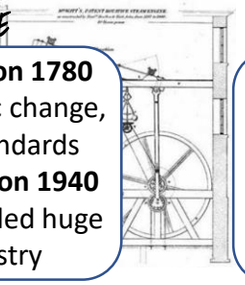
UNIT 1: NEW AND EMERGING TECHNOLOGIES

INDUSTRY AND ENTERPRISE



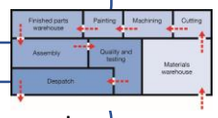
Industrial revolution 1780
social and economic change, improve living standards
The digital revolution 1940
Computer has enabled huge change in industry

Robotic Automation of manufacturing processes offers significantly greater *consistency*, *accuracy*, *reliability* and *productivity* than human workers

Barcodes were introduced in the 1980s, products were manually priced and counted for stock control.

Types: UPC-A & Code 128

Workflow is essential to health, safety and efficiency A production line must flow logically from one stage to the next Automation and new technologies



Graphene is a honeycomb lattice carbon structure only one atom thick. 200 times stronger than steel, very flexible, excellent conductor.

3D printing has the potential to change product development everywhere **3D bioprinting** is being used to create new, living organs

Virtual marketing includes: Search Engine Optimisation, Email marketing, Social media and Viral campaigns. **Crowd funding:** raise investment from individuals who believe in their idea

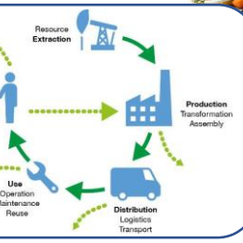
SUSTAINABILITY AND THE ENVIRONMENT

Finite (non-renewable) resources and fossil fuels Cannot be synthetically reproduced Includes **coal, gas and oil**

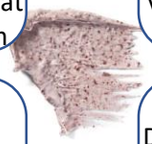
Non-finite materials
Oxygen, Fresh water, Timber, Leather
Renewable resources:
Wind, wave, solar, geothermal, tidal and biomass

Responsible Design
Use non-renewable energy. Toxic by-products. Impact of mining or harvesting. Product or production emit CO_2. Transportation, Maintenance, Worker Welfare, End of life

Life Cycle Assessment



Pollution Our air and waterways can be affected by industrial pollution
Global Warming Excess of CO_2 in the atmosphere that traps heat Burning fossil fuels releases CO_2 from the earth



Environmental Impact
Battery: Dangerous metals, Finite Resources
Miro Beads: Plastic microbeads in exfoliating scrubs, body washes and toothpaste. Fish Eat them we eat fish Mmmmmm

Eco-friendly Technology
Old technology combined with new ideas can create excellent new products i.e. Hybrid Engines

PEOPLE CULTURE AND SOCIETY

Technology Push
New technology is often pushed on to the market, driven by research. Often consumers are not aware of the new technology or the advantages it may bring

Market Pull
Consumer driven pressure causes manufacturers to continuously develop new products or add functionality to existing products

CoBots
Collaborative robots allow greater human-robot interaction. CoBots can adapt to human operation, work **with** humans rather than **for** them =improved productivity

Fashion and Trends
Evolution in the development of materials, technology and fashion has driven design trends

Colour
Does red mean STOP, DANGER?
Or WEALTH, LUCK and HAPPINESS?

Society
Societies all over the world perceive language, actions and products differently
In one country, a product may be very popular, in another, it may not be so well received

Inclusive Design
Designs may be developed to be easily used by the elderly or disabled. Pedestrian crossings audible beeps + bright colours for the partially sighted

PRODUCTION TECHNIQUES AND SYSTEMS

Automation
Robots and automated systems often replace manual jobs, and can therefore save labour costs Some companies(google,tesla) are developing autonomous self-driving vehicles

SketchUp

AUTODESK FUSION 360

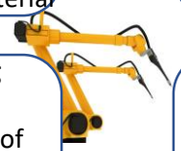
Computer Aided Design

Advantages of CAD	Disadvantages of CAD
Designs can be created, saved and edited easily, saving time	CAD software is complex to learn
Designs or parts of designs can be easily copied or repeated	Software can be very expensive
Designs can be worked on by remote teams simultaneously	Compatibility issues with software
Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes	Security issues - Risk of data being corrupted or hacked
CAD is very accurate	
CAD software can process complex stress testing	

2D½ DESIGN

Computer Aided Manufacture
Automated machinery controlled by software to manufacture physical parts. CAM uses CNC and CAD files to generate 3D tool paths for the machinery to follow

Computer Numerical Control
Include CNC milling machines, routers and lathes Laser Cutters and 3d Printers. By cutting at different speed rates, laser cutters can burn through or etch the surface of a material



Flexible Manufacturing Systems
FMS involve an assembly of automated machines commonly used on short-run batch production lines where the products frequently change.

Lean Manufacturing
'Lean' is a Japanese philosophy created by Toyota
It aims to manufacture products just before they are required to eliminate areas of waste

JIT
Items are created as they are demanded
No surplus stock of raw material, component or finished parts are kept

INFORMING DESIGN DECISIONS

Informing Design Decisions
If you are designing a new product, you will need to gather opinion and facts in relation to: Successes of similar products Available technology The size and need of market

Planned Obsolescence
A policy of planning or designing a product with an artificially limited useful life, so it will become obsolete

Product Lifespan
Designers should consider: Fashion and trends. The requirements to maintain market share. New technologies. Upgradeability and function?

Disposability
Some products are planned with deliberately short lifespans

Specialist Repair
Some products are manufactured to be too complex to be repaired at home. Specialist Knowledge and Tools are required

Ethics and the environment
Sustainably sourcing components and materials, ethical production methods, reducing waste, recycling and end-of-life disposal

End of Life
Responsible end of life design should include: Reduced materials recycled and recyclable materials easy-to-separate materials built-in reusability where possible