



Energy Sector Toolkit Teacher Briefing Guide

Offshore Energy and Subsea Technology

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 Energy 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 Energy 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

North East Offshore Energy and Subsea Technology sector – Background Information

The North East is the leading location in England in the wind energy, oil, and gas sectors with a thriving cluster of supply chain businesses to the offshore energy and subsea industry, supporting 15,000 jobs. This is forecast to grow significantly as investment in offshore wind projects increases.

The planned Dogger Bank offshore wind farm will be the world's biggest offshore wind farm and two of the companies involved in the development, operation, and maintenance of the wind farm have decided to make Port of Tyne their base.

The Offshore Renewable Energy Catapult is the UK's leading technology, innovation, and research centre for offshore renewable energy. Their unique testing and research facilities at Port of Blyth bring industry and academia together to drive innovation in renewable energy.



Video activities

Students answer questions using information provided in the videos.

Careers in North East Offshore Energy and Subsea Tech sector (2:50)

<https://www.youtube.com/watch?v=ckd0mAuDscs>

Overview of why the sector is so important to the North East economy and highlights of the future opportunities available.

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.

Osbit (6:40)

<https://www.youtube.com/watch?v=jDyTm7Kbfo8&feature=youtu.be>

Introduction to an offshore engineering company, by one of their graduate engineers. Highlights the importance of creativity, teamwork, problem solving and communication skills in addition to Maths, English, and Science to careers in engineering.

Offshore renewable energy catapult (2:57)

<https://www.youtube.com/watch?v=yWwRU-toABs>

Overview of job roles available at the Offshore Renewable Energy Catapult introduced by a variety of staff.

Port of Blyth (5:54)

<https://www.youtube.com/watch?app=desktop&v=oQyDpIBJwd0>

Recorded presentation by Business Development Manager at Port Training Services, Port of Blyth. Overview of port activities and the cluster of offshore energy businesses based at the port, apprenticeship routes and links to subjects.



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 7 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	Energy, motion and forces	Understanding energy transfers and calculating forces and pressure are important in the planning of offshore wind farms and in the development of subsea equipment, to ensure it can withstand the extreme pressures underwater.
	Materials	Understanding properties of materials and how to develop new materials with certain properties is essential in the production of new products such as wind turbine blades.
	Earth and atmosphere	Offshore wind is a key part of the government strategy to reduce carbon dioxide emissions and combat climate change.
KS4 Biology	Effect of human interaction on ecosystems and biodiversity	Industry needs to understand the impact on the ecology of seabed of offshore developments. Each proposed offshore wind farm requires a full assessment by Natural England.
KS4 Chemistry	Bonding, structure and properties of materials.	Understanding properties of materials and how to develop new materials with certain properties is essential in the production of new products such as wind turbine blades
	Chemistry of the atmosphere	Offshore wind is a key part of the government strategy to reduce carbon dioxide emissions and combat climate change.
KS4 Physics	Energy	Understanding and calculating energy transfers, is essential to understand the capacity and efficiency of offshore wind farms in order to plan their development.
	Electricity and energy transfers	Understanding energy transfers and calculating power and resistance, is essential in the development of offshore wind farms in order to understand their capacity and efficiency.
	Forces and motion	Newton's laws of motion are used to design components and equipment for offshore and subsea developments, in order ensure they can function in the extreme conditions offshore.
Additional subject related skills	Development of skills such as scientific thinking, experimental skills and strategies and an understanding scientific vocabulary, units and nomenclature is essential in the industry in order to design, build, test and evaluate the products needed for offshore energy developments.	

Maths Curriculum links

Key stage	Curriculum link	These skills and knowledge are important to this industry because
KS3	Geometry and measures	Geometry is used to develop and analyse design drawings which are then made into the wind turbines or subsea structures. These accurate scale diagrams are essential to enable the precision engineering required to build this complex equipment.
KS4	Algebra	Algebra is used to design and analyse systems and manufacturing processes and to calculate the forces the offshore or subsea structures will experience. It is important to ensure they are built to withstand the extreme conditions and continue to operate effectively over time.
	Probability	Probability is important when evaluating the safety of manufacturing processes and offshore systems and structures. Health, safety, and environmental (HSE) considerations underpin all working practices in industry.
	Statistics	The ability to describe, interpret and compare data is used across the design, manufacture and evaluation of offshore structures and equipment. This data is used to monitor safety, efficacy and improve efficiencies over time.
Additional subject related skills	Critical thinking, problem solving, analytical thinking and quantitative reasoning are skills used daily by those working in the offshore energy and subsea technology sector. This enables designs to be continually improved and the safe, effective, and efficient manufacture and operation of the technology.	

English Curriculum links

Key stage	Curriculum link	These skills and knowledge are important to this industry because
KS3 & KS4	Spoken language	The ability to hold discussion and debate as well as to work collaboratively is important to communicate effectively with colleagues. Being able to use technical language and adapt the language used depending on your audience is key when communicating with customers and other stakeholders.
KS3 & KS4	Reading and Writing	Reading for information, enhancing vocabulary through sector specific language and able to write for a variety of purposes and audiences e.g. through reading technical publications and instructions or to produce reports for a variety of audiences.
Additional information	Skills developed through English are important for offshore energy and subsea technology industry to ensure that employees are kept up to date with changing practices, able to clearly read and understand safety instructions and to work collaboratively. The information in the videos and presentation can be used as a research base to allow students to create their own piece of work e.g., a spoken or written piece around the developments of offshore energy and subsea technology and their importance in the switch to greener energy.	



Additional activities and further information

There is an optional research task on slides 5 and 6 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.

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 – Offshore wind - October 2021
https://www.youtube.com/watch?v=GhL_6okqKvk
- Online CPD course available from STEM learning
<https://www.stem.org.uk/cpd/ondemand/443955/linking-stem-curriculum-learning-careers>