

30 PLASTICS



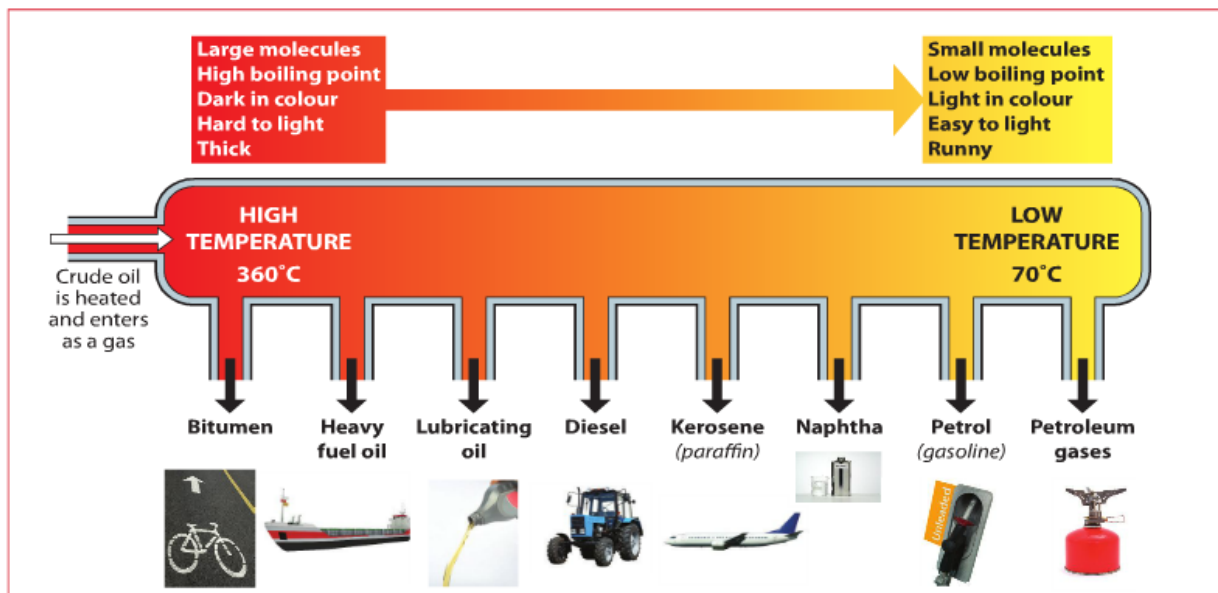
▲ Fig 30.1 Everyday plastics

PROPERTIES OF PLASTICS

Plastic	Examples of use	Reasons for use
Polythene	Plastic bags, fertiliser sacks, squeeze bottles, lunch boxes	Strong, cheap and flexible
Rigid PVC	Pipes and gutters, window frames, floor tiles, curtain rails	Strong, long lasting, weather resistant
Flexible PVC	Insulation for electrical wires, hosepipes, shower curtains	Strong, long lasting, very flexible, electrical insulator
Polystyrene	Food containers, yoghurt pots, electrical components	Strong (but brittle), rigid, electrical insulator
Expanded polystyrene (aeroboard)	Packaging, house wall insulation, disposable coffee cups	Extremely low density, good heat insulator
Nylon	Tights, carpets, ropes, combs, brushes, gear wheels	Can be spun into fibres, hard-wearing, 'slippery'

THE ORIGINS OF PLASTICS

Crude oil is a thick, black, foul-smelling liquid. Oil in this form is not of much use. The oil is a mixture of hydrocarbons which are separated in an oil refinery by fractional distillation. About 4 per cent of oil is used to make plastics.



▲ Fig 30.2 Fractional distillation of crude oil

MAKING PLASTICS

The manufacture of plastics from crude oil involves two stages:

- 1 Simple hydrocarbons are separated from crude oil. They are known as monomers (**mono** means **one**).
 - 2 These monomers react together and form long chains called polymers (**poly** means **many**).
- All plastics are made up of repeating units (monomers) linked together to form polymers. This process is called **polymerisation**.



▲ Fig 30.3 A model of polymerisation

Polymerisation

Small repeating units called monomers join together to form a large molecule called a polymer.

ENVIRONMENTAL IMPACT OF PLASTICS

Plastic does not break down easily. It is not affected by air and water. It is not biodegradable – bacteria cannot break it down. The first ever plastic bag could still be around unless it was burned. This is a major disadvantage of plastics. Landfill sites are full of plastic that will not break down.