North East Ambition

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Construction Sector Toolkit Teacher Briefing Guide
Construction - Sustainable Housing

Introduction

The resources have been designed to be used as starter/plenary sessions for subject lessons, connecting to relevant topics within the scheme of work or related subject specific skills. There are links to additional resources or optional extension activities which could support a full careers lesson if desired.

Learning Objectives

- Learn about the construction sector and why it is important to the North East economy.
- Gain an awareness of the different job roles available in different industries within the North East construction sector and how these may be appealing as a future career.
- Gain an understanding of the relevance of the curriculum to careers in the North East labour market and what skills and academic subjects are required for these roles.

Construction in the North East – Background information

The construction sector is important to the North East and enables the growth of other key sectors in the North East economy, creating jobs in our region.

In 2020 there were over 50,000* people employed in 8,125 businesses in our region and more skilled people are needed in this sector. The CITB Construction Skills Network NE LMI report 2021-2025 estimates a further 7,000 new workers are needed between the end of 2020 and 2025 to meet the recruitment needs of the industry in the North East.

The UK, Welsh and Scottish governments have underpinned climate change commitments with a legally binding target to reduce greenhouse gas emissions to net zero by 2050.

The decarbonisation of homes to achieve net zero presents a huge opportunity for construction businesses, creating demand for a new set of skills and services to help make homes and buildings more sustainable.

The report Understanding skills demand within domestic energy published by the North East Local Enterprise Partnership in May 2022 outlines the scale of the challenge. "There are 24 million homes that require domestic retrofit for decarbonisation. To achieve the 2050 targets, the UK must decarbonise the heating market at a rate of 20,000 homes per week by 2025. The current rate is 20,000 homes per year. The UK has one of the worst energy efficiency ratings in Europe with an older housing stock that is insufficiently insulated.

There are significant social and economic opportunities too that could be gained. This challenge, if met, presents a significant economic and social opportunity for UK regions, potentially generating business growth and innovation and creating 240,000 skilled green jobs by 2035. The transition to low carbon, energy efficient homes, has the potential of significantly reducing fuel poverty and thereby health inequalities."

The development of skills required to deliver net zero by 2050 presents a challenge in terms of scale, pace, and quality. However, it also presents significant career opportunities for young people in the North East.

*For the most recent economic and employment data please visit North East Evidence Hub

Video activities

Students answer questions using information provided in the videos.

Careers in sustainable construction (4:09)

https://www.youtube.com/watch?v=4GlNkR7nE2o

North East employers RE:GEN and Gentoo explain how the construction of housing is changing in response to Net Zero and what that means in terms of jobs and skills, focussed on two housing developments on the North East.

The videos below are optional, they can be used to provide additional context to explain why homes need to change and what this means in terms of construction.

The path to zero carbon heat (3:10)

https://www.youtube.com/watch?app=desktop&v=BEc3GdtAjSM

Introductory video of the challenge faced by the UK to achieve net zero and offering 3 alternatives to fossil fuels – electrification, hydrogen and hybrid. Clear explanations of what each path involves.

Corehaus – Modern Methods of Construction (1:46)

https://vimeo.com/379864727

Animation showing modular housing assembly by North East company Corehaus. It is suggested this modern method of construction may have advantages in terms of energy efficiency and reduces on-site construction time.

The following videos show people working in the sector and highlight some of the skills and qualifications which could help with a career. You do not need to show all the video clips but can select those which are most relevant to your students.

Clear Climate – interview with heat pump trainer and apprentice (2:17)

https://www.youtube.com/watch?v=x8rg67w_ebs

Logan, an apprentice heat pump fitter, and his trainer Lee talk through careers in this emerging technology and the opportunities created by Net Zero targets in this industry.

Bowmer and Kirkland – interview with Design Manager (2:32)

https://safeshare.tv/x/ss6217ee56c47db

Graduate design manager, Hollie, from a North East construction company shares her thoughts on the benefit of careers in construction and the opportunities in the North East.

Gateshead Council – interview with an Energy Technician (1:51)

https://youtu.be/_oy7f0wFJ9o

Liam an apprenticeship qualified energy technician introduces his role managing utility contracts in the borough and projects to improve energy efficiency and work towards net zero. For example, by developing solar farms and district heating networks.

Northern Gas Network –hydrogen for domestic heat – career opportunities (2:48)
https://youtu.be/30Bl_L0cLEo
Two NGN staff involved in the Hydrogen homes project talk through their roles and career journeys. One progressed into their role through in-work training, while the other took an apprenticeship route.

Bowmer and Kirkland – interview with a construction site manager (7:21)
https://www.youtube.com/watch?v=lZiRs-Wbo04
Charlotte tells us what it's like to work as a Construction Site Manager for Bowmer and Kirkland. She talks about what skills are required for her job, how she balances being a mum with being a "boss lady", and how her love for fashion design as a child developed into a career on a Construction Site. (can skip first 1.18 mins if preferred as generic intro for all NEUPC videos)

Optimum Skills Academy – case study of a bricklayer
Part 1 of Beth's story (1:51)
Beth joined the Optimum Skills Construction Academy on a Traineeship. She built her confidence and excelled as a bricklayer. She completed her work experience with Wilmott Dixon who decided quickly to keep her on. Beth is now completing her Level 2 Bricklaying Apprenticeship with subcontractors of Wilmott Dixon, Shaw Construction. Video below provides further information on this next part of Beth's career journey.
Part 2 of Beth's story (2:45)
Beth has excelled throughout her apprenticeship and achieved a distinction in her End Point Assessment!

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Curriculum links

These toolkit resources could be used to introduce a new topic, subject content or to make general links between your subject and how the skills and knowledge acquired can support a future career.

Select the links relevant to your subject from the table below and insert into slide 8 of the lesson PowerPoint template, to highlight the connections between the subject/topic taught and careers in the North East labour market.

Science curriculum links		
Key stage and subject	**Curriculum link**	**These skills and knowledge are important to this industry because**
KS3 Science	**Ecosystems**	Understanding the impact of building development on ecosystems, the interdependence of organisms within those ecosystems, and how to mitigate any negative impact of developments is a key part of the planning and design stage of construction.
	Energy	The transition to low carbon heat provides an opportunity to discuss fuel use and costs in the domestic context, for example insulation to improve energy efficiency and reduce costs. Domestic heat pumps and district heating networks use the principles of heating and thermal equilibrium in their systems to heat up homes and buildings.
	Materials	Understanding properties of materials is important in the design and construction of housing. Development of new materials with certain properties, e.g. effective insulators or efficient battery materials is important to develop new technology and improve efficiency to support our low carbon heating future.
	Earth and atmosphere	Low carbon domestic heating and sustainable building is a key part of the government strategy to reduce carbon dioxide emissions and combat climate change.
KS4 Biology	**Ecology**	Development of sites for housing or the retrofit of existing homes to reduce carbon emissions can impact habitats and affect ecosystems. Assessment of this impact and effective planning to reduce any negative impact requires an understanding of ecosystems and the interdependence of organisms. The ability to extract and interpret data from charts, graphs, and tables relating to these assessments is essential to enable sustainable planning.
KS4 Chemistry	**Bonding, structure, and properties of materials**	Understanding properties of materials is important in the design and build of housing. Development of new materials with certain properties, e.g. effective insulators or efficient battery materials is important to develop new technology and improve efficiency to support our low carbon heating future.
	Chemistry of the atmosphere	Low carbon domestic heating and sustainable building is a key part of the government strategy to reduce carbon dioxide emissions and combat climate change.

	Life cycle assessment	Each of the materials used in construction of a building must undergo a life cycle assessment. This is so planners and developers can understand the impact on the environment of the materials and methods used for construction, and disposal at the end of useful life e.g. windows. These life cycle assessments can be used to make construction more sustainable and support decisions on which materials and methods to use. For example, traditional vs modern methods of construction (MMC.)
KS4 Physics	**Energy**	Calculating energy changes and efficiency, understanding energy transfers and specific heat capacity are essential in the design of heating systems and networks and evaluating insulation in buildings.
	Electricity	Calculating current and resistance and designing electrical circuits is key in the design of heat pump systems and technology for homes. Domestic installers and technicians need to understand circuits and potential difference in home heating electrical systems. Demand for these skills will increase as more homes have heat pumps fitted.
Additional subject related skills	Development of skills such as scientific thinking, analysis, and evaluation of data and risks, and an understanding of scientific vocabulary, units and nomenclature is essential across all aspects of the construction industry. These skills are needed to design and build our infrastructure and develop new technologies and materials to reduce the impact of construction on the environment.	

Maths Curriculum links

Key stage	Curriculum link	These skills and knowledge are important to this industry because
KS3	**Number**	Being able to understand standard units of mass, length, time, money and other measures to ensure that projects are appropriately managed
	Ratio, proportion and rates of change	Being able to create scale diagrams to ensure buildings are planned correctly and can be replicated.
	Geometry and measures	Being able to draw and measure angles, calculate area and interpret scale drawings. Using Pythagoras to work out measurements that aren't able to be taken
KS4	**Number**	Understanding standard units of measurements and being able to apply them in a variety of different ways to ensure the accuracy of drawings and when calculating the materials needed for a project. Understanding the limits of accuracy with rounded measurements is also important in this aspect of construction.
	Ratio, proportion and rates of change	Being able to use ratio notation or scale factors to ensure that building plans can be scaled efficiently and safely.

	Geometry	Being able to identify and apply circle definitions and properties such as when an architect is drawing up building plans. Being able to translate 2D plans to 3D and then construct and interpret 3D plans.
Additional subject related skills	Development of skills such as critical thinking, problem solving, time management and independent working are essential across the construction industry. In order to effectively design and build sustainable housing in a way that reduces the impact on the environment and to manage project timelines and budget.	

English Curriculum links

Key stage	Curriculum link	These skills and knowledge are important to this industry because
KS3 & KS4	**Spoken language**	Communicating with a variety of people is a key skill needed while working in sustainable housing. The ability to communicate instructions clearly and effectively to your co-workers to ensure effective teamworking and to communicate in meetings with external stakeholders to manage and deliver projects. Negotiation skills help when communicating with suppliers and subcontractors.
KS3 & KS4	**Reading and writing**	Many job roles in the construction of sustainable housing require some level of administrative work and so it is important to have good reading and writing skills. Being able to write reports, produce meeting minutes, write fee/funding bids are also important, as is the ability to read tender documents, client specifications and instructions.
Additional information	Skills developed through English are important for a variety of roles in sustainable housing. Being able to understand and use industry specific vocabulary, both written and spoken, ensures good levels of communication across a project which reduces the risk of mistakes.	

Additional activities and further information

There is an optional research task on slides 6 and 7 of the PowerPoint presentation if you would like to expand this activity into a full lesson. There is also an optional plenary which could be used as a reflection activity following a subject lesson. These could also be set as home learning tasks.

You can access more resources relating to careers in the curriculum on the North East Ambition website and on the Careers and Enterprise Company website.

If students are interested in finding out more about the industry in the North East and the varied career routes and opportunities available, there are some links on the plenary activity on the final slide which may be of interest.

You can find out more about the North East labour market via the LMI toolkit for educators on the North East Ambition website and through the North East Local Enterprise Partnership website.

Careers in the Curriculum CPD resources

Useful links for teachers to develop skills and knowledge to connect careers to the curriculum:

- Careers in the curriculum online CPD course delivered in partnership with NU:STEM
  - Careers in initial teacher education 1 – Unconscious bias
    https://www.youtube.com/watch?v=DLSVltC8oNE
  - Careers in initial teacher education 2 – Aspirations and gender
    https://www.youtube.com/watch?v=fucKEq4MvN8
  - Careers in initial teacher education 3 – Employability characteristics and role models
    https://www.youtube.com/watch?v=l3jryc1s87M
- Teacher Industry insights session – Construction (May 2022)
  https://www.youtube.com/watch?v=wHOfuXYT7SA
- Online CPD course available from STEM learning
  https://www.stem.org.uk/cpd/ondemand/443955/linking-stem-curriculum-learning-careers