Knowledge Organiser: 'Yr8 'Polymers & Programming'

Keyword	Definition
pliable	easy to bend without breaking
ductile	able to be shaped without losing toughness
lightweight	having less than the usual or the expected weight
resistance	the ability to withstand or take, not accepting
brittle	hard but easily broken
tough	hard to break or snap
strong	able to withstand force without breaking

Thermoforming Polymers- can be heated and shaped many times

Polypropylene (PP)

- low density
- tough
- flexible
- softens at 140-150 degrees Celsius

Polyethylene terephthalate (PET)

- transparent
- lightweight
- strong
- tough
- softens at 80 degrees Celsius

High density polyethylene (HDPE)

- stiff
- strong
- lightweight
- chemical resistant
- softens at around
- 130 degrees Celsius

Polymethyl-methacylate (PMMA)
Known as acrylic or perspex

- hardwearing
- stiff
- resists weather well
- brittle not tough
- can be transparent or coloured
- softens between 85-165 degrees

Thermosetting Polymers- can be heated and shaped only once

Links mean no movement. The bond between the molecules is very strong.

Epoxy resin (ER)

- made by mixing a chemical with a hardener
- hard
- rigid
- good electrical insulator
- chemical resistant
- can be reinforced

Urea formaldehyde (UF)

- hard
- stiff
- strong
- brittle
- good electrical insulator

Melamine formaldehyde (MF)

- heat resistant
- hard
- resists some chemicals
- strong
- scratch resistant

Keyword	Definition
adhesive	a substance used to stick things together
hard	ability to withstand scratching, abrasion or denting
scratch	scrape, dig or tear something
insulator	something that doesn't allow heat, electricity or sound to pass through
thermal	relating to heat
stiff	not flexible and difficult to bend

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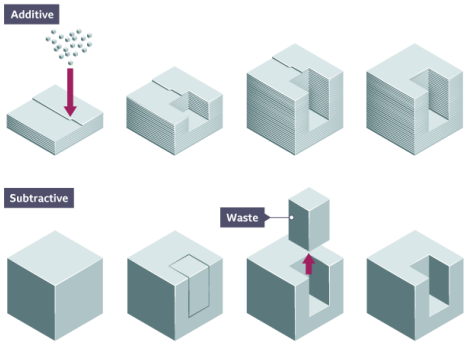


Additive manufacturing- builds up layers of a material (can be a polymer)
Subtractive manufacturing- pieces are cut away from a larger piece of material.

Additive manufacturing leaves very little waste so is more environmentally friendly.

Advantages of CAD	Disadvantages of CAD
ideas developed quickly	expensive set up costs
viewed from different angles	needs a skilled workforce
feedback obtained quickly	technology changes rapidly
easy to design and test	computers can fail

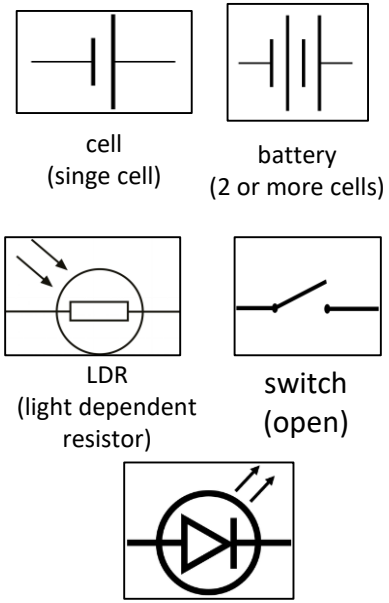
Advantages of CAM	Disadvantages of CAM
Fast and accurate	Expensive set up costs
Can run constantly	Needs a skilled workforce
Good for mass production	Maintenance required
Less material wastage	Machines can fail

Keyword	Definition
program	instructions executed by a computer
circuit	a path between two or more points along which an electrical current can be carried
microcontroller	a mini computer on a chip designed to control electronic devices
resistor	manages the amount of electrical flow in a circuit
tolerance	an acceptable margin of error of a manufactured product
control flow	the order in which the commands are completed in a program

Systems diagrams are used to simplify electronic systems. It lets us know how the system will work.

input	process	output
The trigger to complete the circuit. This is usually a switch or a sensor.	The part of the circuit that takes a signal from the input then completes a 'job'. This can be a microcontroller	The end of the circuit where the electricity transforms. It might be a light or a sound

Electronic Symbols



Basic

This part of the program starts the task

Input/Output

Collects readings from the LDR so it knows when to switch on.

Operators

Let's us decide how dark or light we want it to be when our light switches on. (at -200 lumens)

Control

This is the sort of glue holding the program together. It's in the background controlling everything.

Sparkles

This controls the sparkles (LED's) and their colour, if they change colour and how often

Variables

The variables are just that, variable. It means we can set the LDR to a set darkness

Example program

CRUMBLE