

ICT in Resistant Materials

Easter Break Revision

ICT

- Used to communicate and transfer data from one system to another.
- Now very advanced and continue to improve.
- Networks now exist almost everywhere there is computers, i.e. coffee shops, railway stations and airports.
- **Manufactures use ICT to keep track of products, components, accounts, sales data and production control.**

Emails



- **High speed communication.**
- **Excellent for designers, manufacturers, retailers and consumers to contact each other** because it's **fast** and **cheap**.
- **Lots of different documents** (designs, production schedules) **can be attached** and sent also.
- **Adv** – **very high speed**, large address books can be created for emailing lots of people at once, orders and payments can be made, **eliminates postage costs (cheap)**, mobile technology means emails can be sent on the move.
- **Disadv** – lots of spam (junk mail) can be generated slowing down servers, **hackers could potentially gain access to files and personal data**, you do not know if the person you are communicating with is who you think they are.

Electronic Point of Sale (EPOS)

- Used to **gather** and **record information**.
- **Shops use them at checkouts** when **scanning** products.
- The **barcode** on the product **contains information** about that product. As it is scanned the **unique code is recorded on a computer**.
- This **monitors how much** of each item is **sold**, current levels of **stock and** can **reorder stock** if needed.
- **Companies use the gathered data from EPOS** systems to manage sales and stock.
- **They can** also **see how much money has been made** which **helps** them **control theft, wastage and damage**.
- Can keep track of favourite items for sales purposes.



EPOS in manufacturing

- A stock control system similar to shops.
- During manufacture, **products are batched together and given a barcode**, i.e. 50 screws boxed together and barcoded.
- These **products are** then booked out for particular jobs and **tracked using the barcode**.
- **Replacement stock can then be ordered automatically** because the stock was recorded in the first place.
- **Excellent for quality control and quality assurance.**
- Also means that **large amounts of stock are not needed** in the first place.
- **Adv** – can check stock levels quickly and easily, can adjust and record stock levels on a daily basis.

(g) Describe **two** advantages, to the manufacturer of the desks, of using the internet to market its business.

(4)

1

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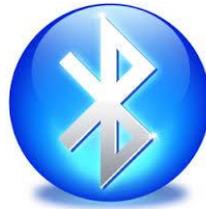
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Digital Media and New Technology

Easter Break Revision

Bluetooth



- A technology that allows some connections to be made via radio waves instead of wires.
- An open wireless system for exchanging data over short distances.
- Data is exchanged between mobile and fixed devices, usually over a personal area network (PAN).
- Can exchange data between laptops, PCs, mobile phones, digital cameras and games consoles such as Wii and PS3.
- Appropriate transmitters and receivers may need to be fitted, i.e. Bluetooth headset.

| <u>ADV</u> | <u>DISADV</u> |
|--|---|
| <ul style="list-style-type: none">-Low power consumption. Good for small batteries.-Devices do not need to be in line of sight.-High powered devices can work up to 100m. Good for use in railway stations and shopping malls. | <ul style="list-style-type: none">-Games controllers need battery power and can run out mid-game.-Power failure will interrupt service and data could be lost.-Security issues; Bluejacking and Bluebugging. |

Videoconferencing



- A **communication system allowing two or more people to see and talk to each other from completely different locations.**
- **Virtual meetings** can take place **across the country and the world.**
- **Needs a** video camera, TV or projector, microphone, loudspeakers, and a web connection.
- ***Designers can talk to clients without needing to travel.***
- **Adv** – **saves time** and **money** and **good for the environment** (**no travelling**), more efficient as lots of people from different locations can be involved, people can work from home.
- **Disadv** – **can be expensive to set up**, **internet speed** can slow or stop conversations, some people don't feel comfortable on camera or using a microphone.



CAD and CAM Technology

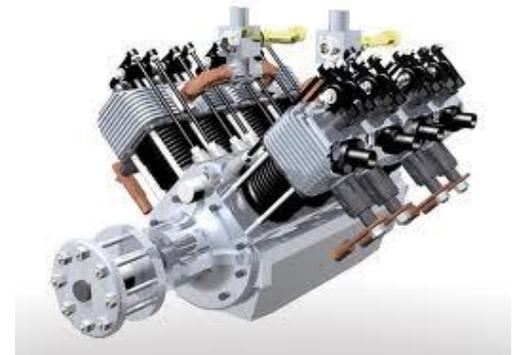
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CAD and CAM

- Developments in computer technology has benefited designers and manufacturers enormously.
- Designers use CAD systems to create, develop, record and communicate.
- CAM systems translate designs into code that CNC machines can read.
- Products and components can be made automatically, quickly and accurately.

Virtual Modelling and Testing

- A **computer or digital model** of a physical object.
- Mainly used to see what it might look like in the end.
- Can also be **tested in simulation programs**.
- **Adv** – **products can have colour and texture added** to see what they would like in real life, **designs can be changed** quickly and easily **without redrawing**, **files can be sent** to clients and manufacturers **via email saving time and money**, **files can be sent to CAM machines** for prototypes to be made.
- **Disadv** – **software** can be **expensive** to buy, **learning to use the software can take time**.



Laser Cutting



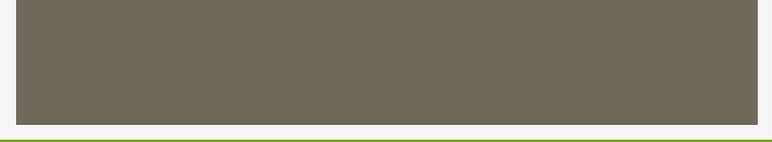
- A developing technology that uses a high-powered laser to cut various materials.
- Controlled by a computer.
- Laser melts or burns away the material to cut it.
- Best on a flat surface, but can cut round materials.
- Finished work needs little surface finishing.
- Regularly available in schools.
- **Adv** – highly accurate, can work 24/7, easy to cut identical components.
- **Disadv** – initial costs for machines is high, lasers can damage eyes, not very effective on highly polished mirrored surfaces.

CNC Milling and Turning

- CNC stands for **Computer Numerically Controlled**.
- Products can be cut and turned with great accuracy and speed.
- Milling machine uses a cutting tool that moves up and down vertically. The work is clamped in a table and the table moves backwards, forwards and side to side.
- **Can cut curves, 3D shapes and profiles.**
- CNC lathes can have pneumatic chucks and automatic material-feeding tubes, meaning that they can run non-stop.
- **Adv – can work 24/7, extremely accurate; identical copies produced every time, fewer manual workers needed (lower labour costs), complex shapes can be achieved.**
- **Disadv – Initial costs of machines is high, CNC milling and turning requires highly skilled staff.**

Rapid Prototyping

- Such as 3D printing.
- Only for making prototypes, not finished products.
- **Material is added in layers building it up into a 3D object.**
- Commonly used in car and aeroplane design.
- **Adv – Prototypes can be made very quickly, full 3D complex-shaped products can be made, 3D models are easier to handle than a 2D image and show off a design idea more quickly, products can be tested and developed and brought to the market more quickly, fewer manual workers are needed (lower labour costs).**
- **Disadv – Initial costs of machines is high, models are sometimes fragile and may break.**



(d) The computer desk was designed using computer-aided design (CAD).

Describe **two** advantages for the designer of using CAD to design the computer desk.

(4)

1

2

(d) The final toy design was virtually modelled and tested using computer-aided design (CAD).

Describe **two** advantages of virtually modelling and testing the final design using CAD before starting manufacture.

(4)

1

2

(c) The wooden shapes for the puzzle were cut out using a laser cutter.

(i) Give **two** health and safety issues associated with using a laser cutter.

(2)

1

2

(iii) Describe **two** advantages of laser cutting.

(4)

1

2