Teacher Notes

Themes

- Animal biodiversity
- Habitats and ecosystems
- Threatened species
- Conservation and sustainability

Key learning outcomes

- Marvel at the diversity of animals that need tree hollows
- Learn how tree hollows form and how long it takes
- Discover how animals use and take care of tree hollows
- Understand the threats to these habitats and ecosystems and empathise with threatened species
- Learn how people can help to conserve habitat by making sustainable choices
- Appreciate how scientists study wildlife and ecosystems

Key curriculum areas

- Science: Biology for Science Understanding, Science as a Human Endeavour, Science Investigation
- English: Language, Literature, Literacy
- HASS: Geography
- Mathematics: Number and algebra, Measurement and geometry, Statistics and probability
- Cross Curriculum Priority – Sustainability: Systems, world views, futures

Publication details

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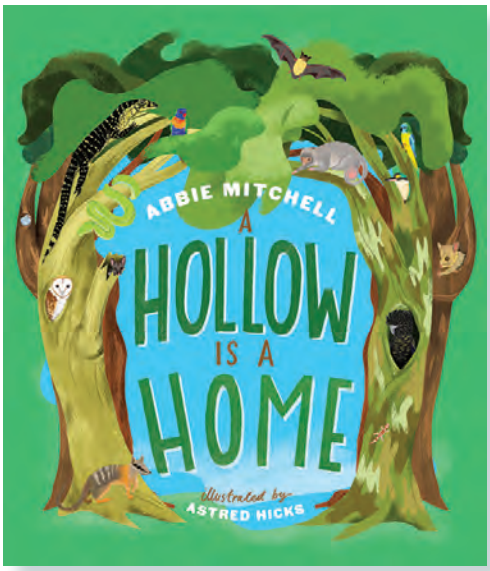
Teacher notes prepared by Mike McRae.



A Hollow Is a Home

Abbie Mitchell

Illustrated by Astred Hicks

Come and take a peek inside the amazing world of tree hollows and discover more than 340 species of incredible Australian animals that call hollows home. With colour photos of glorious gliders, darting dunnarts, minute microbats and many more, this book is full of fun facts about animals that use tree hollows as places for resting, nesting or hiding. Find out how hollows are created, why they are so vital to healthy ecosystems and the ways that they are threatened. You'll meet scientists who spend their time hollow-hunting and there are also plenty of tips on how you can spot hollows yourself, help to protect the environment and encourage habitat for hollow-dependent animals.

Readers in Years 3 to 6

CSIRO PUBLISHING
www.publish.csiro.au

Locked Bag 10, Clayton South, VIC 3169, Australia | Tel: 1300 788 000 (local call in Australia) | Email: publishing.sales@csiro.au

Teacher Notes

About the author and illustrator

Abbie Mitchell is an environmental educator who provides school and community programs to celebrate and promote Australian biodiversity. She lives in the bush with her husband, two kids, some stingless beehives and a couple of charismatic dogs – and lots of native creatures.

Astred Hicks is an award-winning book designer, illustrator and author. She has been designing books for over 10 years through her Sydney-based business Design Cherry.

Pre-reading activities

To prepare students for reading *A Hollow Is a Home*.

Find a tree on the school grounds that students can spend some time observing. Invite students to explain what makes it different to a shrub or even a grass. Ask them to describe the living things – both those they can see and those they might not be able to – that would use the tree, differentiating between those that might simply be stopping for a rest and those that use the tree for other resources.

Use this tree as a reference point for the book, returning to it for comparison or contrast. The students might be able to find out its species name and perhaps even other characteristics such as its age or major events in its life.

Discussion questions

Science

1. Ask students what they think different conservation statuses might mean and invite them to provide examples they've heard before. Discuss with them how an animal might be placed on an official conservation list. (Page 7)
2. Create a list of reasons an animal might require a tree hollow for survival. Discuss why animals are vulnerable to exposure to the elements and how a tree hollow might provide added benefits. (Pages 8–13)
3. Ask students to look up the life spans of some of the species listed in the illustration on page 18. Compare this with how long it takes a hollow to form in a tree. If habitat in a certain area is destroyed, why might planting new trees not be enough to save a threatened species?

4. Have students describe what they like about their home and what they use it for. Animals live in different ecosystems and require different resources from their habitats. What features of a tree and its hollow might different animals want? (Pages 24–29) Use the 'Creature feature' panels throughout the book as examples.
5. Being careful to instruct students not to give away too much about their address, discuss with them how far they might travel in a typical week. Who travels the furthest? Who barely leaves their suburb? Use this to discuss how different animals have their own 'ranges', drawing comparisons of their area with areas students might be familiar with. (Page 31)
6. Do any of the students have chores that they do around the house? Discuss how these are similar or different to the housekeeping that animals do to their hollows. (Pages 40–45)
7. Habitats are cleared for a variety of reasons. Ask students how this makes them feel and what impact this might have on wildlife. Give them a scenario, for example a woodland ecosystem being cleared for urban development, and invite them to predict the consequences for the animals that lived there. (Page 46)
8. Tree hollows are in high demand and at times there are not enough for all the animals that need them. Sometimes animals have to find a substitute, especially in an urban environment. Ask students if they have any amusing or shocking experiences of animals moving into their own homes. (Pages 54–59)
9. Many kinds of scientists pay close attention to what lives in tree hollows as part of their work. Ask students for examples of different kinds of scientists who might study animals. Perhaps they personally know somebody who works in such a profession? (Pages 72–75)
10. Making an urban environment friendly for animals that live in hollows could be one way to help species whose homes have been destroyed or are threatened. Ask students for their ideas on ways they can turn a garden or part of the schoolyard into an animal-friendly ecosystem. Remind them of the threats their own pets pose and what might be done to reduce the risks. (Page 87)

English

1. *A Hollow Is a Home* provides the scientific names of animal species. Why might these complicated sounding names be used instead of common names? Invite students to try to pronounce them. (Page 6)
2. *A Hollow Is a Home* is full of wonderful facts on animals and their habitats. The scientist profiles also discuss some facts, but include a few subjective opinions. Discuss with the students the difference between a fact and an opinion, and ask them to find examples of each in the profiles. (Pages 72–75)

3. At the back of *A Hollow Is a Home* there's a glossary of terms which students might or might not understand already. Ask the students to select five new words from the glossary to use in a short composition about an animal or ecosystem from the book.

Mathematics

1. Roughly 115 species of Australian bird make use of tree hollows, which is about 15 per cent of the total number of species. Estimate with the students how many species of birds there are in the country. Use the chart on page 23 to make estimates for other groups of animals.
2. *A Hollow Is a Home* is full of measurements describing quantities of area, length and time. Ask students to come up with as many units for each as they can, and discuss which are most appropriate for describing specific things, from tree height to hollow size.

Activities

Science

Conservation conversation

The International Union for Conservation of Nature (IUCN) is the worldwide authority on the health of living populations around the globe. Its 'Red List' can be found online, and it provides readers with a snapshot of the status of a variety of animals. (Pages 6–7)

Ask students to see if they can find their favourite animal on the list. Come up with some examples of extinct, threatened and vulnerable animals, and discuss why they are under threat or extinct. Invite students to create posters that promote these facts. Ask them to think about who they want to read their poster. Would the choice of audience affect the design of the poster and the language they might use?

Extension: Have students provide their opinion on what might be done to conserve their choices of species. Once they've written this down, ask them to describe other consequences of this action.

Label a tree

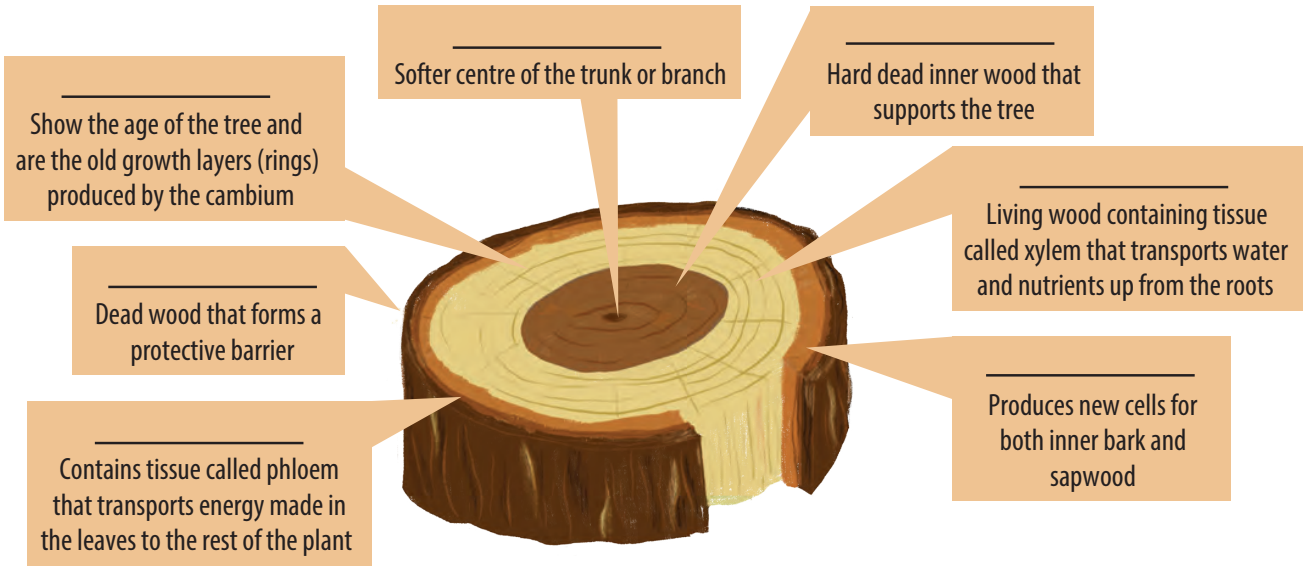
A hollow forms when the inside of a tree is damaged, for example by termites, fungi or fire. Read the section 'Heart attack: how hollows form' (Pages 15–16). Explain the names of the different tissues inside the tree and how they help the tree to grow. Students can complete the worksheet 'What is inside a tree?', which is found on the next page.

What is inside a tree?

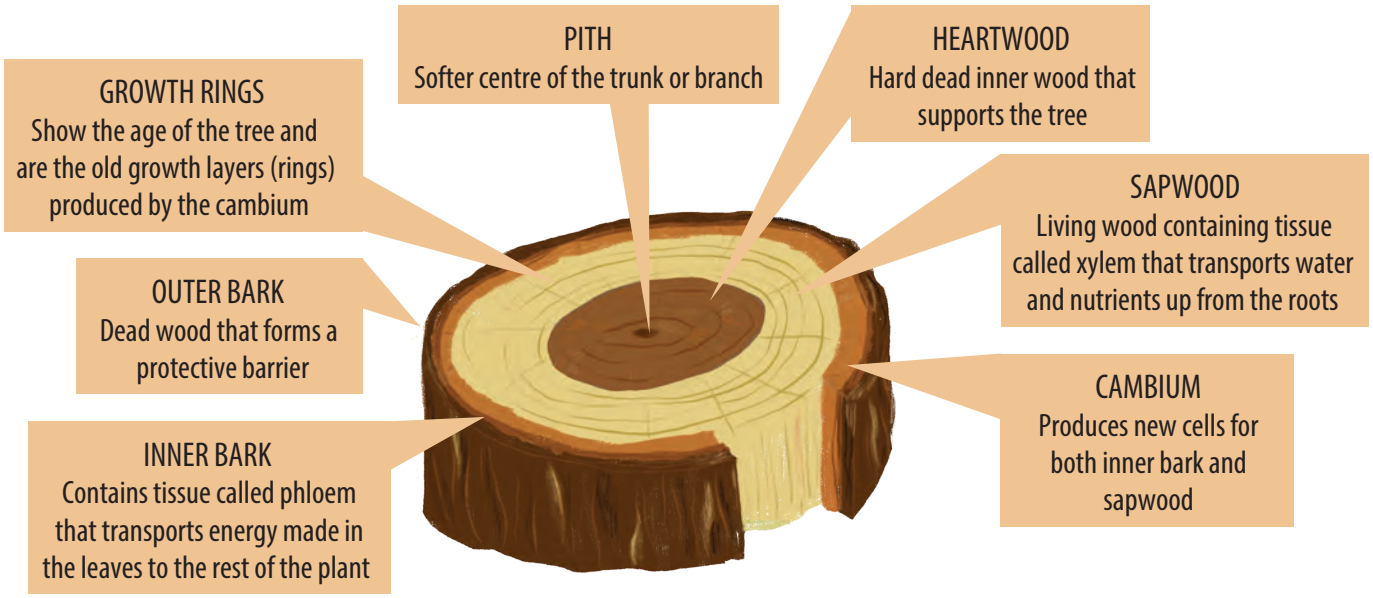
The diagram below shows what is inside a tree.
Fill in the blanks with the name of each part.

Part names

Sapwood	Growth Rings	Cambium	Inner Bark
Outer Bark	Heartwood	Pith	



Worksheet answers



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Hollow hunting

Hollows come in all shapes and sizes, in all kinds of trees. Reading about them in a book is one thing. To see them first hand, take students on an outing to a nearby woodland environment and have them record their observations on the Hollow Hunt Survey sheet (see printable survey on the next page).

To complete the survey:

- Look for trees that are likely to have hollows, even if hollows are hard to see. (Page 67, 80)
- Look for clues left by animals that might be accessing a hollow. (Page 79)
- If a hollow is seen, draw a sketch of the tree. Label the drawing with the type of hollow. (Page 14)
- Measure the DBH and estimate the height of the tree. (Pages 82–83)
- Use a compass to work out the direction the hollow faces.
- Estimate the size of the hollow entrance. (Page 83)

The 4 Rs

Whether in the home or in the classroom, there are a variety of items that we might not really need, we can have fewer of, we can get a lot of use out of, or we break down and turn into something new.

Explain the 4 'Rs' – refuse, reduce, reuse, recycle (Page 64). Use four different coloured sticky notes – one for each of the 4 'Rs' – to catalogue items in a room. If it can be reused, ask students to describe its expected life span.

Extension: Invite students to use a fifth sticky note to label items that don't fit any of the above, and will end up in landfill.

English

Tree story

Write a story from the perspective of a tree, telling how a hollow formed in it and who came to visit over time. (Pages 14–20)

Scientist roleplay

A Hollow Is a Home contains four short interviews with researchers who investigate tree hollows as part of their work. (Pages 72–75)

Working in pairs, invite students to roleplay an interview with each scientist, where one student is asking questions and the other is responding as if they were that researcher. They can use the interviews as a script, or rework the information in them to come up with their own spin.

Hollow Hunt Survey

Survey information

Location
(Address or GPS coordinate)

_____

Date _____ **Time** _____ **Temperature** _____

Season

Spring Summer Autumn Winter

Weather conditions

Sunny Rainy Overcast Windy Night

Photo or drawing of location

Tree information

Tree species _____
(if known)

Tree height _____
(approximately)

Tree DBH _____
(circumference at 140 cm ÷ 3.14)

Tree health

Overall: Healthy Dead Fire scars Termites

Branches: Many dead Few dead
Broken Cut

Tree connectivity _____
(How many branches touch other trees?)

Hollow information

Distance from ground _____
(approximately)

Size of hollow entrance _____
(approximately)

Small < 5 cm Large 11-20 cm
Medium 6-10 cm Extra large >20 cm

Location of hollow _____

Base of tree End of branch
Trunk Middle of branch
Top of trunk

Direction that hollow faces _____

Other observations
(e.g. What does it look like? Can you tell the depth?
Is it hidden by foliage? Does it look weather-proof/safe?
Is there much food nearby?)

Animal clues or sightings

A Hollow Is a Home review

Collect some book reviews from different sources. *Double Helix* magazine contains book reviews written by kids in every issue – order some back copies to share.

Discuss with students what details they might want to know in a review. Break them down into 'things that are objective', like page numbers or facts about the authors, and 'things that are subjective', like their personal opinion about how much (or how little) they enjoyed reading it.

Have students write a review for *A Hollow Is a Home*.

HASS: Geography

Use a satellite image from Google Maps to look at your school and local area. See if you can identify areas of good habitat and large trees that may have hollows. Is there habitat connectivity for arboreal animals to move across the area? Are there areas that could be improved to link connectivity? What type of improvements could be made? (Pages 34, 68)

Mathematics

Tree pi

One way to estimate the likelihood of a tree having a hollow is to measure the thickness (diameter) of its trunk. (Page 82)

What you need

- String
- Pencil
- Scissors
- Thumbtack
- Measuring tape
- Calculator

What to do

1. Find a tree that seems to have a single trunk, growing on relatively flat ground.
2. Use the measuring tape to work out a height of 140 centimetres from the ground. Mark this height with a pencil.
3. Place a thumbtack into the pencil mark on the tree (don't worry, one thumbtack won't harm it!).

4. Secure the string to the thumbtack and unwind a length around the tree parallel to the ground.
5. Pull the string tight and mark the spot where it meets the thumbtack again. Cut the string at this point. Measure the length of the string. This is the circumference of the tree.
6. To find the diameter of the tree, divide the circumference by 3.14 (a number called 'pi').

According to *A Hollow Is a Home*, about half of all trees with a diameter of 50 centimetres should have a hollow. This is an average figure based on a lot of measurements over a large area.

Based on the trees in the area where you took your measurement, would you agree? What's unique about your area that might affect this probability of finding a hollow? (Page 17)

Treegonometry

A clinometer is a handy way to measure the height of an object, using little more than some maths and a few simple tools. You can also do an estimate before finding a more precise measurement. (Page 83)

What you need

- Recycled paper
- Sticky tape
- Recycled cardboard
- Scissors
- String
- Metal washer
- Measuring tape

Making the clinometer

1. Cut the cardboard into a perfect square with a side of 20 centimetres.
2. Cut the cardboard square diagonally across to provide two right angled triangles. Each student needs one of these triangles.
3. Roll a strip of paper to make a narrow cylinder, about as wide as a pencil, and secure it with tape. Tape the cylinder along the triangle's long side (the hypotenuse) to use as a scope.
4. Cut 30 centimetres of string and tie one end to the washer.
5. Tape the free end of the string to one of the 'sharp' corners of the triangle, just below the scope (not the right angle).

Using the clinometer

1. Find a tall tree to measure, preferably at least twice as tall as a person.
2. Hold the clinometer so the scope side is higher than the right angle. The right angle can be pointing at the ground, and the string is on the opposite side to the person using it.
3. To measure the tree, hold the clinometer up to your eye and look at the top of the tree through the scope.
4. Angle the clinometer so the string lines up with one flat side of the triangle, and the other flat side runs parallel to the ground. If you can't see the top of the tree through the scope any more, move closer or further away from the tree until you can.
5. Once the string lines up with one side of the triangle and the ground with the other, the line of sight down the scope will make an angle of 45 degrees with the ground.
6. Just as the length of two sides of the triangle is the same, the distance from the viewer to the tree will be roughly the height of the tree. Use a tape measure to work this out.
7. To work it out more precisely, you need to take into account your eyes are actually higher than the ground. Measure the distance from your eyes to the ground and add this to the distance.

Australian Curriculum Links

Year level	Learning area: science	Other learning areas
Year 3/4	**Science Understanding: Biological sciences** • Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044) • Living things have life cycles (ACSSU072) • Living things depend on each other and the environment to survive (ACSSU073) **Science Understanding: Chemical sciences** • Natural and processed materials have a range of physical properties that can influence their use (ACSSU074) **Science as a Human Endeavour** • Science knowledge helps people to understand the effect of their actions (ACSHE051, ACSHE062) **Science Inquiry Skills** • With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (ACSIS054, ACSIS065) • Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS060, ACSIS071)	**English** • Understand how different types of texts vary in use of language choices, depending on their purpose and context (for example, tense and types of sentences) (ACELA1478) • Understand differences between the language of opinion and feeling and the language of factual reporting or recording (ACELA1489) • Understand how texts vary in complexity and technicality depending on the approach to the topic, the purpose and the intended audience (ACELA1490) **HASS: Geography** • The importance of environments, including natural vegetation, to animals and people (ACHASSK088) • The use and management of natural resources and waste, and the different views on how to do this sustainably (ACHASSK090) **Mathematics** • Recognise, represent and order numbers to at least tens of thousands (ACMNA052, ACMNA072) • Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084) • Compare objects using familiar metric units of area and volume (ACMMG290)
Year 5/6	**Science Understanding: Biological sciences** • Living things have structural features and adaptations that help them to survive in their environment (ACSSU043) • The growth and survival of living things are affected by physical conditions of their environment (ACSSU094) • Sudden geological changes and extreme weather events can affect Earth's surface (ACSSU096) **Science as a Human Endeavour** • Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098) • Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100) **Science Inquiry Skills** • Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACSIS086, ACSIS103)	**English** • Understand the uses of objective and subjective language and bias (ACELA1517) • Identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts (ACELA1517) • Select, navigate and read texts for a range of purposes, applying appropriate text processing strategies and interpreting structural features, for example table of contents, glossary, chapters, headings and subheadings (ACELY1712) **HASS: Geography** • The influence of people, including Aboriginal and Torres Strait Islander Peoples, on the environmental characteristics of Australian places (ACHASSK112) • The environmental and human influences on the location and characteristics of a place and the management of spaces within them (ACHASSK113) **Mathematics** • Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108) • Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112) • Pose questions and collect categorical or numerical data by observation or survey (ACMSP118) • Make connections between equivalent fractions, decimals and percentages (ACMNA131)

Teacher Notes

Year level	Learning area: science	Other learning areas
All	**Cross Curriculum priority: Sustainability** OI.2 All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival. OI.3 Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. OI.4 World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability. OI.7 Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.	

Related books from CSIRO Publishing

Animal Eco-Warriors (2017)
Bouncing Back (2018)
Phasmid (2015)