



### Why is the study of Engineering important?

Engineering will help you acquire knowledge, understanding and technical skills through work-related contexts as part of your Key Stage 4 learning. The qualification is equivalent to and complements GCSEs to help develop work-related skills in the Engineering sector. It will help broaden your experience and understanding of where your studies can take you in the future.

### What skills will the study of Engineering teach you?

Engineering gives learners the opportunity to develop sector-specific knowledge and skills in a practical learning environment. The main focus is on four areas of equal importance, which cover the:

- Development of key engineering practical and technical skills, such as research, observation, measurement, making, using computer-aided design (CAD) and disassembly
- Knowledge of key engineering sectors (mechanical, electrical/electronic and engineering design) and the interrelation of each in industry
- Knowledge of the stages involved in planning and implementing an engineering project
- Knowledge and skills involved in the investigation of solutions to engineering problems in response to a given brief.

Learners will produce solutions to problems using different combinations of engineering skills, including designing as part of the engineering design and make process. The engineering design and make process: define the problem, develop possible solutions, choose a solution, design and model the solution, evaluate outcome of project, work in a team.

- Interpreting an engineering brief, e.g. physical requirements, aesthetics, size, function, performance requirements.
- Producing initial design proposals, e.g. researching existing products, producing design sketches in 2D and 3D, using creative thinking and evaluation techniques to generate the best solution given the brief.
- Computer-aided design (CAD) drawings using drawing, editing, modification and manipulation commands to generate engineering drawings and circuit diagrams on templates to the appropriate standard.
- Generating final design solution using 2D drawing techniques and 3D models, e.g. detailed drawings, circuit diagrams, 3D printing, physical modelling.
- Making final design solution decisions, e.g. selection of materials, selection of making techniques, considering quality requirements.

- How employees work in a team and peer review during the engineering design and make process with the customer as a focus, using generic skills, e.g. behaviours, attitudes, limitations, respect for others, professionalism, working relationships, collaborative skills.

Learners will also investigate the materials, components and processes used in the production of engineered products. The engineering material categories covered are:

- Ferrous, e.g. mild steel, wrought iron, stainless steel or non-ferrous, e.g. aluminium, titanium, copper, silver, zinc
- Thermosetting polymers, e.g. phenol-formaldehyde, polyimides, polyurethane or thermoforming polymers, e.g. polyethylene, polypropylene, acrylic.
- Properties of engineering materials, such as strength, hardness and toughness.
- Characteristics of engineering materials, such as machinability, workability and durability.
- Types of components, such as proprietary, e.g. rivet, nut and bolt, screw, key, mechanical fixings, electronic components, such as resistors, capacitors, fuses, diodes or product specific, e.g. bush, flange, printed circuit board (PCB).
- Characteristics of components, e.g. permanent/semi-permanent, sizes/dimensions, surface roughness, values, fixing methods.
- Types of engineering processes e.g. drilling, sawing, filing, shearing, turning, milling, forging, casting, extruding, moulding, folding, bending, fastening, bonding, soldering and brazing.

### Your study of Engineering

The course is split into three components;

**Component 1:** Exploring Engineering Sectors and Design Applications (Internally assessed) Learners will explore the links between the various engineering sectors and the role of design in the production of engineered products.

**Component 2:** Investigating an Engineering Project (Internally assessed) Learners will investigate the selection of materials, proprietary components, making processes and disassembly of a given engineered product. They will plan, reproduce, inspect and test a single component.

**Component 3:** Responding to an Engineering Brief (Externally assessed in February and May of Year 10) Learners will investigate and create solutions to problems in response to given engineering briefs.

## How can you deepen your understanding of Engineering?

- [www.technologystudent.com](http://www.technologystudent.com)
- [www.bbc.co.uk/schools/bitesize](http://www.bbc.co.uk/schools/bitesize)
- [www.engineering.com](http://www.engineering.com)
- <https://qualifications.pearson.com/en/qualifications/btec-tech-awards/engineering.html>
- Revise BTEC Tech Award Engineering Revision Guide
- BTEC Level 1/Level 2 Tech Award Engineering Student Book

## Study of Engineering can lead to a wide range of careers:

- The UK is regarded as a world leader in engineering, which covers a wide range of exciting and rapidly developing areas such as renewable energy, space, low carbon, aerospace, automotive, agri-food and bioscience. People with engineering skills are always in demand. Between 2010 and 2020, engineering companies are projected to have 2.74 million job openings.
- Mechanical Engineer
- Electrical Engineer
- Automotive Engineer
- Aerospace Engineer

## How are you assessed in Engineering?

There are 6 assessment points each year that we term Praising Stars®. We assess how students at their current stage of study are on track to reach their end of stage targets which are formulated on aspirational expectation from their KS2 starting points. We make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Engineering curriculum.

## How will I be assessed?

Pearson BTEC Level 1/2 Tech Award in Engineering				
Comp. Number	Component Title	GLH	Level	How assessed
1	Exploring Engineering Sectors and Design Applications	36	1/2	Internal
2	Investigating an Engineering Project	36	1/2	Internal
3	Responding to an Engineering Brief	48	1/2	External Synoptic

## Pearson BTEC Level 1/2 Tech Award in Engineering Course Overview

Term	Year 1	Year 2
<b>Autumn 1</b>	Key skills and subject knowledge	Component 1 – Exploring Engineering Sectors and Design Applications.
<b>Autumn 2</b>	Key skills and subject knowledge	Component 1 – Exploring Engineering Sectors and Design Applications.
<b>Spring 1</b>	Key skills and subject knowledge	Component 3 – Responding to an Engineering Brief.
<b>Spring 2</b>	Component 2 – Investigating an Engineering Project	Component 3 – Responding to an Engineering Brief.
<b>Summer 1</b>	Component 2 – Investigating an Engineering Project	Component 3 – Responding to an Engineering Brief.
<b>Summer 2</b>	Component 2 – Investigating an Engineering Project	

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