

INTUITION EDUCATION

HSC 2026 · PREDICTED PRACTICE PAPER

2026 HSC Investigating Science

Original practice material — not a NESA paper

Total marks: 100

GENERAL INSTRUCTIONS

- Reading time — 5 minutes
- Working time — 3 hours
- Write using black pen
- Draw diagrams using pencil
- Calculators approved by NESA may be used
- Section I — 20 marks. Attempt Questions 1–20. Allow about 35 minutes for this section
- Section II — 80 marks. Attempt Questions 21–36. Allow about 2 hours and 25 minutes for this section

HOW THIS PAPER WAS BUILT

This full-length practice paper was built from the consensus of a six-model AI panel (fable, opus, gpt-5.6-sol, gemini-3.1-pro, grok, deepseek), each of which independently predicted the 2026 examination from the 2019–2025 papers and NESA marking feedback. The 117 question-level predictions were clustered; every cluster with consensus probability ≥ 0.55 is realised in this paper, the remainder is drawn from the panel's watch list, and the science–technology "continuous cycle" is deliberately kept to a short single-link item in line with the panel's rested call on the full-cycle closer. Each Section II question is tagged with the consensus cluster it realises and the probability that a question of that kind appears in 2026. Every question is original — none is copied from a past paper, and scenario surfaces used in 2025 (sleep/heart-rate, Fertiliser Z, spinifex, thermometer accuracy) have been rotated per the corpus-echo rule.

Answers and marking notes are published as a separate PDF — sit the paper first, then download the solutions from intuitioneducation.com.au/hsc-2026/investigating-science.

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Section I

20 marks — Attempt Questions 1–20 — Allow about 35 minutes for this section

Use the multiple-choice answer sheet for Questions 1–20.

Question 1

A student's depth-study report contains the sections: abstract, introduction, method, results, discussion, conclusion.

In which section should the student assess the reliability of the results obtained?

- A. Method
- B. Results
- C. Discussion
- D. Conclusion

Question 2

A lit candle was placed in a jar, and the jar was sealed.

Which of the following is an observation?

- A. The flame went out 40 seconds after the jar was sealed.
- B. The flame used up all of the oxygen inside the jar.
- C. Flames cannot burn in the absence of oxygen.
- D. The flame would burn for longer in a larger jar.

Question 3

A scientist grew a small tree in a weighed quantity of soil for five years, adding only water. The tree's mass increased by about 74 kg while the soil lost only 57 g, and the scientist concluded that the tree's substance came from the water alone.

Who conducted this investigation?

- A. Joseph Priestley
- B. Jan Baptista van Helmont
- C. Percy Spencer
- D. Barry Marshall

Question 4

The steps of an investigation into stomach ulcers are listed.

1. Spiral bacteria were repeatedly seen in biopsy samples from patients with gastritis.
2. It was proposed that the bacteria, not stress, caused gastritis and ulcers.
3. The bacteria were successfully cultured after plates were left over a holiday period.
4. A researcher swallowed a culture of the bacteria and developed gastritis.

In which order did these steps occur?

- A. 2, 1, 3, 4
- B. 1, 2, 3, 4
- C. 1, 3, 2, 4
- D. 2, 3, 1, 4

Question 5

A safety data sheet for propan-2-ol states: "Highly flammable liquid and vapour. Causes serious eye irritation."

A student's investigation requires a beaker of propan-2-ol to be warmed to 40 °C.

Which action best minimises the most serious risk in this procedure?

- A. Wearing a cotton laboratory coat
- B. Warming the beaker in a water bath on an electric hot plate
- C. Wearing disposable gloves while pouring
- D. Carrying out the procedure near a sink

Question 6

A measuring cylinder is graduated in 1 mL divisions. The bottom of the meniscus sits between the 36 mL and 37 mL marks.

Which value is the most appropriate way to record this volume?

- A. 36 mL
- B. 36.5 mL
- C. 36.50 mL
- D. 37.00 mL

Question 7

Students investigated the effect of water salinity on the hatching of brine shrimp eggs. Five salt concentrations were prepared using the same volume of water, and the containers were kept at the same temperature and light level. The number of hatched shrimp was counted after 48 hours.

What is the independent variable in this investigation?

- A. The number of hatched shrimp
- B. The temperature of the water
- C. The salt concentration of the water
- D. The time allowed for hatching

Question 8

Students are testing the claim that a vitamin solution speeds up the germination of mung beans.

Which change to their investigation would most improve its validity?

- A. Repeating the investigation with three more batches of beans
- B. Using a more precise balance to measure the vitamin powder
- C. Including a group of beans given only water
- D. Excluding the slowest-germinating beans from the results

Question 9

What is the main purpose of peer review before scientific research is published?

- A. To ensure the research is written in a style the public can understand
- B. To have independent experts assess the methodology and conclusions
- C. To confirm the research will be profitable for the journal
- D. To guarantee that the results can never be overturned

Question 10

An Olympic swimmer with no scientific qualifications appears in advertisements describing a breakfast cereal as "scientifically formulated", and sales rise sharply.

Which effect best explains the public's acceptance of this claim?

- A. The halo effect
- B. The Hawthorne effect
- C. The Mozart effect
- D. The placebo effect

Question 11

The productivity of workers in a call centre rose every time researchers trialled a change to the office — brighter lights, dimmer lights, new chairs — and fell back once the researchers left.

Which effect best explains these results?

- A. The halo effect
- B. The Hawthorne effect
- C. The placebo effect
- D. The Mozart effect

Question 12

A sleep-tracking app displays a message inside the app inviting users to rate it. Of users who had kept the app for at least six months, 92% reported improved sleep. The company advertises: "92% of users sleep better."

Why should this claim be treated with caution?

- A. The sample size of the survey was too small.
- B. The sample was self-selected and unrepresentative of all users.
- C. The percentage was calculated incorrectly.
- D. Sleep cannot be measured quantitatively.

Question 13

Which row correctly shows a technology enabling an advance in scientific understanding?

	Technology	Scientific advance
A.	X-ray diffraction imaging	The double-helix model of DNA
B.	The double-helix model of DNA	X-ray diffraction imaging
C.	The theory of electromagnetism	The electric generator
D.	Germ theory of disease	Antiseptic surgical techniques

Question 14

An ambulance with its siren on drives at constant speed past a stationary observer.

What does the observer hear as the ambulance approaches and then moves away?

- A. A constant pitch throughout
- B. A lower pitch while approaching, then a higher pitch
- C. A higher pitch while approaching, then a lower pitch
- D. A steadily rising pitch throughout

Question 15

A sealed syringe contains 60 mL of air at a pressure of 100 kPa. The plunger is pushed in slowly at constant temperature until the volume is 20 mL.

What is the new pressure of the air?

- A. 33 kPa
- B. 100 kPa
- C. 200 kPa
- D. 300 kPa

Question 16

A company plans a trial of a new dietary supplement using human volunteers.

Which action would make the trial more ethical?

- A. Increasing the number of volunteers in the trial
- B. Using calibrated instruments to measure the outcomes
- C. Explaining the risks to volunteers and obtaining their written consent
- D. Repeating each measurement three times

Question 17

A company claims its "energised crystal" pendants restore the body's natural frequency, and states that when the pendant appears not to work, the wearer's "energy blockages" are responsible.

Which feature most clearly identifies this claim as pseudoscience?

- A. The claim is made by a commercial company.
- B. The pendants are popular and have many positive reviews.
- C. The claim is constructed so that it can never be shown to be false.
- D. The company did not use a large enough sample when testing pendants.

Question 18

Two students each timed the same pendulum's period five times. The true period is known to be 2.0 s.

DATA PROVIDED IN THE EXAM

Student P's readings: 2.4, 2.4, 2.5, 2.4, 2.4 (all about 0.4 s above the true value). Student Q's readings: 1.8, 2.3, 2.0, 1.7, 2.2 (scattered above and below the true value).

Which row classifies the error most affecting each student's results?

	Student P	Student Q
A.	Random	Systematic
B.	Systematic	Random
C.	Systematic	Systematic
D.	Random	Random

Question 19**DATA PROVIDED IN THE EXAM**

graph — monthly sunscreen sales (left axis, \$ thousands) and monthly jellyfish stings recorded at beaches (right axis, number of stings) plotted for one year; both series peak together in January and dip together in July.

Which statement is best supported by the graph?

- A. Sunscreen chemicals in the water attract jellyfish to swimmers.
- B. Being stung by jellyfish causes people to buy sunscreen.
- C. A third variable, such as more people swimming in summer, could explain both trends.
- D. The two variables are unrelated because correlation is impossible between different units.

Question 20**DATA PROVIDED IN THE EXAM**

table — Agency A: total annual budget \$1.2 billion, spending on medical research \$60 million. Agency B: total annual budget \$3.0 billion, spending on medical research \$90 million.

Which statement about spending on medical research is correct?

- A. Agency A spends more than Agency B in both dollar terms and as a proportion of budget.
- B. Agency B spends more than Agency A in both dollar terms and as a proportion of budget.
- C. Agency A spends more in dollar terms, but Agency B allocates a larger proportion.
- D. Agency B spends more in dollar terms, but Agency A allocates a larger proportion.

Section II

80 marks — Attempt Questions 21–36 — Allow about 2 hours and 25 minutes for this section

Answer the questions in the spaces provided. Show all relevant working in questions involving calculations.

Question 21

(3 marks)

In the 1770s, Joseph Priestley observed that a sprig of mint growing in a sealed jar "restored" air in which a candle had previously burned, so that the candle could burn in it again and a mouse could survive in it.

Outline how Priestley's investigation differed from the traditional linear model of scientific methodology. In your answer, refer to the role played by his initial observation. **(3)**

Question 22

(3 marks)

Technologies capable of detecting radiation, such as photographic plates and radiation counters, contributed to the development of the model of the atom.

Explain how these detection technologies advanced scientific understanding of the atom, and how that understanding later enabled ONE named medical technology. **(3)**

Question 23

(4 marks)

Aboriginal Peoples of northern Australia have long used the Kakadu plum as a food and for treating ailments. Scientific analysis later showed the fruit has one of the highest vitamin C concentrations of any plant, and it is now used in commercial skincare and food-preservation products.

Explain why Aboriginal Peoples' knowledge of the Kakadu plum is valuable to the scientific community, AND what an ethical partnership between researchers and the knowledge holders requires. **(4)**

Question 24

(4 marks)

Iridologists claim that health conditions can be diagnosed by examining patterns in the iris of the eye.

DATA PROVIDED IN THE EXAM

table — four practising iridologists were independently shown the same set of 20 iris photographs and asked to identify which showed "kidney stress". Number of photographs identified: Iridologist 1: 3; Iridologist 2: 11; Iridologist 3: 7; Iridologist 4: 16. No two iridologists selected the same set of photographs.

Explain why iridology is considered a pseudoscience. In your answer, refer to the data provided. **(4)**

Question 25**(3 marks)****DATA PROVIDED IN THE EXAM**

scatter graph — each point represents one suburb; x-axis: number of streetlights in the suburb (200 to 3200); y-axis: number of asthma cases recorded in the suburb per year (15 to 260). The points show a strong positive correlation.

A newspaper reports: "Streetlights linked to asthma — suburbs with more streetlights have more asthma."

Explain why this data does not show that streetlights cause asthma. In your answer, identify a variable that could account for the relationship shown. **(3)**

Question 26**(6 marks)**

A gardening company claims that watering seedlings with diluted seaweed extract makes them grow faster than watering with plain water.

Write a valid and reliable method that a student could follow to test this claim using bean seedlings.

In your method, include:

the independent and dependent variables, and how the dependent variable will be measured quantitatively

an experimental control

TWO variables that must be kept constant

how reliability will be addressed. **(6)**

Question 27**(5 marks)**

A class compared two balances by repeatedly weighing the same 50.00 g standard mass.

DATA PROVIDED IN THE EXAM

results table — Analogue spring balance (g): 47.9, 48.1, 48.0, 48.2, 48.0. Digital balance (g): 49.9, 50.1, 50.0, 55.6, 50.0.

- One of the digital balance readings should be excluded before averaging. Identify this reading and calculate the mean of the remaining digital readings. **(1)**
- Identify which balance is more accurate. Justify your answer using values from the table. **(2)**
- Name the type of error affecting the spring balance's results, propose a likely cause, and state how this error could be corrected. **(2)**

Question 28**(5 marks)**

A university proposes a trial in which 100 adult volunteers will apply a newly developed anti-inflammatory skin cream twice daily for eight weeks. The cream has not previously been tested on humans.

- (a) Justify TWO recommendations an ethics committee would make before approving this trial. **(3)**
- (b) Name ONE code, declaration or regulation governing research on humans, and describe how it addresses ONE ethical issue raised by this trial. **(2)**

Question 29**(4 marks)**

A bottled-water company publishes the following graph in its advertising.

DATA PROVIDED IN THE EXAM

bar chart titled "Tap water complaints keep rising!" — vertical axis "complaints about tap water quality" starts at 94 (not zero) and ends at 106; bars: 2023: 96; 2024: 97; 2025: 99; a fourth bar labelled "2026 (projected)" drawn at 104 in a different shade. The rise from 96 to 99 is about 3%, but the truncated axis makes the 2025 bar appear roughly twice the height of the 2023 bar.

Analyse how the presentation of this graph misrepresents the data and how this could influence public perception of tap water. Refer to specific features of the graph in your answer. **(4)**

Question 30**(4 marks)**

An energy-drink manufacturer funded a university study which concluded that its drink improves concentration in young adults. The funding was declared in the published paper.

Explain why the results of this study should be treated with caution, even though the research was conducted by a university. Support your answer with an example of the influence of commercial interests on science from a DIFFERENT industry. **(4)**

Question 31**(6 marks)**

A company sells the PowerBoost protein bar with the claim:

"Increases muscle mass by 15% in just four weeks."

The company's trial is summarised below.

DATA PROVIDED IN THE EXAM

20 members of one gym ate one PowerBoost bar daily for four weeks. All 20 participants had also begun a new supervised weight-training program at the start of the trial. Mean muscle mass at start: 34.0 kg; mean muscle mass after four weeks: 35.7 kg. There was no group that trained without eating the bar.

- (a) Calculate the actual mean percentage increase in muscle mass, and assess whether the trial data supports the company's claim. **(2)**
- (b) Explain why this trial cannot show that the protein bar caused the increase in muscle mass. **(2)**
- (c) Describe ONE change to the design of the trial that would improve its validity, and justify your choice. **(2)**

Question 32**(7 marks)**

A student investigated the claim that playing classical music increases plant growth.

Five pot plants were placed on a windowsill with a speaker playing classical music for 6 hours each day.

Five pot plants were placed inside a cupboard with no speaker.

The pots were of different sizes and contained different amounts of soil.

After two weeks, the student measured each plant's height once, by eye, using a ruler.

The windowsill plants grew taller, and the student concluded that classical music increases plant growth.

- (a) Explain why this investigation is not valid. In your answer, identify TWO specific faults in the design. **(2)**
- (b) Justify THREE modifications to the investigation, explicitly linking each modification to an improvement in validity, reliability or accuracy. **(3)**
- (c) The student suggests that using fifty plants in each group instead of five would fix the investigation. Explain why increasing the number of plants alone would NOT make the student's conclusion valid. **(2)**

Question 33**(5 marks)**

A company claims that its magnetic knee strap reduces knee pain in runners.

Describe how a double-blind, placebo-controlled trial could be used to test this claim. In your answer, specify what would be used as the placebo, who is prevented from knowing the group allocations, and justify how EACH of these features improves the quality of the evidence. **(5)**

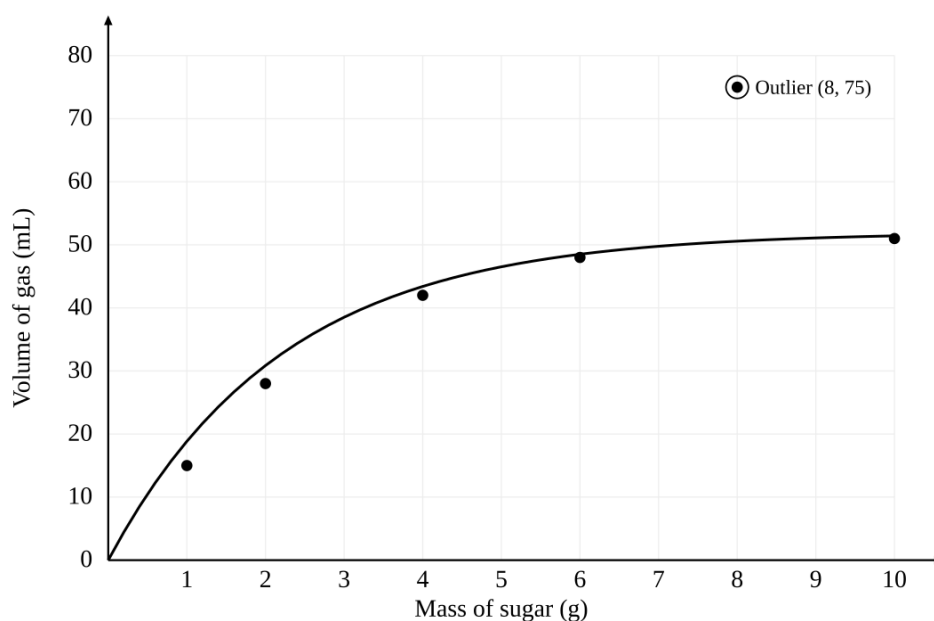
Question 34**(6 marks)**

A student investigated the effect of sugar on fermentation by adding different masses of sugar to identical yeast suspensions and measuring the volume of gas produced in 30 minutes at 30 °C.

DATA PROVIDED IN THE EXAM

results table — Mass of sugar (g): 0, 2, 4, 6, 8, 10. Volume of gas produced in 30 min (mL): 0, 18, 33, 44, 75, 52. The trend rises steeply then flattens (0, 18, 33, 44, then about 50 at 8 g and 52 at 10 g); the reading of 75 mL at 8 g is an outlier — the student later noted that the 8 g measuring tube had a loose bung refitted mid-trial.

(a) Graph the results on the grid provided, including a line or curve of best fit. **(4)**

**DIAGRAM PROVIDED IN THE EXAM**

(b) Describe the relationship shown by your graph, and explain whether the data supports the hypothesis that increasing sugar always increases the volume of gas produced. **(2)**

Question 35

(7 marks)

The table shows research and development funding in one country by source.

DATA PROVIDED IN THE EXAM

table — funding by source, 2015 vs 2025 (billions of dollars, with share of national total): Government: 2015: \$9.2 b (55% of total); 2025: \$10.1 b (38% of total). Business: 2015: \$6.6 b (40%); 2025: \$15.3 b (57%). Philanthropy and other: 2015: \$0.9 b (5%); 2025: \$1.3 b (5%). Total: 2015: \$16.7 b; 2025: \$26.7 b.

- (a) Describe the change in the composition of research funding between 2015 and 2025. Support your answer with values from the table. **(2)**
- (b) Analyse how this change in funding sources could influence the direction of scientific research, the timeframes of research projects, and the reporting of results. Include an overall judgement about whether the change benefits science. **(5)**

Question 36

(8 marks)

Three students discuss the regulation of human gene-editing research.

Student A: "Gene-editing research should be governed by binding international rules. Science crosses borders, so the laws of any single country cannot prevent unethical experiments."

Student B: "Strict regulation just pushes research into countries with no rules. Training scientists in ethics and requiring open publication protect people better than bans."

Student C: "Regulation always lags behind discovery, so institutional ethics committees reviewing each project are the only practical safeguard."

Analyse the extent to which scientific research can be effectively regulated. In your answer, refer to the view of EACH student and to at least ONE named code, declaration or regulatory body. **(8)**

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