

1. Environmental Issues – Be Aware Of, And Able To Discuss, The Importance Environmental Issues In Design And Manufacture.

1	Sustainable Materials And Components	Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. Design for the Environment (DfE) is a design approach to reduce the overall human health and environmental impact of a product, process or service, where impacts are considered across its life cycle
2	The Environmental Impact Of Packaging Of Products	Excessive use of packaging materials is creating many environmental problems. Large amounts of packaging material waste raises the requirement of effective waste-management systems. In addition, many packaging materials , e.g. polyethylene, are not suitable for disposal in the environment .

Key Terms

Circular Economy	Linear Economy
Product Miles	Product Life Cycle
Materials processing	Greenhouse Gasses
Climate Change	Renewable
Finite Resources	The 6 R's

2. Conservation Of Energy And Resources – Discuss, The Concept Of A Circular Economy; A circular economy is based on the principles of designing out **waste and pollution**, keeping products and materials in use, and **regenerating** natural systems.

1	Products Are Designed To Conserve Energy, Materials And Components .	Designing products which reduce the environmental cost the product has, is increasingly more important to businesses. Examples of two areas where the environmental impact of a product can be reduced by design are: <input type="checkbox"/> By using recycled materials in a products manufacture. <input type="checkbox"/> By lowering the products use of energy in either its manufacture or use.
2	The Design Of Products	For minimum impact on the environment including raw material extraction, consumption, ease of repair, maintenance and end of life .
3	Sustainable Manufacturing	Sustainable manufacturing is the creation of manufactured products through economically-sound processes that minimise negative environmental impacts while conserving energy and natural resources. One of the best ways to improve the sustainability of manufacturing is to use renewable energy. Power sources like wind, solar, hydro, or biomass are completely clean.
4	The Impact Of Waste, Surplus And Byproducts Created In The Process Of Manufacture.	Waste is a very costly misuse of our natural resources. We want to prevent waste occurring in the first place. But, some amount of waste is inevitable. So, where it does occur, we need to manage it in the most resourceful and efficient way possible. <input type="checkbox"/> Reuse Of Material Off-cuts – Designing for and Using standard sizes of materials, reusing offcuts as well as storing the material properly to protect it from weather and accidental damage. <input type="checkbox"/> Chemicals – There are four characteristics chemical wastes to be considered as hazardous . These are Ignitability, Corrosivity, Reactivity, and Toxicity. <input type="checkbox"/> Heat – Waste heat is heat that is produced by a machine, or other process that uses energy, as a byproduct of doing work. Waste heat has lower functionality than higher extremes of heat. <input type="checkbox"/> Water – In the manufacture of products, water may be contaminated or wasted. The waste and the water will enter the public sewer system, which transports the waste and water to a water treatment plant There the water is cleaned and filtered to remove the waste.
5	Cost Implications Of Dealing With Waste.	One of the main elements of sending waste directly to landfill is the cost – Around £100 per tonne .
6	The Impact Of Global Manufacturing On Product Miles.	Global manufacturing has meant that products, materials and components can be sourced from anywhere in the world and therefore the distances a product travels during its life cycle have increased dramatically.