area)</td>
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</table>

**Activity 7(a) (AC3.1) - Design research tools**

A good way of considering this particular learning outcome is to relate it to a built environment project, real or imaginary, and produce a report on how it is perceived by the local community. There may be projects nearby which are already causing some controversy that will suit your purposes. Or, it could be linked to a model made in AC2.1 or use an image or plan from elsewhere, potentially the same as used in AC2.3.

Once the main themes have been explored, then a pilot or trial questionnaire can be produced and tested within the class. The questionnaire can then be revised if it doesn’t produce the required and anticipated type of data.

Once questionnaires are finalised, learners could go out into the community and try and approach the public for their thoughts and preferences on a given project. As learners may find it difficult to get people to stop and respond, a shared approach may be wise with individuals having a limited number of responses to collect. Simple identity cards featuring
the teaching centre’s logo may help get respondents to stop and help rather than assuming it is a sales and marketing exercise.

Another way of getting questionnaires completed would be for learners to attach with a set of questionnaires, a short covering letter and a photograph of the proposed sustainable scheme. These could then be dropped off at neighbours’ houses for collection a few days later.

There are also many online ways of capturing data, Google Forms is a simple way of getting information and you may already use it in your teaching centre. Free internet based opportunities also exist such as Survey Monkey. General opinions on sustainability or a particular scheme, real or imaginary, can also be quickly obtained from staff and learners.

**Activity 7(b) (AC3.2) - Analyse findings**

Once the responses have been collected they can be either manually put into a spreadsheet or, this can be done for you if you use certain internet options. The key in the next stage is to try to get the learners to notice trends or patterns, for example respondents of a particular age may generally answer in a different way to other age groups.

Bias and influence may be due to the questionnaire design and the way the questions are phrased or the order in which they are placed. For example, if a question asks the respondent to rate between 1 and 5, where 1 means they agree strongly and 5 that they disagree strongly the 3 option often offered allows respondents to state that they have no opinion or have not thought about a particular issue. It might be an easy way out of answering a certain question. The physical placement of the "undecided" category (at the midpoint of the scale) can change response patterns. There are many websites that help explain this.

Splitting the task down into bite-size chunks is also a good way of getting learners to complete a word based task like this. A system such as Google Classroom is an excellent way of managing groups and multitask projects. Each ‘chunk’ can be set as an assignment with clear goals and success criteria, thus enabling the learners to be more easily supported.

**Activity 7(c) (AC3.1) - Present Conclusions**

If there is a real building proposal that could be used for the research, then the results of the questionnaire could be useful to the local council or any other parties involved in its completion. They could be involved in viewing the presentation of the findings and this may bring out a new side of your learners. Splitting the group up to deliver key points is important as some learners will not be used to presenting to others. The board of governors may well have links to a local project and may also be easily involved in the presentation process. Some practice will be necessary, especially perhaps in the earlier stages, some smaller presentation tasks can be built in. Supporting material to go with the oral presentation can be produced with the main findings such as slide shows, graphs and charts. As teachers we should be well placed to advise on this type of presentation.
Links

FSC https://www.youtube.com/watch?v=OmbJAHmvygk
The Green Building Council http://www.ukgbc.org
Sustainable Cities http://www.sustainablecities.org.uk
Sustainable case studies
http://wales.gov.uk/topics/planning/policy/guidanceandleaflets/casestudies/?lang=en
Energy reduction http://www.energysavingtrust.org.uk
Grand Designs http://www.channel4.com/programmes/grand-designs
Construction Excellence http://www.cewales.org.uk
Sustainable Building Centre https://www.youtube.com/watch?v=Q7XZAc2CD6s
Low Energy Buildings http://www.lowenergybuildings.org.uk
Questionnaire site https://www.surveymonkey.com