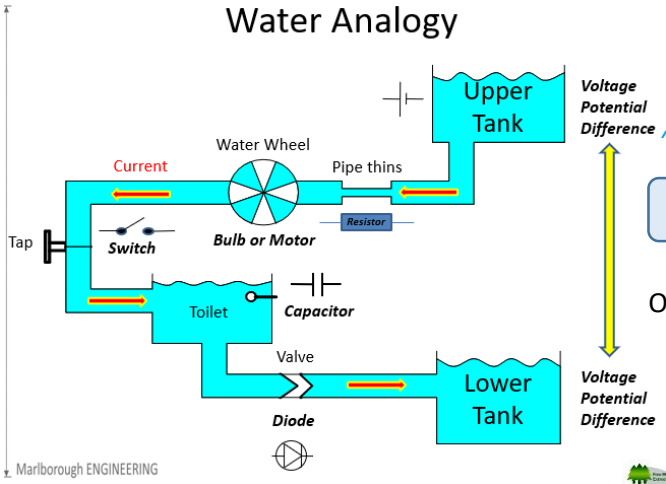
Electronics | Ohms Law | Power | Modern Technology | Miniaturisation

Water Analogy



Voltage Potential Difference

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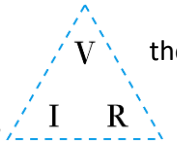

P=VI
the unit is **Watts**

Safety Signage

Efficiency

Or $\eta = \frac{Power\ Out}{Power\ In}$ X 100

1970s cleaner

Modern hi-tech vacuum cleaner

CAD

Advantages

- Quicker for the accuracy
- Easy to make edit/make copies/versions
- Email document round world then groups / different individuals can work on same document
- Link to CAM and rapid prototyping

Disadvantages

- Set-up cost
- Training
- Any ICT/mechanical issues

CAM

Advantages: same as CAD +

- Repeatability/consistency
- Complex shapes
- Safe as work is enclosed

Disadvantages: same as CAD

CIM: Computer integrated manufacturing= all ICT in production

Sustainability: Life Cycle Assessment

Raw material: Extraction + is it sustainable
Processing into stock form: impact
Manufacture: impact of
Use: how long it lasts. Easy to repair etc…
Disposal: is it recyclable etc…

Electronics Etc…
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Ergonomics
Comfortable use of a product.

Sustainability
WEEE Directive

The Waste Electrical and Electronic Equipment Directive became European Law in February 2003. It set out collection, recycling and recovery targets for all types of electrical goods, with a minimum rate of 4 kilograms per head of population per annum recovered for recycling by 2009

You must provide a way for your customers to dispose of their old household electrical and electronic equipment when you sell them a new version of the same item.
Gov.UK

Electronic circuit diagram components (symbols)

Symbol	Component	Symbol	Component	Symbol	Component
	Joined conductors		Crossing conductors -no connection		Single-Pole-Single-Throw switch (SPST) (normally open)
	Fixed resistor		Diode		Single-Pole-Single-Throw switch (SPST) (normally closed)
	Potentiometer		Light-Emitting Diode (LED)		Single-Pole-Double-Throw switch (SPDT)
	Preset potentiometer		NPN transistor		Double-Pole-Double-Throw switch (DPDT)
	Thermistor		Amplifier		Push-To-Make switch (PTM)
	Light-dependent resistor		Fuse		Push-To-Break switch (PTB)
	Polarised capacitor	2 pin	Resonator		Loudspeaker
	Non polarised capacitor	3 pin			Opto switch
usually drawn with added detail +9V 0V	Power supply		Primary or secondary cell	RL	Relay (with double-throw contacts - contact symbol varies with type used)
			Battery (of cells)		

Note: Relay Symbol - The symbol consists of a relay coil and contacts. Contacts are usually drawn separate from the coil at convenient points on the circuit diagram and are always shown in the unoperated position.

Ergonomics:
Describe two ergonomic considerations that could affect the design of a toothbrush.
2 × [2]

Modern Technology:
Describe two ways in which modern technology has made the vacuum cleaner easier to use in the home. (4)

Describe **two** disadvantages of the modern hi-tech vacuum cleaner compared to the 1970s cleaner. [4]

Miniaturisation:
The two images above are of a 1990s computer and a modern sleek tablet form of computer. Describe the technological developments in its design that have enabled the computer to become smaller. (4)

Ohms Law:
1. A simple circuit has 12v battery and the bulb has a resistance of 300 Ohms. What is current flowing through the circuit?

2. A bike light has a resistance of 600 Ohms and is running a current of 2 milliamps. What voltage battery needs to be inserted?

3. Two 2v cells are in a torch. The current flowing is 5 milliamps. What is the resistance of the circuit (bulb)?

Electronics Etc…

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CAD/CAM:
Computer aided design now plays a major role in the design of engineered products. Discuss the advantages of CAD to the engineer (4)

Sustainability:
The recycling and disposal of products, materials and components plays a major role in our everyday life. Discuss how a manufacturer of computers has tried to address these issues. [4]

Environment:
Discuss why and how the modern hi-tech vacuum cleaner has been designed to be environmentally friendly. [4]

Electronics:
Draw a circuit diagram for a battery powered torch with an LED, switch and flash feature.

Safety:
Draw four safety signs you remember from the workshop.

Power and Efficiency:
A circuit has a 9V cell and a current of 0.5A How much power is the motor providing if no energy is wasted as heat or sound?

A circuit has a 9V cell and a current of 0.5A The motor in the circuit is producing 4W of power.
Draw the circuit and work out the efficiency of the motor as a percentage