

1 Water and the molecules of life – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
polar	极性	_____
hydrogen bonds	氢键	_____
Carbon	碳	_____
macromolecules	大分子	_____
polymers	聚合物	_____
monomers	单体	_____
dehydration synthesis	脱水缩合	_____
hydrolysis	水解	_____
Carbohydrates	碳水化合物	_____
cellulose	纤维素	_____
Lipids	脂质	_____
hydrophobic	疏水	_____

Recall

You already know some biology chemistry:

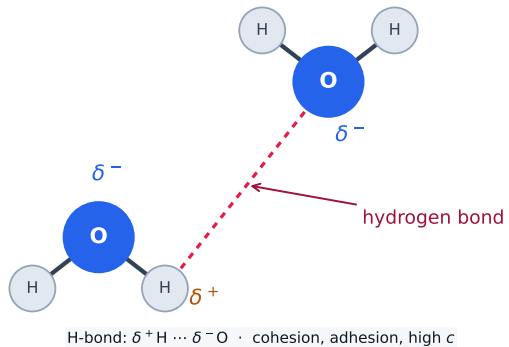
- Living things are built mostly from a few elements – carbon, hydrogen, oxygen, nitrogen.
- Water is everywhere in life, inside and around cells.
- You have met carbohydrates, fats, and proteins as the main food molecules.

This sheet lines up why these molecules matter. Each idea has a short worked example.

New ideas

■ 1 Water is special

Water is **polar** 极性: its oxygen pulls electrons a little more than its hydrogens, so one end is slightly negative and the other slightly positive. This lets water molecules form **hydrogen bonds** 氢键 with each other.



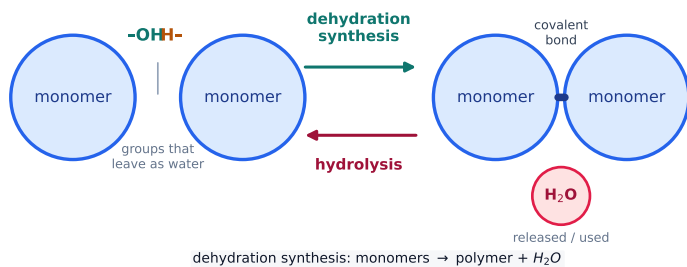
These bonds give water its life-supporting properties: it sticks together, dissolves many substances, and resists temperature change.

■ 2 Carbon builds life

Carbon 碳 can form four bonds, so it builds long chains and rings – the skeletons of all biological molecules.

■ 3 Building and breaking big molecules

Large molecules (**macromolecules** 大分子) are **polymers** 聚合物 built from repeating units called **monomers** 单体. Cells join monomers by **dehydration synthesis** 脱水缩合 (removing water) and break them by **hydrolysis** 水解 (adding water).



■ 4 Carbohydrates and lipids

- **Carbohydrates** 碳水化合物 (sugars) store energy and give structure (like **cellulose** 纤维素 in plants).
- **Lipids** 脂质 (fats) are **hydrophobic** 疏水 (they do not mix with water); they store energy and build cell membranes.

Watch out: all of water's helpful properties – sticking together, dissolving things, resisting temperature change – come from the **hydrogen bonds** between its molecules.

Practice

Try these in order. The methods are all above.

2.1 Explain why a water molecule is described as polar. [2]

2.2 State why carbon is able to build such a wide variety of large molecules. [2]

2.3 Name the process that (a) joins monomers into a polymer, (b) breaks a polymer apart. [2]

2.4 Give one function of carbohydrates and one function of lipids in living things. [2]

2.5 State what “hydrophobic” means and give one example of a hydrophobic molecule. [2]
