Biology

HSC · 2017 SYLLABUS · TEACHER BRIEF

What eight HSC papers tell us about 2027

All 344 question parts from 2019–2026, read against the syllabus, NESA's marking guidelines and marker feedback · Prepared November 2026 for Biology teachers · 2027 is the last paper on this syllabus

51% *start here, page 3*

of all marks sat on **12 dot points**, each the main focus of a question in 7 or 8 of the 8 papers

2

questions worth **7–9 marks** in every paper. Of the 16, five were Evaluate, four Explain and four Analyse

67%

of marks came with a **graph, table or diagram** (56–85% per paper)

56

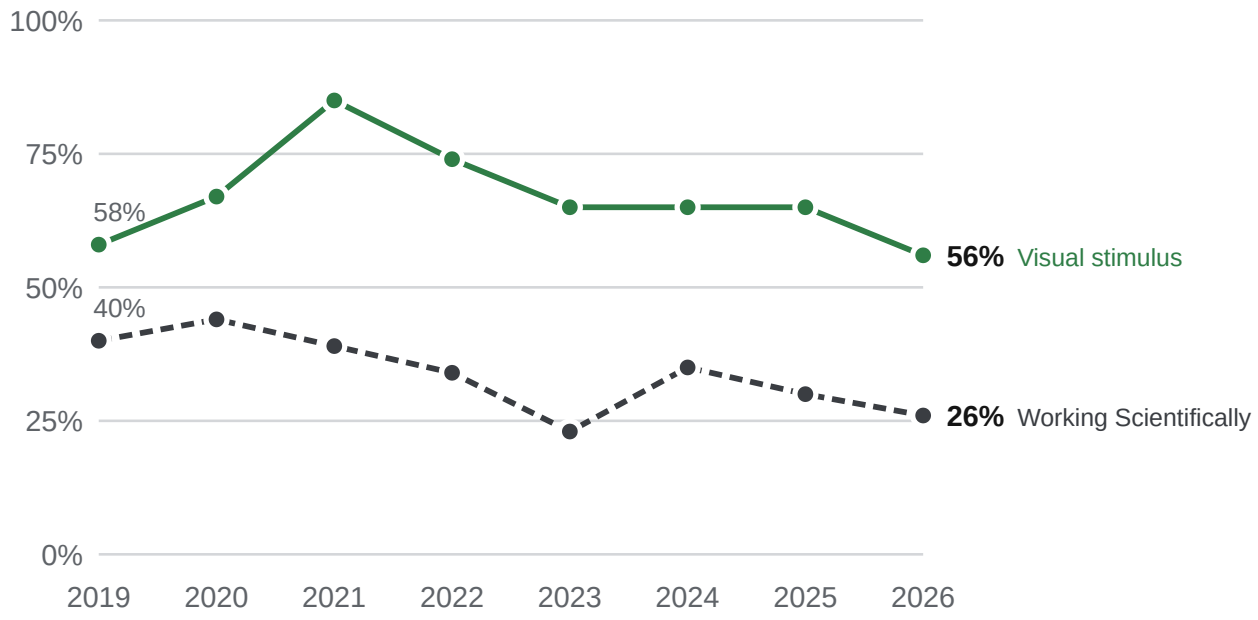
marks per 2022–26 paper, on average, on a **top-15 watch-list** made from earlier papers

Five things to act on

1. **Start with the 12 core dot points** (page 3). Inheritance, preventing the spread of disease and pathogens alone averaged 18 marks per paper.
2. **Practise long responses in every module.** Every paper has had exactly two questions worth 7–9 marks. Seven of the 16 were mainly on Module 6, five on Module 7, four on Module 8 and none on Module 5.
3. **Teach genetic technologies as one topic.** Its eight dot points in Module 6 together carried 7–18 marks in every paper, and five of the 16 longest questions. Page 4 compares two of those questions.
4. **Teach students to work with evidence.** Questions where students had to read or use data averaged 54 marks per paper. Questions on validity, reliability or design carried 5–11 marks in every paper.
5. **Revisit less familiar tasks** (pages 5–6). In 2026, 24 marks went to dot points that had averaged half a mark per paper or less in 2019–25. Some of the content was familiar, such as dialysis, but it was asked in a new way.

Two-thirds of marks came with a graph, table or diagram

% of each paper's marks on parts with a graph, table or diagram, and the share of marks NESA maps to Working Scientifically outcomes*

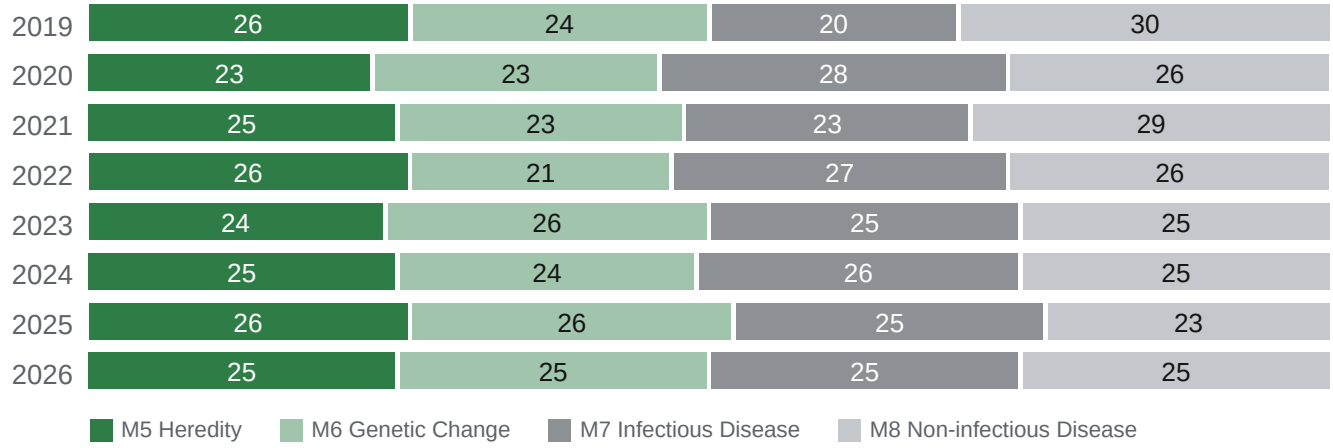


* Adding parts with only a written scenario, 72–95% of marks came with a stimulus (84% overall). Working Scientifically share: each part's marks split equally across the outcomes in NESA's mapping grid (34% on average); counting every part that has a Working Scientifically outcome, it is 61%. School tests set their own Working Scientifically/content split per assessment task.

How the paper is built

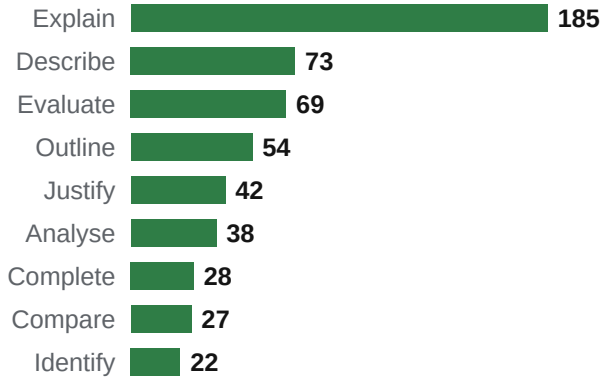
Each module gets about a quarter of the paper, and exactly 25 marks in 2026

Marks per paper by the module each part was mainly on. Modules carried 20–30 marks per paper, and 23–26 since 2023.



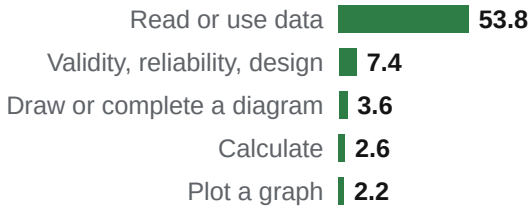
Explain is the workhorse verb

Section II marks for the nine most common verbs (538 of 640; two-verb parts split). Explain has 29% of Section II marks and the top four verbs have 60%.



What students have to do beyond recall

Average marks per paper on parts that needed each skill. A part can count in more than one row.



Students plotted a graph in five papers. In 2024 Q29 they plotted a line of best fit (2 marks), then extended it and calculated from it (3 marks).

The two long responses in each paper

Year	Questions worth 7–9 marks
2019	Q32b Analyse (7) dengue and malaria maps · Q33d Evaluate (8) Alzheimer's classification
2020	Q30 Explain (7) disease management · Q32c Explain (8) rabies protection
2021	Q30 Analyse (7) measles vaccine data · Q33c Analyse (9) salmon and biodiversity
2022	Q30 Discuss (7) malaria and vector maps · Q32 Explain (7) gene pools and ancestry
2023	Q27 Evaluate (7) air-pollution study method · Q32 Evaluate (7) pygmy possum gene pool
2024	Q32 Explain (7) immune response to *H. pylori* · Q34 Discuss (7) biotechnology ethics
2025	Q30b Evaluate (7) benefits to society · Q32 Design (7) an epidemiological study
2026	Q26b Analyse (7) attitudes to GM salmon · Q30 Evaluate (7) dialysis

What the long responses demand

- **The right evidence.** Fourteen of the 16 came with a stimulus. Students must check whether to use it, their own examples or both.
- **The verb.** Evaluate and Assess need evidence weighed and a judgement. Justify needs support for the choice.
- **Both sides when asked (2021 Q30).** Full marks needed arguments for and against the statement, such as comparing the 2 deaths with the 40.
- **A reasoned design (2025 Q32).** Survey each age group, use isolated region C as a control and record other exposures.
- **Five more parts were worth 6 marks.** Both Compare parts were on reproduction (2022 Q25, 2025 Q27).

The core: twelve dot points that return almost every year

Each of these was the main focus of a question in **7 or 8 of the 8 papers**. Together they carried **409 of the 800 marks (51%)**.

Dot point	Papers	Share of all marks	How it is examined, and what markers ask for
Inheritance patterns *pedigrees, crosses* M5.IQ4.DP2	8/8	6.5%	Justify a genotype from named relatives (2023 Q25a) or a pattern from a pedigree (2025 Q31a). Predict ratios with full working (2021 Q22).
Preventing the spread of disease *hygiene, quarantine, vaccination* M7.IQ4.DP2	8/8	6.2%	Vaccination carried 24 of its 50 marks, 21 of them with data: explain rabies treatment (2020 Q32c), assess a vaccination schedule (2023 Q30).
Infectious diseases and pathogens *classification, testing* M7.IQ1.DP1	8/8	5.0%	Classify from a key (2022 Q21b). Design a test of honey on bacteria (2022 Q26) or of microbes in water (2026 Q29), with a control and repeats.
Polypeptide synthesis *mRNA, tRNA* M5.IQ3.DP2	8/8	4.0%	Describe translation (2026 Q28, 5 marks). Compare transcription with DNA replication (2024 Q30a) and explain the roles of mRNA and tRNA (Q30b).
Technologies for disorders *hearing, vision, kidney* M8.IQ5.DP2	8/8	3.9%	Explain how dialysis replaces a kidney function (2020 Q24c). Use data on cochlear implants (2024 Q35). Compare LASIK with another aid (2025 Q26).
Maintaining the internal environment *temperature, water balance* M8.IQ1.DP2	8/8	3.8%	For plants, a response such as stomata closing (2019 Q29) is a different answer from a structural adaptation (2026 Q22).
Types of mutation *point and chromosomal* M6.IQ1.DP2	8/8	3.4%	Identify a substitution (2020 Q23a). Explain why deleting three bases removes one amino acid (2024 Q28b). A substitution may change nothing (2023 Q35b).
Causes of non-infectious disease M8.IQ2.DP1	8/8	3.2%	From 9 marks in 2019 to 1 in each of 2025 and 2026. Markers want the cause of the disease, not a symptom (2024 Q24a).
Cell replication *mitosis, meiosis, DNA replication* M5.IQ2.DP1	8/8	2.5%	Half its 20 marks were multiple choice. Written parts ask for DNA replication (2022 Q28b, 2026 Q21b) or compare mitosis and meiosis (2025 Q33a).
Reproduction *sexual and asexual* M5.IQ1.DP1	7/8	5.0%	Animal fertilisation carried 15 marks and fungi 8. Compare internal and external fertilisation using data (2025 Q27).
Mutation, gene flow and genetic drift *the gene pool* M6.IQ1.DP6	7/8	4.2%	Apply mutation, selection, drift and gene flow to ancestry data (2022 Q32, 7 marks) or a possum population (2023 Q32, 7).
Negative feedback loops *temperature, glucose* M8.IQ1.DP1	7/8	3.4%	Complete a temperature flow chart (2019 Q21, 2025 Q24a) or explain glucose graphs (2020 Q31a, 6 marks). 20 marks in 2019–21, 7 since.

Two contrasts to practise

Incomplete dominance or co-dominance? In 2022 Q22, dark purple × white eggplants always give violet fruit: a blend, so incomplete dominance, and two violet plants give 1 dark purple : 2 violet : 1 white. In 2025 Q8, red × white camellias have red and white petals: co-dominance. Markers wanted a key, letters whose capital and lower case look different (not Vv), and the step from pure-breeding parents to heterozygous offspring.

Glucose or temperature? 2020 Q31b asked how the two differ. The sample answer pairs each difference: the hypothalamus or the pancreas detects the change; nerves or hormones bring the response. Markers wanted each difference matched to its counterpart. Practise both: insulin and glucagon on the liver and body cells; nerves to sweat glands, skin blood vessels and muscles (2019 Q21, 2025 Q24).

The 2027 watch-list

How it is ranked: each dot point's average marks per paper, plus a bonus for appearing in more papers. Built from earlier papers only, the top 15 held **56 of the 100 marks** in each 2022–26 paper, on average (how we tested it: page 6).

	Dot point	19	20	21	22	23	24	25	26	Papers	Marks per paper
1	**Inheritance patterns** M5.IQ4.DP2	11	7	11	2	8	1	5	7	8/8	6.5
2	**Preventing the spread of disease** M7.IQ4.DP2	2	12	7	6	11	4	6	2	8/8	6.2
3	**Infectious diseases and pathogens** M7.IQ1.DP1	4	5	4	10	5	2	3	7	8/8	5.0
4	**Reproduction in animals, plants, fungi, microbes** M5.IQ1.DP1	6	8	1	6	5	3	11	·	7/8	5.0
5	**Mutation, gene flow and genetic drift** M6.IQ1.DP6	7	6	·	7	7	1	5	1	7/8	4.2
6	**Polypeptide synthesis** M5.IQ3.DP2	4	1	3	4	4	8	3	5	8/8	4.0
7	**Technologies for hearing, vision, kidney disorders** M8.IQ5.DP2	1	5	3	2	4	6	6	4	8/8	3.9
8	**Maintaining the internal environment** M8.IQ1.DP2	3	1	5	1	6	7	1	6	8/8	3.8
9	**Types of mutation** M6.IQ1.DP2	5	3	1	5	6	5	1	1	8/8	3.4
10	**Causes and effects of non-infectious disease** M8.IQ2.DP1	9	4	3	3	3	2	1	1	8/8	3.2
11	**Negative feedback loops** M8.IQ1.DP1	5	9	6	1	1	·	4	1	7/8	3.4
12	**Uses and applications of biotechnology** M6.IQ2.DP1	·	·	11	2	6	12	·	·	4/8	3.9
13	**Evaluating an epidemiological study** M8.IQ3.DP3	·	2	6	4	7	·	7	1	6/8	3.4
14	**Cell replication** M5.IQ2.DP1	1	1	2	7	1	1	5	2	8/8	2.5
15	**Immune response after exposure** M7.IQ3.DP2	1	·	5	·	·	7	10	1	5/8	3.0

Marks per paper: 0 1–2 3–4 5–7 8+

Year columns show the marks on questions mainly about that dot point. The last column is the average over the eight papers.

Next on the list (16–20)

- Evaluating prevention of a non-infectious disease M8.IQ4.DP1 · 5/8 papers, 2.8 marks per paper
- Incidence and prevalence of non-infectious disease M8.IQ3.DP1 · 6/8 papers, 2.4
- Fertilisation, implantation and pregnancy hormones M5.IQ1.DP2 · 5/8 papers, 2.1 (7 marks in 2026)
- Modelling meiosis and crossing over M5.IQ4.DP1 · 4/8 papers, 2.0
- Benefits of genetic technologies M6.IQ3.DP5 · 3/8 papers, 2.1 (a 7-mark question in 2020 and 2025)

Reading the list

- **Reproduction (4)** had 11 marks in 2025 and none in 2026, after seven papers in a row.
- **Biotechnology uses (12)** had 11 marks in 2021 and 12 in 2024. In four papers no question was mainly about it, yet questions worth 7 marks touched on it each time.
- **Immune response (15)** had 17 of its 24 marks in 2024 and 2025, then 1 in 2026.
- **Non-infectious disease causes (10)** and **feedback loops (11)** have had at most 4 marks per paper since 2022.

Genetic technologies: eight dot points, one topic

The eight dot points on biotechnology and genetic technologies (M6.IQ2–IQ3) together averaged **13 marks per paper** (7–18), twice the 6.5 of the top single dot point. Only two of them are in the top 20. The questions differ. In 2020 Q30 students chose the technologies. In 2026 Q26b the GM salmon was given, and all seven marks were for social, economic and cultural influences on public attitudes.

Required content not yet examined in full

watch this space

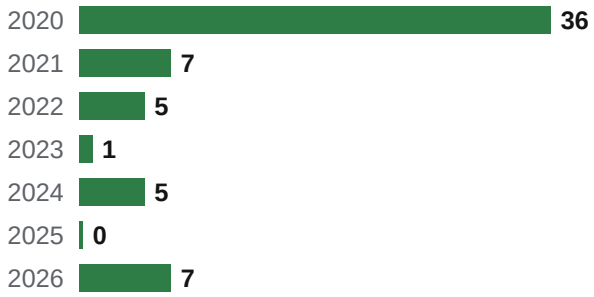
We checked every 2019–2026 question, marking guideline and sample answer: **none of these has been examined in full**, and 2027 is the last paper on this syllabus. The task on the right covers what is missing.

Syllabus content	What the papers asked	Practice task
Naturally occurring mutagens M6.IQ1.DP1	UV light appears in 2021 Q15 and 2025 Q2. No question asked for a mutagen because it occurs naturally.	Explain how radiation from the decay of radon, a natural gas, can break DNA strands.
Public health campaigns against infectious disease M7.IQ4.DP2	2025 Q10 shows measles deaths falling after immunisation. The campaign questions (five papers) measured a non-infectious disease, such as cervical cancer in 2022 Q27.	Evaluate a hand-hygiene campaign. Separate uptake of the action from the change in disease incidence.
Dot points that no question has been mainly about		
Evaluating the manipulation of plant and animal reproduction in agriculture M5.IQ1.DP3	Asked in pieces: artificial pollination (2022 Q23b) and breeding technologies in cattle (2023 Q34). Not asked as a whole.	Judge the effect on yield and genetic diversity for a chosen herd. Using few sires and crossing breeds differ.
Benefits of engaging in an epidemiological study M8.IQ3.DP4	2021 Q31 evaluates a statin study. Its sample answer says the study justifies a larger trial. No question asked for the benefits in general.	Use the smoking study in 2022 Q31a-ii to explain how an association guides research but cannot alone show cause.
Cell replication and the continuity of species M5.IQ2.DP2	A side issue in 2020, 2023 and 2025. The 2024 Q33a sample answer also links crossing over to survival.	Link accurate DNA copying to inheritance, meiosis and fertilisation to chromosome number, and variation to survival.
Asked only as recognition, or only in part		
Nutritional diseases M8.IQ2.DP1	Two multiple-choice questions on a deficiency (2021 Q1, 2023 Q14). In 2024 Q11 students compared obesity rates by age.	Explain how a lack of vitamin C causes scurvy. Separately, compare prevalence across age groups.
Reproduction in bacteria and protists M5.IQ1.DP1	Binary fission is a wrong option in 2021 Q2. 2023 Q5 graphs bacterial growth and 2025 Q1 asks about an amoeba's daughter cells.	Compare binary fission in bacteria with binary fission and budding in protists. Budding in protists has not appeared.
Treatment, management and future research for a non-infectious disease M8.IQ3.DP2	2020 Q30 (7 marks) is on managing disease and 2026 Q30 (7) evaluates dialysis. No question asked about future research.	For one disease, connect how it is managed now with a question that future research could answer.
Future directions of biotechnology M6.IQ2.DP1	Three multiple-choice questions. 2019 Q19–20 are on how CRISPR works. Only 2023 Q18 asks about future use.	Propose a future use of a biotechnology in wheat, its intended benefit and one implication.
Structure and function of proteins M5.IQ3.DP3	Two multiple-choice questions on levels of structure (2023 Q11, 2026 Q4). 2022 Q31b-ii (4 marks) links a mutation, a protein's function and cancer risk.	Trace amino acid sequence to folding to function. Only proteins with more than one polypeptide have quaternary structure.

NESA's mapping grids never list the Working Scientifically outcomes for questioning and predicting or conducting investigations. Students still made a prediction in 2024 Q29b and designed a study in 2025 Q32.

Dot points appearing for the first time

Marks on questions that touched a dot point not seen in any earlier paper. In 2026 all 7 were the question on attitudes to GM salmon.



Where the syllabus offers a choice

Content the syllabus lists "for example" can still turn up in the material a question supplies.

- Viral plant pathogens (M7.IQ2.DP1) are mentioned in 2023 Q13. In 2026 Q24b students named their own Australian plant and pathogen.
- Smoke bush (M7.IQ4.DP7) has not appeared. SNPs (M5.IQ4.DP3) were in 2020 Q17–18.
- Analysing the incidence and prevalence of nutritional disease is required (M8.IQ3.DP1).

Also on the radar

Where 24 marks went in 2026

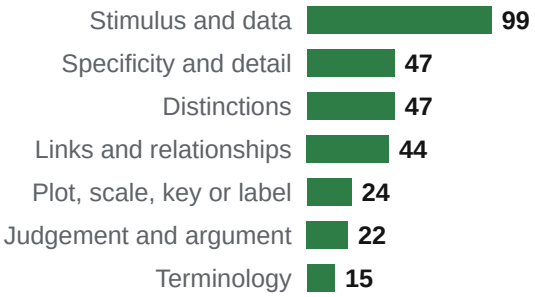
Seven dot points had averaged half a mark per paper or less in 2019–25. In 2026 they carried dialysis (7), attitudes to GM salmon (7), quarantine (4), a plant's response to a pathogen (3) and three multiple-choice questions. Only 11 of the 24 marks were on content that had been that rare.

- **Aboriginal protocols.** The answer to 2026 Q1 is to consult Aboriginal knowledge holders first. Also teach the protection of Indigenous cultural and intellectual property.
- **Disease control.** 2024 Q27 is on pasteurisation. No question has asked for culturally diverse strategies to predict or control spread.
- **Agricultural production.** 2024 Q26 asks about a plant disease. No written question has asked how an animal disease reduces production.
- **Two uses of genetic technology.** Not asked directly: genetic engineering to prevent a non-infectious disease, or an industrial use such as making an enzyme for cheese.
- **Population frequencies.** One multiple-choice question (2021 Q10). The five-mark 2019 Q30 also needed frequency ratios.

What markers reward

Words used in marker feedback

Approximate keyword counts across the 363 "areas to improve" comments in NESA's feedback, 2019–25. A comment can count in more than one row.



- **Use all of the stimulus.** In 2022 Q27 markers wanted the text as well as the graph. Incidence was already falling before screening began.
- **Be specific.** "Boil the water to kill the bacteria", not "boil the water" (2020 Q21). "Yeast", not "fungi" (2024 Q21).
- **Link cause to effect.** Explain means how and why.
- **Use the exact term.** Codon, anticodon, antigen, antibody, "engulf".
- **Plot what is asked.** In 2021 Q25a, plot both ears with a key and no line of best fit. In 2024 Q29a, plot one series and add the line of best fit.

Pairs that marker feedback says students confuse

- DNA replication vs polypeptide synthesis
- external fertilisation vs asexual reproduction
- chromosomes vs chromatids
- antibiotics vs antibodies
- prevention vs treatment of disease
- somatic vs germ-line mutation
- active vs passive immunity
- negative vs positive feedback
- validity vs reliability vs accuracy
- gene flow vs genetic drift
- antibody- vs cell-mediated response
- hearing aids vs cochlear implants

Method and limits

- **Data:** all 344 parts of the 2019–2026 papers, each counted once under the dot point it mainly tested. Marker feedback: 2019–25.
- **Skills and verbs** were judged twice, independently, from the marking guidelines; disagreements were settled against the guideline.
- **Watch-list test:** each year's list (2022–26) was built from earlier papers only; questions mainly on its top 15 were worth 49, 75, 57, 59 and 39 of that paper's 100 marks (56 on average). **Topics are not "due":** a Biology dot point absent from one paper returned in the next 46% of the time (77% if it had appeared); a "due" bonus made the list worse.
- **These are patterns in past papers.** NESA can examine any dot point.

References

1. NESA. *HSC exam papers: Biology*, 2019–2026 (papers, marking guidelines, mapping grids, marker feedback), nsw.gov.au/education-and-training/nesa/curriculum/hsc-exam-papers/biology; and *Biology Stage 6 Syllabus* (2017).

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