

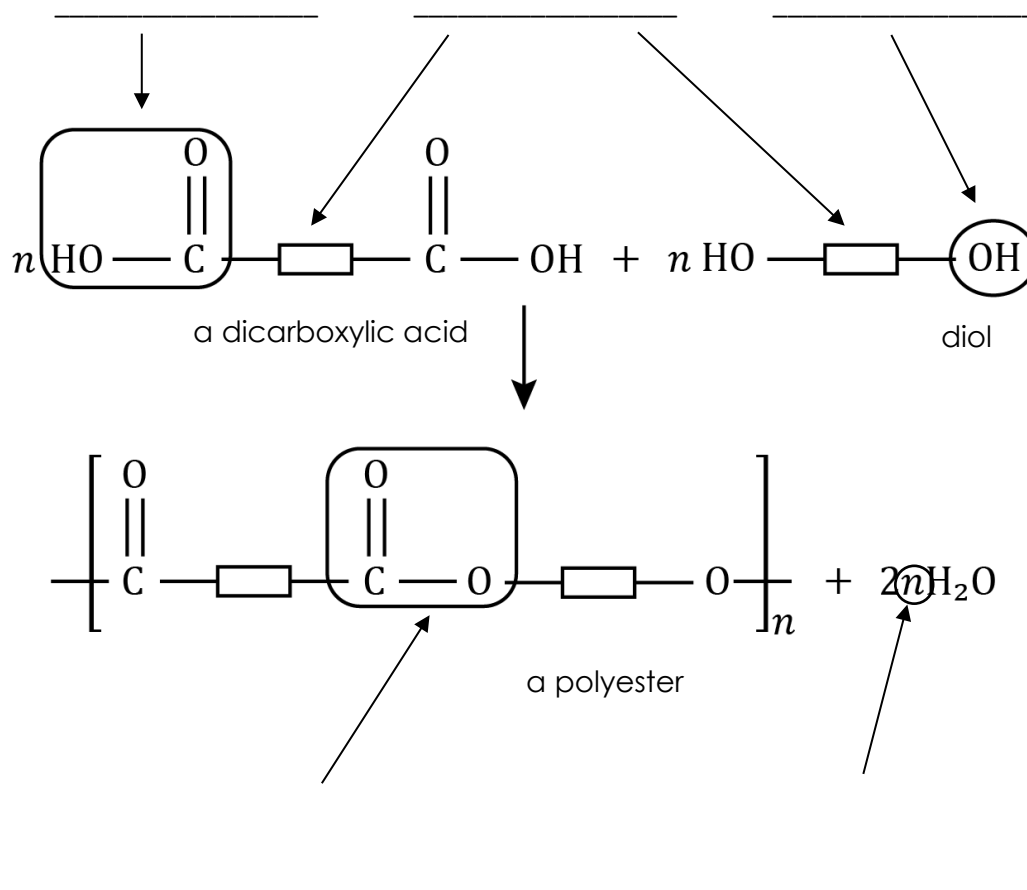


Condensation polymerisation: knowledge check

- 1.1 The diagram shows a dicarboxylic acid reacting with a diol in a condensation polymerisation reaction to produce a polyester and water.

Use the words provided to label the parts identified on the diagram.

carboxylic acid functional group alcohol functional group
 ester functional group a large number the rest of the molecule





1.2 Addition polymerisation and condensation polymerisation are two different types of polymerisation.

Place ticks in the correct column of the table to indicate whether each statement is describing addition polymerisation or condensation polymerisation.

	Addition polymerisation	Condensation polymerisation
The monomers contain carbon-carbon double (covalent) bonds.		
The monomers only contain one functional group.		
The monomers contain two functional groups.		
Only one product is formed in the polymerisation process.		
Two products are formed in the polymerisation process.		



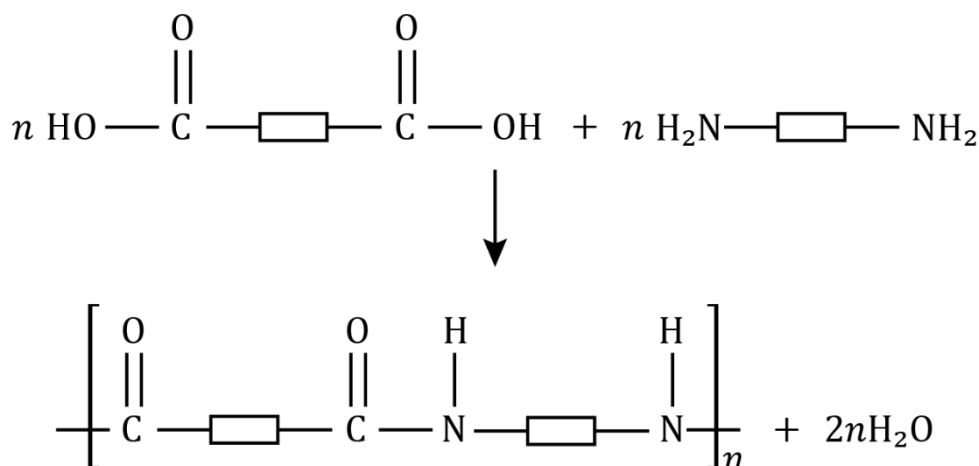
- 1.3 Select the correct answer from those provided to match each of the descriptions in the table describing condensation polymerisation.

polyester diol dicarboxylic acid $\text{HOOC}-\square-\text{COOH}$
 $\text{HO}-\square-\text{OH}$ water ester functional group

Description	Answer
Type of polymer produced from $\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{COOH}$ and $\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH}$.	
The small molecule produced as well as the polymer.	
Type of monomer including two carboxylic acid functional groups.	
Type of monomer including two alcohol groups.	
The short-form representation of $\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{COOH}$.	
The short-form representation of $\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH}$.	
Link formed between the two monomers.	



1.4 The diagram shows the condensation polymerisation reaction between a dicarboxylic acid and a diamine to produce the polyamide, nylon.



Use the words and formulas provided to complete the sentences describing this condensation polymerisation reaction.

NH_2 $-\text{CONH}-$ COOH
 dicarboxylic acid diamine polyamide

The first monomer is a _____ containing two _____ functional groups.

The second monomer is a _____ containing two _____ functional groups.

The polymer formed is a _____, which contains the functional group _____.



Condensation polymerisation: test myself

For questions 2.1 to 2.7 circle the correct answer.

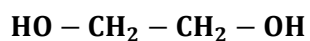
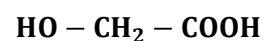
2.1 Which statement correctly describes polymers?

- A Polymers are small covalent molecules.
- B Polymers are very long chain-like covalent molecules.
- C Polymers are long chain-like ionic structures.
- D Polymers are small ionic substances.

2.2 Which of the following is a condensation polymer?

poly(ethene) poly(chloroethene) polyester poly(tetrafluoroethene)

2.3 Circle two monomers that could join up to make a condensation polymer.



2.4 What property of monomers makes them suitable to use to make condensation polymers?

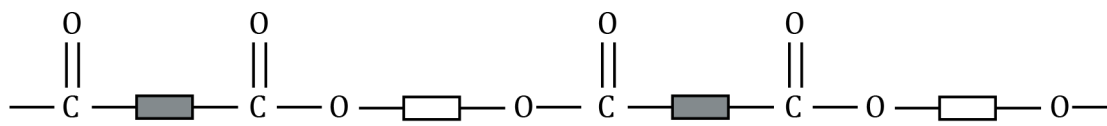
- A They have double bonds.
- B They have one functional group only.
- C They have two functional groups.
- D They are all esters.

2.5 What is the correct definition of a dicarboxylic acid?

- A a molecule with two C=C groups
- B a molecule with two COOH groups
- C a molecule with two OH groups
- D a molecule with two NH₂ groups



- 2.6 The diagram shows a short section of a condensation polymer. What is the name of this polymer?



nylon

poly(ethene)

polyester

polypeptide

- 2.7 Polypeptides are examples of condensation polymers.

What monomers are used to produce polypeptides?

amino acids

alkenes

alcohols

carboxylic acids

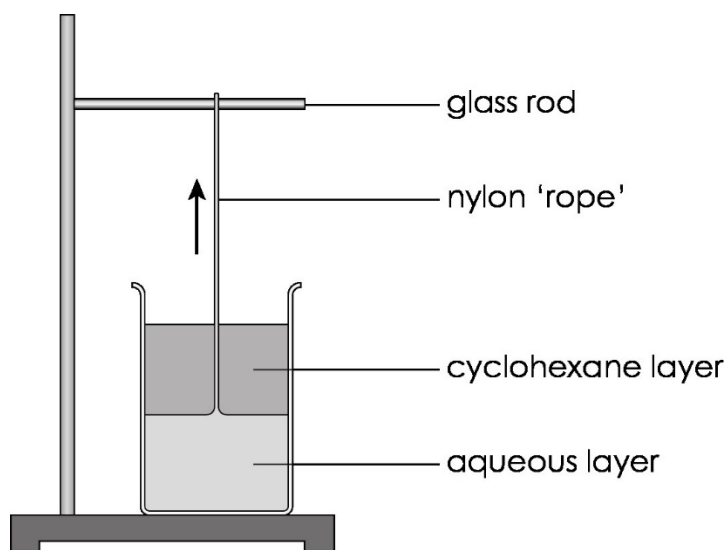


Condensation polymers: feeling confident?

3.1 This apparatus is used to make nylon in the lab.

The instructions for this process are given but they are in the incorrect order.

Complete the table by adding the letters to put the instructions in the correct order. The first has been done for you.



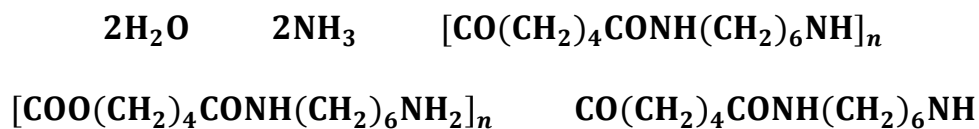
- A** Pour about 10 cm³ of monomer X solution into a beaker.
- B** Wind the nylon rope around the glass rod and continue to gently lift it out of the beaker.
- C** Dissolve monomer X in deionised water.
- D** Use tweezers to gently lift the layer of nylon that forms at the interface.
- E** Dissolve monomer Y in cyclohexane.
- F** Carefully pour about 10 cm³ of monomer Y solution into the beaker so that it forms a layer on top of the aqueous layer.

Step	Instruction
1	C
2	
3	
4	
5	
6	



3.2 The polyamide, Nylon 6,6, is made from the two monomers, $\text{HOOC}(\text{CH}_2)_4\text{COOH}$ and $\text{H}_2\text{N}(\text{CH}_2)_6\text{NH}_2$.

Choose the correct formulas to complete the equation representing this reaction. Make sure your equation shows the repeating unit.





Condensation polymerisation: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I can describe the characteristics of a polymer and an example of condensation polymerisation.			
I can describe the differences between addition polymerisation and condensation polymerisation.			
I can describe the monomers used to make condensation polymers and identify their functional groups.			
I understand the equation for the reaction to produce polyester, using block diagrams.			
I understand the equation for the reaction to produce nylon, using block diagrams.			
Feeling confident? topics	I understand this well	I think I understand this	I need more help
I can describe a process to make nylon in the laboratory.			
I can complete equations representing the reaction to produce nylon.			