

INKBIOLOGY FLASHCARDS

# Biological molecules, water and inorganic ions

Unit B02 · 29 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in mark-scheme wording, and the misconceptions that lose marks. These cards and each lesson's whole-lesson check run on the website with spaced-repetition scheduling, at [inkphysics.co.uk/biology/flashcards](https://inkphysics.co.uk/biology/flashcards).

**DEFINITION**

Define: Monosaccharide.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Monomer.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Polymer.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Condensation.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Hydrolysis.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Glycosidic bond.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Disaccharide.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Define: Polysaccharide.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

A small molecule from which a larger one is built by joining many of them together.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

A single sugar unit, the monomer from which disaccharides and polysaccharides are built.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

A reaction that joins two molecules with a covalent bond and releases a molecule of water.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

A large molecule made of many similar monomers joined together.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

The covalent bond formed by condensation between two monosaccharides, joining them through an oxygen atom.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

A reaction that breaks a covalent bond between two molecules using a molecule of water.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Many monosaccharides joined by glycosidic bonds into one large molecule.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

**DEFINITION**

Two monosaccharides joined by a glycosidic bond.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

### SPOT THE ERROR

Say what is wrong with this claim:

Starch and cellulose are made of different sugars, which is why one is food and the other is not.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

### DEFINITION

Define: Lipid.

### DEFINITION

Define: Triglyceride.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

### DEFINITION

Define: Ester bond.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

### DEFINITION

Define: Hydrophilic.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

### DEFINITION

Define: Hydrophobic.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

### SPOT THE ERROR

Say what is wrong with this claim:

Unsaturated means the fatty acid is shorter, with fewer carbon atoms in it.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

### DEFINITION

Define: Polar molecule.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

#### DEFINITION

A biological molecule that is largely non-polar, insoluble in water and soluble in organic solvents such as ethanol.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

#### SPOT THE ERROR

Same sugar, different bond. Both are chains of glucose: starch of  $\alpha$ -glucose, cellulose of  $\beta$ -glucose, which differ only in where one hydroxyl group sits on carbon 1. That flips every second glucose in cellulose, straightens the chain, and leaves the enzymes that hydrolyse starch unable to fit it.

CARBOHYDRATES: FROM ONE SUGAR TO A STORE OF THOUSANDS

#### DEFINITION

The covalent bond formed by condensation between a hydroxyl group of glycerol and the carboxyl group of a fatty acid.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

#### DEFINITION

One glycerol molecule joined to three fatty acids by three ester bonds.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

#### DEFINITION

Not attracted to water: non-polar, so it is excluded from water rather than dissolving in it.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

#### DEFINITION

Attracted to water: charged or polar, so it interacts with water molecules.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

#### DEFINITION

A molecule with an uneven distribution of charge, so that one part is slightly negative and another slightly positive.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

#### SPOT THE ERROR

Unsaturated is about bonding, not length. Saturated means no carbon to carbon double bond, so the tail lies straight and packs closely; unsaturated means at least one, which bends it permanently. Stearic and oleic acid both have eighteen carbons, and only one of them is an oil.

LIPIDS: TRIGLYCERIDES, PHOSPHOLIPIDS AND THE ESTER BOND

**DEFINITION**

Define: Hydrogen bond.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

**DEFINITION**

Define: Specific heat capacity.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

**DEFINITION**

Define: Latent heat of vaporisation.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

**SPOT THE ERROR**

Say what is wrong with this claim:

Water is a good solvent because it is a liquid, so things can move about in it.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

**DEFINITION**

Define: Amino acid.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Polypeptide.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Protein.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Primary structure.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

The energy needed to raise the temperature of one kilogram of a substance by one kelvin.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

#### DEFINITION

A weak attraction between a slightly positive hydrogen atom of one molecule and a slightly negative atom of another.

#### SPOT THE ERROR

Being liquid is not enough: shake sugar with cooking oil and nothing dissolves. Water dissolves ionic and polar solutes because its own molecules are polar, so their charged ends surround an ion and hold it away from its neighbours. A lipid carries no charge, so nothing separates it.

WATER AND INORGANIC IONS: THE PROPERTIES LIFE DEPENDS ON

#### DEFINITION

The energy needed to change one kilogram of a liquid into a gas without a change in temperature.

#### DEFINITION

A chain of amino acids joined by peptide bonds.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

A molecule containing an amine group, a carboxyl group and a variable side chain attached to the same carbon.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

The sequence of amino acids in a polypeptide, held by peptide bonds.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

One or more polypeptides folded into a specific three-dimensional shape.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Secondary structure.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Tertiary structure.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Quaternary structure.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**DEFINITION**

Define: Denaturation.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

**SPOT THE ERROR**

Say what is wrong with this claim:

Proteins are made of amino acids, so a protein's job comes from which amino acids it contains.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE



#### DEFINITION

The overall three-dimensional fold of a single polypeptide, held by hydrogen bonds, ionic bonds, disulfide bridges and hydrophobic interactions between side chains.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

The regular coiling or pleating of the backbone into an  $\alpha$ -helix or  $\beta$ -pleated sheet, held by hydrogen bonds between the C=O of one peptide group and the N-H of another.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

The loss of a protein's specific three-dimensional shape through disruption of the hydrogen bonds, ionic bonds and hydrophobic interactions holding it, so the function is lost, while the primary structure is unchanged.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### DEFINITION

The arrangement of two or more polypeptides, and any non-protein groups, in a functioning protein.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE

#### SPOT THE ERROR

The order fixes the fold and the fold does the job. Two proteins can contain the same amino acids in different orders and do unrelated things, so the function follows from the shape rather than from the list of residues.

PROTEINS: FROM ONE AMINO ACID TO A WORKING SHAPE