

Design & Technology - RM & Graphics



Crowd Funding	fund (a project or venture) by raising money from a large number of people who each contribute a relatively small amount, typically via the internet.
Virtual Marketing	Advertising through social media to promote products
Co-operatives	a farm, business, or other organization which is owned and run jointly by its members, who share the profits or benefits.
Fair-trade	trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers.



CAD

Computer Aided Design



- 2D Design
- Sketch-up
- Auto-desktop
- Photoshop

- ✓ Precise / accurate.
- ✓ Quick to make changes.
- ✓ Can save a design to file and re use or edit it easily.
- ✓ Less wastage - test before you use materials.

- Workers must be trained to use the computer programme (software.)
- Must have access to a computer /power.
- Expensive software.

CAM

Computer Aided Manufacture



- Laser cutter
- CNC router
- CNC millers
- 3D Printers

- ✓ Precise / accurate.
- ✓ Quick to make changes.
- ✓ Can cut many of the same design in one go.
- ✓ Fast.
- ✓ Can use the same design in more than one material.

- Expensive machinery.
- Specialist maintenance - costs money.
- Extraction.

Automation and Robotics = loss of jobs for humans!

Computer numerically controlled (CNC): machine tools that are controlled by a computer.

Flexible manufacturing system (FMS) : a system in which production is organised into cells of machines performing different tasks.

Just in time (JIT): a production method that means materials and components are ordered to arrive at the production assembly point just in time for production.

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GRP
(Glass-fibre reinforced plastic)

Example: Canoes / boats
Properties: lightweight and strong

Composite materials =

two or more distinctly different materials combined together to create a new material with improved properties.

CRP
(Carbon-fibre reinforced plastic)

Example: high-performance sports equipment / vehicles.
Properties: VERY lightweight and VERY strong.



Kevlar
Bullet/stab-proof vests



Conductive thread – touch-screen gloves

Modern Materials & Technical Textiles

A material that has recently been developed for specific applications

Corn Starch Polymers – bio-compostable 'plastic' - packaging



Fibre-optics
For data transfer



Photo-chromic Pigment
Changes colour with light
Example: 'transition lenses'



Thermo-chromic Pigment
Changes colour with heat
Example: 'image-reveal mugs'



Smart Materials

A material that changes its properties in response to changes in its environment.

Nitinol / smart-memory alloy
Returns to shape with body-heat
Example: 'braces'



Phosphorescent Pigment
Glowes in the dark
Example: 'fire-exit'



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Market pull is about what consumers want.

Designers often design products that people want or need. This is called consumer demand.

Changing fashions and social attitudes affects the kind of products people want.



Market PULL
Making what customers want and demand.
Example:
personalised trainers.

Market Pull

Technology push is about what manufacturers can provide.

In industry, research and development departments are always coming up with new technologies, materials and manufacturing techniques.

This can bring about products which might be cheaper, better at its function, more efficient or nicer looking.



Technology PUSH
Technology and materials get better so we make products to make use of them.
Example: lighter materials mean faster cars.

Technology Push



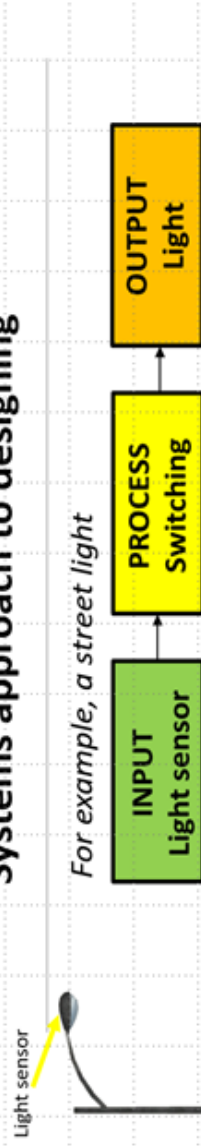
Hindu, Sikh and other faith were repulsed that the new notes in the UK are made from tallow, which is an animal fat-based substance. These communities avoid meat and meat based products as part of their religion. This led to over 100,000 signatures on a petition when the money was released.

Cultural Differences



Plopp is Sweedens most popular chocolate bar and has been since 1949. The name of the product makes it difficult to market in different countries.

Systems approach to designing



What does it do?

The light will come on when it gets dark (output)

How does it do it?

A trigger has switched on the circuit, making the light come on (process)

What makes it do it?

The light sensor has registered that it is dark (input) and triggered the switching process

Inputs:

light/temperature / pressure sensors and switches



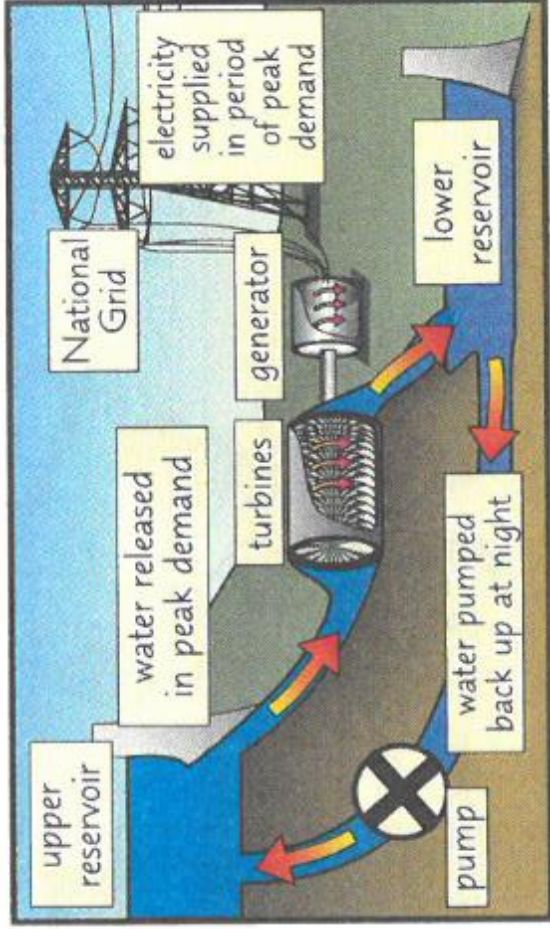
Processes:

microcontrollers as counters, timers and decision making



Outputs: buzzers, speakers and lamps





KINETIC PUMPED ENERGY STORAGE

To make electricity,
Water flows.....

Top reservoir



through a **TURBINE**



Bottom reservoir

Re-chargeable batteries

- can be used many times.
- Typically the batteries produce 1.2 volts of energy (1.2v) – slightly less than alkaline batteries.
- Re-chargeable batteries are responsible for many technological improvements in products such as mobile phones and cars.
- Just like alkaline batteries, they need to be disposed of carefully.



TESLA

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Alkaline batteries

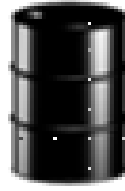
- Batteries are a store of electricity.
- There are electro-chemicals inside the batteries, which react to produce electricity.
- Typically the batteries produce 1.5 volts of energy (1.5v).
- Alkaline batteries are single-use and have to be disposed of at the end of their life.
- The chemicals and toxins inside the batteries can be dangerous to humans and wildlife, so must be disposed of correctly.



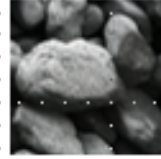
© Scanrail/123 RF

Fossil Fuels – Fossil fuels are natural resources that form underground over millions of years.
There are the three main types:

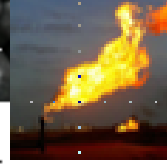
Oil



Coal



Natural Gas



Renewable energy:

