

Stores, fibres and name tags

60 minutes • B1.1.4 to B1.1.7 • Chapters 4, 5, 6

Starch and glycogen as stores, cellulose as a fibre, and sugar name tags on cells

BY THE END, STUDENTS CAN

- ☐ Tell pentoses from hexoses and alpha from beta glucose in ring diagrams, and link glucose's properties to its uses B1.1.4
- ☐ Explain how coiling, branching and size suit starch and glycogen to storing energy B1.1.5
- ☐ Explain how alternating beta glucose gives cellulose straight chains, bundled by hydrogen bonds B1.1.6
- ☐ Explain how glycoproteins let cells recognise each other, using the ABO blood groups B1.1.7

TIMING

0-5	5 min	Do now	
5-17	12 min	Packed tight	
17-29	12 min	Turn it over	
29-39	10 min	Name tags	
39-54	15 min	Molecule speed dating	
54-60	6 min	Exit	
	60 min	One lesson	

STARTER

- 5 min** **Do now**
- "Bread, cotton and liver: what do they have in common?" (Starch, cellulose and glycogen: all glucose.) Then the Sweet Treats Stay Energetic tiles.

ON THE BOARD, FROM THE GUIDE

Open the guide on the projector at each chapter (the links work in this PDF). Every figure plays from its own buttons, and the lesson's slides have the same figures, step by step, in the order of this plan.

04 Starch and glycogen: energy packed tight

CHAPTER 04 IN THE SLIDES

Switch the figure through Amylose, Amylopectin and Glycogen, and have the class say what will change before each.

Play the animation, Watch it happen: building and using a store. It loops; pause it on each moment below and ask what is happening (in the lesson slides it is a video).

- Glucose units join one at a time; a **water** molecule leaves at each link.
- Amylose **coils** into a helix: a lot of glucose in a small space.
- Amylopectin and glycogen **branch**, so they have many ends.
- Enzymes take glucose off the **ends**, using a water molecule each time.

Predict box: An amylose molecule and a glycogen molecule hold the same number of glucose units. A sprinter's muscles suddenly need glucose. Which store can release it faster? Hands up or mini whiteboards first.

Answer C: Glycogen: its many branches give enzymes many ends to work on

05 Turn every other glucose over and the chain runs straight

CHAPTER 05 IN THE SLIDES

Step through the figure (6 steps, the arrow keys on a projector). Stop on each caption and ask what changed before you go on.

1. Two **beta glucose** molecules. Their OH groups point opposite ways.
2. Turn one **over** and they can join: water leaves and a bond forms.
3. Every other unit is turned over, so the chain runs **straight**.
4. Neighbouring chains are linked by many **hydrogen bonds**.
5. Bundles of chains form **microfibrils**.
6. Layers of microfibrils give the **cell wall** its strength.

Step through the figure (4 steps, the arrow keys on a projector). Stop on each caption and ask what changed before you go on.

1. Two **beta glucose** molecules, their carbons numbered.
2. The OH on **carbon 1** of one points up, and the OH on **carbon 4** of the other points down: they cannot meet.
3. Turn the second over and they meet. They leave as **water**, and a **1,4 glycosidic bond** joins the rings, as in **cellulose: condensation**.
4. Add water and the bond splits again, the H to one sugar and the OH to the other: **hydrolysis**.

Predict box: Cellulose chains lie side by side in bundles. What holds neighbouring chains together? Hands up or mini whiteboards first.

Answer B: Hydrogen bonds between OH groups on neighbouring chains

06 Sugar name tags on the cell surface

CHAPTER 06 IN THE SLIDES

Switch the figure through O, A, B and AB, and have the class say what will change before each.

Predict box: What makes a group A red blood cell different from a group B one? Hands up or mini whiteboards first.

Answer C: One different sugar at the tip of each sugar chain

THE LESSON

12 Packed tight

min

Chapter 4's figure and the polymers scene. Students sketch the three shapes and count the ends. Then the chapter 4 predict box.

12 Turn it over

min

Chapter 5's bond builder first: students try to join two β -glucose before anyone explains. Then chapter 5's figure. Fill in a table: starch, glycogen, cellulose; monomer, shape, branches, where, job.

10 Name tags

min

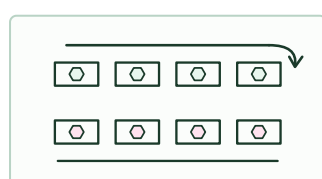
Chapter 6's figure with the O, A, B, AB switch, then the chapter 6 predict box. One minute on why transfused blood must match (forward to C3.2).

15 Molecule speed dating

min

The speed dating game below, with the carbohydrate cards only.

ACTIVITIES



GAME

Molecule speed dating

Each student holds a card with one molecule: a drawing, its name and two facts. Pairs meet for one minute to find one thing their molecules share and one difference, then one row moves along. Six rounds. Lesson 2 uses carbohydrate cards; add lipid cards for a review of the whole topic.

Needs: one card per student.

Exit

One sentence each: why starch barely dissolves, and why cellulose is strong.

WHAT STUDENTS GET WRONG

"Insoluble because hydrophobic." Starch and glycogen are insoluble because each molecule is huge.

Cellulose as a store. It is structural.

"Group O has no antigens." It has the base chain, without A or B.

STRETCH AND SUPPORT

Support: the tiles as a starter in each lesson (ABBA, Sweet Treats Stay Energetic, Double Kinks Leave Liquids).

Support: the key terms (tap the dotted words) as a glossary, and the bond builder's tap mode on a tablet.

Stretch: how can cellulose made by plants end up as a carbon sink for thousands of years? (The linking question on carbon sinks; forward to C4.2.)

IN THE GUIDE

- 4 [Starch and glycogen: energy packed tight](#)
- 5 [Turn every other glucose over and the chain runs straight](#)
- 6 [Sugar name tags on the cell surface](#)
- A11 [The whole guide, with the figures that play](#)
- PPTX [This lesson's slides, in the order of this plan](#)

PRACTISE AND REVISE**BUILD FOR YOUR CLASS**

- [Tarsia puzzle, dominoes and picture reveal](#) on B1.1, built from its key terms and ready to print
- A [pub quiz](#) with rounds on B1.1, to present or run with no projector
- An [escape room built from the question bank](#) on B1.1

ALREADY ON THE SITE FOR B1.1

- Quiz: [Biological Molecules](#)
- Revision map: [B1.1 Carbohydrates and lipids](#), to fill in
- Exam questions: [B1.1 in the exam maker](#), a paper with its markscheme

CARD SETS ON SPLYCR

Open a set to host it as a class game, or make a copy to edit.

- [B1.1 Carbohydrates](#)
- [B1.1b Lipids](#)

**EXAM PRACTICE****Check yourself**

Set it for homework: a fresh paper of exam-bank questions on B1.1 each time, marked as students go and saved to their Exam practice when they are signed in.

biologybybradford.com/exam-maker/sit?topics=B1.1&level=HL&paper=quiz&marks=15&src=ep

How this was made. The course structure, the activities and the teaching choices come from my own classroom, my presentations and my years of teaching IB and AP Biology. I use Claude, an AI, to help write and build the interactive guides, lesson plans, slides and practice questions, and to draw the diagrams and code the interactives. I direct the work and review it against the IB and AP specifications before it goes live.