

Geography Level 8

Chapter 5 — Doing geography: the inquiry toolkit

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Asking good questions: how a geographical inquiry begins

Curriculum link: **VC2HG8S01** (Victorian Curriculum 2.0, Levels 7 and 8, Geographical Skills — Geographical inquiry). This section draws on the CD's elaborations .E01–.E04. It is stage 1 of the inquiry cycle (Figure 1); stages 2–7 are taught in sections 5B–6C. The working material for every task here comes from Chapters 1–4 of this book: water in the world (Ch 1), place and liveability (Ch 2), landforms and landscapes (Ch 3) and changing nations (Ch 4).

Teaching sequence

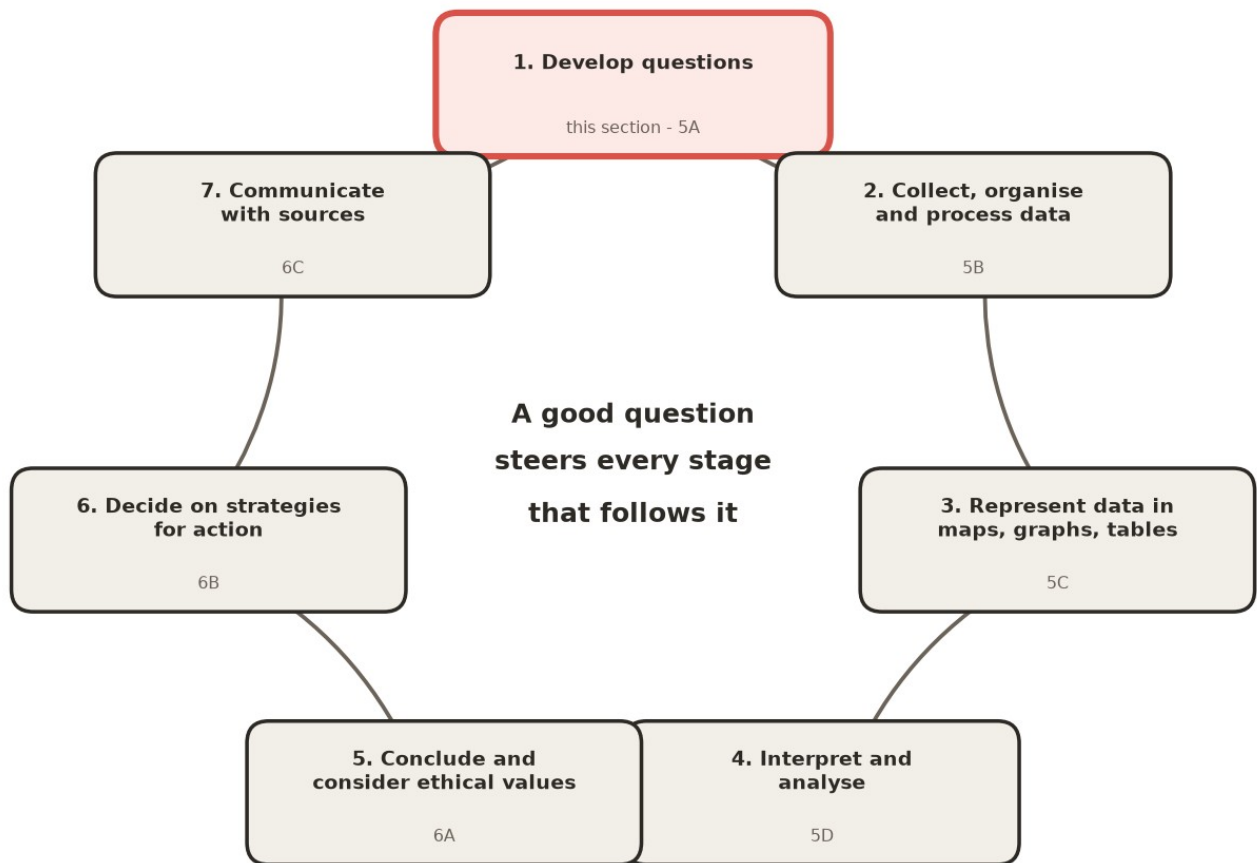
1. Start from Figure 1: locate this section in the inquiry cycle before any content.
 2. Define the three curriculum words (Figure 2) and the two tests for a geographical question; test a few student suggestions live on the board.
 3. Introduce the 7 concept lenses (Figure 3) and the three question families (Figure 4); drill lens → question orally on one shared topic.
 4. Work through demonstration 1 with Figure 6, then demonstration 2 with Figures 7–8.
 5. Run the practice set; use the checklist (Figure 9) as the peer-feedback tool between scaffolded and unscaffolded tasks.
 6. Close with the response task — the question set and plan are the evidence for VC2HG8S01.
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Theory

A geographical inquiry is planned work. You pick a real phenomenon, issue or challenge, and you work through it stage by stage: questions, then collecting data, then representing it, then interpreting it, then concluding, then deciding on action, then communicating (Figure 1). This section teaches the first stage, and it is the one every other stage leans on. A weak question makes the whole inquiry weak; a strong question makes the rest of the cycle much easier to run.

The inquiry cycle - and where this section fits

Every inquiry moves through these stages. You cannot skip the first one.



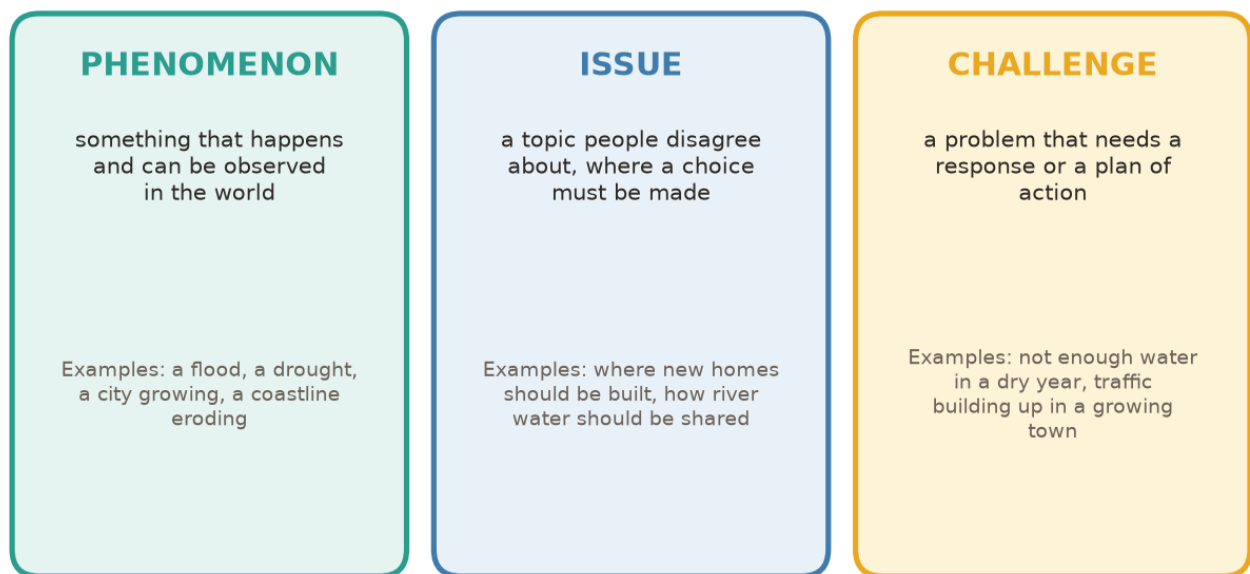
Stages 2-7 are taught in sections 5B to 6C of this book.

Figure 1 — The inquiry cycle, with stage 1, developing questions, highlighted: the part this section teaches.

The three words the curriculum uses. The Victorian Curriculum uses the words *phenomenon*, *issue* and *challenge* but does not define them, so this section treats them as follows (Figure 2): a **phenomenon** is something that happens and can be observed in the world; an **issue** is a topic people disagree about, where a choice must be made; a **challenge** is a problem that needs a response or a plan of action. One real topic can be all three at once. Competition for water in the Murray–Darling Basin is a phenomenon (it can be observed and measured), an issue (people disagree about who should get the water) and a challenge (the Basin needs a plan for dry years).

Three words the curriculum uses - what they mean here

The Victorian Curriculum uses these words but does not define them. This section treats them as follows.



One real topic can be all three at once - competing uses of water is a phenomenon, an issue and a challenge.

Figure 2 — The three curriculum words, defined for this section.

Two tests for a geographical question. A question is geographical if it passes both tests: (1) it is about a place, a group of people in a place, or the environment — it points to *where*; and (2) it can be answered with evidence about places — data, maps or fieldwork. “Is water important?” fails both tests. “Where does the Basin’s water go, and why does it go there?” passes both.

The 7 concepts are question lenses. Place, space, environment, interconnection, sustainability, scale and change each give you a different angle on the same topic (Figure 3). Turn the lens onto any topic and it hands you a question. A question set built from several lenses covers a topic well; a set built from one lens is thin.

Seven concept lenses for framing questions

Each of the 7 geographical concepts gives you an angle on any topic.

Concept	Question starter
Place	What makes this place what it is, and what is changing about it?
Space	Where does this happen, and why there rather than somewhere else?
Environment	How do people and the environment affect each other here?
Interconnection	How is this place linked to other places - and what flows between them?
Sustainability	Can this keep going without harming people or the environment?
Scale	Does the answer change when you look locally, nationally or globally?
Change	What caused the change, and what might change next?

A strong inquiry uses several lenses. One lens alone gives a thin question.

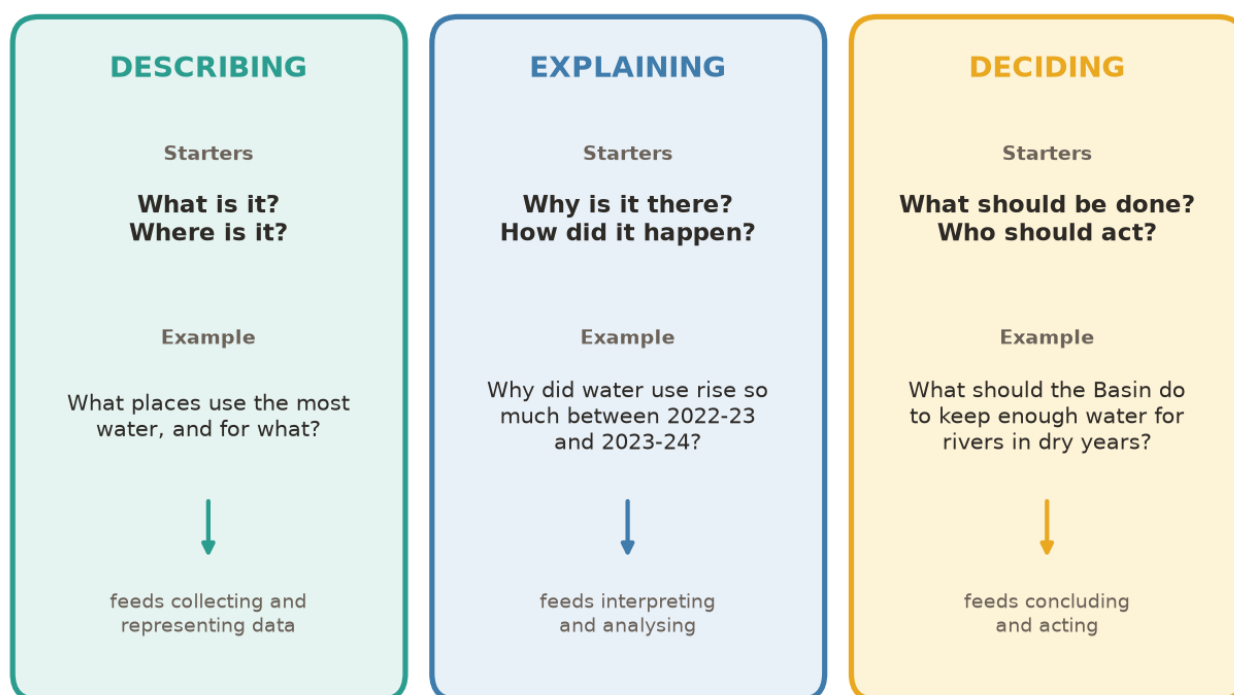
Adapt these starters to your topic - the lens is the idea, not the exact words.

Figure 3 — The 7 geographical concepts as lenses, with a question starter for each.

Three families of questions. Geographical questions fall into three families, and each family feeds a different stage of the cycle (Figure 4). *Describing* questions (what is it? where is it?) tell you what data to collect. *Explaining* questions (why is it there? how did it happen?) tell you what to interpret and analyse. *Deciding* questions (what should be done? who should act?) tell you what to conclude and act on. An inquiry that only describes is not yet an inquiry — the explaining and deciding questions are where the thinking happens.

Three families of geographical questions

Strong inquiries ask all three kinds. Each family feeds a different stage of the cycle.



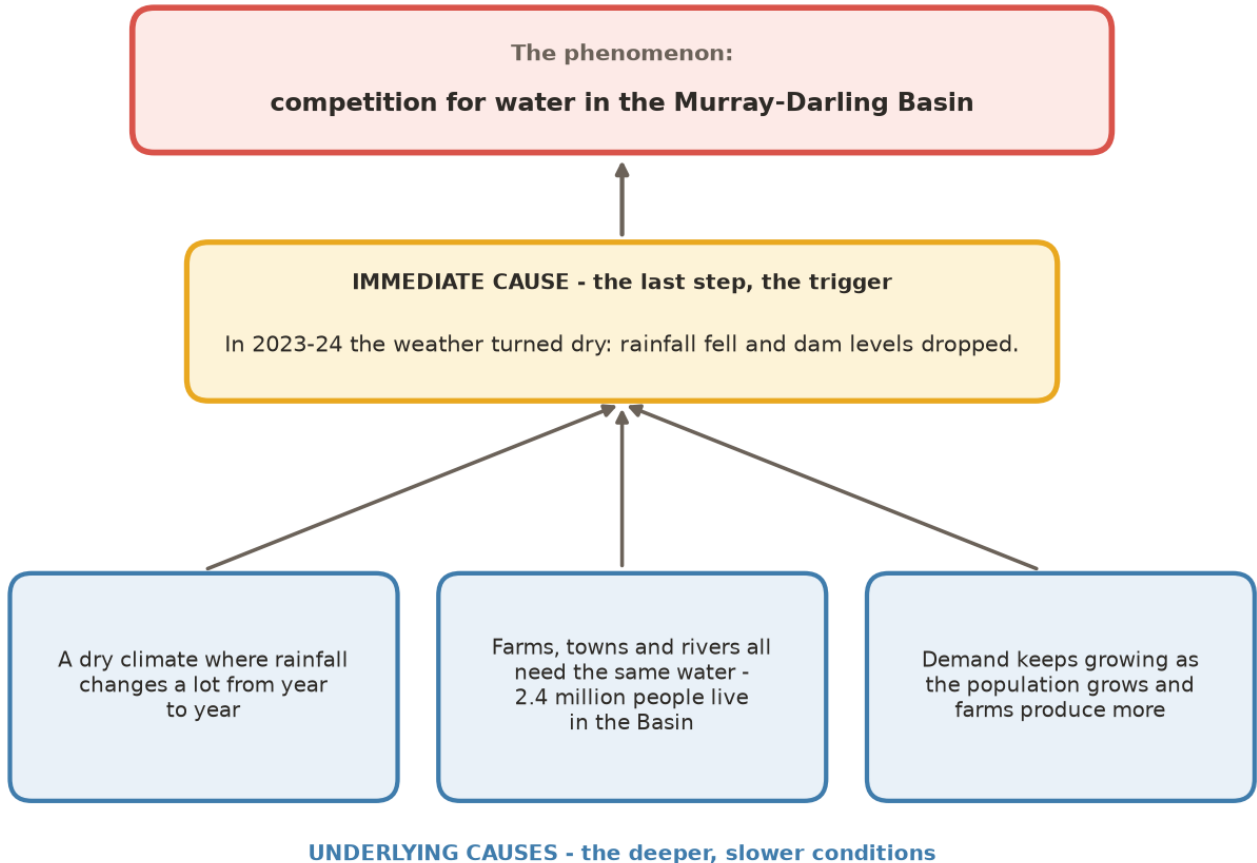
Description alone is not inquiry. The explaining and deciding questions are where the thinking happens.

Figure 4 — The three families of geographical questions, and the stage of the cycle each feeds.

Two levels of cause. Explaining a phenomenon usually needs both levels (Figure 5). The **immediate cause** is the last step — the trigger that set the event off. The **underlying causes** are the deeper, slower conditions that made the trigger matter. If you stop at the trigger, your explanation is shallow; if you ignore the trigger, your explanation floats. A quick habit that finds both levels is to ask “why?” twice.

Immediate and underlying causes

Explaining a phenomenon usually means finding BOTH levels of cause.



A question about the trigger alone ("Why was 2023-24 drier?") misses the deeper story.

Figures: Australian Bureau of Statistics, Water Account, Australia, 2023-24 (released 11 December 2025); Murray-Darling Basin Authority.

Figure 5 — Immediate and underlying causes, worked on the real case of water competition in the Murray–Darling Basin. Figures: Australian Bureau of Statistics, Water Account, Australia, 2023–24; Murray–Darling Basin Authority.

Plan at a range of scales, with digital tools. The same topic can be investigated at the local scale (fieldwork in your own suburb or town — the plan in Figure 7 works for any Victorian locality), the national scale (for example ABS data for Australia) and the global scale (comparing Australia with another country). Planning tools you might use are a shared planning document, a survey form app, a spreadsheet and a map app. A good plan holds your big question, your sub-questions, your scales, your data, your sources and your ethics check in one place (Figure 7).

Check every question. Before a question set goes into your plan, run each question through the checklist in Figure 9. A box you cannot tick tells you exactly what to fix.

Worked examples

Example 1 — developing questions about competing uses of water (scaffolded)

Working material: Chapter 1, water in the world. Data used: Australian Bureau of Statistics, Water Account, Australia, 2023–24 financial year (released 11 December 2025), and the Murray–Darling Basin Authority. Retrieved 25 August 2026.

Step 1 — name the phenomenon, and back it with one real fact. In 2023–24, Australia’s farms, homes and businesses used 17,223 GL of water (a GL is one thousand million litres — about 400 Olympic swimming pools). Farming used 11,760 GL of that — about two-thirds. The Murray–Darling Basin holds about 2.4 million people and

grows much of Australia’s food, and in 2023–24 the year turned dry: rainfall was 12 per cent lower than the year before and water storages fell by 8 per cent. So farms, towns and rivers were all after the same water. That is the phenomenon.

Step 2 — write the big question. *Why is there competition for water in the Murray–Darling Basin?* It names a place, it implies explaining, and it can be answered with data. Both tests passed.

Step 3 — run the lenses to grow sub-questions. Figure 6 shows the set this produced — one question per lens, so the set is broad without being random.

Model question set - worked demonstration 1

Big question: Why is there competition for water in the Murray-Darling Basin?

Lens	Question	Family
Place	What places in the Basin use the most water, and what do they use it for?	describing
Change	How did water use change from 2022-23 to 2023-24, and why?	explaining
Interconnection	How does taking water higher up a river change what places lower down get?	explaining
Scale	Do the causes of competition look different at local and national scales?	explaining
Sustainability	Can the Basin keep supplying farms, towns and rivers through dry years?	deciding
Environment	How do farms and towns change the rivers they take water from?	explaining

Six lenses, six questions, three families - from one big question.

Data behind these questions: ABS Water Account 2023-24 - national use 17,223 GL; farming 11,760 GL; households 1,868 GL.

Figure 6 — Model text: the developed question set for demonstration 1.

Step 4 — sort the set into families. The set in Figure 6 has one describing question, four explaining questions and one deciding question. All three families are present, so the set will collect, analyse *and* decide — not just describe.

Step 5 — check both levels of cause. The explaining questions point at causes, so sort them: “rainfall fell and storages dropped in 2023–24” is the immediate cause (the trigger); “a dry and changeable climate”, “farms, towns and rivers needing the same water” and “growing demand as the population grows” are underlying causes (Figure 5). The Change and Scale questions investigate the underlying level; a good follow-up question to add is “*How much of the competition would remain even in a wet year?*” — it targets the underlying causes directly.

Step 6 — run the checklist (Figure 9). Every question names a place or the environment; every one is answerable with ABS or Basin Authority data, maps or fieldwork; each fits a lens; each is worded so two readers get the same meaning; each matters to real people; none is a one-word answer. The set is ready to move to stage 2 of the cycle.

Example 2 — planning an investigation at a range of scales (scaffolded)

Working material: Chapter 2, place and liveability. Liveability is how liveable a place is — how well it serves the people who live there. This plan works for any Victorian suburb or town: use your own.

Step 1 — topic and big question. Topic: how liveable is my local area, and for whom? Big question: *what makes my suburb or town liveable, and does everyone experience it the same way?* Both tests pass: it is about a place, and it is answerable with fieldwork and census data.

Step 2 — grow sub-questions from the lenses. Five lenses, five questions (Figure 8): place (which places near home do people use most, and why?), space (how far is it to a park, a doctor or a bus stop?), interconnection (how does a lack of services change how people feel about the area?), change (what has changed here in the last ten years?) and sustainability (which parts need care so they stay good?).

Step 3 — choose the scales. Local: fieldwork — survey 20–30 residents and map the services they use. National: compare the survey results with ABS Census QuickStats for my area and for one very different place (a remote town, for example), using the same measures.

Step 4 — name the digital tools and the sources. A survey form app for the fieldwork (primary source), a spreadsheet to sort the answers, a map app to show distances, and ABS Census QuickStats on the web (secondary source). Every source is named in the plan, not “the internet”.

Step 5 — do the ethics check. No names collected; answers kept private; results grouped so no one person can be picked out. People’s views about their own suburb are personal — ask with care, and let anyone say no.

A blank copy of the form is Figure 7; the finished plan for demonstration 2 is Figure 8.

INVESTIGATION PLAN - MODEL FORM

Copy it and fill it in for your own phenomenon, issue or challenge.

My phenomenon, issue or challenge:

My big question:

My sub-questions (aim for 5 - use several concept lenses):

Scale - local: what will I look at near me?

Scale - national or global: what will I compare it with?

What data or evidence will I need?

Where will I get it? (name your sources)

Which digital tools will I use?

Ethics check: how will I keep people's answers private?

A plan you can follow beats a plan that looks impressive.

Figure 7 — A blank planning form. Copy it and fill it in for your own inquiry.

COMPLETED PLAN - worked demonstration 2

Topic	How liveable is my local area - and for whom?
Big question	What makes my suburb or town liveable, and does everyone experience it the same way?
Sub-questions	1. (Place) Which places near my home do people use most, and why? 2. (Space) How far is it to a park, a doctor or a bus stop? 3. (Interconnection) How does a lack of services change how people feel about the area? 4. (Change) What has changed here in the last ten years? 5. (Sustainability) Which parts need care so they stay good?
Scale - local	Fieldwork: survey 20-30 residents and map the services they use.
Scale - national	Compare my results with ABS Census QuickStats for my area and one very different place.
Data needed	Survey answers; distances to services; census figures on age, transport and services.
Sources	My own fieldwork (primary); ABS Census QuickStats (secondary).
Digital tools	Survey form app, spreadsheet for results, map app to show distances.
Ethics check	No names collected; answers kept private; results grouped so no one person can be picked out.
Every sub-question names a lens. Every scale has data. The ethics check is filled in.	

Works for any Victorian suburb or town - use your own.

Figure 8 — Model text: the completed plan for demonstration 2, at local and national scales.

Is my question a strong geographical question?

Tick every box. A box you cannot tick tells you what to fix.

☐
It names or points to a place, a group of people or the environment.

☐
It can be answered with evidence - data, maps, fieldwork or sources.

☐
It fits at least one concept lens (place, space, environment, interconnection, sustainability, scale, change).

☐
It is clear enough that two people would understand it the same way.

☐
It matters to real people, not just to my assignment.

☐
It opens up more questions - it cannot be answered with one word.

Missed a box? Rewrite the question - do not lower the standard.

Keep your drafts: seeing a question improve is part of the skill.

Figure 9 — The good-question checklist: use it on every question you write.

Practice questions

Scaffolded

Q1. For each question below, say whether it is geographical (passes both tests) or not. For each one that fails, rewrite it so it passes. (a) What is the best film of all time? (b) Where do people in my suburb go to catch a train? (c) Why do more Australians live near the coast than inland? (d) Is water nice?

Q2. Put each question into its family — describing, explaining or deciding. (a) How much water did Australian farms use in 2023–24? (b) Why did farm water use rise 14.6 per cent between 2022–23 and 2023–24? (c) What should a growing town do first to stay liveable? (d) Which services are within a ten-minute walk of your home? (e) How did the Twelve Apostles stacks form along the Victorian coast?

Q3. Name the strongest concept lens (from Figure 3) behind each question. (a) How does less water in the Basin change food prices in cities far away? (b) Will the Basin still be able to supply farms, towns and rivers in fifty years? (c) Where in Australia is rainfall lowest, and why there? (d) How has Melbourne’s built-up area changed since 1990? (e) Why do people describe the same suburb as liveable or not liveable?

Q4. Sort each cause of water competition in the Murray–Darling Basin into *immediate* or *underlying*. (a) Rainfall fell and storages dropped during 2023–24. (b) The climate is dry, and rainfall changes a lot from year to year. (c) Farms, towns and rivers all need the same water. (d) Demand keeps growing as the population grows.

Q5. The question “Is liveability good in Australia?” fails both tests for a geographical question. Rewrite it as two questions — one describing and one explaining — naming the place you will study.

Q6. For the big question *Why is there competition for water in the Murray–Darling Basin?*, name one thing you could investigate at each scale: (a) local (within the Basin, near a named town); (b) national; (c) global (comparing Australia with one other place).

Unscaffolded

Q7. Working material: Chapter 1. For the phenomenon of competing demands on water in a region, develop a big question and four sub-questions, using four different concept lenses. Tag each sub-question with its family.

Q8. Working material: Chapter 4. For the challenge of providing public housing in cities that are growing, write one describing, one explaining and one deciding question. For each, name one kind of data that would help answer it.

Q9. Choose one phenomenon, issue or challenge from any of Chapters 1–4. Draw a cause chain for it: one immediate cause and at least two underlying causes, in the shape of Figure 5.

Q10. Working material: Chapter 2. Copy the planning form (Figure 7) and complete it for an investigation of the liveability of your own local area, using at least two scales and naming at least one primary and one secondary source.

Response task

Choose **one** topic from the working material of Chapters 1–4:

1. competing demands on water in a region (Ch 1);
2. improving the liveability of your local area (Ch 2);
3. managing ecotourism at a landform site near you (Ch 3) — ecotourism means tourism that tries to protect the places and living things visitors come to see;
4. providing public housing in cities that are growing (Ch 4).

Then, on that topic, produce:

- one sentence stating what the topic is — phenomenon, issue, challenge, or more than one, and why;
- one big question that passes both tests for a geographical question;
- five sub-questions, each tagged with its concept lens and its family, using at least three different lenses;
- a cause chain with one immediate cause and two underlying causes (Figure 5’s shape);
- the completed planning form (Figure 7), with at least two scales and named digital tools;
- one paragraph explaining why your question set is strong, using the checklist (Figure 9), and naming at least one real source of data you would use (for example an ABS release used in Chapters 1–4).

This is the evidence for VC2HG8S01: the question set and the plan together *are* the skill the CD describes.

Answers

Q1. (a) Not geographical — no place, and no way to answer it with data, maps or fieldwork; a fix: “Where are the most-visited cinemas in your city, and why there?” (b) Geographical. (c) Geographical. (d) Not geographical — “nice” is a personal response; a fix: “How much water does a household in my city use in a year, and how does that compare with the national figure?”

Q2. (a) Describing. (b) Explaining. (c) Deciding. (d) Describing. (e) Explaining.

Q3. (a) Interconnection. (b) Sustainability (change also accepted with reasons). (c) Space. (d) Change. (e) Place (perceptions of the same place).

Q4. (a) Immediate. (b), (c), (d) Underlying.

Q5. Model fix — describing: “What services are within a ten-minute walk of homes in [your suburb]?” explaining: “Why do people rate [your suburb] more or less liveable than [a named other place]?”

Q6. (a) Model: how one town in the Basin (for example Mildura) shares its water between farms, homes and the river in a dry year. (b) How Australia’s total water use split between farming, households and industry in 2023–24 (ABS Water Account). (c) How a dry-region basin in another country (for example the western United States) deals with the same competition.

Q7–Q10. See the fully-worked solutions for models of Q7 and Q8; Q9 and Q10 are your own — check them against Figures 5, 7 and 9.

Fully-worked solutions

Q7 — model response. Big question: *Why must farms, towns and rivers compete for water in the Murray–Darling Basin, and can that competition be managed in dry years?* Sub-questions: (place, describing) What does each user — farms, towns, rivers — take from the Basin’s rivers in a year? (interconnection, explaining) How does water taken higher up a river change life for places lower down? (change, explaining) How did the dry year of 2023–24 change water use compared with the wet year of 2022–23? (sustainability, deciding) Which rules for sharing water should stay in a dry year, and which should change? Each passes both tests, the lenses differ, and all three families are present — so the checklist (Figure 9) is satisfied.

Q8 — model response. Describing: “How many new homes were built in a growing outer suburb (for example Casey or Wyndham in Melbourne) in the last five years?” — data: ABS building-approvals counts. Explaining: “Why do new homes cluster at the city’s edge rather than near the centre?” — data: land-price maps and census figures on where people live. Deciding: “What should a growing suburb build first — new homes, new schools, new clinics or new parks — and why?” — data: the suburb’s own census profile of ages and services, plus the local council’s plan.

Q9 — model check. A cause chain scores when: the immediate cause is a last step, not a condition (“rainfall fell in 2023–24”, not “the climate is dry”); the underlying causes are slower conditions that would still matter in a different year; and every box could be tested against real data or a named source.

Q10 — model check. A plan scores when: the big question passes both tests; the five sub-questions use at least three lenses; the two scales each have data attached (not just a label); every source is named (your own fieldwork counts as a primary source; ABS Census QuickStats is a strong secondary source); the digital tools are real ones you could run (survey form app, spreadsheet, map app); and the ethics check is filled in — no names, private answers.

Response task — model check. The task is the skill. A strong submission has: the topic sentence naming which of the three words applies; a big question passing both tests; five sub-questions with lens and family tags and at least three lenses; a cause chain with a true trigger and true underlying causes; a plan with two scales, named tools and an ethics check; and a closing paragraph that uses the checklist honestly — including the box it nearly missed, and the rewrite that fixed it.

Sources

- Australian Bureau of Statistics, *Water Account, Australia, 2023–24 financial year*, released 11 December 2025, www.abs.gov.au — national water consumption 17,223 GL; agriculture, forestry and fishing 11,760 GL; households 1,868 GL; rainfall 12 per cent lower and storages down 8 per cent on 2022–23. Retrieved 25 August
- Australian Bureau of Statistics, *5 insights on water use in Australia*, released 11 December 2025, www.abs.gov.au — household use 174 kL per household in 2023–24. Retrieved 25 August 2026.
- Murray–Darling Basin Authority, *Water recovery* (carrying “Why the Murray–Darling Basin matters”), www.mdba.gov.au — the Basin is about one million square kilometres and home to about 2.4 million Australians. Retrieved 25 August 2026.
- Australian Bureau of Statistics, *Census of Population and Housing — QuickStats*, www.abs.gov.au — the secondary source named for the liveability plans. Retrieved 25 August 2026.

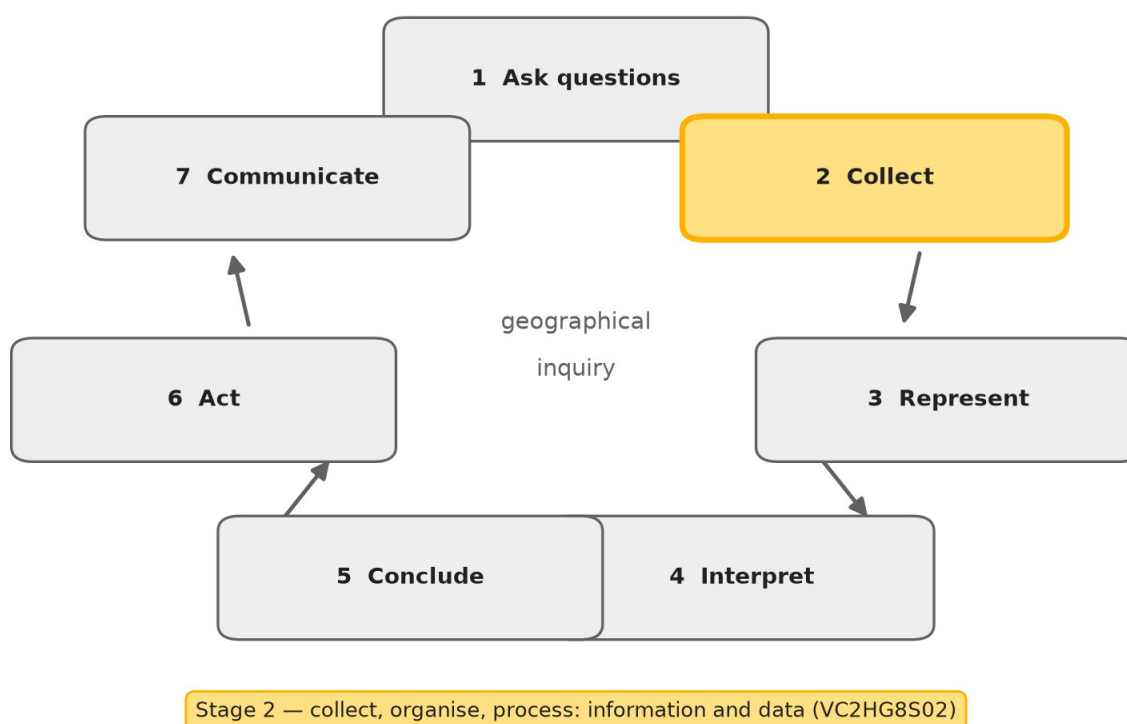
Gathering and sorting data: fieldwork, sources and digital tools

Victorian Curriculum 2.0, Humanities — Geography, Levels 7 and 8 band.

This section owns **VC2HG8S02** (Geographical Skills — Geographical inquiry) and draws on elaborations VC2HG8S02.E01–VC2HG8S02.E04: primary methods and digital tools (VC2HG8S02.E01), the two kinds of data and the Census reliability check (VC2HG8S02.E02), advanced search for secondary materials (VC2HG8S02.E03), and judging relevance and reliability (VC2HG8S02.E04). The section builds towards the band achievement standard's data-collection sentence (Level 8).

In section 5A you learned to ask a strong focus question. A strong question is only the start: the answer has to be built from evidence, and evidence has to be gathered, sorted and checked. That is stage 2 of a geographical inquiry — the stage this section owns (Figure 1).

The inquiry cycle — this section is stage 2



The seven stages of a geographical inquiry drawn as a cycle: ask questions, collect, represent, interpret, conclude, act, communicate. Stage 2, collect, is highlighted in amber and labelled as the work of this section.

Stage 2 has three moves. You **collect** information and data, you **organise** it so it can be seen clearly, and you **process** it so it starts to say something. This section gives you the two kinds of source, the primary methods (including fieldwork), the two kinds of data, the three moves themselves, and the checks that tell you whether a source deserves to be cited.

Theory

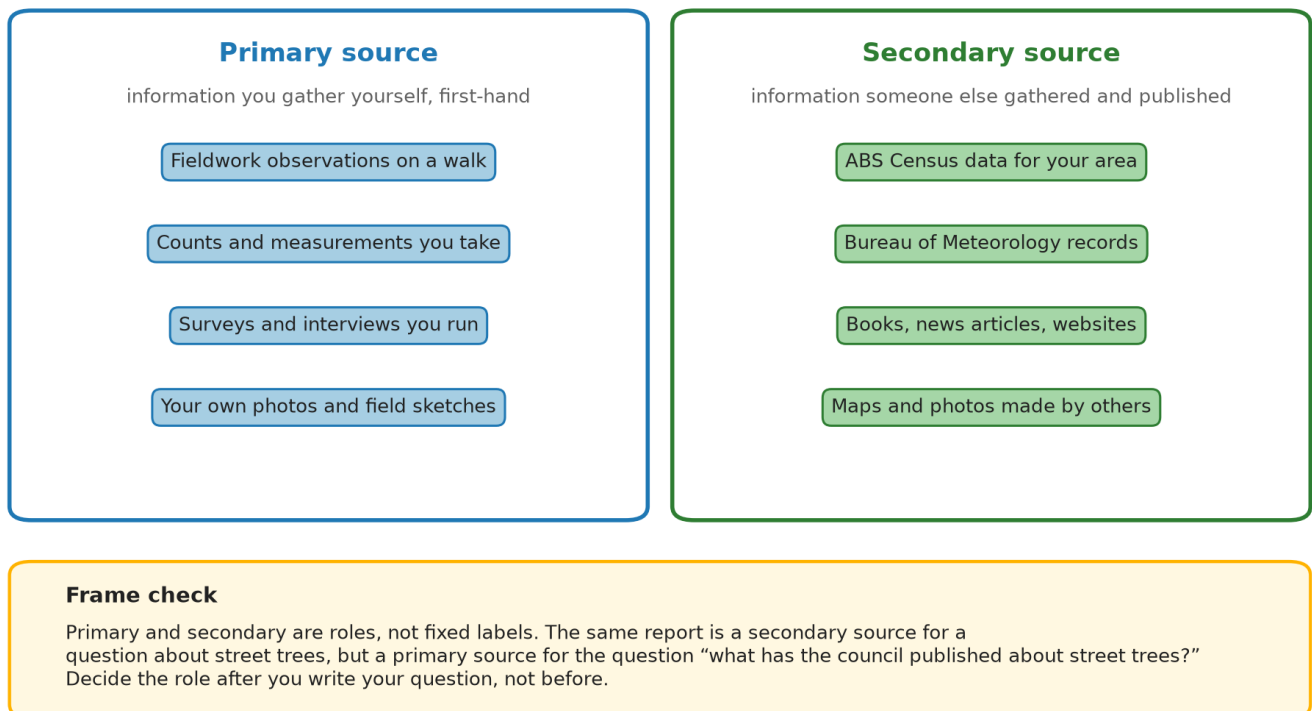
Two kinds of source

Every piece of evidence in geography comes from one of two kinds of source, and the curriculum's own words for them are worth fixing down (Figure 2).

- A **primary source** gives you information first-hand. You gathered it yourself, for your own question: your counts, your measurements, your survey answers, your photographs.

- A **secondary source** gives you information someone else gathered and published: ABS Census data, official weather records, books, news articles, maps and photographs made by other people.

Two kinds of source



Roles defined per VC2HG8502 (primary and secondary sources); frame check is this book's reading of those roles.

Two panels. Left: primary source, information you gather yourself first-hand, with examples: fieldwork observations on a walk, counts and measurements you take, surveys and interviews you run, your own photos and field sketches. Right: secondary source, information someone else gathered and published, with examples: ABS Census data for your area, Bureau of Meteorology records, books news articles websites, maps and photos made by others. A frame check box below says the same report can be a secondary source for one question and a primary source for another, and to decide the role after you write your question.

Primary and secondary are **roles, not fixed labels**. Whether a source is primary or secondary depends on your question. If your question is about street trees, a council report is a secondary source — someone else gathered the facts. If your question is "what has the council published about street trees?", that same report is a primary source: the thing itself you are studying. Decide the role after the question is written, not before.

Primary methods, including fieldwork

Fieldwork means collecting data at the place itself — outside the classroom — by watching, counting, measuring, asking and recording. It is the backbone of this whole book: the local liveability investigation in section 2F, the local landform study in sections 3C and 3D, and the water-use watch that opens Chapter 1 all run on the same fieldwork, and this section is where its methods are taught.

Each method suits some questions and not others, and each has a digital tool that makes it sharper (Figure 3).

Geospatial technologies are the tools that attach information to places on the Earth's surface — a camera that stores a location pin with each photo, a mapping app, a survey form that records where answers came from. The curriculum expects you to use them "as appropriate", which means when they genuinely help.

Choose your method: primary research in this book

Method	What you get	Digital tool that helps	Used for
Observation walk (fieldwork)	counts and condition notes	camera; notes or tally app	2F liveability walk
Field sketch with labels and notes	the shape and layout of a place	camera as a back-up	3C local landform
Measurement (tape, trundle wheel, thermometer)	sizes, distances, temperatures	spreadsheet to store the values	3C/3D landforms; Ch 1 water-use watch
Survey (written questions)	opinions and ratings from many people	online survey form	2F liveability views
Interview (spoken questions)	detailed views and stories	voice recorder app	2F community views
Photo study	a streetscape record you can revisit	phone camera with a location pin	2F streetscapes; 3D change over time
Height data and contour mapping	the shape of the land surface	mapping app or GIS	3C recreating landform features

Methods per VC2HG8502.E01 (fieldwork, interviews, surveys, sketches, photos, measurements, recreating landform features); tasks run in any Victorian locality.

A four-column table of primary research methods. Columns: method; what you get; digital tool that helps; used for. Rows cover an observation walk (fieldwork), a field sketch with labels and notes, measurement with tape trundle wheel and thermometer, a survey of written questions, an interview of spoken questions, a photo study, and height data with contour mapping. The used-for column points to this book's liveability walk in 2F, the local landform study in 3C and 3D and the Chapter 1 water-use watch.

Choosing a method is choosing what kind of evidence you will have. If you need how many, you count or measure. If you need what people think, you ask. If you need the shape of a place, you sketch it or photograph it. A good collection plan usually mixes methods, because one method alone gives one thin slice of a place.

Recording it well: the fieldwork sheet

Data collected in your head is data lost by lunchtime. Fieldwork is recorded on the spot, on a sheet like Figure 4, with four parts: a count table in tallies, a photo log, a field sketch with labels and notes, and a short survey. The header row — site, date, start time, weather, observer — is not paperwork for its own sake. It is what lets you judge your own work later: a count of people on a wet Monday is not the same fact as a count on a dry Saturday, and the header is how a reader can tell.

Fieldwork record sheet (model)

Fill in one sheet per site. The same sheet works for the 2F liveability walk and the 3C/3D landform study.

Site: _____ Date: _____ Start time: _____ Weather: _____ Observer: _____

A Count table (tally one item at a time)

Feature	Tally	Total
Footpath: good		
Footpath: cracked		
Footpath: missing		
Crossings		
Shade trees		
Rubbish bins		
Bus stops		
Cars parked on footpath		

B Photo log

Photo no.	What it shows	Where (location pin)
1		
2		
3		
4		

C Field sketch with labels and notes

Draw the corner or street block you can see.
Add labels (names, counts) and short notes
pointing to the parts that matter for your question.

D Short survey

Question:

"How safe do you feel walking here?"

(1 = not safe, 5 = very safe)

Record each answer:

1 ___ 2 ___ 3 ___ 4 ___ 5 ___

Model sheet for teaching. Every entry is written by the student at the site; the sheet is generic to any Victorian town or suburb.

A model fieldwork record sheet with a write-in header (site, date, start time, weather, observer) and four parts: A a count table with tally and total columns for footpath condition, crossings, shade trees, rubbish bins, bus stops and cars parked on the footpath; B a photo log with columns for photo number, what it shows and where the location pin places it; C a box for a field sketch with labels and notes; D a short survey asking how safe people feel walking here on a 1 to 5 scale.

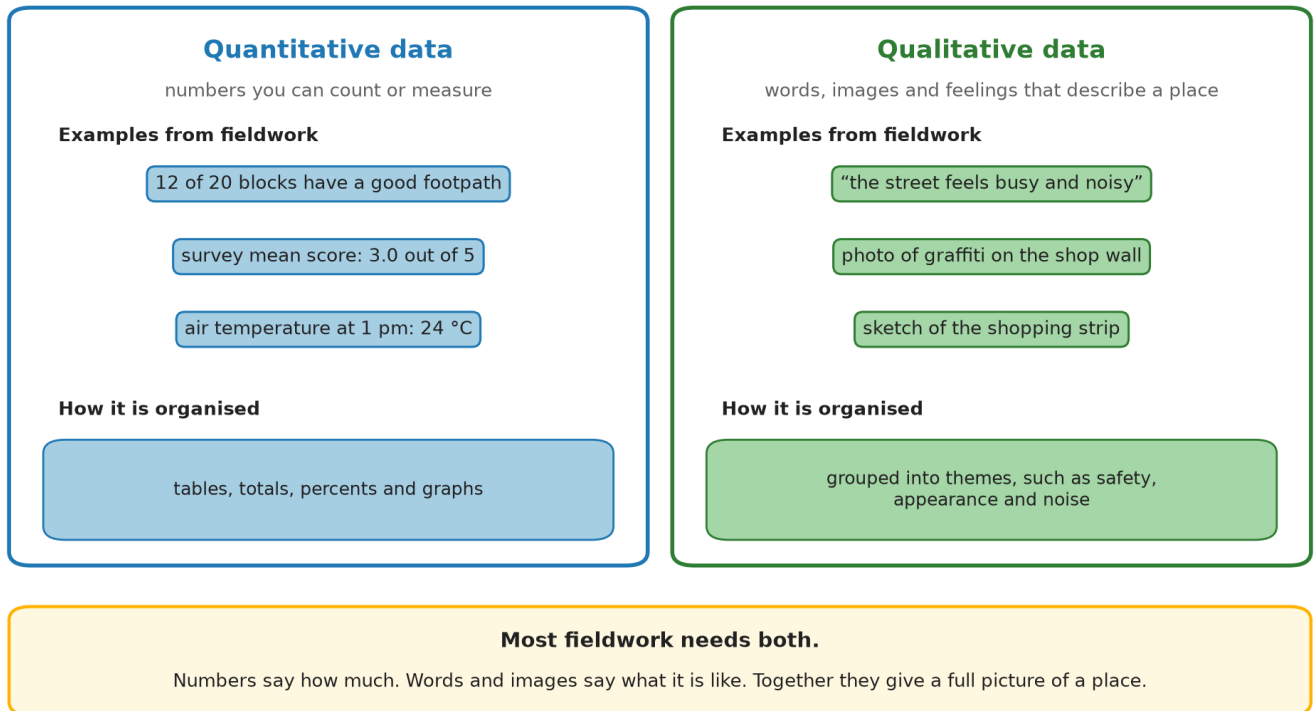
The same sheet serves the 2F liveability walk and the 3C/3D landform study — the rows change, the habit does not. Fieldwork tasks in this book are written so that any Victorian town or suburb can run them with local observation; your site is your data.

Two kinds of data

Sources and methods produce two kinds of data (Figure 5).

- **Quantitative** data is numbers — things you can count or measure: 12 of 20 blocks have a good footpath; the survey mean is 3.0 out of 5; the temperature at 1 pm was 24 °C.
- **Qualitative** data is words, images and feelings that describe a place: "the street feels busy and noisy", a photograph of graffiti, a sketch of a shopping strip.

Two kinds of data: numbers and words



Quantitative and qualitative data per VC2HG8502.E02; examples are model fieldwork values.

Two panels comparing quantitative data (numbers you can count or measure, organised as tables totals percents and graphs) with qualitative data (words images and feelings that describe a place, organised by grouping into themes such as safety appearance and noise), each with fieldwork examples, and a bottom line saying most fieldwork needs both: numbers say how much, words and images say what it is like.

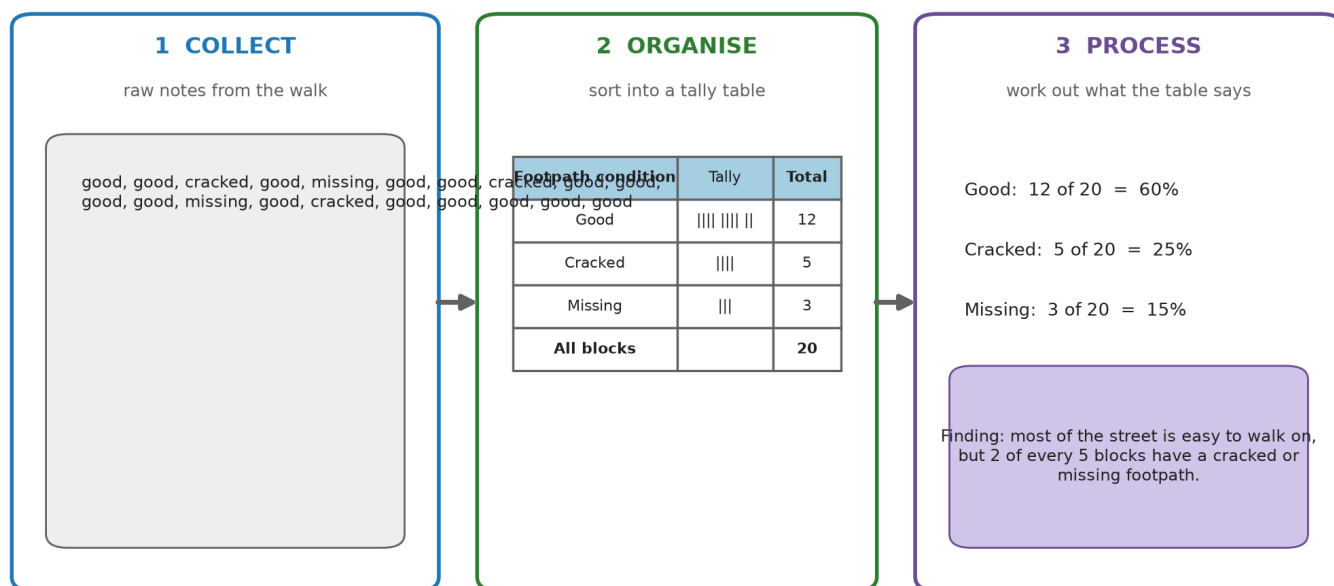
The two kinds are organised in different ways. Numbers go into tables, totals, percents and graphs. Words and images get grouped into **themes** — safety, appearance, noise — so that five people's remarks stop being five separate remarks and become one pattern. Most fieldwork questions need both kinds: the numbers say how much, the words say what it is like.

The three moves: collect, organise, process

The three verbs of stage 2 are a pipeline, and each has a distinct job (Figure 6).

- **Collect** is gathering the raw material: the notes, tallies, photos and survey answers as they come in. Raw notes are allowed to be messy.
- **Organise** is sorting the raw material so it can be seen: tallies into a table, photos into a log with locations, survey answers into a list or table.
- **Process** is working out what the organised data says: totals, percents, means, and the grouped themes — and then a finding sentence.

From raw notes to a finding: collect, organise, process



Model class data for teaching; the same three steps apply to any fieldwork in this book (VC2HG8502).

Three linked panels. Collect shows raw notes of footpath conditions written as they were observed on a walk. Organise shows the same notes sorted into a tally table: good 12, cracked 5, missing 3, all blocks 20. Process shows the worked percents (60%, 25%, 15%) and a finding: most of the street is easy to walk on, but 2 of every 5 blocks have a cracked or missing footpath.

A common mistake is stopping at organise. A table is not a finding. Processing is the step that turns “12, 5, 3” into “2 of every 5 blocks have a cracked or missing footpath” — and that sentence is what a question can be answered with.

Before any of the three moves happens in the field, the plan gets written down, and the whole pipeline fits on one page (Figure 10). Each row is a decision: which methods, what each will collect, which digital tools help, how the data will be organised, and what the reliability check will be.

Collection plan (model)

Every row is a decision. Copy this shape and fill each row for your own question from 5A.

My question	Is our street safe and easy to walk on?
Methods I will use	observation walk; photo study; short survey
What I will collect	quantitative: footpath and crossing counts; survey scores. qualitative: photos, notes on how the street feels.
Digital tools	phone camera with location pin; tally app; online survey form
How I will organise it	tally table for counts; photo log; survey scores in a table
My reliability check	compare my counts with ABS Census data for my area; check each source with the relevance and reliability questions

Model plan for teaching; it reuses the local liveability fieldwork of section 2F (VC2HG8S02.E01).

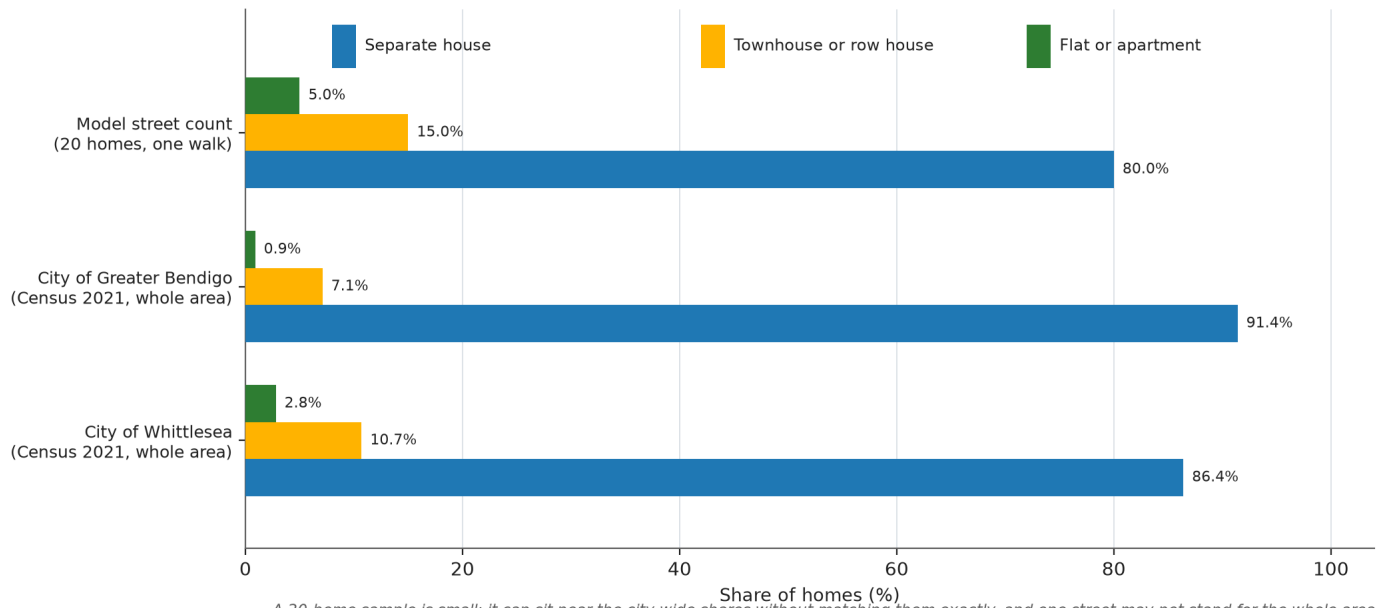
A model collection plan of six rows, each filled in for a walking question: my question; methods I will use; what I will collect; digital tools; how I will organise it; my reliability check. The reliability check row says compare my counts with ABS Census data for my area and check each source with the relevance and reliability questions.

Checking reliability

Reliability is whether a source or a data set can be trusted. The curriculum's own example of a reliability check is to compare your fieldwork results with Australian Bureau of Statistics (ABS) Census data — the Census being the official count of every person and home in Australia, run every five years (most recently 2021).

Figure 7 shows that check in action. A class counted home types along one street: 16 separate houses, 3 townhouses or row houses and 1 flat in 20 homes (80%, 15%, 5%). The ABS Census 2021 says that across the whole City of Greater Bendigo the shares are 91.4% separate houses, 7.1% townhouses or row houses and 0.9% flats or apartments; across the City of Whittlesea, a fast-growing outer-Melbourne area, they are 86.4%, 10.7% and 2.8%.

Checking a street count against the Census: home types in one street and in two Victorian local government areas



Source: ABS, Census of Population and Housing 2021, QuickStats for the City of Greater Bendigo and the City of Whittlesea (retrieved 25 August 2026). Street count is model class data.

A grouped bar chart comparing home types in three sources: a model street count of 20 homes (80% separate house, 15% townhouse or row house, 5% flat or apartment), the City of Greater Bendigo in the ABS 2021 Census (91.4%, 7.1%, 0.9%), and the City of Whittlesea in the ABS 2021 Census (86.4%, 10.7%, 2.8%). A note says a 20-home sample is small: it can sit near the city-wide shares without matching them exactly, and one street may not stand for the whole area.

Three things to notice. First, the street count sits *near* the Census shares without matching them exactly — that is what small samples do, and saying so is part of an honest reliability statement. Second, the two Census areas differ from each other (Whittlesea has more townhouses and flats than Bendigo), so you must compare your street with **your own area's** Census figures, not anyone else's. Third, the Census itself is a strong source to check against: its author is Australia's official statistics agency, it counts rather than guesses, and it is dated.

Finding secondary sources: search smarter

Secondary research means finding what other people have already gathered. A plain keyword search returns thousands of pages; **advanced search functions** cut that to the pages you actually need (Figure 8). The two worked examples in Figure 8 use `intitle:` to force a word into the page's title — try both strings and notice how much narrower the results are.

Search smarter: advanced search functions

Tool	What it does	Example
"..." quote marks	search an exact phrase	"water scarcity in Australia"
intitle:	word must appear in the page title	intitle:Australian views on water shortages
site:	search one website only	site:abs.gov.au census 2021
- minus	leave a word out	liveable city Australia -property
filetype:	one kind of file only	filetype:pdf water plan Victoria

Two worked search strings (the book's own, after VC2HG8S02.E03)

`intitle:Australian views on water shortages`

`intitle:Australia's liveability rankings`

The search functions shown are standard advanced-search tools of major search engines; the two worked strings are the book's own, after VC2HG8S02.E03.

A table of advanced search tools: quote marks search an exact phrase; intitle: makes a word appear in the page title; site: searches one website only; a minus sign leaves a word out; filetype: returns one kind of file only. A box below shows two worked search strings (the book's own): intitle:Australian views on water shortages, and intitle:Australia's liveability rankings.

site: is the workhorse for reliability. Searching site:abs.gov.au or site:bom.gov.au keeps you inside official data agencies while you look, which is a reliability filter built into the search itself.

Judging what you find: relevance and reliability

Every source you might cite gets judged twice (Figure 9).

- **Relevance:** does it answer your exact question, about your place, at your scale, and is it up to date? A worked example question is "Does this source match what people currently think about urbanisation?" — a 1990s page about cities may be well made and still useless for a question about today.
- **Reliability:** who is the author, are they an expert in this field, do they reference data or other experts, who published it, and can you check its key facts against another source?

Judge every source twice: relevance and reliability

RELEVANT does it fit my question?	RELIABLE can I trust it?
Does it answer my exact question?	Who is the author? Are they an expert in this field?
Is it about my place and my scale?	Does the author reference data or other experts?
Is it up to date — does it reflect current thinking?	Who published it?
Can I check its key facts against another source?	Can I check its key facts against another source?
Worked example: <i>"Does this source match what people currently think about urbanisation?" (after VC2HG8S02.E04)</i>	Worked example: <i>"Who is the author? Are they an expert in this field? Do they cite other experts?" (after VC2HG8S02.E04)</i>

A source can pass one test and fail the other. An old atlas is reliable but not relevant to a question about today. A fresh online post about your suburb may be relevant but not reliable. Check both before you cite it.

Checklist built from VC2HG8S02.E04; the two example questions are the book's own.

Two panels of checklist questions. Relevant: does it answer my exact question; is it about my place and my scale; is it up to date, does it reflect current thinking, with the urbanisation worked example. Reliable: who is the author and are they an expert in this field; does the author reference data or other experts; who published it; can I check its key facts against another source, with the author worked example. A bottom line says a source can pass one test and fail the other, so check both before you cite it.

A source can pass one test and fail the other, which is why both checks are run every time. An old atlas is reliable but not relevant to a question about today. A fresh online post about your own suburb is highly relevant but may be nobody's evidence at all.

Worked example 1 — a liveability walk: collect, organise, process

The class focus question (from 5A) is **"Is our street safe and easy to walk on?"** The site is a 400-metre stretch of the shopping street near school — the same local site the 2F liveability investigation uses. Every step below is a decision from Figure 3 and a record from Figure 4.

Step 1 — Collect. Two students walk the stretch once, sheet in hand, on a dry Tuesday at 10 am (the header row says so, which matters). They split the footpath into 20 blocks of about 20 metres and record each block's condition; they count crossings, shade trees, bins and bus stops; they photograph three things and note where the location pin puts each one; they sketch the busiest corner with labels; and they ask ten shoppers one survey question, "How safe do you feel walking here?", scored 1 to 5. The raw results:

Record	Raw result
Footpath blocks (20)	12 good, 5 cracked, 3 missing
Crossings	2
Shade trees	9
Bins	3
Bus stops	1
Cars parked on the footpath	4
Photos	P1 cracked footpath outside shop 12; P2 missing

Record	Raw result
	footpath at the corner; P3 wide good footpath at the bus stop
Sketch	the busiest corner, with the crossing, the bus stop and the pinch point where the footpath narrows labelled
Survey scores (10)	2, 3, 3, 3, 4, 2, 4, 3, 2, 4

Step 2 — Organise. The block conditions go into a tally table (Figure 6): good 12, cracked 5, missing 3, total 20. The photos go into the log with their location pins. The survey scores go into a list, sorted: 2, 2, 2, 2, 3, 3, 3, 3, 4, 4.

Step 3 — Process. Percents for the footpath: good 12 of 20 = 60%; cracked 5 of 20 = 25%; missing 3 of 20 = 15%. The survey mean: the scores add to 30, and $30 \div 10 = 3.0$ out of 5. The qualitative side gets themes: the photos and sketch group under “pinch points” (the cracked and missing blocks sit at the corner where most people cross) and “shade” (the nine trees are all in the northern half).

Step 4 — A finding sentence. “Most of the street is easy to walk on, but 2 of every 5 blocks have a cracked or missing footpath, and the damage is worst at the corner where most people cross; walkers rate the street 3.0 out of 5 for safety.” That sentence — numbers, place, and people’s own words together — is what stage 2 produces. Stage 3 (5C) will turn it into maps and graphs; stage 4 (5D) will interpret it.

Worked example 2 — checking a count against the Census, then judging a source

The same class counted home types on a second walk, this time on a street of 20 homes: 16 separate houses, 3 townhouses or row houses, 1 flat.

Step 1 — Process the count. 16 of 20 = 80% separate houses; 3 of 20 = 15% townhouses or row houses; 1 of 20 = 5% flats.

Step 2 — Pull the Census for the same area. The school is in the City of Greater Bendigo, so the right comparison is the ABS 2021 Census for that local government area: 91.4% separate houses, 7.1% townhouses or row houses, 0.9% flats or apartments (Figure 7).

Step 3 — Judge the match. The street’s 80% sits below the area’s 91.4%, and its 15% townhouse share sits above the area’s 7.1%. Is the count therefore wrong? Not necessarily. Twenty homes is a small sample, and this street is older and closer to the centre than the area as a whole — one street may not stand for 121,470 people’s worth of homes. The honest statement is: *our count is close to the Census pattern (mostly separate houses) but not identical, and with a 20-home sample that is expected.* Comparing with Whittlesea’s shares (86.4 / 10.7 / 2.8) shows the second half of the check: had the class compared its street with the wrong area’s Census, the “mismatch” would have meant nothing at all.

Step 4 — Judge a secondary source. For the follow-up claim “our town’s homes are changing”, two sources are on offer:

	Source A	Source B
What	ABS Census QuickStats page for the area, dated 2021	An unsigned social-media post: “everyone round here is building townhouses now”
Author	The ABS, Australia’s official statistics agency	No name given
References	Based on the Census count itself; the ABS cites its methods	None
Relevance	High — it is exactly the area and topic	High — it is about the same town
Reliability	High	Low — no author, no data, nothing to check

Source B is not worthless: a local resident's remark is a genuine observation, and it is a useful clue about what to go and count. Give it a fair hearing — the post may be reporting something real that the class can test on its next walk. But a clue is not evidence. The class cites Source A, notes its date, and puts Source B in the plan as a thing to test, not a thing to cite. That is the relevance–reliability check doing its job: both sources were given a fair look, and only one could be cited.

Practice tasks

Part A — with steps to follow

- Q1.** For the question “Is our shopping strip easy and safe to walk on?”, label each source primary or secondary, and quote the words that told you. (a) your own tally of crossings from a walk on Monday (b) the ABS 2021 Census page for your local government area (c) answers from a survey of 20 shoppers that your group ran (d) a news article about the strip published last year
- Q2.** Frame check. The news article from Q1(d) becomes a *primary* source for a different question. Write one question for which that article is primary evidence.
- Q3.** Match each thing you need to know with the best method from Figure 3, and name the digital tool you would add. (a) how many shade trees are on the strip (b) how shoppers feel about lighting after dark (c) the width of the footpath at the busiest corner (d) what the strip looked like ten years ago
- Q4.** Sort each statement as quantitative or qualitative. (a) “there are six bins on the strip” (b) “the strip feels friendly” (c) “the survey mean was 3.4” (d) “the painting on the shop wall makes the corner welcoming” (e) “it was 31 °C in the shade at noon”
- Q5.** Organise and process. A class recorded the state of eight bins on the strip: full, empty, full, full, empty, full, full, full. (a) Build the tally table (rows: full, empty; columns: tally, total). (b) Work out the percent of bins that were full. (c) Write one finding sentence the way Worked example 1 did.
- Q6.** A classmate says “our town is full of flats now” and shows you one photo of a new block of flats. Using the idea from Figure 7, explain (a) why one photo is not enough, and (b) which Census figure for your own local government area you would check, and where you would get it.
- Q7.** Build a search string for each job, using the tools in Figure 8. (a) pages whose title holds the phrase “water scarcity in Australia” (b) only pages from the ABS website about the 2021 Census (c) pages about liveable Australian cities, leaving property-sale pages out

Part B — on your own

- Q8.** Copy the plan shape from Figure 10 and fill every row for the focus question you wrote in 5A. Each row is a decision: methods, data kinds, tools, organisation, reliability check.
- Q9.** Run a 15-minute observation walk somewhere near your school or home with a Figure 4 sheet. Record at least three tally rows, two photo-log entries and the header row.
- Q10.** Process your Q9 tallies into percents and write one finding sentence. State one reason your count might differ from a count made on another day (use the header row).
- Q11.** Find two secondary sources for your 5A question. Judge each with both columns of Figure 9, and state which one you would cite and why the other fails.

Evidence-based response task

Use only the field notes below (model class data, collected with a Figure 4 sheet).

Corner of School Road and Second Street, Tuesday 9.00–9.15 am, dry, 11 °C. People who crossed at the lights: 14. People who crossed mid-block: 6. People with prams: 3. Wheelchair users: 2. People who waited through two light changes: 4. Notes: no ramp at the north corner; the button at the south corner is hard to press; two people had to step back from turning cars; shoppers said the crossing feels too short.

- (a) Organise the notes into one count table and one short list of qualitative notes. (b) Process the counts into one percent that answers “how often do people cross away from the lights?” (c) Group the qualitative notes into one or two named themes. (d) Name the two methods from Figure 3 that produced these notes. (e) Name one secondary source you would check this against, and ask it two questions from Figure 9. Write about half a page. You are marked on the three moves (collect, organise, process) and on the checks — not on your opinions.

Answers and model responses

Q1. (a) Primary — your own tally, gathered first-hand. (b) Secondary — the ABS gathered and published it. (c) Primary — your group ran the survey. (d) Secondary — journalists gathered and published it.

Q2. Model: “What were local news reports saying about the strip last year?” For that question the article is itself the thing being studied, so it is primary.

Q3. (a) Observation walk with a count table; tool: tally app or camera back-up. (b) Survey or interview; tool: online survey form or voice recorder. (c) Measurement with a tape or trundle wheel; tool: spreadsheet to store values. (d) Photo study of older images; tool: none needed, or a mapping app to pin where old photos were taken.

Q4. (a) Quantitative. (b) Qualitative. (c) Quantitative. (d) Qualitative. (e) Quantitative.

Q5. (a) Full: tally of 6, total 6; empty: tally of 2, total 2; all bins 8. (b) 6 of 8 = 75%. (c) Model: “Three of every four bins on the strip were full at the midday count, which suggests the bins may be too few or emptied too rarely.”

Q6. (a) One photo is one street at one moment; a 1-flat-in-20 lesson from Figure 7 applies — small samples and single streets do not stand for a whole area. (b) The dwelling-structure shares (separate house / townhouse / flat) for your own local government area, from ABS Census QuickStats; compare the year of the data with the claim too.

Q7. (a) `intitle:water scarcity in Australia`. (b) `site:abs.gov.au census 2021`. (c) `liveable city Australia -property`.

Q8–Q11. Check against the plan shape (Figure 10), the sheet (Figure 4) and the two-column check (Figure 9). A plan that names methods matched to its question, splits quantitative from qualitative data, says how each will be organised, and builds in a reliability check is working at the standard.

Evidence-based response task — model response. (a) Count table: crossed at the lights 14; crossed mid-block 6; people with prams 3; wheelchair users 2; waited through two light changes 4. Qualitative list: no ramp at the north corner; south button hard to press; two people stepped back from turning cars; “the crossing feels too short”. (b) 20 people crossed in all (14 + 6), so 6 of 20 = 30% crossed away from the lights. (c) Themes: *access* (no ramp, hard button, prams and wheelchairs) and *safety* (stepping back from cars, crossing feels too short). (d) Observation walk (fieldwork) for the counts and notes; short interviews for the shoppers’ remarks. (e) Check against the local council’s road-safety pages or the ABS Census journey-to-work data for the area; ask it: who is the author and are they an expert?, and is it up to date? A plan that organises first, processes second and checks third has run the pipeline the curriculum names.

Teaching sequence (teacher-facing)

1. **Hook (5 min):** Show Figure 6’s raw-notes panel only. Ask the class to find anything useful in it within 20 seconds, then reveal the tally table. Name the difference as *organising*.
2. **Sources (10 min):** Figure 2. Drill the role-not-label point with one swap: the council report under two questions. Quick check: Q1, Q2.
3. **Methods and the sheet (15 min):** Figure 3, then Figure 4 as the house record. Stress the header row as the seed of reliability language. Quick check: Q3.
4. **Data kinds (5 min):** Figure 5. Quick check: Q4.
5. **The pipeline (10 min):** Worked example 1 live, ending in the finding sentence; insist the sentence is the product. Quick check: Q5, Q10.
6. **Reliability (15 min):** Worked example 2 with Figure 7; then the Source A / Source B table and the steelman rule (take B seriously as a clue, cite A). Quick check: Q6, Q11.
7. **Searching (10 min):** Figure 8; have students run the two worked strings and compare result counts with a plain search. Quick check: Q7.
8. **Fieldwork:** Q9–Q10 are the 2F/3C/3D fieldwork methodised here; run them at your local site. The response task is the summative check of VC2HG8S02 — mark the three moves and the two checks separately, two-point judgement per element, not a holistic grade.

Elaboration coverage: E01 (methods table, sheet, photo log and sketch), E02 (quantitative/qualitative, the Census reliability check in Worked example 2), E03 (Figure 8 and Q7; the two search strings are the book’s own), E04

(Figure 9 and the Source A/B judgement). Differentiation: provide the Figure 4 sheet printed for students who need it; withdraw it for Part B. No First Nations content is included in this section.

Ways to show data: maps, graphs, tables and geospatial tools

Curriculum focus — Victorian Curriculum 2.0, Geography, Levels 7 and 8 band, strand *Geographical Skills*, sub-strand *Geographical inquiry*. This section owns content description VC2HG8S03. It draws on elaborations VC2HG8S03.E01 (maps, graphs, tables, diagrams and other forms, using BOLTSS), .E02 (combining ideas — surveys presented in tables and graphs, annotated diagrams of landform change; trimmed per TOC §2A), .E03 (maps at different scales following cartographic conventions, including the population distribution of Australia and China), .E04 (geospatial technologies, including choropleth maps of ABS Census data) and .E05 (ethical research methods; trimmed per TOC §2A). Working material is drawn from Chapters 1 to 4. Case examples: **Australia** and **China**.

In this section

Data never speaks for itself. A list of numbers, a set of survey answers or a page of field notes becomes useful only when someone represents it — shapes it into a map, a graph, a table or a diagram that other people can read. And the same data can tell very different stories depending on how it is shown.

In Chapter 5 you are working through the full cycle of geographical inquiry. In 5A you built your question. In 5B you collected, organised and processed your data. This section gives you the tools to show what you have found, and the rules that keep your work honest and clear. After this, 5D asks you to read and analyse representations like these and to draw conclusions from them.

In this section you will learn to:

- show information and data as maps, graphs, tables, diagrams and other forms, and put the six map conventions — Border, Orientation, Legend, Title, Scale, Source (BOLTSS) — in place when a map needs them (VC2HG8S03.E01)
- combine ideas by presenting survey results as a table or a graph, and by making annotated diagrams that show change over time (VC2HG8S03.E02)
- build maps at different scales following cartographic conventions, including maps that show where people live in Australia and China (VC2HG8S03.E03)
- use geospatial technologies to make statistical maps, including choropleth maps from Census data (VC2HG8S03.E04)
- apply ethical research methods when you collect and present data (VC2HG8S03.E05)

Key words to learn: represent, format, table, graph, bar graph, line graph, divided bar, annotated diagram, annotation, cartographic conventions, BOLTSS, scale, spatial distribution, choropleth map, geospatial technologies, GPS, GIS, remote sensing, model data, ethical research.

1. Match the format to the question

Every representation starts with a choice: which format fits my question? The six formats in this section cover almost everything you will need.

If your question is about...

A good format is...

where things are

a map

change over time

a line graph

comparing amounts

a bar graph

parts of a whole

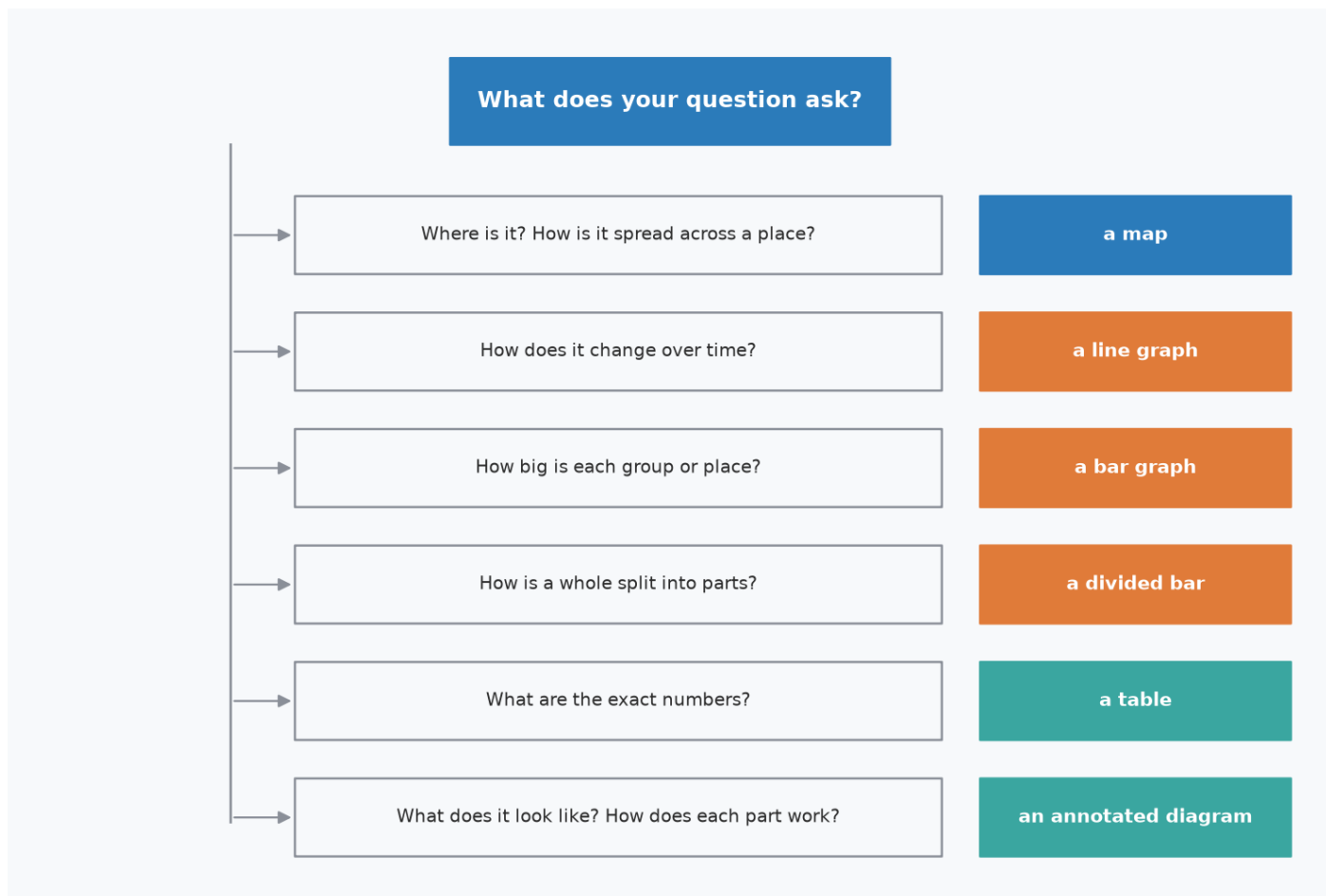
a divided bar

exact values

a table

what something looks like, how it works, or how it changes in one place

an annotated diagram

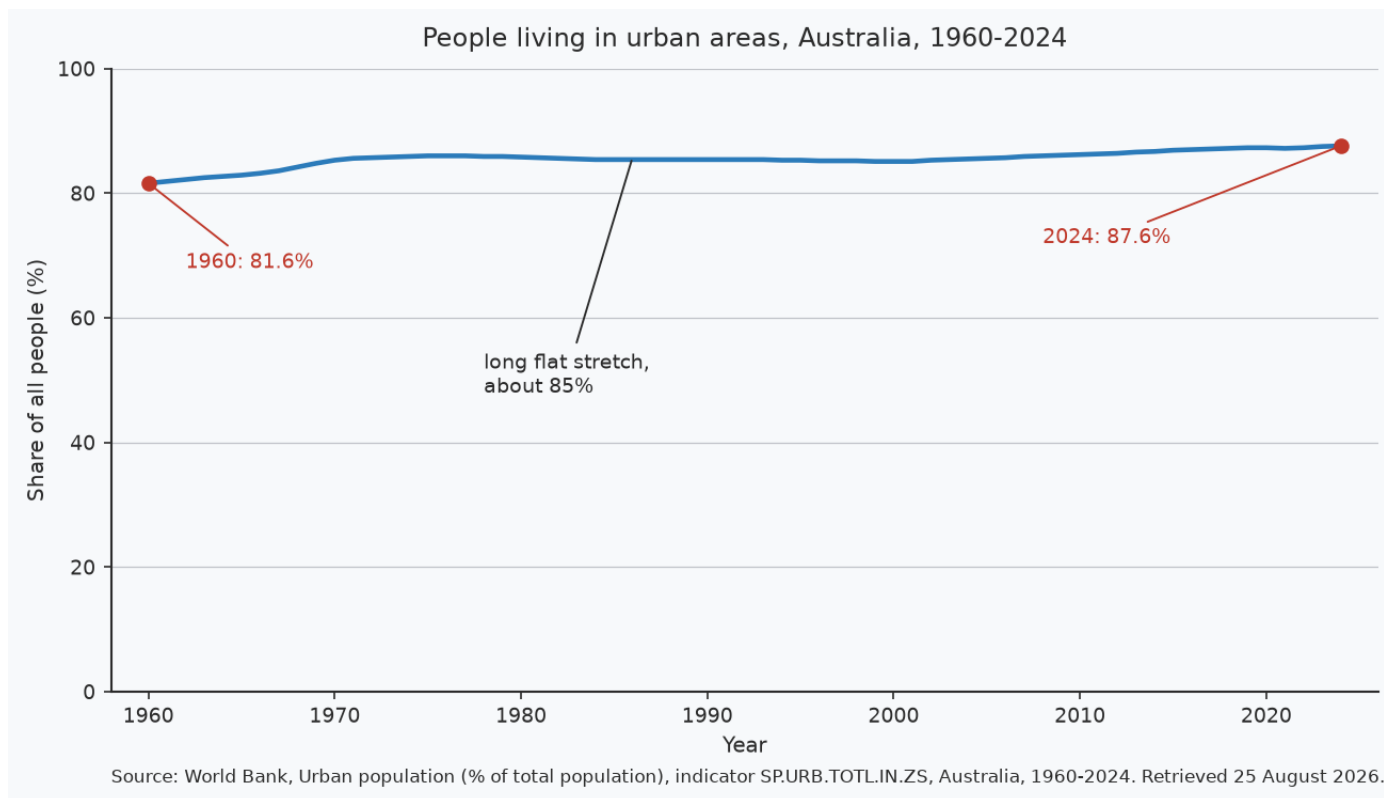


A decision chart with six rows. Each row matches a question to the best format: a map, a line graph, a bar graph, a divided bar, a table or an annotated diagram.

Model chart for practice — the same advice appears in the table above.

The same data can often be shown more than one way. That is a strength: you choose the view that answers your question best. Topic 6 shows what can go wrong when someone chooses a view to mislead instead of to show.

A worked example — one line, one story. The line graph below uses real World Bank data on the share of Australia’s people who live in urban areas, from 1960 to 2024.



A line graph of Australia's urban share from 1960 to 2024. The line starts at 81.6%, rises quickly to about 85%, stays in a long flat stretch for about thirty years, then climbs slowly to 87.6%. The number axis starts at zero.

Source: World Bank, Urban population (% of total population), indicator SP.URB.TOTL.IN.ZS, Australia, 1960–2024. Retrieved 25 August 2026.

Read the shape, not just the numbers:

- In 1960, 81.6% of Australians already lived in urban areas.
- The share rose quickly to about 85.7% by the early 1970s.
- Then came a long flat stretch of about thirty years at around 85%.
- Since the mid-2000s the share has climbed slowly, reaching 87.6% in 2024.

The shape is the story. Australia was already highly urban in the 1960s — Chapter 4's topic of urbanisation — and since then the change has been slow. A format that shows change over time (a line graph) suits this question far better than a table of 65 numbers would.

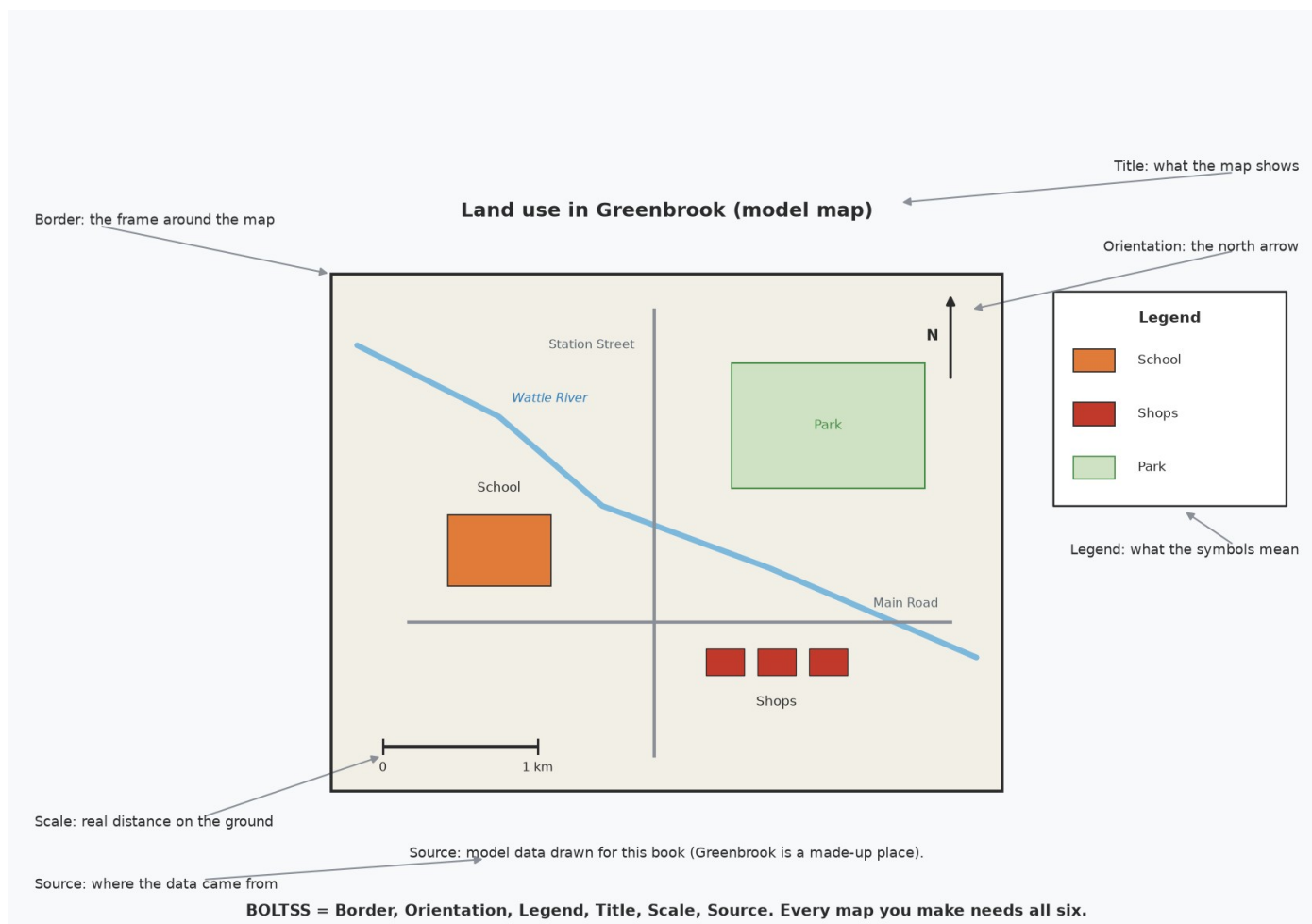
Notice the number axis starts at zero. If it started at 80, the small rise would look huge. Honest axes are the subject of topic 6.

2. BOLTSS — the six conventions every map needs

Maps are read by strangers — people who were not there when you made the map and cannot ask you what it means. Cartographic conventions are the agreed rules that make any map readable by anyone. For every map you make in this course, the rules fit into one word: **BOLTSS** — Border, Orientation, Legend, Title, Scale, Source.

- **B — Border.** A neat line around the map that holds everything in and marks where the map ends.
- **O — Orientation.** A north arrow showing which way north lies, so the reader can turn the map to face the right way.
- **L — Legend.** The key that explains every symbol and colour you used. If it is not in the legend, do not put it on the map.

- **T — Title.** Tells the reader what the map shows — and usually where and when.
- **S — Scale.** The link between distance on the map and distance on the ground. A scale bar (for example, one marked “about 1000 km”) is the simplest form.
- **S — Source.** Where the information came from, and when you got it. A map without a source is a claim without evidence.



A model map of a made-up town called Greenbrook. Call-outs from the margins point to all six parts of BOLTSS on the map: border, orientation, legend, title, scale, source.

Model map of a fictional town, made for practice.

Greenbrook is made up so you can learn the parts without extra noise. Your own maps will use real places and real data — and still need all six parts.

3. Maps at different scales

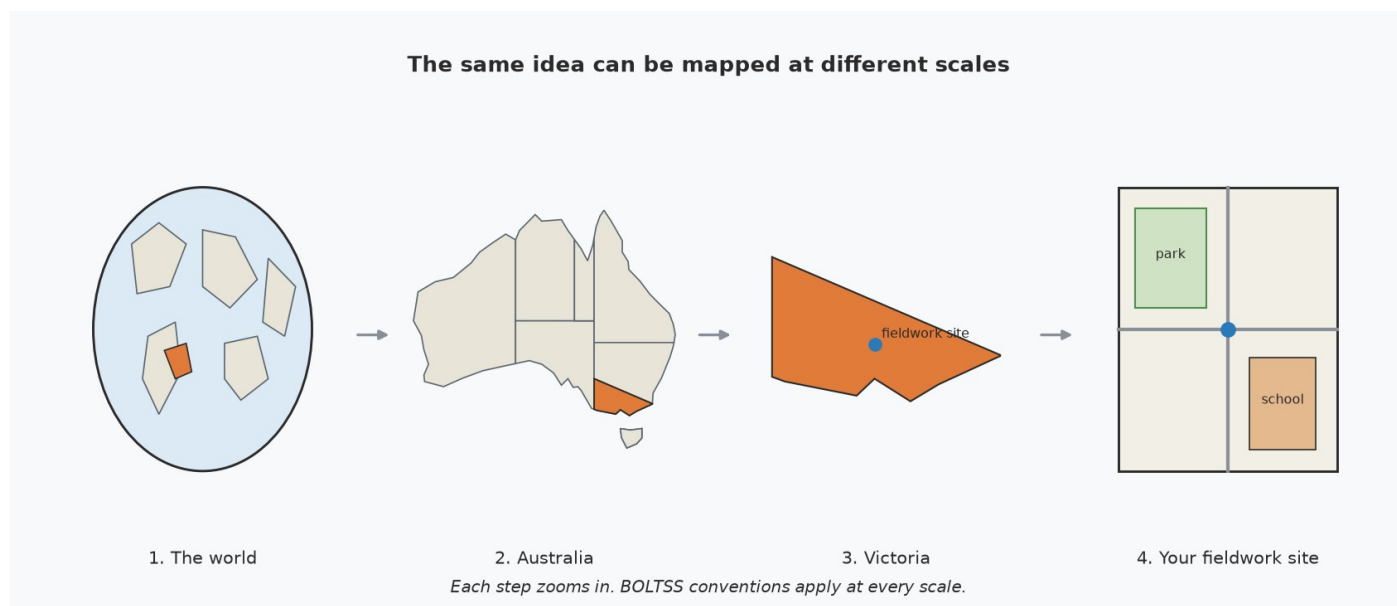
The word *scale* does two jobs in geography. In BOLTSS, scale is the link between map distance and ground distance. Scale also describes how much area a map covers — and that is the meaning in this topic.

Follow one place as the view zooms in:

1. **The whole world.** A globe shows every country, but can show almost no detail.
2. **Australia.** Now states, capital cities and the big empty interior come into view.
3. **Victoria.** Now there is room for regions, rivers and a fieldwork site marked with a dot.
4. **The site plan.** Now you can draw the paths, the trees and the oval. This is the scale of fieldwork.

Each step zooms in and adds detail. The globe cannot show a school oval, and the site plan cannot show a state. The scale you choose depends on your question: water across the whole of Australia (Chapter 1) needs a national map; the

shape of a local landform (Chapter 3) needs a site plan. And BOLTSS applies at every scale — a site plan still needs a border, a north arrow, a legend, a title, a scale and a source.



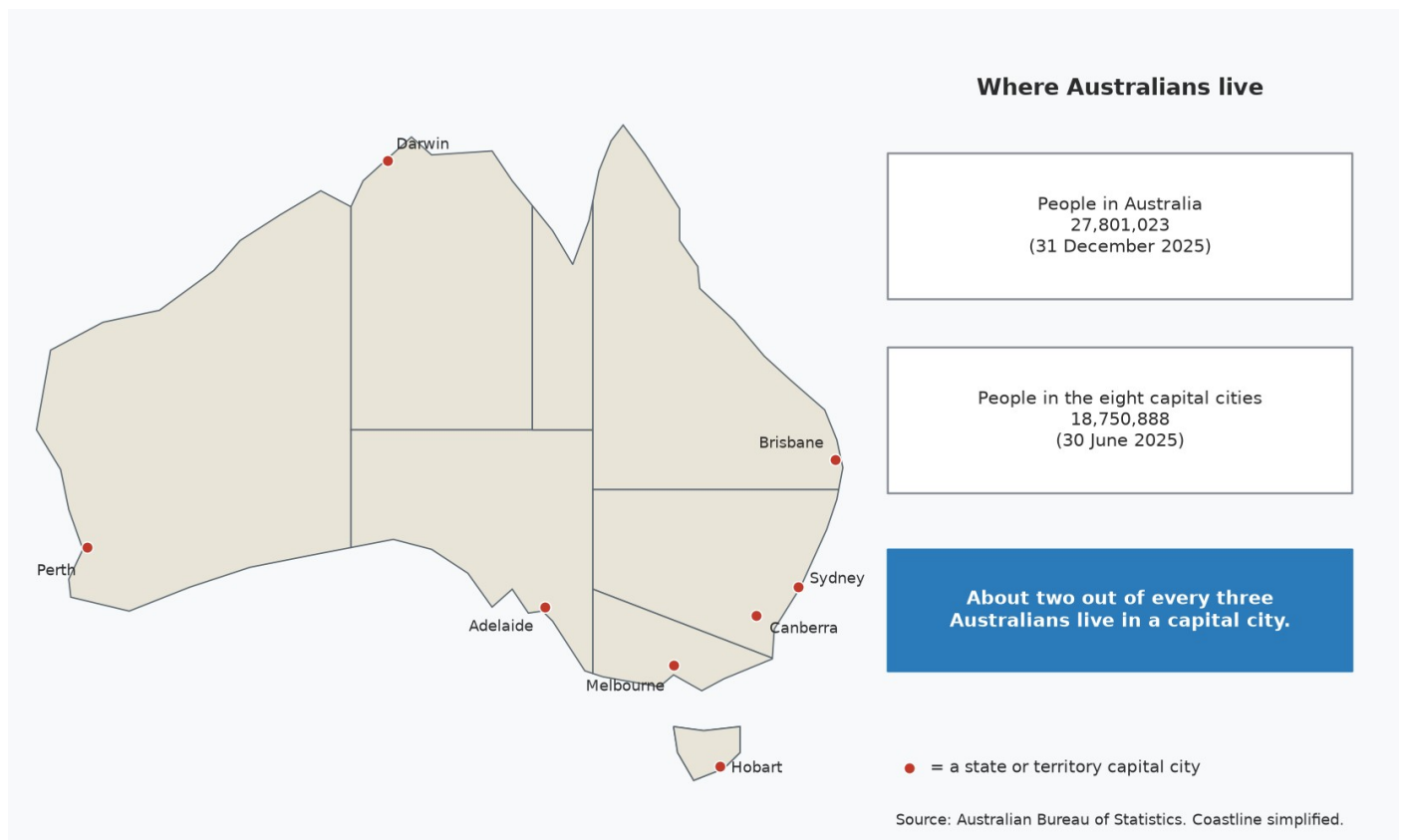
Four views of the same place at different scales: the globe, Australia, Victoria with a fieldwork site marked, and a site plan.

Model diagram for practice. The fieldwork site is a generic Victorian location.

Worked demonstration 1 — showing where people live: distribution maps of Australia and China

This worked demonstration builds two real maps and shows you how to describe them (VC2HG8S03.E03). The skill has two halves: read the map, then put the pattern into words.

Australia. The map below marks the eight state and territory capital cities and reports two real population figures.



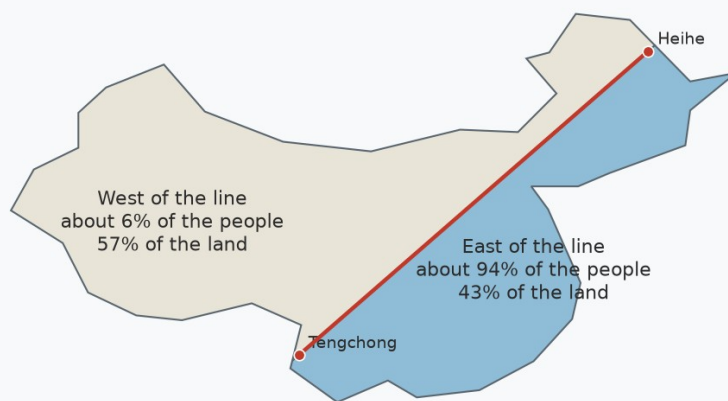
A map of Australia showing the eight capital cities as dots, with a panel reporting 27,801,023 people in Australia, 18,750,888 in the eight capital cities, and that about two out of every three Australians live in a capital city.

Source: Australian Bureau of Statistics — Australia's population 27,801,023 (31 December 2025) and the eight capital-city populations totalling 18,750,888 (30 June 2025). Coastline simplified. Retrieved 25 August 2026.

Read it in words: most Australians live in a handful of large cities near the coast, and about two out of every three live in a capital city. Very large areas of the interior have very few people.

China. China's population is split by a famous line drawn in 1935 by the geographer Hu Huanyong, from Heihe in the north-east to Tengchong in the south-west.

One line, two Chinas



In 1935 the geographer Hu Huanyong drew a line from Heihe to Tengchong. Almost all of China's people live east of it, on less than half of the land.

Compare with Australia: most people live near the coast, in the capital cities.

Source: population shares after Hu Huanyong (1935). Outline simplified.

A map of China split by a red line from Heihe to Tengchong. East of the line: about 94% of the people on 43% of the land. West of the line: about 6% of the people on 57% of the land.

Source: population shares after Hu Huanyong (1935). Outline simplified for teaching.

Read it in words: almost all of China's people live in the east, on less than half of the land. The west is much larger but holds only about 6 people in every 100.

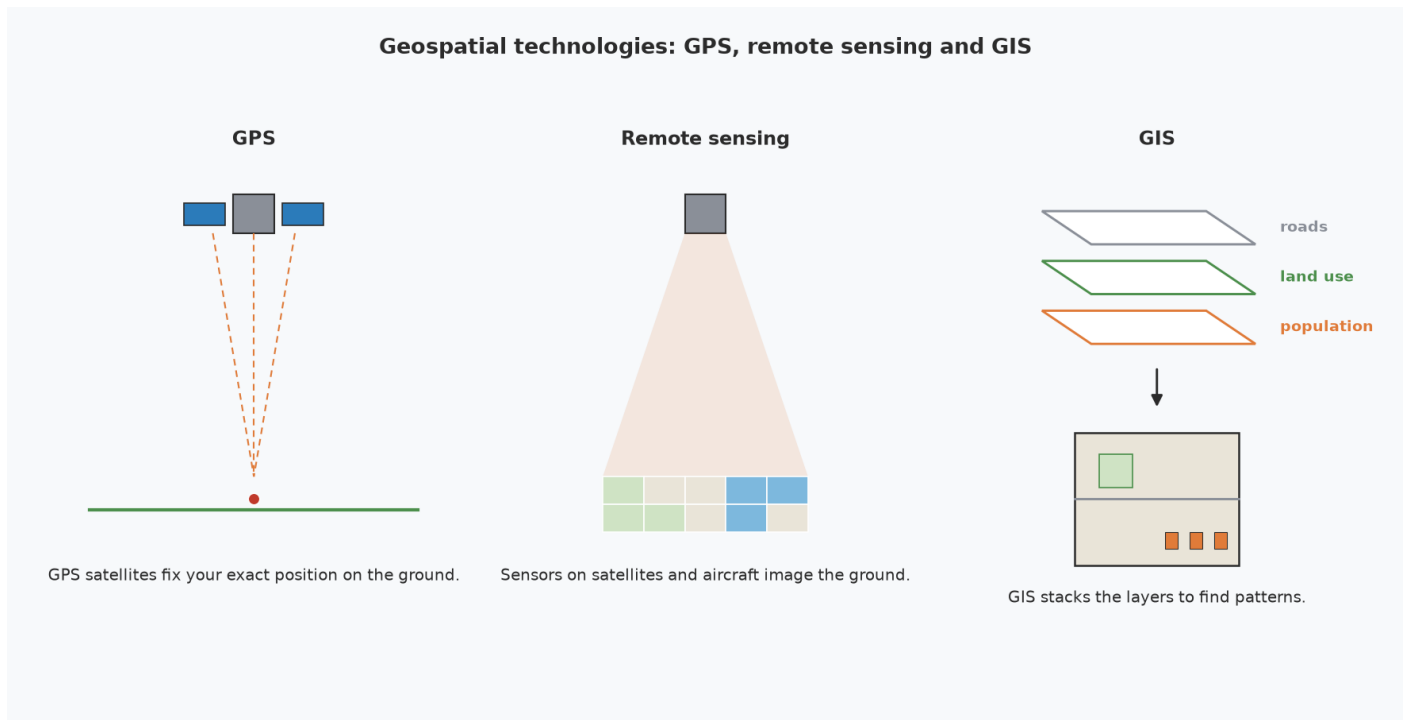
Words that describe distribution. Both descriptions follow the same pattern: *most / very few + where + how much*. Useful words: **clustered** (bunched together), **scattered** (spread out with gaps), **sparse** (very few), **dense** (crowded together), **along the coast, in the east**. One strong sentence beats three vague ones: "Most people in Australia live in capital cities near the coast, while very few live in the dry interior."

4. Geospatial technologies

Geospatial technologies are tools that capture, store, check and present data about places (VC2HG8S03.E04). Three matter most in this course:

- **GPS** (global positioning system) — a network of satellites that pins down a position on Earth. This is how a phone knows where you are, and how fieldworkers mark exactly where they stood.
- **Remote sensing** — scanning Earth's surface from above, with satellites or aircraft, to make images. Remote sensing can show things nobody on the ground could see, such as how far a flood has spread in one night.
- **GIS** (geographic information system) — a computer system that stacks layers of data about the same place — roads, land use, population — and combines them into one map. A GIS map can answer questions a paper map cannot, like "which suburbs are near both a river and a hospital?"

Geospatial technologies: GPS, remote sensing and GIS



Three panels explaining geospatial technologies: GPS satellites sending signals down to a receiver; remote sensing scanning the ground from above; and GIS stacking layers of roads, land use and population into one combined map.

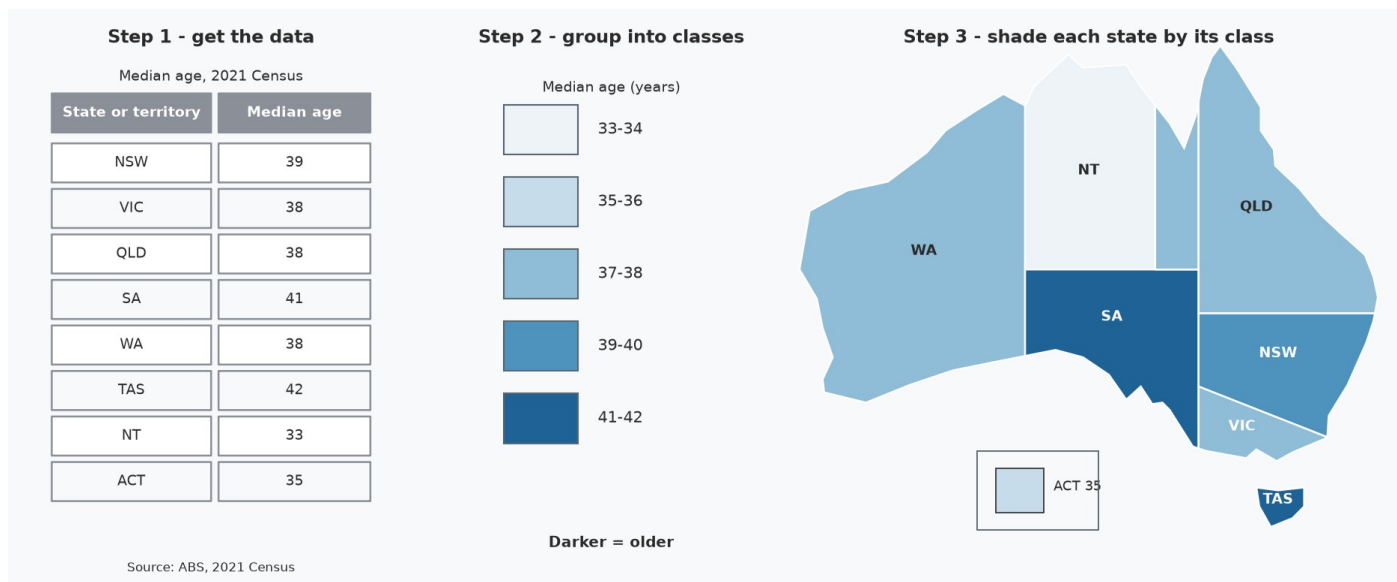
Model diagram for practice.

Honesty box — how the maps in this book were made. Every map in this book is built from scratch, by computer code, from cited data. Coastlines and borders are simplified teaching outlines. None of them is traced from another publisher's map. When you build maps with digital tools, the same rules bind you: know where your data came from, and say so on the map.

Worked demonstration 2 — building a choropleth map from Census data

A **choropleth map** shades whole areas — such as states or territories — according to a number for each area. Darker usually means more. Choropleth maps are made with geospatial technologies and are one of the best ways to show Census data (VC2HG8S03.E04).

Here is the whole build, in three steps, using real data from the ABS 2021 Census: the median age of people in each state and territory. The median is the middle value when all values are sorted — here the ages run from 33 (the youngest) to 42 (the oldest).

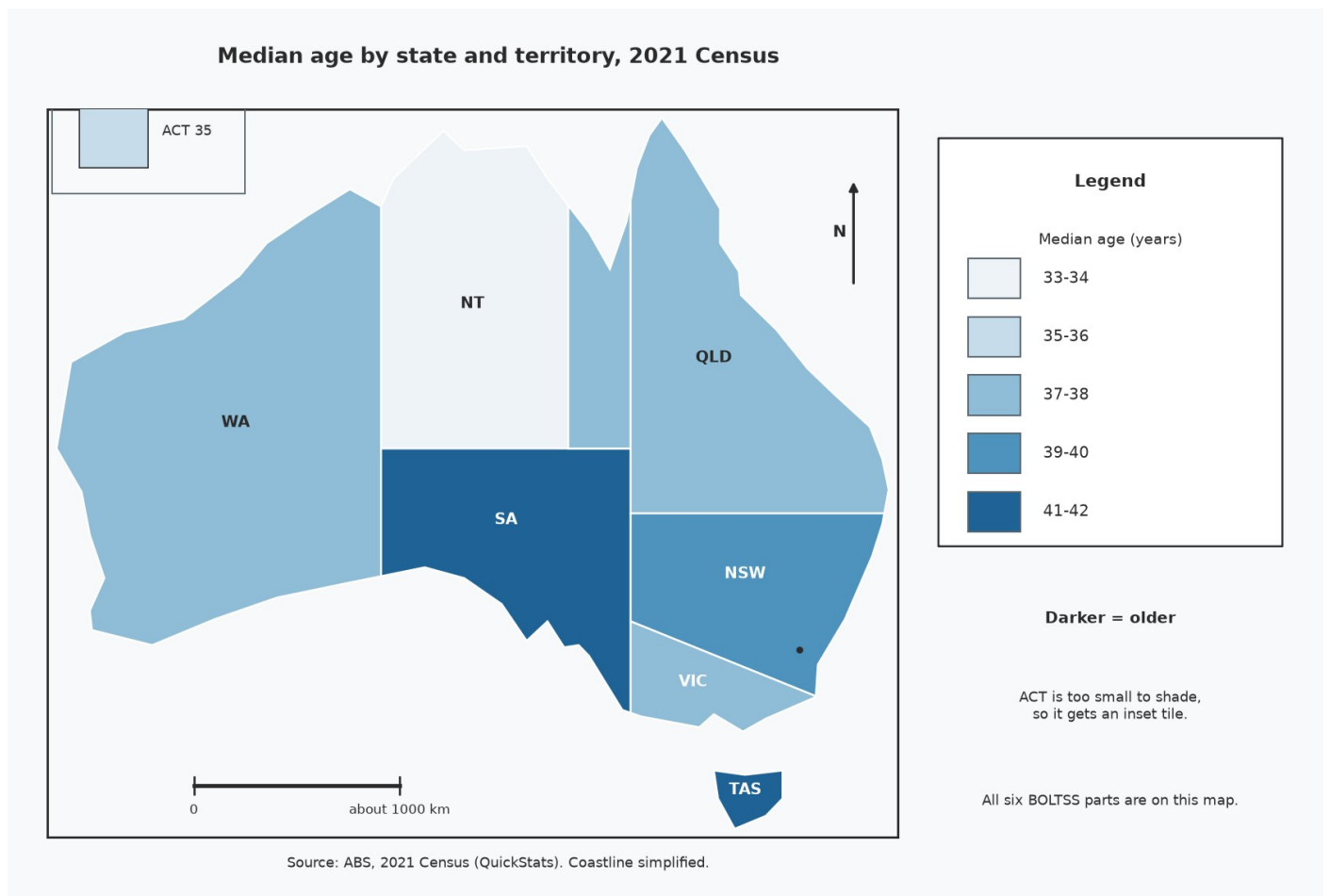


Three steps for building a choropleth map: step 1, a table of median ages for the eight states and territories; step 2, five colour classes from 33–34 to 41–42, darker meaning older; step 3, a map of Australia shaded by class, with the small ACT shown as an inset tile.

Source: Australian Bureau of Statistics, 2021 Census (QuickStats), median age by state and territory. Coastline simplified. Retrieved 25 August 2026.

- **Step 1 — get the data.** Median age for each state and territory, from the ABS 2021 Census.
- **Step 2 — group the values into classes.** Eight exact numbers are hard to see on a map, so we group them into five classes: 33–34, 35–36, 37–38, 39–40 and 41–42. Darker shades mean older.
- **Step 3 — shade each area by its class.** The ACT is far too small to shade at this scale, so it gets an inset tile instead.

Now check the finished map against BOLTSS — every part is there.



A completed choropleth map titled 'Median age by state and territory, 2021 Census', with a border, a north arrow, a legend of five colour classes, a title, a scale bar and a source line. Tasmania is the darkest shade; the Northern Territory the lightest.

Source: Australian Bureau of Statistics, 2021 Census (QuickStats), median age by state and territory. Coastline simplified. Retrieved 25 August 2026.

What does the map say? Tasmania has the oldest median age (42) and the Northern Territory the youngest (33). The southern states are shaded darker than the north. Why might that be? Do not guess from the map alone — Chapter 2 (liveability) and Chapter 4 (migration and changing nations) are where you would go looking for evidence.

5. Combining ideas: surveys and annotated diagrams

Sometimes one format is not enough, and the job is to combine ideas (VC2HG8S03.E02). Two formats do this work especially well: survey results as a table or a graph, and annotated diagrams that show change over time.

From survey to table to graph. A survey is a set of questions asked to a group of people to find out what they think or do. The figure below shows one liveability survey question (liveability means how good a place is to live in — see Chapter 2) answered by 24 students, drawn two ways.

Model liveability survey: 24 students, one answer each

As a table

Which ONE thing would most improve liveability in our neighbourhood?

Answer	Students	Share
More frequent buses	9	about 38%
Safer crossings near school	7	about 29%
More shade trees and parks	5	about 21%
A youth centre	3	about 13%
Total	24	100%

As a bar graph



Number of students

Model data for practice - not a real survey. Shares are rounded.

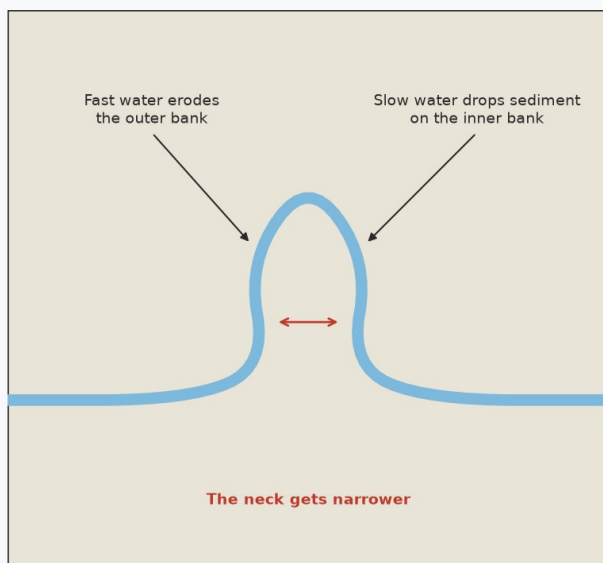
A model liveability survey drawn two ways: as a table with answers, counts and shares, and as a bar graph. Both show the same 24 student answers.

Model data for practice — not a real survey. Shares are rounded.

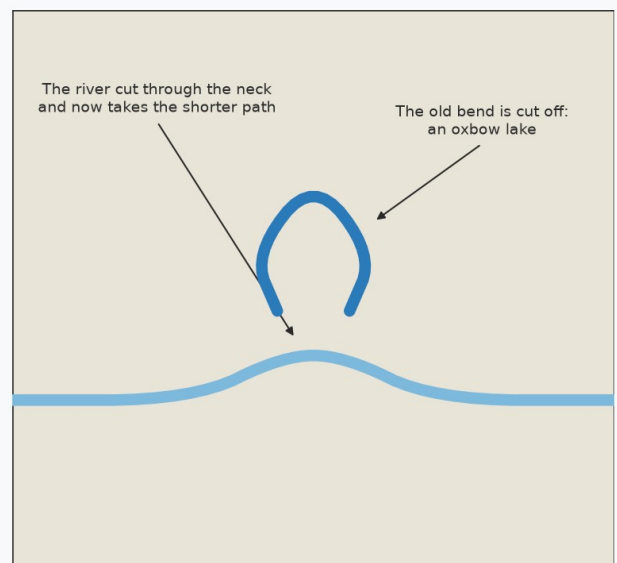
Both views show exactly the same data. The table gives exact values and shares; the bar graph makes the order of the answers obvious at a glance. Choosing between them is the skill of topic 1. When you run a survey of your own (practice question 8), these are your formats — and the rules of topic 6 bind you.

Annotated diagrams. An annotated diagram is a diagram with annotations — labels that say what is happening and why, not just what is there. They are the best format for showing a process in one place over time. The example below shows how a river meander can become an oxbow lake — a river landform you met in Chapter 3.

How a meander can become an oxbow lake (model, top-down view)



Earlier: a looping meander



Later: cutoff and oxbow lake

Model diagram: stages of change over time, not one real river.

Two annotated diagrams showing how a meander can become an oxbow lake. Left: earlier, a looping meander, with labels showing fast water eroding the outer bank and slow water dropping sediment on the inner bank. Right: later, the river cutting through the neck, with the old bend cut off as an oxbow lake.

Model diagram: stages of change over time, not one real river.

The annotations carry the science: fast water erodes the outer bank, slow water drops sediment on the inner bank, the neck gets narrower, the river cuts through, and the old bend is left behind as a lake. Picture plus labels does a job that words alone could not.

6. Representing honestly: ethical research methods

Ethical research methods are fair and honest ways of collecting and presenting data (VC2HG8S03.E05). Ethics is not an extra bolted onto the end of an inquiry — it shapes every step, from the first survey question to the last axis on your graph.

Look at what one small choice can do. The two graphs below show the same model data.



The same model data drawn two ways. Graph A starts the number axis at 10, so small differences look huge. Graph B starts the axis at zero and shows the honest picture. Below the graphs is a checklist of six ethical research practices.

Model data for practice.

Graph A makes a small change look dramatic by starting the axis at 10. Graph B starts at zero and shows the true picture. Same data, two different stories — and only one of them is honest.

The checklist for this section:

- Ask permission before surveying people.
- Record answers exactly as given.
- Never make up or change data.
- Keep people's names private.
- Name your source on every map, graph and table.
- Start number axes at zero, or say clearly why not.

Every representation in this book follows these rules. So should yours.

Practice — scaffolded

1. For each question below, choose the best format from the six in topic 1 and give one reason for your choice.

- - (a) How has Australia's urban share changed from 1960 to 2024? (Chapter 4)
- - (b) What is the exact median age of each state and territory?
- - (c) Where do Australia's people live?
- - (d) What share of students chose each liveability improvement in the model survey? (Chapter 2)
- - (e) How does a river meander change into an oxbow lake? (Chapter 3)

2. (a) List the six parts of BOLTSS and the job of each. (b) A classmate hands in a map with no north arrow, colours that are not explained, and no note about where the data came from. Name the three BOLTSS parts that are missing.

3. Use the completed choropleth map (figure in worked demonstration 2). (a) Which state or territory has the highest median age? (b) Which has the lowest? (c) Which colour class does WA belong to? (d) Write two sentences describing the pattern, using the words from worked demonstration 1.

4. Use the urban line graph in topic 1. (a) What was Australia's urban share in 1960? (b) What was it in 2024? (c) Between about which years does the line stay close to 85%? (d) In one sentence, what does the shape of the graph say about Australia?

5. Use the Australia population map in worked demonstration 1. Write three sentences describing Australia's population distribution. Use the words *coast*, *capital city* and *sparse* at least once each.

6. Use the four-scale figure in topic 3. (a) Put the four views in order from least detail to most detail. (b) Which view would you use to plan a fieldwork site, and why?

7. Use the ethics figure in topic 6. (a) Which graph is honest, and why? (b) What exactly makes the other graph misleading? (c) List three items from the ethical research checklist.

Practice — unscaffolded

8. The model liveability survey (figure in topic 5) asked 24 students to choose the one change that would most improve their neighbourhood. Without copying the figure, build a bar graph of the four results. Your graph must have a title, labelled axes, and a number axis starting at zero.

9. After a fieldwork visit to a local place — or by imagining one at any Victorian locality — draw a sketch map of the site from memory. Include all six parts of BOLTSS. Use the site-plan view in topic 3 as your guide for the level of detail.

10. In the choropleth map (worked demonstration 2), the ACT is shown as an inset tile instead of being shaded on the map. Explain why, and suggest one other fair way to show the ACT's value.

11. Choose one finding from Chapter 1 (water), Chapter 2 (liveability), Chapter 3 (landforms) or Chapter 4 (changing nations). Choose the format that would show it best, and give three reasons for your choice.

Extended response

12. A class survey asked 60 students at a Victorian secondary college how they travel to school. Each student gave one answer. (Model data for practice.)

Travel mode	Students
Walk	18
Bike	9
Bus	15
Car	12
Train	6

-
- (a) Build two representations of these data: a table with a share column (percentages), and a bar graph or divided bar. Give each a title. For the graph, label both axes and start the number axis at zero.
-
- (b) Describe the pattern in three sentences, using the words from worked demonstration 1.
-
- (c) Justify your choice of graph format: why does it suit these data?
-
- (d) If you ran this survey yourself, name two ethical research practices you would follow and explain why each one matters.

Marking guide

What the response shows	Marks
Two correct representations, with titles and (for the graph) labelled axes starting at zero	4
A clear three-sentence description using distribution words	2
Format choice justified with reasons	2
Two ethical research practices named and explained	2
Total	10

Teaching notes (for the teacher)

- **Curriculum coverage.** This section owns VC2HG8S03 and draws on elaborations .E01 (whole), .E02 (remainder only), .E03 (whole), .E04 (whole) and .E05 (remainder only). Elaborations .E02 and .E05 are trimmed per TOC §2A; the trimmed material is not taught in this section.
- **Place in Chapter 5.** This is the representation engine of the inquiry cycle: 5A questions, 5B collects, **5C represents**, 5D interprets and analyses. Working material is drawn from Chapters 1 to 4 (urbanisation data — Chapter 4; liveability surveys — Chapter 2; river landforms — Chapter 3; fieldwork scale — Chapters 1 and 3).
- **Data integrity.** Every map in this section is built from primitives by code in `src/gen_5c_fig*.py` from cited data, never traced from publisher maps (TOC decision D6). Real data: ABS 2021 Census median ages; ABS population figures; World Bank urban share series; Hu Huanyong population shares. Model data (labelled as such): Greenbrook, the liveability survey, the landform stages, the bottles graph, and the travel survey in question 12.
- **Maths ceiling.** Data work stays within VC2 Mathematics Levels 7 and 8 statistics: tables, percentages, median, and bar, line and divided-bar graphs. Nothing beyond that band is required or used.
- **Vocabulary.** BOLTSS, choropleth, geospatial, cartographic conventions and annotated diagram are curriculum words defined at first use. The student-facing text passes the vocabulary gate at ceiling rank 8 (`src/vocab_gate_5c.py`).
- **Fieldwork and surveys.** Question 9 works with any Victorian locality; no named site is required. If students run the liveability survey for question 8 with real respondents, use your school's permission processes and the ethics checklist in topic 6.

Sources and retrieval dates

- Australian Bureau of Statistics, *2021 Census QuickStats* — median age by state and territory (figures 5c_choropleth_steps, 5c_choropleth_age). Retrieved 25 August 2026.
 - Australian Bureau of Statistics — Australia's population 27,801,023 (31 December 2025) and the eight capital-city populations totalling 18,750,888 (30 June 2025) (figure 5c_aus_pop). Retrieved 25 August 2026.
 - World Bank, *World Development Indicators* — Urban population (% of total population), indicator SP.URB.TOTL.IN.ZS, Australia, 1960–2024 (figure 5c_urban_line). Retrieved 25 August 2026.
 - Hu Huanyong (1935), population line from Heihe to Tengchong; shares of about 94% of people on 43% of the land east of the line and 6% on 57% west (figure 5c_china_pop). Outline simplified for teaching.
 - All coastlines and borders in this section are simplified teaching outlines from this book's shared base geometry, constructed from primitives. They are not for navigation.
-

Glossary

- **annotation** — a label added to a diagram or map to explain what is shown.
- **annotated diagram** — a diagram with annotations that explain what is happening, not just what is there.
- **bar graph** — a graph that uses bars to compare amounts.
- **BOLTSS** — the six parts every map needs: Border, Orientation, Legend, Title, Scale, Source.
- **border** — a neat line drawn around a map to hold everything in.
- **cartographic conventions** — the agreed rules for making maps so that any reader can read any map; BOLTSS is the main set in this section.
- **choropleth map** — a map that shades whole areas according to a number for each area; darker usually means more.
- **divided bar** — one bar divided into parts, to show the parts of a whole.
- **ethical research methods** — fair and honest ways of collecting and presenting data.
- **format** — the form a representation takes: a map, graph, table or diagram.
- **geospatial technologies** — tools that capture, store, check and present data about places; the three in this section are GPS, remote sensing and GIS.
- **GIS** — a computer system that stacks layers of data about places and combines them into maps (short for geographic information system).
- **GPS** — a network of satellites that pins down a position on Earth (short for global positioning system).
- **legend** — the part of a map that explains every symbol and colour used.
- **line graph** — a graph that uses a line to show change over time.
- **liveability** — how good a place is to live in, and how easy life is there (see Chapter 2).
- **median** — the middle value when all values are sorted from smallest to largest.
- **model data** — data made for practice and labelled as such; not real results.
- **orientation** — the north arrow on a map, showing which way north lies.
- **remote sensing** — scanning Earth's surface from above, with satellites or aircraft, to make images.
- **represent (representation)** — to show data in a form other people can read, such as a map, graph, table or diagram.
- **scale** — the link between distance on a map and distance on the ground; also, how much area a map covers.
- **spatial distribution** — where something is, and whether it is clustered, scattered, sparse or dense.
- **survey** — a set of questions asked to a group of people to find out what they think or do.
- **table** — data arranged in rows and columns.

Making sense of data: comparisons, patterns, relationships and trends

Geography 8 · Chapter 5 — Doing geography: the inquiry toolkit · Section 5D

Curriculum focus: VC2HG8S04 (Victorian Curriculum F–10 Version 2.0, Geography, Levels 7 and 8, VCAA).

This section draws on **VC2HG8S04.E01–VC2HG8S04.E06** for question and coverage linking.

Elaborations drawn on:

- **VC2HG8S04.E01** — map interpretation and comparison, graphs, statistical methods (Figure 3, Figure 10)
- **VC2HG8S04.E02** — concept maps of fieldwork findings (Figure 4, Q6)
- **VC2HG8S04.E03** — comparing places: inner/outer suburbs, migration sources (Figures 5–6, Q3, Q8)
- **VC2HG8S04.E04** — explaining patterns and trends: climate series, compound urban graph (Figures 7–9, Q4, Q5, Q7)
- **VC2HG8S04.E05** — inferring relationships: surveys, controlled comparison (Figure 10, Q9)
- **VC2HG8S04.E06** — building a liveability index (Figure 11, Q10)

This section builds towards the achievement standard's data-interpretation sentence (Level 8).

Theory

The analytic engine of the inquiry cycle

In 5A you built questions. In 5B you collected, organised and processed data, including fieldwork. In 5C you represented it as maps, graphs and tables. This section is stage 4 of the inquiry cycle: you take data and make it mean something. Level 8 is the year the band's achievement standard is stated, so the work here is done at full depth: not just reading values off a graph, but explaining what they show and why.

Four moves do the work of this stage (Figure 1): **compare, find patterns, test relationships** and **explain trends**. Every task in this section is one of these four moves, aimed at real, sourced data.

Interpreting and analysing: the four moves

Every move starts the same way: look closely, describe what you see, then go further.

These four moves are this section's toolkit. Each one has a question you can aim at any data.

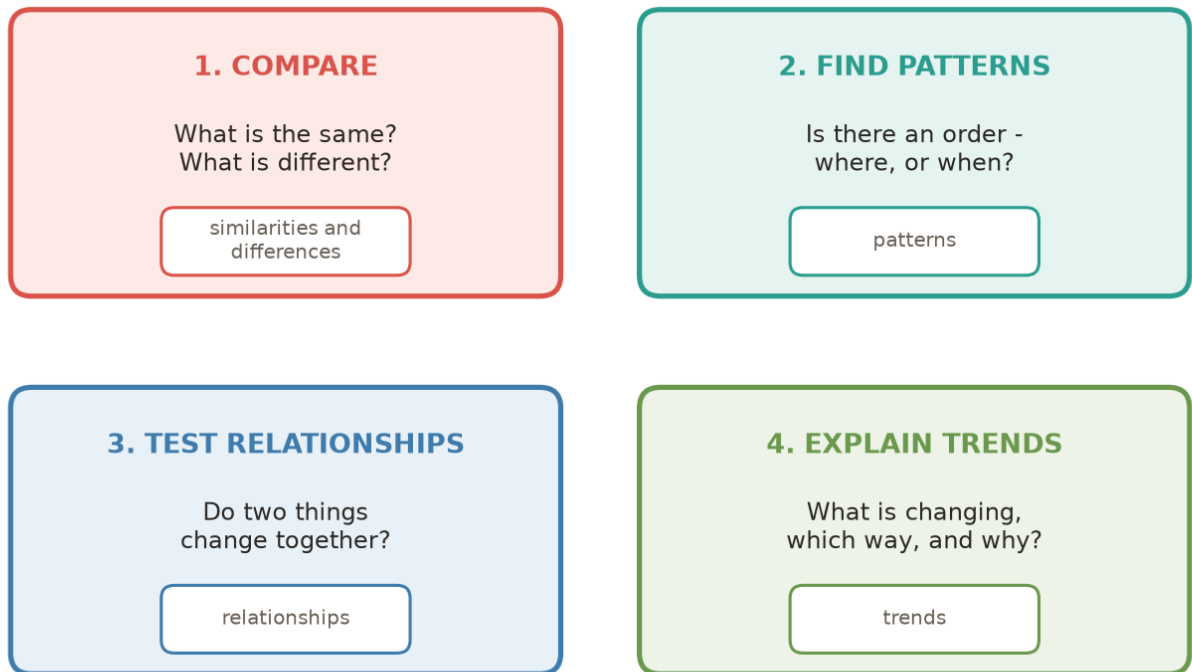


Figure 1 — The four moves of interpreting and analysing. Each one has a question you can aim at any data.

The working material, as in every Chapter 5 section, comes from Chapters 1–4 and from your own fieldwork: Census data (Ch 2 and 2E), migration (Ch 4), climate and hazard records (Ch 1), and data you collected yourself (5B, 2F).

Defining the terms first

pattern — the Victorian Curriculum uses the term *pattern* but does not define it. This section therefore treats it as: *an arrangement you can describe* — where things sit in space (a spatial pattern) or when they happen in time (a time pattern). “Most dots sit near the coast” describes a spatial pattern. “Shopper counts peak at lunchtime” describes a time pattern. Other meanings of the word exist and are not interchangeable with this one.

trend — the Victorian Curriculum uses the term *trend* but does not define it. This section therefore treats it as: *the overall direction of change over time* — rising, falling, or staying about level. A trend is not one single change; it is the direction you see when you stand back and look across many years.

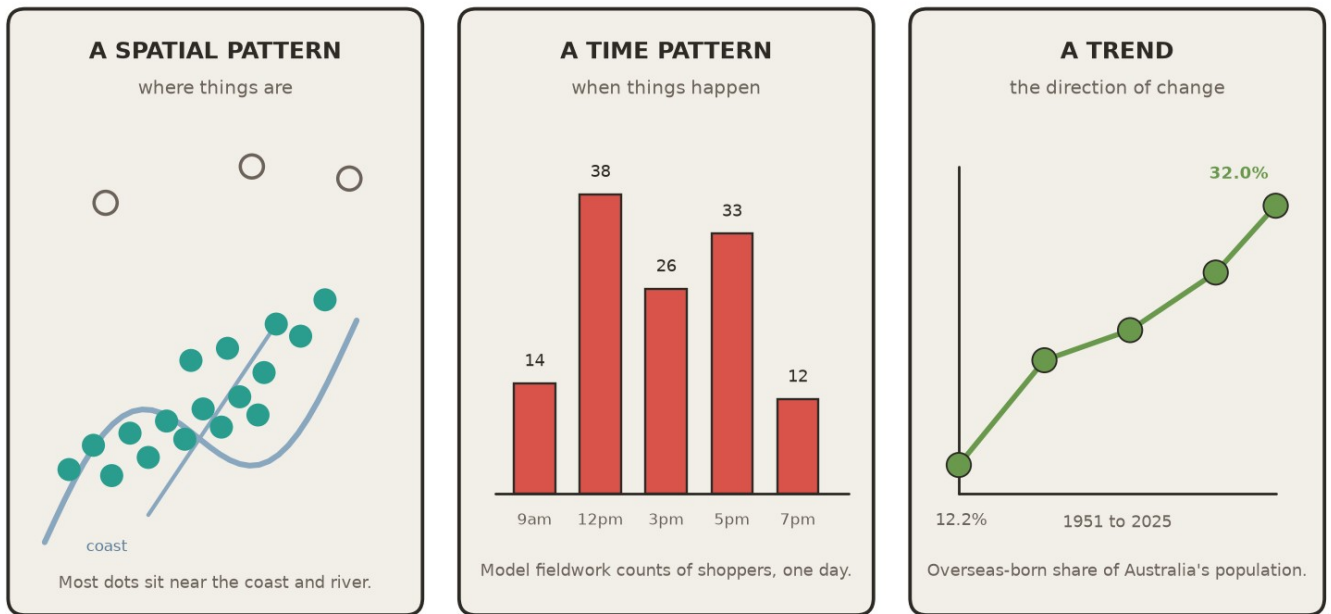
relationship — a link between two things, such that when one changes, the other tends to change too. A relationship is *inferred* — reasoned out from the data — never read straight off it. Two places can show a link without proving one.

index — one number built by combining several measures, after giving each measure a score and a weight. Section 2A met the idea; here you build one yourself.

Pattern and trend are different things. A pattern is an arrangement; a trend is a direction of change (Figure 2). Mixing them up is the most common mistake in this stage of the cycle, so this section keeps them separate from the start.

Pattern or trend? They are different things

A pattern is an arrangement you can describe. A trend is a direction of change.



Left and middle: arrangements in space and time. Right: a change with a direction - a trend.

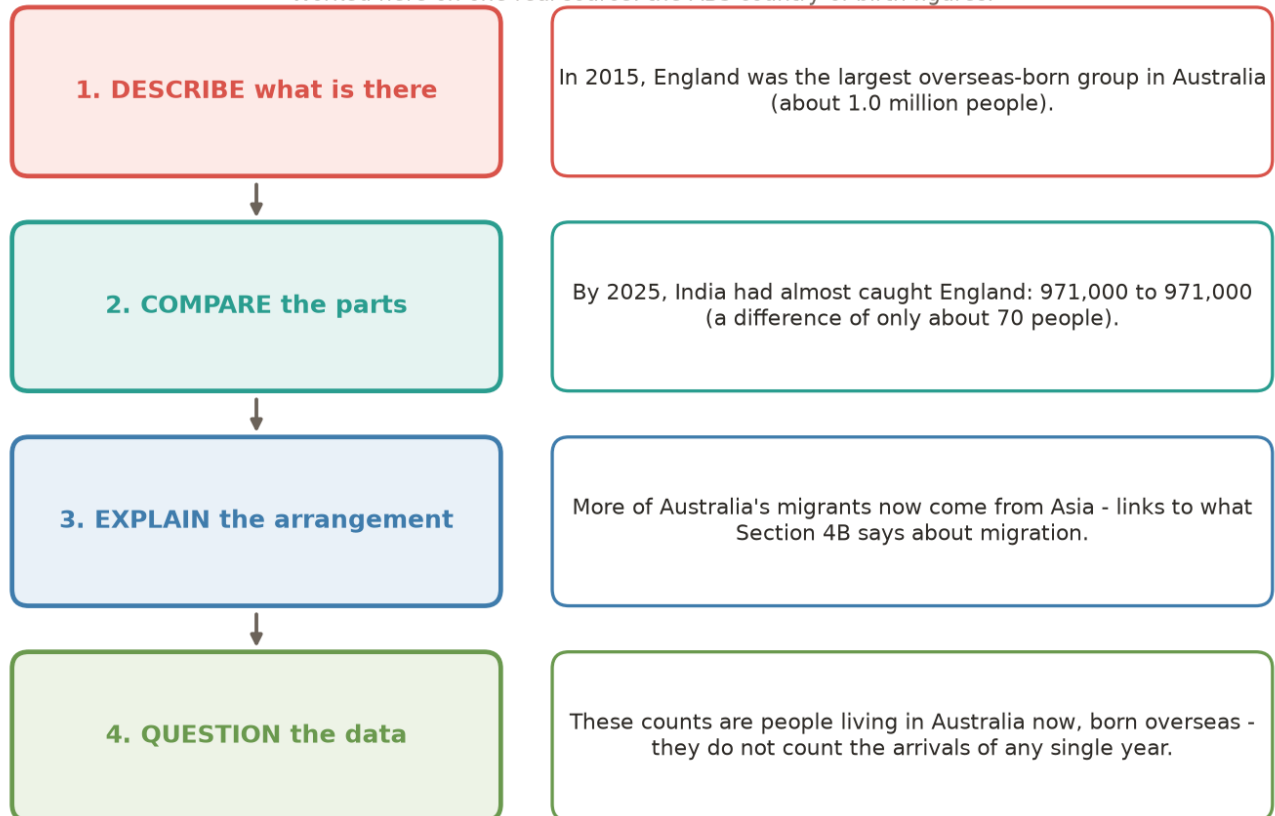
Source for the trend line: ABS, Australia's population by country of birth (retrieved 2026-08-25).

Figure 2 — Patterns are arrangements (in space or in time); a trend is a direction of change. The trend line uses real ABS data.

Every source gets the same four-step read. Maps, graphs, tables, images and survey results all submit to the same sequence (Figure 3): describe what is there, compare the parts, explain the arrangement, then question the data. The figure works the sequence on one real source, the ABS country-of-birth figures.

Reading any source: four steps down

Worked here on one real source: the ABS country-of-birth figures.



Use the same four steps on any map, graph, table, image or survey result.

Figure 3 — The four-step read, worked on a real ABS source. Step 4 is the one most people skip; do not skip it.

Concept maps make relationships visible (E02). A concept map is a set of boxes (the concepts or findings) joined by labelled arrows (the relationships). It is the best tool this section offers for turning fieldwork notes into thinking: once each arrow has to be labelled with a verb phrase — “was seen with”, “leads to”, “means” — you can no longer hide a weak link. Figure 4 is a model map built from a class survey of a local shopping strip, the same survey method taught in 5B and used in 2F.

A concept map of fieldwork findings

Model example: a class survey of a local shopping strip (sections 5B and 2F).

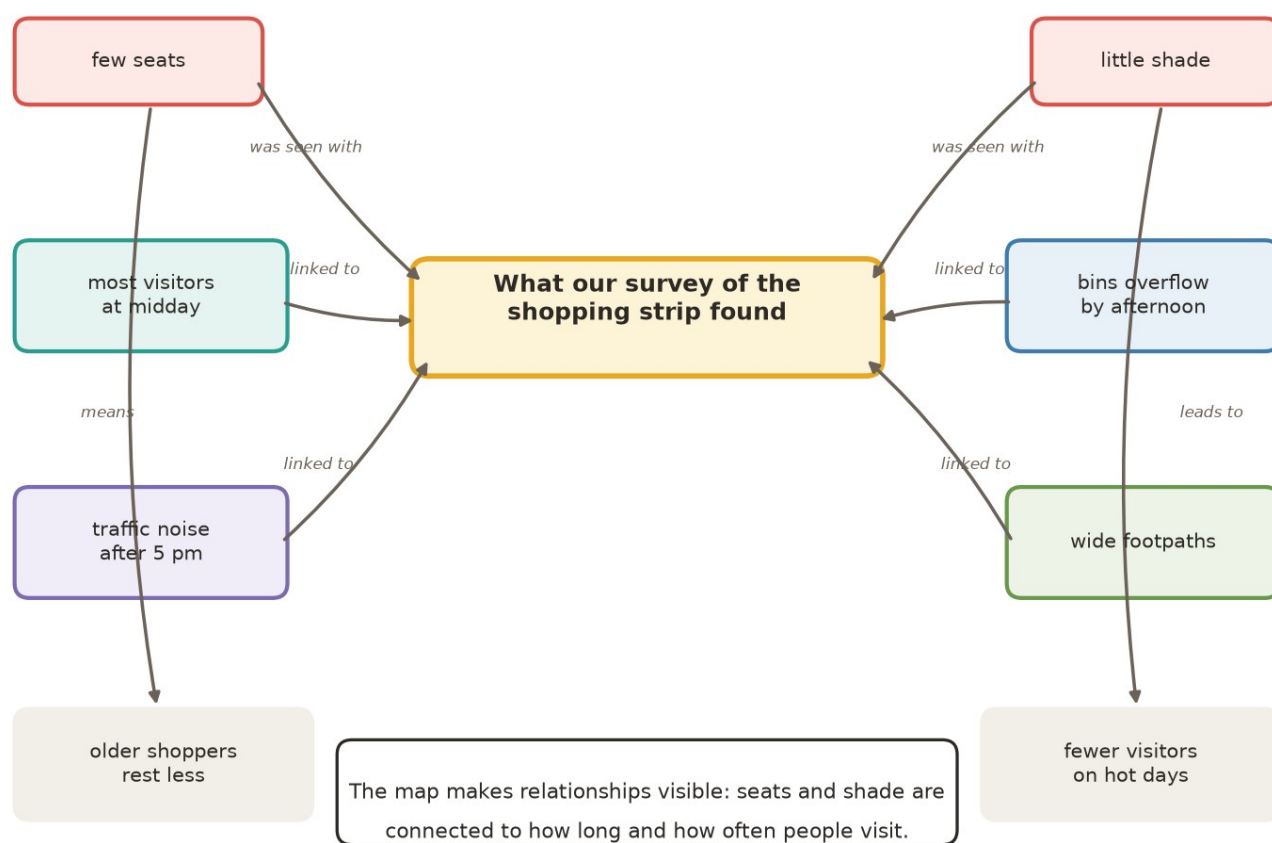


Figure 4 — A model concept map built from fieldwork survey findings (model data; the method is real).

Similarities and differences between places (E03). Comparing two places is the quickest way to turn data into meaning, because a number on its own tells you little. Figure 5 shows two stylised aerial views, drawn from primitives for this book (they are sketches, not photographs): an inner suburb and an outer suburb. The eye sees the difference in housing density at once. Figure 6 then compares real data: where Australia’s overseas-born residents were born in 2015 and in 2025.

Two suburbs, seen from above: inner and outer

Stylised sketches drawn from primitives - not real aerial images. Drawn to show density.

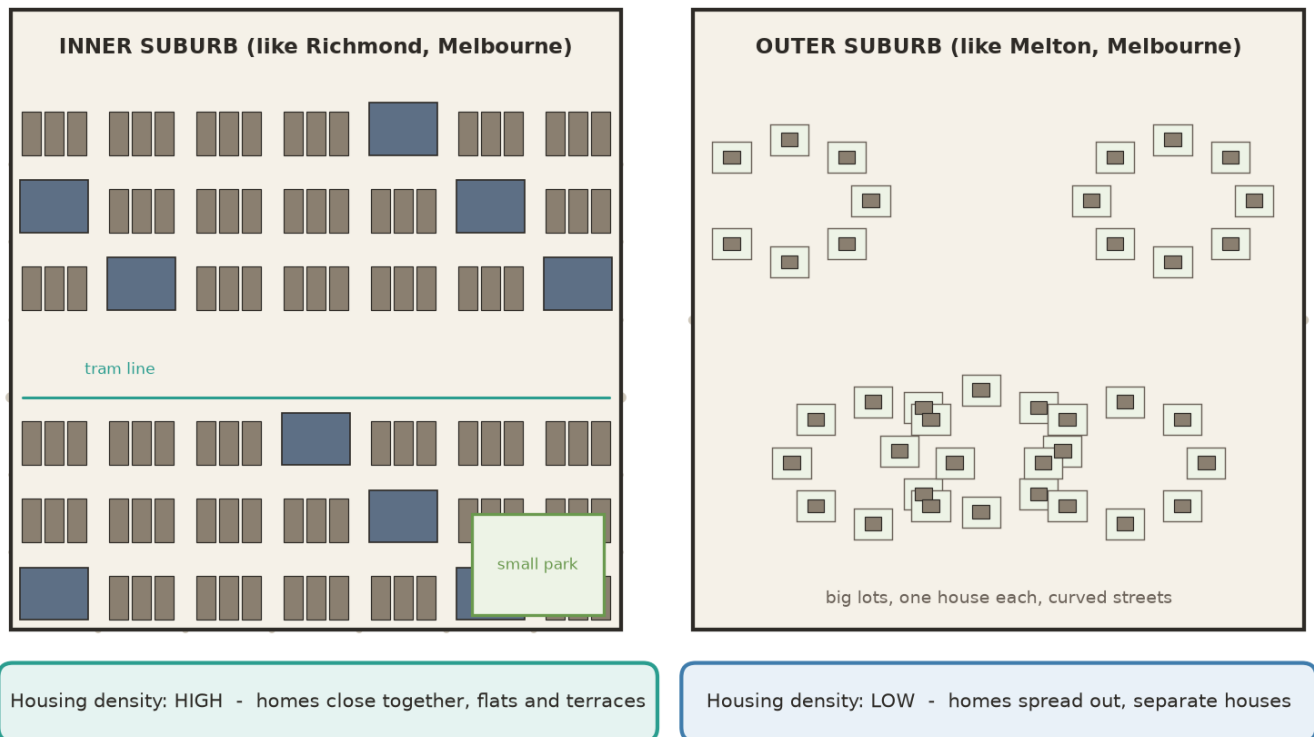
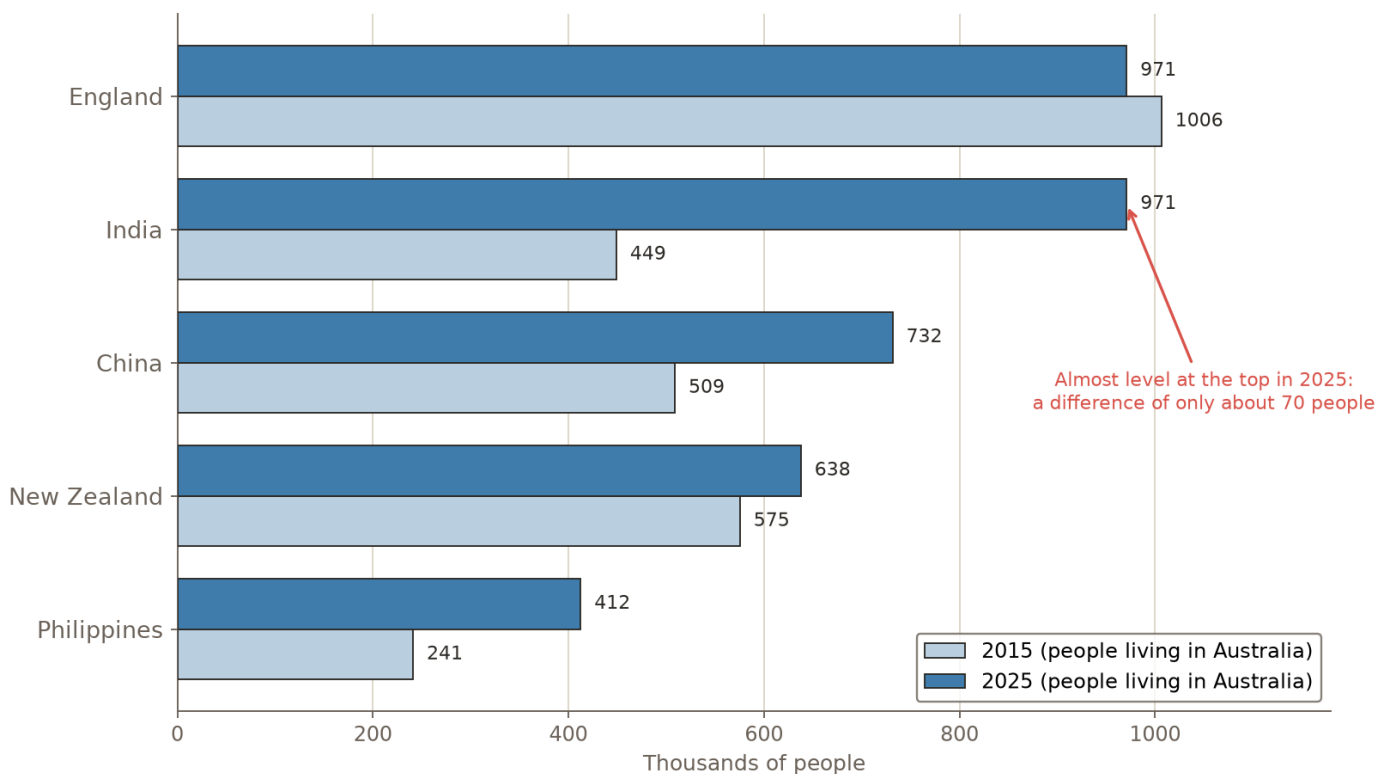


Figure 5 — Inner and outer suburbs seen from above, drawn to show housing density (E03's first example, in sketch form).

Where Australia's overseas-born residents were born: 2015 and 2025



Source: ABS, Australia's population by country of birth, release of 2026-04-29 (counts as at 30 June; rounded). Retrieved 2026-08-25.

Figure 6 — Where Australia's overseas-born residents were born: 2015 and 2025 (E03's second example, with real data).

Explaining patterns and trends (E04). Describing is only step 1; the section’s job is explaining. Figure 7 plots the full annual series of the overseas-born share of Australia’s population, 1891 to 2025 — one long trend with a clear low point. Figure 8 turns the Bureau of Meteorology and CSIRO’s *State of the Climate 2024* key points into a source table of seven climate trends: the kind of weather-map and satellite-image evidence E04 points to. Figure 9 is a compound graph — two graph types in one, lines for every year and bars for four key years — setting Australia’s urban share against that of the United States of America, E04’s named pair.

The overseas-born share of Australia's population, 1891-2025

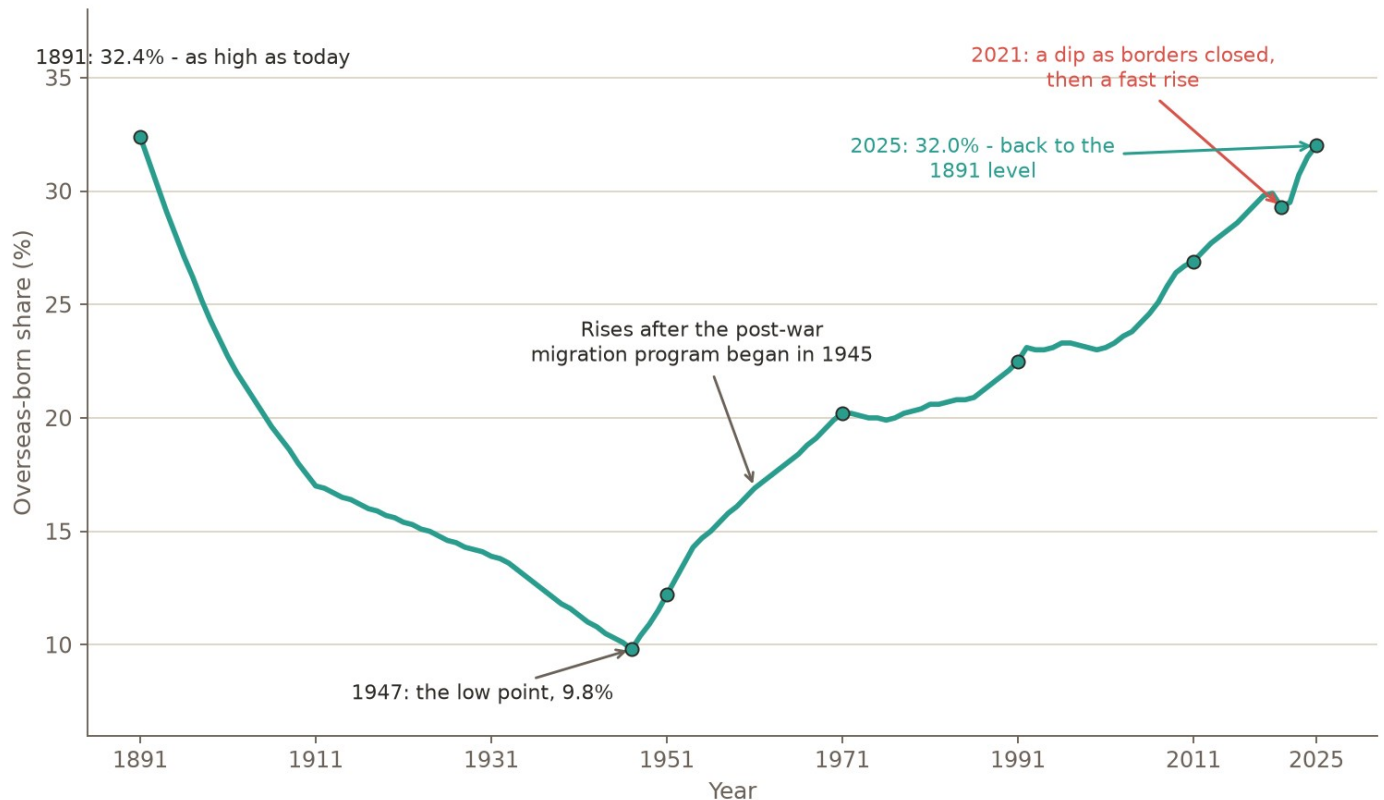


Figure 7 — One long trend: the overseas-born share of Australia's population, 1891–2025.

Seven trends from State of the Climate 2024

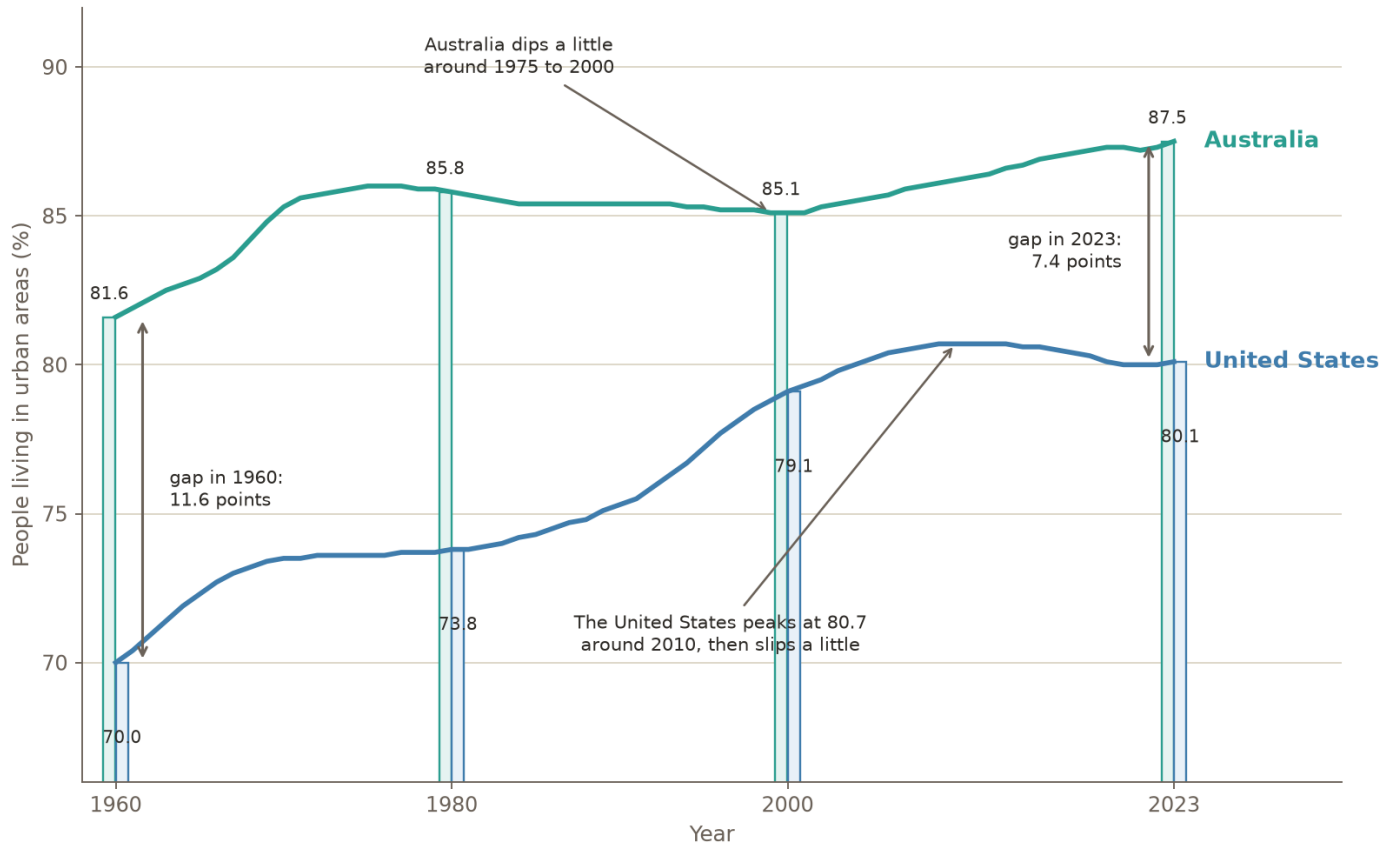
Bureau of Meteorology and CSIRO - the patterns Australia's climate records show

What is measured	The pattern reported	Direction	Where
Land temperature	1.51 °C warmer on average since records began in 1910	^ rising	all of Australia
Sea surface temperature	1.08 °C warmer on average since 1900	^ rising	seas around Australia
April-October rainfall, south-west	down about 16% since 1970 (May-July down about 20%)	v falling	south-west Australia
April-October rainfall, south-east	down about 9% since 1994	v falling	south-east Australia
Tropical cyclones	fewer observed since at least 1982	v falling	northern Australia
Heavy short rainfall	becoming more intense	^ rising	many parts
Sea level	rising, with more very-high sea-level events	^ rising	around the coast

Source: Bureau of Meteorology and CSIRO, State of the Climate 2024 (retrieved 2026-08-25).

Figure 8 — Seven climate trends as a source table (weather maps, rainfall records and satellite observations, summarised).

Share of people living in urban areas, 1960 to 2023 Australia and the United States - same measure, two trends



Source: World Bank, Urban population (% of total population), from United Nations World Urbanization Prospects. Retrieved 2026-08-25.

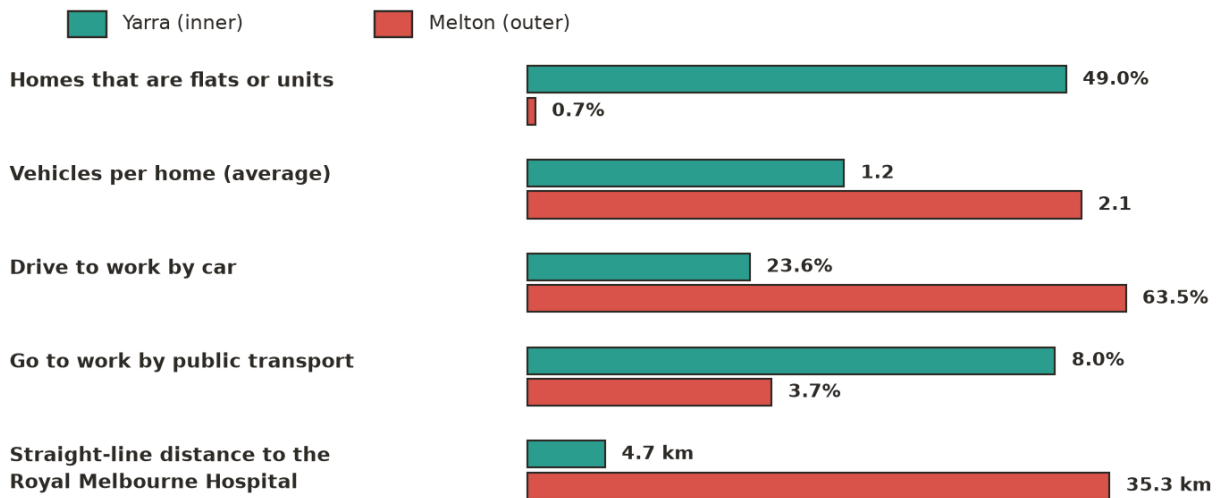
Figure 9 — A compound graph: same measure, two countries, two trends (E04's named comparison).

Testing relationships: the controlled comparison (E05). To test whether two things are related, compare two places that are as alike as possible except for the one thing you are testing. Figure 10 compares Yarra (inner Melbourne) and Melton (outer Melbourne) on 2021 Census data — the same two places and the same values Section 2E used, so you can check our reading against an earlier section.

A controlled comparison: one change at a time

Yarra (inner Melbourne) and Melton (outer Melbourne), Census 2021

Kept the same: one city (Melbourne) - one census year (2021) - one set of ABS rules



What can we infer?

Housing density and transport use look linked:

- where density is higher (Yarra), public transport use is higher and car use is lower
- where density is lower (Melton), most people drive and few catch public transport

Careful: two places can show a link but cannot prove one. To test the relationship, compare many more places and see if the same link holds.

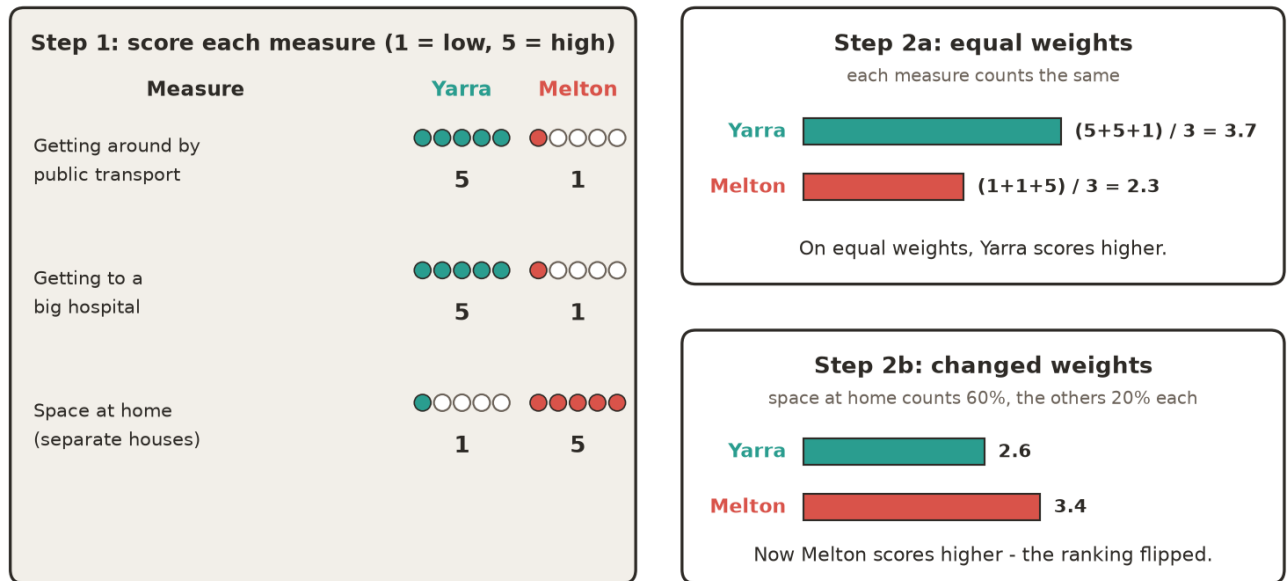
Source: ABS, Census 2021 QuickStats for Yarra (C) and Melton (C), retrieved 2026-08-25; distances measured for this book.

Figure 10 — A controlled comparison: keep as much the same as you can, change one thing, and look for a link.

Compiling an index (E06). An index combines several measures of liveability into one number. The method has three steps: pick measures, score each place on each measure, then weight and combine. Figure 11 builds a model index from the Figure 10 data — and shows why the weights are the most important choice in the whole method, a lesson first met in 2A.

Building a liveability index: three measures, one number

Model index using the data from the controlled comparison (Figure 10)



Who chooses the weights?

People do - not the data. Two fair sets of weights give two different winners.

When you build your own index, say which weights you chose and why. (We met this idea in Section 2A, when we looked at how liveability is judged.)

Model data for this book, built from the ABS Census 2021 QuickStats values in Figure 10.

Figure 11 — Building an index from three measures; changing the weights changes the winner.

The five-question check. Before any explanation leaves your desk, run it through the checklist in Figure 12. It is the section's quality gate, and it doubles as a peer-feedback tool.

Explaining a pattern or trend: a five-question check

Answer each question with your work in front of you. Tick the box if the answer is yes.

- ☐ Have you said what the pattern or trend is, using numbers and place names?
- ☐ Have you said where or when it happens?
- ☐ Have you given a reason - a real-world process that could make it happen?
- ☐ Have you used data as evidence and named the source of that data?
- ☐ Have you said what might happen next, or what could change it?

If you can tick all five, your explanation is ready to share.

Figure 12 — The five-question check for any explanation of a pattern or trend.

Worked examples

Example 1 — explaining a trend with a compound graph (scaffolded)

Working material: Chapter 4, changing nations. Data used: World Bank, Urban population (% of total population), from United Nations World Urbanization Prospects, retrieved 25 August 2026. Figure 9 is the source for every number in this example.

Step 1 — read the graph's two encodings. A compound graph carries two readings at once. The lines show every year from 1960 to 2023; the bars pick out four key years so the two countries can be compared exactly. Both encodings measure the same thing: the share of people living in urban areas.

Step 2 — describe each series before comparing them. Australia starts high (81.6% in 1960), rises to about 86% by the mid-1970s, dips a little to 85.1% around 2000, then climbs to 87.5% by 2023. The United States starts lower (70.0%), rises steadily for fifty years to a peak of 80.7% around 2010, then slips a little to 80.1% in 2023.

Step 3 — compare: similarities and differences. Similarity: both countries are highly urban, and both series move only a few points across 63 years — at this height, change is slow. Difference: Australia was ahead the whole time, but the gap narrowed from 11.6 points in 1960 to 7.4 points in 2023, because the United States was still urbanising through the second half of the twentieth century while Australia was already nearly as urban as it gets.

Step 4 — explain with Chapter 4 knowledge. A trend needs a process behind it. Chapter 4's story of urbanisation — people moving to cities for work, services and connection, as work moved from farms to factories and then to services — explains the United States' long rise: in 1960, three in ten Americans still lived outside urban areas, and that share

shrank for fifty years. Australia's high starting point fits the same story told earlier: by 1960, most Australians already lived in cities and towns, so there was less change left to happen.

Step 5 — question the data. Australia's mid-period dip is smaller than one point, and the United States' slip after 2010 is smaller than one point too. Changes that small may reflect how statistical boundaries are drawn, not real movement of people — so the honest reading is “roughly level for decades”, not “a falling trend”. And the graph alone cannot prove why anything happened: the explanation in Step 4 is an inference, and a full test would need more evidence. That is what the fifth move of interpreting always looks like.

Example 2 — testing a relationship and building an index (scaffolded)

Working material: Chapter 2, place and liveability. Data used: ABS, Census 2021 QuickStats for Yarra (C) (LGA27350) and Melton (C) (LGA24650), retrieved 25 August 2026 — the same values cited in Section 2E; straight-line distances measured for this book. Figures 10 and 11 are the sources for this example.

Step 1 — set up the controlled comparison. We want to test a possible relationship: does housing density go with how people get around? So we pick two places that keep as much the same as possible — both are Melbourne local government areas, both are read from the same 2021 Census, both use the same ABS rules — and differ in the one thing we are testing: inner (Yarra) versus outer (Melton) location, and with it, housing density.

Step 2 — lay out the data. Figure 10 does this. In Yarra, 49.0% of homes are flats or units, there are 1.2 vehicles per home, 8.0% of workers catch public transport and 23.6% drive; the Royal Melbourne Hospital is 4.7 km away in a straight line. In Melton, 0.7% of homes are flats, there are 2.1 vehicles per home, 3.7% catch public transport and 63.5% drive; the same hospital is 35.3 km away.

Step 3 — infer the relationship. Where housing is denser, public transport use is higher and car use is lower — and services sit closer to home. The relationship is plausible as a process, not just a coincidence: trams and trains need many passengers within walking distance to run often, so dense housing supports frequent services, and frequent services make it easier to live without a car. Flats and units also tend to be built where services already cluster.

Step 4 — test the inference honestly. Two places can show a link but cannot prove one. Yarra and Melton also differ in income, age profile and history, and any of those could be doing some of the work. The controlled comparison earns its keep by ruling out *some* explanations (it is not a difference between cities, years or counting rules), and it points to what a real test would look like: many more suburbs, the same two measures, and the same link showing up again and again.

Step 5 — turn the measures into an index (E06). Score each measure 1 to 5 (Figure 11): public transport Yarra 5, Melton 1; hospital access Yarra 5, Melton 1; space at home Yarra 1, Melton 5. With equal weights, Yarra scores $(5+5+1)/3 = 3.7$ and Melton $(1+1+5)/3 = 2.3$. Now change the weights so space at home counts 60% and the other two 20% each: Yarra scores 2.6 and Melton 3.4 — the ranking flips. The data did not change; the values behind the weights did. So an index is only ever “liveability as someone weighed it”, and a good analysis says whose weighing it uses and why — exactly the point 2A made when the weights flipped there too.

Practice questions

Scaffolded

- Pattern, trend or neither?** Using Figure 2, sort each statement and give the reason in one clause:
 - In the left panel, most dots sit near the coast and the river.
 - The overseas-born share of Australia's population rose from 12.2% in 1951 to 32.0% in 2025.
 - In the middle panel, shopper counts were highest at 12 pm and second highest at 5 pm.
 - The cover of this workbook is blue.
- The four-step read (Figure 3).** Run the sequence on Figure 6: (a) describe the largest group in 2015; (b) compare India's 2015 and 2025 bars; (c) explain one change using one idea from Chapter 4; (d) question the data: what do these counts *not* tell you about migration?
- Reading the aerial sketches (Figure 5).** (a) Give two differences between the two sketches. (b) Give one similarity. (c) Match each sketch to Yarra or Melton, backing each match with one number from Figure 10.
- The long trend (Figure 7).** (a) In one sentence, describe the overall shape of the series from 1891 to

2025.

- (b) State the lowest year and its value. (c) Give one reason for the rise after 1947. (d) What happened between 2020 and 2021, and what does the fast rise after it suggest?
5. **The climate source table (Figure 8).** Choose two rows. For each: (a) state what is measured, the direction and where; (b) say whether the row reports a trend, a spatial pattern, or both, with the reason.
- (c) Using a map app or atlas, measure the road distance from Mildura, in Victoria's far north-west, to the Royal Melbourne Hospital, and compare it with the two straight-line distances in Figure 10. What relationship between distance and choice of services do you infer for people in remote places?
6. **A concept map from your own data (E02).** Using counts or notes from your own 5B fieldwork (or the model survey in Figure 4 if you have none yet), draw a concept map with at least four finding-nodes and three labelled arrows. Every arrow label must be a verb phrase ("was seen with", "leads to", "means"). Then write one sentence naming the strongest relationship in your map and saying why it is plausible.

Un scaffolded

7. **Two urban trends (Figure 9).** In three or four sentences: describe each country's series, compare the gaps in 1960 and 2023, and explain one difference between the countries using Chapter 4. Finish with one sentence stating what the graph *cannot* tell you.
8. **Migration sources, 2015 and 2025 (Figure 6).** Identify two similarities and two differences between the two years. Suggest one reason for the change in India-born residents, and one reason to be careful with that suggestion.
9. **The controlled comparison (Figure 10).** (a) State the relationship the comparison suggests. (b) Name two things the comparison keeps the same. (c) Explain, in two sentences, why two places cannot prove a relationship, and what would make the inference stronger.
10. **Build your own index (E06).** Choose any three measures from Figure 10, score Yarra and Melton 1–5 on each, and choose your own weights adding to 100%. Show your working, give both final scores, say which place ranks higher, and defend your weights in two sentences. (Keep the maths to the methods modelled in Figure 11: means and simple weighted sums.)

Extended response — evidence-based written task

Australia's migration story, told with data. Write a response of about 350 words to the prompt: "*What patterns and trends do Figures 6 and 7 show about where Australia's overseas-born population comes from, and how it has changed?*" Your response must:

- describe at least two trends, each with numbers and years;
- identify one similarity and one difference between 2015 and 2025;
- infer one relationship or cause, stated with a caution about what the data can prove;
- name the source of the data in a source line; and
- attach your five-question check (Figure 12) with every box ticked or fixed.

Multimodal option: the same requirements may be met as a 2–3 minute recorded commentary over the two figures.

Answers

Scaffolded

1.
 - (a) Spatial pattern — an arrangement in space, no time involved. (b) Trend — a direction of change across years. (c) Time pattern — an arrangement across the hours of one day, not a change across years. (d) Neither — a single fact, no arrangement and no change.
2.
 - (a) England, about 1006 thousand (about 1.0 million) people. (b) India more than doubled, 449 thousand to 971 thousand, almost catching England. (c) Accept any Chapter 4 reason sensibly used, e.g. Australia's migration program has drawn more skilled and student migrants from India's growing cities. (d) The counts are people living in Australia now, born overseas; they do not count the arrivals of any single year, and they say nothing about where people go after arriving.
3.
 - (a) Any two of: grid streets versus curved streets and cul-de-sacs; small tight terraces and flats versus big lots with one house; a tram line versus none; less open space per home versus more. (b) Any one of: both are residential suburbs of one city; both mix homes with some open space; both have a road network joining the homes. (c) Inner sketch = Yarra (49.0% flats; 1.2 vehicles per home); outer sketch = Melton (0.7% flats; 2.1 vehicles per home).
4.
 - (a) The share fell for six decades to 1947, then rose for most of the period since — a U-shape, not one straight trend. (b) 1947, 9.8%. (c) The post-war migration program brought large numbers of overseas-born people from 1945 onward. (d) The share dipped (to 29.3% in 2021) as borders closed, then rose fast to 32.0% by 2025 — suggesting how quickly the share responds when arrivals resume.
5.
 - (a) Any two rows stated correctly. (b) Every row reports a trend (a direction across years); the two rainfall rows also show a spatial pattern, because the drying is in the south-west and south-east while the north has been wetter — the “where” is part of the pattern. (c) Accept measured values around 500–550 km by road; inference: the farther a place is from major services, the fewer the services within reach, so remote places depend more on local clinics, telehealth and planned trips — the relationship Figure 10 shows at city scale, stretched to state scale.
6. Accept any map with four nodes and three verb-phrase-labelled arrows; the sentence must name one relationship and give a process that could make it real.

Unscaffolded

7. Australia: high and almost level (81.6% to 87.5%, with a sub-one-point dip around 1975–2000). United States: rising 70.0% to 80.7% by about 2010, then a small slip to 80.1%. The gap narrowed from 11.6 to 7.4 points. Explanation: the US was still urbanising through the late twentieth century while Australia started from a high base. Cannot tell: why the tiny dips happen — at under one point they may be boundary or counting artefacts.
8. Similarities: England and New Zealand stay near the top in both years; all five groups remain large. Differences: India more than doubles and joins England almost level at the top; the Philippines grows strongly while England's count falls a little. Reason for India's rise: Australia's skilled and student migration streams (Ch 4). Caution: these are resident stocks at two dates, not the arrivals of any one year, so the figure mixes people who arrived across many decades.
9.
 - (a) Denser housing goes with more public transport use, less car use and closer services. (b) Same city, same census year, same ABS rules (any two). (c) Yarra and Melton also differ in income, age and history, so one of those might really be doing some of the work; more suburbs showing the same link would strengthen the inference.
10. Any internally consistent index: three scores per place, weights adding to 100%, correct arithmetic, a stated winner, and a two-sentence defence of the weights. Note: choosing 60% or more for “space at home” will rank Melton first; equal or service-heavy weights rank Yarra first — and saying so is part of a good answer.

Fully-worked solutions

Question 7 (model paragraph). Both countries are highly urban, but their trends differ. Australia's share of people living in urban areas was already 81.6% in 1960 and moved only to 87.5% by 2023, dipping slightly around 1975 to 2000; the United States rose steadily from 70.0% to a peak of 80.7% around 2010 before slipping to 80.1%. The gap between the two narrowed from 11.6 points to 7.4 points. Chapter 4 explains the difference: the United States was still in the middle of its urbanisation in 1960, with three people in ten outside urban areas, while Australia's urban pattern was mostly set. The graph cannot tell us why the small dips occur — changes under one point may be how boundaries are drawn, not real movement. (*Checks: numbers and years ✓; where and when ✓; process given ✓; source named ✓; what-next/limits stated ✓.*)

Question 10 (model working). Measures and scores: public transport (Yarra 5, Melton 1), hospital access (Yarra 5, Melton 1), space at home (Yarra 2, Melton 5 — Melton's larger homes are clear, but Yarra's parks and smaller households still give some space). Weights: public transport 30%, hospital access 30%, space at home 40%, because a family we interviewed in 2F said getting to services matters most week to week, while space matters but can be traded off. Yarra: $0.3 \times 5 + 0.3 \times 5 + 0.4 \times 2 = 1.5 + 1.5 + 0.8 = 3.8$. Melton: $0.3 \times 1 + 0.3 \times 1 + 0.4 \times 5 = 0.3 + 0.3 + 2.0 = 2.6$. Yarra ranks higher on these weights. Defence: the weights follow a stated family's priorities; someone who values space above all would weight it 60% or more and get Melton first, as Figure 11 shows — so the index states its values openly instead of hiding them.

Extended response (model structure). *Trends.* The overseas-born share of Australia's population fell from 32.4% in 1891 to a low of 9.8% in 1947, then rose to 32.0% by 2025 — back where it started 134 years earlier (Figure 7). Within that, the source countries changed too: in 2015 England was the largest birthplace group (about 1006 thousand), but by 2025 India had almost caught it (971 thousand to 971 thousand, a gap of only about 70 people), with China and the Philippines also far larger than a decade earlier (Figure 6). *Similarity and difference.* Both years show a small set of large groups rather than one dominant source; but the top of the list moved from Europe toward Asia. *Inference with caution.* The shift toward Asia fits Chapter 4's account of Australia's migration program turning to skilled and student migration from Asia's growing cities — but the counts are residents at two dates, not the arrivals of any one year, so they show the outcome of decades of policy, not a single year's change. *Source line:* ABS, Australia's population by country of birth, release of 2026-04-29, retrieved 25 August 2026. *Five-question check:* all five boxes ticked.

Sources used in this section

- ABS, *Australia's population by country of birth* (release of 2026-04-29; counts and shares as at 30 June each year). Retrieved 25 August 2026. Figures 2, 3, 6 and 7.
 - ABS, *Census of Population and Housing 2021, QuickStats for Yarra (C) (LGA27350) and Melton (C) (LGA24650)*. Retrieved 25 August 2026. Figures 10 and 11 and Examples 2 and practice 3, 9, 10.
 - World Bank, *Urban population (% of total population)*, from United Nations World Urbanization Prospects. Retrieved 25 August 2026. Figure 9 and Example 1.
 - Bureau of Meteorology and CSIRO, *State of the Climate 2024*. Retrieved 25 August 2026. Figure 8 and practice 5.
 - Straight-line distances between station centres (Richmond and Melton to the Royal Melbourne Hospital), measured for this book; road distance in practice 5 is measured by students. Figures 10 and 11.
 - Model survey data (Figures 4 and 5): constructed for this book to demonstrate method, and labelled as such.
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Teaching sequence (teacher note — not student-facing)

1. Open with Figure 1 and locate the section in the inquiry cycle (5A Figure 1, stage 4): interpreting and analysing sits between 5C's representation and 6A's concluding.
2. Define the four terms (pattern, trend, relationship, index) with the definition boxes; drill the pattern-versus-trend distinction on Figure 2 until the class sorts the four statements of Q1 without help.

3. Teach the four-step read (Figure 3) once, then reuse it as the standing routine for every subsequent source in the section — do not let students skip step 4.
4. Run Example 1 slowly: it models description → comparison → explanation → questioning on the compound graph, and it states the honest limits of sub-one-point change. Expect to defend “roughly level” as a valid reading.
5. Run Example 2 as the E05/E06 core: the controlled comparison reuses 2E’s Yarra/Melton values so students see the same data analysed two ways; the index build deliberately replays 2A’s weights-flip so the “weights are choices” idea is book-wide, not section-local.
6. Sequence the practice: scaffolded 1–6 with the checklist (Figure 12) as peer feedback between 6 and 7; unscaffolded 7–10 cold; extended response as the assessed evidence for VC2HG8S04. Q5(c) and Q6 send students to their own measurements and fieldwork (5B, 2F), keeping E02 and E05 live rather than paper-only.
7. Maths ceiling: all data work stays within VC2 Mathematics Levels 7–8 statistics — means, percentages, differences and simple weighted sums. No correlation coefficients, no standard deviation.
8. D11 and policy checks: all working material is Chapters 1–4 knowledge or student fieldwork; every real-world datum carries a source line with retrieval date; maps and aerial views are originals built from primitives; no First Nations content appears in this section (Rule 1), and no §2A-trimmed elaboration is taught (5D draws on E01–E06 untrimmed).