# Knowledge Organiser: Year 8 Nightlight

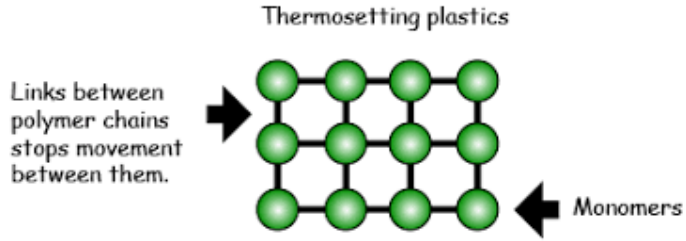
**thermo:** relating to heat

## Thermosetting polymers:

**Urea formaldehyde (UF)**
- hard
- excellent insulator

**Epoxy resin (ER)**
- chemical resistant
- hard
- excellent insulator

**Thermosetting polymers- can be heated and shaped only once.** This is because the bonds between the molecules is strong and will not become weakened by heat. They **cannot be recycled**.

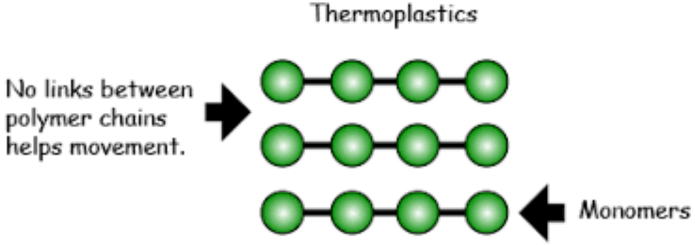



## Thermoforming polymers:

**Polyethylene terephthalate (PETE)**
- transparent
- barrier to gas
- lightweight


**Acrylic (PMMA)**
- Brittle
- transparent or coloured

**Thermoforming polymers- can be heated and shaped many times** as the links between the molecules is weak and becomes weakened when heat is applied. This means they **can be recycled** many times.

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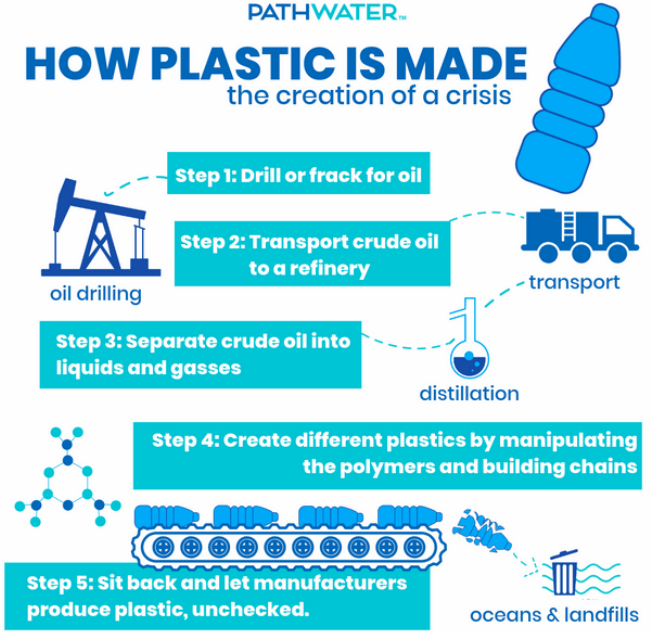
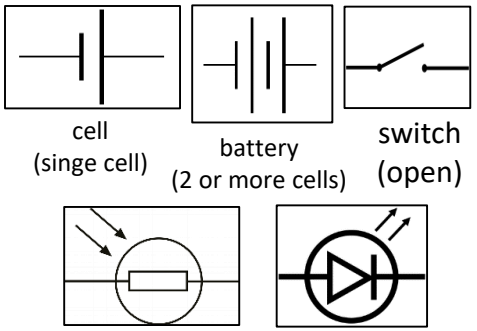


# Knowledge Organiser: Year 8 Nightlight

| Advantages of CAD | Disadvantages of CAD |
|---|---|
| **very precise/accurate as exact dimensions can be entered** eg: component parts for engine in automotive/aerospace industries | expensive set up costs |
| **designs can be seen from 360 degrees** so can be clearly seen and virtually tested | staff require training |
| **easy and quick to alter designs** | computers/software can be affected by viruses |
| **easy and quick to communicate designs** | |

| Advantages of CAM | Disadvantages of CAM |
|---|---|
| **very accurate as identical products made to exact dimensions made using CAD** (no chance of error as with hand making) eg CNC milling used to manufacture metal parts for automotive/aerospace | expensive set up costs |
| **faster and more efficient than making by hand-** machines can run 24/7 and do not need breaks- eg car production line | needs a skilled workforce |
| **nesting can be used to maximise material use** and avoid wastage eg laser cutter used to cut patterns in textiles/model planes etc | machines can fail and need skilled engineers – this can stop production |

## Electronic circuit symbols




| 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 |
| control flow | the order in which the commands are completed in a program |

**Systems diagrams** are used to simplify electronic systems. They show us how the system will work…

**input**
The trigger to complete the circuit.
This is usually a switch or a sensor.

**process**
The part of the circuit that takes a signal from the input then completes a 'job'.
This can be a microcontroller

**output**
The end of the circuit where the electricity transforms.
It might be a light or a sound

**Basic**
This part of the program starts the task

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

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

**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)

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