

North East Energy Sector Toolkit Teacher Guide

Careers in Electrification

Introduction

These 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 Electrification sector – Background Information

Electrification is the replacement of petrol and diesel engines in cars and other vehicles, within electric motors and drives. The UK could create up to 78,000 new jobs by 2040 in the battery supply chain and electric vehicle manufacture, with the North East at the cutting edge of the sector. Manufacturing accounts for 15.3% of the North East LEP area gross value added (GVA) and 11.3% of employment. One in three cars and 26% of all electric vehicle made in the UK are produced here.

Home to Europe's first battery materials factory and first Gigafactory, with two new facilities announced in 2021. Nissan have unveiled plans for Nissan's EV36Zero – a £1billion electric vehicle hub to accelerate the journey to carbon neutrality. There are further plans for new battery Gigafactory at a site near Blyth in Northumberland, which could create up to 3000 new jobs.

Video activities

Students answer questions using information provided in the videos.

EV North – careers in electrification – (4:24)

https://www.youtube.com/watch?v=_fu-5AYPenA

Overview of what is meant by electrification with an introduction to the sector with a North East focus. Video also contains details about career opportunities including 2 interviews, one with a young graduate engineer and another with a current apprentice in the industry.

The following videos show more people working in the sector and highlight some of the skills and qualifications which 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.

Envision AESC – career story of an engineering graduate- (2:0s)

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

Engineering graduate talking about their career journey and their role working at an electric vehicle battery manufacturer. Highlights qualifications and skills which are important and what they enjoy about the role.

Avid technology – overview of company, what they do and relevance of the sector (1m56s)

<https://www.youtube.com/watch?v=58lK75vBkac>

This video provides a description of the company and how they operate at the forefront of new technology. Gives an overview of types of job available and skills which are important and where to find out more information.

Nissan – (1:02) – Production supervisor at Nissan Sunderland

<https://www.youtube.com/watch?app=desktop&v=8oEplrjLvPc>

Short video of a Production Supervisor at Nissan describing a typical day at work and benefits of working at the company. Insights into expectations and qualities valued by the employer.



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 9 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 changes and transfers and calculating forces are important in design and manufacture of electric vehicles.
	Materials	Understanding properties of materials and how to develop new materials with certain properties are essential in the production of new parts for electric vehicles to improve performance and efficiency.
KS4 Chemistry	Bonding, structure and properties of materials.	Understanding properties of materials and how to develop new materials with certain properties are essential in the production of new parts for electric vehicles to improve performance and efficiency.
	Reactivity of metals, oxidation and reduction, cells and batteries	Currently most electric vehicles run on lithium-ion batteries which generate electricity through a cell comprising a positive lithium anode and a negative graphite anode which generates a potential difference.
KS4 Physics	Energy	Calculating energy changes and understanding energy transfers, is essential in the development of electric vehicles and also in the design of manufacturing processes.
	Electricity	Calculating current and resistance and designing electrical circuits enable the efficiency of electric vehicles to be improved, as well as being critical in the design and manufacture of electric vehicles
	Forces and motion	Newton's laws of motion are used to calculate the forces acting upon an electric vehicle and the power and acceleration required to move the vehicle at a particular speed.
Additional subject related skills	Development of skills such as scientific thinking, analysis and evaluation of data and an understanding scientific vocabulary, units and nomenclature is essential in the industry in order to design, manufacture, test and evaluate the electric vehicles, batteries and components.	

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 scale drawings which are then used to build the electrical vehicle or component part
KS4	Algebra	Algebra is used to design and analyse systems and electrical circuits for electrical vehicles, batteries and manufacturing processes.
	Probability	Probability is important when evaluating the safety of electrical vehicles and manufacturing processes.
	Statistics	The ability to describe, interpret and compare data is used across the design, manufacture and evaluation of electric vehicle and battery technology
Additional subject related skills	Critical thinking, problem solving, analytical thinking and quantitative reasoning are skills used daily by those working in the design and manufacture of electric vehicle and batteries. This enables designs to be continually improved and the safe, effective and efficient manufacture 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 e.g. communicating effectively with colleagues and able to speak using technical language
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 undertake research for their own writing
Additional information	Skills developed through English are important to the Electrification sector 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 importance of electrification.	



Additional activities and further information

There is an optional research task on slides 7 and 8 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 – Electrification - January 2021
<https://www.youtube.com/watch?v=mYUS3y4mUmk>
- Online CPD course available from STEM learning
<https://www.stem.org.uk/cpd/ondemand/443955/linking-stem-curriculum-learning-careers>