# Engineering Summer Bridging Work 2025

BTEC National Extended Certificate in Engineering

Time Required: 8 Hours

Submission: First Engineering Lesson in September (Digital Upload)

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## Welcome to Engineering!

You're about to start one of the most hands-on, opportunity-filled courses you'll experience in school. This task is designed to give you a head start, get you thinking like an engineer, and prepare you for the exciting challenges ahead.

Think of this summer task as your first real step into the world of engineering: identifying real-world problems, designing thoughtful solutions, and justifying your decisions — just like the professionals do.

## What Are You Doing?

You'll be completing a mini design project inspired by a real-world issue in one of the engineering sectors listed below.

Your job is to:
Choose a sector
Identify a real problem in that sector
Propose a thoughtful, well-reasoned solution
Present your thinking in a structured report or presentation
Include a CAD model (Onshape) or a simple prototype with documentation

## Engineering Sectors (Pick One)

- A1.1 Aerospace – Aircraft, drones, satellites, spacecraft
- A1.2 Agricultural – Farming, horticulture, forestry machinery
- A1.3 Automotive – Cars, trucks, vans, motorbikes
- A1.4 Biomedical – Hospital tools and medical devices
- A1.5 Chemical – Pharmaceuticals, food and drink, fuels
- A1.6 Civil – Buildings, bridges, tunnels, infrastructure
- A1.7 Energy – Solar, wind, hydro, nuclear, fossil fuel power
- A1.8 Mechatronics – Robots, sensors, electromechanical systems
- A1.9 Marine – Ships, boats, offshore platforms
- A1.10 Rail – Trains, rail networks, signalling equipment

## Key Engineering Themes (Choose at least one)

- • Safety – reduce harm or risk?
- • Reliability – does it last longer, or perform better over time?
- • Maintainability – easier to clean, maintain or repair?
- • Digitalisation – using software, sensors or automation?

## What Your Submission Should Include

1. Title Page – Name, title, sector, theme, optional image

2. Problem Identification – 150–200 words explaining the real-world issue

3. Sector Overview – 5–7 bullet points showing you understand the sector

4. Research – Images, case studies, or examples that inspired your idea

5. Design Proposal – 250–300 words + visuals of your solution

6. CAD or Prototype – Include Onshape screenshots or physical model photos

7. Key Theme Justification – Link your design back to your chosen theme

8. Evaluation – What went well? What could you improve? What did you learn?

## Want to Go Further? (Optional) – Be a keen bean!

• Create a short video explaining your design
• Add a basic cost breakdown
• Get feedback from someone else and include it
• Map out a timeline for how it could be built or used
• Use recycled materials for your prototype

## How to Submit

Email me your work before our first Engineering lesson in September
File name: Firstname_Lastname_EngineeringSummerTask2025

## Why This Matters

This task gives you a proper introduction to the kinds of projects you'll work on across the course. It helps build your engineering mindset and adds the first page to your portfolio — ready to show off to visitors, mentors and future employers.

Plus, it's a great chance to get creative and solve a real problem that matters to you.

## General Engineering & CAD Learning

- Khan Academy – Engineering
- Onshape Learning Center (Free CAD Tutorials)
- Tomorrow's Engineers – Career Inspiration
- IET Education (The Institution of Engineering and Technology)

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## Sector-Specific Links

| Sector | Resource | Link |
|---|---|---|
| **A1.1 Aerospace** | NASA Aeronautics Student Zone | https://www.nasa.gov/aeronautics/students |
| **A1.2 Agricultural** | National Institute of Food and Agriculture – Youth | https://nifa.usda.gov/youth-development |
| **A1.3 Automotive** | Engineering Explained (YouTube – Safe Channel) | https://www.youtube.com/user/EngineeringExplained |
| **A1.4 Biomedical** | BMES – Biomedical Engineering Society (Student Info) | https://www.bmes.org/students |
| **A1.5 Chemical** | Royal Society of Chemistry – Learn Chemistry | https://edu.rsc.org/ |
| **A1.6 Civil** | ICE – Institution of Civil Engineers (Education) | https://www.ice.org.uk/what-is-civil-engineering/ |
| **A1.7 Energy** | U.S. Department of Energy – Student Resources | https://www.energy.gov/science-innovation/education |
| **A1.8 Mechatronic** | SparkFun Education – | https://learn.sparkfun.com/ |

| Sector | Resource | Link |
|---|---|---|
| | Robotics & Sensors | |
| **A1.9 Marine** | Marine Technology Society – Student Section | 🔗 https://www.mtsociety.org/students/ |
| **A1.10 Rail** | Network Rail – How the Railway Works | 🔗 https://www.networkrail.co.uk/running-the-railway/ |

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## Extra Research Help

- 🔍 Google Scholar (Academic Search)
- 📘 BBC Bitesize – Design and Technology