# B1.1 Carbohydrates and lipids

What the Cell · DP Biology · worksheet · SL statements B1.1.1–13

**Name** _____ **Date** _____ **Total** _____ / 48

**About 50 minutes,** or one section at a time. A calculator is allowed. The number of marks shows how many separate points to make.

## Section A: Recall

9 marks

**1** **State** the maximum number of single bonds that a carbon atom can form. B1.1.1 **[1]**

**2** **Name** the type of reaction that digests polymers. B1.1.3 **[1]**

**3** **State** the number of carbon atoms in a pentose and in a hexose. B1.1.4 **[2]**

**4** **State** the monomer of cellulose, and the monomer of glycogen. B1.1.5, B1.1.6 **[2]**

**5** **Define** amphipathic. B1.1.12 **[1]**

**6** **State** the number of water molecules released when a triglyceride forms, and the number released when a phospholipid forms from glycerol and two fatty acids. B1.1.9 **[2]**

## Section B: Understanding

20 marks

**7** **Explain** how the properties of glucose suit its use in organisms. B1.1.4 **[4]**

**8** **Explain** how the structure of starch suits it to energy storage in plants. B1.1.5 **[3]**

9 **Explain** how the structure of cellulose suits it to its function. B1.1.6 [3]

10 **Outline** the role of glycoproteins, with reference to ABO blood groups. B1.1.7 [3]

11 **Explain** how the number of double bonds in a fatty acid affects melting point. B1.1.10 [3]

12 **Explain** why steroids can pass through a phospholipid bilayer, while ions cannot. B1.1.13 [2]

13 **Draw** a section of a phospholipid bilayer, labelling the hydrophilic and hydrophobic regions. B1.1.12 [2]

## Section C: Working with data

11 marks

All data in this section are invented for practice. The patterns are realistic.

**14** B1.1.10

| Fatty acid | Number of carbons | C=C bonds | Melting point / °C |
|---|---|---|---|
| **P** | 18 | 0 | 70 |
| **Q** | 18 | 1 | 13 |
| **R** | 18 | 2 | −5 |
| **S** | 18 | 3 | −11 |

a **Identify** which is saturated, and which are polyunsaturated. **[2]**

b **Describe** the relationship. **[2]**

c **Suggest** why a fish in cold seas stores mostly fatty acids like R and S. **[2]**

**15** B1.1.11

A person stores about 0.5 kg of glycogen and 12 kg of fat. One gram of glycogen stores 17 kJ of energy, and one gram of fat stores 37 kJ.

a **Calculate** the energy stored in each. **[2]**

b **Calculate** the mass of glycogen needed to store the same energy as the fat. **[1]**

c **Explain** why the body also keeps a store of glycogen. **[2]**

## Section D: Longer answer

8 marks

**16** **Compare and contrast** carbohydrates and lipids as energy stores in organisms. B1.1.5, B1.1.11 **[8]**