

Exercise walk-through

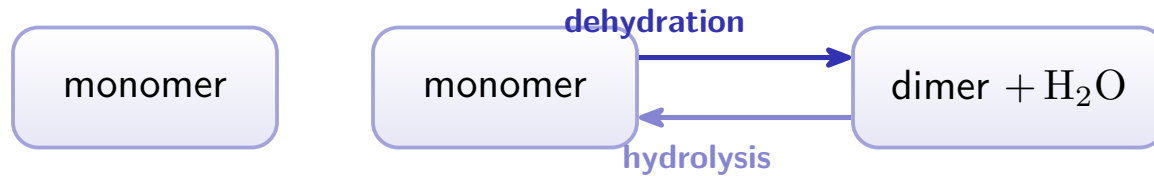
1.3

Introduction to Macromolecules

AP Biology

Macromolecules

Four classes – all built and broken the same way:



Carbohydrates , **lipids** , **nucleic acids** , **proteins** –
the same alphabet spells millions of molecules.

The four macromolecules and their monomers

carbohydrates

monomer: **monosaccharides** . Bond: glycosidic

lipids

not true polymers – glycerol plus fatty acids, joined by ester bonds

proteins

monomer: **amino acids** . Bond: **peptide bonds**

nucleic acids

monomer: **nucleotides** . Bond: phosphodiester

building

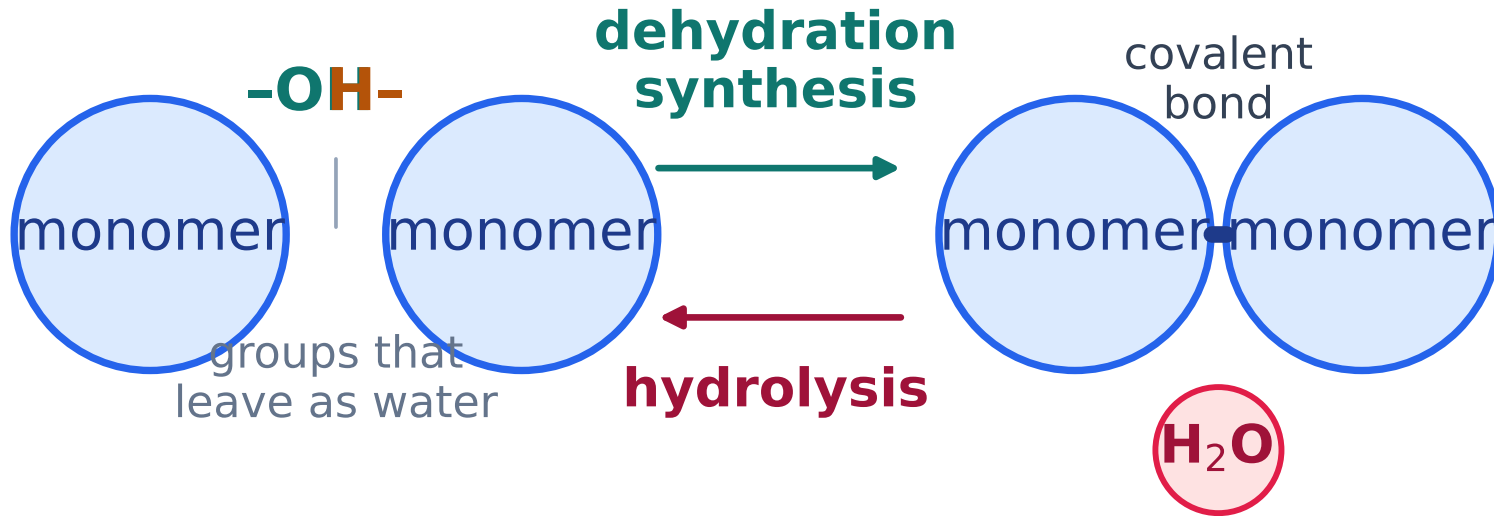
dehydration synthesis joins monomers and **releases** a water molecule per bond

breaking

hydrolysis does the reverse, consuming a water molecule per bond

Ten monomers make **nine** bonds and release **nine** waters – always one fewer than the number of units. That off-by-one is the exam's favourite check.

Introduction to Macromolecules



dehydration synthesis: monomers $\rightarrow$ polymer + H_2O

released / used

Dehydration synthesis builds polymers and releases water; hydrolysis reverses it

Exercises 2.1-2.3

2.1 What is a polymer?

[1]

2.2 What is removed when two monomers join by dehydration synthesis?

[1]

2.3 Name the four classes of macromolecule.

[2]

Exercises 2.1-2.3

2.1 What is a polymer? [1]

2.1

- A long chain of repeating monomers
-

2.2 What is removed when two monomers join by dehydration synthesis? [1]

2.2

- A water molecule
-

2.3 Name the four classes of macromolecule. [2]

2.3

- Carbohydrates, lipids, nucleic acids, proteins

Exercise 3.1

3.1 Breaking a polymer into monomers by adding water is called

[1]

☐

A dehydration synthesis

B hydrolysis

C condensation

D denaturation

Exercise 3.1

3.1 Breaking a polymer into monomers by adding water is called

[1]

☐

A dehydration synthesis

B hydrolysis

C condensation

D denaturation

3.1 B

- hydrolysis

Exercise 3.2 (a)

3.2 A cell links many glucose monomers into a starch polymer.

(a) Name the process and what is removed at each bond.

[2]

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3.2 A cell links many glucose monomers into a starch polymer.

(a) Name the process and what is removed at each bond.

[2]

(a)

- Dehydration synthesis; a water molecule is removed at each bond

Exercise 3.2 (b)

3.2 A cell links many glucose monomers into a starch polymer.

(b) State how the starch could later be broken back into glucose.

[2]

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3.2 A cell links many glucose monomers into a starch polymer.

(b) State how the starch could later be broken back into glucose.

[2]

(b)

- By hydrolysis – adding water to break the bonds back into glucose

Exercise 3.3

3.3 Explain why dehydration synthesis and hydrolysis are described as opposite processes. [2]

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3.3

- Dehydration synthesis **removes** water to form a bond and build a polymer; hydrolysis **adds** water to break the bond – each reverses the other