

STEAM KS4 Engineering unit 1 Overview – Completion date:

You will:

- Learn about forces in engineering and calculating their effects on materials.
- Learn to work with metals including cutting, bending, riveting and welding.
- Learn to work with plastics including vacuum forming and injection moulding.
- Learn about different material types, their properties and their uses.
- Learn about engineering drawings, how to read them and the conventions used.

Foundation for the future

- Using knowledge to explore and develop
- Taking ownership and acting on ideas

Lesson Overview

1. Forces in engineering, tension, compression, torsion.
2. Mechanical properties, toughness, hardness, malleability, ductility
3. Calculating stress, strain, Young's Modulus
4. Tensile testing
5. Ferrous metals
6. Working with steel
7. Non-ferrous metals
8. Working with aluminium
9. Composites
10. Manufactured boards and timber
11. Plastic, thermosetting and thermoplastics
12. Injection moulding and vacuum forming.

Key words

Diameter	Force	Tension
Strain	Young's Modulus	Yield point
Thermoplastic	Thermosetting	Torsion
Stress	Compression	Bending
Ferrous	Stiffness	Rivet
Carbon Fibre	Fibreglass	Resin
Composite		

Reading and vocabulary:

<https://www.bbc.co.uk/bitesize/guides/z6byb82/revison/1>

Try and use these words in your evaluations:

Accurate Process fastener
Welding Adhesive Measurement Vernier
calipers Toughness Compression Tension
Torsion Stress Strain Young's Modulus

Cross curricular

Maths skills are key here, the conversions, angles, shapes and circles knowledge will be developed.

Area, volume and more complex wastage calculation will be discussed.

Calculations of stress and strain.

Creativity is developed through the problem solving of how to manufacture things.

Logical reasoning in the processes and ordering of tasks.

	Completed	Teacher assessment
Recall material properties		
Recall forces in engineering		
Recall ferrous metal		
Recall non-ferrous metals		
Work effectively with steel and aluminium		
Use injection moulding safely		
Use vacuum forming safely		
Recall composite layup for GFRP		
Explain and select material choices		

Teacher assessment (1 = poor – 5 = excellent)