AP BIOLOGY • EXERCISE SHEET

1.4 Carbohydrates

Name: _____ Class: _____ Date: _____ **Total: 11 marks**

Objective

Build the skills to answer exam questions on **carbohydrates**.

You must be able to:

- identify **monosaccharides** 单糖, disaccharides, and **polysaccharides** 多糖
- state the functions (energy storage and structure)
- link structure to function (starch, glycogen, cellulose)

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

The sugar building blocks

Carbohydrates are made of sugar monomers (**monosaccharides**, such as glucose). Two joined make a disaccharide; many joined make a **polysaccharide**.

Storage polysaccharides

Starch (plants) and **glycogen** (animals) store glucose for energy. Their branched/coiled shapes pack many glucose units for quick release.

Structural polysaccharides

Cellulose (plant cell walls) is made of glucose linked in a way that forms strong, straight fibers —providing support, not easily digested.

Structure sets function

The **same** glucose monomer builds both starch (storage) and cellulose (structure); the **difference is the type of bond**, which changes the shape and therefore the role.

2 Practice

Now apply the methods above.

2.1 Name the monomer of carbohydrates. [1]

2.2 State one storage polysaccharide and one structural polysaccharide. [2]

2.3 Which polysaccharide makes up plant cell walls? [1]

3 Exam-style questions

3.1 The monomer that makes up starch, glycogen, and cellulose is [1]

- **A** glucose
- **B** an amino acid
- **C** a nucleotide
- **D** glycerol

3.2 Starch and cellulose are both polymers of glucose but have different functions.

(a) State the function of each. [2]

(b) Explain how they can differ if they share the same monomer. [2]

3.3 Explain why glycogen's branched structure suits its role in animals. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **1.4 Carbohydrates** lesson on the **Learn** page;
- read the **Carbohydrates** section of the AP Biology handout on the **Know** page.

Solutions

2.1 Monosaccharide (e.g. glucose).

2.2 Storage: starch or glycogen; structural: cellulose.

2.3 Cellulose.

3.1 A —glucose.

3.2 (a) Starch stores energy (in plants); cellulose provides structure/support (cell walls). (b) The glucose units are joined by **different bonds**, giving different shapes and therefore different functions.

3.3 Its many branches provide many ends where glucose can be quickly added or removed, allowing fast energy storage and release to meet an animal's needs.