

# Knowledge Organiser



**Learners explore how processes are undertaken by teams to create engineered products or to deliver engineering services safely**

## Learning Aim A

learners will produce evidence that evaluates the relative merits of using different common engineering processes to manufacture a given product or deliver a given service, by comparing and contrasting the advantages and limitations of the chosen processes and of using other possible processes. Learners will provide detailed and justified reasons as to which processes are most effective, by referring to the specific requirements of the given product or service, for example by considering why a product is cast rather than machined, or whether to test or disassemble at a given interval.

## Unit Overview

The use of engineering processes is integral to the manufacture of engineered products and the delivery of engineering services. Thousands of engineering processes are used in the manufacture and service of a complex product, such as an aeroplane. To ensure that these engineering processes can be planned and carried out safely and effectively, engineers must be able to work together to get the job done. It is for this reason that so many engineering companies focus time and effort on understanding engineering processes and developing teamwork.

In this unit, you will examine common engineering processes, including health and safety legislation, regulations that apply to these processes and how individual and team performance can be affected by human factors. You will learn the principles of another important process, engineering drawing, and develop two-dimensional (2D) computer-aided drawing skills while producing orthographic projections and circuit diagrams. Finally, you will work as a team member and team leader to apply a range of practical engineering processes to manufacture a batch of an engineered product or to safely deliver a batch of an engineering service. To complete the assessment task within this unit, you will need to draw on your learning from across your programme.

It is important that engineers understand how engineering processes are used to safely transform ideas and materials into products and services, and how critical it is to be able to work as a valuable member of an effective team or as a team leader. This unit will enable you to apply the knowledge and understanding you gained in Unit 1: Engineering Principles. The unit will help to prepare you for an engineering apprenticeship, a higher education engineering degree or a technician-level role in a wide range of specialist engineering areas.

## Command Words:

- A** Examine common engineering processes to create products or deliver services safely and effectively as a team
- B** Develop two-dimensional computer-aided drawings that can be used in engineering processes
- C** Carry out engineering processes safely to manufacture a product or to deliver a service effectively as a team.

## Learning Aim B

The orthographic drawings must be created on a 2D CAD package and not on a 3D CAD package. The component and electrical circuit to be drawn for learning aim B do not have to be used for learning aims A or C. The drawing should be created from an actual engineered component that must contain at least three different types of common feature. Learners will create the drawings using the knowledge and understanding gained in *Unit 1: Engineering Principles*. For example, taking measures from and performing calculations using the physical component, which could include geometry/vectors, basic arithmetic, trigonometry, and surface area and volume. learners will show in their evidence that they used a full range of CAD commands when generating the drawings and prepared and used additional layers as required for the drawing template, dimensioning and annotation. Overall, all details in the 2D CAD orthographic projection and the electrical circuit diagram must be produced to typically represent the standards found in BS 8888 and BS 60617 (or other relevant international equivalents), with no omissions or errors evident.

## Key Vocabulary

Polymers, Carbon, grains, ductility, brittleness, tensile

## Numeracy links:

Manufacturing uses precise measurements to ensure that accuracy is at its highest.

## Work Related Learning:

Gaining knowledge of how materials and their properties is key to working in any part of engineering

## SMSC and British Values

Understanding the importance that good design can have to solve critical issues in the world.