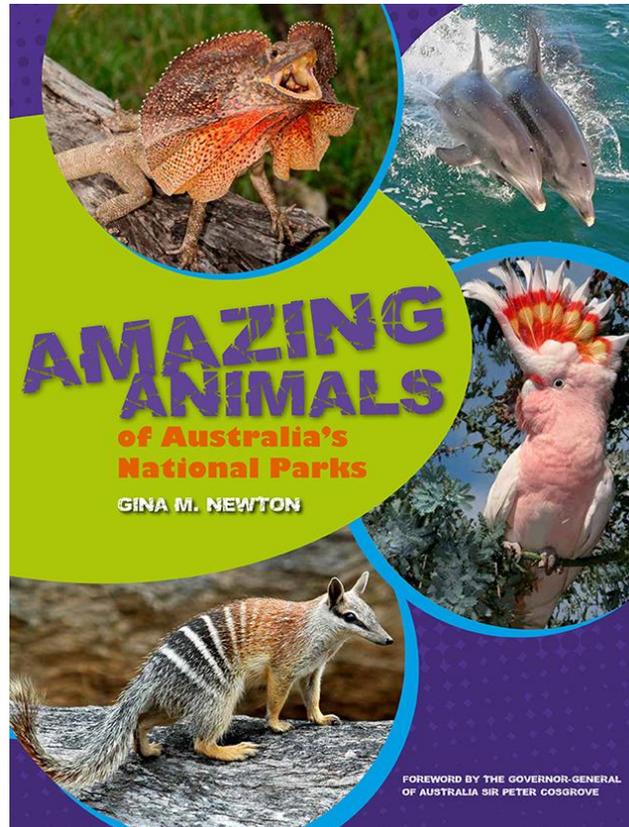


TEACHERS' NOTES: YEAR 5 (AGES 10–11)
Amazing Animals of Australia's National Parks
by Gina M. Newton



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Gina is a marine biologist, zoologist and science communicator with over 30 years' experience. She is a past president of the Australian Marine Sciences Association. She is particularly passionate about raising awareness of Australia's unique environment and biodiversity. Gina is also a popular children's book author.

AUSTRALIAN CURRICULUM LINKS (version 8.2)

Living things have structural features and adaptations that help them to survive in their environment. ([ACSSU043](#))

- explaining how particular adaptations help survival such as nocturnal behaviour, silvery coloured leaves of dune plants
- describing and listing adaptations of living things suited for particular Australian environments
- exploring general adaptations for particular environments such as adaptations that aid water conservation in deserts

Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate. ([AC SIS090](#))

- constructing tables, graphs and other graphic organisers to show trends in data
- identifying patterns in data and developing explanations that fit these patterns
- identifying similarities and differences in qualitative data in order to group items or materials

Compare data with predictions and use as evidence in developing explanations. ([AC SIS218](#))

- sharing ideas as to whether observations match predictions, and discussing possible reasons for predictions being incorrect

Background information for teachers

- a) Over evolutionary time, living things, including animals, have developed structural features and other adaptations (physical or behavioural) that help them to survive in their environment. These adaptations generally relate to how they feed, or how they reproduce successfully, or how they get around and when, or how they shelter or protect themselves from environmental conditions (like weather/climate) or other animals (like predators). These adaptations make a particular animal suited to its environment or habitat. Some animals have also developed strategies (that might combine structural features and behaviour) to deal with temporary or seasonal changes to physical conditions of their habitat (e.g. migration, hibernation/torpor).
- b) Particular environments or habitats may have a particular set of conditions that require animals to have certain adaptations to deal with them. For example, different habitats will have different types of vegetation, soils, rocks, caves, water, biodiversity and climate. This means that finding food, shelter, water and getting around might pose different challenges for different animals.

The first two pages in each habitat section explain more about the features of the different habitats (Woodlands & Grasslands p. 10; Forests p.34; Rainforests p.54; Arid Zones p. 68; Mountains p. 88; Wetlands & Waterways p. 102; Coasts, Oceans & Islands p.118). The indicative maps on the endpapers of the book show the distribution around Australia of each terrestrial habitat type. This distribution shows that the largest habitat area in Australia is the arid zone. The smallest habitat in area is that of temperate rainforest.

- c) Extreme environments such as hot, dry deserts or cold, snowy mountain tops hold particular challenges for animals. Usually only certain animals can live there. Some of these will have very specialised adaptations. There are some exceptions; for example, the Short-beaked Echidna occurs in all terrestrial habitats and they can even swim.

In hot dry environments, animals need to have adaptations to find scarce water resources or alternatively they need to be able to go for long periods without water; staying cool is also important.

In alpine environments, temperatures are extremely cold in winter and often have snow cover. In addition, the higher altitudes result in changes to vegetation cover which may have implications for food or shelter.

- d) A range of general adaptations can apply across different animal types, which deal with similar environmental conditions. Examples might be staying cool in the heat, conserving energy when it is cold or there is not much food around, and conserving or doing without water when water is scarce. Adaptations may be structural (physical), such as the ability to go without water for extended periods, or they may be behavioural such as being active at night in hot climates or licking limbs to promote cooling by evaporation.

Activities

1. Setting the Scene: Understanding Adaptation

- Explain to the class that, for animals, 'adaptation' means changes which make the animal become better suited to its environment. Explain that over a long period of time (i.e. thousands and millions of years) animals have evolved certain structural features on or in their body, or certain behaviours, that help them to survive in the environment that they live in.
 - Ask the students what they think these adaptations might be related to and list them on the whiteboard. For example, how an animal might feed or digest its food, how they get around, how they shelter or protect themselves from predators or the climate, how they reproduce successfully, how they get water, how they communicate, and how they find mates to reproduce.
- Discuss how some animals might combine structural features and behaviour to develop strategies to deal with temporary or seasonal changes in their habitat. For example, hibernation or becoming dormant in the cold and food scarce time of winter.

- Explain to the class that particular environments or habitats may have a particular set of conditions that require animals to have certain adaptations to deal with them. For example, different habitats will have different types of vegetation, soils, rocks, caves, water, biodiversity and climate (these can be listed on the whiteboard as a reminder). This means there will be different types and amounts of food or water or shelter, and perhaps different types of predators and different amounts of rain or different temperatures that the animals have to deal with, and they may need adaptations to help them move and get around in their particular environment. Show the class the endpaper map in the book—this shows the distribution of the main types of different habitats around Australia. The Arid Zone is the largest area of habitat, followed by Woodlands. (Note: Mountains and Wetland & Waterways habitats are not shown on the map.) The map also demonstrates that the areas of the different types of forest are actually quite small by comparison and usually are close to the coast.
- Discuss with the class how extreme environments, such as very hot, dry deserts or cold, snowy mountain tops, hold particular challenges for animals. Usually only certain animals can live in these extreme environments and many of these species will have very specialised adaptations. (Point out though, that there are some exceptions; for example, the Short-beaked Echidna occurs in all terrestrial habitats and they can even swim.) In very hot and dry environments, animals need to have adaptations to find scarce water resources or alternatively they need to be able to go for long periods without water, and staying cool is also important. In snowy alpine environments, temperatures are extremely cold in winter and often have snow cover. This means that animals have to deal with these cold conditions and also find food and shelter.
- Discuss with the class how, often, different types of animal have found different ways to deal with a similar environmental challenge. For example, a reptile may use a different adaptation to cool down in the heat compared to a kangaroo. Or, a thorny devil may have a different adaptation to getting its water while living in a dry desert, compared to a small marsupial. These different adaptations may be structural—related to their body or physiology—or they may be behavioural—such as what time of day they are active. A good example of a behavioural adaptation is shown by kangaroos. To survive in hot summers, kangaroos cool off by licking their forelegs. Kangaroos don't have regular sweat glands, but the network of blood vessels close to the skin in the legs allows the animals to reduce their body temperatures quickly through the evaporation of saliva.

2. Key Glossary Words

Students look up these words in the glossary of the book: aestivate/aestivation; brumation; cache/caching; crepuscular; diurnal; dormant; echolocation; evolved; gastrolith; habitat fragmentation; hibernate/ hibernation; nocturnal; prehensile (tail); supernumerary.

3. Investigating, Recording & Presenting

(Students could do these tasks in small groups of 2–4 or individually.)

- Animal adaptations

- By using the book and sometimes the glossary, students complete either the ‘Adaptation’ or ‘Function & Benefit for Survival’ columns in Table 1.

This will provide a useful overview of the range of different adaptations used by different animals and what purpose the adaptations serve to aid in the survival of the animal. The table has 43 different animals to look up, so allow enough time.

- Adaptations per habitat

- Each section of the book is based on a habitat. Complete Table 2 with any possible adaptations you can think of that an animal in the book may need in that habitat.

Think about the animal going about day-to-day life in its habitat—finding food, shelter and water; hiding from predators; staying warm/cool; reproducing successfully; what time of day the animal might be active. There are a variety of possibilities for answers.

- Select one of the four terrestrial habitats. Read the information at the start of the habitat section in the book to find out more about that habitat. Make a list of all the animals in Table 1 that occur in your chosen habitat (or highlight them on Table 1). Are any of the adaptations the same? If so, which ones? Write a sentence or two explaining whether the adaptations are related to just that habitat or whether they may also occur in other habitats.
- This activity focuses on two animals that live in extreme habitats—the very cold, snow-covered mountain alpine habitat and the very hot, dry desert of the arid zone. The animals are the Mountain Pygmy Possum and the Water-holding Frog. Both species have very specialised adaptations to their extreme environments. Using Table 3 and the book (and glossary) provide further explanations about the adaptations and their benefits for each animal in their respective habitat and list them in Table 3.

- General adaptations

Using the book and Table 4, investigate what the animals in the table have or do to achieve the specific adaptation (highlighted in grey in the table) that helps them to survive in their environment.

- Students complete the ‘What They Have or Do’ column of Table 4. If students run out of space, then they could write out the answer in their work book, using the line number (at right of the table) as a guide.

4. Making Connections

- When Table 1 is completed, the teacher could lead a discussion with the class on the results. Students could call out their answers. Teachers could prompt further questions or discussion as appropriate (e.g. say if students identify different answers for the same animal). Did the students notice anything important? For example, were the same types of adaptations used by different types of animals to overcome the same environmental challenge? Did the same type of animal always use the same adaptation to meet a similar environmental challenge (e.g. reptiles and warming up, or marsupials digesting poor quality diet)?
- Students share their findings with the class for their chosen terrestrial habitat (Table 2). What did they find out? Does the class think that there is a direct relationship between a particular habitat and the adaptations required by animals? (HINT: not generally, as season—which can influence temperature and food/water resources—can sometimes be a more important factor.) However, an exception may be for extreme environments. Discuss what the class found out for the Mountain Pygmy Possum and Water-holding Frog (Table 3). These species have some very specialised adaptations to deal with their extreme environments. For example, the Mountain Pygmy Possum is the only Australian marsupial that undergoes a ‘true’ hibernation.
- Students share their findings for Table 4. Were any patterns obvious? Did different animal types use the same or different adaptations to achieve the same environmental benefit? (HINT: there is a lot of variety.) What does the class think will happen in terms of these animal adaptations in a future impacted by climate change (which will bring warmer temperatures, less rainfall in some areas and changes to seasonal rainfall patterns, and more extreme weather events)? Do students think some species might be better able (or adapted) to cope with the changes compared to other species? If so, the class could discuss why they think this may be so.

5. Extension Activity

Describe the feeding adaptations for two different animals (from the book) from two of these groups: reptiles; birds, marsupials, monotremes or placental mammals. Answer these questions:

- What influence does the type of feeding have on where the animal lives?
- Does the animal need other adaptations to live in this habitat? If so, what are they?

Funtivity

Adaptation Crossword

Complete the Adaptation Crossword on page 12. You could use the glossary in the book to check words and spelling.

Table 1: Animals in *Amazing Animals in Australia's National Park*, and some of their adaptations

| Page | Animal | Adaptation | Function & Benefit for Survival |
|------|---------------------------|---|--|
| 138 | Cricket | large hind legs | enables jumping far—to reach food & escape predators |
| 137 | Cicada | tympanums | |
| 139 | Stick Insect | | camouflage—protects from predators |
| 139 | Scorpion | 1) 2) | capturing prey |
| 59 | White-lipped Tree Frog | | helps them to see at night |
| 75 | Water-holding Frog | aestivating | |
| 13 | Frill-necked Lizard | neck frill | |
| 14 | Yellow-spotted Monitor | | keeps the temperature & humidity right for incubating eggs |
| 17 | Eastern Brown Snake | | subdues captives (prey) |
| 36 | Common Thick-tailed Gecko | can drop its tail off (autotomy) | |
| 38 | Black-headed Python | | absorbs heat to warm up body |
| 56 | Boyd's Forest Dragon | diurnal | 1) 2) |
| 70 | Thorny Devil | | collect and drink water |
| 105 | Freshwater Crocodile | gastroliths (stones swallowed on purpose) | |
| 122 | Green Turtle | | excrete salt (as they drink seawater) |
| 21 | Galah | hooked, hard beak | cracking seeds (its main food) |
| 22 | Bush Stone-curlew | nocturnal | |
| 24 | Australian Barn Owl | structure of flight feathers | |
| 26 | Fairy Wrens | live in groups of 3–12 birds | |
| 41 | Rainbow Lorikeet | | |
| 42 | Satin Bowerbird | | |

Table 1 (continued): Animals and some of their adaptations

| Page | Animal | Adaptation | Function & Benefit |
|------|-------------------------|--|--|
| 61 | Superb Lyrebird | elaborate songs & dances | |
| 76 | Malleefowl | | |
| 113 | Black-necked Stork | | to communicate with mate (has no voice box) |
| 126 | Australian Pelican | soar up really high in the sky (to 3,000 m or more) | |
| 29 | Honey Possum | long, mobile brush-tipped tongue | |
| 32 | Eastern Grey Kangaroo | dormant embryo | |
| 43 | Brush-tailed Phascogale | rotating ankles | |
| 46 | Koala | 2m long appendix (caecum) | |
| 47 | Sugar Glider | membranes of skin from front to back legs (patagium) | |
| 53 | Gould's Wattled Bat | echolocation | |
| 66 | Musky Rat-kangaroo | | used to carry nesting material |
| 81 | Giles' Planigale | torpor & triangular head | |
| 83 | Red Kangaroo | crepuscular (active at dawn and dusk) | |
| 85 | Marsupial Mole | blind eyes & spade-like claws on front limbs | |
| 95 | Short-beaked Echidna | | to protect themselves from predators or harm |
| 96 | Tasmanian Devil | supernumerary young (20–30 born, but only 4 teats) | |
| 98 | Mountain Pygmy-possum | hibernation | |
| 97 | Dusky Antechinus | semelparity ('big bang' reproduction by males) | |
| 129 | Dugong | flexible upper lip | |
| 131 | Dolphins | | so they don't drown while sleeping |
| 132 | Orca | live in complex social structures like pods, clans & communities | |
| 134 | Australian Fur Seal | | detect vibrations of prey underwater |

Table 2: Habitats featured in *Amazing Animals of Australia's National Parks* and possible adaptations needed by animals

| Habitat | Vegetation | Climate Zone | Rainfall (relative) | Possible Adaptation Needed by Animals |
|-------------------------------------|--|---|--|---|
| Woodlands & Grasslands | <ul style="list-style-type: none"> • shorter, more open trees • sparse undergrowth • grasslands—grasses & herbs | <ul style="list-style-type: none"> • temperate • sub-tropical • tropical | <ul style="list-style-type: none"> • low–high | <ul style="list-style-type: none"> • staying cool/warm when it's hot/cold • avoiding predators (shelter, camouflage) • |
| Forests | <ul style="list-style-type: none"> • taller trees, closer together • thick undergrowth • single canopy • floor with logs & litter | <ul style="list-style-type: none"> • temperate • sub-tropical | <ul style="list-style-type: none"> • low–high | <ul style="list-style-type: none"> • digesting poor quality food • • • |
| Rainforests | <ul style="list-style-type: none"> • dense trees • multiple canopies • floor with rich, decaying leaf litter | <ul style="list-style-type: none"> • tropical • sub-tropical • temperate | <ul style="list-style-type: none"> • very high | <ul style="list-style-type: none"> • • • |
| Arid Zones | <ul style="list-style-type: none"> • arid adapted—stunted trees, saltbush, spinifex (hummock), grasses • floor—bare sand or small rocks | <ul style="list-style-type: none"> • tropical • sub-tropical • temperate | <ul style="list-style-type: none"> • dry | <ul style="list-style-type: none"> • finding or saving water/moisture • staying cool • animals mostly nocturnal • |
| Mountains | <ul style="list-style-type: none"> • higher slopes/altitudes—herbs, grass, no trees • lower slopes/altitudes—trees • rocky escarpments | <ul style="list-style-type: none"> • alpine (snow) • temperate • subtropical • tropical | <ul style="list-style-type: none"> • low–medium | <ul style="list-style-type: none"> • keeping warm or cool • finding food when it's scarce • • |
| Wetlands & Waterways | <ul style="list-style-type: none"> • riparian plants like reeds & rushes • floodplain trees & bushes | <ul style="list-style-type: none"> • alpine (snow) • temperate • subtropical • tropical | <ul style="list-style-type: none"> • low–high | <ul style="list-style-type: none"> • feeding under or on water • waterproofing • • |
| Coasts, Oceans & Islands | <ul style="list-style-type: none"> • coast—salt tolerant trees & bushes, like mangroves, saltmarsh & dunes, grasses • ocean—seagrass & seaweed | <ul style="list-style-type: none"> • tropical • sub-tropical • temperate | <ul style="list-style-type: none"> • low–high | <ul style="list-style-type: none"> • getting rid of extra salt • breathing in an aquatic environment • • |

Table 3: Adaptations in extreme environments, with a focus on the Mountain Pygmy Possum in the high altitude mountain alpine environment and the Water-holding Frog in the arid zone

| Mountain Pygmy Possum (p. 98) <i>Adaptations to Survive Alpine Habitat</i> | Water-holding Frog (p. 75) <i>Adaptations to Survive Arid Zone—Desert</i> |
|---|--|
| Hibernation (& body temperature): <ul style="list-style-type: none"> • | Conserving water: <ul style="list-style-type: none"> • |
| Nesting site: <ul style="list-style-type: none"> • | Aestivation (dormancy): <ul style="list-style-type: none"> • |
| Prehensile tail: <ul style="list-style-type: none"> • | Burrowing: <ul style="list-style-type: none"> • |
| Fur: <ul style="list-style-type: none"> • | Eyes on top of flattened head: <ul style="list-style-type: none"> • |
| Size: <ul style="list-style-type: none"> • | Breeding triggered by heavy rain: <ul style="list-style-type: none"> • |
| Cache food: <ul style="list-style-type: none"> • | Spreading egg masses: <ul style="list-style-type: none"> • |
| Supernumerary young: <ul style="list-style-type: none"> • | Tadpoles: <ul style="list-style-type: none"> • |
| Travelling long distance at night: <ul style="list-style-type: none"> • | Adult feeding: <ul style="list-style-type: none"> • |
| Females expel junior males: <ul style="list-style-type: none"> • | Male call: <ul style="list-style-type: none"> • |

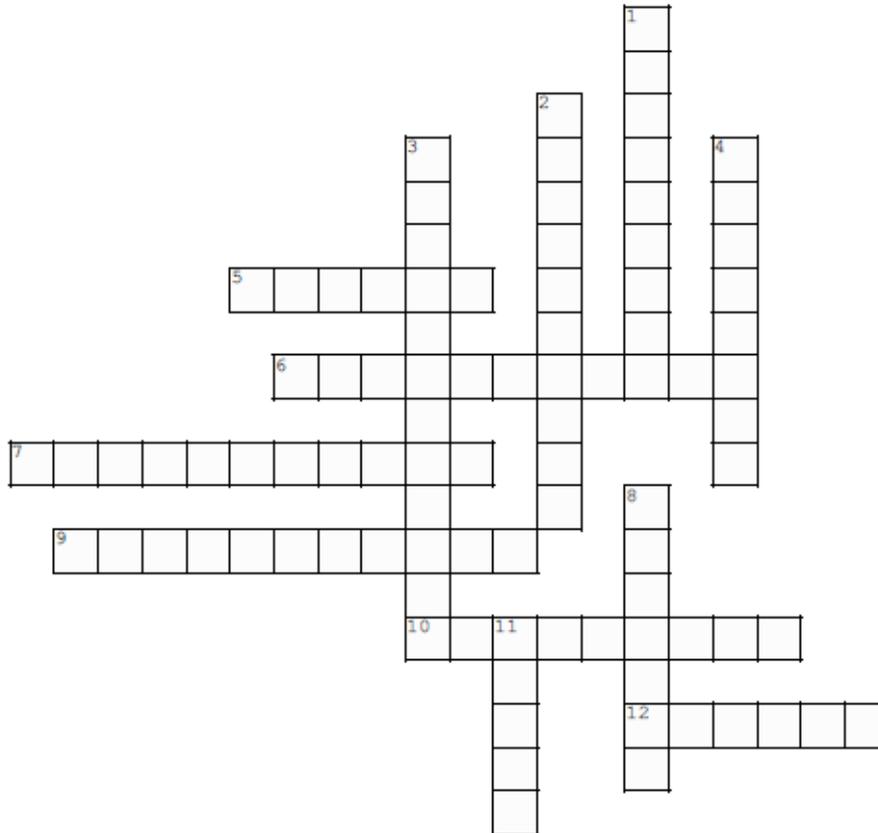
Table 4: General environmental adaptations of animals in *Amazing Animals of Australia's National Parks*

| Adaptation | Animal | Page | What They Have or Do |
|---|----------------------------|------|---|
| Staying cool | | | |
| 1. | Bilby | 82 | |
| 2. | Red Kangaroo | 83 | |
| 3. | Yellow-footed Rock-wallaby | 100 | |
| Staying warm | | | |
| 4. | Black-headed Python | 38 | |
| 5. | Kookaburra (or any bird) | 25 | ruffle their feathers up, which traps air that has been warmed up by their body heat. |
| 6. | Sugar Glider | 47 | |
| Conserving energy (torpor) | | | |
| 7. | Common Bearded Dragon | 12 | |
| 8. | Tawny Frogmouth | 20 | |
| 9. | Giles' Planigale | 81 | |
| Surviving scarce water | | | |
| 10. | Smooth Knob-tailed Gecko | 71 | |
| 11. | Bilby | 82 | |
| 12. | Red Kangaroo | 83 | |
| Special digestion for poor quality diet | | | |
| 13. | Koala | 46 | |
| 14. | Yellow-footed Rock-wallaby | 100 | |
| 15. | Dugong | 129 | |
| Protection from predators | | | |
| 16. | Bush Stone-curlew | 22 | |
| 17. | Short-beaked Echidna | 95 | |
| 18. | Eastern Long-necked Turtle | 109 | |
| Surviving extreme conditions (aestivation; hibernation; brumation—reptile hibernation) | | | |
| 19. | Shingleback Lizard | 73 | |
| 20. | Mountain Pygmy-possum | 98 | |
| 21. | Eastern Long-necked Turtle | 109 | |

Name: _____

Amazing Animal Adaptations

Complete the crossword below



Created with TheTeachersCorner.net [Crossword Puzzle Generator](#)

Across

- 5.** short periods of lowered metabolism
- 6.** blending in with the background environment
- 7.** active at dawn and dusk
- 9.** a long period of dormancy
- 10.** active at night
- 12.** mountain top habitat with periods of snow

Down

- 1.** making a hole or tunnel underground
- 2.** stone swallowed to aid digestion
- 3.** location of object by reflected sound
- 4.** organ that helps digest food of poor quality
- 8.** active in the day
- 11.** hide food for later use