Investigating Science

HSC · 2017 SYLLABUS · TEACHER BRIEF

What eight HSC papers tell us about 2027

Every question from 2019–2026, analysed by syllabus dot point, outcome, command verb and stimulus · Prepared November 2026 for Investigating Science teachers

48% *start here, page 3*

of all marks came from questions mainly on just **11 dot points**, each examined in seven or eight of the eight papers.

~28

marks per paper on parts that asked students to **design or judge an investigation** (19–40 per paper).

2

parts worth **7–9 marks** in every paper. Of the 16, six were Analyse and four Evaluate.

39%

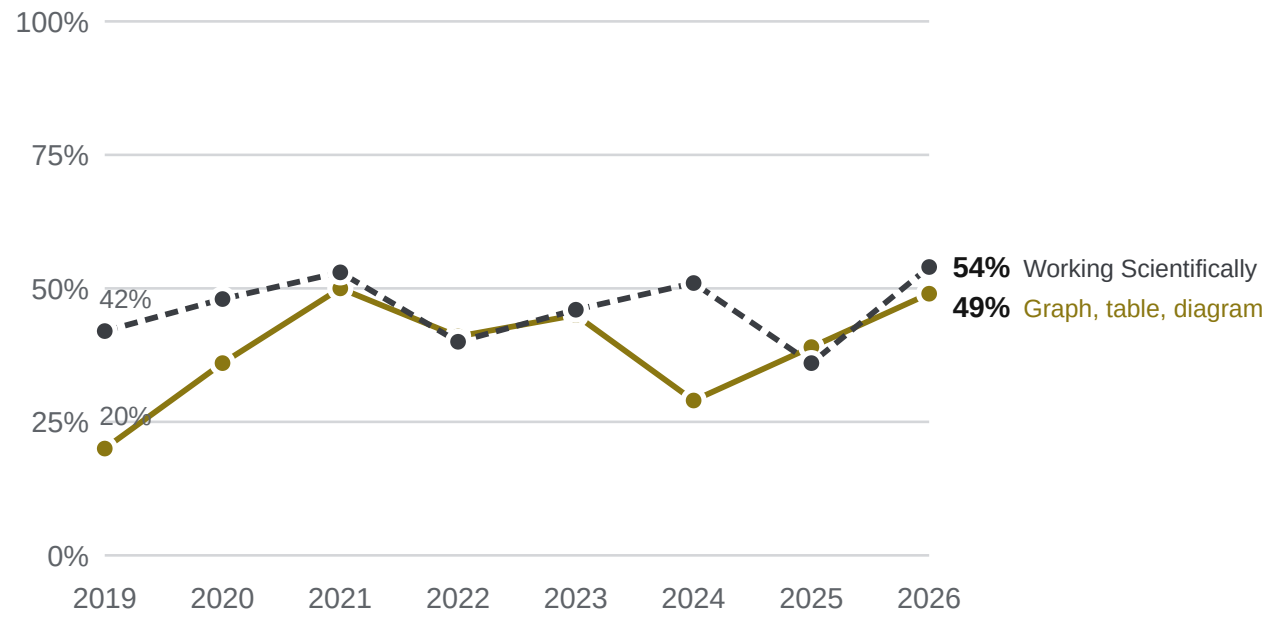
of marks came with a **graph, table, diagram or picture** (20–50% per paper). Counting written scenarios as well, 71%.

Five things to act on

1. **Start with the 11 dot points on page 3.** Questions mainly on them carried 384 of the 800 marks. The table shows how each has been asked.
2. **Practise moving a familiar method to new material.** Papers have used lizards (2024 Q27), flies (2026 Q22) and coral (2026 Q26). Ask which variables and controls still matter, and why.
3. **Teach the six named investigations.** At least one appeared in every paper: Marshall and Warren, van Helmont, Spencer, Eratosthenes, Doppler and Priestley. Questions mainly on the two dot points that name them carried 67 marks.
4. **Vary the evidence in long answers.** In 2026, Q27 gave students two sources to evaluate. Q33 asked them to bring a field of research they had studied and assess two ethical issues in it.
5. **Practise what has not been asked yet.** Pages 5 and 6 list required content with no question so far, or very few, with a task to try for each.

Visual stimulus and Working Scientifically, by year

Percentage of each paper's marks. Visual stimulus includes graphs, tables, diagrams, photographs and packaging.

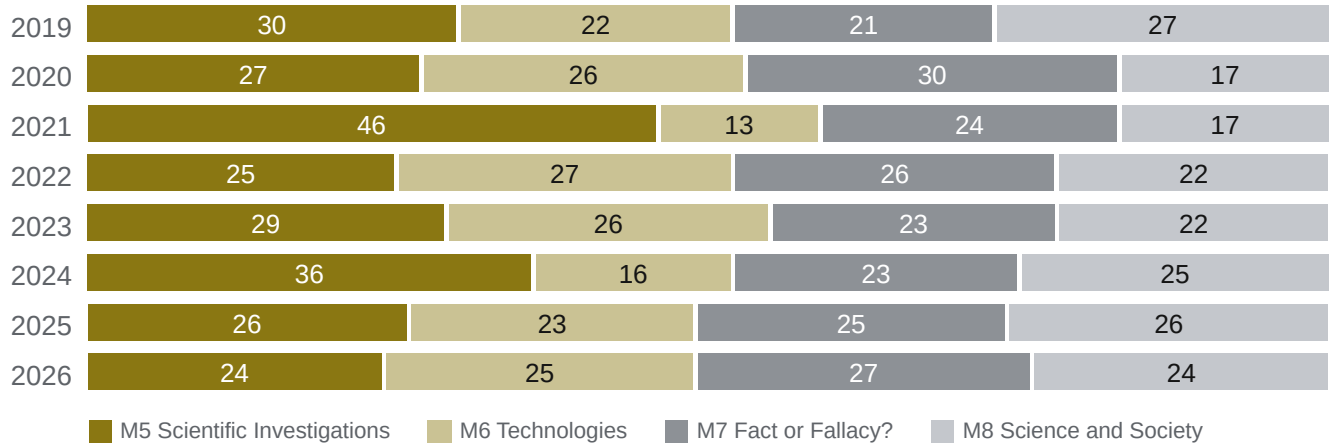


NESA lists the outcomes each question assesses. Sharing a question's marks equally among its outcomes puts Working Scientifically at 36–54% of a paper, 46% on average. Questions with at least one Working Scientifically outcome carried 81% of all marks. School tests set their own Working Scientifically/content split for each assessment task.

How the paper is built

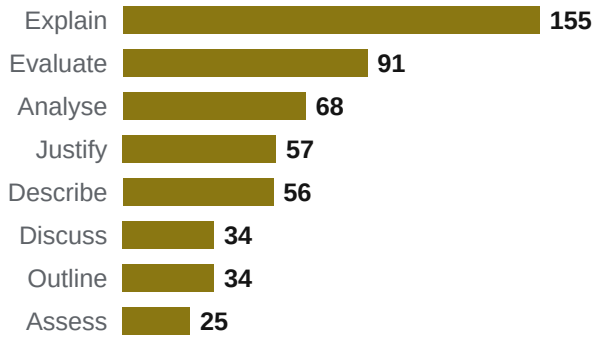
Module 5 had the most marks in four papers and tied with Module 8 in 2025

Marks by module, counting each part under the module it mainly tests. Module 5 carried 243 of 800 marks (24–46 per paper). Modules 6, 7 and 8 carried 178, 199 and 180.



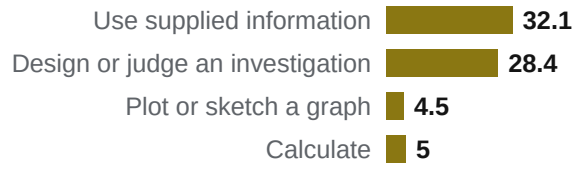
Section II command verbs

Total marks, 2019–26; two-verb parts split. Of the 20 parts worth 6 or more marks, 6 were Analyse, 5 Evaluate and 3 Explain.



What students have to do

Average marks per paper on parts needing each skill. A part can count under more than one skill.



Parts with a graph to plot or sketch carried 4–7 marks in seven papers and none in 2021. Parts with a calculation carried 2–8 marks every year. These count the whole part: the three marks for 2026 Q22b cover working on the graph, a prediction and its justification.

Two parts worth 7–9 marks in every paper

Year	Parts worth 7+ marks (marks, verb): what was asked
2019	Q28 (7, Discuss): tobacco industry and evidence. Q34 (7, Analyse): governments, corporations, research
2020	Q30 (7, Evaluate): water-quality research. Q32c (7, Analyse): conflicts of interest, climate data
2021	Q32 (9, Analyse): validity of two groups' results. Q33c (7, Explain): Priestley's experiment improved
2022	Q28 (7, Analyse): economic influences on data. Q33c-ii (7, Evaluate): funding conditions
2023	Q30 (7, Evaluate): a student's report. Q36 (7, Analyse): technology, theory, new technology
2024	Q28a (7, Describe): a gas-law method. Q35 (7, Justify): placebo, double-blind, control group
2025	Q32 (7, Explain): two advances and world health. Q36 (8, Analyse): science and technology
2026	Q27 (7, Evaluate): two sources. Q33 (7, Assess): two ethical issues in research

What it means for teaching

- Five of the 16 long parts were about an investigation: 2021 Q32 and Q33c, 2022 Q33c-ii, 2024 Q28a and Q35. In 2024 Q35 students justified a placebo, double-blinding and a control group for a trial of copper bracelets.
- The other long parts need different evidence. 2026 Q27 supplied two sources to judge for accuracy, reliability and validity. 2026 Q33 needed a field of research the student had studied.
- Explain is the biggest verb (155 marks), and 45 of the 48 parts asking for it were worth 2–4 marks. Teach students to find every instruction: 2021 Q33c asked them to explain two improvements and to justify further ones.
- Parts that needed supplied information averaged 32 marks per paper (15–49). That includes texts, packaging and diagrams as well as numbers.

The 11 dot points examined almost every year

Each of these was the main subject of a question in **seven or eight of the eight papers**. Together those questions carried **384 of 800 marks**. Some examples below come from related questions counted under another dot point.

Dot point	Papers	Share of all marks 2019–26	How it is examined
Designing a practical investigation with technology *temperature and reaction rate, gas laws, speed and distance* M6.IQ1.DP1	8/8	6.9%	A full method in 2019, 2022 and 2026, and for pressure and volume in 2024 Q28a (counted under Module 5). 2023 Q29b asked for the expected result.
Research, devices and world health *surgical devices and procedures, water treatment, vaccination* M8.IQ3.DP3	8/8	5.6%	The scale changes: a surgical device and human wellbeing (2024 Q25), a procedure and world health (2023 Q22), childhood vaccination and world health (2024 Q22).
Named scientists: objectives, methods and data *Marshall and Warren, Eratosthenes, Doppler, Priestley* M5.IQ2.DP1	8/8	5.4%	Priestley in 2021 Q33 (13 marks): hypothesis, controls, justified improvements. 2020 Q29 (8): a test of the Doppler effect. 2026 Q35 (6): Eratosthenes' method with a labelled diagram.
Past events and the public image of science *nuclear meltdowns, smallpox vaccine, flight, damming rivers* M8.IQ1.DP1	8/8	5.2%	2023 Q33 needed the student's own case study on flight and both views supplied. 2026 Q31a asked how Jenner's demonstration of the vaccine changed society's view of science.
Technology, theories, laws and models *simulations, X-ray diffraction, radioactivity, Hadron collider* M6.IQ2.DP1	8/8	4.2%	2023 Q36 asked for a chain: a technology, the scientific advance it led to, then a new technology. 2025 Q36 used three students' statements.
Evaluating the design of an investigation *variables, sampling, materials, ethics, time frame* M5.IQ3.DP1	7/8	7.4%	Students justify variables, sample, controls and ethics. No 2026 question was mainly on this, yet Q22a asked for the variables and Q28c for a reason to control one.
Testing a claim *validity, reliability, accuracy and error* M7.IQ1.DP1	7/8	3.9%	2025 Q31a asked whether a fertiliser trial supported the company's claim (a 10% gain against a claimed 20%). Q31b asked students to evaluate the design.
What led the named scientists to investigate *Marshall and Warren, van Helmont, Spencer* M5.IQ1.DP1	7/8	3.0%	Often an MCQ. For van Helmont, 2019 Q26 asked for the flaw and a fix, and 2022 Q27 for his method and controlled variables.
Judging correlation and causation *Hawthorne effect, 1991 HRT study, Mozart effect* M7.IQ3.DP1	7/8	2.4%	2025 Q25: why the Mozart effect is not causation. 2026 Q30 (5 marks) accepted a case for or against causation that used both the graph and the table.
Measuring devices, error and accuracy *random and systematic error* M6.IQ1.DP3	7/8	2.2%	Nine MCQs on reading scales, significant figures, calibration and types of error. Written parts in 2022, 2023 and 2025.
Pseudoscience and scientific language *astrology, numerology, iridology* M7.IQ4.DP6	7/8	1.8%	Written parts used astrology (2020, 2025) and numerology (2024). Iridology has only been in MCQs. In 2025 Q21 students had to use the horoscope supplied.

What every paper so far has contained

- **Exactly two parts worth 7–9 marks.**
- **A practical context** from reaction rate, a gas law, or speed and distance.
- **At least one of the six named investigations.**
- **A calculation**, and in seven papers a graph to plot or sketch.

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 **54 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	**Evaluating the design of an investigation** M5.IQ3.DP1	7	9	11	9	4	11	8	·	7/8	7.4
2	**Designing a practical investigation with technology** M6.IQ1.DP1	9	6	7	8	3	9	3	10	8/8	6.9
3	**Research, devices and world health** M8.IQ3.DP3	6	10	1	5	3	9	7	4	8/8	5.6
4	**Named scientists: objectives, methods and data** M5.IQ2.DP1	2	11	15	2	2	2	3	6	8/8	5.4
5	**Past events and the public image of science** M8.IQ1.DP1	7	1	5	1	5	6	8	9	8/8	5.2
6	**Technology, theories, laws and models** M6.IQ2.DP1	2	5	3	5	8	2	8	1	8/8	4.2
7	**Testing a claim** M7.IQ1.DP1	1	·	5	9	7	1	2	6	7/8	3.9
8	**Theories and laws leading to technologies** M6.IQ2.DP2	5	8	2	2	2	·	·	8	6/8	3.4
9	**Governments, corporations and research** M8.IQ3.DP4	7	·	5	7	1	5	·	1	6/8	3.2
10	**What led the named scientists to investigate** M5.IQ1.DP1	5	1	1	5	1	5	·	6	7/8	3.0
11	**Validity of an investigation** M5.IQ3.DP4	5	·	12	1	·	2	4	1	6/8	3.1
12	**Conflicts of interest** M7.IQ4.DP4	7	14	·	·	·	3	4	·	4/8	3.5
13	**Drawing conclusions from data** M5.IQ3.DP3	2	2	·	·	6	7	·	7	5/8	3.0
14	**Judging correlation and causation** M7.IQ3.DP1	5	1	2	·	1	1	3	6	7/8	2.4
15	**Measuring devices, error and accuracy** M6.IQ1.DP3	1	2	1	3	4	·	6	1	7/8	2.2

Marks per paper: 0 1–2 3–4 5–7 8+

Each cell shows the marks from questions mainly on that dot point. A dot (·) means none that year. "Marks per paper" is the eight-year average.

Next on the list (16–20)

- Pseudoscience and scientific language M7.IQ4.DP6 · 7/8 papers, 1.8 marks per paper
- Aboriginal and Torres Strait Islander Peoples' knowledge of plants; bioharvesting M6.IQ2.DP3 · 5/8 papers, 1.9
- Collecting, recording and graphing primary data M5.IQ3.DP2 · 4/8 papers, 1.9
- Benefits of peer review M7.IQ5.DP4 · 4/8 papers, 1.8
- Placebos, double-blind trials and control groups M7.IQ2.DP1 · 5/8 papers, 1.5

Space exploration versus social investment M8.IQ3.DP1 ties with 20th place: also 12 marks across five papers.

Three things the table doesn't show at a glance

Investigation skills are spread through the paper. Questions mainly on the five Module 5 dot points about designing, running and evaluating an investigation carried 10–24 marks per paper (131 in all). In 2026 the ten marks were Q14, Q18 and Q26a–c. In 2023 Q35a students had to recall the claim they tested themselves and the procedure they used, under Module 7.

Conflicts of interest come in bursts. 28 marks in four papers: 7 in 2019, 14 in 2020, 3 in 2024 and 4 in 2025. In 2024 Q33b the authors were paid consultants to a company. In 2025 Q28 a company funded its own studies. 2022 Q28 (7 marks, economic influences on data) drew on the same ideas.

Plant knowledge has moved towards ethics. Questions mainly on medicinal and material uses of plants carried 15 marks in five papers, none in 2025 or 2026. Recent questions asked about the ethics of developing spinifex-enhanced latex (2025 Q29) and about ethical steps and benefit-sharing in research with Indigenous communities (2026 Q6 and Q13).

Required content never or hardly examined

watch this space

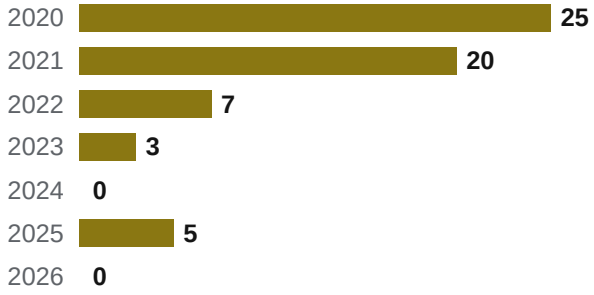
We searched every question, option, marking guideline and sample answer for each item below. “Never” means no question has asked students to do it, even if the idea turns up in an option or a sample answer.

Never asked directly	Syllabus wording	Questions so far	One thing to prepare
Justifying working individually or collaboratively M5.IQ3.DP1	listed under “by:”	never	Ask who should take two readings needed at the same moment, and why. The nearest so far is the 2022 Q29a sample answer, which compares results with other groups.
Beneficial and harmful consequences of applying an investigation's findings M5.IQ3.DP3	listed under “by:”	never; nearest is 2022 Q33c-i	Have students give one benefit and one harm of putting a conclusion to use. 2022 Q33c-i asked only how water research could affect world health.
Examined only lightly			
Justifying materials by availability, cost and familiarity of use M5.IQ3.DP1	listed under “by:”	1 MCQ (2025 Q17), on choosing from the beakers available	For a cooling curve, compare a temperature probe with a glass thermometer and justify the choice by cost, availability or familiarity. No question has asked for these reasons.
The Hawthorne effect and the 1991 HRT study M7.IQ3.DP1	“including”	3 MCQs (2019, 2021, 2024)	Hawthorne: people can behave differently when they know they are observed. HRT: the 1991 study did not take socioeconomic status into account (the answer to 2024 Q10). Have students write two or three marks on each.
Iridology M7.IQ4.DP6	“including”	3 MCQs (2019, 2021, 2023)	2019 Q8 gave iridologists' results in diagnosing gallstones from photographs. Ask what a controlled test would need to show before iridology could be called science.
Computerised simulations and models of Earth's geological history M6.IQ2.DP1	“including”	2 MCQs (2019 Q4, 2026 Q3)	2026 Q3 linked simulations to reconstructing plate movements. 2019 Q4 only read a time span from a chart. Practise explaining how a simulation supports a theory about Earth's past.
Fake science journals and the public perception of science M7.IQ5.DP5	whole dot point	3 marks (2023 Q27)	2023 Q27 asked why so many papers are published in fake journals, not what they do to public trust. Practise the chain from weak review to unreliable claims to lost trust.
A scientist who falsified results M7.IQ5.DP1	whole dot point	3 marks (2020 Q23a)	2020 Q23a asked, with an example, how fraud can be uncovered. Students need one named case and the check that exposed it. Falsifying results is also an accepted issue in 2026 Q33.

Three more tasks to try. Justify why van Helmont needed mass data (2026 Q7 only asked what type of data he collected). Find a step that reduces error in a published report (2024 Q33a asked for a weakness in the method). Predict a realistic time frame for an investigation (2022 Q33c-ii judged a three-year funding limit).

Few dot points are left to appear for the first time

Marks on parts that tested a dot point not examined in any earlier paper. None in 2024 or 2026.



The syllabus's “for example” lists

Students need the main idea and an example they can use. Questions have supplied a context (2022 Q31) or asked for the student's own (2025 Q33, two codes of conduct).

- Cold fusion and the Smolyanitsky and Spears hoax papers have had no question. The names have appeared only as wrong MCQ options, and feedback on 2024 Q34 mentions cold fusion as a poorly chosen example.
- No question has named a code of conduct for cloning, stem cell research or surrogacy. Cloning is an accepted biotechnology example in 2020 Q28b.

Also on the radar

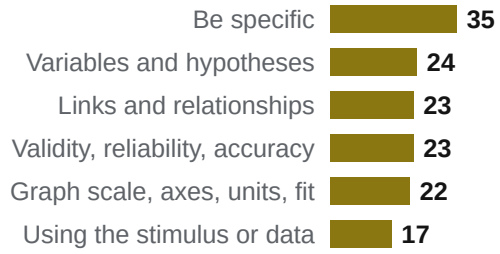
Dot points with five marks or fewer in eight papers

Dot point	Marks	What students were asked
Conventions of a published report M5.IQ4.DP1	1	One MCQ (2019 Q18), on measures of a scientist's impact.
Comparing an investigation with its report M5.IQ4.DP3	3	2022 Q21 asked for two report sections and their purposes. No question has asked for the comparison itself.
The scientists' hypotheses M5.IQ1.DP3	4	2026 Q24b (2 marks): propose a hypothesis for Marshall and Warren.
Why the scientists investigated M5.IQ1.DP2	5	2024 Q31d (3 marks): evaluate students' retest of van Helmont's conclusion.
Volume of papers published M7.IQ5.DP3	4	2025 Q24a: can the scientific community peer review this many articles? Replicating and validating them has not been asked.
International regulation M8.IQ2.DP4	4	2023 Q26b. 2019 Q33b (3 marks) evaluated a protocol or code of conduct.
Emotive advertising M7.IQ1.DP3	5	One MCQ in each of five papers.
A scientific debate in the media M7.IQ4.DP1	5	2020 Q32a–b, on summaries of a climate change debate.

What markers reward

What markers asked students to improve

Number of marker comments in each group, from 244 comments on 96 questions, 2019–25. A comment can count in more than one group.



- **Be specific.** The largest group: 35 comments across 32 questions. Markers wanted specific safety measures, specific examples and specific information from a graph.
- **Name the type of error.** In 2025 Q35, readings always 2 g too high point to a systematic error. Points scattered above and below the line point to random error.
- **Use what is supplied.** Quote values from the graph or table, or a particular claim from the text.

Terms markers said students confuse

Aim and hypothesis (2019 Q24). Theory and law (2021 Q28). Halo effect and Hawthorne effect (2021 Q30). Random and systematic error (2022 Q22, 2025 Q35). Validity and reliability (2020 Q22). A surgical device and a procedure (2023 Q22, 2024 Q25). Rate and time taken (2019 Q23, 2025 Q34).

How the marks were counted

- NESA's marking guidelines give the module and outcomes for each question. We matched each of the 348 question parts to the syllabus dot point it mainly tests and counted its marks there once.
- Skill counts (investigation, supplied information, graph, calculation) use the whole part's marks; every part was classified twice, independently, and disagreements settled against the marking guideline. Marker feedback covers 2019–25.
- **Watch-list test:** each year's list (2022–26) was built from earlier papers only; questions mainly on its top 15 were worth 60, 43, 60, 47 and 60 of that paper's 100 marks (54 on average). **Topics are not "due":** a dot point absent from one paper returned in the next 52% of the time (69% if it had appeared); a "due" bonus made the list worse.

References

1. NESA. Investigating Science HSC papers, marking guidelines, mapping grids and feedback (2019–26), and the Stage 6 Syllabus (2017).

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