

Pairing, copying, DNA and RNA

60 minutes • A1.2.4, A1.2.7, A1.2.8 • Chapters 4, 6 • The dry lab

Complementary pairing and why it makes copies exact, DNA against RNA, and the extraction dry lab

BY THE END, STUDENTS CAN

- ☐ Name the bases of DNA and RNA, and explain how complementary pairing lets DNA be copied and read A1.2.4, A1.2.8
- ☐ Give three differences between DNA and RNA, and sketch ribose against deoxyribose A1.2.7

TIMING

0-5	5 min	Do now	
5-20	15 min	Pair it	
20-30	10 min	DNA or RNA	
30-55	25 min	The dry lab	
55-60	5 min	Exit	
	60 min	One lesson	

STARTER

5
min

Do now

Turn over the Apples in the Tree tiles, then five quick base pairs on the board.

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 Four letters that pair

CHAPTER 04 IN THE SLIDES

Switch the figure through Which base fits each slot?, Paired: only A with T and G with C form hydrogen bonds, Copy it: two molecules with the same sequence and Read it: messenger RNA, read by a transfer RNA, and have the class say what will change before each.

Predict box: One strand of a DNA molecule reads A A T G C. The strands separate and each is copied. What does the strand built against it read, and the strand built against that one? Hands up or mini whiteboards first.

Answer B: T T A C G, then A A T G C

Remember it: Apples Tree Cars Garage (Adenine, Thymine, Cytosine, Guanine).

06 DNA and RNA compared

CHAPTER 06 IN THE SLIDES

Switch the figure through DNA and RNA, and have the class say what will change before each.

Predict box: A sample of nucleic acid is single-stranded and contains thymine but no uracil. What is it most likely to be? Hands up or mini whiteboards first.

Answer A: DNA, from one of the few viruses with single-stranded DNA

Remember it: Some Bananas Split (Sugar, Bases, Strands).

THE LESSON

15

min

Pair it

Chapter 4's figure in pairs: get a wrong base to fail and say why, then Copy it and Read it. Then the copy predict box.

10

min

DNA or RNA

Chapter 6's switch. Students sketch ribose and deoxyribose and mark carbon 2. Some Bananas Split.

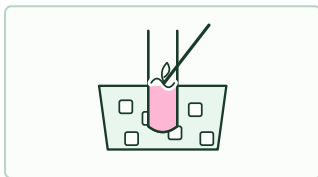
25

min

The dry lab

Pairs run the dry lab, Getting DNA out: the full method three times, then one step left out at a time, to find out which steps matter. Or run the wet extraction as a demonstration while pairs use the dry lab.

ACTIVITIES



PRACTICAL

DNA extraction, the wet version

Optional. The method of the dry lab on a real strawberry, as a demonstration or in pairs. Safety: eye protection; ethanol is highly flammable, so no flames in the room; wash hands after handling meat tenderiser. Afterwards ask what the white threads are: a tangle of millions of DNA molecules, with some RNA and protein, not one molecule.

Needs: strawberries, sealed bags, washing-up liquid, salt, a 60 °C water bath, ice, coffee filters, funnels, boiling tubes, ethanol from the freezer, wooden skewers.

DRY LAB

Getting DNA out

The dry lab, with its tasks and questions after it, and its results table as a CSV for a pooled class graph. One device per pair.

Needs: one device per pair.

PLENARY

5

min

Exit

The question under the dry lab on salt.

WHAT STUDENTS GET WRONG

Complementary means identical. The strands differ; the copies match.

Uracil replaces adenine. It replaces thymine.

Deoxyribose has no oxygen in its ring. It lacks the OH on carbon 2 only.

The white threads from the extraction are a DNA molecule. They are millions, tangled together.

STRETCH AND SUPPORT

Support: cut the figures' captions into cards to put in order, use the dotted key terms as a glossary, and give a drawing frame with the pentagon corners marked for the IB drawings.

Support: use the three mnemonics (Apples in the Tree, Some Bananas Split, Pure As Gold) as a starter in each lesson.

Stretch: why might RNA have come before DNA? (The linking question in chapter 6.)

IN THE GUIDE

- 4** [Four letters that pair](#)
- 6** [DNA and RNA compared](#)
- Lab** [Dry lab: Getting DNA out](#)
- 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 A1.2, built from its key terms and ready to print
- A [pub quiz](#) with rounds on A1.2, to present or run with no projector
- An [escape room built from the question bank](#) on A1.2

ALREADY ON THE SITE FOR A1.2

- Lesson: [Nucleic Acids](#)
- Quiz: [Nucleic Acids \(HL\)](#)
- Quiz: [Nucleic Acids](#)
- Revision map: [A1.2 Nucleic acids](#), to fill in
- Exam questions: [A1.2 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.
- [A1.2 Nucleic Acids](#)

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.

EXAM PRACTICE

Check yourself

Set it for homework: a fresh paper of exam-bank questions on A1.2 at standard level each time, marked as students go and saved to their Exam practice when they are signed in.

biologybybradford.com/exam-maker/sit?topics=A1.2&level=SL&paper=quiz&marks=15&src=ep

