Volume 5

Australian Nature Study Guide

Backyard Edition

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SUMMER/
SPRING

AUSTRALIAN

NATURE STUDY

GUIDEBOOK

Summer and Autumn

Volume Five

Backyard Edition

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About the Author

Marie Viljoen

Marie Viljoen has been home educating for eleven years. She shares her life with her wonderful husband and lives on the land with four of her five children who delight in assisting dad. Two of her daughters have graduated and she's the grandparent of two **precious granddaughters** so far.

In those rare moments when there's time to breath and cappuccinos and chocolate are bliss, she loves to read, bush walk and journal. Above all, she adores her Saviour and exploring His exquisite creation brings her joy while sharing the experience with her children. She's so excited for the opportunity to write and share nature discoveries with you.

Dedication:

To my children for their patience and support – Thank you for tagging along with me on my excursions and being patient when I linger too long. To my longsuffering husband – Thank you for giving me the time to chase my dreams and for not complaining when dinner is late. Again! To my special friend, Elizabeth – Thank you for your consistent encouragement and support. To my amazing friend Johanna – Thank you for simply believing in me, and for the motivation and inspiration you sprinkle in my life. I appreciate all you do. To my Creator – Thank you for giving me the 'eyes to see' Your marvellous creation.

A warm thank you to the photographers

who kindly contributed their photographs for this project.

Get in Touch!

It is my hope this guide will encourage you to marvel at the Aussie wildlife in your backyard and refresh your spirit as you explore and enjoy the gift of creation.

Nature Science for Aussie families is a F.B. Group where outdoor mamas share their adventures, explorations and activities to motivate, encourage and support one another. We'd love to have you come along side us and share in our joy of the outdoors.

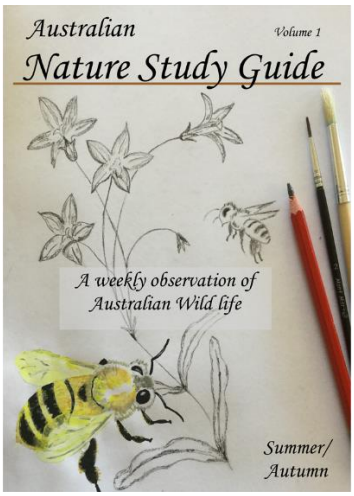
Become a part of our email community for additional support and free resources that'll enrich your nature study encounters by subscribing to our monthly Nature Study Journal here.

Pop in and visit me at:

Instagram: nature_study_australia

Facebook: Nature Study Australia

Nature Study Australia Forum



I invite you to take a weekly walk through Australian wildlife with the

Summer/Autumn Nature Study Guide.

WELCOME NATURE ENTHUSIAST!

The Australian Nature Study Guidebook: Weekly Observations of Australian Wildlife was born out of a need to share nature with my children through the southern hemisphere's seasons. In the Summer/Autumn guide, we observed honeybees, searched for Blue-tongue lizards, explored amphibian metamorphosis and investigated the habitat of a summer tree. We also crept up to Golden Orb spiders and attracted Emperor Gum moths to examine. It was a joy to observe the season while connecting with our unique Aussie wildlife.

Now, I invite you to slow down with us and explore nature in the backyard or park where we'll encounter common, but interesting and complex creatures living alongside us like native bees, ants, grasshoppers and ladybirds. We'll learn interesting facts relating to our iconic eucalyptus trees and investigate summer's blossoms.

I encourage you to take a leisurely walk through this guide, pausing a while should a child be particularly interested and inspired to explore a little longer on a topic. A weekly theme can be extended into a month of adventure where the child is immersed into the secret worlds of nature and natural play.

I hope you'll be inspired to step outdoors with your family and enjoy making precious memories while following the seasonal transformations in the backyard.

As a Christian, my writing will be flavoured with a Christian worldview and as home educators, we have the liberty to take what we need from a resource and leave what we don't, so you have the freedom to tailor this guide to your unique family and personal beliefs. We all have the same goal in mind: to give our children an exceptional education fashioned to their own capabilities and interests.

The information included in this guide can be used by all home educators regardless of your preferred learning style. It is flexible and easily tailored to your preference whether it be Charlotte Mason, Unit Studies, Unschooling, Project-Based, Classical, Traditional, Montessori or Waldorf based.

This guide will encourage observation, exploration, adventure, discoveries, creations, research, writing, reading, drawing, painting, comparisons, discussions, wonder and much more. So, come along. Walk with me.

TABLE OF CONTENTS

STARTING OUT

"We are all meant to be naturalists, each in his own degree, and it is inexcusable to live in a world so full of the marvels of plant and animal life and to care for none of these things." ~ Charlotte Mason

Let's Get Started

This section will provide information on the topic being researched before you head out doors, so that you are equipped with the knowledge you need to answer questions when they're fired at you. It is by no means exhaustive. Instead of reinventing the wheel, I'll be referring you to helpful resources or links on the weeks theme if you'd like to research it further and dig deeper.

Nature Rambles

Nature rambling is a time to explore the backyard and notice which creatures are living amongst you or visiting for a season. Encourage children to investigate the yard for the subjects of your study and observe them; noticing their behaviour, habitat and feeding habits. Once discoveries have been made, the child is free to play or note their observations within a nature journal or by using the notebook pages provided with the guide.

Literature Jaunt

I've included a list of children's books relevant to the theme of the week which will offer enjoyment and ignite excitement in the subject to be explored. Enjoy them by reading the stories outdoors if the weather permits or introduce them to your 'circle time' or 'morning basket.'

The studies do not rely on these books, so don't stress if you can't find a title or if you're unable to visit the library. After reading a story to your children, ask them to narrate it back to you. Start with the youngest child so the older children are challenged further to recall what was read to them.

Please preview the books first to see if they meet your standards. There are a few books that have a secular worldview. I'd suggest skipping the historical viewpoints to the facts related to the study. Also ensure your children have a firm grounding in the creation of the world by God as then they'll be able to perceive evolution's point of view on historical science.

Poetry Picnic

Reading poetry while enjoying a snack is so refreshing and I guarantee, that if the children aren't keen on poetry, they'll be there for refreshments. Pull out your blanket, and a snack to enjoy while reading the poems included in this section with your children. Due to copywrite laws, I haven't included the poems in the guide, but most of them can be found with an internet search. The poems can be used as copy work, either as handwriting practice or as an addition to their nature journal entry. They can also be used for dictation and memory work.

Picture Study

Picture study is a fun way to include art appreciation into your schedule. Children are exposed to wonderful works of art and ideas. The artworks can be found by using the internet in a quick search. Charlotte Mason's method of picture study is for the children to look at the picture intently, and for as long as they need and then answer these few questions:

- Ask them what they saw and expect them to describe it in as much detail as they can. Start with the youngest child so the older children are challenged to include more detail.
- What time of day is it?
- What season do you think it is?
- Is there a story to the picture or is it a scientific sketch?
- Do you like the picture? Why or why not?

Digging Deeper

In this section you'll find activities that will help the children to dig deeper into the nature study should they choose to. There are activities for research, science, crafts, writing, art and much more. Allow the children to choose an activity that's most appealing to them unless you'd like to take a unit study

approach and work on these assignments over a few weeks. I've included assignments to be enjoyed by a variety of ages. As families, we know it's important to enjoy the outdoors together, and as busy people, we can save time by integrating all ages into one study.

Consider its Ways

We'll consider the ways of nature: the work of insects, the perseverance of plant life and the faith and contentedness of birds in an effort to learn how we can build character qualities to honour God and bless others. Proverbs 6:6-6 encourages us to, "Go to the ant, you sluggard; consider its ways and be wise." As we observe creation, we'll notice how God has wired each creature with instinct and initiative. We'll ponder its ways and become wise as we strive to build similar character qualities within ourselves that'll sustain us through life.

Notebook Pages

You'll find four notebook pages per study; two pages are designed specifically for the weekly topic, while the other two pages are generic, allowing you to use them for observations unrelated to the topic of the week. They have been designed by a friend to be a blessing to you.

The note booking pages can be placed in plastic sleeves and filed as a nature journal reference or you could paste the page in an inexpensive botany exercise book. The child could 'journal' on the blank page opposite the pasted notebook page. Keeping a record of the season's investigations and observations is a rewarding exercise and one that can be enjoyed for years to come.

You Can Do It!

You may be wondering how on earth you're going to fit nature study into your busy schedule? Here are a few ideas to consider:

- Integrate subjects.
- Include **all** children together as each one works at their own level.
- Set standard 'academic work' Monday through to Thursday, leaving Friday free for nature exploration, expression, activities and art.
- Spread a seasonal theme across the span of a month by **diving in** and **immersing the family** in a **single** topic. You may feel that one week is just

not enough to enjoy the study and cover all you'd like to know about a subject. **So feel free to linger a while as there's no need to keep up to your neighbour's brisk walk.**

- Schedule nature study over the course of a week and **dip your toes** in like this:

Monday	Tuesday	Wednesday	Thursday	Friday
Introduction as read aloud in Let's Get Started.	Read stories related to the weeks theme.	Poetry and Picture Study	Nature Ramble	Nature Journaling or Activities & Consider its Ways

Exploring the outdoors and creating fond memories with your children is a special opportunity which will nurture a love for all creation within their hearts as they glimpse at the magnitude of how big and awesome our God is.

TAKING THE PLUNGE

Summer

"Nature is but a name for an effect whose cause is God."
~ William Cowper

Ants

Let's Get Started

Bulldog Ant

Myrmecia

Ants are amazing creatures who like to farm. They care for herds of aphid, mealybug or scale 'cows' and milk them for their delicious 'milk' known as honeydew. The ants will herd these insects to new feeding grounds and protect them from predators.

Aphids, mealybugs and scales will attach themselves to plants and insert sharp sucking tubes allowing them to feed on plant juices. The sap is excreted as honeydew which the ants collect and store for their sisters in the nest. Ants have two stomachs: one which stores food for the nest and another which digests nectar for itself. Mutual feeding between worker ants is common and is known as trophallaxes which means 'exchange of food.'

Green Tree ants tend to and protect Blue Lycaenidae caterpillars in exchange for honeydew. Caterpillars attract certain species of ants while repelling others through chemical secretions produced through special glands. Guardian ants will simply stroke the caterpillar with its antennas and drops of honeydew appear.

The Purple Azure butterfly scouts for the perfect place to lay her eggs amongst mistletoe leaves in a gum tree. Once the caterpillars hatch, they fall to the ground where Sugar ants welcome them into their nest. The caterpillars will climb the tree at night to feed on mistletoe while the ants escort and guard them until daybreak when they return to the nest.

Ants have a remarkable symbiotic relationship with many insects and plants. They play an important role in nature's ecology. Ants till the soil while building a colony and plant the seeds they collect by storing them in a pantry. Seeds that have been buried by ants are more likely to germinate and thrive.

Amazingly, through God's design, some plant species entice ants with chemical attractants which encourage ants to disperse their seeds. In return, the ants reap rich nutritional benefits of fatty acids, amino acids and sugars. This partnership is known as myrmecochory.

Ants live in colonies similar to honeybees. The colony is ruled by an egg-laying queen. All regular inhabitants of a colony are infertile females who are the workers; they have different jobs of guardians, foragers, harvesters, hunters, nursers, builders, soldiers and homemakers. Every so often, fertile males and females are produced to begin new communities of ants.

The queen lives a life of luxury, relying on her assistants to feed and groom her. Nursery maids will care for the eggs and larva by washing and moving them when necessary. They'll also produce trophic eggs which are infertile to feed the brood. When the time comes, the larva will spin a cocoon and pupate. During this time, the pupa is in a deep sleep as it changes into an adult ant. The nursery maids know exactly when to assist new ants out of their silk cocoons.

Homemaker ants will keep the nest neat and hygienic by removing droppings, scraps and dead ants. They place the waste on a rubbish heap known as a midden. Soldier ants protect the nest from predators. They have powerful jaws for biting and are larger than the worker ants.

Ants are organised, cooperative and they work together as a community; each one busy with its own work.

The ant fauna of Australia is diverse with about 1300 recorded species. A few ant species to investigate are:

- Black Ants (Ochetellus glaber)
- Bulldog Ants (Myrmecia brevinoda)
- Sugar Ants (Camponotus consobrinus)
- Green Tree Ants (Oecaphylla smaraydina)
- Spider Ants (Leptomyrmex rufipes)
- Fire Ants (Solenopsis invicta)
- Spiny Ants (Polyrhachis sp.)
- Meat Ants (Iridomyrmex sp.)

- Honey Pot Ants (Formicidae)

Ant Facts:

- Ants, sawflies, bees and wasps belong to the insect order Hymenoptera.
- Ants are insects and as such they have:
  - A body with three main parts; head, thorax and abdomen.
  - Six legs attached to the thorax; three on each side.
  - Attached to the head are the mandibles (jaws).
  - Compound eyes meaning they have many lenses within one eye.
  - Antennas which they use to smell, touch, taste and hear.
- Many species of ants have stingers or poison sacks attached to the end of the abdomen which is used as a defence against predators.
- Ants communicate with each other by touching their antennas together, leaving scent trails known as pheromones on the ground to food sources.
- At certain times of the year, usually after rain, winged males and females emerge from their nests to find a partner, fly away and start a new colony. The male does not live long after mating the female. The new queen will chew her wings off and start laying eggs.
- Ants go through complete metamorphosis which includes four life stages: egg, larva, pupa and adult.
- Different species of ants build different homes. Some are simple mounds of dirt and sand, others carve out tunnels in rotting wood while Spiny ants and Green Tree ants build nests in trees.
- Ant nests consist of a maze of tunnels and chambers and each space has a purpose. The queen lives in her chamber while her brood is tended to in nurseries and food is stored in pantries.
- An ant society is a kind and gracious one where they groom and feed each other. Ants we also transport one another when they move from one nest to another.

Further Exploring

The Wonderland of Nature by Nuri Mass

- The Tiny World of Ants, pg. 28

Insect Life by Arabella B. Buckley

- What is an Insect, pg.1
- Ants and Their Honey Cows, pg. 73

All About Ants by Densey Clyne

Ants Close Up by Andrew Kelly

Ants by Sally Morgan

Related Internet Links

Aus Ants

Australian Ants | Oz Animals

Ants | Kid Cyber

Ants | National Geographic

Nature Ramble

What kind of ants are living in your backyard? Shall we find out? Perhaps you'll find the common Black House Ant or another species altogether. Ants aren't shy and they happily live amongst us in parks and cities too. An ant nest can be as simple as a hole in the ground or it could be a massive mound protruding from the earth. Ants live in crevices in concrete, cracks in walls, beneath tree bark and in rotting wood. Some species of ants live in the tree tops and sew leaves together to create their chambers.

Notice how busy ants are. Where are the coming from and where are they going? Do you think they are following a scent trail? Are they carrying anything? Is it much larger than the ant? What kind of nest do they have? Do you see ants grooming or feeding each other?

I wonder what kind of ants they are? Could they be harvesters, hunters, soldiers or nursers? I also wonder if there are any symbiotic relationships between ants and plants or insects nearby? Can you tell?

The hard working ants remind me of busy honeybees as they live and work in a similar way. What do the ants remind you of?

When flying ants come into season, capture a few to examine. The flying ants are the next generation and they are preparing to start new colonies. It's the perfect time to find a queen and start a formicarium.

Literature Jaunt

One Hundred Hungry Ants by Elinor Pinczes | Read Aloud

The Story Book of Science by Jean Henri Fabre, pgs. 1-24

Our Wonderful World by Emery Lewis Howe

- Ant Workers, pg. 30

Little Busybodies by Jeanette Marks

- Eyes and No Eyes, pg. 167

The Ant and the Chrysalis by Aesops Fables | Read Aloud

The Trouble with Ants by Claudia Mills

Are You an Ant by Judy Allen

Little Black Ant on Park Street by Janet Halfmann

Hey Little Ant by Phillip M. Hoose

Grant the Ant by Lindy Handy and Dan Holdaway

Poetry Picnic

The Ants by Jane Taylor

Picture Study

Ant Hills by Sidney Nolan

Consider Its Ways

As we consider the ways of ants we notice that they are **diligent** workers. There's not one lazy ant amongst them. The queen does not nag her brood to complete tasks set for the day. They are **self-motivated** creatures who plan ahead. They

know that if they don't work hard, they won't last the winter. Their conscientious efforts sustain them.

Watch as the Green Tree ants of Northern Australia diligently work with one another as they build a new nest.

Now that you've studied ants and know interesting facts about them, what other qualities can you learn from them?

- Servanthood
- Helpfulness
- Kindness
- Cooperation

Ants encourage us to overcome our lazy tendencies and become diligent workers who are kind, thoughtful, cooperative and wise. Think on these things.

"Go to the ant, you sluggard! Consider her ways and be wise. Without leader, administrator or ruler, it prepares its provisions in summer; it gathers its food during harvest. How long will you stay in bed, you slacker? When will you get up from your sleep? A little sleep, a little slumber, a little folding of the arms to rest, and your poverty will come like a robber, your need like a bandit." Proverbs 6:6

Digging Deeper

Young Students:

- Learn more about ants by visiting with Jess at the Tree House here.
- Compare and discuss the difference between ant species and their nests. Watch how Army ants create a complex structure known as a bivouac using their own bodies to provide shelter for their queen here.
- Colour in the ant page provided with this guide. Discuss the things you notice.
- Create a clay model of an ant.
- Listen to the Ants go Marching One by One song here.

Older Students:

- Watch how ants farm Mealybugs here and protect them here.
- Use a Venn diagram to compare the differences between ants and termites. Start here.

- Investigate how spiders mimic ants in order to trick them and eat their larva. Start here.
- Create a poster-board project of an ant colony.
- Design a formicarium or ant farm to observe ants building their tunnels. Here's how and supplies can be obtained here. Capture flying queen ants to place in your ant farm at the beginning of the anting season.
- Draw and label an ants anatomy in your nature journal. Include notes on your observations from the nature walk.
- Use the ant notebook page to record your observations during your nature ramble in your backyard.

Oldest Students:

- Research and write a report on myrmecochory which is a symbiotic relationship between ants and plants.
- Investigate how Leaf Cutter ants grow fungus like 'mushrooms.' Share your research with your family.
- Create a poster-board project presenting the symbiotic connections between ants and plants, ants and butterflies or ants and aphids.
- Make a journal entry in your diary of the different ant species in your locality and record your observations.
- Use the ant notebook page to record your observations during the nature ramble in your backyard.

Lady Beetles

Let's Get Started

Image: Rhiannon Post

Lady Beetle

Coccinellidae

Lady beetles bleed at the knees when they are frightened or feel threatened. A noxious, foul smelling, yellow liquid oozes out of their joints or abdomen's to warn predators that they taste nasty.

Lady beetles also use aposematic colouration as a defence mechanism to signal toxicity to predators. Aposematic is a Greek word; apo meaning distant, and sema meaning sign. Predators, often know through experience, that bright coloured insects taste awful. Lady beetles also roll over and play dead to prevent being eaten by birds.

Every gardener or farmer loves to see lady beetles chewing on harmful insects such as aphids, mealybugs, mites and beetle larvae which destroy their plants or crops by sucking out plant juices. A lady beetle can eat up to 5000 aphids in its lifetime.

In 1888-1889, an Australian lady beetle (Rodolia cardinalis) was imported to California to save an orange crop from cottony cushion scale. Not all lady beetles are beneficial to gardeners. The twenty-eight spotted lady beetle is a vegetarian and harmful to plants.

Once lady beetles emerge from dormancy in winter, they signal for a mate by excreting a perfumed odour which attracts a partner. The female lady beetle will lay a cluster of 20-30 yellow, jelly-bean like eggs underneath a leaf where there are many aphids for the hatched larvae to feed on. When times are tough, and food is scarce, she'll lay infertile eggs for the grubs to eat so that they have the best possible chance of survival.

The eggs turn grey within a week before the larvae emerges. The grubs first devour their egg cases before pursuing aphids or mealy bugs. They can munch through 30 aphids a day. As the larvae grows it moults several times before attaching itself to a stem. Its skin will split and the larvae becomes a pupa. The miracle of metamorphosis takes place in seven days. The adult lady beetle will

break through the pupa and rest while the exoskeleton hardens. The beetle will fly within an hour and the black spots appear in a day.

A few lady beetle species to investigate are:

- Transvers Lady Beetle (Coccinella transversalis)
- Spotted Potato Lady Beetle (*Henasepilachna vigintiactopunctata)*
- Mealy bug Lady Beetle (*Cryptolaemus montrouzieri)*
- Spotted Amber Lady Beetle (Hippodamia variegate)
- Cardinal Ladybird (*Rodolia cardinalis)*
- Fungus Eating Lady Beetle (Illeis galbula)
- Red Chilocorus (Chilocorus circumdatus)

Plant herbs like coriander, fennel and dill to attract lady beetles to your garden.

Ladybird Facts:

- Lady beetles are common in gardens all over Australia. Their habitats vary depending on the species. Lady beetle habitats range from forests, to grasslands, muddy river beds and grass fields.
- There are about 500 species in Australia and 5000 species in the world.
- A ladybug is also known as a ladybird. The correct term is lady beetle as they belong to the beetle family.
- Lady beetles have a dome shaped back with bold colours of either red, orange and yellow which are littered with black spots that vary in number or black patterns or lines. Some lady beetles are even plain white, brown or black.
- Lady beetles are insects and as such they have:
  - A body with three main parts; head, thorax and abdomen.
  - Six legs attached to the thorax.
  - Attached to the head are the mandibles (jaws).
  - Palps which look like tiny fingers alongside the mandibles that guide the prey to the mouth. The palp can also taste food.
  - Compound eyes. They have thousands of lenses within one eye which enable them to see front, sides and back.
  - Antennas which they use to smell, touch, taste and detect air movement.

  - Two pairs of wings. The two front wings are cases which protect the rare wings that are used for flying. A lady beetle can beat its wings 80-90 times per second. That's very impressive.
  - They breathe through openings known as spiracles on the sides of the abdomen and thorax.
- Lady beetles also eat pollen, sap, nectar and fungus.
- They practice cannibalism when times are hard.
- Their lifecycle consists of egg, larvae, pupa and beetle.
- The female can lay up to 2000 eggs in its lifetime.
- Lady beetles seek dry, sheltered areas to lay dormant in huge clusters during winter. They often return to the same spot every year. They have a chemical that prevents them from freezing and are able to survive beneath snow.

Further Exploring

The Wonderland of Nature by Nuri Mass

  - Ladybird, Ladybird, Don't Fly Away, pg. 10

Insect Life by Arabella B. Buckley

  - Useful Beetles, pg. 32

Ladybirds Up Close by Greg Pyers

Grow With Me Ladybug by Kate Riggs

Related Internet Links

Ladybirds of Australia

Australian Ladybirds

Ladybird Insects | Brisbane Insects

Ladybug Facts | National Geographic Kids

Ladybirds | Backyard Buddies

Nature Ramble

Venture into the backyard and search for lady beetles. They like warm, sheltered areas and sometimes burrow into leaf litter. Investigate plant leaves and stems for lady beetles or evidence of their existence in the yard.

What will you notice while exploring for lady beetles? Perhaps you'll see yellow eggs on the underside of leaves or grubs searching for a snack. What colours are your lady beetles and how many spots do they have?

I wonder what insects your lady beetles are eating? Will it be aphides, mealybugs, mites, nectar or fungus?

What do your observations remind you of? Perhaps the yellow eggs look like jelly beans and the grubs seem like miniature alligators.

Literature Jaunt

The Grouchy Ladybug by Eric Carle | Read Aloud

The Very Lazy Ladybug by Isobel Finn | Read Aloud

Life Story of a Ladybird by Charlotte Guillain

Are You a Ladybug by Judy Allen

A Ladybug's Life by John Himmelman

Insect Life by Arabella B. Buckley

- Useful Beetles, pg. 32

Poetry Picnic

Summer of the Ladybirds by Vivian Smith

Picture Study

Ladybirds by Gisela Zimmer

Consider Its Ways

Lady Beetles are **helpful** workers as they control pests which damage plants and vegetables in the garden. I'm grateful for lady beetles and when I notice them in the garden, I'm so excited because I know they're looking after my interests. As I consider how helpful lady beetles are, it encourages me to take note of those around me. I wonder how I might help them? Can you be a helpful lady beetle to someone in need this week?

"Everyone should look out not only for his own interests, but also for the interest of others." Philippians 2:4

Digging Deeper

Young Students:

- Watch the life cycle of a ladybird here.
- Visit the tree house to learn more about lady beetles here.
- Colour in the lady beetle page provided with this guide. Discuss what you notice on the page.
- Print lady beetle colouring pages here to paint.
- Make your own lady beetle. Here's how.
- Sing along to this cute lady beetle song.

Older Students:

- Research the defence mechanism of aposematic colouration in insects. Discuss your research with a friend and brainstorm the names of insects that have it.
- Use the notebook page to record your observations of the lady beetles in the backyard.
- Draw the anatomy of a lady beetle and write your observations in a nature journal.
- Colour in the lady beetle page provided with this guide. Discuss what you notice on the page.
- Create a rock painting of a lady beetle. Here's how.

Oldest Students:

- Investigate how lady beetles are being used in the cotton industry to control aphid populations.
- Sketch and paint the species of lady beetles in your area in a nature journal. Make a note of your observations and any questions you may be wondering. Start a lady beetle timeline list in your journal.
- Use a notebook page to record the results of your explorations in the backyard.
- Paint a lady beetle in watercolour. Here's how.

Grasshoppers

Let's Get Started

Image: Kylie Grasshopper Acridomorpha

A male grasshopper creates music in a similar way to a violinist. On the inside of the hindleg is a row of pegs he uses to rub his forewing on causing a rasping tune to call females. This is known as stridulation. Some grasshopper species snap their wings while flying to generate music instead, and this is called crepitating. They don't play their instruments in tune but the females don't mind.

Amazingly, each species of grasshopper plays a special melody to attract their own kind. Once the male grasshopper has successfully proposed to a female, he will linger on her back to protect her. When the lady is ready, she'll dig a burrow in the ground and lay a pod of eggs. The eggs can lay dormant in the ground for many years, waiting patiently for the right conditions before hatching. After rains, grasshopper eggs hatch into nymphs. The nymphs cannot fly, and it'll take about two months before the nymphs are fully grown adults with wings.

Did you know that if we could jump as high as a grasshopper, we'd jump right across a football field? They have inbuilt catapults in their hind legs which allow them to spring into the air once their muscles are relaxed. This makes them powerful jumpers and you'd know this if you've ever tried to catch one.

Grasshoppers are omnivores that eat stems, leaves, buds and roots. They are considered pests in the agricultural sector. At times, grasshoppers have swarmed over the country defoliating grasslands and crops.

Grasshoppers inhabit forests, aquatic vegetation and bushlands. In fact, they're tough enough to survive and thrive in the outback. Sugar gliders, snakes, lizards, birds, frogs, assassin bugs, ants and even humans dine on grasshoppers. Would you eat a grasshopper? They are considered a delicious snack in Africa, South America and the Middle East. John the Baptist ate grasshoppers and honey.

Their defences include the ability to spring from danger and hide from predators using their camouflaged suits to blend into vegetation or sand.

A few grasshopper species to investigate are:

Green Vegetable Grasshopper (Atractomorpha similis)

Hedge Grasshopper (Valonga irregularis)

Australian Plague Locust (Chortoicetes terminifera)

Liechardt's Grasshopper (Petasida ephippigera)

Grasshopper Facts:

- Grasshoppers belong to the insect group Orthopteran which include crickets, katydids and locusts. Orthopteran is a Greek word meaning straight wings.
- There are about 500 species of grasshoppers in Australia.
- They are common all over the country.
- 90% of Australian grasshoppers are found nowhere else in the world.
- Grasshoppers undergo incomplete metamorphosis with three stages; egg, nymph and adult.
- Is it a grasshopper or a locust? How do we tell them apart? Locusts have very long feelers or antennae while grasshoppers have short ones. Locusts generally live a life of solitude unless they're swarming.
- Grasshoppers are insects and as such they have:
    - A body with three main parts; head, thorax and abdomen. The grasshoppers abdomen is segmented.
    - Six legs attached to the thorax; three on each side. The hindlegs are used for jumping while the other four are used for walking,
    - Attached to the head are the mandibles (jaws). Grasshoppers chew side to side not up and down like we do.
    - Palps which look like tiny fingers alongside the mandibles that guide the prey to the mouth.
    - Compound eyes meaning they have many lenses within one eye.
    - Two antennae to smell and touch.
    - Two long wings.
    - Short horned grasshoppers have ears in the sides of their abdomens while long horned grasshoppers ears are in their knee joints of the front legs.
    - Spiracles which are a series of holes along the side of the abdomen enabling the insect to breath.

Further Exploring

The Wonderland of Nature by Nuri Mass

- The Acrobatic Grasshopper, pg. 37

Insect Life by Arabella B. Buckley

- Crickets and Grasshoppers, pg. 66

Junior Encyclopedia of Australian Wildlife by Kylie Currey

- Grasshoppers, Crickets and Kaytdids, pg. 139

Related Internet Links

Order Orthoptera | Australian Museum

Locust and Grasshopper Identification Guide

Grasshoppers | Backyard Buddies

Liechardt's Grasshopper | Australian Geographic

Liechardt's Grasshopper | ABC Science

Nature Ramble

Explore the backyard for grasshoppers. Can you catch one? Take a closer look with a magnifying glass at its anatomy.

Notice where you found the grasshopper. What was it doing? Does it have a long pointy tail? This could be the females ovipositor which she uses to deposit eggs into the ground. What else do you notice?

I wonder if your grasshopper is a nymph without wings or an adult with wings? What else do you wonder?

Does the study of grasshoppers remind you of the grasshopper plague in Egypt during Moses's time in the Bible? You can read the story in Exodus, Chapter 10.

Literature Jaunt

The Ant and the Grasshopper | An Aesop Fable | Listen here.

The Ant and the Grasshopper | An Aesop Fable

Are You a Grasshopper by Judy Allen

Grasshoppers by Lisa Amstutz

Little Busybodies by Jeanette Marks

- The Little Army, pg. 21

Poetry Picnic

The Summer Day by Mary Oliver

Picture Study

Grasshopper Sculpture by Kamelia Sofronova

Consider Its Ways

Let's consider the way of the grasshopper in Aesop's Fable, the Ant and the Grasshopper. The grasshopper was the opposite of the ants. The ants were **diligent** workers and the grasshopper was very lazy. He preferred to play all day, placing the daily chores aside of reaping and storing food for winter.

The grasshopper learnt the lesson that all play and no work had the terrible consequence of death. If it were not for the **graciousness** of the ants sharing their food with him, he would have died.

Let's decide to be wise and diligent workers like ants by completing our work before we go out to play. When we complete the assignments given to us well, we are pleasing the Lord.

"Whatever you do, do it from the heart, as something done for the Lord and not for people, knowing that you will receive the reward of an inheritance from the Lord. You serve the Lord Christ." Colossians 3:23-24.

Digging Deeper

Young Students:

- Sing along to this ant and grasshopper tune.
- Watch the cartoon, It's a Bugs Life.

- Watch the grasshopper playing his song here. Make your own grasshopper tune by scraping a ruler over comb bristles.
- How far can you jump? As far as a grasshopper? Let's see you jump.
- Colour in the grasshopper notebook page and discuss what you notice.

Older Students:

- Learn to draw a grasshopper with this tutorial.
- Get up close to a feeding grasshopper by watching this.
- Discuss the difference between a locust and a grasshopper.
- Compare grasshoppers to crickets using a Venn diagram.
- Build a grasshopper with lego. Here's some inspiration.
- Record your observations on the grasshopper notebook page.
- Colour in the grasshopper drawing and discuss what you notice on the page.

Oldest Students:

- Watch a locust plague devour everything in sight here.
- View this grasshopper dissection.
- Research the difference between grasshoppers that stridulate and those who crepitate.
- Read the story of Liechardt's Grasshopper, and the German explorer who discovered it, and then disappeared in the Great Sandy Desert in 1845 here.
- Learn the kinematics of Grasshopper hops here.
- Use the notebook page to record your backyard observations.
- Sketch a grasshopper in your nature journal. Make a note of your observations and questions.

Native Bees

Let's Get Started

Image: Jo Buijs

Masked Bee

Hylaeus

Native bees create a highly prized bush food known as 'Sugarbag.' It is savoured and leisurely relished by Indigenous Australians as a Stingless Bee hive only produces 1kg of honey per year.

Australia has 10 social native bees which do not sting, build hives and produce honey in a similar way to the introduced European Honeybee. The native social bees create their nests within tree hollows, branches and logs with wax and resin.

Most native bees are solitary and they don't store honey in nests. They only collect nectar and pollen to feed their young. Each female will create her own nest. Depending on the species, she may burrow underground, tunnel into wood, mortar, solid sandstone or plant stems. She lays one egg per cell, lines it with pollen and nectar, and then seals it. The grubs will fend for themselves as the female will usually be dead by the time her offspring emerge as adults.

The 'true blue' bees of Australia are important for sustaining the ecosystem as most local wildflowers such as the Solanum species and some vegetables like tomatoes and potatoes depend on the special 'buzz' pollination or sonication that honeybees are unable to provide.

In some plants, the pollen is held tightly by the anthers. The bee buzz pollinates it by holding onto the plant and shaking it with its flying muscles. The strong vibrations cause the anthers to eventually release the pollen which feeds the bee and pollinates the flower.

A few native bee species to investigate are:

Australian Stingless Bee (Tetragonula carbonaria)

Carpenter Bees (genus Xylocopa)

Teddy Bear Bees (Asaropoda)

Blue Banded Bee (Amegilla)

Leaf Cutter Bees (Megachile)

Masked Bees (Colletidae)

Resin Bees (Megachile)

Dawson's Burrowing Bee (Amegilla dawsoni)

Native bees are beautiful and range in colours from metallic green to yellow, red and black. Certain species are designed with stripes or even polka dots. Some are fat, furry and fuzzy while others are sleek, smooth and shiny.

Native Bee Facts:

- There are over 1500 Australian native bee species.
- Carpenter bees are the largest at 24mm long.
- Cape York's minute Quasihesma is the smallest bee at just 2mm long.
- During the summer months there's a great chance of seeing native bees anywhere in Australia.

Further Exploring

Insect Life by Arabella B. Buckley

- Solitary Bees, pg. 46

The Australian Native Bee Book by Tim Heard

Australian Stingless Bees: A Guide to Sugarbag Native Bee Keeping by John Klumpp

Related Internet Links

Which Native Bees are in Your Area? | Aussie Bee

Images of Native Bees | National Geographic

Brilliant Bees: A Seven Week Literature Based Program for Grade 3

Australian Native Bees: Learn More Up Close | Bee Business

The Burrowing Bees of WA.

Native Bee Poster QLD and NSW

Nature Ramble

Investigate your backyard for native bees. Search eucalyptus blossoms and any native plants or herbs flowering in your area. Leaf cutter bees love roses and Blue banded bees like lavender. Bees are active when the daily temperature reaches 20 degrees. The best time to observe native bees is between 10am and 2pm or when the sun begins to set and the bees search for a spot to roost.

What species of bees do you notice working in your garden? What colours are they? Are they social or solitary bees? What time were they most active?

I wonder which blossoms the bees prefer in your backyard? Can you tell?

The fuzzy wuzzy native bee reminds me of a soft, furry teddy bear. What do the native bees remind you of?

Literature Jaunt

Nifty Native Bees by Rebecca Johnson

Sugarbag by Nola Turner-Jensen

Flight of the Honeybee by Raymond Huber

The Book of Bees by Piotr Socha

Poetry Picnic

The Song of the Bee by Marion Douglas

Picture Study

Blue Banded Bees Roosting by Laurence Sanders

Consider Its Ways

Solitary native bees busy themselves with the work of the day, pollinating flowers, collecting nectar and pollen while preparing nests for eggs. They are working hard and quietly going about their own business. As I consider this, I'm reminded to do likewise.

"…seek to lead a quiet life, to mind your own business, and to work with your own hands, as we commanded you." 1 Thessalonians 4:11

Digging Deeper

Young Students:

- Teddy bear bees and Blue banded bees are attracted to blue and purple flowers. Choose a variety of flowers that will bloom through the year to plant in your backyard. Native bees prefer native plants like:
  - Grevillea
  - Bottlebrush
  - Eucalyptus
  - Banksia
  - Acacia
  - Peas and daisies.

  They also enjoy herb plants like:

  - Lavender
  - Rosemary
  - Coriander
  - Parsley and fennel.
- Watch the Blue banded bee buzzing and working here. Then watch the Teddy bear bee here.
- Colour in the native bee page and discuss what you notice.
- Discuss the fertilization of flowers and the difference between European honeybee pollination and the Blue banded bee 'buzz' pollination.

Older Students:

- Take a look at the unique spiral nests of the Australian Stingless Bee here. Discuss how this hive is different to the European Honey Bee hive.
- Write a Cinquain poem about native bees.
  - Line 1: One word title.
  - Line 2: A two word phase describing the title.
  - Line 3: A three word phase describing the action of the title.
  - Line 4: A four word phase describing the feeling relating to the topic.

- Line 5: One word relating back to the title.

Bee
yellow, fuzzy
working, pollinating, buzzing
A joy to watch
Native

- Learn how stingless native bees are being kept to pollinate gardens and reap honey here.
- Compare native bees to flies. Start here and discuss the differences with your family.
- Complete this native bee activity sheet by the Australian Botanic Gardens.
- Use the native bee notebook page to record your backyard observations.
- Sketch a native bee in your nature journal.

Oldest Students:

- Come, take a look inside an Australian Austroplebeia beehive here.
- Build native bee nests to attract them to your backyard. Here are a few native bee nest examples.
- Compare native bees to wasps. Start here and discuss the differences with your family.
- Write a report explaining the importance of native bee pollination to sustain the ecosystem.
- Listen and learn how the Varroa Mite is declining bee populations across the world except for Australia.
- Use the native bee notebook page to record your backyard observations.
- Sketch a native bee in your nature journal.

Summer Flowers

Let's Get Started

Image: Lael Pietzsch

Sunflower

Helianthus annuus

Summer is ablaze with colours of flowing daisies and asters in shades of lavender, pink, blue, purple and white. They are extraordinary flowers. Do you know why? It may seem, as you appreciate the blossoms, that you're only seeing one flower, but upon further investigation, you'll notice hundreds of tiny blossoms within the centre of a flower.

Daisies, Sunflowers and Chrysanthemums belong to the Asteraceae family that produce composite flowers. These plants are intricately designed. Each individual petite flower growing upon the centre disc has its own miniscule stamens, carpel and ovules. These small flowers produce their own tiny seed. Surrounding the central disc are the ray flowers, which are not petals, but individual florets.

Summer flowers not only provide pollen and nectar for insects and birds, but they're a pleasure to feast our eyes upon and a joy to discover secrets like the hidden miracle of an embryo within a seed. All flowers make seeds and it's their purpose to reproduce each season providing food for us and all creatures who feed upon them.

Flower families belong to the Angiosperm group. They are the most diverse of land plants and are characterized by their ability to produce fruit and seed. The function of the flower is to ensure fertilization of the ovule and development of fruit containing seeds.

Common flowers to investigate are:

- Dahlia
- Daisies
- Frangipani
- Bougainvillea
- Agapanthus
- Hibiscus
- Marigolds

- Geraniums
- Roses
- Carnations
- Sunflowers

Summer flowers are a delight to the senses. Their perfume fills the air as we gaze upon delicate, exquisite patterns and gently touch velvety blooms. Walking in the garden and appreciating the beauty of flowers freshens our souls as we appreciate the work of our Designer.

Further Exploring

Note: Prioritise chapters marked with an *

Our Wonderful World by Emery Lewis Howe

- How Plants Grow, pg. 115*
- A Plant and Its Flower, pg. 125*
- Roots of Many Forms, pg. 134
- Plants and Their Stems, pg. 141
- Green Leaf Factories, pg.149
- A Field Daisy and Its Family, pg. 157*
- Bees and Flowers, pg. 164*

Plant Life in Field and Garden by Arabella B. Buckley

Flowers by Steffi Cavell-Clark

Botany for Babies by Jonathan Litton

Growing Patterns by Sarah C. Campbell

Related Internet Links

Composite Flowers | Backyard Nature

Flowers | Encyclopedia Britannica

Inflorescence | Encyclopedia Britannica

Nature Ramble

Step into the backyard and investigate the blooming flowers. If you don't have access to flowers where you live, visit a neighbour's garden, the park or a botanical park in your city.

What plants are flowering in your yard? What colours, shapes and textures do you notice? Can you name the flower parts? Do you see new buds, flower heads, old flowers and seed pods? What else do you notice?

I wonder which pollinating insects are visiting your flowers? Can you tell? Are they helpful or harmful insects?

The sunflower reminds me of the sun. What do summer flowers remind you of?

Literature Jaunt

Jack's Garden by Henry Cole | Read Aloud

The Sunflower House by Kathryn Hewitt | Read Aloud

The Reason for a Flower by Ruth Heller | Read Aloud

Flowers are Calling by Rita Gray | Read Aloud

Welcome the Day by Emma Giuliani

Poetry Picnic

Mirrors of Glory by L. Gayle

Picture Study

Sunflowers by Vincent Van Gogh

Consider Its Ways

As we consider the way of flowers in a field, gently blowing in the breeze, we wonder who takes care of them. God takes care of the flowers. He dresses them in glorious gowns and watches them as they fade, working miracles in secret places as embryos form in seed cases, completing the purpose of reproduction. As the next season arrives, the tiny seed which fell to the ground will awaken,

grow and flower. All the while, God paints the fields with beauty and cares for His creation. Just as the flowers trust God for their care, so we must trust God to take care of all our needs.

"Consider how the flowers grow: They don't labour or spin thread. Yet I tell you, not even Solomon in all his splendour was adorned like one of these. If that's how God clothes the grass, which is in the field today and thrown into the furnace tomorrow, how much more will he do for you – you of little faith…?"

Read Luke 12:27-32

Digging Deeper

Young Students:

- Listen to this rap song about the parts of a plant.
- Learn how plants grow by watching this.
- Dissect a sunflower with this tutorial or look inside a flower here.
- Take photographs of the flowers blooming in your garden and paste them in your nature journal.
- Pick a few flower heads to dry and press with your parents permission. Create a birthday card or bookmark with the dried flowers and send it to a friend.
- Colour in the notebook page included with the guide for this lesson.
- Sing a song of flowers here.

Older Students:

- Discuss the anatomy of a flower using this diagram as a guide.
- Dissect a flower and name its parts.
    - Petal
    - Sepal
    - Stigma
    - Style
    - Ovary
    - Ovule
    - Anther
    - Filament

- Draw or paint a summer flower from your garden. Include as much information as you can about the plant you have chosen to sketch.
- Create a flower arrangement.
- Pick a few flower heads to dry and press with your parents' permission. Create a birthday card or bookmark with the dried flowers and send it to a friend.
- Use the notebook page to record your flower observations in your backyard.

Oldest Students:

- Start a flower timeline in your nature journal and record all the flowers blooming in your area.
- Create a plant timeline by choosing a plant to sketch. Over the course of the plant's lifetime, draw the changes as they happen. You could choose a flower to observe over the course of a week, diligently sketching the plant every day. Take a look at Jack Muir Laws timeline of an iris as a guide here.
- Get creative and put together an unusual flower arrangement. Use gum leaves, bark or drift wood to add to your arrangement.
- Choose one flower to study and sketch it in your field journal. Consider the following:
    - What is the flower shape? Is it:
        - Open?
        - Composite?
        - Tubular?
        - Cylindrical flower head like a Callistemon?
        - Cupped?
        - Orchid?
        - Pea?
        - Globular flowerhead like a Billy Button?
        - Spidery flowerhead like a Grevillia?
    - What are the flower arrangements? Is it:
        - Spiked?
        - Raceme?
        - Panicle?
    - How many petals does the flower have?
    - What colour is the flower, leaves and stem?

    - What are the leaf arrangements? Are they:
        - Opposite
        - Decussate
        - Alternate
        - Whorled?
    - What are the leaf shapes?
    - What are the leaf margins?
    - What is the leaf venation?
- Draw the anatomy of a flower like this one.
- Explore the Fibonacci sequence in sunflowers here, here and here. It's a mathematical marvel which clearly points towards Intelligent Design.
- Use the notebook page to record your backyard flower observations.

Autumn

"God's miracles are to be found in nature itself, the wind and waves, the wood that becomes a tree - all of these are explained biologically, but behind them is the hand of God." ~ Ronald Reagan

Grasses

Let's Get Started

Image: Shelby Pietzsch

Cottontail Grass

Logurus ovatus

Did you know that sugar comes from the Sugar Cane plant of the grass family? I remember chewing the stalk fibres of a sugar cane plant while sucking out the sweet juices as a child. Have you tried it? It's delicious.

Spinifex grass survives and thrives in coastal and arid areas providing protection for the Bilby and Spinifex Hopping Mouse. They dig their burrows near spinifex grass to deter predators by hiding in needle sharp leaves.

According to research scientists, Mathew Barret and Ben Anderson, the spinifex grass species tasted similar to salt and vinegar chips. Isn't that interesting?

Indigenous Australians have many uses for grass such as using the resin from a spinifex species to superglue tools together like axe heads to handles. They also make damper by collecting the seeds of the kangaroo grass and grinding them into flour.

Grassland habitats are vital for the survival of wild animals such as kangaroos, wallabies and wombats who graze on the nutritious native grasses. Birds, lizards and insects like butterflies and grasshoppers are attracted by this environment as it provides them with food and shelter.

The grasses create dense root systems which prevent soil erosion, restore water courses and habitat areas. Grasses flower and produce fruit known as caryopsis

or grain which have no scent to attract insects. They generate pollen which is distributed by the wind. Grasses flourish in poor soils and are drought tolerant.

Grain producing grasses such as rice, maize, oats, wheat, barley and rye provide food for humans and domesticated animals including sheep, goats and cattle. This is where your breakfast cereals come from.

Grasses are also planted in our backyards. They provide a protective covering over hard ground, and it's a barrier which deters soil and dust from entering our homes. It makes the backyard a safe place to run and play. Some backyard lawn varieties are:

- Buffalo Grass (Bouteloua dactyloides)
- Couch Grass (Elymus repens)
- Kikuyu Grass (Pennisetum clandestinum)
- Tall Fescue Grass (Festuca arundinacea)
- Zoysia Grass (Zoysia japonica)

A few common backyard native grasses are:

- Bottlebrush Grass (Enneapogan nigricans)
- Kangaroo Grass (Themeda triandra)
- Wallaby Grass (Rytidosperma species)
- Windmill Grass (Chloris truncata)
- Weeping Rice Grass (Microlaena stipoides)
- Brush Wire Grass (Aristida behriana)

Grass belongs to the Poaceae plant family. There is an estimated 700 species of grass in Australia and 10 000 grass species in the world.

Grasses are exceptionally beautiful whether they are flowering or setting seed. I invite you to explore their exquisite uniqueness by taking a closer look at one of the worlds most important plant groups.

Further Exploring

Australian Grasses Field Guide by Nick Romanowski

Amazing Facts about Australia's Native Plants by Cathy Hope and Steve Parish

- Grass Trees, pg. 29
- Grasses, pg. 30

Plant Life in Field and Garden by Arabella B. Buckley

Related Internet Links

Seed Giving Grasses | Backyard Buddies

Native Grass ID Cards

Native Grasses: A Regional Guide - Adelaide

Grass Identification | Stipa

AussGrass | Identification

Best Native Grasses to Plant in Your Yard

Aussie Grass Tastes Like Salt and Vinegar

Nature Ramble

Explore the backyard for introduced and native grasses. Pull up a grass plant to examine its structure. Search for a few more varieties in your locality and compare their inflorescence and spikelets. Investigate seeds with a magnifying glass and discuss wind pollination.

Notice how the caryopsis is different from that of a flower and discuss how insect pollination is unlike wind pollination.

I wonder what wildlife is living in your backyard grass?

Kangaroo grass reminds me of a kangaroo footprint. This is how the grass received its common name. What are you reminded of when you think of grass?

Literature Jaunt

In the Tall, Tall Grass by Denise Fleming | Read Aloud

Poetry Picnic

Grass by Joyce Sidman

Picture Study

Grass Seed Dreaming by Barbara Weir

Consider Its Ways

Seasons have come and gone since the beginning of creation. Grasses grow, seed and die each year. As I consider how fragile life is, I'm reminded of the one thing that will never pass away. God's Word was with the first man and woman who walked the earth. His words have travelled through time by the inspiration of the Holy Spirit, spoken through the ages to all people and recorded by scribes for preservation and our benefit. The Word of God will remain forever.

"The grass withers, the flowers fade, but the Word of our God remains forever." Isaiah 40:8

Digging Deeper

Young Students:

- Are you scared of grasses? These funny babies are.
- Create a 'Bugs in the Grass' art project. Use this guide by Liz to help you.
- Grow wheatgrass on water beads. It's easy. This is how you do it.
- Learn why grass is green here.
- Design your own grass plant.
- Colour in the grasses notebook page.

Older Students:

- Watch how grass trees attract native bees here.
- Create grass heads or grass pets. Be inspired here.
- Find out how grasses and trees use the wind to pollinate themselves here.
- Investigate the process of pollination here and compare wind pollination to insect pollination.
- Record your grass investigations on the plant notebook page.
- Colour in the grass illustration provided with the guide.
- Sketch the structure of a grass plant in your nature journal and label the parts.
- Learn how to sketch grass here.

Oldest Students:

- Watch the time-lapse video of field grasses going to seed here.
- Investigate the process of pollination here and compare wind pollination to insect pollination.
- Research how grasses were used by native Australians for food, weaving and tool technology.
- Record your grass observations on the notebook page provided with this guide.
- Measure the growth of a grass plant over the course of a week. Create a graph to show the growth outcome.
- Sketch a page of a variety of grass inflorescence and spikelets in your nature journal to compare. Inflorescence types include:
    - Raceme
    - Spike
    - Open Panicle
    - Spike-like Panicle
    - Whorled Heads
    - Digitate Inflorescence
    - Cluster of Spikelets
- Start a grass timeline recording grass species in your locality and seeding seasons. Are they cool season growers or warm season growers?
- Research the skill of basket weaving and natural dying. Perhaps there are workshops in your area you could join.

Eucalyptus Trees

Let's Get Started

Baby Orange

Corymbia ficifolia

Eucalyptus trees mine gold. It's so amazing. Australian researchers confirmed that deep-rooted gum trees plunder gold from ore deposits underground with their long taproots. The roots transport micro gold particles along with water into their leaves. The eucalyptus trees discard the leaves with imbedded gold particles as it recognizes it as a threat to its survival, but gold prospectors are excited about using a cheaper method of finding gold underground by examining gum leaves.

Aboriginal tribes had many uses for the eucalyptus trees like using the bark to make canoes, shields for protection and treating common aliments with leaves and resin known as kino. Kino from the Lemon-scented gum tree was used to treat cuts and wounds as it contains anti-bacterial properties.

The bark of the Stringybark gums were removed in the wet season and used as a canvas for Aboriginal art. The inner layer was smoothed and cured before being painted with colours made from rocks, clay and charcoal. In some states, trees which were scarred by bark removal are protected.

Today, oils are extracted from the leaves and used as fuels, fragrances, insect repellent and natural insecticide.

Eucalyptus trees are home to many species of Australian fauna. The leaves of certain gum trees are the only food source for koalas. The yellow-bellied glider slurps up kino while the Greater Glider and Ringtail Possum feed on leaves.

Parrots, rosellas, cockatoos and galahs feast on gumnuts while the nectar on blossoms nourish birds, bats and insects. Birds nest and shelter within gum tree hollows which can take one hundred years to develop. Some insects lay eggs beneath the bark and inside gum leaves. The Scribbly Gum Moth larvae doodle patterns along the bark as it eats wood.

There are 700 species of Eucalyptus trees in Australia and they are found North to South and East to West. They are divided into three groups:

- Corymbia which includes the bloodwood, ghost gums and spotted gums.
- Angophora which includes narrow-leaved apple and Coolabah apple eucalyptus trees which have no caps or opercula.
- Eucalyptus which includes most gum tree species.

They are an iconic feature of our Australian landscape and they range in size and shape from tall giants to straggly shrubs. The Mountain Ash is the tallest flowering plant on the planet reaching towards the sky at one hundred metres tall.

Some eucalypt species shed old bark from the trunk and bright coloured bark emerges in its place. The new shiny look fades with time. The texture of gum tree bark varies with some being rough and others smooth.

Eucalyptus trees are evergreens which means they hang onto their leaves all year round unlike deciduous trees. Gum leaves are loaded with oil glands that generate aromatic compounds with peppermint or lemon scents. This distinctive aroma protects the tree from damaging pests. Gum plants are described as sclerophylls which means they have hard leaves that enable them to survive hot and dry conditions. The leaves are highly flammable due to their oil content.

Most eucalypt flower in summer and are pollinated by insects, while those which flower in winter are pollinated by birds. The caps on the buds are equivalent to flower petals. The stamens beneath the opercula will pop out expecting to be pollinated. After pollination, they develop into woody fruits known as capsules. We call them gumnuts, but they're really gum fruits.

The woody capsules protect seeds during fires and releases them shortly afterwards so that they can regenerate. Gum trees also redevelop from sprouting new shoots from the trunk or lignotuber.

A few eucalyptus trees to study are:

Tasmanian Blue Gum (Eucalyptus globulus) | Tasmania's Floral Emblem

Yellow Box (Eucalyptus melliodora)

Mountain Ash (Eucalyptus regnans)

Black Ironbark (Eucalyptus sideroxylon)

Lemon Scented Gum (Corymbia citriodora)

Snow Gums (Eucalyptus pauciflora)

Bull Mallee (Eucalyptus behriana)

Ghost Gum (Corymbia aparreringa)

Red Gum (Angophora costata)

Further Exploring

Amazing Facts About Australian Native Plants by Kathy Hope and Steve Parish

- Gum Trees, pg. 34

Eucalyptus Volume 1 by Stan Kelly

Eucalyptus Volume 2 by Stan Kelly

Eucalyptus by John Wrigley

Related Internet Links

Identify Eucalyptus Trees with EUCLID Key

An Illustrated Guide to Australia's Gum Blossoms | Australian Geographic

The World's Tallest Flowering Tree | ABC News

Gold Found Growing in Eucalyptus Trees | ABC News

Eucalyptus Trees | Backyard Buddies

Eucalyptus | Encyclopedia.Com

Nature Ramble

Discover which eucalyptus tree species are in your backyard or locality. To identify gum trees, take note of the bark type, fruit size and shape as well as the juvenile leaves.

Notice how the gum 'flower' is unlike any other flowering plant. Discuss the absence of petals and other differences you see.

I wonder if your eucalyptus trees release scents during hot days? Remember to breath deeply to detect fragrances in the air. I also wonder why eucalyptus trees are also called gum trees? Can you think why that is?

The Lemon-scented gum tree reminds me of sour lemons. What connections can you make to eucalyptus trees?

Literature Jaunt

Gum-blossom Babies by May Gibbs | Audio

Gumnut Babies by May Gibbs | Audio

One Day in the Eucalyptus, Eucalyptus Tree by Daniel Bernstum | Read Aloud

We Love Trees by Rossiti Aishah Rashidi | Read Aloud

Tales from the Gum Tree by May Gibbs

Poetry Picnic

The Gum Tree is Australian by Francis Duggan

Picture Study

Seasonal Bark Painting by Nicolas Pascoe

Consider Its Ways

Eucalyptus tree roots can delve up to 40m underground in search of water and I'm amazed at its ability to draw microscopic gold particles through the roots, up the trunk and into the leaves. It reminds me to dig into the foundation of God's Word while drawing out the nuggets of His truth to treasure in my heart. Will you remember to read the Bible and store Gods precious words in your heart?

"I have treasured your word in my heart so that I may not sin against you." Psalm 119:11

Digging Deeper

Young Students:

- Listen to the 'Give Me a Home Among the Gum Trees' song here.
- Sing 'Kookaburra Sits in the Old Gum Tree.'
- Download 'How to Be a Gumnut Baby' activity sheet by Nature Play SA for fun bush experiences.
- Colour in the eucalyptus tree notebook page.
- Create a gumnut baby by using gum nuts and blossoms.

Older Students:

- Find out why gum leaves hang vertically here.
- Use the plant notebook page to record your eucalyptus observations.
- Sketch a gum tree in your nature journal. Draw a close up view of the flower, gum nut and leaf. Add the bark texture and colour to your illustration.
- Learn how to draw trees with this tutorial.
- Research terpenoids and explain to someone how the Blue Mountains acquired its name.

Oldest Students:

- Listen to this documentary and learn how gold particles are being found in eucalyptus leaves and what this information tells us about the environment it's growing in.
- Take a look at this eucalyptus leaf image to spot the gold particles and read the article.
- Paint Australian Gum Trees on canvas. Here's how.
- Learn how to paint water coloured gum leaves here.
- Research the biological phenomena of allelopathy effects and explain to someone how gum trees use it to influence the growth of nearby vegetation.
- Sketch a variety of gum tree species in your nature journal noting your observations of pollinators and flowering seasons.
- Record your eucalyptus tree observations on the plant notebook pages provided.

Willy Wagtail

Let's Get Started

Image: Stephanie Buijs

Willy Wagtail

Rhipidura leucophrys

According to Aboriginal Folklore, Willy Wagtails eavesdrop, gossip and steal secrets. So when Willy Wagtails showed up near their campsites, conversations dried up. They also believed Willy Wagtail brought bad news and they wouldn't leave camp if the bird was seen on the morning of departure.

Willy Wagtails are cheeky and aggressively protect their territory and nests by expanding their white eyebrows in an effort to intimidate intruders like magpies, crows, butcherbirds and kookaburras who are a threat to their nestlings. They'll frighten fellow suitors away using the same behaviour and losers will tuck their eyebrows away to show submission. Their fine-looking eyebrows are also used to attract mates.

They will build their nests alongside Magpie-larks as they are assertive protectors too. Willy Wagtails build their nests on horizontal structures like branches by weaving grass and spider silk together. The nests are lined with soft textures like fur and hair. Willy Wagtails will directly remove nesting materials from an animal if other materials are not readily available. The birds recycle nesting provisions from one year to the next, thriving in well-watered gardens littered with leaf litter.

The creamy eggs are speckled brown and grey. Both parents incubate the eggs that will usually hatch after 14 days. The nestlings will fledge between 11 to 17 days after hatching with similar plumage to their parents. They will remain with the adults until the next clutch hatches. In favourable conditions, the birds can raise up to 4 clutches a season.

Willy Wagtails are active feeders foraging on the ground for insects and grubs while waving their tail to and fro or up and down. They'll often dart in the air to capture flying insects.

A Willy Wagtail is a passerine bird from the Order Passeriformes which are known as perching birds or song birds. They are the largest of the native

Australian fantails found throughout our mainland except for Tasmania. They prefer open habitats in backyards, woodlands, forests and along water courses. We often spot them in pairs or singularly, but they're known to flock in winter too.

Other fantail birds to investigate are:

Rufous Fantail (Rhipidura rufifrons)

Grey Fantail (Rhipidura albiscapa)

Northern Fantail (Rhipidura rufiventris)

Mangrove Fantail (Rhipidura phasiana)

Arafura Fantail (Rhipidura dryas)

Further Exploring

Birds of Victoria | Urban Areas by Gould League

- Fantails, pg.32

Related Internet Links

Willy Wagtail | Backyard Buddies

Willy Wagtail | Birds in Backyards

Bird Anatomy: How do Birds Fly? | Birds in Backyards

Fantails | Wikipedia

Nature Ramble

Investigate the backyard or local park for Willy Wagtails. Remember to be quiet while observing their behaviour.

Notice the difference in song and chatter. Where are they foraging and catching insects? Does the bird have a partner? Can you spot a nest? What else do you notice?

I wonder if you'll find a Magpie-lark nearby?

Willy Wagtail reminds me of the flycatcher who captures insects in the air. What do these birds remind you of?

Literature Jaunt

Willy Wagtail Grows Up by Peter Sheehan

Willy Wagtail by C.K. Thompson

Poetry Picnic

The Brave Willy Wagtail by Francis Duggan

Picture Study

Willy Wagtail by Jaes Bidwell

Consider Its Ways

When I consider Willy Wagtail's behaviour as it defends its nestlings and territory by facing birds which are enormous compared to its size, I am reminded of David's **courage** as he faced Goliath. He never wavered, believing that with the strength of God he'd succeed in overcoming the giant. I'm in awe of the bird's courage as it faces Wedge-tailed eagles boldly, never backing down. I wonder if I could face the giants in my life with such courage. Do you think you can trust God to protect you as you face your fears in life?

"Be strong and courageous; don't be afraid of them. For the LORD your God is the one who will go with you; he will not leave you or abandon you." Deuteronomy 31:6

Digging Deeper

Young Students:

- Watch Willy Wagtail prepare a nest here.
- Listen to this Willy Wagtail song and do the actions.
- Colour in the Willy Wagtail notebook page.

Older Students:

- Watch how Willy Wagtails raise their young here.
- Paint a simple wagtail like this.
- Learn how to draw birds with John Muir Laws here.
- Sketch a wagtail in your nature journal. Take note of the colour and shape of the beak, the number of toes and the position they face and its posture. Colour in your illustration with the correct colours.
- Create a serial comic or storyboard of Willy Wagtail's antics that you observe in the backyard.
- Use the bird notebook page to record your Willy Wagtail observations.

Oldest Students:

- Listen to Willy Wagtail sing here.
- Research how birds are able to fly. Start here.
- Practise wildlife gesture sketching by drawing quick images of a moving bird. As you notice the bird changing positions, verbalise what you see as you draw and take notes.
- Sketch a wagtail in your nature journal. Take note of the colour and shape of the beak, the number of toes and the position they face and its posture. Colour in your illustration with the correct colours. Make notes of your observations and list any questions you may have regarding its behaviour.
- Draw other fantail birds in your locality in your nature journal. Observe them and take notes of their behaviour as you compare the differences between them.
- Record your Willy Wagtail observations on the bird notebook page provided with this guide.

Geckoes

Let's Get Started

Image: Michael Macmaster

Northern Velvet Gecko

Oedura castelnaui

Have you ever wondered how geckoes stick to walls, windows and ceilings? They hang by their toe hairs. The tiny, bristly hairs known as setae under the toes, allow them to attach themselves to surfaces like Velcro.

Electromagnetic attraction occurs when the seta split into hundreds of microscopic bristles called spatulae and the stickiness turns on when electrons from the geckoes hair molecules and the electrons from the surface molecules interact with one another.

Most geckoes don't have eyelids. Instead, their eyes are cleaned by licking them with their long tongues. They have excellent eyesight which is 350 times more sensitive at night than human eyes. The majority of geckoes are nocturnal hunters. They have vertical pupils while diurnal geckoes have round pupils.

Geckoes and legless lizards are the only lizards which are able to chirp and call. The name gecko originates from the sound of the calls they make. They holler, "gecko…gecko…" to attract mates and warn trespassers.

A gecko will also distract predators by waving its tail. If the tail is captured, it'll deliberately drop its tail at a fracture point and scurry safely away. The tail will regenerate, but once it does, it'll most likely be a different colour and boneless.

There are over 150 gecko species in Australia and they can be found everywhere in the country except Tasmania. They live in habitats ranging from rainforests to deserts, tree tops to ant nests. They are insectivores, dining on cockroaches, spiders, mosquitoes and some species even eat sap and nectar. Fat is stored in the tail for lean times. Geckoes moult as they grow, shedding skin several times a year. They speed the moulting process by detaching loose skin and eating it.

As a reptile, geckoes are unable to regulate their temperature, so they like to bask in the sunshine to keep warm. They are able to store body heat for several hours after sundown.

Some gecko species are parthenogenetic which means females are able to reproduce without a male. They generally lay two eggs per clutch.

A few gecko species to investigate are:

Native House Geckoes (Gehyra dubia)

Southern Leaf-tailed Gecko (Phyllurus platurus)

Spiny-tailed Gecko (Strophurus spp.)

Chameleon Gecko (Carphodactylus laevis)

Asian House Gecko (Hemidactylus frenatus)

Further Exploring

Amazing Facts about Australian Reptiles by Steven Swanson

- Geckoes, pg. 32-35

Gecko by Raymond Huber

The Australian Gecko Catalogue

Related Internet Links

Gecko | Backyard Buddies

Gecko Facts | Kiddle

Geckos | Queensland Museum

Gecko Species List | Reptiles of Australia

Geckoes Sticky Secret | Live Science

Nature Ramble

Explore the backyard at night with a headlamp in search of geckoes. They'll be attracted to insect gatherings near outdoor lights. If you're searching during the day, investigate under bark, in crevices, under leaves and holes in the ground.

Notice how fragile and translucent gecko skin is. If you look closely, you may even see eggs inside its body. Notice the small granular scales on its soft body? How many digits does a gecko have on each limb? Can you spot gecko poo on the walls? Its tiny with a white tip.

I wonder which insects the gecko is targeting for dinner? Can you tell? I also wonder if your gecko is using body language to communicate? What do you think its saying?

The Tiger Gecko reminds me of tiger cats because it has similar markings. What do geckoes remind you of?

Literature Jaunt

Gorgeous Geckoes by Rebecca Johnson

Gecko Go To Sleep by Margaret MacDonald | Read Aloud

First Facts | Reptiles by Rebecca Johnson

The Gecko Gang by Sue and Kerry Kitzelman

Poetry Picnic

The Gecko | Unknown

Picture Study

Gecko on Red and Gold by Lynnette Shelley

Consider Its Ways

The gecko grows and moults; shedding its old skin to make way for a new shiny coat. As I consider its ways, I'm reminded of how we grow in character and build new skill sets as each year passes. We learn to stretch out of the uncomfortable skin of selfishness, allowing the new skin of generosity and self-sacrifice to clothe us. We can only grow in character and practice new qualities as we allow Jesus to regenerate our hearts through his divine power making us useful and productive for His kingdom.

"*For this very reason, make every effort to supplement your faith with goodness, goodness with knowledge, knowledge with self-control, self-control with endurance and endurance with godliness, godliness with brotherly affection and brotherly affection with love. For if you possess these qualities in increasing*

measure, they will keep you from being useless or unfruitful in our knowledge of our Lord Jesus Christ." 2 Peter 1:5-8.

Digging Deeper

Young Students:

- Learn why geckoes have sticky feet here.
- Create a bubble wrap gecko like this.
- Design a gecko dot painting like this.
- Colour in the gecko notebook page.

Older Students:

- Take a closer look at the amazing setae on a geckoes foot here.
- Discover Leopard Geckoes by watching this.
- Create a fun gecko colour wheel like this.
- Go on a gecko hunt here.
- Record your gecko observations on a notebook page.
- Sketch a gecko in your nature journal. Note your observations and list your questions.

Oldest Students:

- Learn how geckoes defy gravity here.
- Research electromagnetic attraction and write a report explaining how it works. Start here.
- Draw a Leopard Gecko with this tutorial.
- Sketch the geckoes of your locality inside your nature journal. Note your observations and list your questions. Compare them to each other.
- Record your gecko discoveries on the reptile notebook page.

Daddy Long-leg

Let's Get Started

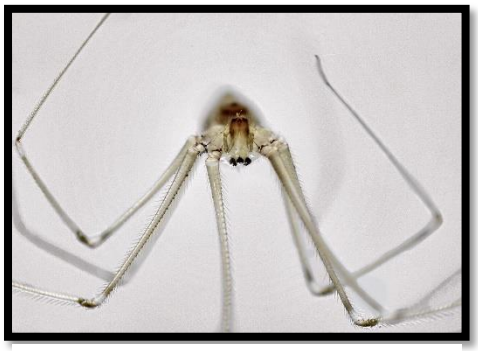


Image: Bec Crozier

Daddy-long-leg

Pholcidae

I'm sure you know that spiders have 8 legs, but did you know they also have 8 eyes? Ok! That's a bit spooky. Look at a close-up picture of a Daddy Long Leg's face, and you will see two groups of three compound eyes and two simple eyes.

The other creepy thing about this spider is its legs. They are so long and spindly. Even though its body is only about 2-5mm, its legs can stretch to 5cm. That's 10 times longer than its body.

However, even though he is creepy looking, the Daddy Long-leg is harmless to humans. It prefers to dine on Redbacks, Huntsman, in fact any kind of spiders and any insect that strays too close to its web.

The web is not sticky like the webs of other spiders. It is a messy tangle created to confuse prey that stumble into it. The Daddy Long-leg will then capture its meal in silk before inflicting a fatal bite.

As a defence it will hang from its web and shake violently or spin quickly. This causes the potential enemy to become confused. It also makes the spider appear larger to its predator.

A Daddy Long-Leg will breed all year round. The female clutches about 20-30 eggs in her jaws. When the spiderlings hatch, they will shed skin 5-6 times before they are fully grown. The spiders will live from 6 months to 3 years depending on the species.

Further Exploring

The life of a spider by Jean Fabre

Christian Liberty Nature Readers

- Book 1 pg. 10-24
- Book 2 pg. 70-92

Related Internet Links

Extreme Magnification of Pholcidae

Daddy Long-legs: Spiders and Other Critters

Daddy Long-legs Spider | Australian Spider | Short Documentary

Spider Facts for Kids | Kiddle

Nature Ramble

Daddy Long-Leg spiders can be found just about everywhere. The only place they don't live is Antarctica and this is because of the extremely cold temperatures. So, as you look around your house and back yard, you will probably find lots of them.

Notice the kind of web they make. How many spiders are in each web? As Daddy Long-legs are solitary arachnids you will most likely only find one in a web, unless there are spiderlings present. Do your notice any shaking or spinning behaviour if you disturb the web? Are there any webs containing eggs?

I wonder if you can find any skins that have been shed?

The Daddy long-leg reminds me of an octopus. Can you think why? What does it remind you of?

Literature Jaunt

The Very Busy Spider by Eric Carl

Miss Spider's Tea Party by David Kirk

Spiders by National Geographic Readers

Are You a Spider by Judy Allen

Poetry Picnic

The Daddy Long-Legs and the Fly by Edward Lear

Picture Study

Spider - Aurore de La Morinerie

Consider Its Ways

We have looked at some of the small creatures that can be found in and around our homes in this term's nature study. When we consider the Daddy Long-leg, we should be awed at the intricacies of the minute details. Not only has the Creator designed beauty in the immense universe, but also in the tiny details of compound eyes which are so small we need to magnify them hugely to even get some concept of their beauty. The ability to spin silk, to creep and live almost anywhere, and to capture and eat pests shows us that a Designer knows and cares for not just the big details, but also the very small.

"The spider skilfully grasps with its hands and it is in kings' palaces…"

Proverbs 30:24-28

Digging Deeper

Young Students:

- Make a Daddy Long-leg using foam balls and wire. Example Here.
- See this page for spider craft project and colouring pages.
- How many Daddy Long-legs can you find in your house? Count them.
- Make some spider cookies.

Older Students:

- Complete an arachnid notebook page.
- Make a map of your house and yard. Mark all the places you find Daddy Long-leg spiders.
- Download a spider anatomy worksheet from here.
- Create a Spider book.
- Make a 'Compare and Contrast' chart for Arachnids vs Insects. Ideas here and information here.
- Can the poison from a daddy long-leg spider kill a person if it were able to bite us? Bust the myth by watching this.

Oldest Students

- Learn about Daddy Long-leg and then use this lesson plan to conduct an interview with a friend or sibling.
- Film a Daddy long-leg vibrating its web. Play the video back in slow motion and describe what you see.
- Collect some Daddy Long-leg web on a microscope slide. Look at it under the microscope and describe what you see. Examine a discarded spider skin if you happen to find one.
- Research spider eyes. Write a paper on what you discover. Information Here.

"Lift up your eyes and look to the heavens: who created all these? He who brings out the starry host one by one and calls forth each of them by name. Because of his great power and mighty strength, not one of them is missing."

Isaiah 40:26

Safety Smart

Australia has more deadly snakes than any other country in the world. It is also home to numerous poisonous spiders and sea creatures. Teaching our children to have a healthy respect for all creatures is wise. A general awareness while out and about will encourage them to be cautious when their curiosity perks up.

Please, never try to pick up a wild animal even if it's injured. There are people who specialise in capturing snakes or taking care of injured wildlife so it's better to contact them to help the creature. Encourage your children to respect all living things. They should not intentionally provoke, tease or mistreat any animal.

Depending on where you live in this vast country, it is possible to experience four seasons in one day. Always be prepared by wearing appropriate clothing and foot wear. Taking along spare clothing or swimming gear is always a great idea. It's wise to carry water with you on your walk with a source to refill as you need it as it can be dangerous to walk on sweltering summer days and I advise against it; rather walk in the cool of the day or wait for a milder day to enjoy the outdoors. It's tempting to rest under the shade of a gum tree in the summer, but they tend to drop their branches when it's hot. Seek out shade in a safe place.

Your children will always appreciate a snack. Fruit is usually quite refreshing after a busy nature ramble. Don't forget to pack sunscreen, bug spray and hats. Keep it simple by keeping a field bag packed for such expeditions so all you'll need to do is add the snacks and water.

Seasons of Australia

Australia has a variety of climate zones due to its size and there is no single seasonal pattern for the whole country.

The temperate zones, including the grasslands and desert, experience a summer/autumn/winter/spring calendar as follows:

- Summer December – February
- Autumn March – May
- Winter June – August
- Spring September – November

While tropical zones have a Wet and Dry pattern. The tropics are divided into three climatic areas:

- Equatorial
- Tropical
- Subtropical

The tropical zones experience six months of wet weather (November-March) typically known as the Big Wet or Monsoon Season. The other six months are known to be the Dry Season (April-October).

Not every topic will coincide with your experience locally. In this case, simply change the topic to that which suite your environment or enjoy learning about the flora and fauna around Australia while experiencing the unique treasures in your own backyard.

Some agree that the European Calendar of four seasons does not match Australia's diversity in climate and environments. Research has been done on the Indigenous Seasonal Calendars so decide if they're more accurate. Investigate the Aboriginal Calendar for your area and observe the seasonal transitions. What do you think?

Beginning a Nature Journal

Nature journaling is a record of all your observations on nature rambles. It could consist of simple pencil sketches to the most elaborate watercolour image. There is no right or wrong way and developing your own 'style' is encouraged. Make notes of your observations and write down the questions which flutter across your mind. You may discover that you'll notice the answers to your questions in time. Expand your observations with words in poems and writing down your feelings and thoughts.

Nature journaling has proved to be an important component to studying nature, so take an interest in journaling together with your family. Set the example and you'll inspire your child to do the same.

If you're worried about your sketching ability, don't. Your diary is personal to you and its purpose is to record scientific data. Sketching ability is not important, and you'll eventually become comfortable the more you practise. You may just surprise yourself and your children will enjoy watching what you do. So place any fears or feelings of inadequacy aside and get started.

Make your own nature diaries as shown here for pre-school, primary or simply buy an inexpensive A5 art book.

Nature journals have two themes: ongoing Journal which is a record of all you've observed year-round or a seasonal journal. Decide which one you'd prefer.

What is Field Journaling?

A field journal is a scientific record of the observations made out on the field. Scientists who work outdoors collecting data, consider their field journals the most important tool in their scientific toolbox.

The field journal is used to record their observations, write down questions and information gathered on a place or topic of interest. It includes specific notes like measurements, counts, estimates, times and places.

Their field journals are not filled with pretty watercolour paintings. Instead, you'll find quick sketches were made while they took notes of their sightings, observations and collections on the go.

The field journal becomes the evidence their work is based on and it's valued by museums who preserve their work so they may be used as references for further investigations.

How can I Start a Field Journal?

So, how can you start a field journal? A field journal or an observational notebook is used to make quick and simple drawings. It's not about how well one can draw but how well one can observe and see. If drawing is not your thing, then take photographs and write your observations in a notebook.

A Field Journal includes metadata. John Muir Laws says, *"To make your observations valuable to science and help you keep track of your experiences, include where and when data on every page. It only takes a few seconds to do and converts any journal page from an anecdote to a scientific record."* Make it a habit to write down the date, time, place and weather when you make an observational drawing in your notebook.

Fill the notebook with your questions. Asking questions like what, how, why and who will exercise your curiosity muscles or use the Curiosity Framework to get you thinking scientifically.

Add all your observations like colours, shapes, patterns, comparisons, counts, timings, measurements, estimates and seasonal changes into the field journal. Include diagrams, maps and lists of birds, animals and insects.

Knowing your biometrics is one way to measure length and height. What is the length of your step? Find the length of your boot and arm span, and the height of your knee, navel and total height. Become accustomed to using this knowledge when you're out in the field measuring and recording your data.

Once you return home, find the answers to the questions by researching the topic you studied and add them to your work. That's it! You've begun the skill of field journaling.

Basic entries in the field journal would be:

- Your name and contact details on the first page should you misplace your diary.
- Date
- Time
- Weather – is it sunny, partly cloudy, cloudy or raining?
- Temperature
- Wind direction and force
- Location
- Sketch and label your subject

Advanced entries include:

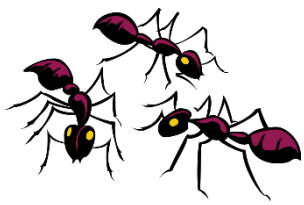
- Latin names
- Information on sketched topic
- Timelines
- Diagrams
- Simple Surveys
- Lists of insects, birds, mammals, flowers, orchids, reptiles etc.
- Measurements
- Graphs
- Photographs which can show changes in seasons and environments.
- Maps
- Compass points and direction.
- Pressed flowers/leaves
- Poems
- Quotes
- Scripture
- Hymns

Download our free Field Journaling Notebook for Nature Detectives here for your use. It's a guided field journal with prompts and reminders to observe, ask questions and record data. It's perfect for the beginner naturalist.

Tools for Nature Exploration

Only take what is necessary for your nature ramble or bush walk. Keep it simple and manageable.

- Nature Journals (One for you too!)
- Writing and/or Art Supplies
- Magnifying Lens
- Bug Container
- Butterfly Net
- Binoculars
- Camera
- Paper bags for collections
- Tape Measure
- Picnic Blanket
- Field Guides
- Compass



Additional Activities

Nature Table

The treasures found while out exploring on nature walks can be displayed on a nature table or shelf. It'll be a place to store all the children stones, feathers, leaves, nuts and cones. A new display can be started each month to keep it manageable and interesting, or the table can be decorated with a theme each season and a new collection started. The nature collection can also be one that grows slowly over time. I've encouraged our children to identify their finds and label them.

Cabinet of Curiosities

Create a Cabinet for fragile and unique curiosities discovered on trials. Gordon Grice, writes in the Cabinet of Curiosities, household items like a fishing tackle box or desk organizer can be used to store specimens.

A Record of Current Events

Make a list of current events relating to nature as they occur. What an amazing keep sake it'll be to look over as the years go by. Record the date, place and time of the event.

Write Lists

Keep a list each of insects, birds, reptiles and amphibians which visit your garden, neighbourhood or nature spot. If you search for wildflowers and orchids, keep lists of dates, time and places so you're able to visit the same spot next year. Then you won't miss your favourite orchids.

Diary of Firsts

Charlotte Mason encouraged her students to keep a Diary of Firsts. She explains, "It is a capital plan for the children to keep a calendar of the first oak-leaf, the first tad-pole, the first cowslip, the first catkin, the first ripe blackberries, where

seen and when. The next year, they will know when and where to look out for their favourites, and will, every year, be in a condition to add new observations." Peek into Lynn Seddon of Raising Little Shoots Diary of Firsts for inspiration.

Phenology Wheel

A phenology wheel is a visual picture of what is happening in your space through the year. The wheel has two wheels within itself and the circle is divided by 12 sections; one for each month. The outer wheel names the seasons and months. A painting or sketch is made within the central wheel. The sketch can be anything you enjoyed in nature that month. The inner most wheel can be used to record special days of the month, like birthdays, Anzac Day, Remembrance Day, Christmas and Easter. Lynn Seddon, from Raising Little Shoots, has a fantastic guide on how to create a phenology wheel.

Resource List

Steve Parish Field Guides

First Field Guide to Australian Mammals

First Field Guide to Australian Birds

First Field Guide to Australian Frogs & Reptiles

First Field Guide to Australian Marine Life

First Filed Guide to Australian Fish

First Field Guide to Australian Insects & Spiders

Steve Parish Amazing Facts Series

Amazing Facts about Australian Reptiles

Amazing Facts about Australian Mammals

Amazing Facts about Australian Marine Fishes

Amazing Facts about Australian Birds

Amazing Facts about Australian Frogs & Toads

Amazing Facts about Australian Native Plants

Amazing Facts about Australian Marine Life

Amazing Facts about Australian Insects & Spiders

Amazing Facts about Australian Wildlife Conservation

Amazing Facts about Australian Southern Skies

Field Guides

Field Guide to Australian Birds by Micheal Morcombe

Tracks, Scats and Other Traces by Barbara Triggs

Wild Food Plants of Australia by Tim Low

Australian Guide to Seashores by Gould League

Australian Guide to Pondlife by Gould League

Australian Guide to Beaches and Rockpools by Gould League

Australian Guide to Frogs and Reptiles by Gould League

Australian Guide to Garden Wildlife by Gould League

Ponding Activities by Wilhelmina & Gould League

Coasting by Gould League

First Flight: Activities for Birdwatches by Gould League

Bush Books of Western Australia:

Mammals

Birds

Birds in the Backyard

Wildflowers

Trees

Plant Identikits of Tasmania:

Woodland Wildflowers

Rainforest Plants

Alpine Wildflowers

Wildflowers of Mt Wellington

Common Orchids

Coastal Plants

Nature Journaling

An Australian Country Woman's Diary by Elizabeth Conabere

A New Zealand Nature Journal by Sandra Morris

The Country Diary of an Edwardian Lady by Edith Holden

Keeping a Nature Journal by Clare Walker Leslie & Charles Roth

The Laws Guide to Nature Drawing and Journaling by John Muir Laws

Nature Anatomy by Julia Rothman

Journaling Pages

My Australian Nature Journal eBook by Joelle Grubb

Bush and Nature Calendar Journal eBook by Homeschooling Downunder

Subscribe with Nature Study Australia to receive free notebook resources throughout the year.

Nature Poems

Birds in Mind by Andrew Lansdown

Australian Poems to Read to the Very Young

Poems to Read to Young Australians by Mary Gilmore and Lynda Pender

More Poems to Read to Young Australians

The Pixie O'Harris Treasury of Animal Verse by Methuen

Nature Books

Parables from Nature by Mrs Alfred Gatty

Bush Seasons by Joan Semmens

A Bush Calendar by Amy E Mack (OOP)

Bush Days by Amy E Mack (OOP)

The Wildernes by Amy E Mack (OOP)

Australian Nature Story Collection for Children by Homeschooling Downunder

Little Busybodies: the life of crickets, ants, bees, beetles, and other busybodies by Jeannette Augustus Marks, 1875-1964 (OOP)

Our Wonderful World by Emery Lewis Howe, 1871 (OOP)

Astronomy

Australian Backyard Astronomy by Ragbir Bhathal

Your Guide to the Night Sky by Ken Wallace, Glenn Dawes & Peter Northfield

I'm thrilled!!

to introduce the

Backyard Edition

of the

Australian Nature Study Guides

Autumn/Winter

Volume 6

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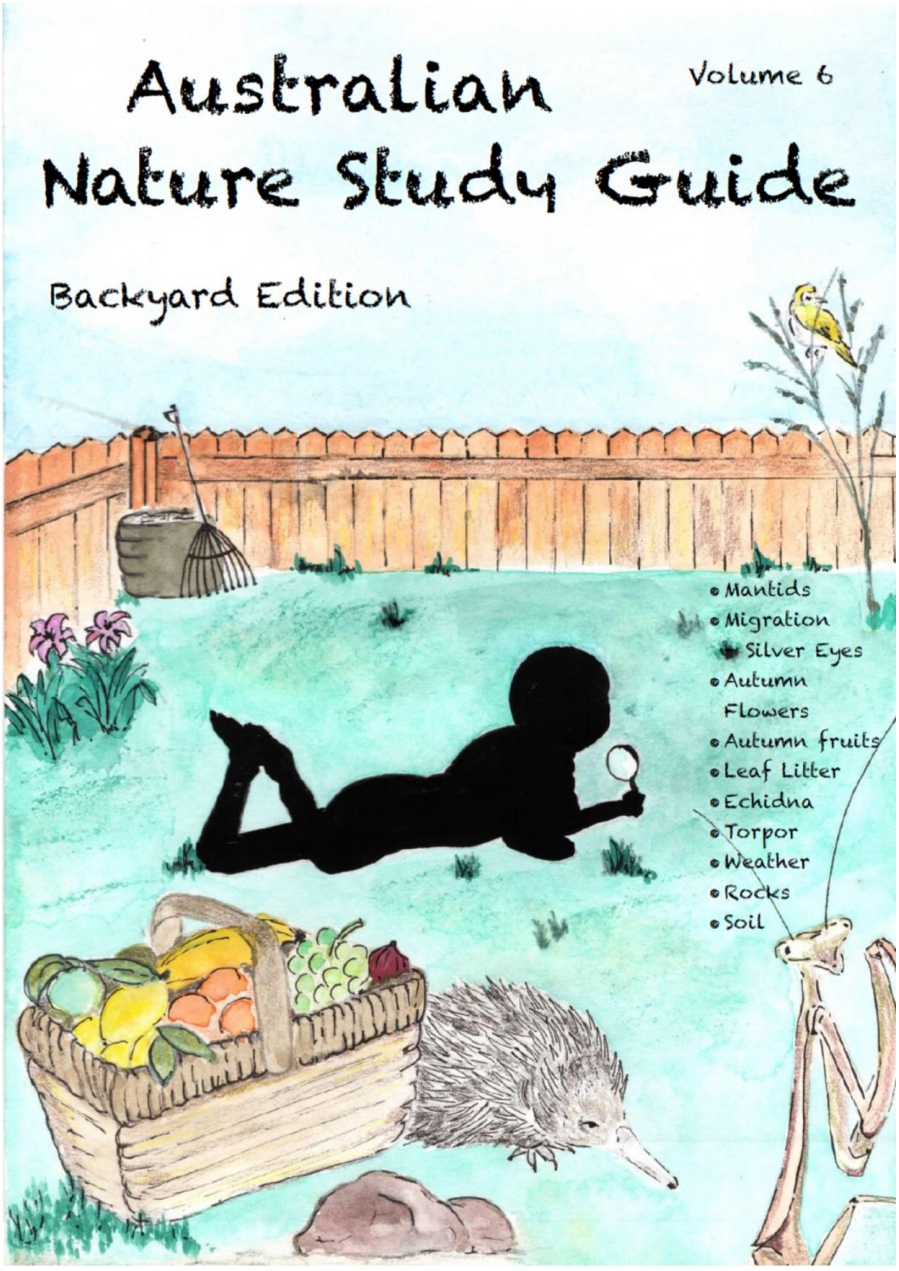

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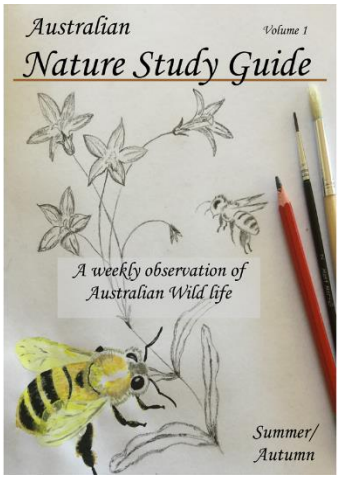
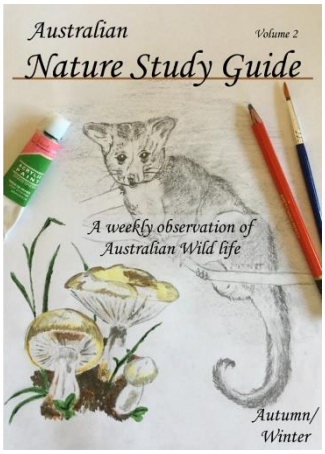
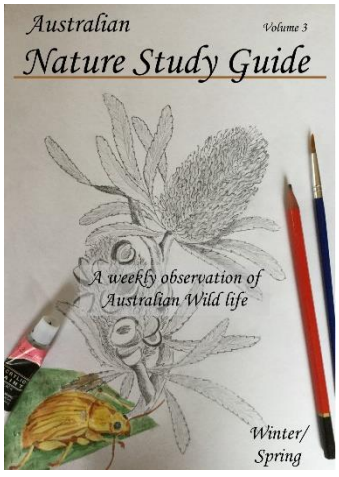
Summer/Autumn | Volume 1



Autumn/Winter | Volume 2



Winter/Spring | Volume 3



Spring/Summer | Volume 4