



Biological Molecules

WALT: State the functions of biological molecules.

Define metabolism.

Name the monomers & polymers of carbohydrates, proteins & nucleic acids.

Describe condensation & hydrolysis reactions.



You are what you eat.

- Examine some of the food labels & produce a list of substances contained in our food.
 - Carbohydrates
 - Proteins
 - Lipids
 - Vitamins & minerals
 - Nucleic acids
 - Water
 - Fibre

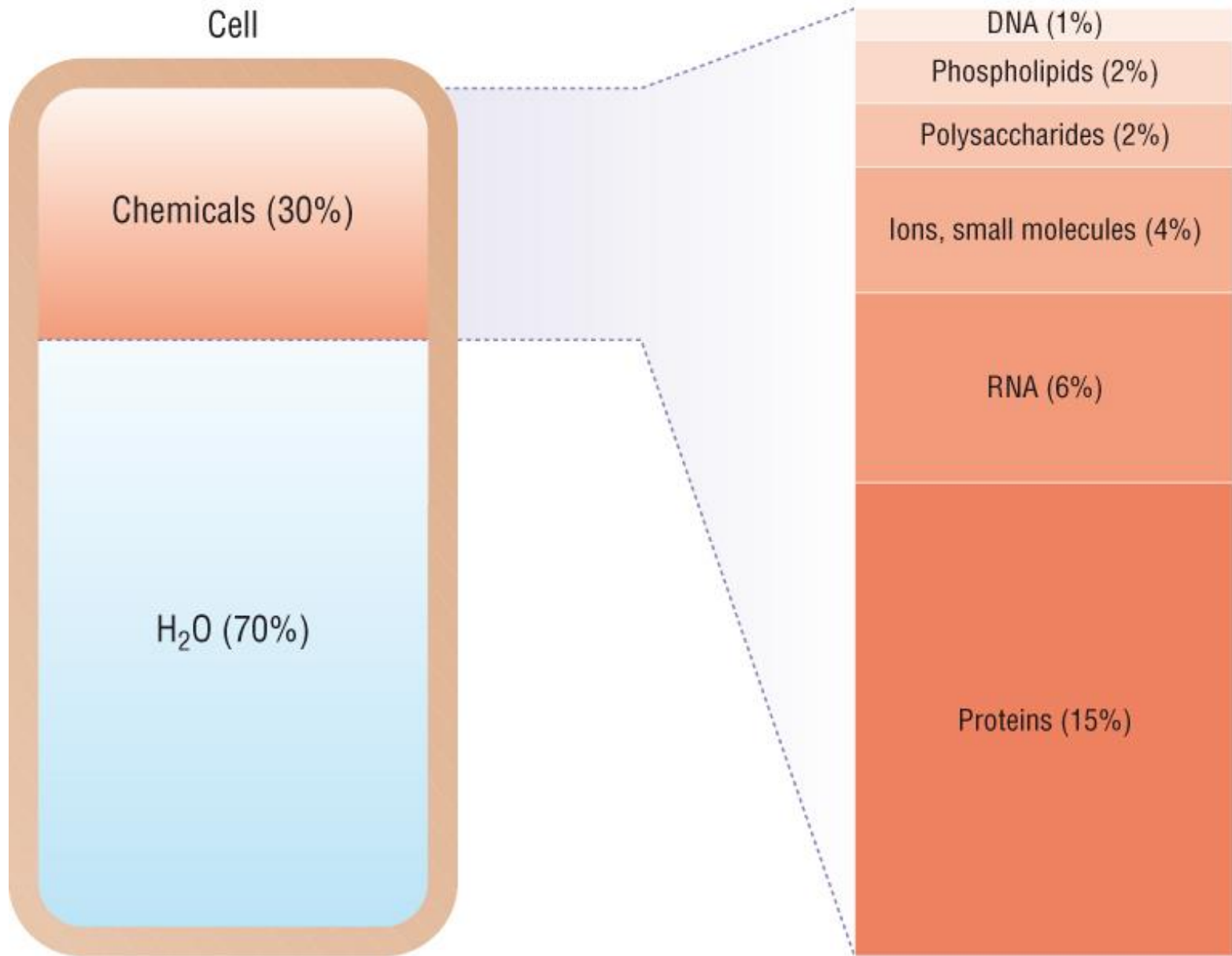


What do these substances do?

Chemical Group	Role
Carbohydrates	Energy provision & storage.
Proteins	Structure, transport, enzymes, hormones, antibodies.
Lipids	Membranes, energy provision & storage, thermal insulation, protection/padding, electrical insulation, some hormones.
Vitamins & minerals	Form parts of larger molecules (eg Haemoglobin), act as enzyme activators.
Nucleic acids	Make up DNA/RNA, carry instructions for making proteins.
Water	Takes part in some reactions, support in plants, solvent, transport, thermal buffer.
Fibre	Helps move material through the gut.



What are we made of?





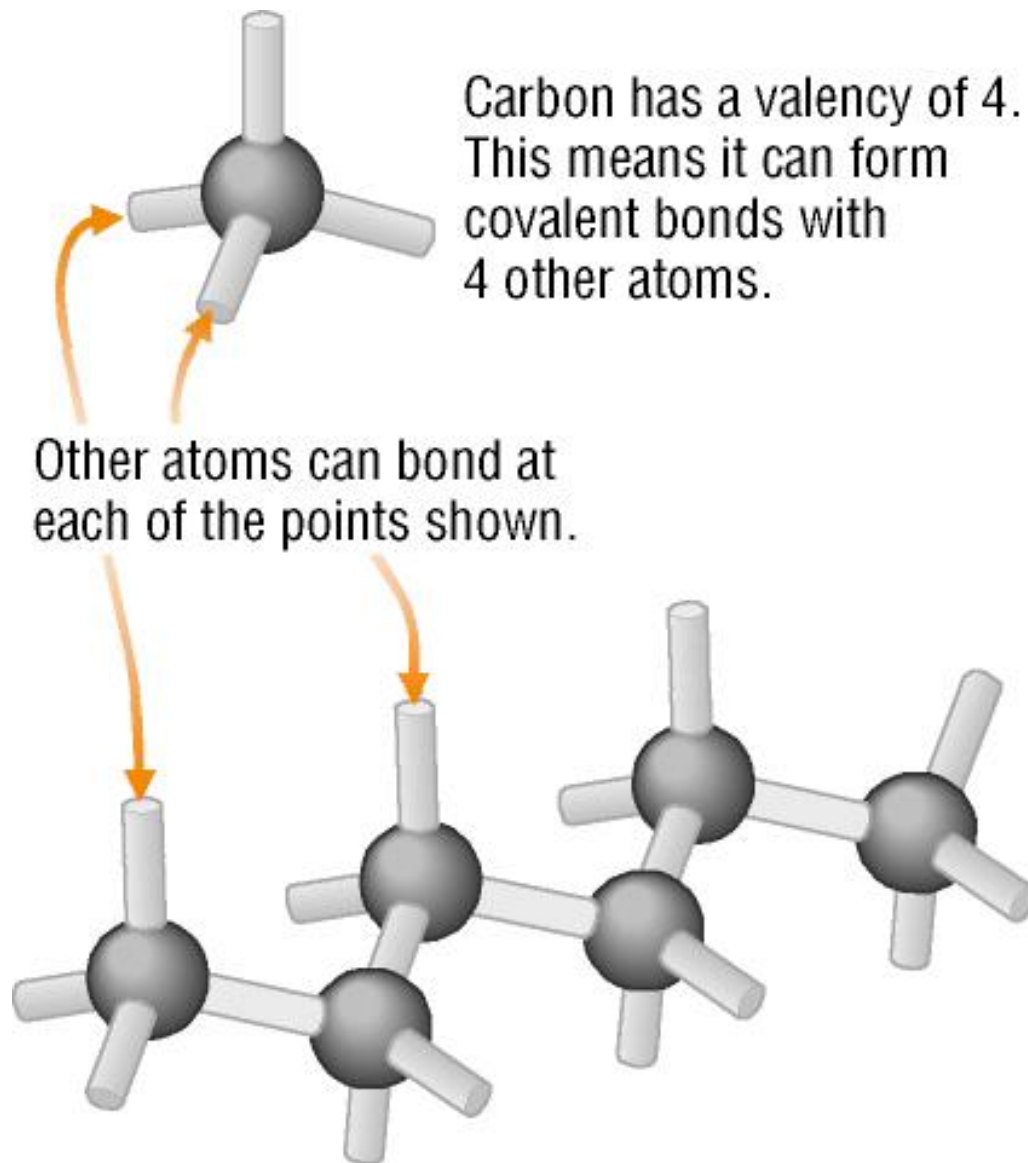
Biochemistry & Metabolism

- Biochemistry:
 - The chemical reactions involving biological molecules.
- Metabolism:
 - All of the chemical reactions that take place within an organism.
 - Anabolic reactions build large molecules from smaller ones.
 - Catabolic reactions break large molecules into smaller ones.



Carbon Chemistry

- Recall the structure of the carbon atom from GCSE.



Carbon atoms bonded in chains can have other atoms bonded to them to give a vast range of molecules.



Other common chemical groups

- Hydroxyl group (-OH)
- Carboxyl group (-COOH)
- Amine group (-NH₂)



Monomers & Polymers

- Monomers:
 - Single, small molecules capable of joining together.
- Polymers:
 - Large molecules made up of many identical monomers.



Biological Polymers

Biochemical	Monomer	Polymer
Carbohydrates	Monosaccharides (simple sugars)	Polysaccharides (Eg. starch, cellulose)
Proteins	Amino acids	Polypeptides & proteins
Nucleic acids	Nucleotides	DNA & RNA

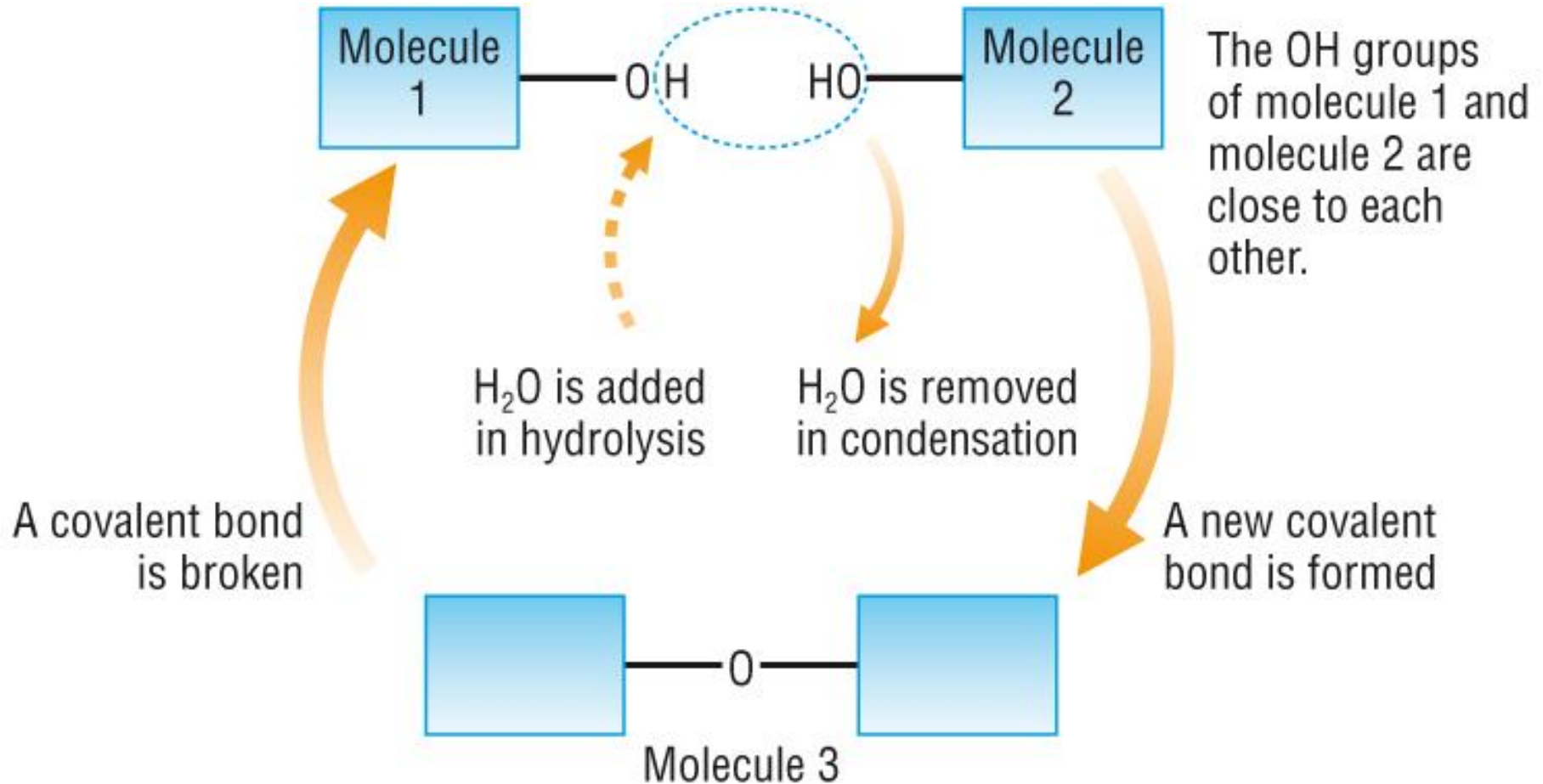


Condensation & Hydrolysis Reactions

- Condensation reactions:
 - Covalently bond monomers together to form polymers.
 - Release a water molecule.
- Hydrolysis reactions:
 - Split polymer molecules into monomers.
 - Use a water molecule.



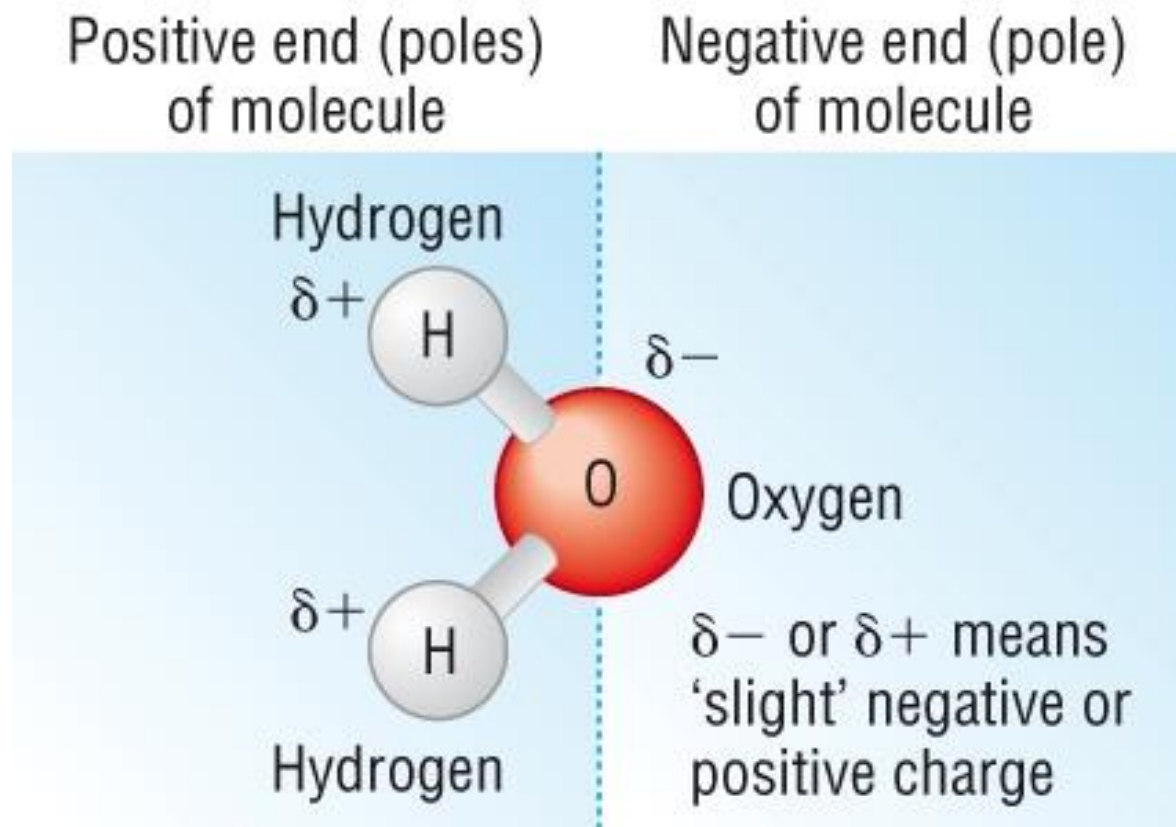
Condensation & Hydrolysis Reactions





Hydrogen Bonds

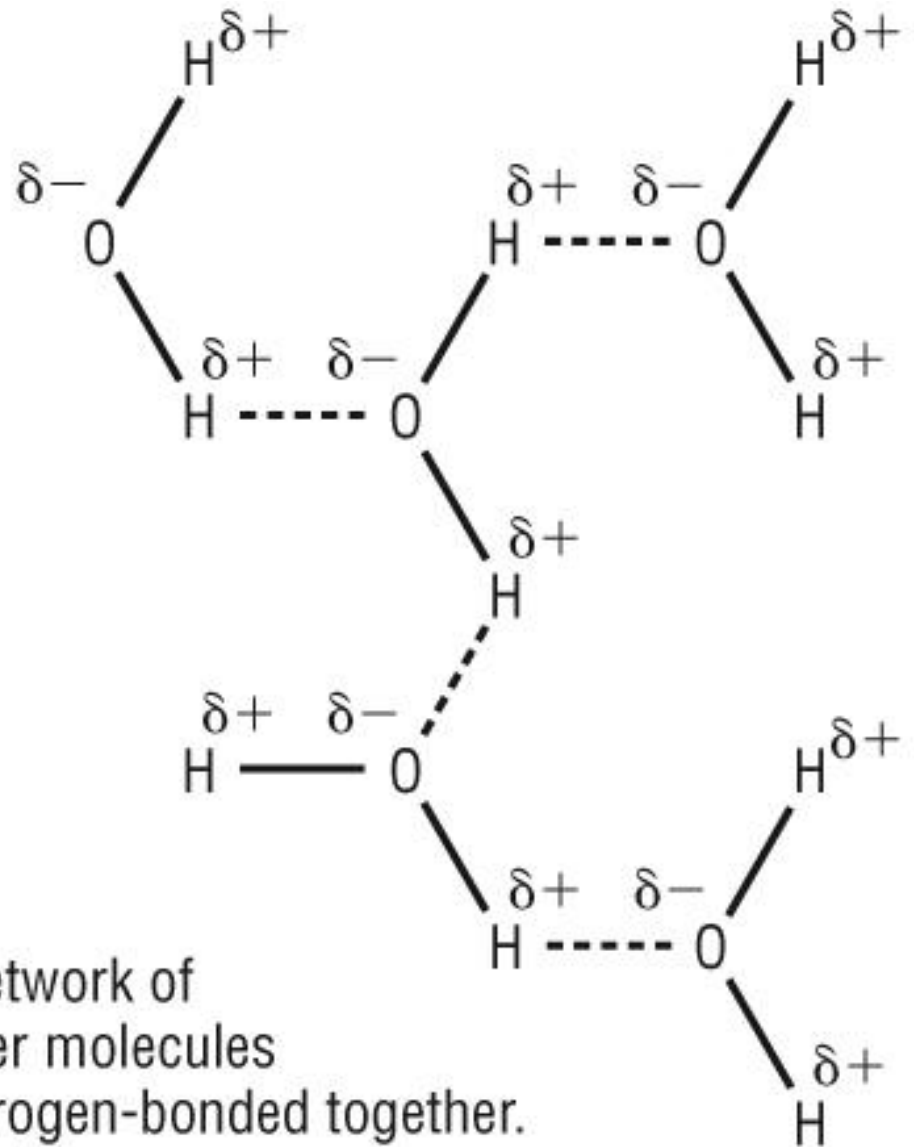
- Weak interactions between slightly positive areas of one molecule and slightly negative areas of another.





Hydrogen Bonds

- Are weak & broken easily by heat.



A network of water molecules hydrogen-bonded together. This is not a permanent structure in water. Networks continually break and reform as water molecules move around.