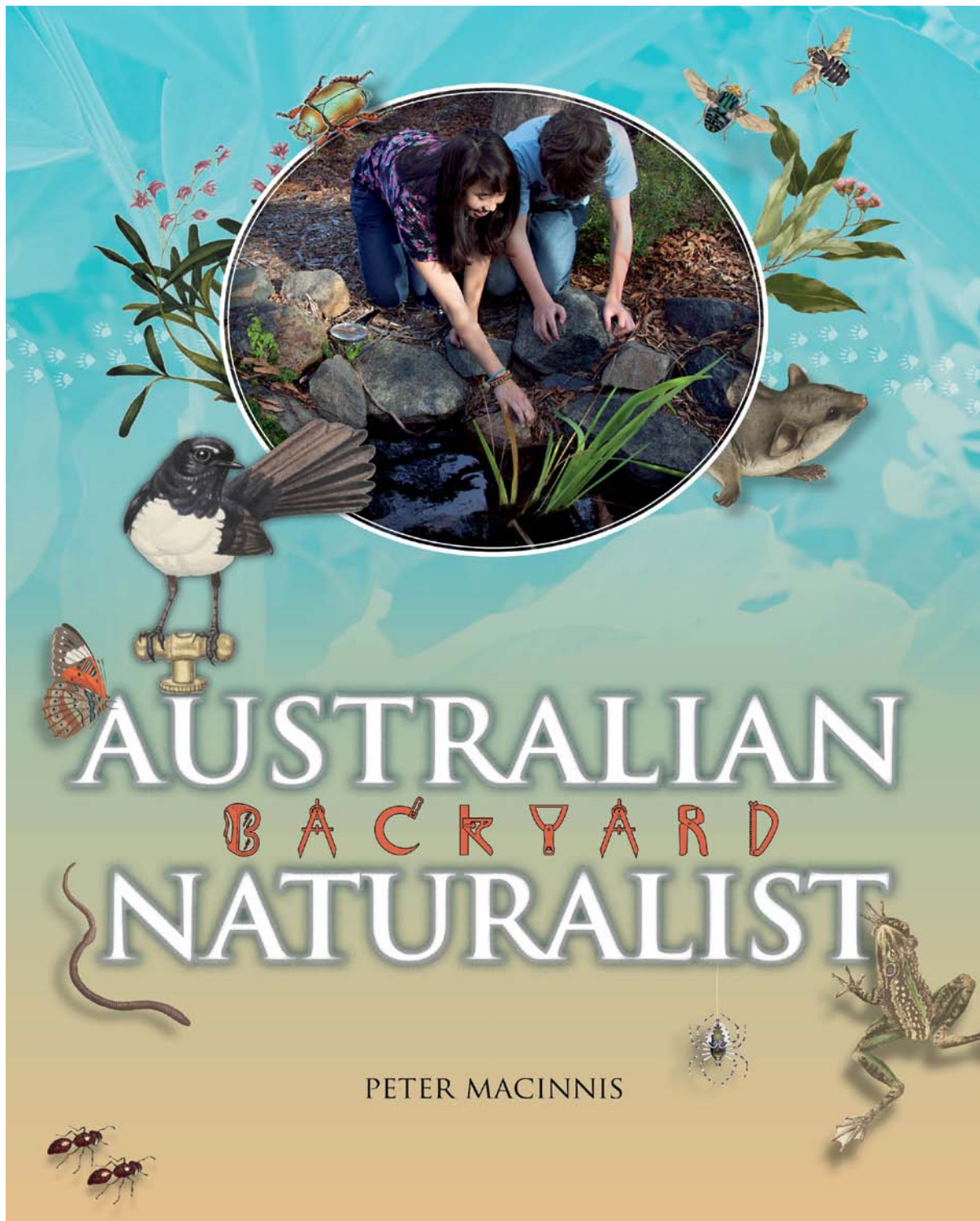


# Australian Background Naturalist



# Chapter 1: Mammals

## Remember

- Ask students to list as many Australian land and sea mammal species as they can.

## Investigate

- Ask students to find out how many mammal species are found on the Australian continent and seas.
- Ask students to classify these species into monotremes, marsupials, native placental mammals and introduced placental mammals.

## Communicate

- As a class, evaluate the assumption that Australia is ‘the land of marsupials’.

## Understand

- Ask students to research the viruses that flying foxes carry in Australia.
- Are there any mammals that have absolutely no hair? (The most likely candidates would be hippos, rhinos, elephants, whales, porpoises, dolphins, seals—and echidnas.)

## Communicate

- Organise a debate on the topic: Flying foxes should be removed from towns and cities.
- Which children’s stories might have been written to get children to think differently about hunting wildlife? (This is an older tradition than you may think!)

## ICT

- Ask students to research the best design for a nesting box for a local mammal (or bird). Find designs on the internet by searching using ‘nesting box design Australia’.
- Ask students to explore the available newspaper evidence of changing uses of various marsupial skins by carrying out searches at <http://trove.nla.gov.au/newspaper> using phrases such as ‘marsupial skins’, ‘platypus rug’, ‘koala skins’ and ‘kangaroo hunt’.

## Create

- Ask students to make a nesting box, attach it to a suitable tree and investigate its effectiveness over the year.
- As a class, make a school compost heap (page 13) and study what lives in it over time.
- Ask the students for contributions of animal skulls and have them use dentition to identify the species they belonged to.

## Chapter 2: Birds

Even a school in the middle of a large city should have a dozen species of bird, either on the ground or flying over it. This is enough to get students interested.

### Remember

- Ask students to list as many Australian bird species as they can.

### Investigate

- Ask students to identify four introduced bird species in the neighbourhood of home or school.
- Ask students to undertake a bird census of their home or school area, relying only on song. For help, do an internet search using the phrase 'bird calls Australia'.
- Ask students to carry out a census, over a week, of the bird species seen in the school or home area and prepare a display on this topic.

### Understand

- Ask students to identify three areas where birds roost or nest in the vicinity of school or home.

### Communicate

- Ask students in pairs to photograph or film seagulls or other birds which interact aggressively with others of their own species, and mount a display showing and explaining the sequences that the birds go through (p. 33). Have the students give a presentation of what they discovered.
- Organise a debate on the topic: Feral birds are pests and should be destroyed.

### ICT

- Ask students to research the best design for a nesting box for a local bird (or mammal). Find designs on the internet by searching using 'nesting box design Australia'.
- Ask students to design, plan and implement a bird-friendly garden in the school grounds. This would include food plants, possibly a compost heap (p. 13), a bird bath/water source and a hide (p. 32). Do an internet search using 'bird friendly garden Australia' or 'attracting birds Australia'.
- Ask students to investigate acclimatisation of Australian bird species. As an example, in the 1890s, kookaburras were introduced into a state where they had not been seen before. Using <http://trove.nla.gov.au/newspaper>, find out more about this. (One key word in the search might be 'acclimatisation', and an advanced search in Trove, limited to the date range 1890 to 1920, and sorted with the earliest items first, will help.)

### Create

- Ask students to make a nesting box, attach it to a suitable tree and investigate its effectiveness over a year.
- Ask students to use a hand lens or a USB microscope to make a close study of feathers of different kinds, and create a poster which explains how feathers work to keep birds warm.

## Chapter 3: Reptiles and amphibians

There are generally strict laws on keeping these animals. Talk to your local pet shop owner.

### Remember

- Ask students to list as many Australian lizard species as they can.
- Ask students to list as many Australian snake species as they can.
- Ask students to list as many Australian frog and toad species as they can.

### Investigate

- Ask students to find out how many species of Australian reptile and amphibian are endangered and how many have become extinct.
- Ask students to evaluate the various methods proposed for controlling the spread of cane toads.
- Ask students to investigate the effectiveness of different baits to attract lizards into a jar pit trap (p. 47). Try fruits, cheese and meat as starters.
- William Dampier found a reptile that he called a 'guano', but this name had nothing to do with bird droppings. See if you can find out what sort of lizard it was, by finding his description. (Hint: see p. 36.)
- Ask students to assess the deadliness of venomous snakes and present the results graphically. This needs to take into account the amount of venom produced and the LD-50 value, the (lethal) dosage that will kill 50 per cent of average humans who are subjected to it. (There is no single, simple answer.)

### Communicate

- Ask students to present the results of their snake-deadliness assessment in graphical form.
- Organise a debate on the topic: Crocodiles and venomous snakes should not be killed under any circumstances.
- Ask students to investigate and re-tell the story of how the gastric brooding frog was discovered, and the mechanisms which it used to breed.

### ICT

- Ask students to use <http://trove.nla.gov.au/newspaper> to trace and describe the introduction of cane toads into Australia in the 1930s (see p. 41).
- Ask students to use <http://trove.nla.gov.au/newspaper> to investigate early colonial treatments for snake bite. (Many, but not necessarily all of these, are tagged as 'snakebite treatment'.)

### Communicate

- Ask students to explain why modern methods of snakebite treatment are more effective than old ones.

### Compare

- Ask students to compare sex determination in crocodiles and frilled-neck lizards (p. 46).

## ICT

- Ask students to discover acceptable methods of mosquito control in outdoor ponds. (You can buy fish which eat mosquito wrigglers and not tadpoles, but some of the recommended fish can later be classed as pests or even illegal. For example, the white cloud minnow is now banned from outdoor ponds in Queensland (see [http://www.dpi.qld.gov.au/28\\_15865.htm](http://www.dpi.qld.gov.au/28_15865.htm) and [http://www.dpi.qld.gov.au/28\\_14163.htm](http://www.dpi.qld.gov.au/28_14163.htm)), where the authorities recommend native fish like pacific blue eyes, rainbowfish and hardy heads. Queensland says that the feral guppy is barely acceptable. The feral *Gambusia* ([http://www.dpi.qld.gov.au/28\\_13877.htm](http://www.dpi.qld.gov.au/28_13877.htm)) is completely unacceptable because these fish attack most Australian tadpoles and often attack the fins of other fish species. The rules change, so students will need to do some research, using phrases like ‘cloud minnow’ (or *Tanichthys*) or *Gambusia* and ‘mosquito control’. Make sure that students search Australian websites only by adding ‘Australia’ in their search.)

## Create

- Ask students to construct a small, safe frog-pond and populate it (pp. 48–49).

## Chapter 4: Spiders

Keeping spiders and arranging food can be a bit of a challenge, but students should learn that there is more variety in spiders in their garden or school grounds than there is in any other animal group. They will only learn this by looking.

### Remember

- Ask students to list as many Australian spider species as they can.

### Investigate

- Ask students to research the number of spider species found in the school grounds.
- Ask students to classify these species into web-makers and others.
- Ask students to investigate, using the lower photograph on page 61 as a model, the angle of slope on orb weavers' webs.
- Ask students to go out into their garden after dark and spotlight for spiders (p. 59). Report back.
- Ask students to keep a spider in a safe jar (p. 60) and observe how it feeds.

### Communicate

- Ask students to draw diagrams to show the stages in the construction of an orb weaver's web (pp. 56–57, noting that local methods may vary from those shown).
- Investigate the story of pioneer spider lady Amalie Dietrich (p. 58). (Note that the author's *Curious Minds*, released in October 2012 by NLA Publishing, will offer some useful detail on her.)

### ICT

- Some people claim that redback spiders are not native to Australia. Ask students to look into the origins of redback spiders. Using newspaper evidence of the incidence of redback spiders as revealed at <http://trove.nla.gov.au/newspaper>, make a case for or against this view.
- Ask students to use <http://trove.nla.gov.au/newspaper> to locate several references to a marine spider, *Desis* sp. Find out more about the habits of spiders that live under the sea. Using 'marine spider' in an internet search will provide usable results, but there is more material to be found by suitably ingenious searches.

## Chapter 5: Butterflies and moths

Silkworms are the easy classroom solution to studying caterpillars. Do a web search using 'silkworms Australia' to find information and to identify suppliers.

### Remember

- Ask students to list as many Australian butterflies and moths as they can.
- Ask students about the difference between moths and butterflies.

### Investigate

- Ask students to examine the number of moths and butterflies to be found in the neighbourhood of the home or school.
- Ask students to compare the antennae of a variety of moths and butterflies from photographs and draw conclusions.
- Ask students to keep a caterpillar in captivity (pp. 72–3) and observe its changes (p. 68).
- Ask students to use a USB microscope to take some photographs of the scales from moth or butterfly wings. Are there any differences between the two? Here is a useful site for methods: <http://oldblockwriter.blogspot.com/2011/12/looking-at-moth-scales.html>. (This is the author's own blog, is carefully child-safe and has other useful wrinkles and tricks.)

### Understand

- Ask students to investigate birefringence in nature.

### ICT

- Ask students to use <http://trove.nla.gov.au/newspaper> to investigate the history of the silk industry of Australia. Search using 'sericulture', 'silk industry' and 'silk AND mulberry'. The last, when sorted as 'earliest first', reveals some interesting and remarkably early notions.

### Create

- Ask students to develop an improved design for a butterfly net than the one shown on pages 74 and 75. A design brief might include weight, size, ease of stowing (or carrying on crowded public transport).
- Ask students to collect some silkworm silk and make a thread with it (p. 69).

## Chapter 6: Flies and mosquitoes

Mosquito wrigglers are easy to locate and easy to contain—and don't have the 'ick' factor of flies. Years 8 and 9 enjoy examining a wriggler, mounted on/in a well slide and viewed under a low power microscope. They can also be studied with the binocular microscope in a Petri dish.

### Remember

- Ask students to list as many Australian fly species as they can.

### Investigate

- Ask students to use traps (p. 198) to determine the number of fly species found around the home or school.
- Ask students to collect and classify mosquito larvae as either anopheline or culicine.

### Communicate

- Ask students to keep a set of mosquitoes and prepare and present a report on the length of the life cycle.

### Understand

- Ask students to calculate the area that would be covered by a year's supply of Australian cowpats. (The answer is on p. 84, but is it correct, based on the latest Australian cattle population?)

### ICT

- Ask students to assess whether or not the Giant Dung Beetle of Cootaburra is real or not. (Most of the web hits on this topic answer that question, but a few of the pages reveal that some people just don't check their facts!)

### Create

- Ask students to plan and construct a fly-breeding cage and test it (pp. 88–9).
- Ask students to improve on the fly trap design shown on page 198.



## Chapter 7: Ants and ant lions

Ant lions are always fascinating to those who don't know them and even more fascinating to those who are familiar with them. Strongly recommended as a classroom display in an old fish tank, but warn students not to bump it.

### Remember

- Ask students to list as many Australian ant species as they can.

### Investigate

- Ask students in small groups to examine the number of different ant species found in an area of at least 300 m<sup>2</sup>.
- Ask students to observe an ant trail.
- Ask students to investigate the distances that ants roam from their nests (p. 105).

### Understand

- Ask students to investigate the meaning of 'angle of rest' and use this to explain how an ant-lion's pit works. (Some handy hints will be found at <http://oldblockwriter.blogspot.com.au/2012/02/ant-lions-and-angle-of-rest.html> (<http://oldblockwriter.blogspot.com.au/> is the author's writing blog. It is carefully child-safe and has other useful insights and tricks.)

### ICT

- Ask students to use <http://trove.nla.gov.au/newspaper> to gather material for an article entitled 'Ten unexpected things about formic acid'.
- To investigate the history of Argentine ants in Australia, ask students to search <http://trove.nla.gov.au/newspaper>, using 'Argentine ants'. For a really effective search, put 'fulltext:argentine ants' in the search box, because that stops 'fuzzy matching'. NOTE: it's important not to have any spaces before or after the colon. The fulltext command stops the helpful search engine returning hits on less relevant items. For example, without the fulltext command, a fuzzy search for 'smile' will generally also return hits on 'smiling', 'smiles', 'smiler' and 'smileys'.

### Create

- Ask students to create and maintain an ant-lion home for one week, feeding the ant lions before releasing them (pp. 106–107).

## Chapter 8: Stingers, biters and nasties

There is not a lot you can do with these animals, if only for safety reasons. One 1869 letter to the editor of *The Sydney Morning Herald* (<http://trove.nla.gov.au/ndp/del/article/13178334>) even accused pseudoscorpions of being dangerous!

### Remember

- Ask students to list as many Australian stinging and biting insect species as they can.

### Investigate

- Ask students to use a Berlese funnel (p. 194) to extract pseudoscorpions and mites from leaf litter.
- Ask students to use a white dish (see <http://oldblockwriter.blogspot.com/2011/12/art-of-white-dish.html>, the author's child-safe blog, for methods) to search through leaf litter to find pseudoscorpions and mites in leaf litter.
- Ask students to observe and film a millipede walking and analyse its movements (p. 123).

### ICT

- Ask students to use the internet to search for methods used by scientists to collect ticks. See <http://www.dartmoorcarn.co.uk/dartmoortickwatch/index.htm> but see also <http://www.dartmoorcarn.co.uk/dartmoortickwatch/biosafety/biosafety.htm> before putting any of these into practice!

## Chapter 9: Leaf litter animals

There are few easy classroom activities with these animals, due to their tiny size, but the writer knows from experience in museum holiday programs that children find sifting through leaf litter to be a fascinating experience.

### Remember

- Ask students to list as many Australian leaf litter animals as they can.

### Investigate

- Ask students to determine the number of 'slaters' in the neighbourhood of either home or school.
- Ask students to use a Berlese funnel (p. 194) to extract springtails from leaf litter.
- Ask students to use a white dish (see <http://oldblockwriter.blogspot.com/2011/12/art-of-white-dish.html>) to search through leaf litter to find microfauna.

### Create

- Ask students to create and maintain a slater home (p. 130).
- Ask students to catch slaters using a pit trap (p. 47) to populate the tank.

### Investigate

- Ask students to populate a slater home with different species from your area and watch for any signs of interaction.
- Ask students to keep a single slater in a high humidity jar (p. 192), feeding it on potato peelings, and observing it moulting (p. 128) as it grows.

### Communicate

- Ask students to undertake and present the results of a time series study of a permanent leaf litter source to see how populations change across the year. Can you relate this to weather, in particular, temperature and rainfall?

## Chapter 10: Snails, slugs and their relatives

As noted in the text, snails and slugs are resilient in captivity. Any purchase of water weed from a pet shop is likely to have some water snails in it.

### Remember

- Ask students to list as many Australian slug and snail species as they can.

### Investigate

- Ask students to examine the number of snails in various parts of a garden.
- Ask students to investigate local bushland to find non-garden land snails.
- Ask students to use a board, with or without a pit trap (p. 47) to gather snails or slugs.
- Ask students to analyse a large sample of bored shells collected on beaches, to see where the shells had been attacked (pp. 142–3).
- Ask students to find out what snails and slugs prefer to eat (p. 138).

### Create

- Ask students to design an effective snail trap.

## Chapter 11: Earthworms and leeches

Leeches do not make good classroom pets. They are quite good at attaching to a finger with their suckers, and this provokes panic, even before they start to bite (which is almost painless). Earthworms and land planarians (not covered in the book) are recommended to the more adventurous teacher.

### Remember

- Ask students to list as many Australian worm species as they can.

### Investigate

- Ask students to examine the numbers of earthworms in different environments: gardens, areas strewn with mulch, lawns etc.
- Ask students to measure how high a barrier an earthworm of a certain length can climb over. (p. 154).

### ICT

- Ask students to use <http://trove.nla.gov.au/newspaper> to investigate the history of leech trading in Australia. (p. 158).

### Create

- Ask students to make and assess the effectiveness of a leech barometer (p. 157).
- Ask students to make, establish and maintain a worm farm (pp. 162–163).

## Chapter 12: Other insects

### Remember

- Ask students to list as many different common names for cicada species as they can (p. 173).

### Communicate

- Crickets are most commonly kept as food for other pets (lizards, tree frogs, fish, spiders, juvenile freshwater crocodiles and others) but they are fairly easy to keep. Ask students to investigate and give a presentation on how to keep and breed crickets.

### Investigate

- Ask students to estimate the number of beetles (or other invertebrates) on a bush or a tree, shaking portions of the bush over an upturned umbrella before using a pooter (p. 196).
- Ask students to observe a class 'pet' phasmid or mantis to learn more of its habits. (Do a web search to find where to purchase a phasmid or mantis and how to keep it.)

### ICT

- Ask students to use the internet to locate a large image of Robert Hooke's 1665 flea illustration. Using 'Hooke flea Micrographia' in Google Images, search with large images selected to get suitable results.

### Create

- Ask students to catch a bush cockroach, provide it with a home and test to see what it prefers to eat (p. 177).