



Section 1:1 - Key vocabulary - Related concepts

- Function** - How does the engineered product work?
- Form** - What does the engineered product look like?
- Innovation** - How unique is the engineered product?
- Invention** - Are there any new functions in the engineered product?
- Evaluation** - How successful is the engineered product?
- Market and Trends** - Who are you designing the engineered product for?
- Ergonomics** - How the engineered product respond to the body?
- Adaptation** - How could you modify the engineered product?
- Collaboration** - Who would have worked on the engineered product?
- Sustainability** - How sustainable is the engineered product?
- Resources** - What materials and equipment does the engineered product use?
- Perspective** - What do the stakeholders require from the engineered product?

Section 1:2 - Metals



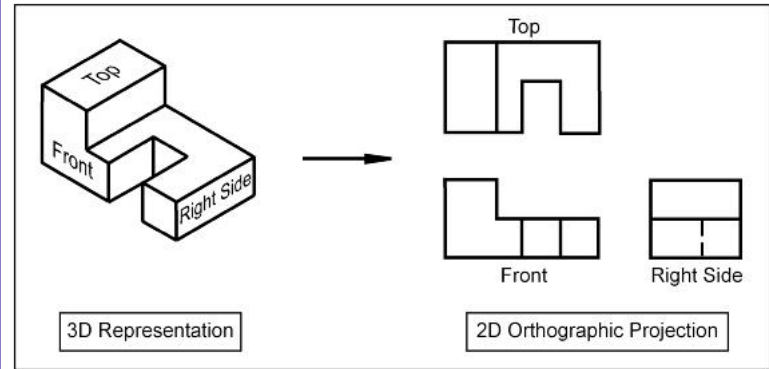
Ferrous Metals – These are metals that contain iron.
 For example – **Mild steel, Stainless Steel** and **Cast Iron**



Non-Ferrous Metals - These are metals that do not contain Iron.
 For example - **Aluminium, Copper, Brass and Zinc.**

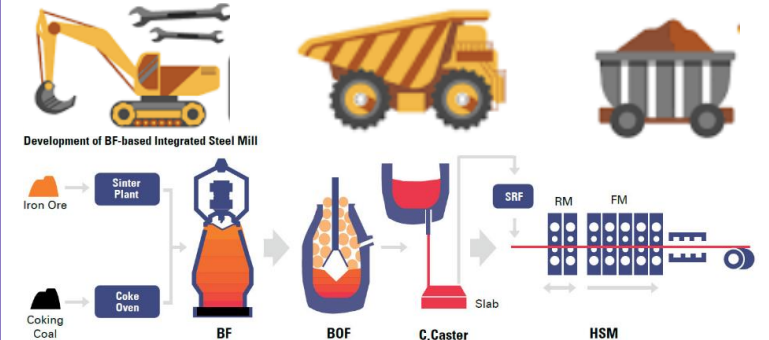
Alloys – These are created using a combination of one or more metals with other elements such as Carbon. Alloys are important because most pure metals have some useful properties but by using them to create Alloys their properties can be improved. For example pure Iron is a soft metal but by adding Tungsten to it the strength is greatly enhanced. There are many different Alloys used in Engineering. For example – **Stainless steel** is an **Alloy**, made using **Chromium** and **Iron**. **Mild Steel** is an **Alloy**, made using **Carbon** and **Iron**.

Section 1:3 - Orthographic Projection



Orthographic projection – Two dimensional views of a three dimensional object.
Elevation - The front or side view of a three dimensional object.
Plan view – The view from above of a three dimensional object to give a two dimensional view.

Section 1:4- Raw material to stock supply



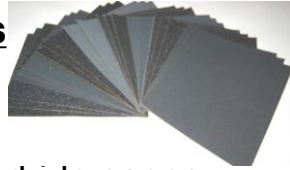
Mild Steel is produced 24 hours a day, every day of the year. After the **Iron ore** is mined it is processed in a blast furnace and converted into steel.



Section 1:5 Tools and processes



Engineers' rule



Carbide paper



Spot Welder



Pillar Drill



Try-square



Hacksaw



File

What does each tool do?

Section 1:6 – Health and Safety awareness

Personal Protective Equipment – PPE

When using the Pillar drill – Goggles and an apron must be worn at all times.

When using the Spot Welder – Fire retardant gauntlet gloves, Fire retardant apron and Full face Safety shield visor.



Stack all stools and chairs against the wall.

Take off all blazers and store them safely.

Aprons to be worn for all practical activities.

Clear away any unnecessary equipment.

Keep quiet and await further instruction.

Section 1:7 - Testing my engineered product

Product Testing - This is the stage of the engineering design development process where the engineered product is tested against the **Design specification criteria** to check that it is meeting the needs of the client or target market. These tests can be carried out at the prototype stage.

Other testing will include **User trial and observations**, assessing the usability and intuitive feedback. **Field** and **Performance tests**, to assess the functionality and performance of the engineered product. **Expert Appraisal**, this will include beta testing, professional feedback and analysis as well as consumer testing.

Section 1:8 - Finishing techniques

Finishing metal materials

Metals can be treated with a number of surface finishes these include **Paint, Powder coated Polymers & Polyurethane rubber.**

Applying these finishes can:

- Seal the metal to protect the surface from oxidisation.
- Enhance the surface.
- To colour the surface
- To give a specific aesthetic appeal.