Polymers
Introducing polymers

Structure of polymers

Summary activities
What are polymers?

Sometimes, hundreds of simple molecules can join together via covalent bonds to form a long chain.

The chains are called **polymers**, and they are very large molecules.

The word ‘polymer’ comes from the Greek words *poly* (meaning ‘many’) and *meros* (meaning ‘parts’).
Natural polymers

All living things, from plants to animals, are made of polymers. Polymers from living things are called **natural polymers**.

Natural polymers include:

- silk
- DNA
- protein
- rubber
- starch.

Some natural polymers can be extracted and converted into useful products. For example, silk produced by silkworms is used to make clothing.
Polymers that are synthesised in a lab are called **synthetic polymers**. These are made from substances extracted from the Earth’s crust.

Synthetic polymers include:

- nylon
- polyester
- poly(ethene)
- polystyrene
- Kevlar.

These polymers can be designed to have particular properties specific to their function.
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Polymers are long chains of atoms joined together by strong **covalent bonds**.

The building blocks of polymers are called **monomers**. These join together to form long polymer molecules in a **polymerisation** reaction.
Multiple polymer molecules are held together by **intermolecular forces**.

These forces determine the properties of the polymer.

Substances made of polymers are **solid** at room temperature due to the **strong** intermolecular forces between the polymer molecules.
Chain length and intermolecular forces

The intermolecular (IM) forces increase as the molecules get larger.

This means that the intermolecular forces are stronger between polymers with longer chains.

Longer chain polymers will be harder, stronger and have higher melting points.
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Multiple-choice quiz