

Mathematics Level 7

Chapter 1 — People, place and sustainable living

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People, their place and its environment: how we depend on it

Curriculum link: VC2HG4K01. This section also draws on VC2HG4K01E01 and VC2HG4K01E02.

In this chapter, “your place” is the part of Australia where you live. For most of us in this class, that is a town or suburb in Victoria. Every place sits inside the environment — and in this section we find out how people and the environment are joined.

Learn

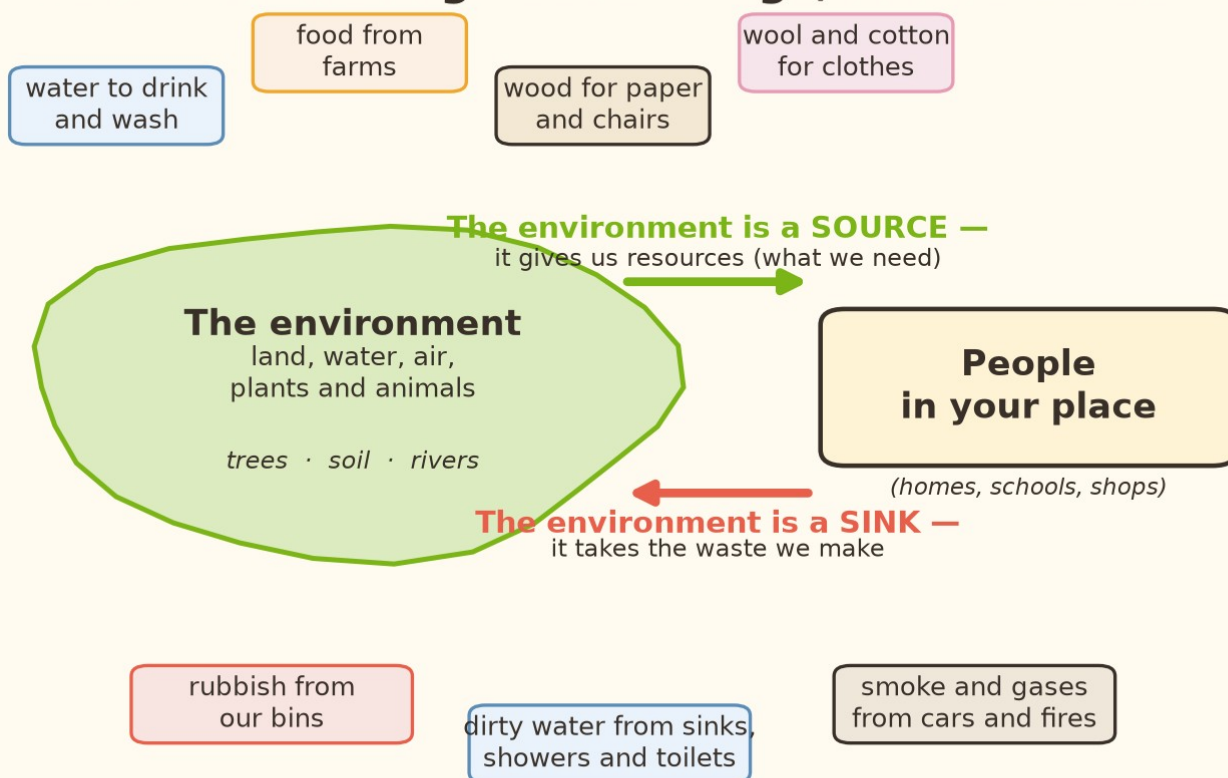
Part 1: We depend on the environment

The **environment** is everything around us that is natural: the land, the water, the air, and all the living things — the plants and the animals.

People in every place **depend on** the environment. To depend on something means to need it. The environment does two big jobs for us:

- **A source.** A source is where something comes from. The environment is the source of our **resources** — the things we need and use, like water, food, wood and wool.
- **A sink.** A sink is where something ends up. The environment is the sink for our **waste** — the things we do not want any more, like rubbish, dirty water and smoke.

The environment gives us things, and takes our waste



Model diagram: one way to see how people and the environment are joined.

Model diagram of people in their place: a green arrow shows the environment working as a source, giving resources such as water, food, wood and wool; an orange-red arrow shows it working as a sink, taking our waste such as rubbish, dirty water and smoke.

The same environment is both the source and the sink. That is why using things carefully matters: what we take out, and what we put back, both change the place.

Part 2: Where our things come from

Everything we use starts in the environment.

- **Water.** Rain falls on the forests in the hills east of Melbourne. The water runs into rivers and is stored in big lakes called **reservoirs**. (A reservoir is a lake that stores water for people to use.) Thomson Reservoir is Melbourne's biggest.
- **Food.** Wheat for bread and pasta grows in the Mallee, Victoria's hot, dry north-west. Dairy cows in Gippsland give us milk, cheese and yoghurt. Apples and pears grow on fruit trees in the Goulburn Valley, near Shepparton.
- **Wool and fibre.** Sheep in the Western District, near Warrnambool and Hamilton, give us wool for jumpers. (Fibre is the thread-like stuff that cloth is made from.)
- **Wood.** Pine tree farms in the wetter parts of southern Australia grow wood for paper, chairs and houses. When a tree is cut down, a new one is planted in its place.

Where do the things we use every day come from?

We use ...	It comes from ...	Real places where it is grown or made
bread and pasta	wheat grain	the Mallee — Victoria's hot, dry north-west
milk, cheese and yoghurt	dairy cows	dairy farms in Gippsland
apples and pears	fruit trees	the Goulburn Valley, near Shepparton
a woolly jumper	wool from sheep	sheep farms in the Western District, near Warrnambool and Hamilton
paper, chairs and houses	wood from pine trees	pine tree farms in the wetter parts of southern Australia

*All of these things start in the environment — on farms, in orchards and in forests.
Farms, orchards and tree farms need soil, water and sun to grow them.*

Real places in Victoria. Regions checked 25 August 2026.

Table matching the things we use to what they come from and the real place where they are grown or made: bread and pasta from wheat grain in the Mallee; milk, cheese and yoghurt from dairy cows in Gippsland; apples and pears from fruit trees in the Goulburn Valley; a woolly jumper from sheep in the Western District; paper, chairs and houses from pine trees.

Water, food, wool and wood are all resources — and they all start in the environment, on farms, in orchards and in forests.

Part 3: Where our waste goes

The environment is the sink for our waste. In Victoria, our waste takes three main paths:

1. **Rubbish** from the red-lid bin is taken to a **landfill** — a big hole in the ground where rubbish is buried and covered.
2. **Bottles, cans and paper** from the yellow-lid bin go to a special works (a factory). There they are melted or squashed and made into new things, so less new stuff is taken from the environment.
3. **Dirty water** from sinks, showers and toilets runs down the drain and through pipes to the Western Treatment Plant, near Werribee. It is cleaned there, and the cleaned water goes back to the sea.

Where do the things we don't want go?



The environment is our SINK: it takes the things we don't want. Too much waste, or waste that does not break down, can hurt the land, the water and the animals.

Bin colours follow the new Victoria-wide plan: yellow = things to make again, red = rubbish.

Three waste paths in Victoria: rubbish from the red-lid bin is buried in a landfill; bottles, cans and paper from the yellow-lid bin are made into new things; dirty water goes down the drain and is cleaned at the Western Treatment Plant before going back to the sea.

A sink can take a lot of waste. But if we make too much waste, the sink fills up: rubbish in a landfill stays there for a very long time. That is another reason using things carefully matters.

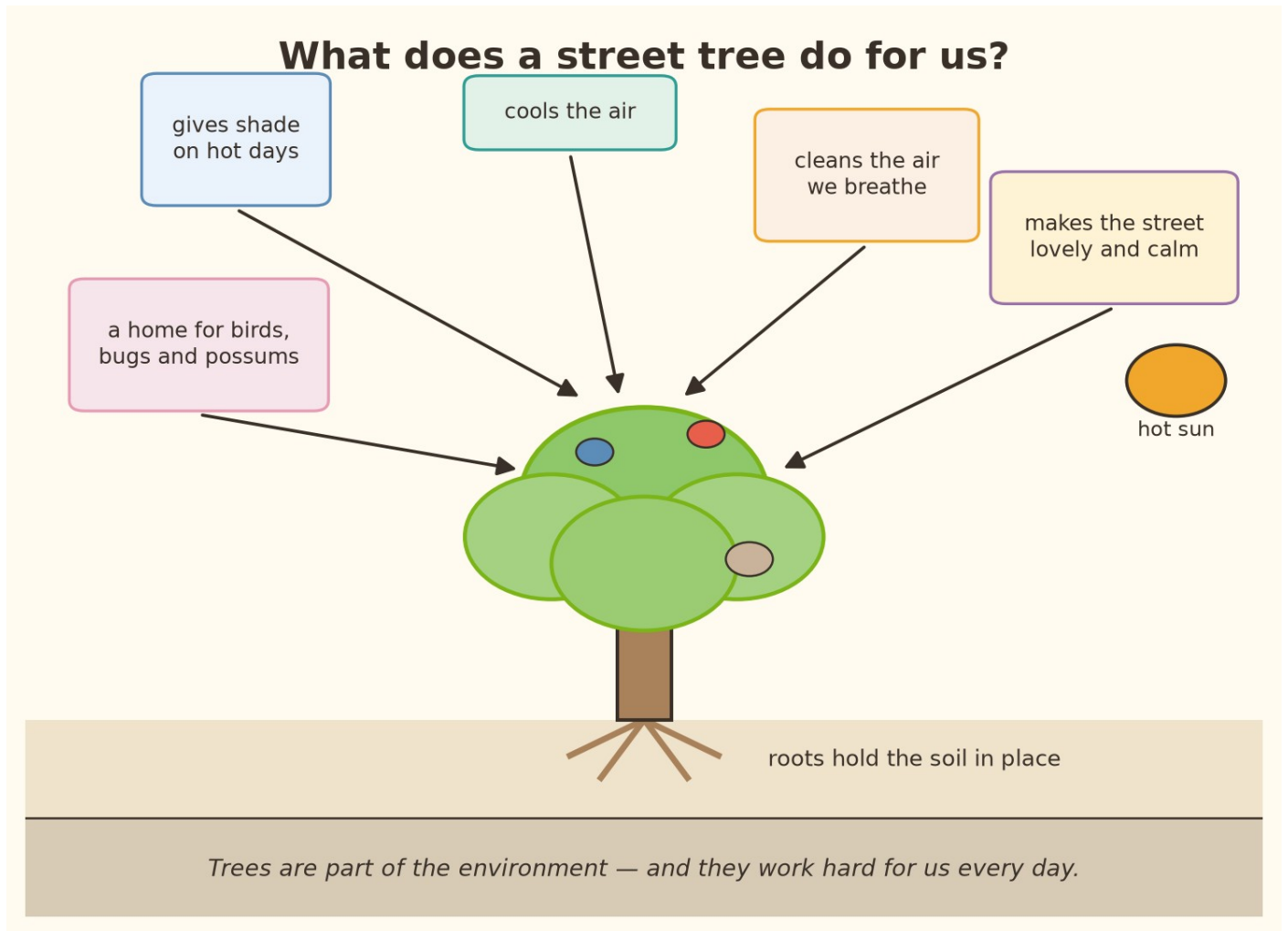
Part 4: How plants support our lives

Vegetation means the plants of a place — the trees, grass, shrubs and flowers. Vegetation does jobs that support people's lives and **wellbeing**. (Wellbeing is how well we are going — feeling healthy, safe and happy.)

Think about a street with big trees:

- trees give shade on hot summer days (in Australia, summer is December to February)
- trees cool the air around them

- trees clean the air we breathe
- trees are a home for birds, bugs and possums
- a street with trees feels lovely and calm



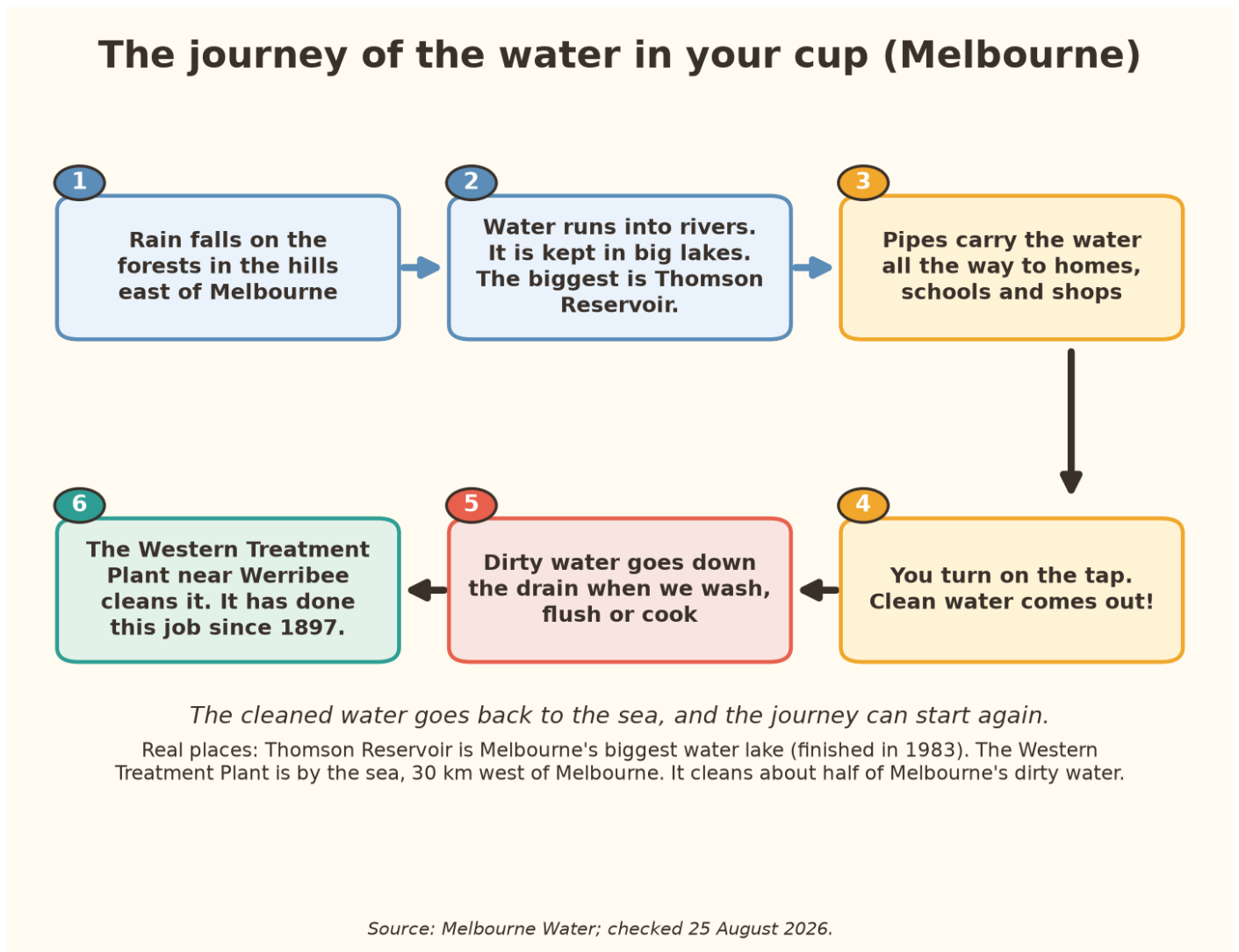
Labelled diagram of a street tree: it gives shade on hot days, cools the air, cleans the air we breathe, is a home for birds, bugs and possums, makes the street lovely and calm, and its roots hold the soil in place.

Parks work the same way. Royal Park is Melbourne's biggest park — 169 hectares of trees and grass, with the Melbourne Zoo inside it. (A hectare is a way of measuring big areas of land.) Lots of vegetation, lots of jobs done for people.

Worked examples

Example 1 — Follow the water (Melbourne)

Use Figure 2.



The journey of the water in your cup in Melbourne: rain falls on the forests in the hills east of Melbourne; water runs into rivers and is kept in big lakes, biggest of all Thomson Reservoir; pipes carry it to homes, schools and shops; you turn on the tap; dirty water goes down the drain; the Western Treatment Plant near Werribee cleans it and the cleaned water goes back to the sea.

Q1. Where does Melbourne's water start its journey? Rain falls on the forests in the hills east of Melbourne.

Q2. Where is the water stored? It runs into rivers and is stored in big lakes. The biggest is Thomson Reservoir.

Q3. What happens after the water goes down the drain? Pipes carry the dirty water to the Western Treatment Plant, near Werribee. It is cleaned there, and the cleaned water goes back to the sea.

Q4. At the end of the journey, is the environment working as a source or a sink? How do you know? A sink. The cleaned water goes *into* the sea — the environment is where it ends up.

Example 2 — A park at work

*Royal Park, Melbourne: 169 hectares of trees and grass. How does the vegetation in Royal Park support people's lives and wellbeing? A good answer names the vegetation **and** the job it does:*

- The big trees give **shade**, so people can rest out of the sun on a 35-degree day.
- The trees **cool the air**, so running around the park feels better.
- The trees and shrubs are a **home** for birds, insects and possums — the zoo is not the only place in the park with animals!
- The green grass and trees make the park feel **lovely and calm** — a good place to play and to rest.

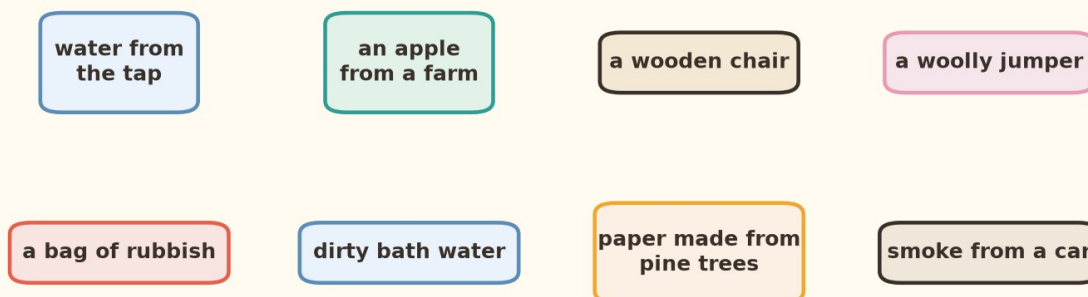
Every one of those jobs is the environment supporting people's lives and wellbeing.

Practice questions

Practice with help

- Fill in each gap with *source* or *sink*.
 - The environment is a _____ for the water we drink.
 - The environment is a _____ for the rubbish we make.
- Use Figure 3. Match each thing to the place where it starts:
 - bread and pasta
 - a woolly jumper
 - milk, cheese and yoghurt
- Use Figure 1. Name two resources the environment gives us, and one waste it takes from us.
- Use Figure 6. List three jobs a street tree does for people.
- Use Figure 7. Sort the eight cards into two piles: taken FROM the environment, and put BACK into it. One card can go in **both** piles. Which one, and why?

Sort the cards: taken FROM the environment, or put BACK into it?



Make two piles. Put each card in the pile where it belongs.
Some cards might fit BOTH ways — be ready to say why!

Eight sorting cards: water from the tap, an apple from a farm, a wooden chair, a woolly jumper, a bag of rubbish, dirty bath water, paper made from pine trees, and smoke from a car.

- True or false? Fix the false ones.
 - A reservoir is a lake that stores water for people to use.
 - A landfill is where dirty water is cleaned.
 - Vegetation means the plants of a place.

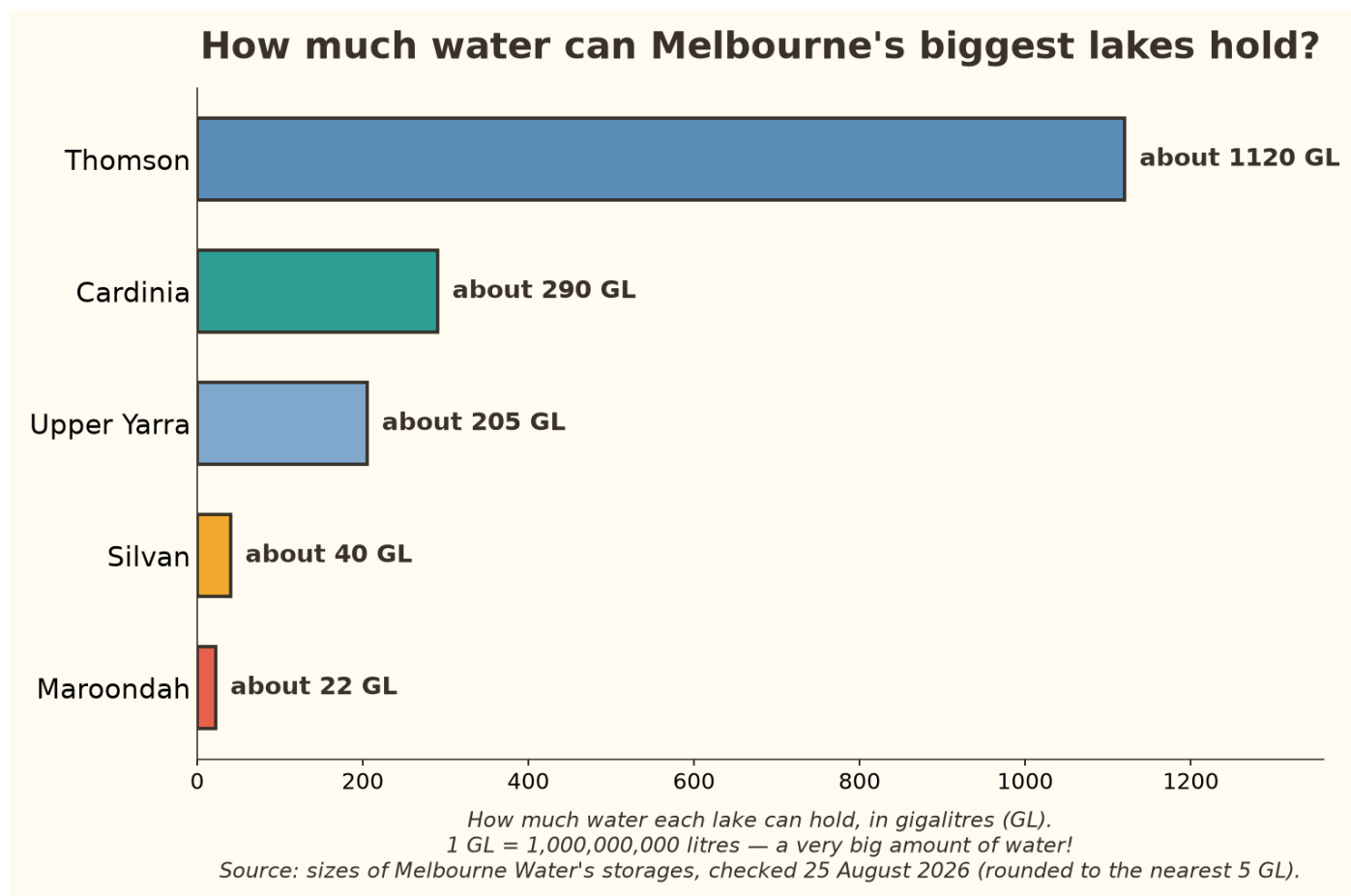
Practice on your own

- Name one thing you used today that came from the environment. Say what it was made from, and where in Australia it may have started.
- A drink bottle is made, used, and then made into a new thing. Is that bottle the environment working as a source, a sink, or both? Explain your answer.

9. Why does a street with big trees feel cooler on a hot January day than a street with no trees?
10. “People depend on the environment.” Do you agree? Use two examples to explain your answer.

Inquiry and fieldwork task

Part A — Read the real data (Figure 4).



Bar chart of how much water Melbourne's five biggest lakes can hold: Thomson about 1120 GL, Cardinia about 290 GL, Upper Yarra about 205 GL, Silvan about 40 GL, Maroondah about 22 GL; 1 GL equals 1,000,000,000 litres.

- (a) Which lake can hold the most water?
- (b) About how many GL can Cardinia hold?
- (c) 1 GL is how many litres?
- (d) Which is bigger, Silvan or Maroondah? How much bigger?
- (e) Write one question of your own about the chart. Swap with a partner and answer each other's questions.

Part B — A fieldwalk near your school.

Take the sheet in Figure 8 (print it, or copy it into your book). Walk near your school with your class. For each thing on the sheet, add a tally line when you see it, and write what it was doing for us. Back in class, draw the best tree you found.

My fieldwork sheet: the trees near my school

Name: Date:

What I looked at	My tally	What it did for us
a big tree		
a small tree		
shade from a tree		
a bird or bug in a tree		
someone resting under a tree		

Tally tip: draw one short line for each one you see.

Draw the best tree you found. Show what it was doing for people or animals.



Printable fieldwork sheet: a table to tally big trees, small trees, shade from a tree, birds or bugs in a tree, and people resting under a tree, with space to write what each was doing for us and a box to draw the best tree found.

Answers

1.
 - (a) source (b) sink
 2.
 - (a) wheat grain — the Mallee (b) wool from sheep — the Western District (c) dairy cows — Gippsland
 3. Any two of: water to drink and wash, food from farms, wood for paper and chairs, wool and cotton for clothes. Any one of: rubbish, dirty water, smoke and gases.
 4. Any three of: gives shade on hot days; cools the air; cleans the air we breathe; a home for birds, bugs and possums; makes the street lovely and calm; roots hold the soil in place.
 5. Taken FROM: water from the tap, an apple from a farm, a wooden chair, a woolly jumper, paper made from pine trees. Put BACK: a bag of rubbish, dirty bath water, smoke from a car. BOTH: dirty bath water — the water was first taken FROM the environment, then put BACK into it dirty.
 6.
 - (a) True. (b) False — a landfill is where rubbish is buried; dirty water is cleaned at the Western Treatment Plant. (c) True. 7–10. See the fully-worked solutions below. Part A. (a) Thomson (b) about 290 GL (c) 1,000,000,000 (d) Silvan, by about 18 GL (e) your own question and answer.
-

Fully-worked solutions

Question 8 — sample answer. Both. The bottle starts as a source: the plastic it is made from came from resources taken out of the environment. When the bottle is made into a new thing, the old bottle becomes waste that goes back *into* the environment's sink — but as something useful, not as rubbish. So the one bottle shows both jobs.

Question 9 — sample answer. The trees give shade, so the sun does not heat the footpath and the houses as much. Trees also cool the air around them. A street with no trees has no shade, so it feels hotter. That is the vegetation doing a job for people.

Question 10 — sample answer. I agree. We depend on the environment for everything we need. For example, the water in my bottle started as rain on the forests east of Melbourne and was stored in Thomson Reservoir — the environment as a source. And when I flush the toilet, the dirty water is cleaned at the Western Treatment Plant and goes back to the sea — the environment as a sink. Without the environment doing both jobs, people could not live in our place.

Sources: Melbourne Water (melbournewater.com.au) for the water journey, storage sizes and the Western Treatment Plant; City of Melbourne for Royal Park (169 hectares, Melbourne's biggest park); Victoria's farming regions (the Mallee, Gippsland, the Goulburn Valley, the Western District). All details checked 25 August 2026.

Activities in my place and why they are located where they are

Owens: VC2HG4K02

Why is the shop on that corner? Why is the farm out at the edge of town? Every activity is somewhere for a reason. Let's find out.

Things you need: a pencil, an eraser, and the maps and pictures in this section.

What we learn

What is an activity?

A place is full of things people do. People buy food, play sport, make things, grow food, learn and work. An **activity** is something people do in a place.

Six kinds of activities

Activities can be put into six kinds. Each kind has a special name.

Six kinds of activities in a place

An activity is something people do. Here are six kinds.

Kind of activity	What people do there	Examples
Retail (selling)	People sell things to customers.	shops, markets, stalls
Recreation (play and rest)	People play, rest and have fun.	parks, ovals, swimming pools
Manufacturing (making)	People make things.	factories, bakeries
Farming (growing)	People grow food and look after animals.	farms, orchards
Education (learning)	People learn.	schools, kindergartens, libraries
Commercial (business work)	People do business work.	offices, banks

Original figure made for this book.

Six kinds of activities poster: retail (selling things, like shops and stalls), recreation (playing and resting, like ovals and parks), manufacturing (making things, like factories), farming (growing food, like orchards and wheat farms), education (learning, like schools) and commercial (business work, like offices)

- **Retail** means selling things. Shops, stalls and markets are retail.
- **Recreation** means playing and resting. Ovals, parks and pools are recreation.
- **Manufacturing** means making things. Factories are manufacturing.
- **Farming** means growing food and looking after animals. Orchards and wheat farms are farming. An **orchard** is a place where fruit trees are grown.

- **Education** means learning. Schools, kindergartens and libraries are education.
- **Commercial** means business work. Offices full of desks and computers are commercial.

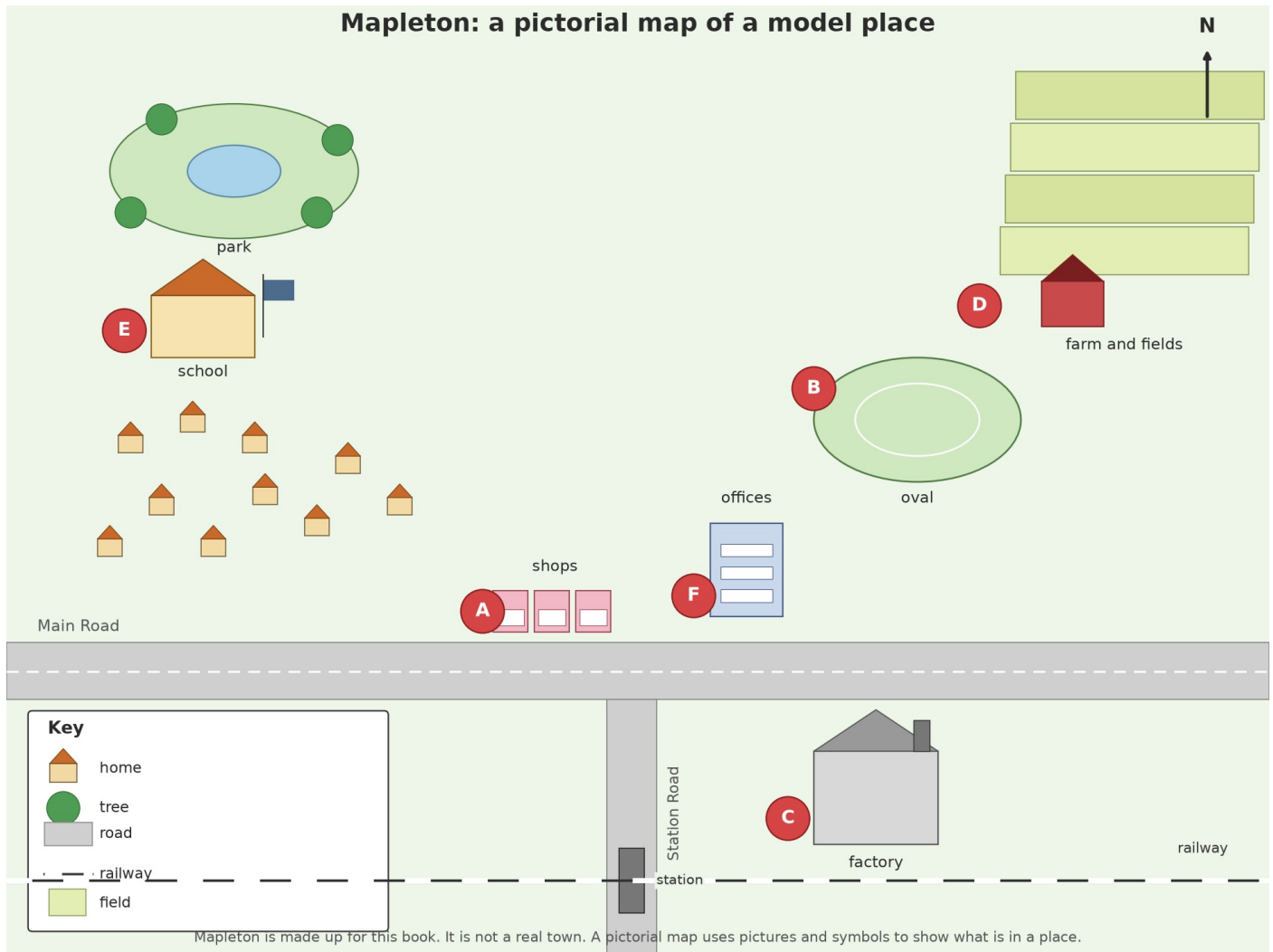
Where is it?

Every activity is in one place. Where something is = its **location**. We say the activity is **located** in that place.

Pictorial maps

We can show the activities in a place on a **pictorial map** — a map made of little pictures. Each little picture is a **symbol**, and it stands for a thing in the place. A **key** tells you what each symbol means. A north point shows which way is north.

The **Mapleton map** below shows a model place. Mapleton is made up — it is not a real town — so we can practise on it before we look at real places.



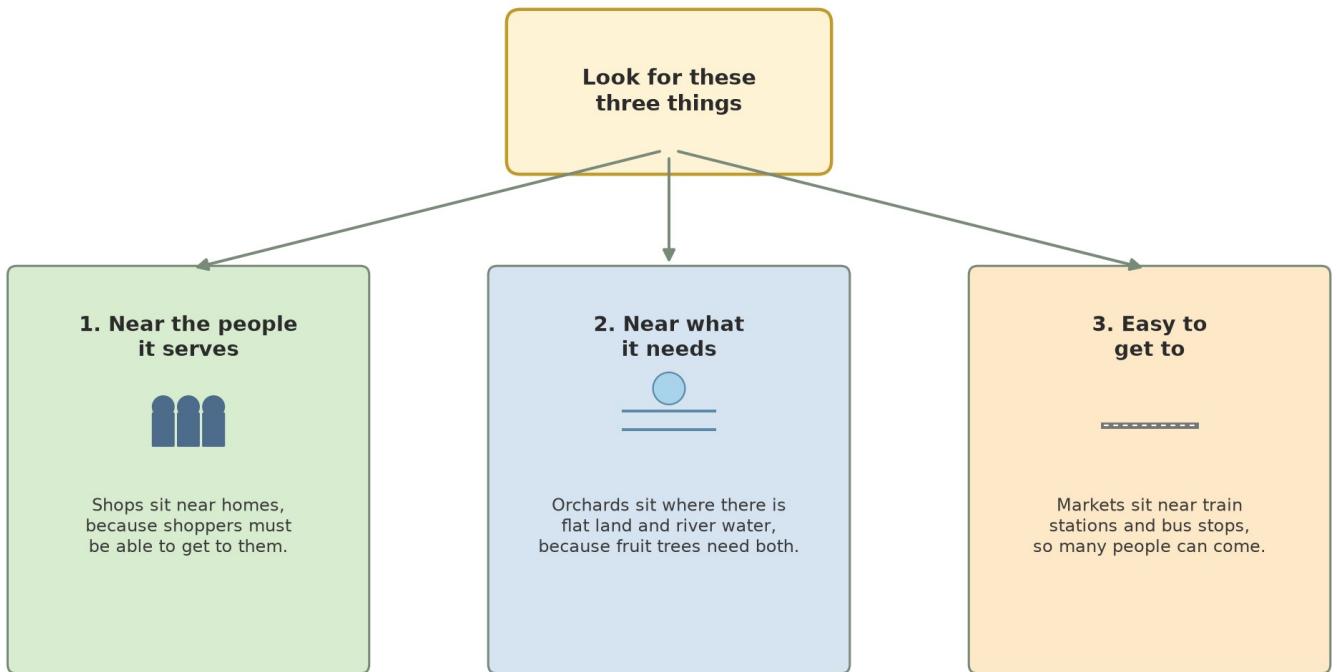
Pictorial map of Mapleton, a made-up model town: houses near a school (E) and a park with a pond; shops (A) and offices (F) along Main Road near the middle of town; an oval (B); a factory (C) beside the road and the railway, with a station; and a farm with big fields (D) at the edge of town. A key shows the symbols for home, tree, road, railway and field, and a north point shows north.

Why is it there?

Every activity is in its place for a reason. The **reasons diagram** below shows the three big reasons to look for.

Why is an activity where it is?

Three big reasons help us think about location.



The word for how easy a place is to get to is *accessibility*.

Reasons diagram with three boxes: 1 near the people it serves (shops sit near homes), 2 near what it needs (orchards need flat land and river water), 3 easy to get to (markets sit near train stations and bus stops). A caption says the word for how easy a place is to get to is accessibility.

The word for how easy a place is to get to is **accessibility**. A place with good accessibility is easy for lots of people to get to. Shops want lots of customers to be able to get to them, so shops look for a location with good accessibility.

When you ask *why is it there?*, you start thinking about space — where things are, and why. That is a big step in geography.

We try together

Worked example 1 — Why is the Queen Victoria Market where it is?

The Queen Victoria Market (“the Queen Vic”) is a real market in Melbourne. It opened in March 1878. It sits between Queen, Victoria, Peel and Franklin streets. It is bigger than seven **hectares** — a hectare is a way of measuring land, about as big as a sports oval. About 10 million people visit it in a year.

Source: Wikipedia, “Queen Victoria Market”, retrieved 25 August 2026.

- Step 1 — Name the kind. The market is full of stalls selling food and goods. Selling things = retail.
- Step 2 — Who uses it? Customers — people who want to buy food and goods. About 10 million visits a year is lots of customers.
- Step 3 — How do people get there? Look at the **market map** below. People walk from nearby homes and offices. They catch a train to Flagstaff Station or Melbourne Central Station, then walk up the street. They catch a bus. The market is easy to get to.
- Step 4 — Put it together. The market is located in the middle of a busy city so lots of customers can get to it. Good accessibility is the reason for its location.



Simple map of the real streets around the Queen Victoria Market in Melbourne: the market sheds sit between Peel, Queen, Victoria and Franklin streets; Flagstaff Station and Melbourne Central Station are on La Trobe Street; bus stops sit near the market on Queen Street and Franklin Street; arrows show visitors walking from the stations and the bus stops to the market. The market opened in 1878 and is over 7 hectares.

Worked example 2 — Why are the orchards and the fruit factory where they are?

The **valley map** below shows a real farming place: the Goulburn Valley in Victoria. Shepparton is a town in the valley, on the Goulburn River.

The valley has flat land, warm sunny summers, and river water from Lake Eildon and the Goulburn Weir that is carried to the trees. So lots of orchards are located there. Farming is located where the land and water are right for it.

Source: Wikipedia, “Goulburn Valley”, retrieved 25 August 2026 — one of the busiest fruit-growing areas in Australia; Lake Eildon and the Goulburn Weir send river water to the farms.

Near the orchards, in Shepparton, there is a big fruit factory — the SPC factory, which cans pears and peaches. SPC began in 1917, when fruit farmers started it.

Source: SPC Global, spc.com.au, retrieved 25 August 2026.

Why is the factory there? Look at the **orchard-to-shop diagram** below. Fresh fruit is heavy, and it rots fast. So the factory sits close to the orchards, and the fruit has a short trip. The cans can then have a long trip to city shops without going bad. Manufacturing is located near what it needs.

Where the fruit comes from: the Goulburn Valley, Victoria

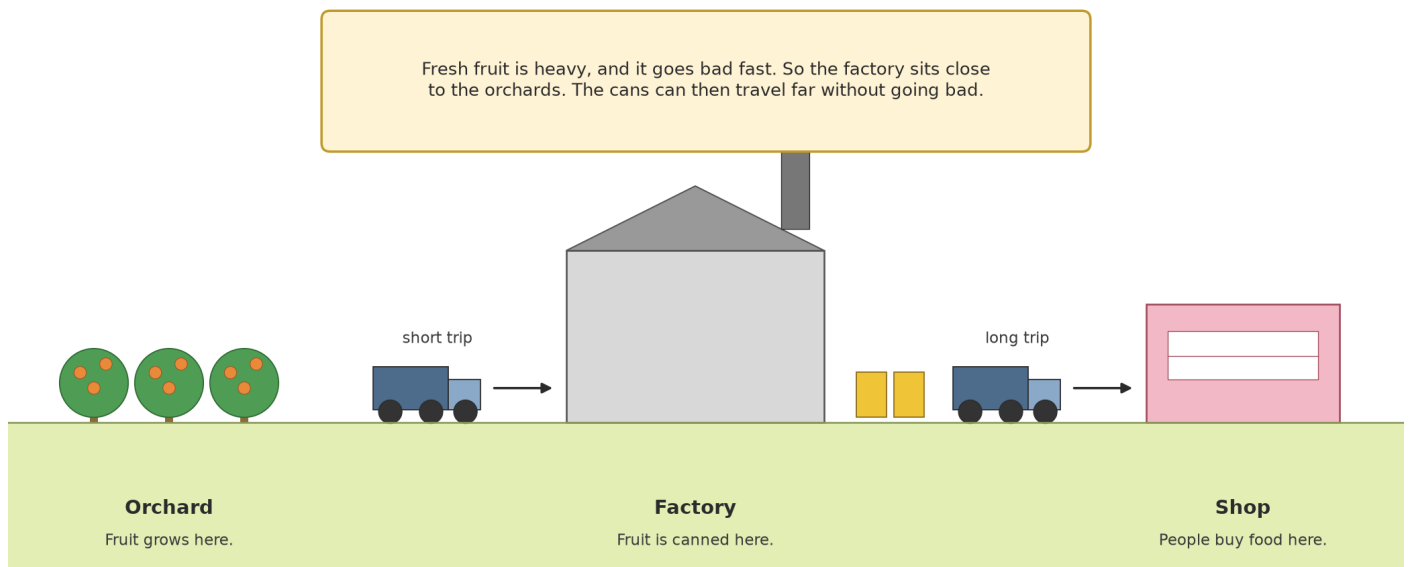


Simple outline, not to exact scale. River water from Lake Eildon and the Goulburn River helps fruit grow here.

Simple map of Victoria showing the Goulburn Valley: Shepparton on the Goulburn River, Lake Eildon and the Goulburn Weir storing river water, the Murray River along the north, Echuca and Melbourne marked, and a north point.

From orchard to factory to shop

Why is a fruit factory built near the orchards?



Labelled diagram from orchard to factory to shop: fruit grows in the orchard; a truck makes a short trip to the factory, where the fruit is canned; then a truck makes a long trip to the shop. A reason box says fresh fruit is heavy and rots fast, so the factory sits close to the orchards, and the cans can travel far without going bad.

Questions to practise

With help

- Look at the Mapleton map. Each letter A to F shows one activity. Match each letter to its kind: retail, recreation, manufacturing, farming, education or commercial.
- On the Mapleton map, the school is near the houses. Why is that a good location for a school? (Hint: who uses the school, and how do they get there?)
- Finish each sentence with a reason from the reasons diagram: *near the people it serves*, *near what it needs*, or *easy to get to*.
 - The shops sit in the middle of town, near the houses. This matches the reason: _____.
 - The farm sits at the edge of town, where the big flat fields are. This matches the reason: _____.
 - The factory sits next to the big road and the railway. This matches the reason: _____.
- The market map shows a real place. a) In what year did the market open? b) Name two ways people can get to the market. c) Why is it good for the market to be near train stations and bus stops? Use the word *accessibility* in your answer.
- Put these six activities into the six kinds: a supermarket; a swimming pool; a factory that makes cars; a wheat farm; a school; an office where people work on computers.
- The **walking-times table** below is made up. It shows how long three children take to walk from home to three places. a) Which home is closest to the shops? b) Which home is closest to the oval? c) Mia loves sport. Is Mia's home a good location for her? Why?

Walking time from three homes

A made-up example for practising.

Home	Walk to the shops	Walk to the school	Walk to the oval
Zac's home	4 minutes	6 minutes	9 minutes
Mia's home	10 minutes	3 minutes	5 minutes
Ari's home	7 minutes	8 minutes	2 minutes

Which home is closest to each place? Read the table to find out.

Made-up table of walking times from three homes (Zac, Mia and Ari) to the shops, the school and the oval, in minutes: Zac 4, 6, 9; Mia 10, 3, 5; Ari 7, 8, 2.

On your own

- Name two activities in your place (your suburb or town). Say which kind each one is, and give one reason why it is located where it is.
- Your town wants to build a new oval for young people. Where should it go? Give a reason. Think about accessibility for young people.
- Factories are often located next to big roads or railways. Give two reasons why.
- Markets are located in cities, but orchards are located out in the country. Explain why each one is where it is.

Fieldwork task

Fieldwork means going out to a real place to look and find out for yourself.

With your teacher, walk around the area near your school. If you cannot go out, use a real street map of the area instead. Find three activities. Then use the **map sheet** below: draw your place as a pictorial map, with a symbol for each activity, a key, a title and a north point. Pick one of your three activities and answer the question: why is it located where it is? Use one of the three reasons from the reasons diagram.

My place: a pictorial map

Name: _____Date: _____

N
↑

Draw your place here.
Add a symbol for each activity you find.

My symbol key

Tick: I gave my map a title. I added a north point. My key matches my symbols.

Blank sheet for drawing a pictorial map of your own place: a drawing area with a north point, lines for your name and the date, a symbol key with five blank rows, and a tick list — I gave my map a title, I added a north point, my key matches my symbols.

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Answers

1. A retail (shops), B recreation (oval), C manufacturing (factory), D farming (farm), E education (school), F commercial (offices).
2. The children who go to the school live in the houses near it, so they can walk there. A school near homes has good accessibility for children.
3.
 - a) near the people it serves. b) near what it needs. c) easy to get to.
4.
 - a)
1878.
 - b) Any two of: walk, catch a train, catch a bus. c) Near stations and stops, lots of customers can get to the market — that is good accessibility.
5. Supermarket = retail; swimming pool = recreation; car factory = manufacturing; wheat farm = farming; school = education; office = commercial.
6.
 - a) Zac's home, 4 minutes. b) Ari's home, 2 minutes. c) Yes — Mia takes only 3 minutes to walk to the oval, so the oval is easy for her to get to.
7. Answers will be different for different places. Each activity needs a kind and a reason.
8. Near the houses, so young people can walk there — good accessibility for young people.
9. Two reasons: trucks and trains can get to the factory to carry goods in and out (easy to get to), and workers can get to it.
10. A market sells food, so it wants lots of customers — cities have lots of people, so markets are located where the people are. Orchards need lots of flat land, sun and water — the country has that land, so orchards are located there.

All the working

Question 2 — Who uses a school? Children and teachers. Where do the children live? In the houses. On the Mapleton map, the school (E) sits right by the houses, so the children can walk there. A school near homes is easy for its children to get to — that is a good location.

Question 6c — Read the walking-times table. Mia takes 3 minutes to walk to the oval. That is a short walk, so the oval is easy for Mia to get to. Mia loves sport, so a home close to the oval is a good location for her.

Question 8 — The new oval is for young people, so it should go where young people live — near the houses. Then they can walk to it. That gives the oval good accessibility for young people. (This is the same reason the school on the Mapleton map sits near the houses.)

Question 9 — Reason 1: a factory makes goods, and the goods have to travel to shops. Next to a big road or a railway, trucks and trains can carry the goods in and out — the factory is easy to get to. Reason 2: workers have to get to the factory every day, so a location near roads (and near homes) helps them too.

Question 10 — A market is retail: it sells food, so it needs lots of customers. Cities have lots of people, so markets are located in cities, close to the people they serve. An orchard is farming: fruit trees need lots of flat land, sun and water. The country has big flat land and river water, so orchards are located out in the country, near what they need.

Fieldwork task — An example answer: *I found a shop (retail), a park (recreation) and an office (commercial). My pictorial map has a symbol for each one, a key, a title and a north point. The shop is located near the houses, so it is near the people it serves.*

Sustainability: how we use resources and deal with waste

Curriculum link — Victorian Curriculum Version 2 (VC2), Geography, Levels 3–4:

VC2HG4K09

- VC2HG4K09.E01
- VC2HG4K09.E02
- VC2HG4K09.E03
- VC2HG4K09.E04
- VC2HG4K09.E05

Cross-curriculum priority: Sustainability — carried by all five elaborations; taught in full in this section.

Chapter 1 bindings honoured: sustainability defined as maintaining the source-and-sink functions into the future (E01); the renewal rule (E02); the breakdown rule (E03); water investigated as the named real resource, with reduced consumption and recycled wastewater (E04); classroom/school audit, local-government waste management, nude-food lunch boxes, recycled toilet paper and timber management (E05). Aboriginal and Torres Strait Islander content is excluded (Rule 1); none is used. All diagrams are original; model diagrams are labelled as such.

Theory

What we will learn

- The environment does two jobs for us. It is our **source** — it gives us the things we use. It is also our **sink** — it takes our waste and breaks it down or holds it safely.
- **Sustainability** means making sure the environment can keep doing both jobs into the future.
- Two rules keep things sustainable: the **renewal rule** (do not use a renewable resource faster than it renews) and the **breakdown rule** (do not add waste faster than it can break down, and do not add non-breaking waste at levels that harm people, animals or plants).
- We will follow one real resource — **water** — from where it comes from, to how its use can be made sustainable.
- We will look at how **timber** is used — in ways that are sustainable, and ways that are not — and we will do a real **audit** in our own school.

Words to know

- **environment** — everything around us: air, water, soil, plants, animals and people
- **natural resource** — something from nature that people use, like water, timber, soil, coal or gas
- **renewable** — able to be replaced in nature as fast as we use it, if it is managed well
- **non-renewable** — a fixed amount in nature; once it is used up, it is gone
- **sustainability / sustainable** — keeping the environment's source and sink jobs going into the future

- **waste** — what we throw away or must get rid of
- **sink** — a place where waste goes and is broken down or held safely
- **biodegradable** — able to be broken down by living things into soil
- **non-biodegradable** — not able to break down into soil; stays a very long time
- **landfill** — a place where rubbish is buried
- **recycled water** — used water that has been cleaned and used again (not for drinking)
- **desalination** — taking the salt out of sea water to make fresh water
- **plantation** — a forest that people plant and look after, to grow timber
- **harvest** — to cut and gather a crop, like trees for wood
- **electricity** — the power that runs lights and machines
- **audit** — a careful looking-and-counting check
- **fieldwork** — finding things out by going and looking for yourself

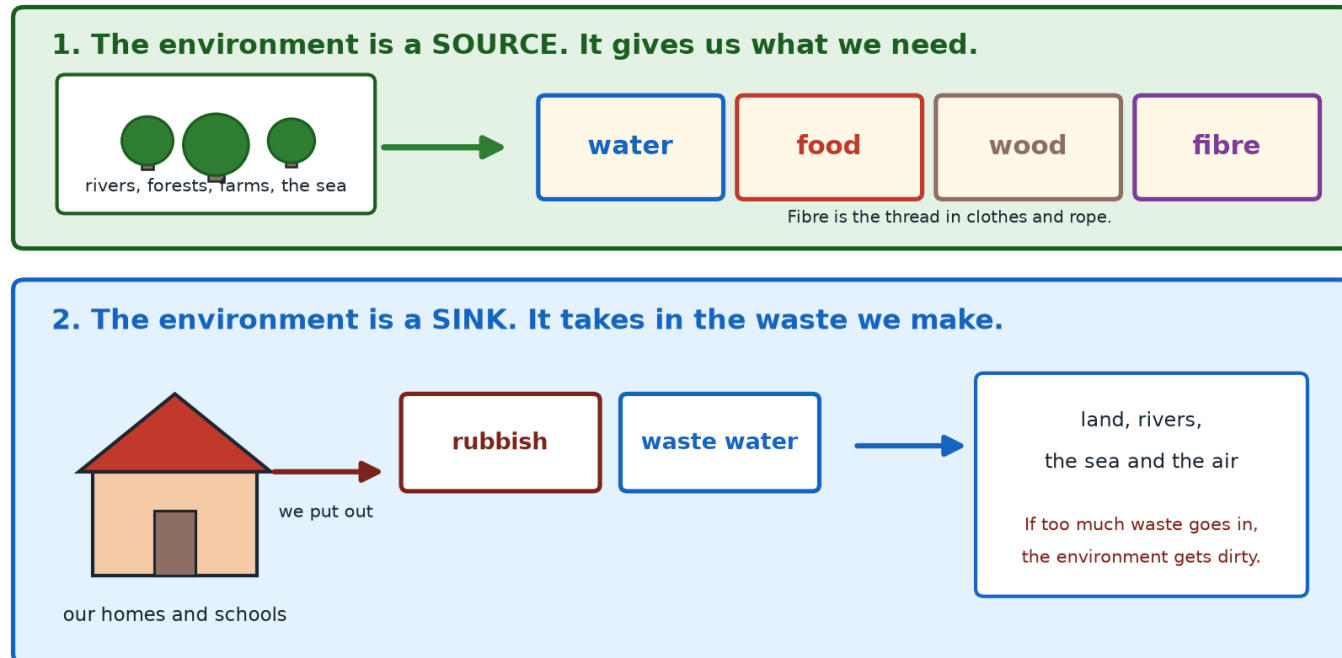
Part 1 — The environment: our source and our sink

Everything we use begins somewhere in the environment. The wood in a pencil comes from trees. The water from a tap begins as rain that fills dams. Even coal and gas began as living things a very long time ago.

The environment is also where our waste ends up. Food scraps can break down and become soil. Rubbish that cannot break down is buried in landfill. So the environment does two jobs: it is our **source** of things, and it is our **sink** for waste.

Sustainability means making sure the environment can keep doing both jobs into the future.

Source and sink: what the environment does for us



Two rows of pictures. Top row: a forest, a dam and a mine give us timber, water and coal, labelled 'source — the environment gives us things'. Bottom row: our waste goes to soil, to landfill and to the air, labelled 'sink — the environment takes our waste'.

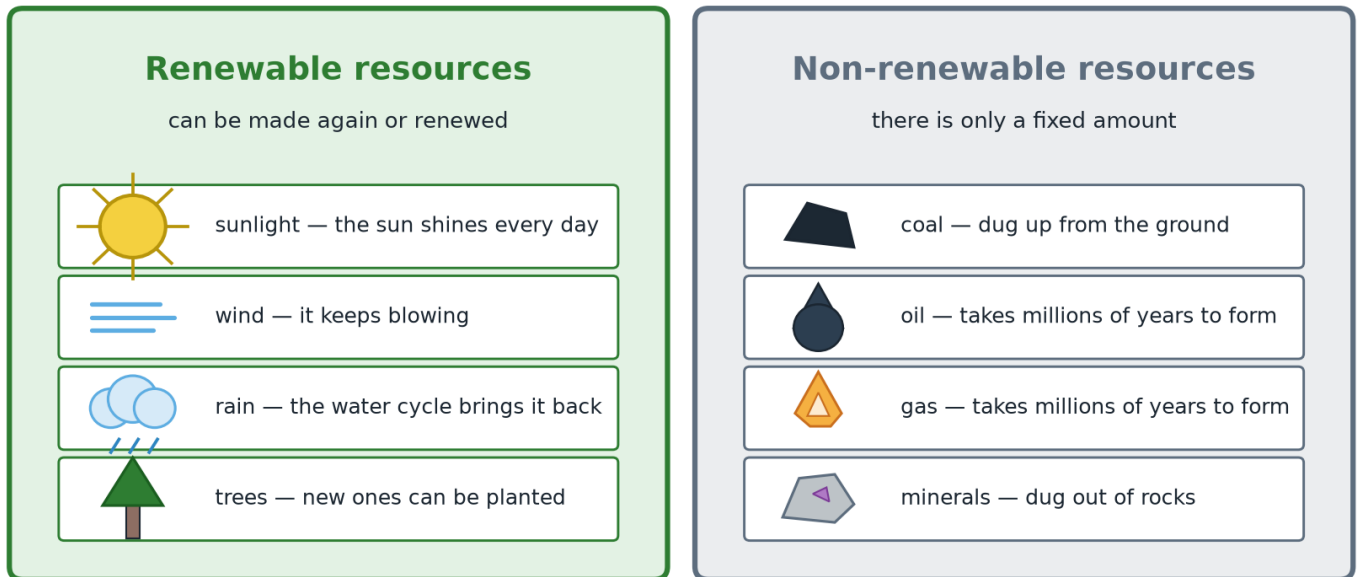
Picture 1. The environment does two jobs for us: source and sink.

Part 2 — Renewable and non-renewable resources

Some natural resources can be replaced as fast as we use them. Sunlight shines every day. The wind keeps blowing. Rain refills our dams. Trees can be replanted. These are **renewable** resources — but only if they are managed well.

Other resources are a fixed amount in nature. Coal and gas took millions of years to form. When we burn them, they are gone for good. These are **non-renewable** resources.

Two kinds of natural resources



Be careful! A renewable resource can still run out — if we use it faster than nature can replace it.

Two panels. The left panel shows the sun, wind, rain and trees, labelled 'renewable — can be replaced as fast as we use it'. The right panel shows coal, gas, oil and rocks, labelled 'non-renewable — a fixed amount; once used, gone'.

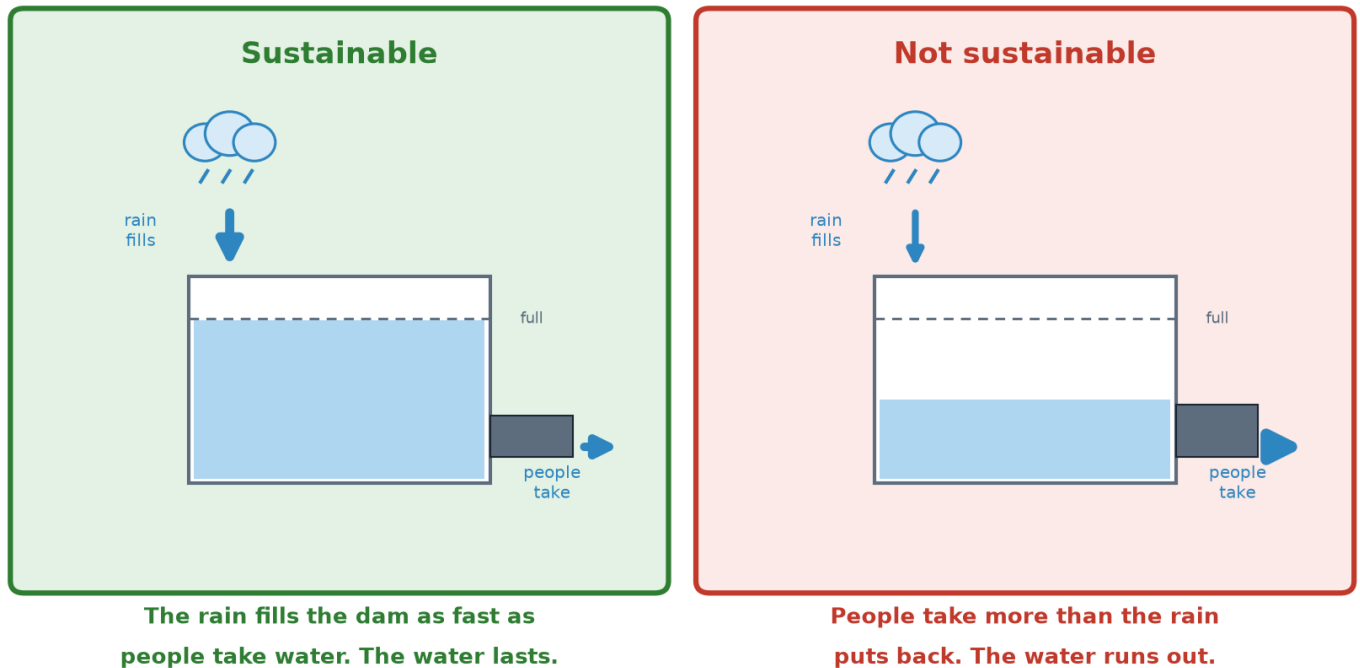
Picture 2. Renewable resources can be replaced. Non-renewable resources are a one-time gift.

Part 3 — The renewal rule

A renewable resource only stays renewable if we follow the **renewal rule**: do not use it faster than it renews.

Picture a dam. Rain fills it. People take water out. If the rain puts back as much as people take, the water lasts. That is sustainable. But if people take more than the rain puts back, the dam slowly empties. Then a renewable resource starts to run out — and that is not sustainable.

The renewal rule: do not use a resource faster than it renews



Sustainability means making sure the taking never beats the renewing.

Two dam pictures. The left dam gets as much rain as people take out, so it stays full, labelled 'sustainable'. The right dam has people taking more than the rain puts back, so the water level is low, labelled 'not sustainable'.

Picture 3. The renewal rule: the taking must never beat the renewing.

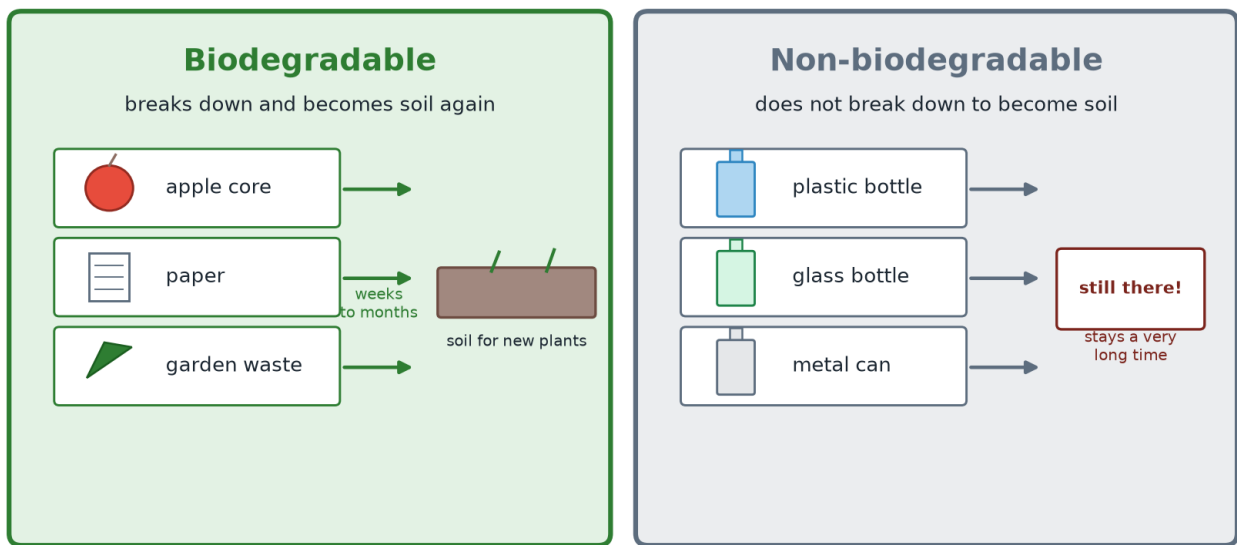
Part 4 — The breakdown rule

Waste has a rule too — the **breakdown rule**. It has two parts.

Part one: **biodegradable** waste, like food scraps and garden waste, must not be added faster than it can break down. Most of it breaks down in weeks to months and becomes soil for new plants.

Part two: **non-biodegradable** waste, like plastic, glass and metal, must not be added at levels that harm people, animals or plants. It does not break down to become soil. A plastic bottle left in the bush can stay there for a very long time.

What happens to our waste?



Plastic breaks down very slowly, so it can stay in the environment a very long time. That is why we recycle it — and never drop it as litter.

Two panels. The left panel shows an apple core, paper and garden waste breaking down into soil in weeks to months, labelled 'biodegradable'. The right panel shows a plastic bottle, a glass bottle and a metal can that do not break down, labelled 'non-biodegradable — still there!'.

Picture 4. Some waste becomes soil again. Some waste just stays.

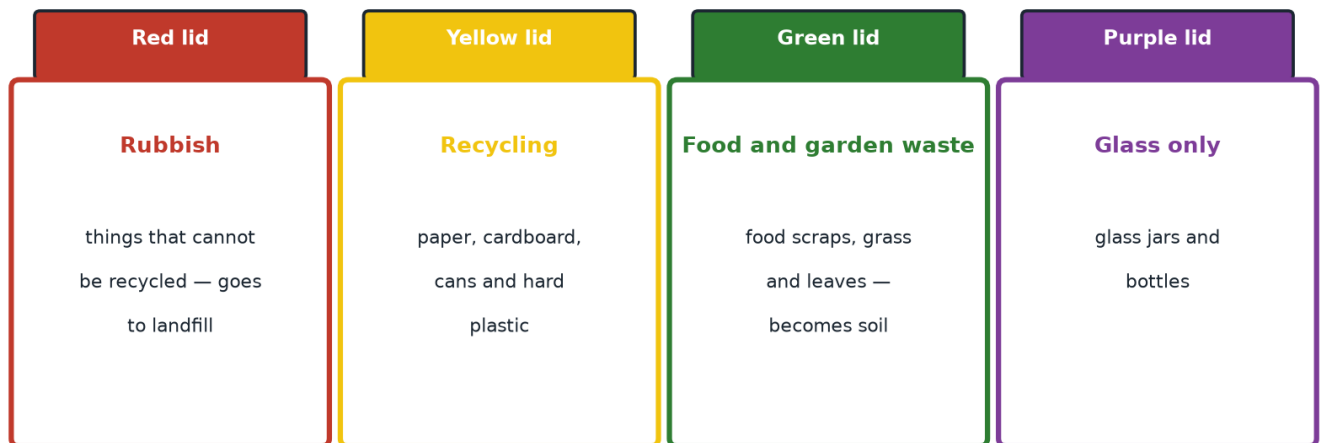
Part 5 — Managing waste in Victoria

One big way we look after the sink is by sorting our waste. In Victoria, homes have four bins: a **red** lid for rubbish that goes to landfill, a **yellow** lid for recycling (paper, cardboard, cans and hard plastic), a **green** lid for food and garden waste, and a **purple** lid just for glass. Under Victoria's recycling plan, every home will have the green bin by 2030 and the purple bin by 2027.

Your bins are collected by your local council — that is **local government** doing the waste job. The council runs the tip and the recycling, and turns green waste into new soil.

Victoria also has a Container Deposit Scheme: most drink bottles and cans can be taken to a return point to get 10 cents back, and there are more than 600 return points around Victoria. And Victoria has said no to some plastic things we use only once, like plastic straws, plates and forks.

Victoria's four bins



Under Victoria's recycling plan, every home will have a food and garden waste bin by 2030 and a glass bin by 2027.

Sort it right! Food scraps in the red bin cannot be recycled — they just get buried.

Four bins with coloured lids: red for rubbish to landfill, yellow for recycling, green for food and garden waste, and purple for glass only.

Picture 5. Victoria's four bins. Sorting it right keeps more waste out of landfill.

Part 6 — A close look at one real resource: water

Water is renewable — the rain refills the dams. So where does Melbourne's water come from? Most of it comes from protected forests and hills, where rain fills big dams, and the water is cleaned before it reaches your tap. Some comes from the sea: at a **desalination** plant near Wonthaggi, salt is taken out of sea water — it can make up to 150 billion litres a year. And some water is used twice: used water from homes goes to a cleaning plant and comes back as **recycled water**. It is not for drinking, but it waters parks, farms and sports fields, like on Phillip Island.

Water use can be made more sustainable in two big ways. One is **using less**. Melbourne has simple water-saving rules all year round, called the Permanent Water Saving Rules, which started in 2011 — things like watering the garden in the cool part of the day and fixing dripping taps straight away. Not long before that, between 2006 and 2012, Melbourne had very little rain and people had to use much less water; the habits we learned then still help today. The other way is **recycling wastewater**, so the same water does two jobs.

Where Melbourne's water comes from (model diagram — not to scale)

1. Most of Melbourne's water:



2. Sea water with the salt taken out:



3. Used water gets cleaned and used again:



Three rows. Row one: protected forests and hills fill dams with rain, the water is cleaned, and it reaches your tap. Row two: sea water goes to the desalination plant near Wonthaggi and joins the pipes. Row three: used water from homes is cleaned and becomes recycled water for parks, farms and sports fields.

Picture 6. Where Melbourne's water comes from (model diagram — not to scale).

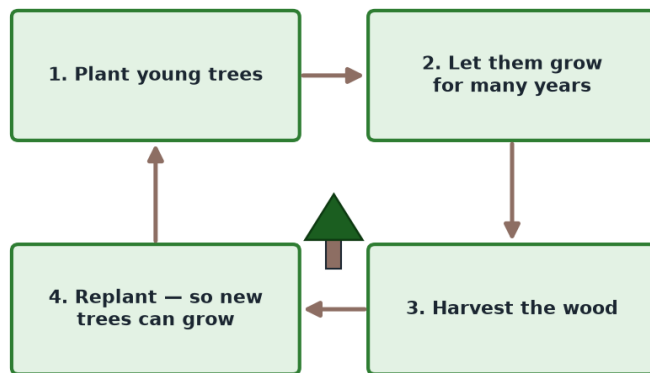
Part 7 — Timber: sustainable and non-sustainable ways

Timber is renewable — if it is managed well. In a **plantation**, people plant young trees, let them grow for many years, harvest the wood, and replant. Round and round it goes, so the timber keeps coming.

Native forests are different. They grew by themselves over a very long time, they are homes for many animals, and they are slow to grow back. People argued about cutting native forests for wood. Some people said logging gave them wood for homes and furniture, and jobs in country towns. Other people said native forests are animal homes that take a very long time to grow back, so cutting them was taking more than nature could put back. From 1 January 2024, Victoria stopped logging native forests. Most timber in Victoria now comes from plantations.

Timber: a renewable resource — if it is managed well

A plantation is a forest people plant for timber.



Round and round it goes —
that is why timber can be renewable.

What about native forests?



Native forests grew by themselves,
over a very long time. They are homes
for many animals, and they are slow
to grow back.

**People argued about cutting native forests for wood. From 1 January 2024,
Victoria stopped logging native forests. Most timber in Victoria now comes from plantations.**

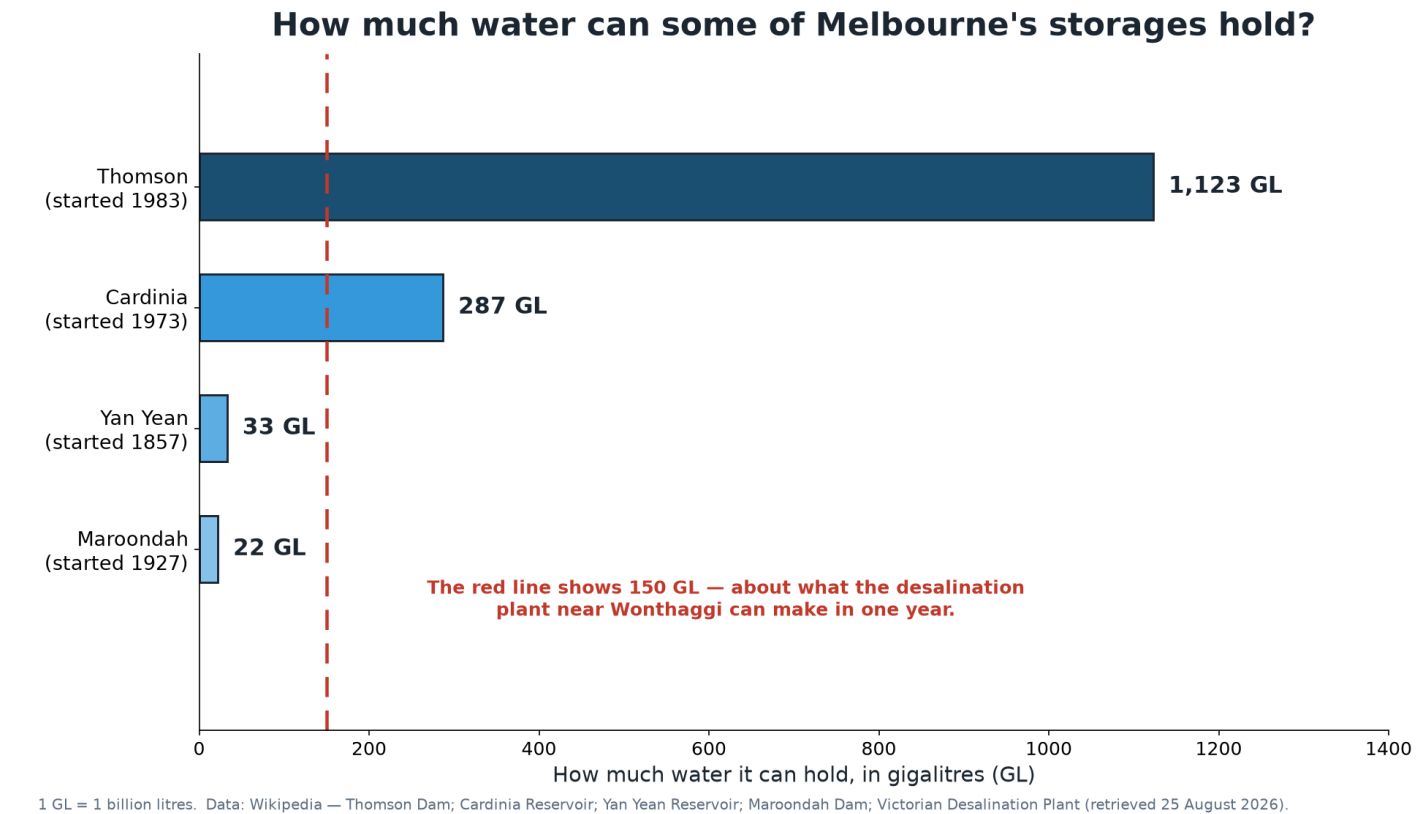
Left: a four-step cycle for a plantation — plant young trees, let them grow, harvest the wood, replant. Right: a native forest panel with trees, and the note that from 1 January 2024 Victoria stopped logging native forests.

Picture 7. Plantation timber goes round in a cycle. Native forests are not part of that cycle in Victoria any more.

Worked examples

Worked example 1 — Reading a real data graph: Melbourne’s water storages

This graph shows real facts about four of Melbourne’s water storages.



A bar graph of how much water four Melbourne storages can hold: Thomson 1,123 GL (started 1983), Cardinia 287 GL (started 1973), Yan Yean 33 GL (started 1857) and Maroondah 22 GL (started 1927), with a red dashed line at 150 GL.

Picture 8. How much water can some of Melbourne’s storages hold? (1 GL = 1 gigalitre = 1 billion litres.)

Let’s read it step by step.

- Read the title.** The graph measures how much water each storage can hold, in gigalitres (GL). 1 GL is 1 billion litres.
- Find the biggest.** The longest bar is Thomson: 1,123 GL. It started storing water in 1983.
- Find the oldest.** The labels give the years. Yan Yean started in 1857 — the oldest of the four, holding 33 GL.
- Use the red line.** The red line is 150 GL — about what the desalination plant near Wonthaggi can make in one year. Thomson holds more than seven times that much. Maroondah (22 GL) and Yan Yean (33 GL) each hold less.
- Say what it means.** Melbourne keeps its water in storages of very different sizes and ages. The rain that fills them is a renewable resource — as long as we follow the renewal rule.

Worked example 2 — Sorting a real lunch

Here is a lunch and where each thing should go. Copy the thinking.

Thing	Where it goes	Why
Banana skin	Green bin (food and garden)	Biodegradable — becomes soil
Paper sandwich bag	Yellow bin (recycling)	Paper can be recycled
Drink can	Return point first (10 cents!), then yellow bin	Recycling a non-renewable metal
Broken plastic toy	Red bin (rubbish)	Hard to recycle — goes to landfill

Thing	Where it goes	Why
Glass jar	Purple bin (glass only)	Glass is recycled separately

Checking the sink: only one thing ends up in landfill. The rest are recycled or become soil. That is the breakdown rule and good sorting working together.

Practice questions

Practice with help

S1. Source or sink? (Picture 1 helps.) Write *source* or *sink* next to each one. The first is done for you.

- a) A dam full of rain water for our taps — **source** (done)
- b) Soil breaking down our food scraps into new soil — _____
- c) A plantation growing trees for pencil wood — _____
- d) Landfill holding buried rubbish safely — _____

S2. Renewable or not? Tick the box, then finish the reason starter.

- a) Sunlight — renewable / non-renewable. Reason starter: *It is renewable because...*
- b) Coal — renewable / non-renewable. Reason starter: *It is non-renewable because...*
- c) Water in dams, refilled by rain — renewable / non-renewable.
- d) Natural gas — renewable / non-renewable.

S3. Which dam follows the renewal rule?

- Dam A: rain puts in 2 buckets a day; people take out 2 buckets a day.
- Dam B: rain puts in 1 bucket a day; people take out 3 buckets a day.

Fill in: Dam _____ is sustainable because the rain puts back _____ the people take. Dam _____ is not sustainable because the taking beats the _____.

S4. Will it break down? Sort these into two lists (Picture 4 helps). Hint: think *becomes soil* or *stays*.

apple core · plastic bag · leaves · glass jar · paper · metal can

S5. Which bin? Use Picture 5. One is done for you.

- a) Newspaper → yellow bin (done)
- b) Apple core → _____
- c) Glass bottle → _____
- d) A plastic wrapper that cannot be recycled → _____

S6. Write with a model. Read the model below, then write 2–3 sentences of your own about one way YOUR class saves water or cuts down waste. Say why it helps. Starters if you want them: *One way our class helps is... This helps because...*

Model writing — read it, then write your own

How our class saves water

One way our class saves water is by turning taps off tight
after we wash our hands. This helps because less clean water
goes down the drain. That leaves more water in the dams for
everyone. We can also tell our families what we learned.

Now you try: write about one way YOUR class saves water or cuts down waste. Say why it helps.

A model paragraph on writing lines: 'How our class saves water. One way our class saves water is by turning taps off after we wash our hands. This helps because less clean water goes down the drain. That leaves more water in the dams for everyone. We can also tell our families what we learned.'

Picture 9. Model writing — read it, then write your own.

Practice on your own

U1. The renewal rule says: do not use a renewable resource faster than it renews. Explain this rule in your own words, using your own example (not a dam).

U2. A creek near a park has plastic bags and bottles in it. Use the words *biodegradable* and *non-biodegradable* to explain why this is a problem for the animals and plants that live there.

U3. Name two ways the use of water can be made more sustainable — one way that uses less, and one way that recycles wastewater. For the recycling way, name a real place in Victoria where recycled water is used.

U4. Native forests: give one reason some people supported logging them, and one reason other people were against it. What did Victoria decide from 1 January 2024? Use the renewal rule to say why cutting native forests faster than they regrow was not sustainable.

Inquiry task — read the real graph, then question it

Look again at Picture 8 (the water storages graph).

- a) Which storage can hold the most water? How much?
- b) Which storage is the oldest? When did it start?
-

- c) The red line shows 150 GL — about what the desalination plant can make in a year. Which two storages hold less water than that?

- d) Now be the question-setter: write one question about Melbourne's water that this graph *cannot* answer.

Class audit — our fieldwork (Picture 10)

This is **fieldwork**: we go and look for ourselves. With your teacher, walk around your school with this audit sheet. For each thing you find, fill in one circle. Then write how many.

Our school sustainability audit

Walk around the school with your class. For each thing you find, fill in one circle. Then write how many.

What we look for	Tally	How many?
Dripping taps we find	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Lights on in empty rooms	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Taps left running	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Recyclable things in the red (rubbish) bin	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Food scraps in the green (FOGO) bin at lunch	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Drink containers we could return for 10 cents	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	

When you finish, ask: What can our class do better? Who can we tell?

An audit sheet titled 'Our school sustainability audit' with rows to tally: dripping taps we find, lights on in empty rooms, taps left running, recyclable things in the red rubbish bin, food scraps in the green bin at lunch, and drink containers we could return for 10 cents.

Picture 10. Our school sustainability audit sheet.

When you finish, answer in your book:

1. Which row had the highest count?
2. What is one thing our class could do better next week?
3. Who else could we tell — our school, or local government (the council)?

Think about it

1. A **'nude food' lunch box** has no wrapping — the food sits loose in the box or in reusable pots. Why does this cut down waste? Where would the wrapping usually have ended up?
2. **Recycled toilet paper** is made from paper that has already been used once. Explain how choosing it helps both jobs of the environment — the source job and the sink job.
3. Imagine your council stopped collecting bins for a month. What would happen to your street, and what does that tell you about why local government manages waste?

Answers

S1. b) sink c) source d) sink.

S2. a) renewable — the sun keeps shining every day. b) non-renewable — coal took millions of years to form; once burnt, gone. c) renewable — rain refills the dams. d) non-renewable — a fixed amount; once used, gone.

S3. Dam A is sustainable because the rain puts back **as much as** the people take. Dam B is not sustainable because the taking beats the **renewing**.

S4. Becomes soil (biodegradable): apple core, leaves, paper. Stays (non-biodegradable): plastic bag, glass jar, metal can.

S5. b) green bin c) purple bin d) red bin.

S6. Answers will be different. A good answer names one action (for example, turning taps off, using a refillable drink bottle, or a nude food lunch box) and says why it helps (less water used, or less waste made).

U1. Answers will be different. A good answer says the resource must get replaced as fast as it is used, with a fresh example (for example, picking fruit from a tree: if we pick only what regrows each year, the tree keeps feeding us).

U2. A good answer says plastic is non-biodegradable, so it does not break down to become soil; it stays in the creek and can harm the animals and plants there (for example, a turtle or a platypus eating or getting tangled in it).

U3. Using less: for example, shorter showers, fixing dripping taps, following the Permanent Water Saving Rules. Recycling wastewater: used water is cleaned and used again for parks, farms and sports fields — for example, on Phillip Island, where farms and ovals have been watered with recycled water since 2012.

U4. For logging: wood for homes and furniture, and jobs in country towns. Against: native forests are animal homes that regrow very slowly, so logging took more than nature could put back. Decision: from 1 January 2024, Victoria stopped logging native forests; most timber now comes from plantations. Renewal rule: the trees were being cut faster than they could regrow, so the resource could not renew.

Graph task. a) Thomson — 1,123 GL. b) Yan Yean — started 1857. c) Maroondah (22 GL) and Yan Yean (33 GL). d) Answers will be different (for example, *How full are the storages right now?* or *How much water does Melbourne use in a year?* — the graph shows what storages can hold, not those things).

Class audit. 1–3 will be different for every school. A good answer names the highest row, one class action, and whether the school or the council is the right one to tell (for example, dripping taps → tell the school; broken bins at the park → tell the council).

Think about it. 1) No wrapping means nothing to throw away; the wrapping would usually have ended up in the red bin (landfill) or as litter. 2) Source job: fewer new trees need to be cut for paper. Sink job: less used paper ends up as waste. 3) Rubbish would pile up, smell, and bring in rats and flies; recyclables would not be recycled. It shows we depend on local government to keep the sink working.

Teacher notes

- **Coverage map (VC2HG4K09):** E01 → Part 1, S1; E02 → Parts 2–3, S2, S3, U1; E03 → Part 4, S4, U2; E04 → Part 6, Worked example 1, Inquiry task, S6 model, U3; E05 → Parts 5 and 7, Worked example 2, S5, U4, Class audit, Think about it. All five elaborations carry the Sustainability cross-curriculum priority and are taught in full.
- **Chapter 1 bindings:** sustainability is defined exactly as the maintenance of the source-and-sink functions into the future; the renewal rule and breakdown rule are named and applied; water is the investigated real resource (reduced consumption via the Permanent Water Saving Rules and the 2006–2012 restrictions era; recycled wastewater via the Phillip Island scheme); the classroom/school audit is delivered as fieldwork.
- **Contested terms (per CONTESTED_TERMS.md):** native-forest logging is the contested issue. Both positions are steelmanned symmetrically in Part 7 and U4 (jobs and wood supply vs animal habitat and slow regrowth), in Level-3 language, and the dated policy outcome (Victoria ceased native-forest logging on 1 January 2024; announced 23 May 2023) is stated as fact.

- **Exclusions:** no Aboriginal and Torres Strait Islander content is used (Rule 1). Nothing from the §2A exclusion list is taught.
- **Diagrams:** all ten figures are original, generated by scripts in `src/`. Pictures 1–7, 9 and 10 are model diagrams (labelled “not to scale” where spatial); Picture 8 is a real-data figure with sources and retrieval date printed on the figure.
- **Vocabulary:** student-facing text is written to a Year 3 ceiling (rank 3) and checked with the house vocabulary gate (`gate_lc.py`); curriculum-owned and defined subject terms are exempt per `WORD_LEVEL_POLICY.md`.
- **Differentiation:** S1–S6 give starters, models and hints; U1–U4 remove them. The audit sheet doubles as a collaborative fieldwork task for mixed-ability pairs.

Sources (teacher)

- Wikipedia — *Thomson Dam*; *Cardinia Reservoir*; *Yan Yean Reservoir*; *Maroondah Dam*; *Victorian Desalination Plant* (capacities, completion years, 150 GL/yr desalination capacity; retrieved 25 August 2026). Desalination plant located near Wonthaggi (Dalyston), completed December 2012.
- Victoria’s recycling policy — four household bins (red/yellow/green/purple), glass bin by 2027 and food-and-garden (FOGO) bin by 2030 rollout; single-use plastics banned (straws, cutlery, plates among banned items) — vic.gov.au (page updated 8 May 2026; retrieved 25 August 2026).
- Vic Container Deposit Scheme (CDS for Victoria): 10-cent refund on eligible containers, more than 600 refund points statewide (retrieved 25 August 2026).
- Phillip Island Recycled Water Scheme: operating since September 2012, Class A recycled water for non-drinking uses (farms, ovals, parks) — Western Port Water (retrieved 25 August 2026).
- Melbourne water history: Stage 1 restrictions from 28 August 2006; restrictions lifted 1 December 2012; Permanent Water Saving Rules in place since 2011 (retrieved 25 August 2026).
- Native-forest logging: Victoria ceased native-forest logging on 1 January 2024 (policy announced 23 May 2023); most Victorian timber now from plantations (retrieved 25 August 2026).