

Science 3–4

Contents

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Contents

This book is the **Science 3–4** student workbook. It is written for the **Levels 3 and 4** band of the Victorian Curriculum F–10 Version 2.0 (VC2), Science. **The band is one scope.** Every content description in this book is tagged “Levels 3 and 4” — not one is tagged Level 3 alone or Level 4 alone — so the book does not split them into a Year 3 part and a Year 4 part. Schools choose their own two-year rotation, and the book works with any rotation.

The series is nine books:

- **Chapter 0 — Contents** — Science34_Chapter00_Contents — this book: how to use the book, what it covers, teacher notes, safety notes and the band word list (*16 pp*)
- **Chapter 1 — Working scientifically: asking, planning and measuring** — Science34_Chapter01 — subtopics 1A, 1B and 1C, and the Chapter 1 check-up (*47 pp*)
- **Chapter 2 — Working scientifically: representing, evaluating and communicating** — Science34_Chapter02 — subtopics 2A, 2B and 2C, and the Chapter 2 check-up (*53 pp*)
- **Chapter 3 — Biological sciences** — Science34_Chapter03 — subtopics 3A, 3B and 3C, the Chapter 3 check-up and the Chapter 3 investigation task (*47 pp*)
- **Chapter 4 — Chemical sciences** — Science34_Chapter04 — subtopics 4A and 4B, the Chapter 4 check-up and the Chapter 4 investigation task (*44 pp*)
- **Chapter 5 — Earth and space sciences** — Science34_Chapter05 — subtopics 5A, 5B and 5C, the Chapter 5 check-up and the Chapter 5 investigation task (*66 pp*)
- **Chapter 6 — Physical sciences** — Science34_Chapter06 — subtopics 6A and 6B, the Chapter 6 check-up and the Chapter 6 investigation task (*41 pp*)
- **Chapter 7 — Science as a human endeavour** — Science34_Chapter07 — subtopics 7A and 7B, and the Chapter 7 check-up (*35 pp*)
- **Chapter 8 — End-of-band review** — Science34_Chapter08_Review — the end-of-band review drawn from all seven chapters, with its marking guide (*15 pp*)

Series total: nine books ≈ 348 pages. The built books — Science34_Chapter00_Contents, Science34_Chapter01 to Science34_Chapter07, and Science34_Chapter08_Review — are in S:\Files\VC2Science\Textbook3_4\.

How to use this book

The chapters are in a teaching order. Chapters 1 and 2 are the Science inquiry strands, and they come first because every knowledge chapter sets investigations that assume them. Chapters 3 to 6 are the four knowledge strands — biological, chemical, Earth and space, and physical sciences. Chapter 7 comes last, because both of its subtopics ask students to reason about cases drawn from Chapters 3 to 6. **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 Chapter 7 should still come after the knowledge chapters it draws on.

One band, two years. The band is not split by year level. Whichever way a school rotates the chapters across Year 3 and Year 4, every subtopic in this book is taught as written.

A subtopic is not one lesson. Each of the 18 subtopics is several lessons of work. The book is sized for about 62 content lessons and about 10 assessment lessons — about 72 lessons across the two-year band, or about one science lesson a week — with room left to go back over things.

The book is written for readers in Years 3 and 4. Sentences are short. Every science word is named and explained the first time it is used, and the words are gathered at the end of every subtopic and again in the band word list in this booklet. The numbers stay inside what VC2 Mathematics Levels 3 and 4 delivers: whole numbers, simple fractions, and readings to one decimal place at most. There is no percentage arithmetic — where a proportion comes up, the book teaches the proportion, not the arithmetic. Graphs are column graphs, not line graphs.

Estimate before measuring. Every measurement activity in the book asks for an estimate before the measuring starts, so a silly reading is noticed when it happens.

Everything real is really real. Every data set, photograph subject and named case in the book is real, named and Victorian, and carries a source line with a retrieval date, so students can see where the numbers come from.

Checks, tasks 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 18 content descriptions of the Levels 3 and 4 band, word for word as the Victorian Curriculum F–10 Version 2.0 gives them. 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	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
1	VC2S4H01	Nature and development of science	“data from observations obtained through scientific inquiry can be used to develop explanations of natural phenomena”	.E01–.E05 (5)	62	7A
2	VC2S4H02	Use and influence of science	“scientific knowledge, skills and data can be used by people to explain how they will meet a need or solve a problem”	.E01–.E07 (7)	79	7B
3	VC2S4U01	Biological sciences	“living things have characteristics that distinguish them from non-living things and things that were once living, including fossils”	.E01–.E03 (3)	86	3A
4	VC2S4U02	Biological	“plants and	.E01–.E05	67	3B

#	Code	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
		sciences	animals have different life cycles; offspring are similar, but not identical, to their parents”	(5)		
5	VC2S4U03	Biological sciences	“consumers, producers and decomposers have different roles and interactions within a habitat; food chains can be used to represent feeding relationships”	.E01–.E06 (6)	92	3C
6	VC2S4U04	Chemical sciences	“solids, liquids and gases have observable properties; adding or removing heat energy leads to a change of state between solids, liquids and gases”	.E01–.E06 (6)	88	4A
7	VC2S4U05	Chemical sciences	“the properties of natural and made materials, including fibres, metals, glass and plastics, influence their use and re-use”	.E01–.E06 (6)	72	4B
8	VC2S4U06	Earth and space sciences	“rocks, minerals and soils are important Earth resources and	.E01–.E06 (6)	57	5A

#	Code	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
9	VC2S4U07	Earth and space sciences	have observable properties that enable them to be used in a variety of ways” “water is an important Earth resource that originates from various sources; water cycles through the environment by moving through the sky, landscape and ocean, and involves processes including precipitation, evaporation, transpiration, condensation, melting, freezing, crystallisation, infiltration and run-off”	.E01–.E07 (7)	53	5B
10	VC2S4U08	Earth and space sciences	“weather events and climate have impacts on the land, air, water and living things; human activity can affect climate”	.E01–.E04 (4)	68	5C
11	VC2S4U09	Physical sciences	“heat energy can be generated from different sources; temperature changes may happen when	.E01–.E06 (6)	85	6A

#	Code	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
12	VC2S4U10	Physical sciences	heat is transferred from one object to another” “forces, including frictional, gravitational, electrostatic and magnetic, can be exerted by one object on another through direct contact or from a distance and affect the motion (speed and direction) of objects”	.E01–.E06 (6)	84	6B
13	VC2S4I01	Questioning and predicting	“observations can be used as a basis for posing questions to identify patterns and relationships, and to predict the outcomes of investigations”	.E01–.E06 (6)	86	1A
14	VC2S4I02	Planning and conducting	“scientific investigations to answer questions or test predictions can be planned and conducted using provided scaffolds, including identifying the attributes of fair tests, and	.E01–.E06 (6)	79	1B

#	Code	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
15	VC2S4I03	Planning and conducting	considering the safe use of materials and equipment” “observations, including formal measurements , can be made and recorded by following procedures to use familiar scaled instruments and digital tools as appropriate”	.E01–.E04 (4)	89	1C
16	VC2S4I04	Processing, modelling and analysing	“data and information can be organised and represented to identify patterns and simple relationships by constructing tables, graphs and visual or physical models”	.E01–.E06 (6)	76	2A
17	VC2S4I05	Evaluating	“findings can be compared to those of others, including, as appropriate, whether a test was fair or not, to enable conclusions to be drawn, and may lead to the identification of further questions for investigation”	.E01–.E06 (6)	81	2B
18	VC2S4I06	Communicati	“observations,	.E01–.E06	66	2C

#	Code	Strand	Content description (verbatim)	Elaboration ids	MCQs	Owner
		ng	findings and ideas can be communicated for an identified purpose and audience by using scientific vocabulary and digital tools as appropriate”	(6)		
				101	1,370	18 owners

Notes on this table:

- The **Elaboration ids** column is the full set VCAA gives for each code — this is what joins the book to the question bank. Elaborations are illustrations of what a content description might look like, not the content description itself: the content description is the spine, and an elaboration that is not used is not a gap.
- **Thirteen elaborations are reserved and are not taught in this book.** Twelve of them are the elaborations that name Aboriginal and/or Torres Strait Islander Peoples; the thirteenth is VC2S4U08.E04. They are reserved under the estate’s ICIP 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 three elaborations.
- **The counts close.** 18 codes, 18 owners — every code is owned exactly once. 101 elaboration ids, each allocated exactly once. 1,370 banked questions 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 3 and 4 only. The Foundation to Level 2 band is a separate book, and the years before Foundation (Birth–Foundation) are not covered in this series at all. Towards Foundation Levels A–D are a separate product for students with disability, and are not in this book. The content descriptions of the other Science bands (Levels 5–6, 7–8 and 9–10) live in their own books, and VCE content is not in this book.

Teacher notes

Assessment in this book is formative and teacher-marked. Science Levels 3 and 4 has **no VCAA examination and no external assessment**: every instrument below is a school instrument, and nothing in this book is a mock examination or formatted as one.

Instrument	Count	Marks each	Total	Where
Chapter check-up	7 (one per chapter)	15	105	end of each chapter
Investigation task	4 (one per knowledge chapter)	20	80	end of Chapters 3, 4, 5 and 6
End-of-band review	1	40	40	after Chapter 7
			225	

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**. There is no time to beat; 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. An answer given orally to the teacher counts the same as a written one.
- **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. Accept any response that carries the same idea in the student's own words; the spelling of scientific words does not have to be exact.
- **A mark is a record that evidence was seen**. The records are for reporting against the Levels 3 and 4 achievement standard. They are not used to rank students.

The chapter check-ups. Seven check-ups, one at the end of each chapter, 15 marks each: Part A has eight 1-mark items (name, identify, classify, label), and Part B has three items worth 2 or 3 marks each (explain, compare, construct a table or a food chain or a labelled diagram). Every item is tagged with the code it traces to, and traces to the achievement-standard extract of a subtopic in that chapter.

The investigation tasks. Four tasks, one at the end of each knowledge chapter. Each student runs one real investigation, and the task assesses the whole Chapter 1–2 inquiry arc **in performance**, in the content context of its host chapter. The mark split is fixed, so the four tasks are comparable:

Component	Assesses	Marks
Question and prediction, with the observation it is based on	VC2S4I01	3
Completed planning scaffold: what to change, what to keep the same, hazard and control	VC2S4I02	5
Measurements taken and recorded correctly, in the student's own table	VC2S4I03	4
Table, graph or model constructed, and the pattern read off it	VC2S4I04	4
Comparison with another group's findings, fairness judgement, one further question	VC2S4I05	2
Findings communicated to the stated audience, using the chapter's vocabulary	VC2S4I06	2

Host contexts: **Chapter 3** an observational investigation of a local habitat; **Chapter 4** a fair test of a change of state or an insulator; **Chapter 5** a soil or local-water-source comparison; **Chapter 6** a friction or heat-transfer fair test. Each task names its equipment and its safety controls, and each asks for an estimate before measuring.

The end-of-band review. Run once, after Chapter 7. Part A: 15 questions worth 1 mark each, drawn across all seven chapters. Part B: five questions worth 2 marks each, applying knowledge to a new situation. Part C: 15 marks on one real, sourced Victorian stimulus set — students read a table or a column graph, identify a pattern, and answer whether the conclusion drawn from it is fair. Part C is where Chapters 1–2 and Chapter 7 are assessed together. The review is a teaching instrument for reporting against the Levels 3–4 achievement standard, not a mock examination.

The question bank. The bank holds 1,370 multiple-choice items keyed to the 18 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 — classify, compare, construct, explain, pose, plan — that a pick-one item cannot evidence.

Safety notes

Safety in this book is stated **at the point of use**: every hands-on activity states the hazard, the control and the supervision required, on the same page as the activity. Subtopic 1B teaches this pattern — name the hazard, name the control — and every activity in the book follows it. Every activity is safe for a Year 3–4 classroom. Standing rules, in every part of the book:

1. **No open flame.** Nothing in this book lights a fire. Fire is met only as a source of heat to read about and to reason from (Chapter 6), and always from well back.
 2. **No heating beyond a kettle or a supervised hotplate.**
 3. **No hazardous chemicals.**
 4. **Materials are never tasted** unless the teacher says it is safe. Students observe with sight, smell, touch and hearing.
 5. **Field activities state the safety equipment** — VC2S4I02.E04 names gloves for soil work — and the teacher watches.
 6. **Wash your hands** after handling materials, soil or food.
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Word list

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

Chapter 1 words

1A — Observing, questioning and predicting

- **observe** — to use your senses to find out about something, carefully
- **record** — to write down or draw what you observed
- **investigate** — to find out about something carefully, by watching, testing or looking things up
- **question** — what an observation makes you wonder; a science question can be investigated
- **pattern** — something that repeats in your observations, or a change you can describe
- **relationship** — when one thing changes and another thing changes with it
- **predict / prediction** — to say what you think will happen, based on something you observed before
- **guess** — saying what might happen, with no observation to stand on

1B — Planning a fair test, and working safely

- **plan** — what you write down before the test: the change, the keep-the-same, the look-for, the use, the steps, the safely, and how many times
- **planning scaffold** — a starting frame the teacher gives you, with the parts of a plan ready to fill in
- **fair test** — a test where only one thing changes and everything else stays the same, so the answer can be trusted
- **what we change / keep the same / look for** — the three parts of a fair test
- **try** — one time the test is done; a plan says how many tries there are
- **grip** — how well the underneath of a shoe holds on without slipping
- **sealed** — shut all the way, so nothing gets in and nothing gets out
- **hazard** — anything that could hurt someone
- **control** — what you do to stop the hurt
- **field site** — a place outside, like the garden bed, where the class works carefully
- **pitfall trap** — a cup sunk into the ground that small animals walk into; the teacher sets and checks it

1C — Measuring and recording with scaled instruments

- **measure / measurement** — comparing something with a unit everyone agrees on; the number and unit you get
- **instrument** — a tool with a scale that we measure with, like a ruler, cup, scale or thermometer
- **scale** — the marks on an instrument
- **unit** — the fixed amount everyone agrees on, like cm, g, mL or °C
- **length** — how long something is (cm, m)
- **mass** — how much matter is in something (g)
- **capacity** — how much a cup or bottle holds (mL)
- **temperature** — how hot or cold something is (°C)
- **estimate** — a sensible guess at a size, made before measuring, using what you know
- **procedure** — the steps we follow, in order
- **round up / round down** — write the nearer mark; right in the middle, we round up
- **record** — to write down what you saw, number and unit together
- **digital tool** — a tool that finds the number for you and shows it on a screen

Chapter 2 words

2A — Tables, graphs and models

- **data** — what we notice, count or measure, and write down (from 1A)
- **table** — a way of setting data out in rows and columns, in order
- **title** — the line that says what a table or graph is about
- **column heading** — the words at the top of a column that say what it holds, with the unit
- **unit** — what was counted (here, days)
- **axes (one axis)** — the two lines that frame a graph; the vertical one runs up and down, the horizontal one runs side to side
- **scale** — the numbers on an axis and the jump between them
- **column graph** — a graph where each number becomes a column of that height
- **model** — a thing that stands in for a real thing, simpler and not as big
- **graphic organiser** — a table-like picture that sets ideas out side by side so they are easy to compare
- **pattern** — something that repeats in the data, or a change you can describe (from 1A)
- **relationship** — when one thing changes and another thing changes with it (from 1A)

2B — Comparing findings and judging fairness

- **findings** — what your investigation shows — what you found out, from what you observed and measured
- **compare** — to put things side by side and look for what is the same and what is different
- **fair test** — a test where the things compared are different in only one way — the thing being tested — and everything else is kept the same
- **checklist** — a list you check off, one line at a time
- **judge** — to decide, using what you know — scientists also say *evaluate*
- **conclusion** — your answer to the question, made from the findings
- **further question** — a new question the findings raise, that could be investigated next
- **classify** — to sort things into groups by what you observe

You already know from earlier subtopics: observe, record, question, prediction, data, and the three parts of a fair test — change one thing, keep the rest the same, measure the result.

2C — Communicating for a purpose and an audience

- **communicate** — to share what you observed and found out, so others can understand it
- **purpose** — your reason for sharing: to tell, to explain, to warn, or to get someone to act

- **audience** — the people you are sharing with
- **labelled diagram** — a drawing with a title, labels, lines and units, so anyone can read it
- **report** — short writing that tells your findings in order, ending with a conclusion
- **conclusion** — what your results mean
- **poster** — a big, quick message: a short title, one big picture or diagram, a few short facts
- **advertisement** — a message that gets someone to act, with reasons and one clear step
- **digital tool** — a computer or tablet used to share your science
- **source line** — the line that says where your facts or numbers came from
- **maximum** — the highest — the maximum temperature is the hottest reading
- **observe, record, predict (from 1A)** — to look carefully; to write or draw what you noticed; to say what will happen, based on what you observed

Chapter 3 words

3A — *Living, once living, and never living*

- **living** — alive right now — it does all five things on our list
- **once living** — was alive once, but is not alive any more
- **never living** — was never alive
- **product of a living thing** — never alive itself, but made by or from a living thing
- **characteristics** — the things you can check; a living thing does all of them
- **sorting test** — the three questions that put any thing into its group, with a reason
- **fossil** — the shape of something that was once living, kept in rock
- **impression** — the shape left behind when you press something into clay and lift it out

3B — *Life cycles, parents and offspring*

- **life cycle** — the stages a living thing goes through, from the start of its life to the start of the next
- **stage** — one part of a life cycle
- **metamorphic** — a life cycle with a big change; the young look nothing like the adult
- **non-metamorphic** — a life cycle with a small change; the young look like small adults
- **egg** — the stage many animal life cycles start from
- **larva** — the eating and growing stage of a metamorphic animal, like a caterpillar or a grub
- **pupa** — the stage of a butterfly or beetle where the body is rebuilt inside a hard case
- **cocoon** — the silk case many moth larvae spin around their pupa
- **spawn (frogspawn)** — the jelly mass of frog eggs laid in water
- **tadpole** — the young frog: it has a tail, no legs, and lives in water
- **froglet** — a young frog with legs and a shrinking tail
- **adult** — the full-grown stage of a life cycle
- **offspring** — the young of a plant or animal
- **parent** — the mother or father of offspring
- **identical** — exactly the same in every way
- **colony** — a group of animals, like penguins, that live and breed together in one place
- **breakwater** — a wall built out into the sea to keep the water near the land calm

3C — *Producers, consumers, decomposers and food chains*

- **habitat** — the place where living things live, with everything found there
- **role** — the job a living thing does with food
- **producer** — a living thing that makes its own food, like a plant
- **consumer** — a living thing that eats other living things, like an animal

- **decomposer** — a living thing that breaks down dead plants, dead animals and waste
- **predator** — an animal that hunts and eats other animals
- **prey** — the animal a predator catches and eats
- **food chain** — a drawing that shows who eats what, with arrows pointing to the eater
- **native** — has always lived here
- **introduced** — brought to Australia by people, and not native
- **extinct** — died out, with not one left
- **fungi** — the decomposers that grow on dead wood and leaves, like mushrooms

Chapter 4 words

4A — Solids, liquids, gases and changes of state

- **state** — the way a kind of stuff behaves: solid, liquid or gas
- **solid** — holds its own shape; hard to squash
- **liquid** — takes the shape of its container; hard to squash
- **gas** — spreads to fill all the space it can; easy to squash
- **container** — the thing holding a liquid or a gas
- **property** — something about a thing you can notice or test
- **heat energy** — what we add or remove to change a thing's state
- **melting** — the change from solid to liquid (heat added)
- **freezing** — the change from liquid to solid (heat removed)
- **boiling** — the change from liquid to gas (enough heat added)
- **change of state** — when a thing turns from one state into another

4B — Choosing, using and re-using materials

- **material** — what a thing is made of
- **object** — the thing itself
- **natural** — from plants, animals or the ground
- **made** — made by people, often from natural things
- **property** — a word that describes a material
- **waterproof** — keeps water out
- **see-through** — light can get through it
- **flexible** — bends without breaking, and springs back
- **fibre** — a thin thread made into cloth; one of the four families
- **metal** — strong, hard, shiny family; keeps water out
- **glass** — see-through, hard family; breaks if dropped
- **plastic** — light, waterproof family; can be made into many shapes
- **re-use** — use a thing again, just as it is
- **recycle** — change the material to make something new

Chapter 5 words

5A — Rocks, minerals and soils as Earth resources

- **resource** — something people can use
- **rock** — a hard, solid lump that comes from the ground
- **mineral** — a natural solid stuff with its own colour and shine; rocks are made of minerals
- **soil** — the soft top layer of the ground where plants grow
- **property** — something you can observe about a thing

- **texture** — how a thing feels — smooth or rough
- **grain** — the size of the bits a rock is made of — big bits or small bits
- **crystal** — a little solid with its own shape that you can sometimes see in a rock
- **building blocks** — the parts that join together to make a rock
- **gemstone** — a hard, pretty mineral cut and polished for jewellery
- **graphite** — a soft, dark mineral used as the “lead” in pencils
- **bluestone / basalt** — a dark, hard rock used for building and crushed into blue metal
- **blue metal** — bluestone crushed into small pieces, used under roads and railways
- **granite** — a speckled rock made of quartz, feldspar and mica
- **quarry** — a place where people dig out rock like bluestone or granite
- **mine** — a place where people dig out valuable things like gold or coal
- **nugget** — a lump of gold picked up from the ground
- **habitat** — a home for living things
- **filter** — to clean water as it moves through something, like soil

5B — *Water sources and the water cycle*

- **resource** — something people can use
- **water cycle** — the loop that water moves through, again and again: sky, landscape and ocean
- **salt water** — water with salt in it, like the water in the oceans
- **fresh water** — water that is not salty, that we can drink
- **water vapour** — water as a gas, rising in the air
- **precipitation** — water falling from the sky: rain, snow or hail
- **evaporation** — liquid water warming and changing into water vapour
- **transpiration** — plants giving off water vapour through their leaves
- **condensation** — water vapour cooling and changing back into tiny liquid drops
- **melting** — the change from solid to liquid (heat added)
- **freezing** — the change from liquid to solid (heat removed)
- **crystallisation** — water vapour turning straight into tiny ice crystals
- **infiltration** — rain soaking down into the soil and rock
- **run-off** — water flowing across the surface of the land
- **groundwater** — water that has soaked into the rock under the ground
- **aquifer** — rock that holds a lot of groundwater
- **glacier** — a slow-moving river of ice high in the mountains
- **ice cap** — a thick sheet of ice over land near the coldest parts of Earth
- **iceberg** — a big chunk of ice floating in the sea
- **wetland** — an area of land that is wet all year round, like a swamp or a marsh
- **lagoon** — a shallow area of water near the coast or a river
- **reservoir** — a big lake where water is stored for people to use
- **gigalitre (GL)** — a unit for very large amounts of water
- **drought** — a long, dry time with much less rain than usual
- **desalination plant** — a plant that takes the salt out of ocean water to make fresh water

5C — *Weather, climate, and human activity*

- **weather** — what the air is like on one day — sun, cloud, wind, rain, hot or cold
- **climate** — what the weather is usually like at a place, worked out from about 30 years of records
- **weather station** — a place where tools measure the weather every day
- **thermometer** — a tool that measures how hot or cold something is

- **rain gauge** — a tool that catches rain so we can measure how much came down
- **forecast** — what the weather is likely to be like soon
- **mean** — the usual amount, worked out from many records
- **weather event** — a time when powerful weather arrives: a storm, flood, heatwave, bushfire or drought
- **heatwave** — a stretch of days much hotter than usual
- **flood** — a time when a river rises over its banks and water covers the land
- **bushfire** — a fire that burns in forests and bush
- **drought** — a long, dry time with much less rain than usual
- **heat-trapping gases** — gases in the air that keep some of the Sun's heat in, like a blanket
- **pollution** — smoke and waste that dirty the air, water or land
- **deforestation** — cutting down forests
- **agriculture** — farming — growing crops and raising animals
- **urbanisation** — cities growing, with more buildings and roads

Chapter 6 words

6A — Heat sources and heat transfer

- **source of heat** — anything that gives out heat, like the Sun, a fire, an electrical device or a geothermal spring
- **heat energy** — the energy that moves from a warm thing to a cool thing; you feel it as warmth
- **temperature** — how hot or how cold something is
- **°C** — the symbol for the unit of temperature
- **thermometer** — the tool that measures temperature
- **lukewarm** — between warm and cool; not quite warm and not quite cool
- **material** — what a thing is made of, like metal, wood, plastic or ceramic
- **lets heat through well** — describes a material, like most metals, that heat moves through fast
- **does not let heat through well** — describes a material, like wood, plastic, ceramic, cloth or trapped air, that heat moves through slowly
- **insulated** — made so heat moves slowly in or out
- **fair test** — a test where only one thing is changed, so the result is fair
- **predict** — to say what you think will happen before you test it
- **geothermal** — to do with heat from inside the Earth; a geothermal spring is hot water from deep underground

6B — Forces: contact, and at a distance

- **force** — a push or a pull that one thing puts on another
- **frictional force** — the force between rubbing surfaces; pushes against motion and slows things
- **gravitational force** — the force that pulls objects towards the centre of the Earth
- **magnetic force** — the force from a magnet; pulls some metals without touching them
- **electrostatic force** — the pull from a rubbed thing, like a balloon, on light bits
- **direct contact** — the two things touch when the force works
- **at a distance** — the force works with a gap — no touch needed
- **attract** — when two magnets pull together
- **surface** — the outside top or side of a thing, where it touches or rubs
- **grip** — strong friction that stops slipping
- **magnitude** — how strong a force is; the longer the arrow, the stronger the force
- **motion** — a thing moving; forces can change its speed or its direction
- **force arrow** — a drawing of a force: the point shows direction, the length shows magnitude

Chapter 7 words

7A — Data that explains natural phenomena

- **natural phenomenon** — something that happens in the natural world, that we can notice and ask about
- **observation** — what you notice when you look or measure carefully
- **data** — observations that are written down or recorded, as numbers or notes
- **explanation** — a saying of why something happened, that fits the data
- **soil test** — a lab check of a soil sample that gives back data about the soil, as numbers
- **pH** — a number that tells how acid a soil is
- **acid** — a soil with a low pH is acid; most plants grow badly in soil that is too acid
- **alkaline** — the opposite of acid; a soil with a high pH is alkaline
- **germ** — a tiny living thing, too small to see, that can make food go off
- **food scientist** — a scientist who studies food and how to keep it good to eat
- **ecologist** — a scientist who studies living things and how they get on with each other
- **hydrologist** — a scientist who studies water: rain, rivers and storages
- **water storage** — a big place where a city's water is kept until it is needed
- **megalitre** — a very big unit of water; an Olympic swimming pool holds about two and a half of them

7B — Science that meets a need or solves a problem

- **insulation** — anything that slows heat down as it passes through
- **reservoir** — a lake people built to hold water
- **billion** — a thousand million
- **million** — a thousand thousands
- **litre** — the amount of milk in a big milk bottle
- **drought** — a long time with much less rain than usual
- **larva (larvae)** — the maggot stage of an insect, between egg and pupa
- **pupa (pupae)** — the resting stage of an insect, between larva and adult
- **single-use** — made to be used once, then thrown away
- **tread** — the pattern of grooves on a tyre
- **aquaplaning** — when a tyre skates on a layer of water instead of gripping the road
- **magnetic separation** — using a magnet to pull magnetic materials out of a mix