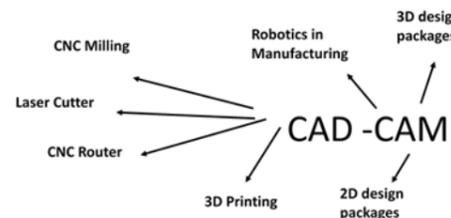


1.1 New and Emerging Technologies – Year 10 Product Design

Key Terminology	Definition
Co-operative	Co-operative a business owned, governed and self-managed by its workers.
Fair Trade	A movement that aims to achieve fair and better trading conditions and opportunities that promote sustainability for developing countries.
Sustainability	Meeting present-day needs without compromising the needs of future generations.
Ecological footprint	The impact of a person or community on the environment; the amount of land needed to supply the natural resources they use.
Social footprint	The impact a company or organisation has on people and communities.
Technology push	Where new technology or materials are developed and designers take the opportunity presented by this to design new products.
Market Pull	Where users want a product to be improved or redeveloped to meet their needs.
Computer-aided design (CAD)	Using computer software to draw, design and model on screen.
Computer-aided manufacture (CAM)	Manufacturing products using computer controlled machines.
Computer Numerically Controlled	Machine tools and equipment that are controlled by a computers.
Just in time (JIT)	A production method that means materials and components are ordered to arrive at the product assembly point just in time for production.
Lean manufacturing	Focusing on reduction of waste when manufacturing.
Planned obsolescence	Planning or designing a product to have a short life span.

Productions techniques and systems



Flexible Manufacturing Systems (FMS): - Production is organised into cells of machines performing different tasks.

Just in Time (JiT): - production is a manufacturing philosophy that started in Japan. It aims to keep limited materials and components in stock to save the company money on storage, transportation, financial capital interest, etc.

Lean manufacturing is the aim to reduce waste of materials and energy during production of products.

Key points

Automation is the use of computers to control machinery in factories with minimal human involvement.

Enterprise is a skill where people take risks to bring new products to the market.

Sustainability is about meeting our own present-day needs without compromising the needs of future generations.

Culture is the values, beliefs, customs and behaviours displayed by different groups of people.

Just in time (JIT) production is a method of organising a factory so that materials and components are ordered to arrive at the workplace just in time for production.

Planned obsolescence is when a product is deliberately designed to have a shortened life span through component failure or by going out of fashion.

Industry and Enterprise

How is technology transforming the way we work?

Automation uses machines and robots to carry out repetitive tasks.

Advantages:

- Produces products of a consistently high quality
- Low product cost
- Can produce large numbers of products quickly
- CNC machines are adaptable, and can often carry out a range of tasks.

Disadvantages:

- Very expensive to set up
- Requires a specialist workforce
- Can be costly if the system breaks down.



Enterprise is where individual or companies show initiative thinking about how to do things differently / better. Below are some examples of technology driven enterprise.

- Crowd funding:** - Is a way of using social media to build awareness so that lots of people can contribute small amounts of money to raise a large sum for a project.
- Virtual marketing:** - Companies are using social networks and websites to increase brand awareness.
- Retail:** - Adapting to trends such as 'showrooming' where shoppers visit shops to look at a product before buying it online.
- Fair Trade:** - A movement created to help producers in developing countries. It aims to achieve fair and better trading conditions. Social media has enabled the movement to advertise its cause.
- Co-Operatives:** - A business owned and self-managed by its workers.

Why do products change and develop?

Technology Push and Market Pull



Changing Job Roles due to Technology

New roles that have been created by technology:

- Robotics designers
- Programmers
- Systems analysts
- Computer technicians
- Logistics (as a result of online shopping).

Culture is the values, beliefs, customs and behaviours used by groups and societies to interact with each other and the world. In the global market place designers need to be aware of these issues. It may include:

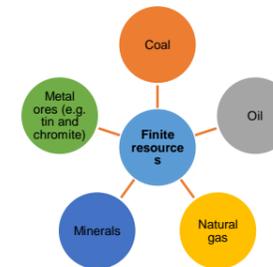
- Ethnic groups
- Political groups
- Religious groups.

Society designers must design products to meet the needs of everyone in society. This includes:

- Those with a disability
- The elderly
- People from different religious groups.

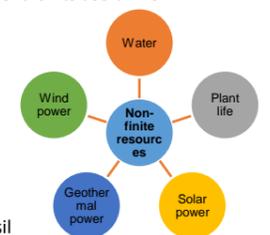
Sustainable design

Sustainability is about meeting our own present-day needs without compromising the needs of future generations. Designers need to think about the **life cycle** of a product from cradle to grave and its environmental impact. Designers should think about how they can make a product last as long as possible, and what can be done with the product at the end of its useful life.



A **finite resource** is a resource that does not renew itself quickly enough to meet the needs of future generations.

A **Non-finite resource** is a resource that can replenish quickly enough to meet current and future needs.



Manufacturing products uses energy, of which a huge proportion is produced by burning fossil fuels. Burning of fossil fuels releases pollutants and causes global warming. Global warming is the gradual increase in the average temperature of the Earth's atmosphere and oceans, which affects the Earth's climate.

Ecological Footprint: - Designers have a legal and moral responsibility to reduce their ecological footprint and ensure that products are more sustainable.

Social Footprint: - The effect that a company or organisation has on people and communities is referred to as their social footprint. They have a responsibility to consider human rights and working conditions.

Disposal of waste

Before a product goes into production its end of life needs to be considered. A designer can then ensure minimal negative impact on the environment. There are three main ways to dispose of products, Landfill, resource recovery, energy recovery and incineration.