

Science 7–8

Chapter 6 — Communicating

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The scientific report: structure, conventions, scientific vocabulary, voice and referencing

What we teach here — VC2S8I08 (Victorian Curriculum F–10 Version 2.0, Science, Levels 7 and 8):

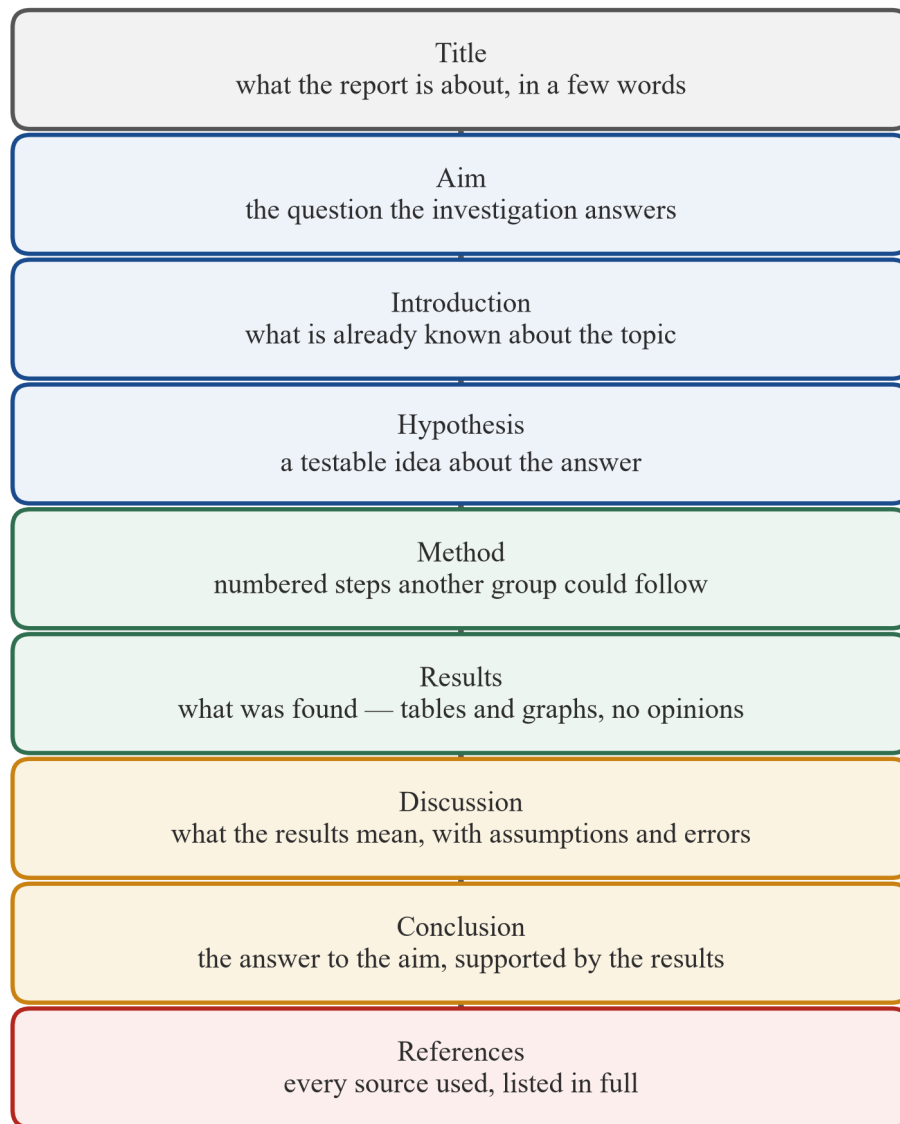
“communicating ideas, findings and arguments for specific purposes and audiences involves the selection and use of appropriate presentation formats, scientific vocabulary, models and other representations, and may include the use of digital tools” **This subtopic owns the first limb of a split CD (D6).** 6A carries the scientific report’s structure, its conventions, its scientific vocabulary, and its referencing; the partner 6B carries choosing the presentation format, the models and the digital tools to suit the purpose and the audience. So here you learn what a report *is* and how every piece of one is written; choosing *which* format to use for *which* audience is 6B’s job, and this subtopic points to 6B rather than teaching it. **In our words:** a scientific report is a promise that someone else can check your work. To keep that promise it has a fixed shape — every section answers one question — and fixed habits: tables and figures numbered and captioned, units written once, precise words instead of vague ones, the right voice and tense in the right section, and a reference for every borrowed thing. None of that is decoration. It is how a reader can follow what you did, check what you found, and tell your ideas apart from everyone else’s. **Achievement-standard extract served here (D13):** *“They select and use appropriate presentation formats, scientific vocabulary, models and other representations when communicating their ideas, findings and arguments for specific purposes to specific audiences.”* 6A is the owner of VC2S8I08, so the extract appears here in full; 6B cites it by reference. **Elaborations drawn on:** VC2S8I08.E01 (active and passive voice in scientific writing, and analysing a journal-style piece for voice and tense), VC2S8I08.E03 (a report on an investigation of the properties of different rock types, written with scientific conventions and carrying a discussion of assumptions and sources of error), VC2S8I08.E06 (justifying a particular ethical response to a selected socio-scientific issue). **Scope notes:** the ceiling is held (D9). The rock work here is a *setting* for report writing, not rock science: rocks are described only by what you can see and feel, and the rock cycle, rock types and resource extraction are Ch13’s. Choosing the right graph or table for a data set is 4A’s; planning the method itself is 3A’s; naming assumptions and errors as ideas is 5A’s; judging whether a source is trustworthy is 5B’s; picking the format for the audience is 6B’s. Here those earlier skills are *used* in writing up, never re-taught. The one maths habit we lean on is rounding a mean to the decimal place of the readings (VC2M7N04).

Word watch — the report’s own words. A **scientific report** is a written account of an investigation that lets another person check it. A **convention** is an agreed habit of presentation — where a caption goes, how a unit is written — that every report in science follows, so every reader knows where to look. The **aim** is the question the investigation answers; the **hypothesis** is the testable prediction you state before the test (2B); the **results** are what you found, as numbers and plain statements; the **discussion** is what the results mean, including assumptions and sources of error; the **conclusion** is the one- or two-sentence answer to the aim. **Voice** is about who comes first in a sentence: in the **active voice** the doer comes first (*“we measured the mass”*), in the **passive voice** the thing it happened to comes first and the doer is usually left out (*“the mass was measured”*). **Tense** is whether a sentence sits in the past or the present. A **citation marker** is a small tag in the text, like [S1], that points at one line in the **reference list** — the list at the end of a report that gives every source in full. Using someone else’s words, ideas or images without credit, so they read as yours, is **plagiarism**. To **justify** a position is to give reasons for it that someone on the other side has to answer, and a **socio-scientific issue** is a real-world question where science meets people — where the evidence is part of the argument but not all of it.

Theory

Why a report has a fixed shape

Imagine handing your method and results to a student at another school, with a note: *check this for me*. Everything they would need to check you — what you asked, what you knew, what you thought would happen, what you did, what you found, what it means, where your facts came from — has to be on the page. A scientific report is that page, and its nine sections exist because they are the nine things a checker needs. The shape never changes, whatever the investigation is.

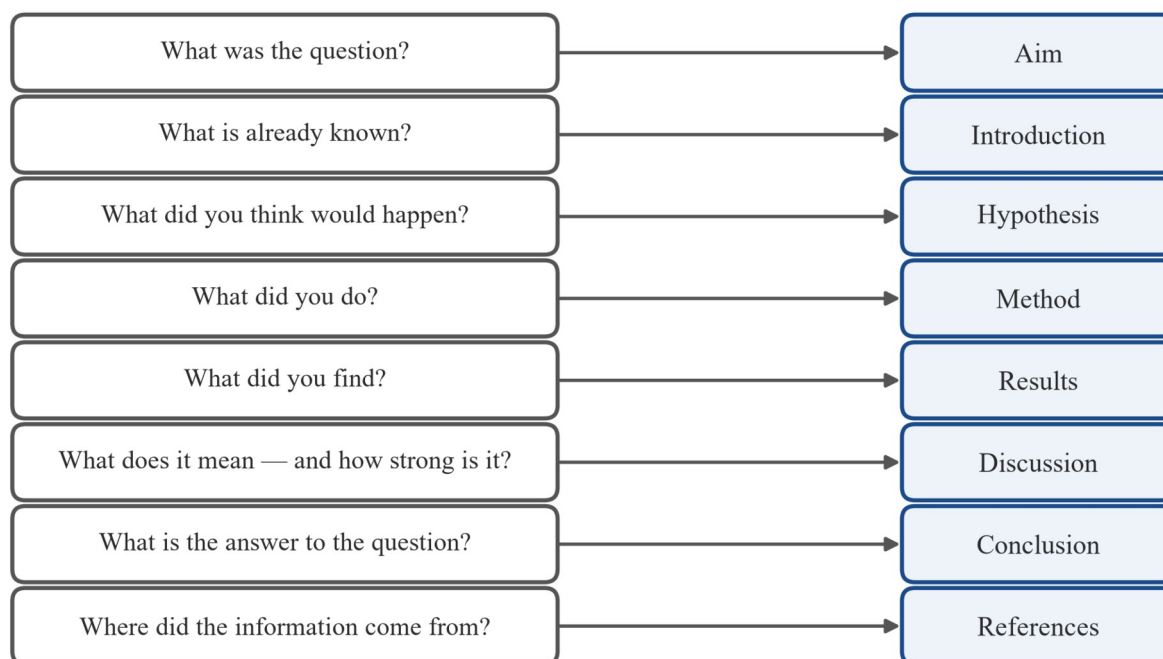


*the same
shape for
every report*

Flow chart titled “The nine sections of a school scientific report”: nine boxes joined top to bottom by arrows — Title, what the report is about, in a few words; Aim, the question the investigation answers; Introduction, what is already known about the topic; Hypothesis, a testable idea about the answer; Method, numbered steps another group could follow; Results, what was found — tables and graphs, no opinions; Discussion, what the results mean, with assumptions and errors; Conclusion, the answer to the aim, supported by the results; References, every source used, listed in full; a side note reads “the same shape for every report”

A quicker way to hold the shape in your head is to hear each section as an answer to one question a reader is asking. Learn the questions and you can never lose the shape: when you are writing, each section earns its place by answering its question, and a sentence that answers a *different* question is in the wrong section.

Each section answers one question

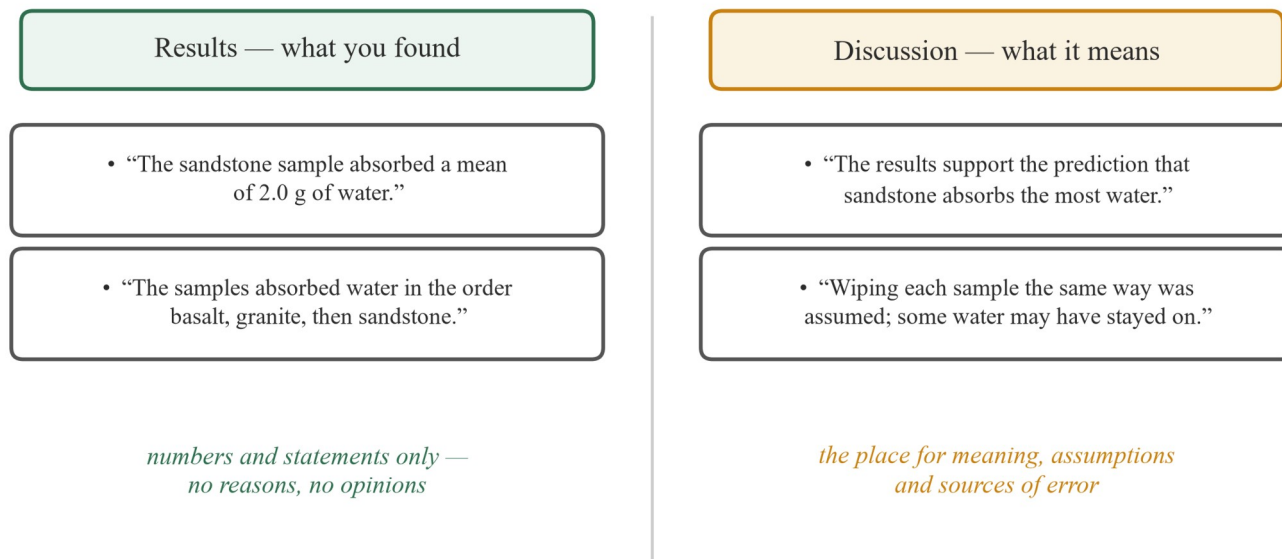


Matching chart titled “Each section answers one question”: eight question boxes on the left joined by arrows to section boxes on the right — What was the question? → Aim; What is already known? → Introduction; What did you think would happen? → Hypothesis; What did you do? → Method; What did you find? → Results; What does it mean — and how strong is it? → Discussion; What is the answer to the question? → Conclusion; Where did the information come from? → References

One investigation will carry us through the whole subtopic: three rock samples — granite, basalt and sandstone — soaked in water to see which absorbs the most. The rock science stays simple on purpose; the thing being taught is the report.

The line between results and discussion

The section students mix up most is the pair in the middle. The rule is short: **results are what you found; discussion is what it means**. A results sentence carries a number or a plain statement of what happened, and no reasons and no opinions. A discussion sentence carries the meaning — whether the hypothesis stood up, what was assumed, what could have shifted the numbers.



Two-panel chart titled “Results — what you found” against “Discussion — what it means”: the green results panel holds two example sentences, “The sandstone sample absorbed a mean of 2.0 g of water” and “The samples absorbed water in the order basalt, granite, then sandstone”, with the note “numbers and statements only — no reasons, no opinions”; the amber discussion panel holds “The results support the prediction that sandstone absorbs the most water” and “Wiping each sample the same way was assumed; some water may have stayed on”, with the note “the place for meaning, assumptions and sources of error”

A handy check: if a sentence contains *because*, *this shows*, *this supports* or *this means*, it is doing discussion work. If it could be read straight off the table or the graph with nothing added, it is results.

Convention 1 — tables

A results table in this book and in every lab report you write from now on follows four conventions. They are not taste; they are what let a reader check your numbers without asking you a single question.

caption above the table, numbered, in one line

the unit sits in the heading, written once, not in every cell

the thing you chose to change goes in the first column

the mean is rounded to the decimal place of the readings

Table 1. Water absorbed by three rock samples (simulated data)

Rock sample	Trial 1 water absorbed (g)	Trial 2 water absorbed (g)	Mean water absorbed (g)
granite	0.4	0.6	0.5
basalt	0.2	0.4	0.3
sandstone	1.8	2.2	2.0

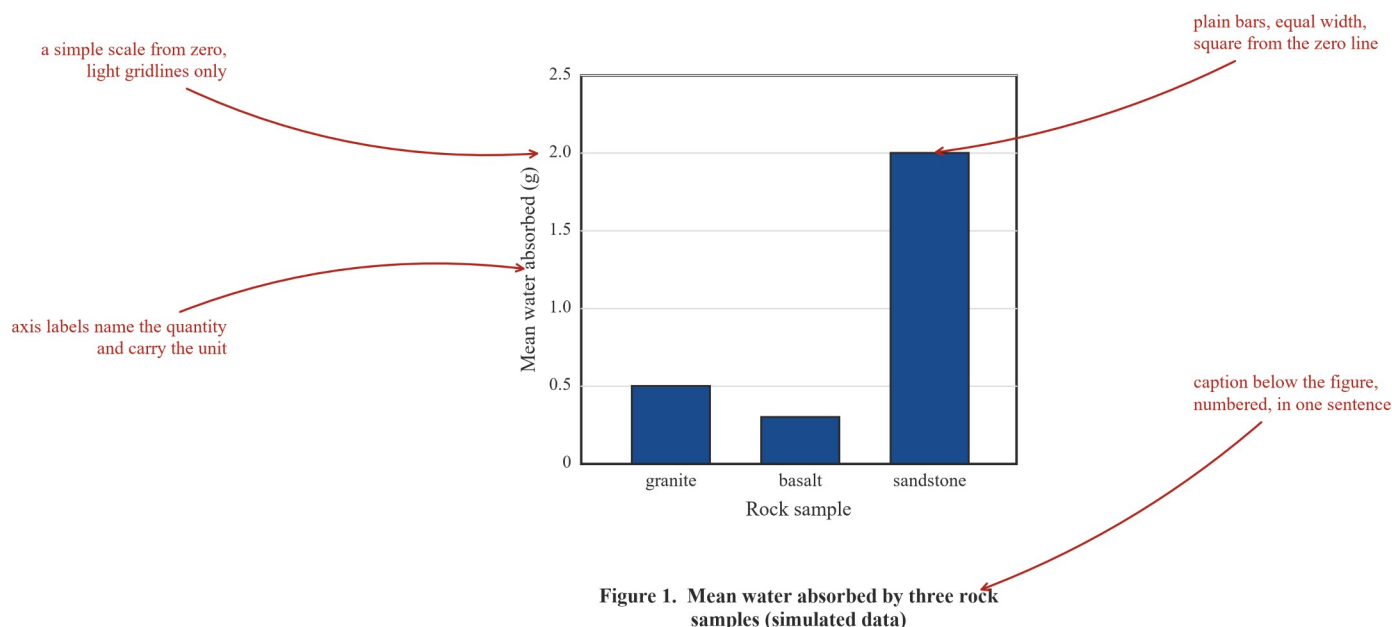
Labelled anatomy of a results table titled “Table 1. Water absorbed by three rock samples (simulated data)”: a four-column table — Rock sample; Trial 1 water absorbed (g); Trial 2 water absorbed (g); Mean water absorbed (g) — with rows granite 0.4, 0.6, 0.5; basalt 0.2, 0.4, 0.3; sandstone 1.8, 2.2, 2.0; red callouts point out: the caption sits above the table, numbered, in one line; the unit sits in the heading, written once, not in every cell; the thing you chose to change goes in the first column; the mean is rounded to the decimal place of the readings

Read the four callouts as a checklist. (1) The **caption goes above the table**, numbered in the order the tables appear — Table 1., Table 2. — in one line that says what is in the table. (2) The **unit is written once, in the heading** — (g) — never repeated in every cell, because every cell in that column is grams and saying it thirty times adds nothing. (3) The **thing you chose to change** — here, which rock the sample is — **goes in the first column**, with what you measured in the columns after it. (4) A **calculated mean is rounded to the decimal place of the readings**

(VC2M7N04): the readings sit at one decimal place, so the mean does too. A mean of exactly 0.5 g written as 0.500 g pretends to a fineness the balance never had.

Convention 2 — figures

A graph in a report is a **figure**, and figures follow their own conventions — the mirror image of the table's in one place: **the caption goes below the figure**, numbered in the order the figures appear, in one full sentence.



Labelled anatomy of a column graph titled “Figure 1. Mean water absorbed by three rock samples (simulated data)”: a plain column graph with a vertical axis labelled “Mean water absorbed (g)” on a simple scale from 0 to 2.5 with light gridlines, a horizontal axis labelled “Rock sample”, and equal-width square columns for granite 0.5, basalt 0.3 and sandstone 2.0 rising from the zero line; red callouts point out: a simple scale from zero with light gridlines only; axis labels name the quantity and carry the unit; plain bars of equal width, square from the zero line; the caption sits below the figure, numbered, in one sentence

The axis labels do the unit's job here: *Mean water absorbed (g)* names the quantity **and** carries the unit, on both axes. The columns start square from the zero line, are all the same width, and nothing is dressed up — no 3-D shading, no colour tricks — because a figure's only job is to show the data honestly. (Choosing a column graph in the first place is because the thing changed is a set of names, not a number line; choosing the right display for a data set is 4A's toolkit, and once chosen, these are the conventions it is drawn with.)

Scientific vocabulary — precise, not fancy

Scientific vocabulary is not long words. It is **exact** words — words that let a reader picture exactly what you saw and repeat exactly what you did. The swap to make in your writing is never casual → formal; it is vague → precise.

Vague		Precise
"The rock was pretty hard."	→	"A steel nail scratched the rock, but a fingernail did not."
"It took ages to dissolve."	→	"It took 74 s to dissolve."
"There was heaps of bubbling."	→	"Bubbles of gas formed across the whole surface within 10 s."

say exactly what you saw, with a number and a unit where you have one

Two-column chart titled "Vague" against "Precise" with three rewrites joined by arrows: "The rock was pretty hard." becomes "A steel nail scratched the rock, but a fingernail did not."; "It took ages to dissolve." becomes "It took 74 s to dissolve."; "There was heaps of bubbling." becomes "Bubbles of gas formed across the whole surface within 10 s."; the footnote reads "say exactly what you saw, with a number and a unit where you have one"

Notice what the precise column does. Each sentence says **what happened, to what, with a number and a unit where there is one** — and a reader in another school could repeat it. *Pretty hard* tells them nothing they can check; *a steel nail scratched it, a fingernail did not* is a test they could run this afternoon. The same rule catches the two words that weaken most student reports, *lots* and *a bit*: how many, how much, in what unit? And when you do use a subject term — *absorb*, *mean*, *systematic* — you define it the first time you use it, because that is the deal science makes with its reader: no word arrives undefined.

Voice — who comes first (VC2S8I08.E01)

Every sentence in a report is written in one of two **voices**. In the **active voice** the doer of the action comes first. In the **passive voice** the thing it happened to comes first, and the doer is usually left out altogether.

Active voice	Passive voice
"We measured the mass of each sample." We measured the mass of each sample the doer the action what it happened to the doer of the action comes first: someone did something use it for most of a report — it is short and clear	"The mass of each sample was measured." The mass of each sample was measured (doer left out) what it happened to the action no doer named the action comes first: what was done matters more than who did it use it when the doer does not matter — often in a method

Two-panel chart titled "Active voice" against "Passive voice": the blue active panel shows "We measured the mass of each sample" split into *We* (the doer), *measured* (the action), *the mass of each sample* (what it happened to), with the notes "the doer of the action comes first: someone did something" and "use it for most of a report — it is short and clear"; the amber passive panel shows "The mass of each sample was measured" split into *The mass of each sample* (what it happened to), *was measured* (the action), *(doer left out)* (no doer named), with the notes "the action comes first: what was done matters more than who did it" and "use it when the doer does not matter — often in a method"

comes first: what was done matters more than who did it” and “use it when the doer does not matter — often in a method”

Both voices are proper science — this is not a rule about right and wrong, it is a choice about what the reader looks at. Real journal articles mix the two on purpose: a paper will say “*we measured*” where the writers’ choice matters, and “*the samples were dried*” where who dried them adds nothing. For your reports, the habit that reads well is: **active for most of it** — it is short, clear, and honest about who did the doing — **passive where the doer truly does not matter**, which is most often the method.

Try it 1 — swap the voice. Take these two sentences and rewrite each in the other voice. (i) “*We lifted each sample out with tongs.*” (ii) “*The mean of the two trials was calculated.*” Then say, in half a line each, which version you would keep in a method and why.

Tense — when was it true?

The second language choice is **tense**, and the tense map for a report is simple once you hear the reason behind it: **past for what was done and what was found, present for what is known and what the results mean.** You did the method once, in the past, so it is past tense. Your results happened, so they are past. But *sandstone is a porous rock* is true today and was true before you started, so the introduction and the meaning-sentences sit in the present.

Which tense goes where?

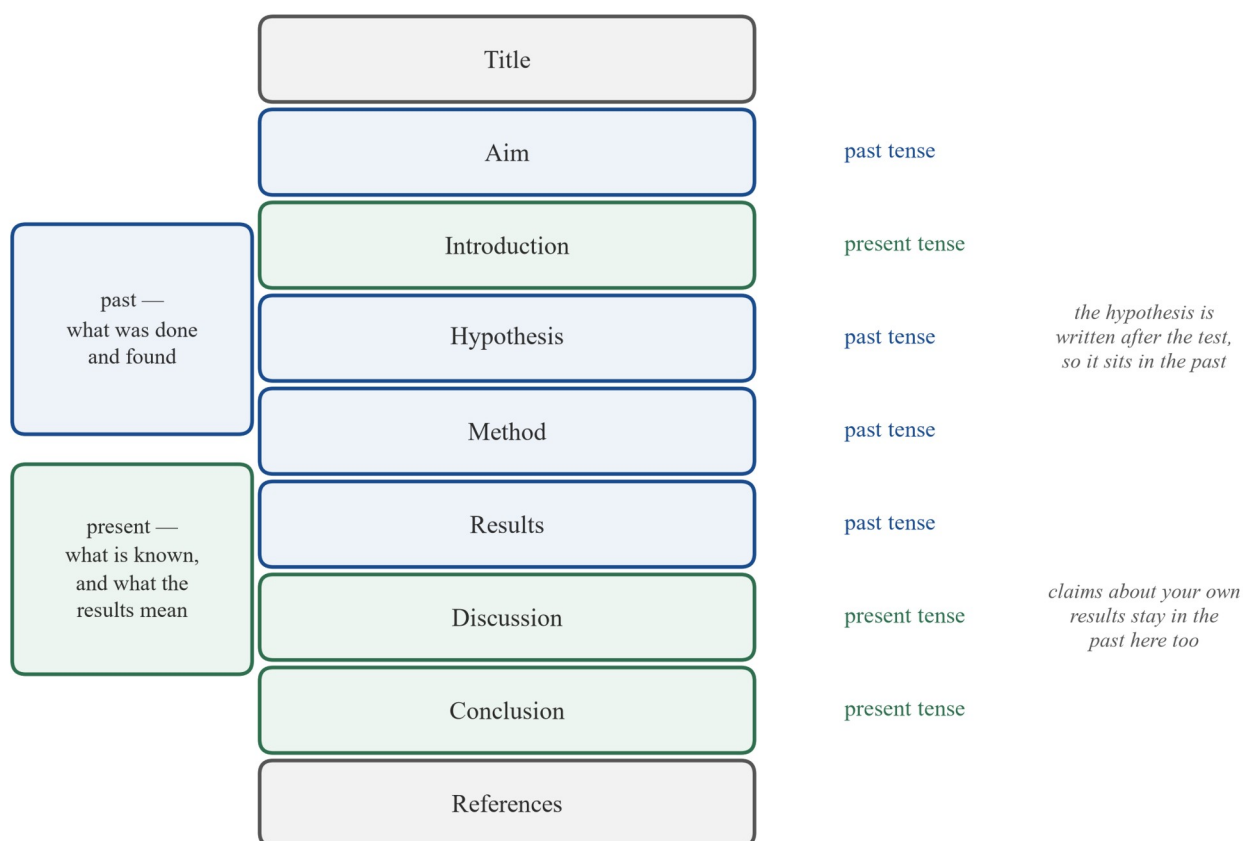


Chart titled “Which tense goes where?”: the nine report sections listed top to bottom with a tense beside each — Title (none); Aim, past tense; Introduction, present tense; Hypothesis, past tense; Method, past tense; Results, past tense; Discussion, present tense; Conclusion, present tense; References (none); two legend boxes read “past — what was done and found” and “present — what is known, and what the results mean”; side notes explain that the hypothesis is written after the test, so it sits in the past, and that claims about your own results stay in the past in the discussion too

Two traps sit in that map and both are worth naming. The **hypothesis sits in the past** in a finished report — *it was predicted that...* — because by the time the report is written, the predicting is in the past. And inside the discussion,

which is mostly present, **claims about your own results stay in the past**: *the sandstone sample absorbed the most water* does not become present just because it sits in a present-tense section.

Try it 2 — fix the tense. Each sentence below sits in the section named. Fix the tense where it is wrong; leave it where it is right. (i) Method: “*Each sample is soaked for 10 min.*” (ii) Introduction: “*Sandstone was a porous rock with tiny spaces between its grains.*” (iii) Results: “*The sandstone sample absorbs a mean of 2.0 g of water.*”

Reading a report the way an editor does (VC2S8I08.E01)

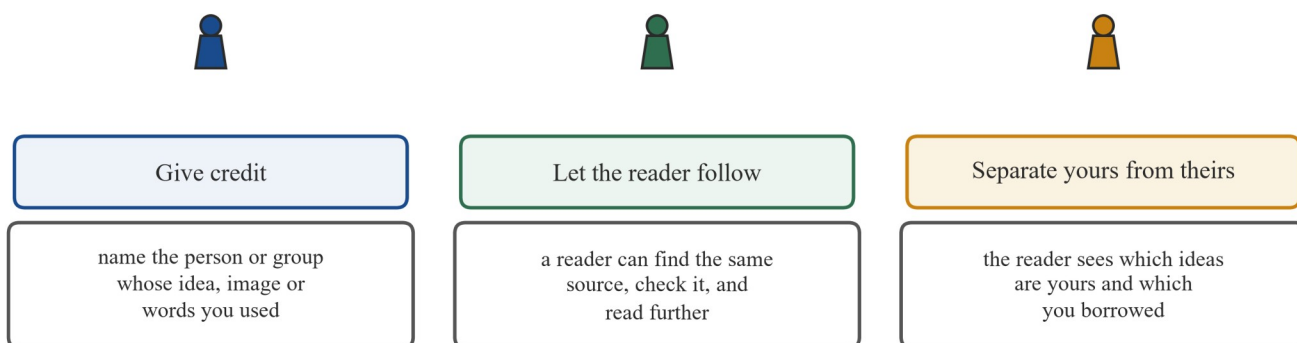
The elaboration behind this section asks you to analyse journal-style writing for voice and tense — the same two features you have just placed. Here is a short paragraph written for this book in the style of a science journal article about the rock investigation.

The three samples were dried for one hour and then weighed. We soaked each sample in 200 mL of water for 10 min. Sandstone is a porous rock, so it holds water in the spaces between its grains. The sandstone sample absorbed a mean of 2.0 g of water.

Read it with the two charts in front of you. Sentence 1 is **passive, past** — the doer is left out, and the drying happened once. Sentence 2 is **active, past** — the writers put themselves in (*we*), and the soaking happened once. Sentence 3 is **present** — a fact about sandstone that was true before the test and is true after it, so it sits in the present even between two past sentences. Sentence 4 is **past** — a claim about this investigation’s own results. Four sentences, four deliberate choices: that density of choice is what “journal style” means, and it is exactly the control a finished report shows.

Referencing — every borrowed thing has an address

A report leans on other people’s work more than it first appears: a fact in the introduction, a picture, a number from a website, an idea from a book. Referencing has three jobs, and all three protect the reader.

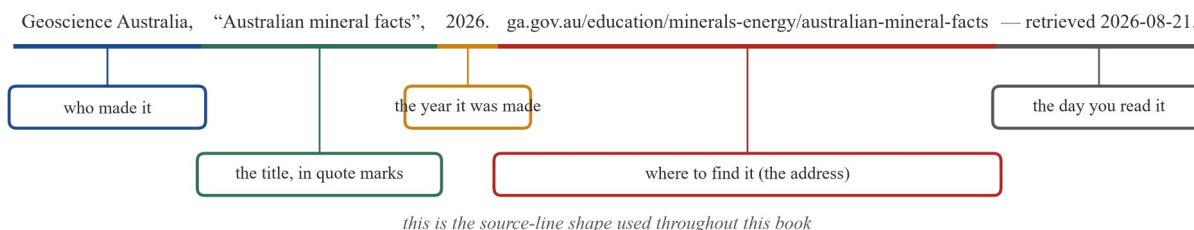


*using a source without crediting it is plagiarism —
presenting someone else's work as your own*

Three-panel chart of the three jobs of referencing, each with a simple figure above its panel: “Give credit — name the person or group whose idea, image or words you used”; “Let the reader follow — a reader can find the same source, check it, and read further”; “Separate yours from theirs — the reader sees which ideas are yours and which you borrowed”; the footnote in red reads “using a source without crediting it is plagiarism — presenting someone else’s work as your own”

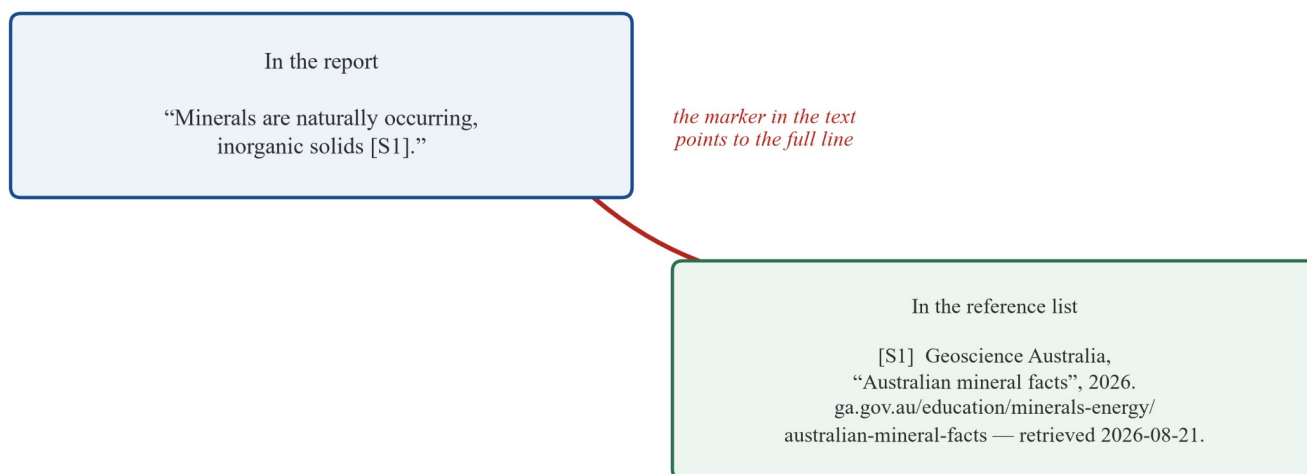
The habit that does all three jobs at once is the **source line**: every source listed in full, in the reference list, built from five parts.

One source line, and the five jobs its parts do



Labelled anatomy of one source line: “Geoscience Australia, ‘Australian mineral facts’, 2026. ga.gov.au/education/minerals-energy/australian-mineral-facts — retrieved 2026-08-21.” with five coloured underlines and labels — who made it; the title, in quote marks; the year it was made; where to find it (the address); the day you read it; the footnote reads “this is the source-line shape used throughout this book”

And inside the report, a borrowed fact carries a small **citation marker** that joins the sentence to its full line in the reference list. The marker and the list are one system: every marker points at a line, and every line is pointed at by at least one marker.



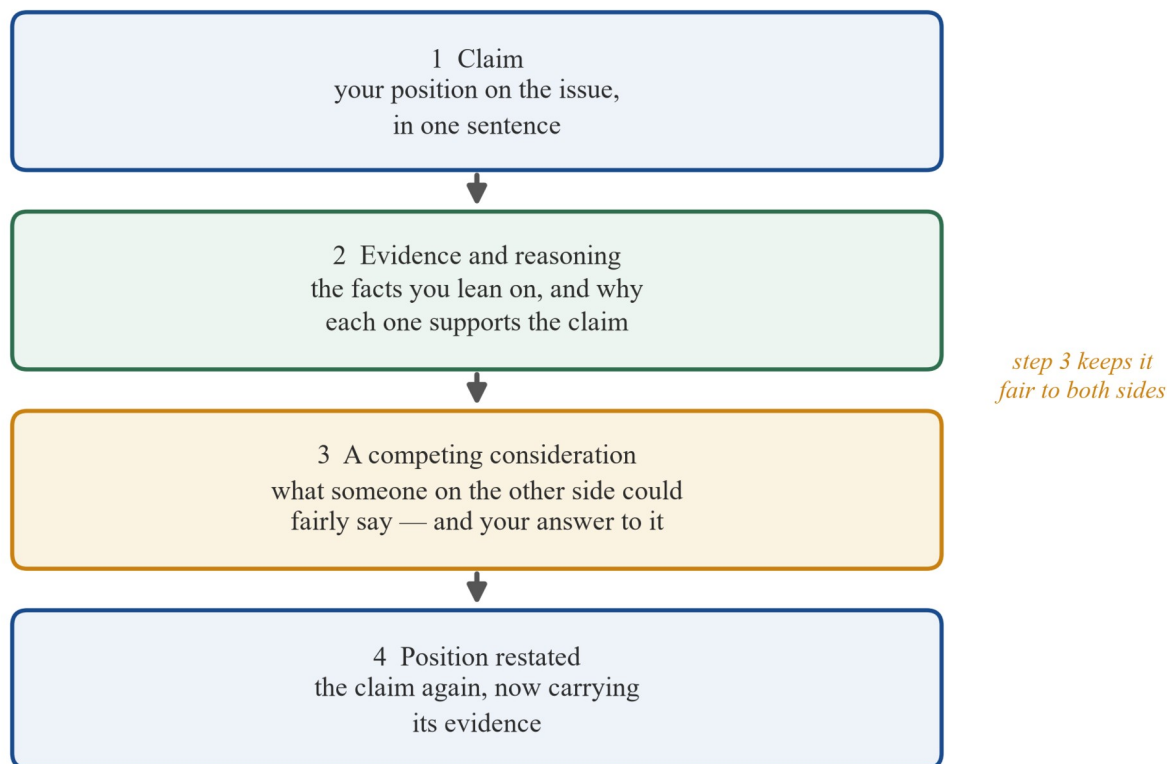
Two-box chart of the citation join: the report sentence “Minerals are solids that form in nature [S1].” in a blue box, joined by a red arrow labelled “the marker in the text points to the full line” to a green box holding the reference-list line “[S1] Geoscience Australia, ‘Australian mineral facts’, 2026. ga.gov.au/education/minerals-energy/australian-mineral-facts — retrieved 2026-08-21.”

The marker system has one rule that keeps it honest: **borrowed means marked, even when you have rewritten the idea in your own words**. Changing someone’s sentence into your own words does not make the idea yours. A report with unmarked borrowing is committing **plagiarism** — presenting someone else’s work as your own — and the fix is never “write it in other words so it is not noticed”; the fix is the marker.

Try it 3 — place the marker. A student’s introduction says: “Australia produces 19 useful minerals in significant amounts, from over 350 operating mines.” That fact came from the same Geoscience Australia page, listed as [S1]. Rewrite the sentence with its marker in place, and say in one line whether rewriting the page’s words in your own words would remove the need for the marker.

The shape of a justification (VC2S8I08.E06)

Reports are not only about investigations. Science also meets the public in **socio-scientific issues** — questions where the science is part of the argument but people’s lives, work and places are the rest of it — and a report or a submission on such an issue has to *justify* its position: give reasons that someone on the other side has to answer. A justification has a shape, and the shape is what stops it being mere opinion.



Four-step flow chart titled “The shape of a justification”: 1 Claim — your position on the issue, in one sentence; 2 Evidence and reasoning — the facts you lean on, and why each one supports the claim; 3 A competing consideration — what someone on the other side could honestly say, and your answer to it; 4 Position restated — the claim again, now carrying its evidence; a side note reads “step 3 keeps it fair to both sides”

Step 3 is the one students skip, and it is the one that does the most work. A justification that never faces the other side has not argued; it has asserted. Naming the fairest point against you and answering it is what makes a claim worth accepting — and it is the same habit, word for word, that science uses on its own ideas in 5A and 18A. Here we borrow the shape for writing.

The model report (VC2S8I08.E03)

Everything above now goes into one finished piece: a short report on the rock investigation, written to the conventions of this subtopic. Read it twice — once for what it says, once for the conventions doing their quiet work.

Title — Which of granite, basalt and sandstone absorbs the most water?

Aim — To find which of the three rock samples absorbs the most water.

Introduction — Rocks are made of minerals; a mineral is a solid that forms in nature rather than being made by living things, and minerals are the ingredients of rocks [S1]. Different rocks hold different amounts of water: some feel grainy and soak water up like a sponge, while others are hard and tight. This investigation compares how much water three rock samples absorb.

Hypothesis — It was predicted that the sandstone sample would absorb the most water, because sandstone is grainy and has many tiny spaces that can hold water.

Method —

1. Three rock samples of about the same size (each about 50 g) — granite, basalt and sandstone — were dried in a warm place for one hour and then weighed.
2. Each sample was placed in its own beaker with 200 mL of water.
3. After 10 min, each sample was lifted out with tongs over a tray and wiped once, the same way, with a paper towel.

4. Each sample was weighed again, and the water absorbed was found as the mass after soaking minus the mass before.
5. Steps 1–4 were repeated, giving two trials for each sample, and the mean was calculated for each rock.

Risk note: spilt water is a slip hazard; samples were lifted over a tray and the bench wiped dry, and safety glasses were worn when handling the rocks.

Results — The sandstone sample absorbed the most water in both trials (Table 1, Figure 1). Its mean of 2.0 g was about four times the granite mean (0.5 g) and about seven times the basalt mean (0.3 g).

Table 1. Water absorbed by three rock samples (simulated data)

Rock sample	Trial 1 water absorbed (g)	Trial 2 water absorbed (g)	Mean water absorbed (g)
granite	0.4	0.6	0.5
basalt	0.2	0.4	0.3
sandstone	1.8	2.2	2.0

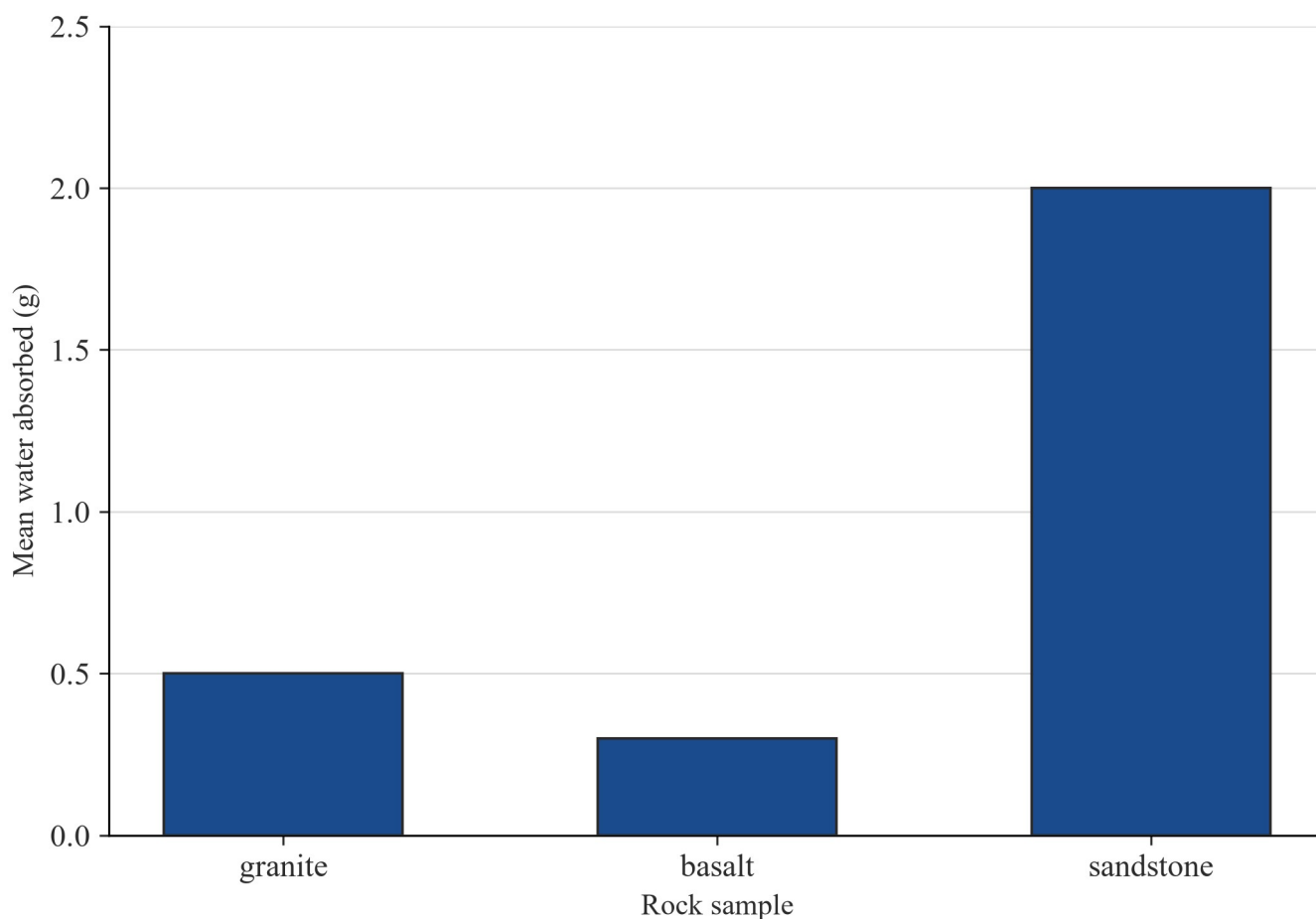


Figure 1. Mean water absorbed by three rock samples (simulated data)

Column graph titled below as “Figure 1. Mean water absorbed by three rock samples (simulated data)”: a vertical axis labelled “Mean water absorbed (g)” running from 0.0 to 2.5 in steps of 0.5 with light gridlines, a horizontal axis labelled “Rock sample”, and three equal-width columns rising square from the zero line — granite 0.5, basalt 0.3, sandstone 2.0

Discussion — The results support the hypothesis: the grainy sandstone, with its many tiny spaces, absorbed far more water than the two hard, tight rocks. Two assumptions sit inside the method: that one wipe with a towel left the same thin film of water on every sample, and that 10 min was long enough for each rock to take in what it could. The most likely source of error is water left on a surface after wiping, which would push every reading a little high — the same

direction every time, systematic in shape (5A's word). The gap between sandstone and the other two is so large that this error would not change the order, which makes the conclusion a confident one for these three samples.

Conclusion — Of granite, basalt and sandstone, sandstone absorbs the most water: a mean of 2.0 g against 0.5 g for granite and 0.3 g for basalt.

References —

[S1] Geoscience Australia, "Australian mineral facts", 2026. ga.gov.au/education/minerals-energy/australian-mineral-facts — retrieved 2026-08-21.

Before you hand in your own, run the checklist the model report just passed.

Before you hand it in

- ☒ all sections present, in order
- ☒ tables and figures numbered, each with a caption
- ☒ units in headings and axis labels, written once
- ☒ results hold no opinions; the discussion carries the meaning
- ☒ assumptions and sources of error are stated in the discussion
- ☒ precise words — no vague amount-words left
- ☒ past tense for what was done and found; present for what is known
- ☒ every borrowed fact, image or idea carries a marker
- ☒ the reference list holds every source, in full

Checklist titled "Before you hand it in" with nine ticked boxes: all sections present, in order; tables and figures numbered, each with a caption; units in headings and axis labels, written once; results hold no opinions; the discussion carries the meaning; assumptions and sources of error are stated in the discussion; precise words — no vague amount-words left; past tense for what was done and found; present for what is known; every borrowed fact, image or idea carries a marker; the reference list holds every source, in full

Worked examples

Example 1 — scaffolded

Five sentences from a rock report have come unstuck from their sections. Place each one in the section it belongs to, and give the question that section answers.

- (a) "Which of granite, basalt and sandstone absorbs the most water?"
- (b) "Each sample was soaked in 200 mL of water for 10 min."

- (c) “Water left on a surface after wiping may have pushed the readings a little high.”
- (d) “Of the three rocks tested, sandstone absorbs the most water.”
- (e) “A mineral is a solid that forms in nature, and minerals are the ingredients of rocks.”

Working	Comment
(a) Aim — it is the question the investigation answers.	The aim is the question, not a sentence about the question.
(b) Method — it says what was done, in the past tense, as a step someone could repeat.	Numbered, past, repeatable: the three marks of a method step.
(c) Discussion — it says what a result might <i>mean</i> for trust in the numbers (a source of error).	Anything about assumptions, errors or meaning is discussion work, not results work.
(d) Conclusion — it answers the aim in one sentence, and the answer is supported by the results.	The conclusion answers the question the aim asked; here the words of (a) come back with an answer attached.
(e) Introduction — it is what is already known, borrowed from a source, so it would also carry a marker.	Known facts sit in the introduction and in the reference list, never unmarked.

Example 2 — scaffolded

A student’s first draft carries three convention faults. Find each one and fix it.

- (a) Their graph’s caption — “Figure 1. Water soaked up by the rocks” — is printed **above** the graph.
- (b) Their results sentence reads: “The sandstone soaked up quite a lot of water, way more than the others.”
- (c) Their graph’s vertical axis is labelled only “amount”.

Working	Comment
(a) A figure’s caption goes below the figure, numbered, in one full sentence: “Figure 1. Mean water absorbed by three rock samples (simulated data).”	Tables caption above; figures caption below. The pair is the easiest convention to swap and the first one a checker notices.
(b) Rewrite with a number and no opinion: “The sandstone sample absorbed a mean of 2.0 g of water, about four times the granite mean.”	“Quite a lot” and “way more” are vague amount-words; the precise column of the vocabulary chart wants a number, a unit, and a comparison a reader can check.
(c) The axis label must name the quantity and carry the unit: “Mean water absorbed (g)”.	“Amount” names nothing measurable; a reader must know what the axis holds and in what unit.

Example 3 — unscaffolded

Here is a paragraph written for this book in the style of a journal article.

1. The samples were wiped once with a paper towel after soaking. 2. We weighed each sample before and after soaking. 3. Granite is a hard, tight rock with few spaces between its grains. 4. The granite sample absorbed a mean of 0.5 g of water.

- (a) Name the voice of sentence 1 and of sentence 2.
- (b) Name the tense of sentence 3 and of sentence 4, and say which rule of the tense map each one follows.
- (c) Sentence 1 is passive and sentence 2 is active, yet both sit happily in a method. Say why, in one line.

Sentence 1 is **passive** — the thing it happened to (*the samples*) comes first and no doer is named. Sentence 2 is **active** — the doer (*we*) comes first. Sentence 3 is **present** tense, following the rule *present for what is known*: a fact about granite that was true before the test and is true after it. Sentence 4 is **past**, following the rule *past for what was found*: a claim about this investigation’s own results stays in the past even when the numbers are summarised as a mean. (c) Voice is a choice about what the reader looks at, not a rule about correctness: sentence 1 leaves the doer out because who wiped the samples adds nothing, while sentence 2 keeps *we* in because the writers’ own weighing is the point — and a method that mixes the two for those reasons reads like a real journal method.

Example 4 — unscaffolded

A hypothetical scenario for practice. A small town’s council is weighing a proposal to allow a sandstone quarry on a hill near the town creek. The stone would be used for local building work and the quarry would employ about 40

people for about 20 years. The hill would be cut away while the quarry runs, and trucks would use the road through town. The company says it will reshape and replant the hill when the quarry closes.

A student submits this response: “*The quarry should not go ahead, because damaging a hill is wrong.*” Rebuild it into the four-step shape of a justification.

1 Claim. The quarry should go ahead only under strict conditions: a bonded plan to reshape and replant the hill, and trucks routed around the town rather than through it. **2 Evidence and reasoning.** The hill and the creek would carry the damage while the jobs and the stone are the benefit; a replanting plan that the company must pay for (a bond) turns “we will fix it” from a promise into a condition, and routing trucks around the town moves most of the daily harm away from the people who did not choose it. **3 A competing consideration, and an answer to it.** The fair point on the other side is real: 40 jobs and cheap local stone for 20 years are a genuine benefit to the town, and refusing outright would cost the town both. The answer is that the conditions do not refuse the benefit — they keep the benefit while making the repair certain instead of hoped for. **4 Position restated.** So the justified response is not “no quarry” but “quarry only with the repair paid for in advance and the trucks kept out of the main street” — the claim now carrying its evidence and having faced the other side.

Practice questions

Scaffolded

Q1. About the report map. (a) Name the section that tells the reader what was done. (b) Name the section that carries the tables and graphs. (c) Name the section that lists every source used.

Q2. About the results–discussion line. Place each sentence in results or discussion. (a) “*The basalt sample absorbed a mean of 0.3 g of water.*” (b) “*The results support the prediction that sandstone absorbs the most water.*” (c) “*Wiping each sample the same way was assumed.*”

Q3. About table conventions. (a) Where does a table’s caption go, and what must it carry? (b) Where is a column’s unit written, and how many times? (c) What goes in the first column of a results table?

Q4. About figure conventions. (a) Where does a figure’s caption go? (b) What two things must an axis label carry? (c) The rock graph uses plain columns of equal width from the zero line. Why are 3-D shading and tricks banned from a scientific figure, in one line?

Q5. About precise vocabulary. Rewrite each vague sentence as a precise one, inventing a sensible number and unit where you need one. (a) “*The water got warm.*” (b) “*It soaked up a bit of water.*”

Q6. About voice. (a) In the active voice, what comes first in the sentence? (b) Rewrite “*The samples were dried for one hour*” in the active voice. (c) Name the section where the passive voice is most at home, and the reason in half a line.

Un scaffolded

Q7. A classmate’s report has, in order: Title, Aim, Method, Results, Conclusion, References. (a) Name the two sections of the taught shape that are missing. (b) Give the question each missing section answers. (c) One sentence in their report reads “*The sandstone probably soaked up more because it has more tiny spaces.*” Which missing section does it belong in, and why is it not a results sentence? (3 marks)

Q8. A draft table is shown below.

Trial	granite (g)	basalt (g)	sandstone (g)
1	0.4	0.2	1.8
2	0.6	0.4	2.2
mean	0.500	0.300	2.000

Find three convention faults and give the fix for each. (3 marks)

Q9. A draft results paragraph reads: *“The sandstone soaked up heaps of water and the granite almost none. It was way better than the others.”* Rewrite it as two results sentences: past tense, precise, using the numbers in Table 1, with no opinions. (3 marks)

Q10. A paragraph written in journal style:

1. Each sample was soaked for 10 min. 2. We repeated the whole method once. 3. Basalt is a hard, dark rock with few spaces between its grains. 4. The basalt sample absorbed a mean of 0.3 g of water.

- (a) Name the voice of sentences 1 and 2.
- (b) Name the tense of sentences 3 and 4, matching each to its tense-map rule.
- (c) Say in one line why the passive is a good fit for sentence 1. (4 marks)

Q11. A student’s introduction reads: *“Australia produces 19 useful minerals in significant amounts, from over 350 operating mines. This investigation compares three rocks.”* The first sentence came from the Geoscience Australia page listed as [S1], but no marker appears. (a) Name what is missing. (b) Rewrite the borrowed sentence with its marker in place, and write the full [S1] line exactly as it must appear in the reference list. (c) Name the word for using someone else’s work so that it reads as yours. (3 marks)

Q12. *A hypothetical scenario for practice.* A council is weighing a proposal for a wind farm on grazing land near a town. The turbines would supply clean power for thousands of homes and pay the landholders a rent; some residents say the turbines would change the view they love and the quiet they value. A student writes only: *“The wind farm should go ahead, because clean power is good.”* Rebuild the response into the four steps of a justification. (4 marks)

Q13. A graph in a draft report carries three faults: its caption sits above it; its vertical axis is labelled “water”; and its three rock columns are joined point to point by a line. Name each fault and give the fix. (3 marks)

Q14. Another class repeats the rock investigation with larger samples (each about 100 g) and finds means of 1.1 g for granite, 0.6 g for basalt and 4.2 g for sandstone. (a) Write a two-sentence results paragraph for their report: past tense, precise, no opinions. (b) Write a one-sentence conclusion that answers their aim. (c) Name one assumption or one source of error their discussion must state. (4 marks)

Answers

Q1. (a) Method. (b) Results. (c) References. **Q2.** (a) Results. (b) Discussion. (c) Discussion. **Q3.** (a) Above the table; a number (Table 1, Table 2 ...) and a one-line statement of what is in the table. (b) In the column heading, written once. (c) The thing you chose to change. **Q4.** (a) Below the figure. (b) The quantity it names and the unit. (c) A figure's only job is to show the data honestly; dressing up can only make the data look like something it is not. **Q5.** (a) e.g. "The water's temperature rose from 19 °C to 31 °C." (b) e.g. "The sample absorbed 0.4 g of water." **Q6.** (a) The doer of the action. (b) "We dried the samples for one hour." (c) The method — the doer usually does not matter there, so the action comes first. **Q7.** (a) Introduction and Discussion. (b) Introduction: what is already known? Discussion: what does it mean, and how strong is it? (c) Discussion — it gives a reason (*because*) and a meaning (*probably ... because*); a results sentence states what was found with no reasons attached. **Q8.** Any three of: no numbered caption above the table (add e.g. "Table 1. Water absorbed by three rock samples (simulated data)" above it); the thing changed (rock sample) is not in the first column (trials are — swap so each rock is a row and the trials and mean are columns); the means are written to three decimal places while the readings sit at one (round the means to one decimal place: 0.5, 0.3, 2.0). **Q9.** e.g. "The sandstone sample absorbed a mean of 2.0 g of water. The granite sample absorbed a mean of 0.5 g and the basalt sample a mean of 0.3 g." **Q10.** (a) 1 passive; 2 active. (b) 3 present — present for what is known; 4 past — past for what was found. (c) Who wiped or soaked the samples adds nothing, so the action comes first and the doer is left out. **Q11.** (a) The citation marker (and so the join to the reference list). (b) "Australia produces 19 useful minerals in significant amounts, from over 350 operating mines [S1]." with the list line: [S1] Geoscience Australia, "Australian mineral facts", 2026. ga.gov.au/education/minerals-energy/australian-mineral-facts — retrieved 2026-08-21. (c) Plagiarism. **Q12.** A four-step rebuild, e.g.: claim — the wind farm should go ahead with the residents' concerns written into the conditions (setback distances, a community fund); evidence and reasoning — clean power for thousands of homes and rent for landholders are real benefits, and conditions answer the view-and-quiet concern without losing them; a competing consideration and an answer — the residents' love of the view and quiet is a fair point, not an obstruction, and the answer is that conditions respect it where the turbine positions allow; position restated — go ahead with the concerns carried in the conditions. **Q13.** Caption above → move it below the figure, numbered, one sentence; axis labelled "water" → name the quantity and carry the unit, e.g. "Mean water absorbed (g)"; columns joined by a line → leave the columns plain and unjoined, equal width, square from the zero line (a joining line pretends the names on the axis are a number line). **Q14.** (a) e.g. "The sandstone sample absorbed the most water, with a mean of 4.2 g. Granite absorbed a mean of 1.1 g and basalt a mean of 0.6 g." (b) e.g. "Of the three rocks tested, sandstone absorbs the most water." (c) e.g. that one wipe left the same film of water on every sample (assumption), or water left on a surface after wiping pushed readings high (source of error).

Fully-worked solutions

Q1. (a) The **Method** says what was done — numbered, past-tense steps another group could follow. (b) The **Results** carries the tables and graphs — what was found, with no opinions. (c) The **References** lists every source used, in full. (1 mark each.)

Q2. (a) **Results** — it is a plain statement of what was found, with a number and no reason attached. (b) **Discussion** — "the results support" is meaning-work: it weighs the findings against the hypothesis. (c) **Discussion** — naming an assumption is part of "how strong is it". (1 mark each.)

Q3. (a) A table's caption goes **above** the table, numbered in order (Table 1, Table 2 ...) and stating in one line what the table holds. (b) The unit is written **once, in the column heading** — (g) — never repeated in every cell. (c) The **thing you chose to change** — here, which rock the sample is — goes in the first column, with the measured quantities after it. (1 mark each.)

Q4. (a) A figure's caption goes **below** the figure, numbered, in one full sentence. (b) An axis label must carry **the quantity it names and the unit** — e.g. *Mean water absorbed (g)*. (c) Because a figure's only job is to show the data honestly — shading and tricks can only make readers see something the numbers do not say. (1 mark each.)

Q5. Model rewrites; any precise sentence with a number and a unit where one fits passes. (a) "*The water's temperature rose from 19 °C to 31 °C.*" — "warm" tells no reader anything checkable; two thermometer readings do. (b) "*The sample absorbed 0.4 g of water.*" — "a bit" is a vague amount-word; a mass in grams is the measurement. (Accept any sensible numbers; the mark is for precision, not for the value.)

Q6. (a) The **doer of the action** comes first — *we measured...* (b) “*We dried the samples for one hour.*” (c) The **method** — the doer usually does not matter there, so the action comes first and the doer is left out. (1 mark each.)

Q7. (a) The **Introduction** and the **Discussion** are missing. (1 mark) (b) The introduction answers *what is already known?*; the discussion answers *what does it mean — and how strong is it?* (1 mark) (c) It belongs in the **discussion**: it gives a reason and a meaning (*probably ... because ...*), and a results sentence states only what was found, with no reasons or opinions attached. (1 mark)

Q8. Three faults, one mark each. (1) There is **no numbered caption above the table** — add one above, e.g. *Table 1. Water absorbed by three rock samples (simulated data)*. (2) The **thing changed is not in the first column**: the rows are trials and the columns are rocks, the wrong way round — rebuild with each rock as a row (first column) and Trial 1, Trial 2 and the mean as the columns after it. (3) The **means are written to three decimal places** (0.500, 0.300, 2.000) while the readings sit at one — a mean is rounded to the decimal place of the readings, so 0.5, 0.3 and 2.0.

Q9. Model rewrite: “*The sandstone sample absorbed a mean of 2.0 g of water. The granite sample absorbed a mean of 0.5 g and the basalt sample a mean of 0.3 g.*” The marks sit at: past tense (1), the table’s numbers used with units (1), and no vague amount-words or opinions left (1). “Heaps”, “almost none” and “way better” are vague amount-words; the results section carries numbers and plain statements only.

Q10. (a) Sentence 1 is **passive** — *the samples* (what it happened to) comes first and no doer is named; sentence 2 is **active** — *we* (the doer) comes first. (1 mark) (b) Sentence 3 is **present** — the rule *present for what is known*: a fact about basalt true before and after the test. Sentence 4 is **past** — the rule *past for what was found*: a claim about this investigation’s own results. (2 marks) (c) In sentence 1 the doer adds nothing — who soaked the samples does not change what was done — so the action comes first and the doer is left out. (1 mark)

Q11. (a) The **citation marker** is missing — the borrowed fact has no join to the reference list. (1 mark) (b) In the text: “*Australia produces 19 useful minerals in significant amounts, from over 350 operating mines [S1].*” In the reference list: [S1] *Geoscience Australia, “Australian mineral facts”, 2026. ga.gov.au/education/minerals-energy/australian-mineral-facts — retrieved 2026-08-21.* (1 mark) (c) **Plagiarism**. Rewriting in your own words does not make the idea yours, so the marker stays either way. (1 mark)

Q12. A model rebuild, one mark per step present and doing its job. **1 Claim** — one sentence of position, e.g. the wind farm should go ahead with the residents’ concerns written into the conditions. **2 Evidence and reasoning** — the facts leaned on and why each supports the claim: clean power for thousands of homes and rent for the landholders are real, named benefits, and conditions (setback distances from homes, a community fund) answer the view-and-quiet concern without losing those benefits. **3 A competing consideration and an answer to it** — the fairest point on the other side stated honestly (the view and the quiet are genuinely valued, and some of that is lost whatever the conditions say), then answered (conditions keep as much of it as the turbine positions allow, and the lost part is weighed against power and rent the whole town shares). **4 Position restated** — the claim again, now carrying its evidence: go ahead, with the concerns carried in the conditions.

Q13. One mark per fault-and-fix. (1) The caption sits **above** the graph — a figure’s caption goes **below**, numbered, in one full sentence. (2) The vertical axis is labelled only “*water*” — the label must name the quantity **and carry the unit**, e.g. *Mean water absorbed (g)*. (3) The columns are **joined by a line** — a joining line pretends the rock names form a number line; the fix is plain, equal-width columns rising square from the zero line, unjoined.

Q14. (a) Model: “*The sandstone sample absorbed the most water, with a mean of 4.2 g. The granite sample absorbed a mean of 1.1 g and the basalt sample a mean of 0.6 g.*” Past tense, the three means with units, no reasons or opinions — that is the results shape. (2 marks) (b) Model: “*Of granite, basalt and sandstone, sandstone absorbs the most water.*” One sentence that answers the aim, supported by the results. (1 mark) (c) Any one named honestly — e.g. the assumption that one wipe left the same thin film of water on every sample, or the source of error that water left on a surface after wiping pushed every reading a little high. (1 mark)

Sources

- Victorian Curriculum and Assessment Authority, *Victorian Curriculum F–10 Version 2.0, Science, Levels 7 and 8*, content description VC2S8I08 and its elaborations, 2026. vcaa.vic.edu.au — retrieved 2026-08-21.

- Geoscience Australia, “Australian mineral facts”, 2026. ga.gov.au — retrieved 2026-08-21. Quoted in the citation-join figure; paraphrased with a marker in the model report’s introduction; the two facts used in Try it 3 and Q11 come from this page.

All numerical series in the figures, the model report and the questions (the granite–basalt– sandstone trials and means, the 19 minerals and 350 mines aside, which are Geoscience Australia’s) are **simulated data for practice**, labelled as such wherever they are plotted or tabled; they are teaching data, not measurements, and carry no source claim. The rock investigation is an original teaching scenario chosen for VC2S8I08 .E03; the town-quarry and wind-farm scenarios in Example 4 and Q12 are clearly hypothetical settings for the justification shape, not reported events.

Elaboration contexts used: VC2S8I08 .E01 (the voice and tense charts and the journal-style analysis paragraphs), VC2S8I08 .E03 (the model rock-properties report with its conventions, assumptions and sources-of-error discussion), VC2S8I08 .E06 (the four-step justification shape and its two scenario exercises).

Teacher-facing note (not student text). 6A owns the report limb of VC2S8I08 (D6): structure, conventions, scientific vocabulary, voice and referencing. The partner 6B owns the selection limb — presentation formats, models, other representations and digital tools for purpose and audience — so audience and format *choice* is by design not taught here, and the scope note says so in student language. The subtopics taught before this one in the inquiry front block (D8) are used, not re-taught: hypothesis (2B), method planning and variables (3A), table and graph construction (4A), assumptions and random/systematic error (5A). The rock context is held below the D9 ceiling: rocks are described by observable feel and behaviour only; rock types, the rock cycle and resource extraction remain Ch13’s, and the quarry scenario raises extraction as a lived issue without teaching its science. The weighing of socio-scientific considerations as content is 18A’s; 6A borrows only the *writing shape* of a justified position (E06). Source trustworthiness and claim evaluation are 5B’s; 6A teaches the referencing mechanic that 5B’s evaluated sources feed into. No Aboriginal and Torres Strait Islander elaborations of VC2S8I08 (E04, E07) are drawn on: they sit in 6B’s share and in D10’s decision, and none of 6A’s three drawn elaborations carries such content.

Choosing the format for the purpose and the audience: models, other representations and digital tools

What we teach here — VC2S8I08 (Victorian Curriculum F–10 Version 2.0, Science, Levels 7 and 8):

“communicating ideas, findings and arguments for specific purposes and audiences involves the selection and use of appropriate presentation formats, scientific vocabulary, models and other representations, and may include the use of digital tools” This subtopic shares the CD with 6A (partner clause, D6): 6A

carries the report half — structure, conventions, scientific vocabulary as content, voice and referencing — and 6B carries the choosing half: which format, model or representation fits the purpose and the audience, and where digital tools earn their place. Every clause of the CD is served once across the two subtopics. **In**

our words: the same piece of science can be a table, a graph, a poster, a talk, a model, an animation or a labelled drawing — and the difference between a message that lands and a message that is lost is usually the choice of format, not the science. Choosing well is a skill with a method: ask *why am I communicating? who is it for? what do they already know?* — then match the format to the answers, and test it on one person before you call it finished. **Achievement-standard extract served here (D13):** *“They select and*

use appropriate presentation formats, scientific vocabulary, models and other representations when communicating their ideas, findings and arguments for specific purposes to specific audiences.” The extract is shared with 6A under the partner clause; 6B serves the selecting-and-using of formats, models and representations for specific purposes and audiences. **Elaborations drawn on:** VC2S8I08 .E02 (an

animation that explains particle theory to a peer audience), .E04 (Aboriginal and Torres Strait Islander Peoples’ ways of communicating their understanding of the internal systems of organisms), .E05 (a documentary on the geosphere, and the language, models and analogies chosen for a specific audience),

.E07 (the publication of Aboriginal and Torres Strait Islander Peoples’ seasonal calendars with scientific institutions, and how that spreads First Nations knowledge to school communities and the general public).

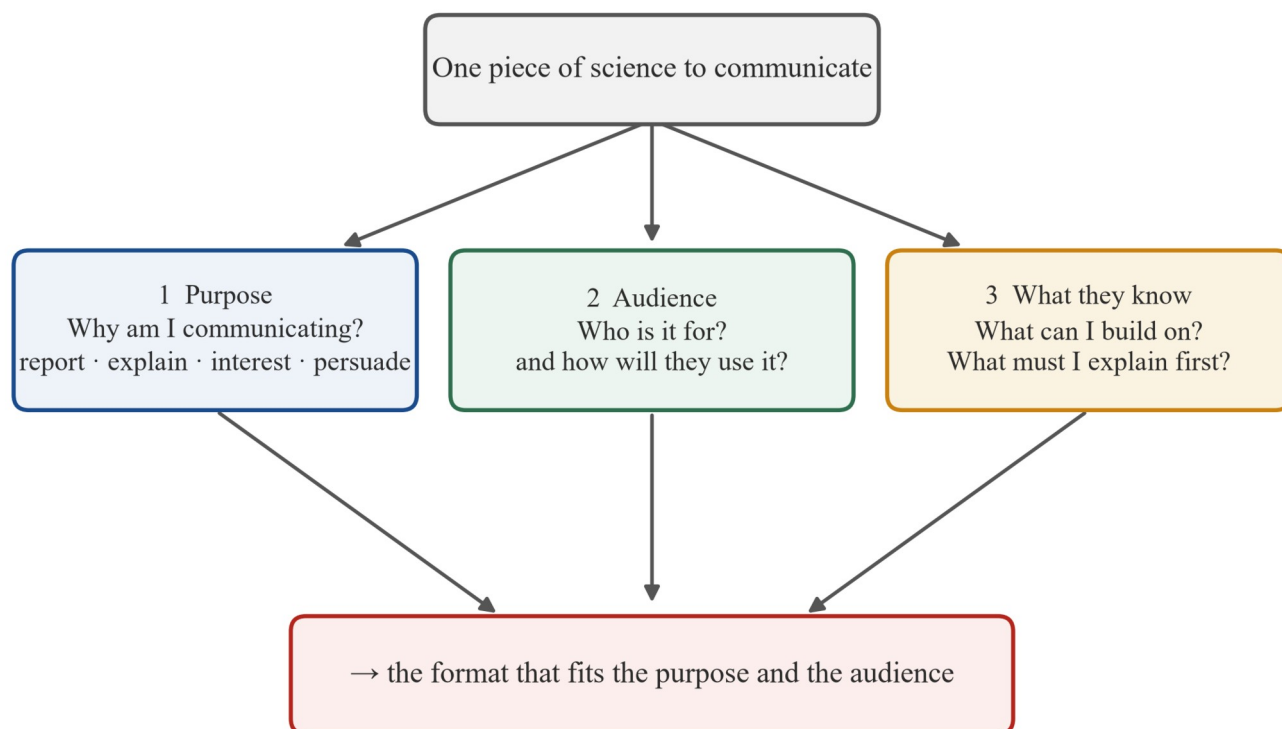
Scope notes: the ceiling is held (D9). Particle theory is Ch10 and the geosphere is Ch12; here they appear only as *subjects* of communication tasks — things a storyboard or a documentary would be about — and are never taught (D8). Aboriginal and Torres Strait Islander content comes only from the named, published, permissioned sources listed below, and the ownership and protocols side of that content — Indigenous Cultural and Intellectual Property (ICIP) — is taught in 5B (D10). Elaborations are used as contexts, not as scope (D12). No new maths is taught here (D11): means and graphs arrive already made by 3C, 4A and 4C.

Word watch — *format, audience, purpose, model, representation, analogy, digital tool*. A **format** is the shape a message travels in — a table, a graph, a poster, a talk, a model, an animation. The **audience** is who the message is for, and the **purpose** is what the message is meant to do: report, explain, spark interest, persuade. A **model** is a stand-in for the real thing — a drawing, a physical build or a diagram that shows what the real thing is like when it is too big, too small, too slow or too hidden to show directly. A **representation** is the wider family: any way of putting an idea somewhere it can be seen or heard, including models, graphs, tables and labelled drawings. An **analogy** says *this is like that* — it carries an unfamiliar idea on the back of a familiar one, and it always has two halves: what it carries well, and where it breaks. A **digital tool** is any device or software that takes part in collecting, holding, graphing or presenting the message.

Theory

One message, three questions

Every choice of format starts from the same three questions. They come before any decision about tables or posters or video, because the best format for one audience can be the worst format for another.



Flow chart titled “One piece of science to communicate”: three numbered boxes — 1 Purpose (Why am I communicating? report · explain · interest · persuade), 2 Audience (Who is it for? and how will they use it?), 3 What they know (What can I build on? What must I explain first?) — all three feeding a red box, “the format that fits the purpose and the audience”

Notice the third question. It is the one most people skip, and it is the reason a message can be perfectly true and still perfectly lost: the audience can only follow what connects to something they already know. So the communicator builds on what is there, and explains what is not.

The same finding, three audiences

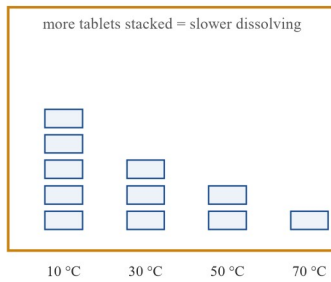
One investigation, one finding — and three completely different ways of telling it. A group tests how fast a tablet dissolves in water at four temperatures (simulated data for practice), and the finding is: *the hotter the water, the faster the tablet dissolves*.

One investigation, three audiences — the dissolving time of a tablet in water (simulated data for practice)

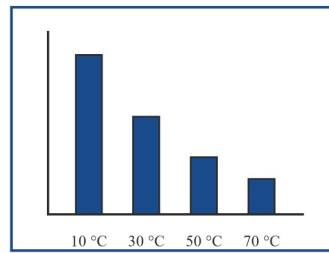
Finding: the hotter the water, the faster the tablet dissolves (means of three trials)

Audience: primary-school class
Purpose: get them interested
Format: spoken demo + big-picture poster

“Hot water wins the race!”



Audience: your class
Purpose: show the pattern
Format: column graph with units



Audience: your teacher
Purpose: report exactly what was measured
Format: results table in a report (6A)

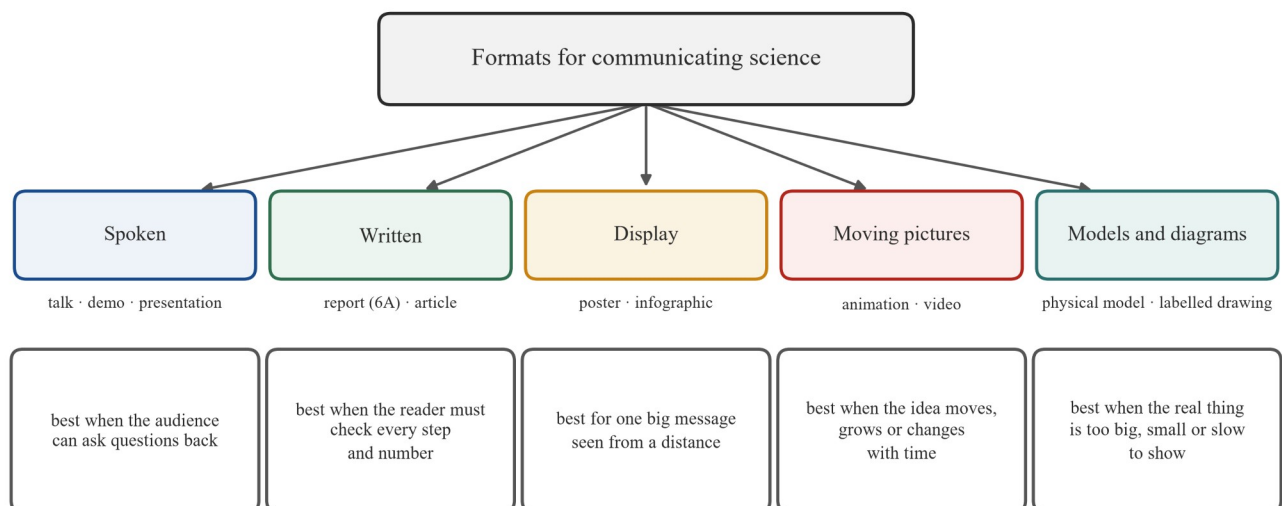
Temperature (°C)	Mean dissolving time (s)
10	95
30	58
50	34
70	21
each mean is from three trials, timed to the nearest second	

Diagram titled “One investigation, three audiences — the dissolving time of a tablet in water (simulated data for practice)”: the finding “the hotter the water, the faster the tablet dissolves (means of three trials)” is retold three ways — for a primary-school class, a spoken demo and a big-picture poster; for your class, a column graph with units; for your teacher, a results table in a report (6A); Panel A, a picture graph “Hot water wins the race!” where more tablets stacked means slower dissolving; Panel B, a column graph of mean time in seconds against water temperature in degrees Celsius (95 s at 10 °C, 58 s at 30 °C, 34 s at 50 °C, 21 s at 70 °C); Panel C, the same four pairs as a results table with the note “each mean is from three trials, timed to the nearest second”

None of the three is “the” correct format. The picture graph and the demo fit an audience that cannot yet read a table; the column graph fits an audience that can read a pattern and check the units; the results table fits a teacher who must see exactly what was measured, in the report the group writes up (that report is 6A’s territory). Same science, three purposes, three audiences — three formats.

The family of formats

The formats open to a Year 8 scientist fall into five families, and each family has a job it does better than the others.



One message can travel in several formats at once — a talk with a poster, a report with a graph, a documentary with a model. Choosing well means matching the format to the purpose and the audience.

Chart titled “Formats for communicating science” with five families, each with its job: Spoken (talk · demo · presentation) — best when the audience can ask questions back; Written (report (6A) · article) — best when the reader must check every step and number; Display (poster · infographic) — best for one big message seen from a distance; Moving pictures (animation · video) — best when the idea moves, grows or changes with time; Models and

diagrams (physical model · labelled drawing) — best when the real thing is too big, small or slow to show; footer: one message can travel in several formats at once — a talk with a poster, a report with a graph — and choosing well means matching the format to the purpose and the audience

Learn the jobs, not a list. When the purpose is *report*, the audience needs to check the numbers, so the written family earns its place. When the purpose is *spark interest* in a new audience, a poster or a video leads. And one message can travel in several formats at once — the families combine.

The match grid

The five jobs and the six most-used formats make a grid. Read it as a shortlisting tool, not a rule book: *best* means usually the strongest choice, *good* means often works, *ok* means possible with care, and a dot means weak.

	results table	column or line graph	model or labelled drawing	animation or video	poster	spoken talk
Show exactly what you measured	best	best	ok	·	ok	ok
Show a pattern or a trend	ok	best	ok	good	good	ok
Explain how something works	·	ok	best	best	ok	good
Get a new audience interested	·	ok	good	best	best	good
Persuade people to act on the evidence	ok	good	ok	good	best	best

best = usually the strongest choice · good = often works · ok = possible · · = weak

Grid with five communication jobs down the side (Show exactly what you measured / Show a pattern or a trend / Explain how something works / Get a new audience interested / Persuade people to act on the evidence) and six formats across the top (results table / column or line graph / model or labelled drawing / animation or video / poster / spoken talk); each cell is marked best (blue circle), good (green circle), ok or a weak dot, and the legend reads: best = usually the strongest choice, good = often works, ok = possible, dot = weak

Two habits make the grid useful. First, read across a job's row before choosing — the temptation is to pick your favourite format and then look at one cell. Second, when two formats both read *best*, that is the signal to combine them: a graph inside a report, a model inside a talk.

Try it 1 — shortlist with the grid (VC2S8I08)

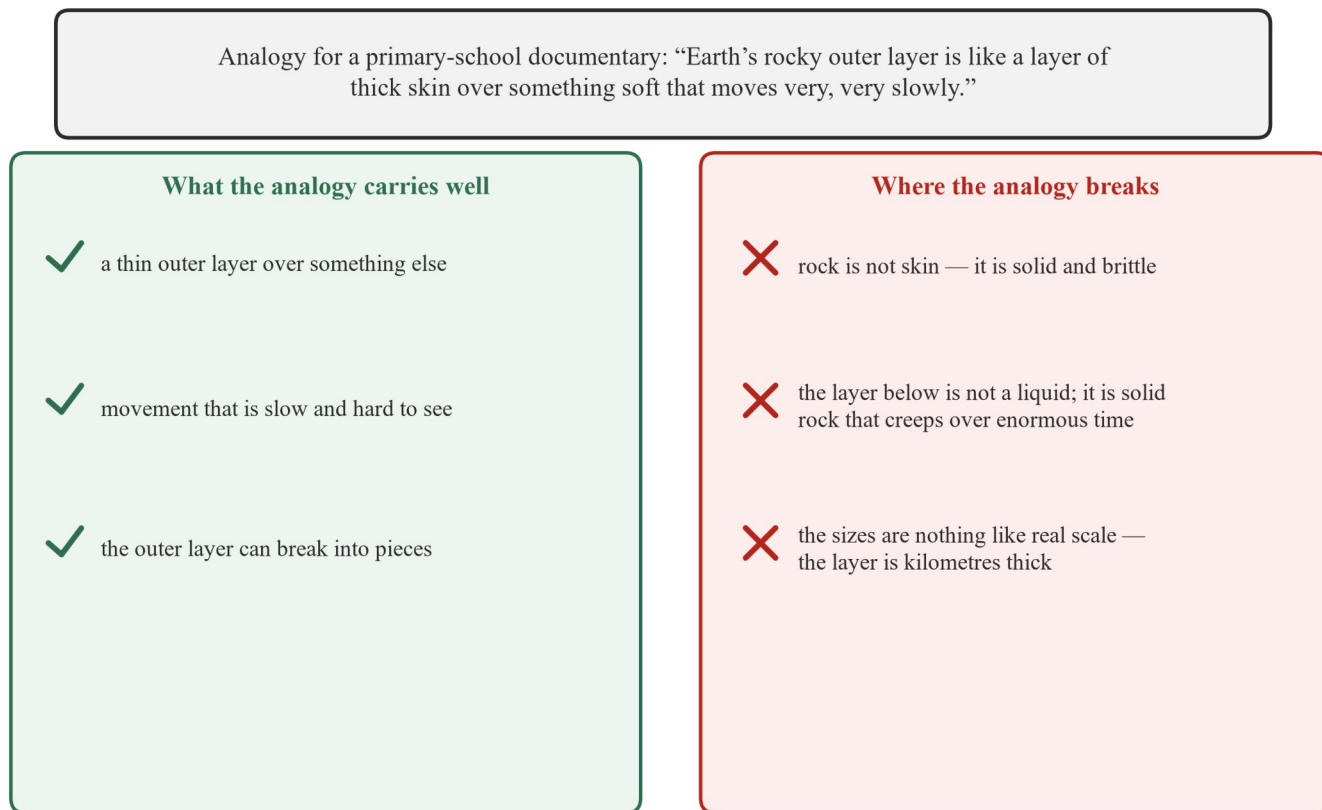
Two jobs need a format.

1. *Show exactly what you measured* to a teacher who must check your evidence.
2. *Get a new audience interested* — students from another school who have never seen your topic.

For each job: read across the row, shortlist two formats, and write one line saying why each fits the purpose and the audience. Then say which of your shortlisted pair you would combine with the other, if any.

Models, representations and analogies — showing what cannot be seen

Some science cannot be put on a table in front of the audience: it is too big, too small, too slow or hidden inside something. That is when the model-and-diagram family earns its place — and when the analogy earns its. An analogy is a representation made of words: *this is like that*. Like every format, it must be matched to the audience, and like every format it has limits. The honest way to use one is to say both halves — what it carries well, and where it breaks.



Say both halves when you use an analogy — what it carries, and where it breaks.

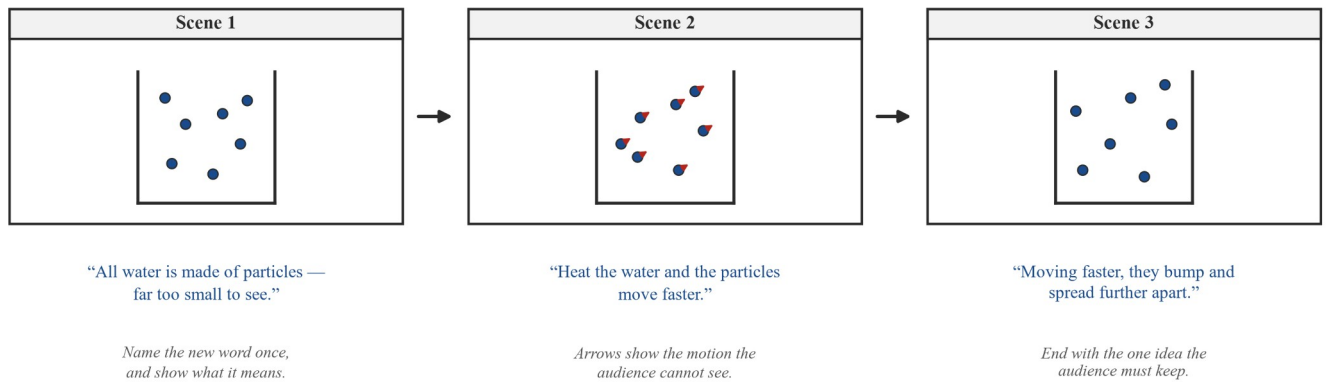
Two-panel chart headed “Analogy for a primary-school documentary: ‘Earth’s rocky outer layer is like a layer of thick skin over something soft that moves very, very slowly.’”: green panel “What the analogy carries well” — a thin outer layer over something else; movement that is slow and hard to see; the outer layer can break into pieces; red panel “Where the analogy breaks” — rock is not skin, it is solid and brittle; the layer below is not a liquid, it is solid rock that creeps over enormous time; the sizes are nothing like real scale, the layer is kilometres thick; footer: say both halves when you use an analogy — what it carries, and where it breaks

The audience matters twice here. For a primary-school audience, the analogy’s job is to carry the *shape* of the idea — a thin outer layer, slow movement, pieces that can break — not the full science of the geosphere (which is Ch12’s job, not this chapter’s). The breaks are still said, in one honest line, because an analogy that hides its breaks stops being a representation and starts being a rumour.

Animation: the format for ideas that move (VC2S8I08.E02)

When the idea itself moves, grows or changes with time, the moving-pictures family is usually the strongest choice — and the discipline of the format is that thirty seconds of animation carries one idea, not five. A storyboard is the planning form for that choice: scene by scene, what the audience sees, what the audience hears, and what each scene must leave behind.

Storyboard for a 30-second animation: particle theory, for an audience of your peers (the science itself is Ch10)



Storyboard titled “Storyboard for a 30-second animation: particle theory, for an audience of your peers (the science itself is Ch10)”: Scene 1, a cup of still blue particles with the line “All water is made of particles — far too small to see” and the note “Name the new word once, and show what it means”; Scene 2, particles with red motion arrows, “Heat the water and the particles move faster”, note “Arrows show the motion the audience cannot see”; Scene 3, particles spread further apart, “Moving faster, they bump and spread further apart”, note “End with the one idea the audience must keep”

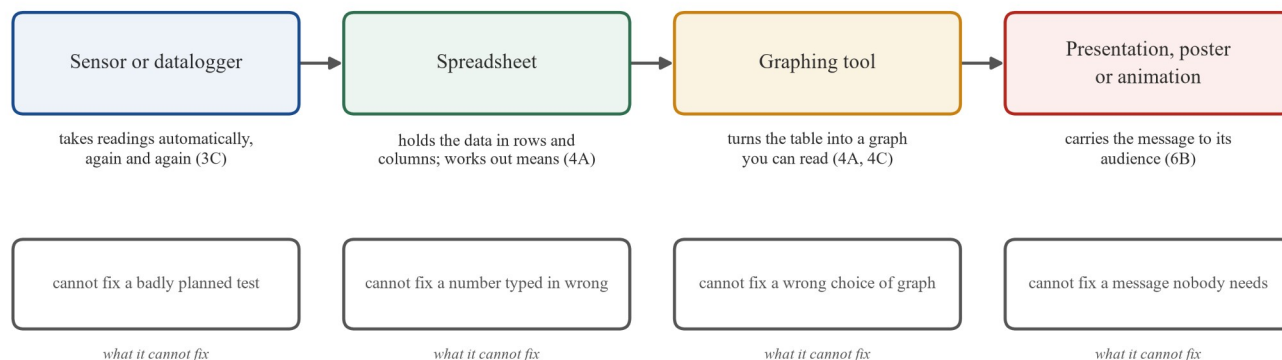
Read the storyboard as a series of *format* decisions, because that is what it is. The audience is peers, so the words can be plainer and quicker than for adults. The new word is named once and shown, not defined at length. The arrows carry what the eye cannot see. And the last scene exists only to land the one idea the audience must keep. What the storyboard, on purpose, does *not* do is teach particle theory — the science inside it belongs to Ch10; here it is the subject of the animation, nothing more (D8).

Try it 2 — storyboard thirty seconds (VC2S8I08.E02)

Plan a 30-second animation for your peers that explains why a smell spreads across a room. (The particle science behind it is Ch10’s; your job here is the format.) Draw or describe three scenes. For each scene write: what the audience sees, the one spoken line, and the note to yourself about what that scene must leave behind. Finish by stating, in one sentence, the one idea your audience must keep.

Digital tools — where they help, where they cannot

Digital tools are part of communicating too — the curriculum’s “may include the use of digital tools” — and the rule for them is the same as for every format: match the tool to the job, and know what the tool cannot fix.



Each tool does one job well. The thinking — what to measure, what the pattern means, who needs to hear it — stays yours.

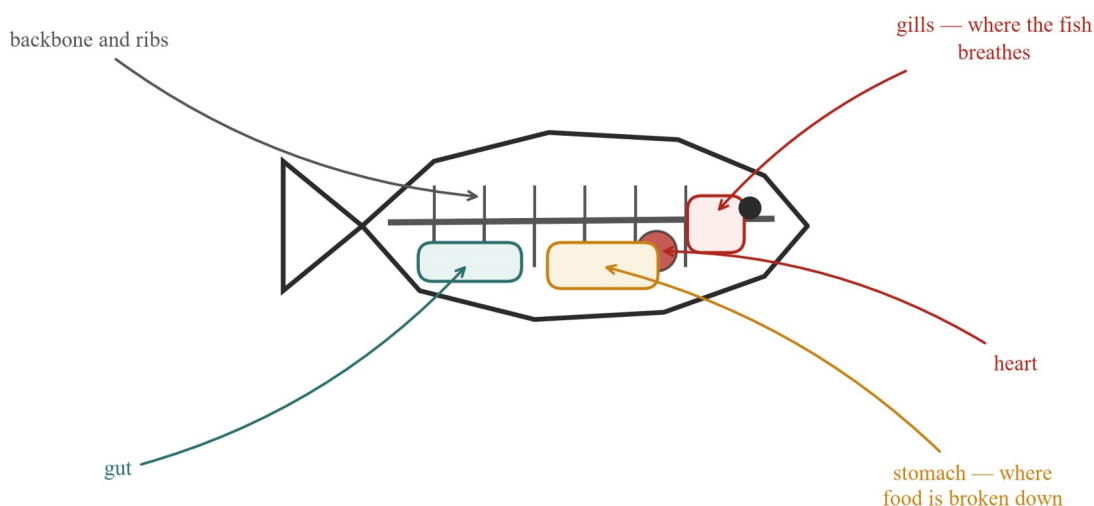
Chain diagram of four linked boxes: Sensor or datalogger — takes readings automatically, again and again (3C); Spreadsheet — holds the data in rows and columns, works out means (4A); Graphing tool — turns the table into a graph you can read (4A, 4C); Presentation, poster or animation — carries the message to its audience (6B); under each box a grey “what it cannot fix” note: cannot fix a badly planned test / cannot fix a number typed in wrong / cannot fix a wrong choice of graph / cannot fix a message nobody needs; footer: each tool does one job well — the thinking (what to measure, what the pattern means, who needs to hear it) stays yours

Each box does one job well, and each grey note is the same warning in a different coat: the tool carries the work, it does not do the thinking. A datalogger will faithfully record a badly planned test; a spreadsheet will average a number typed in wrong; a graphing tool will draw the wrong graph. The thinking — what to measure, what the pattern means, who needs to hear it — stays yours. (The tools themselves are taught where the codes sit: 3C, 4A, 4C. Here they are choices in a format chain.)

Showing what is inside: the x-ray idea as a representation (VC2S8I08.E04)

The model-and-diagram family is not a modern or a European invention. In the rock art of Kakadu — *kunbim*, the art of the Bininj/Mungguy Traditional Owners — one recognised style is the “x-ray” style, in which the artist draws the animal’s outline *and* its internal parts: the backbone, the guts, the heart, the gills. X-ray paintings at Ubirr belong to the last 1 500 years, painting continued at Nanguluwurr as recently as the 1960s, and some art in Kakadu is up to 20 000 years old. Our sketch below is an original teaching sketch of the *idea* of the style — it is not a copy of any artwork.

Showing what is inside: the idea of the X-ray style of rock art (original teaching sketch)



The outline shows what the animal looks like; the inside shows where its parts sit.
Drawing the inside correctly takes detailed knowledge of the animal's body.

Original teaching sketch titled “Showing what is inside: the idea of the X-ray style of rock art (original teaching sketch)”: the outline of a fish with its tail, and drawn inside it a backbone with ribs and labelled shapes for the gills (where the fish breathes), the heart, the stomach (where food is broken down) and the gut; caption: the outline shows what the animal looks like, the inside shows where its parts sit — drawing the inside correctly takes detailed knowledge of the animal's body

Look at what this style is, in 6B's language: a labelled representation that communicates knowledge of *internal systems* — the parts of an organism and where they sit — to an audience. The outline carries what the animal looks like; the inside carries what the artist knows about how it works. And the inside cannot be faked: drawing it correctly takes detailed knowledge of the animal's body. Elaboration .E04 points to exactly this — Aboriginal and Torres Strait Islander Peoples' ways of communicating their understanding of the internal systems of organisms — and the rock art of Kakadu is a published, permissioned example of it (Parks Australia). The deeper rules about who may share such knowledge, and on what terms, are ICIP — taught in 5B.

Seasonal calendars in print (VC2S8I08.E07)

A second example of knowledge communicated in a chosen format: the seasonal calendars of Aboriginal and Torres Strait Islander Peoples, published in collaboration with scientific institutions. The calendar below is the Brambuk seasonal cycle of the Gariwerd (Grampians) region, belonging to the Djapwurrung and Jardwadjali language groups, as published by the Bureau of Meteorology.

Gariwerd's six seasons — the Brambuk seasonal cycle

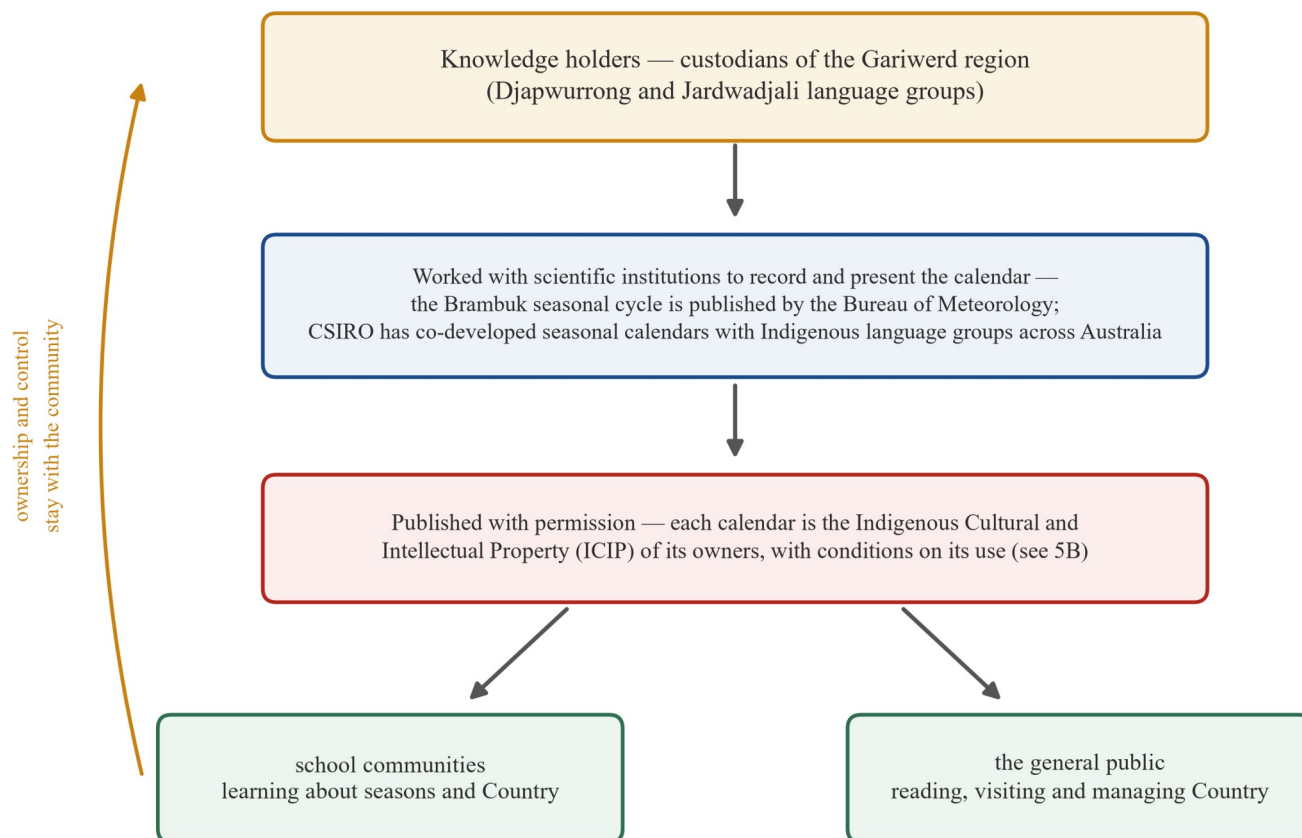
language groups of the custodians: Djapwurrong and Jardwadjali



Season names and dates as published by the Bureau of Meteorology for the Gariwerd / Grampians region

Seasonal wheel titled “Gariwerd’s six seasons — the Brambuk seasonal cycle”, for the Djapwurrong and Jardwadjali language groups: six wedges clockwise from the top — Ballambar (butterflies, mid-November to late January), Kooyang (eels, late January to late March), Gwangal Moronn (honey bees, late March to end of May), Chunnup (cockatoos, late May to end of July), Larneuk (nesting birds, late July to August), Petyan (wildflowers, September to November); centre: six genuine seasons, marked by what the plants, animals and weather are doing; caption: season names and dates as published by the Bureau of Meteorology for the Gariwerd / Grampians region

Read the wheel as a communication choice. Six seasons, each named for what the plants, animals and weather are *doing* — Kooyang is eel time, Petyan is wildflower time — carry a whole body of ecological knowledge in a single picture a school student can hold. That is the format doing work: a cycle, not a list, because the knowledge itself is a cycle.

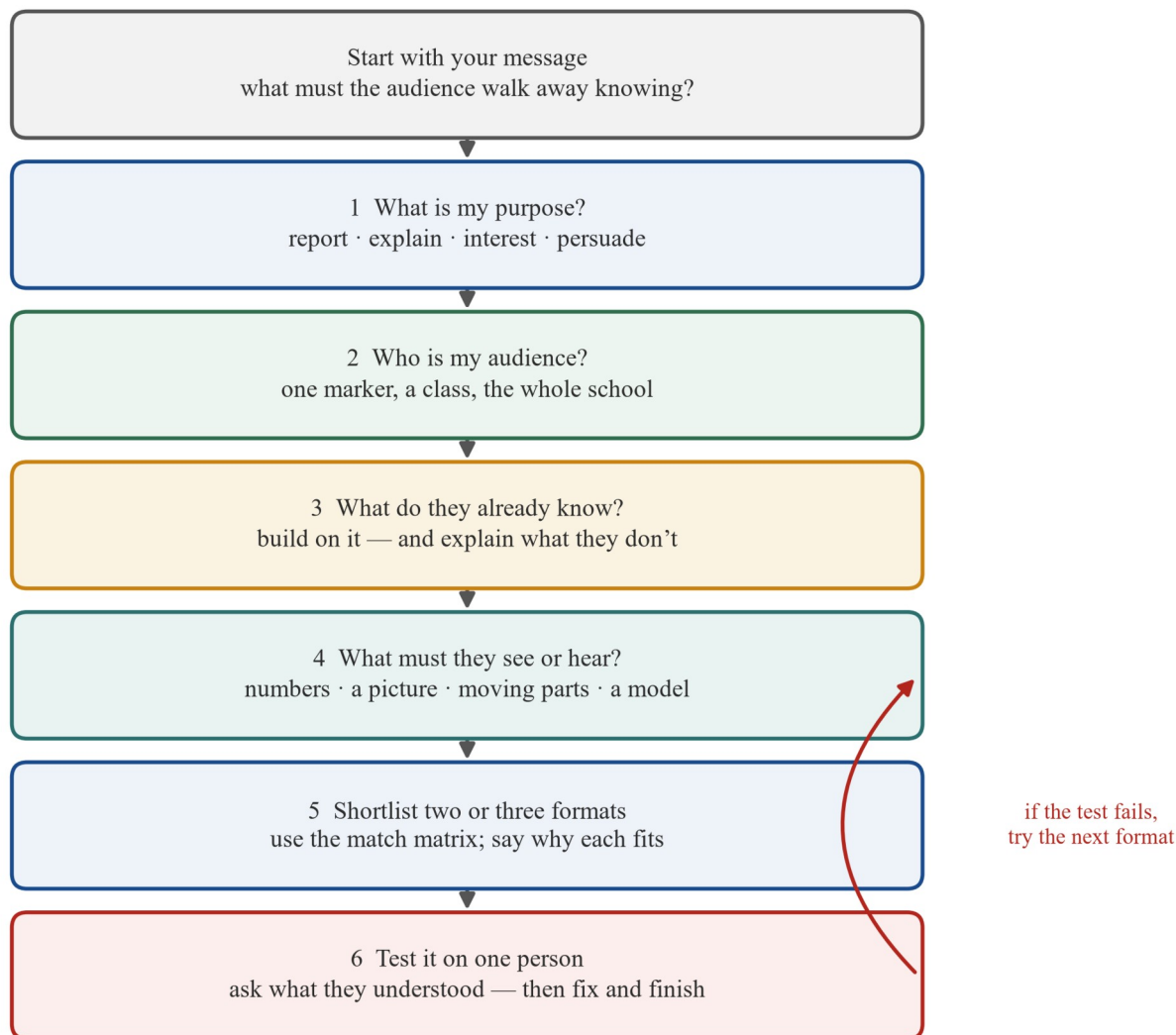


Flow chart of how a seasonal calendar reaches the public: top amber box, knowledge holders — custodians of the Gariwerd region (Djapwurrong and Jardwadjali language groups); blue box, worked with scientific institutions to record and present the calendar — the Brambuk seasonal cycle is published by the Bureau of Meteorology, and CSIRO has co-developed seasonal calendars with Indigenous language groups across Australia; red box, published with permission — each calendar is the Indigenous Cultural and Intellectual Property (ICIP) of its owners, with conditions on its use (see 5B); two green boxes, school communities learning about seasons and Country, and the general public reading, visiting and managing Country; a return arrow labelled “ownership and control stay with the community”

And the publication chain is the other half of the elaboration. The knowledge holders worked with scientific institutions — the Bureau of Meteorology publishes the Gariwerd calendar; CSIRO has co-developed calendars with Indigenous language groups across Australia — and the published calendars reach school communities and the general public. That is how First Nations knowledge has spread to students and to the wider public: not taken, but published *with permission*, with ownership and control staying with the community. Every calendar remains the ICIP of its owners, with conditions on its use — the ownership and protocols side is 5B’s teaching, and we repeat here only what every user of a published calendar must know: it is shared on terms, and the terms stay.

Choosing, step by step

The whole method fits in six steps, with one loop: test it on one person, and if the test fails, try the next format on your shortlist.

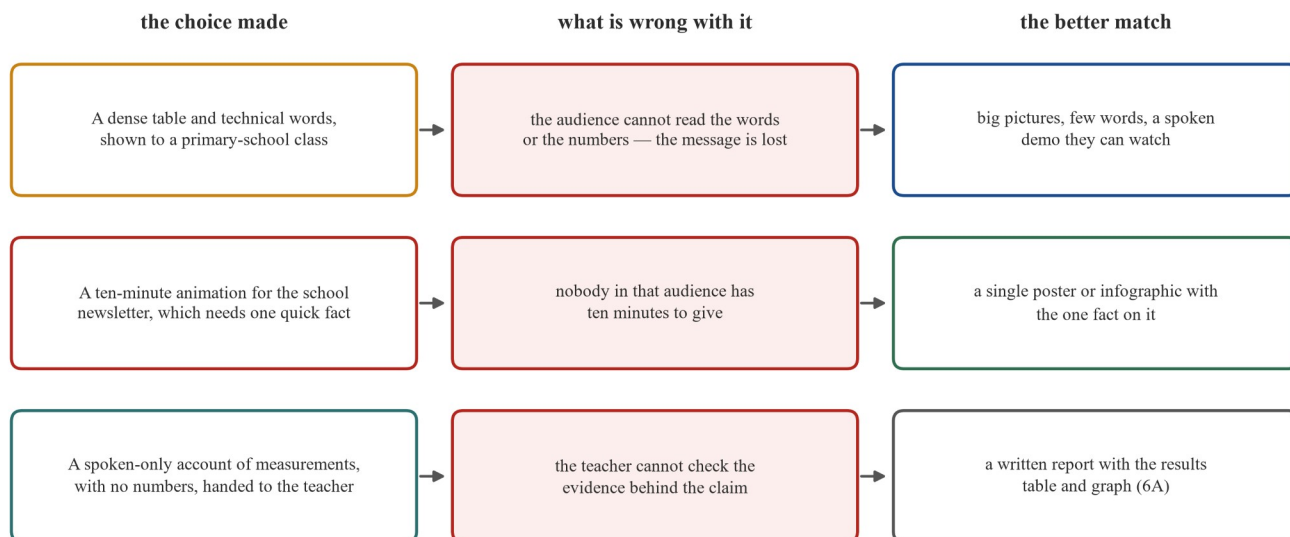


Six-step flow chart for choosing a format: start with your message — what must the audience walk away knowing?; 1 What is my purpose? (report · explain · interest · persuade); 2 Who is my audience? (one marker, a class, the whole school); 3 What do they already know? (build on it — and explain what they don't); 4 What must they see or hear? (numbers · a picture · moving parts · a model); 5 Shortlist two or three formats (use the match grid; say why each fits); 6 Test it on one person (ask what they understood — then fix and finish); a red loop arrow runs from step 6 back to step 4, labelled “if the test fails, try the next format”

The loop is the point. Step 6 is not a formality: asking one person *what they understood* is the cheapest test a communicator ever gets, and the red arrow says what to do with a bad result — not argue with the audience, go back and change the format.

When the format misses the audience

Every format in the chart below is a fine format. Every one of them simply met the wrong audience or the wrong purpose — which is the whole subject of this subtopic in three rows.



None of the three formats is wrong in itself — each one simply met the wrong audience or purpose.

Three-row chart with the headings “the choice made”, “what is wrong with it” and “the better match”: row 1, a dense table and technical words shown to a primary-school class → the audience cannot read the words or the numbers, the message is lost → big pictures, few words, a spoken demo they can watch; row 2, a ten-minute animation for the school newsletter, which needs one quick fact → nobody in that audience has ten minutes to give → a single poster or infographic with the one fact on it; row 3, a spoken-only account of measurements with no numbers, handed to the teacher → the teacher cannot check the evidence behind the claim → a written report with the results table and graph (6A); footer: none of the three formats is wrong in itself — each one simply met the wrong audience or purpose

Notice the shape of each row: the fix is never “do the science better.” The science was fine. The fix is a different format for the same message — which is exactly what the six-step method prevents.

Worked examples

Example 1 — scaffolded

A group has the tablet results from the three-audiences diagram (simulated data for practice): 95 s at 10 °C, 58 s at 30 °C, 34 s at 50 °C and 21 s at 70 °C, each a mean of three trials.

- Their teacher asks for the results in the group’s written report. Name the format that fits, and the purpose it serves.
- The same group presents the finding to a Year 2 class. Choose a format and justify it in one sentence tied to the audience.
- Why is the table the wrong choice for the Year 2 class, even though it is the right choice for the teacher?

Working	Comment
(a) A results table in the report (6A). Purpose: to report — the teacher must see exactly what was measured, with units and trial means, so the evidence can be checked.	The written family’s job: best when the reader must check every step and number. The grid reads <i>best</i> for “show exactly what you measured” → results table.
(b) A spoken demo (drop the tablet, watch the race) with a big-picture poster or picture graph. Justification: the audience cannot yet read a results table, but it can watch a race and read a picture where more stacked tablets means slower dissolving.	Audience first: what can they build on? The grid reads <i>best</i> for “get a new audience interested” → poster, animation or video, and a demo lets questions come back.
(c) Because the format must fit the audience, not the	The mismatch clinic, row 1: a dense table shown to a

Working	Comment
science. The table's strength — exact numbers an expert can check — is exactly what a Year 2 audience cannot use; the picture's strength — one big message seen at a glance — is exactly what they can.	primary-school class loses the message. Nothing wrong with the table; wrong audience.

Example 2 — scaffolded

Use the particle-theory storyboard (VC2S8I08.E02).

- Who is the audience, and what does the storyboard assume they already know?
- What is the one idea the audience must keep, and which scene lands it?
- Why do the red arrows in Scene 2 do real communicating work?

Working	Comment
(a) Peers — other students in the class. Assumed knowledge: what water is, what heating means, and that things can be made of parts too small to see is <i>new</i> — so Scene 1 names the word once and shows it, instead of assuming it.	Question 3 of the method: what can I build on, and what must I explain first? The storyboard answers both on purpose.
(b) <i>Heat makes particles move faster, and faster particles spread further apart</i> — landed by Scene 3, which exists only for that idea.	Thirty seconds carries one idea. The last scene's note says it plainly: end with the one idea the audience must keep.
(c) The motion is the thing the audience cannot see with their eyes; the arrows are the representation that makes the invisible visible.	The model-and-diagram family's job, inside a moving format: show what the real thing is like when it is too small to show directly.

Example 3 — unscaffolded

A student makes a poster for the school's Prep (foundation) class about the tablet investigation. The poster is a full A1 sheet of the results table, the words "mean dissolving time decreases as temperature increases", and no pictures.

- Name the audience and purpose the poster would actually fit.
- Redesign it for the Prep class: two concrete format choices and one line of reason for each.

The poster as made fits **a reader who must check the numbers — a teacher or another older class, with the purpose report** (*that is the written/table family's job*). For the Prep class, two redesign choices: **swap the table for a picture graph or four big pictures of cups with stacked tablets, because the audience reads pictures, not numbers** — and **replace the sentence with a spoken demo or a five-word line ("hot water wins the race")**, because the audience cannot yet read the long sentence and a demo lets them watch the finding instead. Both choices tie to what the audience can build on, which is the redesign's whole job.

Example 4 — unscaffolded

A group is making a short documentary for a primary-school audience about the geosphere — the idea that Earth's rocky outer layer changes over enormous time (the science itself is Ch12's; here it is only the subject, D8). (VC2S8I08.E05)

- Choose two formats the documentary should combine, with one reason each tied to the audience.
- The group wants to open with the analogy "Earth's rocky outer layer is like a layer of thick skin over something soft that moves very, very slowly." State one thing the analogy carries well and one place it breaks, and say why the documentary should still mention the break in one line.

(a) Any two well-matched choices, e.g. **moving pictures (animation or video) — the idea changes over enormous time, and animation can compress that time into seconds the audience can watch** — plus **a model or labelled drawing (or the skin analogy on screen) — the layer is kilometres thick and cannot be filmed, so a representation must show it**. (b) Carries well: **a thin outer layer over something else, with slow, hard-to-see movement**. Breaks: **rock is not skin — it is solid and brittle, the layer below is not a liquid, and the sizes are**

nothing like real scale. The break still gets its one honest line because **an analogy that hides its breaks teaches the audience something false — saying both halves keeps it a representation, not a rumour.**

Practice questions

Scaffolded

- Q1.** About the three questions. (a) Name the three questions that choose a format. (b) Which question asks “who is it for, and how will they use it?” (c) Why does the third question matter? Answer in one sentence.
- Q2.** About the three-audiences diagram (simulated data for practice). (a) State the group’s finding in one sentence. (b) Which panel carries the finding to the teacher? (c) In Panel A’s picture graph, what does more stacked tablets mean?
- Q3.** About the family of formats. (a) Which family is best when the audience can ask questions back? (b) Which family is best for one big message seen from a distance? (c) Name two families that can travel together in one message.
- Q4.** About the match grid. (a) Which format reads *best* for “show exactly what you measured”? (b) Which formats read *best* for “get a new audience interested”? (c) For “show exactly what you measured”, which formats carry only a weak dot?
- Q5.** About the Gariwerd seasonal wheel. (a) How many seasons does the wheel show? (b) Which season is eel time, and roughly when does it run? (c) Who publishes this calendar, and with whom?
- Q6.** About the digital tools chain. (a) Which tool works out means? (b) Name one thing a graphing tool cannot fix. (c) In one sentence: who does the thinking in the chain?

Un scaffolded

- Q7.** About the x-ray teaching sketch and its source (VC2S8I08.E04). (a) What does the x-ray style show that an outline alone cannot? (b) Why can the inside not be faked? One sentence. (c) Whose published, permissioned rock art is the real example here, and where is it? (3 marks)
- Q8.** About the skin analogy for a primary-school documentary. (a) State one thing the analogy carries well. (b) State one place the analogy breaks. (c) Why say both halves when you use an analogy? (3 marks)
- Q9.** Use the mismatch clinic. Pick one row. State what is wrong with the choice made, and say why the better match fits that audience or purpose. (2 marks)
- Q10.** The tablet finding again (simulated data for practice): *the hotter the water, the faster the tablet dissolves*. (a) Choose a format for your own class and give one reason tied to the audience. (b) Choose a format for a Prep class and give one reason tied to the audience. (c) Which of your two reasons is about what the audience can build on? (3 marks)
- Q11.** One message, two audiences: “our garden beds grew better with compost.” The audiences are a Prep class and the principal (who must decide whether to fund more compost). (a) For each audience, state one thing they already know and one thing you must explain first. (b) Name one format choice that would differ between the two, and say why. (3 marks)
- Q12.** About the seasonal-calendar publication chain (VC2S8I08.E07). (a) Who owns a published seasonal calendar, and what is that ownership called? (b) What does “published with permission” mean for someone who wants to use the calendar? (c) Name the two audiences the publication reaches. (3 marks)
- Q13.** Apply the choosing flow. A group must tell families at the school fair: “the water tank is nearly empty after the dry term — please bring rainwater when you can.” (a) State the purpose (report, explain, interest or persuade) and the audience. (b) State one thing that audience already knows and one thing the group must explain first. (c) Shortlist two formats from the grid and say why each fits. (3 marks)

Q14. One message can travel in two formats at once. (a) A group pairs a spoken talk with a poster at assembly. Say why the pair can beat either alone, in one sentence. (b) Name step 6 of the choosing flow, and write the one question you would ask your test person. (2 marks)

Answers

Q1. (a) Purpose; audience; what they know. (b) Audience. (c) The audience can only follow what connects to something they already know. **Q2.** (a) The hotter the water, the faster the tablet dissolves. (b) Panel C, the results table (in the report, 6A). (c) Slower dissolving. **Q3.** (a) Spoken. (b) Display. (c) Any pair, e.g. spoken + display (a talk with a poster). **Q4.** (a) Results table. (b) Animation or video, and poster. (c) Poster and spoken talk. **Q5.** (a) Six. (b) Kooyang, late January to late March. (c) The Bureau of Meteorology, working with the Djapwurrung and Jardwadjali knowledge holders of the Gariwerd region. **Q6.** (a) The spreadsheet. (b) Any one: a badly planned test; a number typed in wrong; a wrong choice of graph. (c) You do — the thinking stays yours. **Q7.** (a) The internal parts — backbone, guts, heart, gills — and where they sit. (b) Drawing the inside correctly takes detailed knowledge of the animal's body. (c) The Bininj/Mungguy Traditional Owners' *kunbim* (rock art) at Kakadu. **Q8.** (a) Any one carry, e.g. a thin outer layer over something else. (b) Any one break, e.g. rock is not skin — it is solid and brittle. (c) So the audience is not taught something false; a hidden break turns a representation into a rumour. **Q9.** Any row, e.g. row 2: the newsletter needs one quick fact and nobody in that audience has ten minutes to give — a single poster or infographic with the one fact fits the purpose. **Q10.** (a) E.g. a column graph with units — the class can read a pattern and check the axis. (b) E.g. a demo and a picture graph — the audience watches the race and reads pictures, not numbers. (c) The Prep reason (they cannot yet read numbers or tables). **Q11.** (a) Prep: knows plants need water; must be shown what compost is. Principal: knows the garden project and the budget; must see the evidence (how much better). (b) E.g. a results table or graph for the principal (check the evidence) versus pictures of the two beds for the Prep class. **Q12.** (a) The community that owns it — Indigenous Cultural and Intellectual Property (ICIP). (b) It is shared on terms, and the terms stay: use it as permitted, with the conditions on its use. (c) School communities, and the general public. **Q13.** (a) Purpose: persuade; audience: families at the fair. (b) Know: what a water tank is; explain first: how empty “nearly empty” is, and why rainwater helps. (c) Any two matched, e.g. poster (one big message seen from a distance at a fair) and spoken talk (questions can come back). **Q14.** (a) The poster carries the one big message for the back of the crowd while the talk carries the detail and answers questions. (b) Test it on one person; “what did you understand?”

Fully-worked solutions

Q1. (a) Purpose, audience, and what they know. (b) The audience question. (c) The audience can only follow what connects to something they already know — so the communicator builds on what is there and explains what is not (1 mark).

Q2. (a) The hotter the water, the faster the tablet dissolves. (b) Panel C — the results table in the report (6A). (c) More stacked tablets = slower dissolving — the cold cup's tall stack is the slow race (1 mark).

Q3. (a) Spoken — a talk, demo or presentation lets questions come back. (b) Display — a poster or infographic carries one big message seen from a distance. (c) Any working pair, e.g. spoken + display: a talk with a poster — one message, several formats at once (1 mark).

Q4. (a) The results table. (b) Animation or video, and the poster. (c) Poster and spoken talk — neither shows exact measurements well, so both carry only the weak dot (1 mark).

Q5. (a) Six genuine seasons. (b) Kooyang (eel time), late January to late March. (c) The Bureau of Meteorology publishes it, working with the Djapwurrung and Jardwadjali knowledge holders of the Gariwerd region (1 mark).

Q6. (a) The spreadsheet (holds the data in rows and columns, works out means — 4A). (b) Any one grey note, e.g. a wrong choice of graph. (c) You do — each tool does one job well, and the thinking stays yours (1 mark).

Q7. One mark each. (a) The internal systems — the backbone, guts, heart and gills, and where they sit inside the body (1 mark). (b) Because drawing the inside correctly takes detailed knowledge of the animal's body — the inside carries knowledge, not decoration (1 mark). (c) The Bininj/Mungguy Traditional Owners' rock art (*kunbim*) at Kakadu, published by Parks Australia (1 mark).

Q8. One mark each. (a) Any one carry, e.g. it carries a thin outer layer over something else, with slow, hard-to-see movement (1 mark). (b) Any one break, e.g. rock is not skin — it is solid and brittle, and the sizes are

nothing like real scale (1 mark). (c) Because an analogy that hides its breaks teaches something false — saying both halves keeps it a representation, not a rumour (1 mark).

Q9. One mark for the mismatch, one for the better-match reason. Example, row 3: a spoken-only account with no numbers gives the teacher nothing to check — the teacher’s purpose is to see the evidence behind the claim (1 mark), so a written report with the results table and graph (6A) fits, because the written family is best when the reader must check every step and number (1 mark).

Q10. One mark each. (a) Any matched pair, e.g. a column graph with units — the class reads patterns and checks axes, so the graph shows the trend at a glance. (b) Any matched pair, e.g. a spoken demo with a picture graph — the Prep audience watches the race and reads pictures, not tables. (c) The Prep reason — “they cannot yet read numbers or tables” is exactly “what can they build on?”

Q11. (a) One mark per audience, e.g. Prep: knows plants need water and sun; must be shown what compost is. Principal: knows the garden project and the budget; must see the evidence — how much better, measured. (b) One mark: any format choice tied to purpose, e.g. the principal gets a results table or graph (report — check the evidence) while the Prep class gets two photos of the beds (display — one big message), because the purposes differ: decide, versus wonder.

Q12. One mark each. (a) The community that owns it — it is their Indigenous Cultural and Intellectual Property (ICIP). (b) It is shared on terms, and the terms stay: use it as permitted, under the conditions on its use — ownership and control stay with the community. (c) School communities, and the general public.

Q13. One mark each. (a) Purpose: persuade (please bring rainwater); audience: families at the fair. (b) Know: what the school’s water tank is for; explain first: how low “nearly empty” is, and what their rainwater changes. (c) Any two shortlisted with audience reasons, e.g. poster — one big message seen from a distance at a busy fair — and spoken talk — families can ask questions back.

Q14. (a) Any one-sentence reason the pair wins, e.g. the poster carries the one big message to the back of the crowd while the talk carries the detail and lets questions come back (1 mark). (b) Test it on one person — and ask “what did you understand?” (not “did you like it?”), then fix and finish (1 mark).

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- Bureau of Meteorology, *Indigenous seasonal calendars — Gariwerd calendar* (Brambuk seasonal cycle; Djapwurrung and Jardwadjali language groups). bom.gov.au — retrieved 2026-08-21.
- Bureau of Meteorology, *Indigenous Weather Knowledge — seasonal calendars portal*. bom.gov.au — retrieved 2026-08-21.
- CSIRO, *Indigenous science — Indigenous knowledge: seasonal calendars* (co-developed with Indigenous language groups across Australia). csiro.au — retrieved 2026-08-21.
- Parks Australia, *Kakadu National Park — rock art* (Bininj/Mungguy *kunbim*; x-ray style; Ubirr x-ray paintings of the last 1 500 years; Nanguluwurr painted as recently as the 1960s; some art up to 20 000 years old). kakadu.gov.au — retrieved 2026-08-21.

All numerical series in the figures and questions (the tablet dissolving means of 95 s, 58 s, 34 s and 21 s at 10 °C, 30 °C, 50 °C and 70 °C) are **simulated data for practice**, labelled as such in each figure that plots them; they are teaching data, not measurements, and carry no source claim. The tablet investigation, the smell-spread storyboard task, the Prep-class poster, the documentary brief, the garden-beds and water-tank scenarios are original teaching scenarios. The particle-theory and geosphere content inside the animation and documentary tasks is, by design, only the *subject* of a communication exercise: the science itself is Ch10’s and Ch12’s and is never taught here (D8, D9). The x-ray sketch is an original teaching sketch of the idea of the style, not a reproduction of any artwork; the factual claims about Kakadu rock art are sourced to Parks Australia. The Gariwerd season names, meanings and dates are reproduced as published by the Bureau of Meteorology, with permission as the calendar’s own publication states; each calendar remains the ICIP of its owners (5B teaches the ownership and protocols side).

Elaboration contexts used: VC2S8I08 .E02 (the particle-theory storyboard and the smell-spread task), .E04 (the x-ray idea as a representation of internal systems, sourced to Kakadu rock art), .E05 (the documentary brief, its two formats and the carry/break reading of the skin analogy), .E07 (the Gariwerd wheel and the publication chain to school communities and the general public).

Teacher-facing note (not student text). 6B shares VC2S8I08 with 6A under the partner clause (D6): 6A owns the report half (structure, conventions, vocabulary as content, voice, referencing) and 6B owns the choosing half taught here; the D13 extract is served across the pair. Every science-context reference is, by design, a setting for format choice, never taught content (D8): particle theory is Ch10's, the geosphere is Ch12's, dataloggers are 3C's, spreadsheets and means are 4A's, graphing is 4C's and the report is 6A's — students meeting those references before the owning chapter treat them as given. No new maths is taught (D11); the means in the tablet data arrive pre-computed as simulated data. Aboriginal and Torres Strait Islander content follows D10 exactly: only the named, published, permissioned sources listed above (Bureau of Meteorology's Gariwerd calendar, the BOM portal, CSIRO's calendar work, Parks Australia's Kakadu rock art), no invented communities, Peoples or knowledge claims, and the ICIP ownership and protocols teaching sits in 5B with a cross-reference here. The D10 treatment remains reviewer-pending per the TOC. Reserved elaboration ids not listed in the TOC row for 6B are not drawn on (D12).

Test A

Topic test T3 — Evaluating and communicating Science 7–8 · Victorian Curriculum 2.0 · Levels 7 and 8

This is a school-designed paper. It is not a VCAA instrument and it is not a VCAA examination. Levels 7 and 8 carry no VCAA examination and no external assessment; achievement at Levels 7 and 8 is reported against the Victorian Curriculum 2.0 achievement standard on teacher judgement, and the marks here are one source of evidence towards that judgement.

About this test

- **Total: 30 marks** — Test A (8 multiple-choice marks) and Test B (22 marks of short and structured response, including one flawed method to critique). Answer all questions.
- **Suggested time: 35 minutes.** This test is untimed: students may take as long as they need to finish it.
- **A scientific calculator is permitted.** No formula sheet. No reading time.
- **Reading support is available.** The plan specifies no special reading support for this task, so students may use the reading support their classroom normally provides — for example, a teacher reading a question aloud. Reading is not being tested.
- The paper covers Topic 3 — Evaluating and communicating: Chapter 5, subtopics 5A (Interrogating a method and a conclusion) and 5B (Building an evidence-based argument), and Chapter 6, subtopics 6A (The scientific report) and 6B (Choosing the format for the purpose and the audience).
- **Every mark on this paper is an inquiry-strand mark.** The three content descriptions assessed — VC2S8I06, VC2S8I07 and VC2S8I08 — are all Science inquiry codes, so the required minimum of 5 inquiry-strand marks is exceeded by the whole paper.

What this paper assesses

scientific methods, conclusions and claims can be analysed to identify assumptions, possible sources of error, conflicting evidence and unanswered questions — VC2S8I06

evidence-based arguments can be constructed to support conclusions or evaluate claims, including consideration of ethical issues and protocols associated with using or citing secondary data or information — VC2S8I07

communicating ideas, findings and arguments for specific purposes and audiences involves the selection and use of appropriate presentation formats, scientific vocabulary, models and other representations, and may include the use of digital tools — VC2S8I08

Answer all eight questions. Choose A, B, C or D. Each question is worth 1 mark.

Q1. Not keeping the temperature the same across trials is a: (1 mark)

A. A controlled variable that improves the experiment B. The independent variable being tested C. A source of error from a variable that is not controlled D. A random error that averages out with repeats

Q2. An assumption in a parachute drop test might be: (1 mark)

A. The air stays still for every drop B. There are no assumptions at all C. The wind is always strong D. Parachutes are the same as balloons

Q3. Why are random errors usually reduced by repeating a measurement and taking the mean? (1 mark)

A. Repeating the measurement removes systematic errors as well B. Random errors tend to average out across many trials C. Repeating the measurement makes each single reading more precise on its own D. Random errors only occur on the first trial

Q4. A PRIMARY source in science is: (1 mark)

A. A textbook summary B. A news article C. A web page summary D. The original report or data of a study

Q5. Which source is usually the MOST credible for scientific evidence? (1 mark)

A. A web page with no named author B. A report written by experts and checked by other experts C. A short social media post D. A claim on a website with no date or author

Q6. When constructing an argument, which combination of evidence is generally the strongest? (1 mark)

A. Many primary sources that agree with one another B. One secondary article C. A single web page D. Personal opinion only

Q7. Which sentence is in the ACTIVE voice? (1 mark)

A. The volume was measured. B. Volume gets measured. C. The student measured the volume. D. Volume is measurable.

Q8. A short animation was made to explain a finding to a general audience. For an audience of EXPERTS, which format would fit better? (1 mark)

A. A short poster aimed at the general public B. A single news headline C. A simple labelled diagram with no text D. A detailed written report or talk with full evidence

Test B

Answer all four questions. Write your answers in full sentences where a question asks you to explain. Show your working where you calculate.

Q9. A student wants to find out which of two brands of paper towel soaks up more water. Their method is: (8 marks)

1. Take one sheet of brand A and one sheet of brand B.
2. Pour 50 mL of water onto the brand A sheet and time how long the sheet takes to soak it all up.
3. Pour 100 mL of water onto the brand B sheet and time it.
4. Brand A took 20 s and brand B took 30 s. The student concludes: *brand A soaks up water faster.*

Each brand was tested once. (All data in this question is simulated data for practice.)

- (a) Identify **two** problems with this method that make the comparison unfair or the result unreliable. (2 marks)
- (b) Name the variable that should have been kept the same but was not. (1 mark)
- (c) Suggest **two** improvements to the method. Each improvement must fix one of the problems you named in part (a). (2 marks)
- (d) Identify **one** assumption the method makes but does not check. (1 mark)
- (e) The student repeats the brand A test three more times and records 20 s, 24 s and 16 s. Calculate the mean of these three times. Show your working. (1 mark)
- (f) Explain why repeating a test and taking the mean is more reliable than doing the test once. (1 mark)

Q10. A student is building an argument about the claim: *Australia's climate is warming*. They find two sources. (6 marks)

Source 1: *Australia's climate has warmed by an average of 1.51 ± 0.23 °C since national records began in 1910.*

Bureau of Meteorology and CSIRO, "State of the Climate 2024 — Report at a glance", 2024.

<https://www.bom.gov.au/weather-and-climate/past-weather-and-climate/state-of-the-climate-2024/report-at-a-glance> — retrieved 2026-08-21.

Source 2: An online post reads: *"Last summer where I live wasn't even hot, so Australia isn't really warming."* The post has no author and no date.

- (a) Use **two** rows of the credibility scorecard to explain why Source 1 is more credible than Source 2. (2 marks)
- (b) Source 2 uses one person's local summer to argue against the warming of a whole continent. Name the move this is, and explain in one line why it is weak evidence. (2 marks)
- (c) Give your verdict on the claim *Australia's climate is warming*, using one of the verdict words, and support your verdict in one sentence using the evidence from Source 1. (2 marks)

Q11. A student writes these three sentences in a scientific report: (4 marks)

- Sentence 1: *The water was heated to 40 °C.*
- Sentence 2: *We measured the soaking time for each sheet.*
- Sentence 3: *Paper towel is made of fibres that can hold water.*

- (a) Which sentence is written in the passive voice? (1 mark)
- (b) Rewrite Sentence 1 in the active voice. (1 mark)
- (c) Name the tense of Sentence 3, and say why that tense is the right choice for that sentence. (2 marks)

Q12. A group has investigated which of three materials soaks up the most water, and their findings are in a results table. They want to share the findings with two different audiences. (4 marks)

- **Audience 1:** a class of primary-school students.
- **Audience 2:** the school principal, who will decide which material to buy for cleaning up spills.

- (a) Choose a presentation format for Audience 1 and explain why it fits that audience. (2 marks)
- (b) Choose a presentation format for Audience 2 and explain why it fits that audience. (2 marks)

Marking guide

For the classroom teacher. This paper is a school instrument of this book's own design, not a VCAA examination; the marks are one source of evidence towards the on-balance judgement against the Levels 7 and 8 achievement standard. Mark every part as set out below. Accept any response that carries the same idea in different words; spelling and handwriting do not lose marks. There are no half-marks: each mark point is either earned or not earned.

Where the multiple-choice items come from. The band's question bank

(mcq-system/data/output/questions/L7-8_Science.csv) holds six items keyed to each of VC2S8I06, VC2S8I07 and VC2S8I08, at those codes' E01 and E02 elaborations. Test A draws eight items from that bank — three from VC2S8I06 (Q1, Q2, Q3), three from VC2S8I07 (Q4, Q5, Q6) and two from VC2S8I08 (Q7, Q8). The option order has been changed from the bank order, and the answer letters below are the letters as printed on the paper. Where a bank option carried a word above this book's word ceiling, that option is rewritten in the book's own words without changing what it tests: in Q1 and Q2 the bank's *constant* becomes *the same / stays still*; in Q3 *typically* becomes *usually*; in Q4, Q5 and Q6 the bank's *blog* becomes *web page*; in Q5 the bank's *peer-reviewed* and *anonymous* options are also rewritten; in Q6 *converging* becomes *that agree with one another*; in Q7 the bank's *measureable* is respelt *measurable*; in Q8 the bank's *seminar* and *infographic* options are rewritten. No item draws on a code from any other band or topic; the only codes used are the three above. The bank's First Nations elaborations for these codes (VC2S8I07.E03–.E05, VC2S8I08.E04 and .E07) are not drawn on, consistent with the CONTENT_POLICY Rule 1 exclusion.

Multiple-choice answers (8 marks)

Q	Answer	As printed	Source
1	C	A source of error from a variable that is not controlled	Bank item VC2S8I06.E01.S01.D 1.V01 (options reordered; <i>constant</i> in the book's words)
2	A	The air stays still for every drop	Bank item VC2S8I06.E02.S01.D 1.V01 (options reordered; <i>constant</i> in the book's words)
3	B	Random errors tend to average out across many trials	Bank item VC2S8I06.E01.S01.D 3.V01 (options reordered; <i>typically</i> in the book's words)
4	D	The original report or data of a study	Bank item VC2S8I07.E02.S01.D 1.V01 (options reordered; <i>blog</i> in the book's words)
5	B	A report written by experts and checked by other experts	Bank item VC2S8I07.E01.S01.D 1.V01 (options reordered; <i>peer-reviewed / blog / anonymous</i> options in the book's words)
6	A	Many primary sources that agree with one another	Bank item VC2S8I07.E02.S01.D 3.V01 (options reordered; <i>converging / blog</i> in the book's words)
7	C	The student measured the	Bank item

Q	Answer	As printed	Source
		volume.	VC2S8I08.E01.S01.D 2.V01 (options reordered; <i>measurable</i> respelt)
8	D	A detailed written report or talk with full evidence	Bank item VC2S8I08.E02.S01.D 2.V01 (options reordered; <i>seminar / infographic</i> options in the book's words)

Each correct answer earns 1 mark. There is no working required for Test A and no part-credit.

Short and structured response — marking (22 marks)

Q9 (8 marks · 5A · VC2S8I06)

- (2 marks) Any two problems, one mark each. Accept: the two sheets were given different volumes of water (50 mL and 100 mL); each brand was tested only once; the size or thickness of the sheets is not stated as the same; the conclusion does not follow because the times are for different amounts of water. Do not accept “they got it wrong” or “human error” with no detail.
- (1 mark) The volume (amount) of water. Accept “how much water was poured” or “the amount of water”. Do not accept “the time” (that is the measured variable) or “the brand” (that is the changed variable).
- (2 marks) Two improvements, one mark each, each matched to a problem from part (a). Accept: use the same volume of water for both brands; repeat each test several times and take the mean; use sheets of the same size and thickness; pour the water the same way each time. An improvement earns no mark if it does not fix a real problem from part (a).
- (1 mark) Any one assumption the method does not check. Accept: the two sheets are the same size; the two sheets are the same thickness; the water is poured the same way each time; “soaked up” is judged the same way each time; the sheets start equally dry.
- (1 mark) Mean = $(20 + 24 + 16) \div 3 = 60 \div 3 = 20$ s. Award the mark for the correct mean with working shown; accept 20 s with a correct sum and division. Do not award the mark for the answer with no working.
- (1 mark) Accept any response that says a single reading can be thrown off by chance (random error), and that repeating the test and taking the mean lets the high and low readings average out, so the result is closer to the true value. The response must name the idea of chance/scatter or averaging out; do not accept “it is more accurate” with no reason.

Q10 (6 marks · 5B · VC2S8I07)

- (2 marks) Any two rows of the credibility scorecard worked correctly for both sources, one mark each. Accept any two of: *who is behind it?* — Source 1 is the national weather agency and the national science agency, Source 2 has no named author; *are they expert?* — Source 1 reports measured temperature records, Source 2 shows no expertise; *are they independent?* — Source 1 has no gain from either answer, Source 2 is a personal view; *is it up to date and dated?* — Source 1 is the dated 2024 report, Source 2 has no date; *can you check it elsewhere?* — Source 1 can be checked against other agencies’ records, Source 2 cannot be checked. Each row must compare both sources to earn the mark.
- (2 marks) 1 mark for naming the move — **cherry-picking** (accept “picking one bit of the record” or “using one example”). 1 mark for the explanation — accept: one local summer is a wiggle, not the trend; the trend averages every year since 1910, so one season in one place cannot remove it; one person’s story is near the bottom of the evidence ladder.
- (2 marks) 1 mark for a correct verdict word — **well supported** (the claim is backed by a credible source and high-on-the-ladder evidence, and does not reach past what was measured). 1 mark for a supporting sentence that uses Source 1’s evidence correctly, for example: *Australia has warmed by an average of 1.51 °C since 1910, measured across the national record (Bureau of Meteorology and CSIRO, 2024).* The sentence must

use the warming figure or the record and credit the source; do not award the mark for a verdict with no evidence.

Q11 (4 marks · 6A · VC2S8I08)

- (a) (1 mark) Sentence 1 (*The water was heated to 40 °C*).
- (b) (1 mark) Any active-voice rewrite of Sentence 1, for example *We heated the water to 40 °C* or *The student heated the water to 40 °C*. The doer must come first and the meaning must be kept. Do not accept a sentence that stays passive.
- (c) (2 marks) 1 mark for naming the tense — **present**. 1 mark for the reason — accept: Sentence 3 says what is already known or generally true (what paper towel is made of), and the tense map uses the present tense for what is known. Do not award the reason mark for “it is a fact” with no link to the tense-map rule.

Q12 (4 marks · 6B · VC2S8I08)

- (a) (2 marks) 1 mark for a format that fits a primary-school audience — accept a picture graph, a poster with pictures, a demonstration, or a simple labelled diagram. 1 mark for a reason tied to that audience — accept: younger students read pictures better than tables; they have not yet learned to read a results table; the format builds on what they already know. The reason must be about the audience, not just “it looks nice”.
- (b) (2 marks) 1 mark for a format that fits the principal’s purpose — accept a short written report, a column or bar graph with the numbers, or a results table with a recommendation. 1 mark for a reason tied to that audience — accept: the principal needs to check the numbers to make a buying decision; the purpose is to report and persuade, so the written or display family fits. The reason must be about the audience or the purpose, not just “it looks professional”.

Mark summary and curriculum map

Section	Marks	Inquiry-strand marks
Test A — Multiple choice	8	8
Test B — Short and structured response	22	22
Total	30	30 (required minimum: 5)

Every item sits on an inquiry-strand content description, so the whole paper counts towards the inquiry minimum. Evidence towards the achievement-standard extracts (§4.1 of the plan of record):

Items	Code	Achievement-standard extract
Q1, Q2, Q3, Q9	VC2S8I06	“They identify assumptions and sources of error in methods and analyse conclusions and claims with reference to conflicting evidence and unanswered questions.”
Q4, Q5, Q6, Q10	VC2S8I07	“They provide science-based explanations for findings, and use evidence to support conclusions and evaluate claims.”
Q7, Q8, Q11, Q12	VC2S8I08	“They select and use appropriate presentation formats, scientific vocabulary, models and other representations when communicating their ideas, findings and arguments for specific purposes to specific audiences.”

Sources

- Victorian Curriculum F–10 Version 2.0, *Science, Levels 7 and 8*, content descriptions VC2S8I06, VC2S8I07, VC2S8I08, their elaborations and the achievement standard. Victorian Curriculum and Assessment Authority, vcaa.vic.edu.au — retrieved 2026-08-21.
- Bureau of Meteorology and CSIRO, *State of the Climate 2024 — Report at a glance*, 2024. <https://www.bom.gov.au/weather-and-climate/past-weather-and-climate/state-of-the-climate-2024/report-at-a-glance> — retrieved 2026-08-21.

The only real datum in this paper is the warming figure of 1.51 ± 0.23 °C since 1910 (Bureau of Meteorology and CSIRO, 2024, source line above), used in Question 10 solely as a claim to evaluate, exactly as it is used in subtopic 5B; the causes of a changing climate are not taught at this band. Every other number in this paper — the paper-towel times and volumes in Question 9 — is **simulated data for practice**, labelled as such wherever it appears. The paper-towel scenario, the report sentences in Question 11 and the audiences in Question 12 are original teaching scenarios of this book's own design.

Teacher-facing note

This note is written for an adult professional and is not student-facing text.

- **A school instrument, not a VCAA exam (D14).** Levels 7 and 8 carry no VCAA examination and no external assessment. This paper is a school-based assessment instrument of this book's own design, graded against the achievement-standard extracts above, and its marks are one source of evidence towards the on-balance teacher judgement.
- **Administration.** Completion is untimed despite the 35-minute suggested time; a scientific calculator is permitted; reading support is whatever the classroom normally provides. Award the marks exactly as set out in the guide — point-based, no holistic rubric, no half-marks, spelling and handwriting do not lose marks.
- **Inquiry coverage (D7).** All three assessed codes are inquiry-strand, so every one of the 30 marks is an inquiry mark, well above the required minimum of 5.
- **First Nations content (CONTENT_POLICY Rule 1).** This paper draws no Aboriginal or Torres Strait Islander content. The reserved elaborations for these codes — VC2S8I07.E03, .E04, .E05 and VC2S8I08.E04, .E07 — are not assessed here, even where subtopic 6B treats them; the elaborations are contexts, not scope (D12), so VC2S8I07 and VC2S8I08 are fully assessed through their non-First-Nations elaborations.
- **Scope ceiling (D9).** Question 10 uses the *State of the Climate 2024* datum as evaluation context only — no greenhouse mechanism and no cause of climate change is taught or assessed. The mathematics drawn on is the mean of three readings (Question 9); the percentage-error interlock (VC2M8N05) taught in 5A is available but not required by this paper.