

Science 5–6

Contents

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Aboriginal and Torres Strait Islander content has been excluded as accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately.

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Contents

This book is the **Science 5–6** student workbook. It is written for the **Levels 5 and 6** band of the Victorian Curriculum F–10 Version 2.0 (VC2), Science. **The band is one scope.** All seventeen content descriptions in this book are tagged “Levels 5 and 6” — not one is tagged Level 5 alone or Level 6 alone — so the book does not split them into a Year 5 part and a Year 6 part. Schools choose their own two-year rotation, and the book works with any rotation.

The book is thirteen booklets:

- **Chapter 1 — Questioning and predicting** — Science56_Chapter01 — subtopic 1A, Investigable questions and reasoned predictions (*15 pp*)
- **Chapter 2 — Planning and conducting** — Science56_Chapter02 — subtopics 2A, Planning a repeatable, fair and safe investigation, and 2B, Measuring and recording with reasonable precision (*27 pp*)
- **Chapter 3 — Processing, modelling and analysing** — Science56_Chapter03 — subtopic 3A, Tables, graphs and models that show what the data says (*17 pp*)
- **Chapter 4 — Evaluating** — Science56_Chapter04 — subtopic 4A, Comparing findings, finding the errors, asking the next question (*14 pp*)
- **Chapter 5 — Communicating** — Science56_Chapter05 — subtopic 5A, Communicating science for a purpose and an audience, and Topic test 1 — Working scientifically, with its answers and fully-worked solutions (*24 pp*)
- **Chapter 6 — Biological sciences** — Science56_Chapter06 — subtopics 6A, Habitats, physical conditions, and what changes them, and 6B, Surviving here: change over time, features and behaviours, and Topic test 2 — Biological sciences, with its answers and fully-worked solutions (*39 pp*)
- **Chapter 7 — Chemical sciences** — Science56_Chapter07 — subtopics 7A, Particles, states and mixtures, and 7B, Reversible and irreversible change, and Topic test 3 — Chemical sciences, with its answers and fully-worked solutions (*38 pp*)
- **Chapter 8 — Earth and space sciences** — Science56_Chapter08 — subtopics 8A, Weathering, erosion, transportation and deposition, 8B, Sudden change and natural hazards, and 8C, Gravity, orbits, and Earth’s daily and yearly cycles, and Topic test 4 — Earth and space sciences, with its answers and fully-worked solutions (*57 pp*)
- **Chapter 9 — Physical sciences** — Science56_Chapter09 — subtopics 9A, Light: sources, paths and what objects do to it, and 9B, Circuits: conductors, insulators and energy, and Topic test 5 — Physical sciences, with its answers and fully-worked solutions (*41 pp*)
- **Chapter 10 — Nature and development of science** — Science56_Chapter10 — subtopic 10A, How scientific knowledge changes (*15 pp*)
- **Chapter 11 — Use and influence of science** — Science56_Chapter11 — subtopic 11A, Using science to identify problems and make decisions, and Topic test 6 — Science in society, with its answers and fully-worked solutions (*23 pp*)
- **Chapter 12 — End-of-band review** — Science56_Chapter12_Review — the end-of-band review drawn from the whole book, in two parts, with its marking guide and the mapping grid to the achievement standard (*23 pp*)
- **Chapter 0 — Contents** — Science56_Chapter00_Contents — this booklet: how to use the book, what it covers, teacher notes, safety notes and the band word list (*14 pp*)

Series total: thirteen booklets ≈ 333 pages. The built booklets — Science56_Chapter01 to Science56_Chapter11, Science56_Chapter12_Review and Science56_Chapter00_Contents — are in S:\Files\VC2Science\Textbook5_6\.

How to use this book

The chapters are in a teaching order. Chapters 1 to 5 are the five Science inquiry sub-strands, one chapter each: questioning and predicting, planning and conducting, processing, modelling and analysing, evaluating, and

communicating. They come first because every knowledge chapter sets investigations: a student cannot plan a fair test in Chapter 6 with the variables, precision and error material still ahead. Chapters 6 to 9 are the four Science understanding sub-strands — biological, chemical, Earth and space, and physical sciences. Chapters 10 and 11 are the two Science as a human endeavour sub-strands, and they sit last because both of them ask students to reason *about* science — and that reasoning is stronger once a student has a stock of science from Chapters 6 to 9 to reason about, immediately before the end-of-band review. **This is a teaching order, not a VCAA sequence.** VCAA states no order within a band, and a school that runs the chapters in another order is not out of compliance — but Chapters 10 and 11 should still come after the knowledge chapters they draw on.

One band, two years. The band is not split by year level: there are no Year 5 chapters and no Year 6 chapters, because the curriculum itself makes no Year 5 / Year 6 split. Whichever way a school rotates the chapters across Year 5 and Year 6, every subtopic in this book is taught as written.

A subtopic is not one lesson. Each of the 17 subtopics is several lessons of work. The book is sized for about 63 content lessons and 9 assessment lessons — 72 lessons across the two-year band, which is about one science lesson a week on a 36-week school year — with room left to go back over things.

Inside each subtopic. Every subtopic opens with its **Words to know** and a short theory section: short paragraphs, with every new science word named and explained the first time it is used. That is followed by worked examples — two worked with support and one worked without — then questions: six with support and ten without, spanning every major variation of the subtopic. Every subtopic has one investigation page, and every subtopic ends with a compact answer key and fully-worked solutions.

The investigation pages plan and analyse practical work — they do not replace it. Every investigation page carries this banner: *PRACTICAL — this page plans or analyses work done in the classroom, laboratory or field. It is not a substitute for doing it.* The page supplies the planning frame, the variables table, the risk table and the blank data tables; the activity itself, the equipment, the supervision and the teacher's risk sign-off happen in the classroom, laboratory or field.

The numbers stay inside what VC2 Mathematics Levels 5 and 6 delivers. In particular: this book takes repeat measurements but does **not** average them — mean, median, mode and range arrive in Year 7, so repeats are compared, the readings that agree are kept, and the reading that does not fit is spotted and the measurement taken again. There is **no ratio, proportion or scale factor** either — the solar-system scale work in 8C is a physical modelling activity with supplied distances, not a calculation. Percentage is the only proportional idea used.

Everything real is really real. Every data set, record and named case in the book is real, Victorian or Australian where the curriculum asks for it, and carries a source line with a retrieval date, so students can see where the numbers come from. Seasons are southern-hemisphere, and day-length and weather work uses Victorian localities and Victorian data.

Every science word is gathered twice. Each subtopic's words are listed in its Words to know box, and they are all gathered again, chapter by chapter, in the band word list at the back of this booklet.

The tests and the review are untimed. There is no time to beat on any instrument in this book, and if a student needs it, the teacher will read any question out. See the teacher notes below.

What this book covers

The table below lists all 17 content descriptions of the Levels 5 and 6 band, as the Victorian Curriculum F–10 Version 2.0 gives them (abridged here; the full text of each is in the curriculum authority file). Each content description is owned by exactly one subtopic, and each subtopic owns exactly one content description. This table is the map of what the book covers; the series checks itself against this map.

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
1	VC2S6H01	Nature and	scientific	.E01, .E0	.E04	81	10A

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
		development of science	knowledge changes over time, often resulting from collaboration or by building on the work of others, and leads to advances in science	2, .E03, .E05, .E06, .E07			
2	VC2S6H02	Use and influence of science	scientific knowledge, skills and data can be used by individuals and communities to identify problems, consider responses and make decisions	.E01 –.E06 (.E02 process-and-law only)	—	76	11A
3	VC2S6U01	Biological sciences	habitats can be described by their physical conditions; changing the physical conditions of a habitat, including by human activity, may affect the growth and survival of organisms	.E01, .E02, .E03, .E05, .E06, .E07	.E04	82	6A
4	VC2S6U02	Biological sciences	organisms have evolved over time, as seen in	.E01 –.E06	.E07	84	6B

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
			fossils and scientific records; the structural features and behaviours of living organisms enable them to thrive in their environments				
5	VC2S6U03	Chemical sciences	the observable properties of matter (solids, liquids and gases) can be explained by modelling the motion and arrangement of their particles; mixtures (including solutions) can be formed by combining 2 or more different substances	.E01 –.E06	.E07	85	7A
6	VC2S6U04	Chemical sciences	changes to substances may be reversible ... or irreversible, in which case new substances are formed; for most substances a change of state or	.E01 –.E06	.E07	91	7B

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
7	VC2S6U05	Earth and space sciences	dissolving in water is reversible, while irreversible changes include cooking and rusting geological processes including weathering, erosion, transportation and deposition can cause slow or rapid changes to Earth's surface	.E01 –.E05	.E06	89	8A
8	VC2S6U06	Earth and space sciences	sudden geological changes or extreme weather conditions can affect Earth's surface and atmosphere; the impacts of natural hazards ... can be reduced by human actions and technological innovations	.E01 –.E04	.E05	81	8B
9	VC2S6U07	Earth and space sciences	the force of gravity keeps Earth and other planets in the solar system in orbit around the Sun;	.E01 –.E05	.E06	87	8C

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
			cyclic observable phenomena, including variable day and night length, can be related to Earth's tilt, rotation on its axis and revolution around the Sun				
10	VC2S6U08	Physical sciences	light can be produced from many sources; light travels in a straight path, can form shadows, and can be absorbed, transmitted, reflected or refracted by objects	.E01 –.E05	.E06	79	9A
11	VC2S6U09	Physical sciences	materials may be electrical insulators or conductors; energy can be transferred and transformed in electrical circuits where the components of a circuit play particular roles in the function of the circuit	.E01 –.E06 (all 6)	—	85	9B
12	VC2S6I01	Questioning and 	investigable questions	.E01	—	91	1A

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
		predicting	and reasoned predictions can be used in guiding investigatio ns to identify patterns and test relationship s	— .E05 (all 5)			
13	VC2S6I02	Planning and conducting	repeatable scientific investigatio ns ... can be planned and conducted, including ... deciding the variables to be changed, measured and controlled in fair tests, considering potential risks, planning for the safe and ethical use of equipment and materials, and obtaining permissions for investigatio ns conducted on Country and Place or in protected areas	.E01 — .E06 (.E06 process- and-law only)	—	89	2A
14	VC2S6I03	Planning and conducting	equipment can be used to observe,	.E01 — .E03 (all 3)	—	77	2B

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
15	VC2S6I04	Processing, modelling and analysing	generate, measure and record data with reasonable precision for repeated measurements, using digital tools as appropriate data and information can be organised and processed to show patterns, trends and relationships by constructing representations including tables, graphs and visual or physical models	.E01 – .E05 (all 5)	—	73	3A
16	VC2S6I05	Evaluating	methods and findings can be compared with those of others to identify sources of error, to select evidence in support of reasoned explanations and conclusions, and to develop further	.E01 – .E04 (all 4)	—	78	4A

#	Code	Sub-strand	Content description (abridged)	Elaboration ids drawn on	Not taken up	MCQs	Owner
17	VC2S6I06	Communicating	questions for investigation scientific ideas, findings, patterns, trends and relationships can be communicated for a specific purpose and audience, using various presentation formats, scientific vocabulary and digital tools as appropriate	.E01, .E02, .E03, .E05	.E04	84	5A
				88 of 98 drawn on	10	1,412	17 owners

Notes on this table:

- The **Elaboration ids** columns record VCAA's elaborations — one illustration each of what a content description might look like. The elaborations are illustrations, not the requirement: the content description is the expectation, and an elaboration that is not used is not a gap. The ids are recorded here because they are what joins each subtopic to the banked question set.
- **Ten elaborations are not taken up in this book.** They are VC2S6H01.E04, VC2S6U01.E04, VC2S6U02.E07, VC2S6U03.E07, VC2S6U04.E07, VC2S6U05.E06, VC2S6U06.E05, VC2S6U07.E06, VC2S6U08.E06 and VC2S6I06.E04 — the elaborations that carry Aboriginal and Torres Strait Islander cultural knowledge. They are held back under the estate's decision on Aboriginal and Torres Strait Islander cultural knowledge; the notice on the first page of every booklet in this series says this. No content description is left without a teaching context — every code still draws on at least four elaborations.
- **The mandated permissions limb is taught.** VC2S6I02's own content description requires obtaining permissions for investigations conducted on Country and Place or in protected areas, and its achievement standard requires students to identify cultural considerations when planning fieldwork. Subtopic 2A teaches this as process and law, against real, named Victorian instruments — the *Aboriginal Heritage Act 2006* (Vic), the *National Parks Act 1975* (Vic) and the *Wildlife Act 1975* (Vic) — and draws on .E06 of VC2S6I02 and .E02 of VC2S6H02 for their process-and-law content only.
- **The counts close.** 17 codes, 17 owners — every code is owned exactly once. 88 elaborations drawn on + 10 not taken up = 98, the full set in the authority file. 1,412 banked questions are keyed to these codes, and every banked question for this band reaches a subtopic. There are no gaps: no content description is handed to another book, deferred, or delivered at reduced weight.

What this book does not cover. This book covers Levels 5 and 6 only. The other Science bands — Foundation to Level 2, Levels 3 and 4, Levels 7 and 8, and Levels 9 and 10 — live in their own books. The years before Foundation (Birth–Foundation) are not covered by this series at all. Towards Foundation Levels A–D are a separate product for students with disability, and are not in this book. VCE content, vocabulary and unit references do not appear on any student-facing page of this book.

Teacher notes

There is **no VCAA examination at Levels 5 and 6, no external assessment, no study score and no mark VCAA receives**. Victorian schools report achievement against the Victorian Curriculum F–10 achievement standard on teacher judgement. Every instrument below is a **school instrument**, and the mark totals are a school convenience for consistency across classes. Every test carries this standing notice:

This is a school-designed paper. It is not a VCAA instrument. Achievement at Levels 5 and 6 is reported against the Victorian Curriculum achievement standard on teacher judgement; the marks here are one source of evidence towards that judgement.

The instruments. Six topic tests — one per topic, not a pair of papers — are folded into the booklet of their host chapter at build time, each with its compact answer key and fully-worked solutions. The end-of-band review fills the Chapter 12 booklet.

Instrument	Covers	Marks	Planned for	Inquiry marks (min)	Host
Topic test 1 — Working scientifically	Chapters 1–5 (1A, 2A, 2B, 3A, 4A, 5A)	40	about 45 minutes	40 (whole paper)	Chapter 5 booklet
Topic test 2 — Biological sciences	Chapter 6 (6A, 6B)	30	about 35 minutes	8	Chapter 6 booklet
Topic test 3 — Chemical sciences	Chapter 7 (7A, 7B)	30	about 35 minutes	8	Chapter 7 booklet
Topic test 4 — Earth and space sciences	Chapter 8 (8A, 8B, 8C)	40	about 45 minutes	10	Chapter 8 booklet
Topic test 5 — Physical sciences	Chapter 9 (9A, 9B)	30	about 35 minutes	8	Chapter 9 booklet
Topic test 6 — Science in society	Chapters 10–11 (10A, 11A)	25	about 30 minutes	8	Chapter 11 booklet
End-of-band review (Parts A and B)	the whole book	60	two sessions of about 45 minutes	20 of Part B's 35	Chapter 12 booklet
Total		255			

The assessment program is nine lesson slots: six topic tests, two review sessions and one feedback lesson.

Administration — untimed, with reading support. These rules apply to every instrument in the book, and each instrument states them on its first page:

- Completion is **untimed**. The times in the table above are planning guidance for a Years 5–6 timetable and attention span; there is no time to beat, and a student may take as long as they need.

- **Reading support** is permitted. The teacher may read any question aloud to a student who needs it. Reading is not what is being looked at, and the teacher does not help with the answer.
- There is **no calculator, no formula sheet and no reading time**.
- Item types: 1-mark multiple choice (four options, A–D), 1–3 mark short response, and one 5–6 mark extended item per paper, built on a supplied stimulus — a data table, a graph, a labelled diagram or a short scenario.
- **Science inquiry is examinable in its own right, so it is examined in every paper.** At least 25% of the marks in every topic test are inquiry-strand marks, whatever the topic. A student cannot pass this book on recall.
- **Marking guides ship with every instrument.** Each guide gives the acceptable responses and the mark allocation per response, written so a generalist primary teacher can mark it without a science background.
- **A mark is a record that evidence was seen.** The records are for reporting against the Levels 5 and 6 achievement standard. They are not used to rank students.

The end-of-band review. Run once, after Chapter 11, in two sessions of about 45 minutes each. Part A is 25 one-mark multiple-choice questions drawn across the four Science understanding sub-strands and Science as a human endeavour. Part B is 35 marks, cumulative and stimulus-based, on one supplied investigation write-up: tabulate and graph the supplied data, identify a source of error and propose an improvement, and communicate the finding to a named audience. Part B's minimum inquiry weighting is 20 of its 35 marks, because processing, evaluating and communicating are best assessed cumulatively on one realistic investigation rather than in fragments. The review's stimulus is a real, sourced Victorian data set. The review is a teaching instrument for reporting against the Levels 5–6 achievement standard, **not a mock examination**, and it must not be retitled or reformatted as one.

The mapping grid. The Chapter 12 booklet also carries a one-page grid mapping every instrument to the achievement-standard extract of the content descriptions in the table above, so a teacher can convert test evidence into an on-balance judgement without re-reading the curriculum. It is the artefact that makes the mark totals defensible to a parent or a school leader.

The question bank. The bank holds 1,412 multiple-choice items keyed to the 17 codes in the table above. They are a practice and diagnostic resource for the subtopic that owns each code — **they are not the assessment instrument, and there are no multiple-choice-only papers in this book.** The band's achievement standard is written in verbs — plan, construct, compare, explain, communicate — that a pick-one item cannot evidence.

Safety notes

Safety in this book is stated **at the point of use**: every practical activity states the hazard, the control and the supervision required, on the same page as the activity. Subtopic 2A teaches the pattern — name the risk, name the control, in a risk table agreed before the work starts — and every investigation page in the book follows it. Standing rules, in every part of the book:

1. **No mains electricity in any activity.** The circuits of 9B use cells of 6 V or below, and the book says so wherever a circuit is built. Mains electricity — supplied at 230 V in Victoria — is taught as hazard-and-safety content only, never as an activity, following Energy Safe Victoria guidance.
2. **Sealed-container mould and micro-organism activities carry an explicit do-not-open-the-bag instruction**, and a disposal instruction. The bag stays sealed, and the teacher disposes of it.
3. **Eye protection is specified wherever there is heating, splashing or a projectile**, and teacher supervision is stated where required.
4. **Every practical page carries the PRACTICAL banner** — *this page plans or analyses work done in the classroom, laboratory or field; it is not a substitute for doing it*. No page implies that a written exercise satisfies a practical requirement. The activity, the site, the equipment, the supervision, the teacher's risk sign-off and the school's fieldwork permission process are all beyond what a printed page can supply.
5. **Fieldwork gets its permissions before it starts.** Where an investigation leaves the classroom, 2A teaches that permission is obtained before work starts, under real Victorian instruments — the *Aboriginal Heritage Act 2006* (Vic), the *National Parks Act 1975* (Vic) and the *Wildlife Act 1975* (Vic) — and that access may be restricted or refused.

6. No photographs of identifiable children appear in this book, and no claims are made about living private individuals.
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Word list

Every science word in this book is named and explained the first time it appears, and every subtopic opens with its Words to know. This list gathers those words, chapter by chapter, as the book teaches them. A word that the book teaches again in a later subtopic is listed again where the book teaches it again.

Chapter 1 words

1A — Investigable questions and reasoned predictions

- **investigable question** — a question we can answer by doing a test: we observe carefully and we measure
- **prediction** — a statement of what we think will happen in a test, made *before* the test is done
- **reasoned prediction** — a prediction with a reason attached, written as “I predict ... because ...”
- **reason** — the *because* part of a reasoned prediction, using what we already know
- **pattern** — what happens across a range of things or groups
- **relationship** — what happens to one thing when another thing is changed
- **evidence** — the observations and readings that show whether a prediction was right
- **observe** — to watch carefully and note what happens

Chapter 2 words

2A — Planning a repeatable, fair and safe investigation

- **investigation** — a careful piece of work set up to answer a question
- **variable** — anything that could be different from one run of a test to the next; in a fair test one variable is changed, one is measured, and the rest are kept the same
- **fair test** — a kind of investigation that changes one thing and measures the result
- **field observation** — a kind of investigation that watches and records what happens in a real place; you observe, you do not change things
- **survey** — a kind of investigation that asks people questions
- **simulation** — a kind of investigation that copies the real thing with a model or a computer
- **research** — finding out from books and trusted sites what careful investigations have already shown
- **method** — the numbered list of steps for doing a test, written with enough detail that another group could repeat it
- **repeat** — to do the test, or a measurement, again, so the findings can be checked
- **risk** — something in an investigation that could cause harm, together with the harm it could cause
- **ethical** — thinking about how an investigation affects living things and places, and choosing to treat them well, so nothing comes to harm because of the work
- **permission** — someone whose job it is to say yes must say yes, before the work starts; in many places this is also the law
- **protocols** — the rules for how to behave in or near a place, set by the people responsible for it

2B — Measuring and recording with reasonable precision

- **reading** — the number and unit an instrument shows
- **unit** — the standard amount a quantity is measured in, such as the metre
- **metre (m)** — the unit of length
- **gram (g)** — the unit of mass
- **litre (L)** — the unit of volume
- **second (s)** — the unit of time

- **degree Celsius (°C)** — the unit of temperature
- **volt (V)** — the unit that measures how much energy a source gives to the flow of electricity — the push
- **ampere (A)** — the unit that measures the flow of electricity
- **kilo-** — the prefix meaning one thousand of a unit, as in kilometre
- **milli-** — the prefix meaning one thousandth of a unit, as in millilitre
- **precision** — measuring and recording as carefully as the job needs
- **trial** — one go at a measurement; repeats are extra trials
- **repeat** — an extra trial of the same measurement, used to check the data (from 2A)
- **parallax** — the trick of the eye when a scale is read from above or below, so the reading lands on the wrong mark; scales are read with the eye level with the mark
- **probe** — a small digital tool you put where you want to measure — in the soil, in a cup of water, in the air
- **spreadsheet** — a table on a screen that digital tools can record readings straight into

Chapter 3 words

3A — Tables, graphs and models that show what the data says

- **data** — the numbers and notes we collect when we measure and observe
- **representation** — a display of data — a table, a graph, a labelled diagram, a model — that makes the story in the data easy to see
- **table** — a grid with a row and a column for everything that needs to be recorded, designed *before* the data is collected
- **column graph** — a graph that stands one column over each category so the heights can be compared at a glance
- **line graph** — a graph that shows change over time: plot a point for each pair of values, then join the points in order with straight lines
- **axis** — one of the two lines that frame a graph, carrying the scale and its units
- **scale** — the numbers on an axis, going up in equal steps
- **unit** — what the quantity is measured in, written once in the column heading or axis label (from 2B)
- **key** — a small box saying what each colour or symbol on a graph means
- **category** — a group we sort things into: magpie, worm and beetle are categories
- **pattern** — something that repeats in the data, or a change we can describe (from 1A)
- **trend** — the direction the data moves in over time — up, down, or staying about the same
- **relationship** — what happens to one thing when another thing is changed (from 1A)
- **model** — a stand-in for something that is too big, too small, too fast, too slow or too far away to study directly
- **annotate** — to add short notes and lines to a picture that point to the parts
- **circuit diagram** — a drawing of a circuit in which every part is a small agreed symbol and every wire is a straight line

Chapter 4 words

4A — Comparing findings, finding the errors, asking the next question

- **method** — the steps we follow to carry out a test (from 2A)
- **variable** — a thing we could change in a test; in a fair test only one is changed (from 2A)
- **trial** — one go at the test; doing repeats means doing extra trials (from 2B)
- **error** — a mistake in the method or in a reading that makes the findings harder to trust
- **data** — everything we record when we do a test (from 3A)
- **evidence** — the readings we *choose* to support our explanation — data becomes evidence when it is selected to back a claim (from 1A)
- **conclusion** — what we decide from the evidence

- **findings** — what the results of a test tell us
- **absorb** — to soak up

Chapter 5 words

5A — *Communicating science for a purpose and an audience*

- **communicate** — to share science ideas, findings, patterns and relationships with other people, on purpose, in a way that fits the people who will read or watch
- **purpose** — what you want your work to do: to tell, to explain, to warn, or to get someone to act
- **audience** — the people you share your work with
- **format** — the shape your work takes: a science report, a labelled poster, a persuasive letter, a slideshow or a short animation
- **science report** — a format that shares the whole test so others can repeat it
- **labelled poster** — a format that teaches or shows one big idea; one clear, labelled picture does most of the work
- **persuasive letter** — a format that asks someone to do something, and gives reasons backed by evidence
- **slideshow** — a format that talks an audience through findings with pictures that carry the point
- **animation** — a short moving picture that shows an idea or a process
- **vocabulary** — the science words of a topic, used correctly rather than avoided
- **conclusion** — the part of a report that answers the aim: it says what the results show, and names any errors and how to improve (from 4A)
- **source** — where a fact or number came from; a source line says who provided it and when it was retrieved

Chapter 6 words

6A — *Habitats, physical conditions, and what changes them*

- **habitat** — the place where a living thing lives
- **physical conditions** — the non-living parts of a habitat: how hot or cold it is, how much light and water there is, how salty the water is, what the soil is like, and what shelter there is
- **temperature** — how hot or cold the habitat is
- **light** — how much sunlight reaches the habitat
- **water** — how much water there is, as rain, in the soil, or as a pond, creek or bay
- **salinity** — how much salt is in the water
- **soil** — what the ground is made of, and what is in it for plants
- **shelter** — places where animals can hide, rest or stay safe
- **survival** — whether organisms stay alive in a habitat
- **growth** — whether organisms grow in a habitat, and how well
- **sprout** — when a seed starts to grow
- **hatch** — when a young animal comes out of an egg
- **nocturnal** — active at night
- **mould** — a living thing that is not a plant — it cannot make its own food — and grows on food and damp surfaces
- **colony** — a growing group of the same living thing; the fuzzy spots on mouldy bread are colonies

6B — *Surviving here: change over time, features and behaviours*

- **organism** — any living thing — a gum tree, a wombat, a honeyeater, you
- **environment** — the place and conditions where an organism lives
- **fossil** — the preserved remains of a living thing from long ago, or the trace it left, usually found in rock
- **sediment** — sand and mud that settles in layers, for example on the bottom of a sea or a lake

- **evidence** — things we can observe and measure that tell us something about the world (from 1A)
- **extinct** — died out, with none left
- **structural feature** — a body part of an organism, or the shape of one — a beak, a claw, a trunk, a layer of fur
- **behaviour** — something an organism does
- **adaptation** — a feature or behaviour that helps an organism survive in its environment
- **camouflage** — an adaptation that uses both structure and behaviour to let an organism blend in with its surroundings
- **nocturnal** — active at night (from 6A)
- **hibernation** — a long, deep sleep through the cold months, using very little energy
- **torpor** — a deep hibernation-like sleep in which body temperature falls and heartbeat and breathing slow right down
- **variation** — the differences between members of the same family; offspring are not exact copies of their parents or of each other
- **offspring** — the young of a plant or animal
- **advantage** — a way a feature helps an organism
- **disadvantage** — a way the same feature can cost an organism; every feature has a price
- **predator** — an animal that hunts other animals
- **prey** — the animal a predator hunts and eats
- **weathering** — the slow breaking-up and wearing-away of rock where it sits (met again in 8A)
- **mineral** — the natural solid materials that rocks are made of

Chapter 7 words

7A — Particles, states and mixtures

- **matter** — anything that takes up space and has mass
- **particle** — a piece of matter far too small to see on its own
- **solid** — the state of matter that keeps its own shape; its particles are locked in a regular pattern
- **liquid** — the state of matter that takes the shape of its container; hard to squash
- **gas** — the state of matter that spreads to fill all the space it can; easy to squash
- **volume** — the space a sample of matter takes up, measured in litres (L) or millilitres (mL)
- **mass** — the amount of matter in something, measured in grams (g) or kilograms (kg)
- **compress** — to squash something into less space
- **compressibility** — how easy a substance is to compress; gases compress easily, solids and liquids hardly at all
- **mixture** — two or more different substances combined; each keeps its own properties
- **solution** — a mixture in which one substance dissolves in another
- **solute** — the substance that dissolves
- **solvent** — the substance that does the dissolving
- **dissolve** — to break up and spread out until the mixture looks the same all through
- **separate** — to get the substances of a mixture apart again by a physical means — by sorting and picking, sieving, using a magnet, or recovering a dissolved solute

7B — Reversible and irreversible change

- **reversible** — a change that can be undone, so the original substance is recovered
- **irreversible** — a change that cannot be undone, because a new substance has formed
- **recover** — to get a substance back after a change
- **change of state** — a change between solid, liquid and gas: melting, freezing, evaporating or condensing
- **melting** — the change from solid to liquid; it needs heat

- **freezing** — the change from liquid to solid; it needs cooling
- **evaporating** — the change from liquid to gas; it needs heat
- **condensing** — the change from gas to liquid; it needs cooling
- **soluble** — describes a substance that dissolves in water
- **insoluble** — describes a substance that does not dissolve in water
- **solubility** — how well a substance dissolves
- **rust** — the flaky, crumbly, orange-brown substance that forms when iron meets water and oxygen; rusting is an irreversible change
- **recycle** — to turn used materials into new objects, using reversible changes such as melting

Chapter 8 words

8A — *Weathering, erosion, transportation and deposition*

- **weathering** — the breaking-down of rock where it sits (from 6B)
- **erosion** — the picking-up and moving of broken pieces by moving water or moving air
- **transportation** — the carrying of those pieces along by moving water or moving air
- **deposition** — the dropping of the pieces when the water or air slows down
- **mechanical weathering** — breaking caused by non-living things, such as wind-blown sand, heating and cooling, and ice
- **biological weathering** — breaking caused by living things, such as tree roots
- **frost wedging** — water freezing in a crack and forcing it wider
- **abrasion** — the rubbing and wearing-away of rock by wind-blown sand
- **run-off** — water that runs off the ground instead of sinking in
- **simulated slope** — a model slope built in the classroom to stand in for a real hillside

8B — *Sudden change and natural hazards*

- **natural hazard** — a natural event that can harm people, places or the environment
- **earthquake** — a sudden shaking of the ground, when rock deep underground snaps along a fault
- **fault** — a crack or break in the rock
- **tsunami** — a very large wave made when an earthquake lifts the sea floor and pushes the water above it
- **magma** — hot, melted rock under the ground
- **lava** — magma that has reached the surface
- **vent** — the pipe magma rises through
- **crater** — the opening at the top of a volcano
- **bushfire** — a fire that spreads through grass, scrub or forest; also called a wildfire
- **flood** — when water covers land that is usually dry
- **drought** — a long time — months or years — with much less rain than normal
- **levee** — a raised wall of earth built along a river bank to hold flood water back
- **desalination** — taking the salt out of sea water to make fresh water

8C — *Gravity, orbits, and Earth's daily and yearly cycles*

- **gravity** — the pull between objects; the force that keeps the planets in orbit around the Sun
- **orbit** — the path a planet takes around the Sun, held there by gravity
- **rotation** — Earth's daily turn on its axis; one rotation takes one day
- **revolution** — Earth's trip around the Sun, once a year
- **axis** — the imaginary line through Earth from pole to pole that it turns on
- **tilt** — the lean of Earth's axis; because of the tilt, the hemispheres take turns leaning toward the Sun
- **hemisphere** — half of Earth: the northern hemisphere and the southern hemisphere

- **equator** — the line around Earth's middle, halfway between the poles
- **sunrise** — the moment the Sun first appears above the horizon in the morning
- **sunset** — the moment the Sun disappears below the horizon in the evening
- **daylight** — the time between sunrise and sunset
- **latitude** — how far a place is from the equator; the further from the equator, the more the length of daylight changes through the year
- **elapsed time** — the time that passes between two moments; the length of daylight is the elapsed time between sunrise and sunset

Chapter 9 words

9A — *Light: sources, paths and what objects do to it*

- **source** — anything that gives out light
- **natural source** — a source that makes light in nature: the Sun, the stars, lightning, glow-worms
- **artificial source** — a source of light that people make: light bulbs, candles, torches and screens
- **ray** — a straight line with an arrow showing which way the light travels
- **beam** — many rays together, like the beam of a torch
- **shadow** — the dark shape that forms where light cannot reach
- **absorb** — the object takes the light in; it does not pass through and it does not bounce back
- **transmit** — light passes through the object
- **reflect** — light bounces off the object
- **refract** — light changes direction as it passes into or out of the object
- **transparent** — describes a material that lets almost all light through, so you can see through it
- **reflection** — light bouncing off a surface; the angle the light comes in at always equals the angle it leaves at
- **refraction** — light changing direction as it passes from one material into another
- **ray diagram** — a drawing of rays that explains what we see
- **mirror** — a smooth, shiny surface that reflects light well
- **prism** — a piece of clear glass shaped like a triangle that splits white light into colours
- **periscope** — a tube with two mirrors set at 45 degrees that lets you see over or around things

9B — *Circuits: conductors, insulators and energy*

- **circuit** — a complete loop of material that electricity can flow through
- **cell** — a small object that stores energy as chemical energy and transforms it into electrical energy; a single cell gives 1.5 V
- **battery** — two or more cells joined together
- **switch** — the component that opens and closes the path
- **conductor** — a material that lets electricity flow through it
- **insulator** — a material that does not let electricity flow through it
- **component** — one part of a circuit; each component has its own job
- **electrical energy** — the energy carried by flowing electricity
- **transfer** — to move energy from one place to another
- **transform** — to change energy from one form to another
- **mains electricity** — the electricity that flows into homes from the power system, supplied at 230 V in Victoria; far more dangerous than a cell, and never used in this book's activities
- **hazard** — something that can cause harm
- **safety switch** — a device fitted in a home's switchboard that cuts the power quickly if electricity flows where it should not

Chapter 10 words

10A — How scientific knowledge changes

- **scientific knowledge** — the claims about the world that science currently supports with evidence
- **claim** — a statement put forward as true
- **evidence** — information gathered from tests and careful watching that shows whether a claim holds up (from 1A)
- **collaboration** — scientists working together
- **contribution** — something one person or team adds to an idea
- **advance** — a step forward in what science knows or can do
- **timeline** — a line of events in time order
- **biofluorescent** — glowing in colour under UV light
- **remote sensing** — watching a place from far away, without touching it

Chapter 11 words

11A — Using science to identify problems and make decisions

- **problem** — something that needs fixing or deciding
- **data** — the facts, numbers and observations we collect (from 3A)
- **evidence** — data that we use to back up a claim (from 1A)
- **response** — a possible way to deal with a problem: a rule, a guideline, a design, or a decision to leave things as they are
- **decision** — a choice about what to do
- **community** — a group of people who live, work or meet together
- **cost** — what must be given up for a decision — usually money, time or something else people want
- **rule** — something people agree to follow
- **guideline** — advice about the best thing to do
- **claim** — the decision or answer you are arguing for (from 10A)
- **audience** — the people you are trying to persuade — a council, a principal, a class, a family (from 5A)