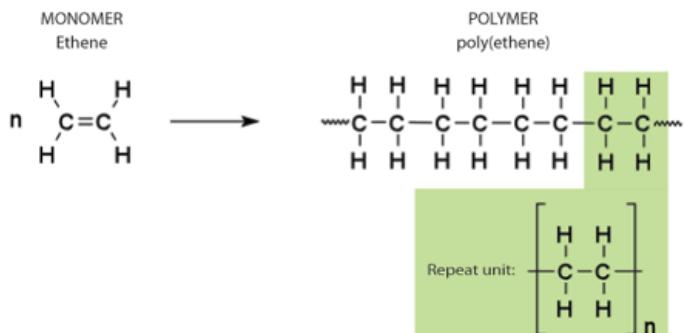


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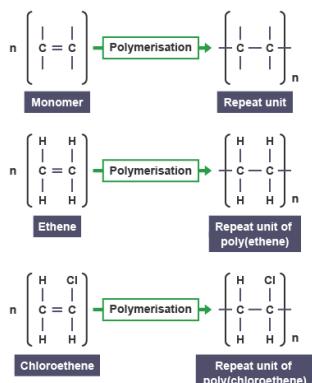
C11 – Polymers – triple students only

Addition Polymers

Plastics are materials made from **polymers**, which are long chain molecules containing covalent bonds. Polymers are made by joining **monomers** together. Monomers have to have a carbon to carbon double bond. This happens when one of the bonds in a double bond is broken and the monomer joins to the next one, making a long chain. The name of a polymer comes from putting poly- in front of the name of the monomer. This type of polymerisation is known as **addition polymerisation**. Different monomers will give polymers with different properties.



To represent polymers we use a **repeating unit**. As the polymers are typically many thousands of carbon atoms long we use an n to represent a large number.



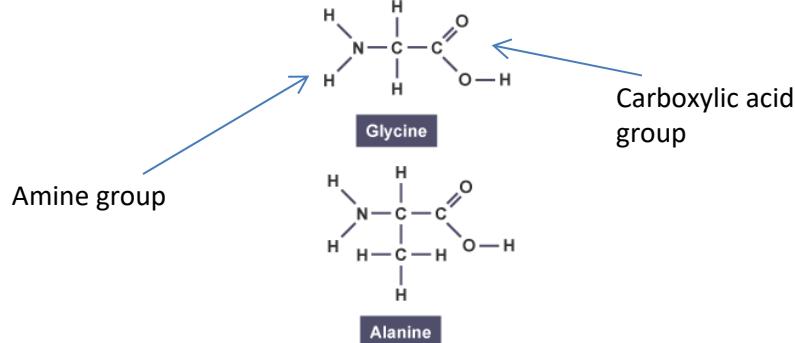
Key Terms	Definitions
Addition Polymer	An addition polymer is a polymer which is formed by an addition reaction , where many monomers bond together with no loss of atoms or molecules.
Monomer	A molecule that can be bonded to other molecules to form a polymer. An alkene is an example.
Repeating Unit	A repeating unit is a part of a polymer whose repetition would produce the complete polymer chain.

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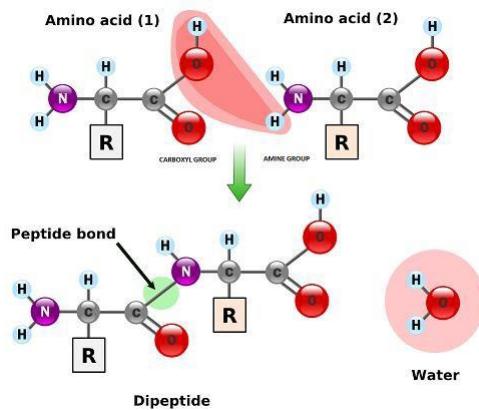
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Condensation Polymers

Other examples of condensation polymers include proteins. These are polymers of amino acids. Amino acids contain two functional groups, **a carboxyl group and an amino group**. Below is the diagram of two amino acids, alanine and glycine:



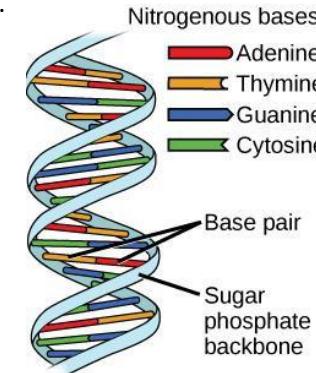
The carboxyl acid can react with the amino group on another amino acid molecule. This will form a peptide bond and as this reaction continues a large **polypeptide or protein** will form.



Proteins form molecules like enzymes, haemoglobin and a wide variety of body tissues.

Key Terms	Definitions
Amino Acid	A molecule which contains a carboxyl and amino group.
Peptide bond	A bond formed between an amino and carboxyl group.

DNA
DNA is made up of a nucleotide strands with bases to form the double helix structure. The nucleotide strands (sugar phosphate backbones) are condensation polymers.



Sugars can also form condensation polymers. For example glucose can be stored as **glycogen**, a polymer. Plants also make a polymer called **cellulose** to make their cell walls.

