



Australian National  
Botanic Gardens

# Alive with learning

# Australian Plant Families



This learning resource is intended to be used as a stand-alone document or in conjunction with a visit to the Australian National Botanic Gardens. This kit is intended for students from year 5 to year 12.



Australian Government  
Parks Australia

## Excursion

Enjoy a deeper learning experience by booking a Botanist Apprentice program, with a focus on plant dissection, at the Australian National Botanic Gardens.

## Using this resource

The Australian Plant Families resource can be used as outlined or to create your own activities.

This kit is intended for year 5 to year 12 and has links to the Science curriculum.

It contains:

- Curriculum links
- Information about plant classification
- Information about plant anatomy
- Information sheets and botanical diagrams on six common Australian plant families
- Suggested activities:
  - Research, Discover and Collect
  - Plant Dissection
- Suggested extension activities

## Planning your Visit

Bookings are essential for all school excursions to the Gardens.

This includes both facilitated Ranger guided or teacher guided visits.

To make a booking, please visit Book Canberra Excursions – <https://www.bookcanberraexcursions.com.au/>

Visit our website for a variety of planning tools, including:

- [Risk assessment](#)
- [Certificate of currency](#)
- [Pre-visit information](#)
- [Gardens map and guide](#)

## Contact

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Email: [education@anbg.gov.au](mailto:education@anbg.gov.au)



## Curriculum links

These may not all apply, depending how this document is used.

### Cross Curriculum Priorities

OL.1	The biosphere is a dynamic system providing conditions that sustain life on Earth.
OL.2	All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival

Year	Subject	Code	Description
5	Science	ACSIS093	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts
		ACSSU043	Living things have structural features and adaptations that help them to survive in their environment
		ACSIS086	Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks
6	Science	ACSIS110	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts
		ACSSU094	The growth and survival of living things are affected by physical conditions of their environment
		ACSIS103	Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks
7	Science	ACSIS133	Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate
		ACSSU111	Classification helps organise the diverse group of organisms
		ACSIS125	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed
		ACSIS126	Measure and control variables, select equipment appropriate to the task and collect data with accuracy
8	Science	ACSSU149	Cells are the basic units of living things; they have specialised structures and functions
		ACSSU150	Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce
		ACSIS140	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed
		ACSIS146	Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements
		ACSIS148	Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate

Year	Subject	Code	Description
9	Science	ACSSU175	Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment
		ACSIS165	Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods
		ACSIS166	Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately
		ACSIS174	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations
10	Science	ACSSU185	The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence
		ACSIS199	Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods
		ACSIS208	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations
		ACSIS200	Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately
11/12 Senior Secondary	Biology Unit 1	ACSBL003	Conduct investigations, including using ecosystem surveying techniques, safely, competently and methodically for the collection of valid and reliable data
		ACSBL006	Select, construct and use appropriate representations, including classification keys, food webs and biomass pyramids, to communicate conceptual understanding, solve problems and make predictions
		ACSBL007	Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports
		ACSBL016	Biological classification is hierarchical and based on different levels of similarity of physical features, methods of reproduction and molecular sequences
		ACSBL017	Biological classification systems reflect evolutionary relatedness between groups of organisms
		ACSBL018	Most common definitions of species rely on morphological or genetic similarity or the ability to interbreed to produce fertile offspring in natural conditions – but, in all cases, exceptions are found

Year	Subject	Code	Description
Senior Secondary	Biology Unit 2	ACSBL031	Design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
		ACSBL032	Conduct investigations, including microscopy techniques, real or virtual dissections and chemical analysis, safely, competently and methodically for the collection of valid and reliable data
		ACSBL035	Select, construct and use appropriate representations, including diagrams of structures and processes; and images from different imaging techniques, to communicate conceptual understanding, solve problems and make predictions
		ACSBL045	The cell membrane separates the cell from its surroundings and controls the exchange of materials, including gases, nutrients and wastes, between the cell and its environment
		ACSBL046	Movement of materials across membranes occurs via diffusion, osmosis, active transport and/or endocytosis
		ACSBL052	Photosynthesis is a biochemical process that in plant cells occurs in the chloroplast and that uses light energy to synthesise organic compounds; the overall process can be represented as a balanced chemical equation
		ACSBL053	Cellular respiration is a biochemical process that occurs in different locations in the cytosol and mitochondria and metabolises organic compounds, aerobically or anaerobically, to release useable energy in the form of ATP; the overall process can be represented as a balanced chemical equation
Senior Secondary	Biology Unit 3	ACSBL059	In plants, gases are exchanged via stomata and the plant surface; their movement within the plant by diffusion does not involve the plant transport system
		ACSBL062	Design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
		ACSBL075	Continuity of life requires the replication of genetic material and its transfer to the next generation through processes including binary fission, mitosis, meiosis and fertilisation
		ACSBL093	Speciation and macro-evolutionary changes result from an accumulation of micro-evolutionary changes over time
Senior Secondary	Biology Unit 4	ACSBL094	Differing selection pressures between geographically isolated populations may lead to allopatric speciation
		ACSBL097	Design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including the rights of living organisms
		ACSBL101	Select, construct and use appropriate representations, including diagrams and flow charts, to communicate conceptual understanding, solve problems and make predictions



# Australian Plant Families

## What is an Australian Plant?

Australian plants are those which have originated and evolved on this continent.

Over 200 million years ago Australia was part of a supercontinent called Gondwana. The continent was made up by the land masses now found in the southern hemisphere such as Australia, Africa, South America, New Zealand, Antarctica, India and Arabia. Gondwana started to slowly break apart from about 180 million years ago.

Australia's geographic isolation has meant that many of our plants are very different from those growing in other parts of the world. Most Australian plants are not found anywhere else in the world; however, some closely related plants are found on the continents which made up Gondwana, such as Africa and South America.

## Scientific Plant Names

The classification of plants and how they are grouped together helps us understand how plants fit together in a wider Australian or world context.

Plants are known to most people by their common name like Waratah or Sturt's Desert Pea. Sometimes this can get confusing because different people call the same plant different common names. Lots of completely different plants can have the same common name, but every plant has its own unique scientific name. Using the scientific name means everyone knows exactly what plant is being spoken about.

Common Name – *what people generally call the plant.*

Scientific Name – *Made of two words; the first word is the plant's genus, the second is the species.*

Plants are classified according to features or properties that they have in common. There is a hierarchy of classification, with each level describing something about the plant and its features. Every plant is classified into each level of the hierarchy.

New South Wales's floral emblem, the Waratah or *Telopea speciosissima*, provides a great example of the classification process. Each level of classification tells us more about the plant.



*Telopea speciosissima*

**Kingdom:** Plantae – tells us that this is a plant, not an animal or bacterium

**Division:** Magnoliophyta – tells us that this is a plant with cotyledons (the first singular, pair or whorl of leaves developed by the embryo of a seed), flowers and seeds

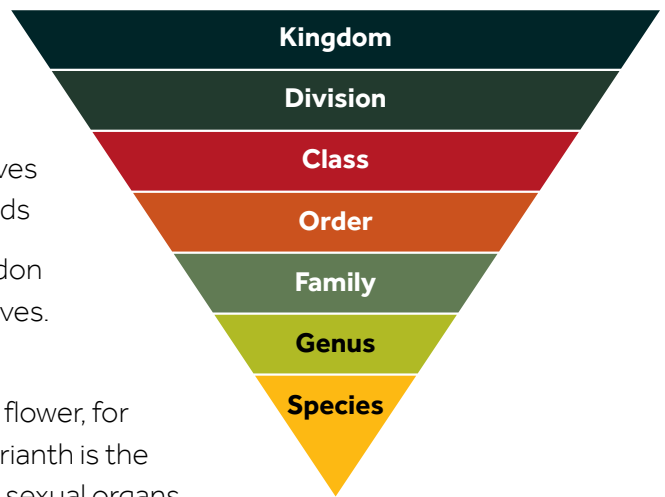
**Class:** Magnoliopsida – tells us this plant is a dicotyledon (two seed leaves) which means there are two first leaves. (Monocotyledonous plants have one first leaf)

**Order:** Proteales – tells us about the structure of the flower, for example, 4 perianth segments in each flower. The perianth is the non-reproductive part of a flower that surrounds the sexual organs. The perianth consists of the sepals and the petals

**Family:** Proteaceae – tells us more specifically about the flower structure, that has three of the perianth segments fused and one free

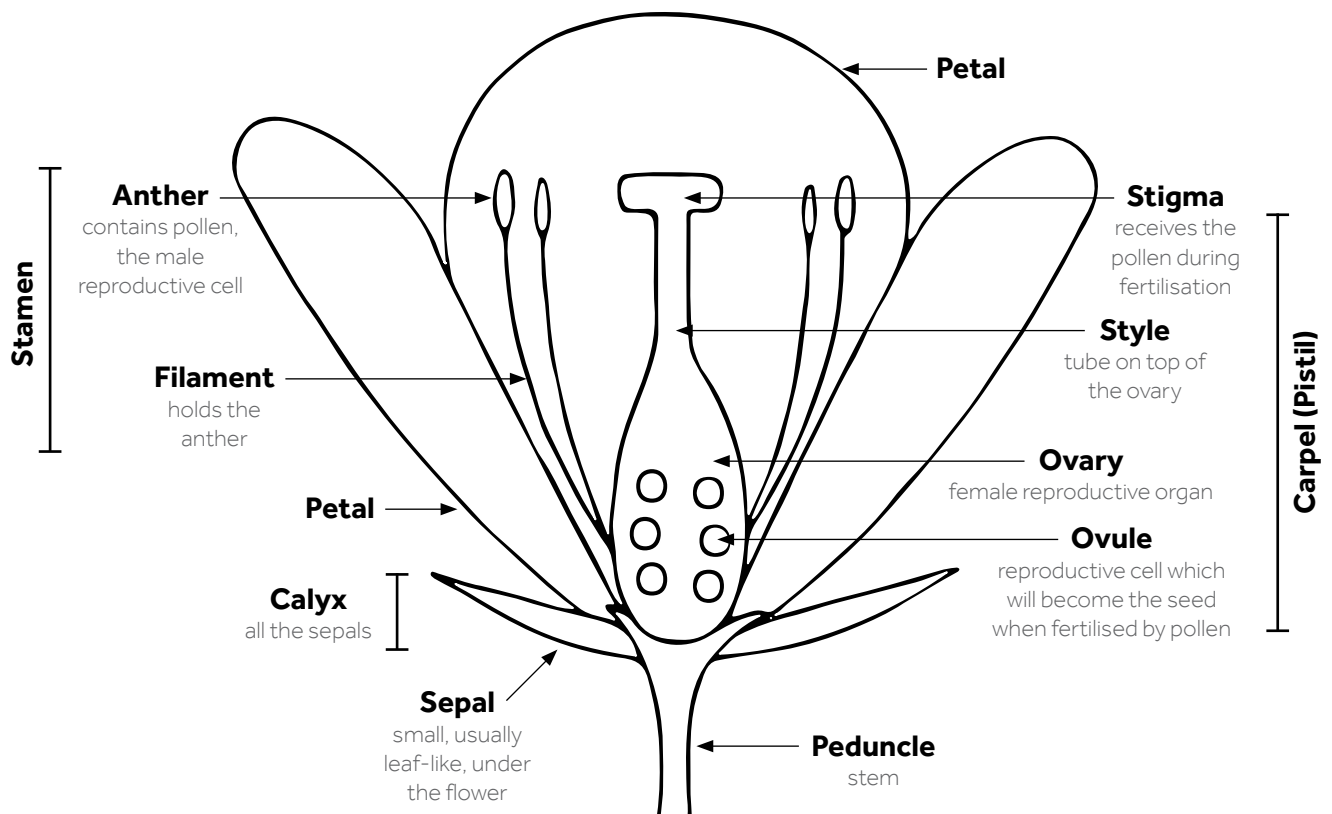
**Genus:** *Telopea* – tells us that it has large pinkish red bracts surrounding the head-like flowerhead

**Species:** *speciosissima* – this name is unique to this type of plant



## Plant Anatomy

Another important step towards understanding how plants are grouped together is having a look at plant anatomy. The below diagram gives you an idea of the main parts of a flower. You may see these anatomical words referenced in the information in this document.



Adapted from EnchangedLearning.com

# Activity ideas - Research, Discover and Collect

## Research and Present

- Break students into groups
- Assign each group an Australian plant family and give handout from this document
- Ask each group to try to source an example of a plant from this family (this could be homework)
- Ask each group to research and do a small presentation on their plant family
- Include interesting facts/stories and information not presented in this document

## Scavenger Hunt

- As a class, or in smaller groups start a collection of Australian Plant families
- Collect and identify as many Australian plants as you can and try to sort into family groups
- Discover interesting ways to display them
- Hint – you can research museums, botanic gardens and cultural institutions for ideas on plant displays

## Scientific Drawing

- Collect an Australian plant in flower. Draw and label the flower and plant parts
- Use microscopes or magnifying glasses to examine the finer detail of the plant parts and label accordingly e.g. stomata, fine hairs
- Hint – Look at 'Top Draw' or 'Floral Emblems' on the Australian National Botanic Gardens website for tips on scientific drawing
- Hint – this could be run as a 'Plant Bingo'. The first person to find and draw three of the plant families wins

## Plant Cells

- Delve deeper and use a microscope to look at the cells within a plant
- There are many resources online that can assist with observing plants to a cellular level
- Plant Energy Biology have some great interactive resources regarding plant cells  
<https://www.plantenergy.edu.au/outreach>

## Plant Evolution

- Research the evolution of different Australian plant families
- Research and discuss how plant fossils are used to look at continental drift and plate tectonics.
- Research and discuss plants that link to Gondwana. Look at plants that span different continents that were also part of Gondwana, for example *Nothofagus*



# Activity ideas – Plant Dissection



## At the Australian National Botanic Gardens

Book a Botanist Apprentice program at the Australian National Botanic Gardens to participate in a Ranger-led plant dissection program.

## At School

Book a teacher-only plant dissection program at the Australian National Botanic Gardens and learn how to dissect flowers. Take this information and run a program at school.

Or;

There are many resources online outlining how to dissect a flower. These are aimed at students of all ages. Find an age-appropriate resource and run a dissection activity for your students.

Things you will need:

- Plants - these can be Australian plants from the families listed below. For a more general activity, lilies are great for illustrating plant parts
- Something to cut with – scissors or scalpel depending on the age of your students
- Magnifying glass or microscope
- Bench or table space for dissection

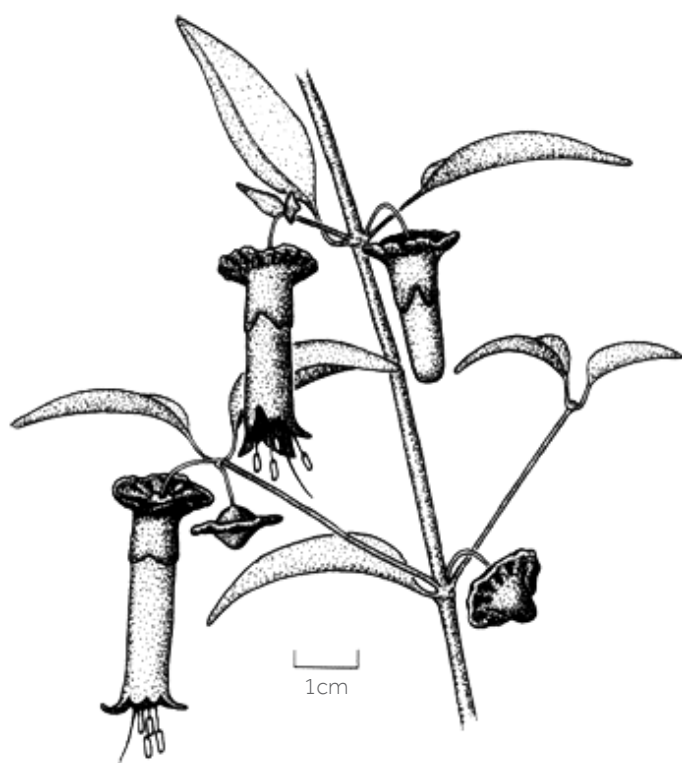
## Extension activities

Looking at flower structures, ask students to research and draw conclusions about the flower's primary pollinator, for example, birds, insects, mammals.

- Things to look at include:
  - Shape of flower, e.g. tubular flowers are usually pollinated by birds such as honey eaters as their beak reaches nectar at the bottom, whereas plants growing on the ground are sometimes pollinated by small mammals)
  - Markings on flower, e.g. Certain markings and colours can attract insects
  - Colour of flower, e.g. Different colours attract different pollinators
  - The Australian Museum has a great resources on pollination to assist with this activity – [https://australian.museum/learn/animals/insects/pollination/?gclid=EAlalQobChMI44T81sL76wlVSqaWCh1b2gdWEAAYASAAEgLLxPD\\_BwE](https://australian.museum/learn/animals/insects/pollination/?gclid=EAlalQobChMI44T81sL76wlVSqaWCh1b2gdWEAAYASAAEgLLxPD_BwE)

# Six common Australian plant families

- Asteraceae
- Lamiaceae
- Mimosaceae
- Myrtaceae
- Proteaceae
- Rutaceae



*Correa baeuerlenii*  
Family Rutaceae



*Callistemon* species  
Family Myrtaceae

# Family Asteraceae

Some of the many genera in Asteraceae family are:

- *Xerochrysum*
- *Helipterum*
- *Brachyscome*

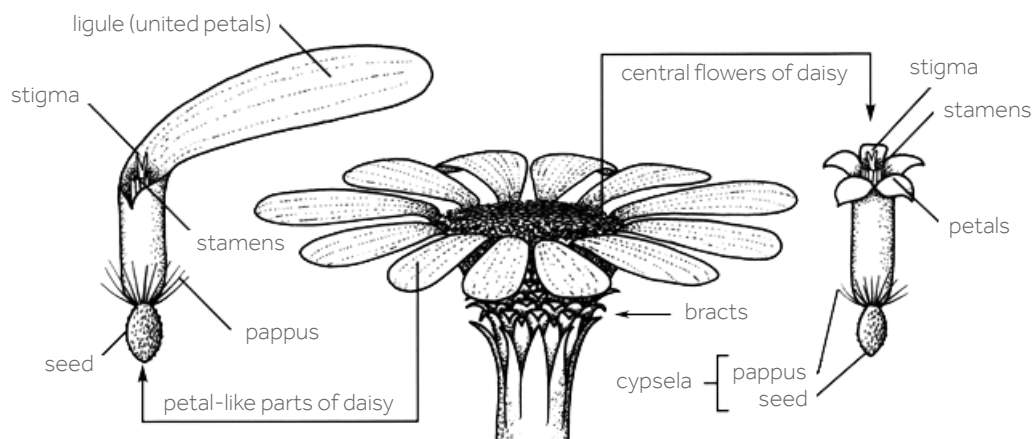
## Characteristics

- members of this family, commonly known as daisies, are usually herbs or shrubs and may be annuals or perennials
- the flower heads are very complicated, with the flowers on a common base surrounded by one or more rows of bracts
- the bracts are a variety of colours in different species most commonly yellow, orange, pink or white
- seeds are produced in large quantities and are attached to a parachute, like a tuft of hairs, which makes dispersal by wind very effective
- most species grow readily from fresh seed

## Interesting facts

- The daisy flower is actually made up of many small flowers, known as a composite head
- There are around 1,300 species of daisies in Australia
- Pollination is by insects

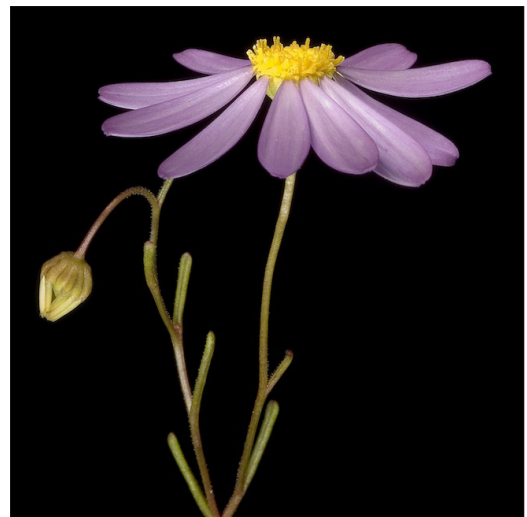
## Flower structure of the family Asteraceae



daisy flower (Asteraceae) – composite head of many small flowers



*Xerochrysum macranthum*



*Brachyscome iberidifolia*

# Family Lamiaceae

Two common genera of the family Lamiaceae are:

- *Prostanthera*
- *Westringia*

## Characteristics

- members of this family may be herbs, shrubs or small trees
- leaves are usually strongly aromatic
- stems are square in cross-section
- the mauve, purple or white flowers are irregular



*Prostanthera spinosa*

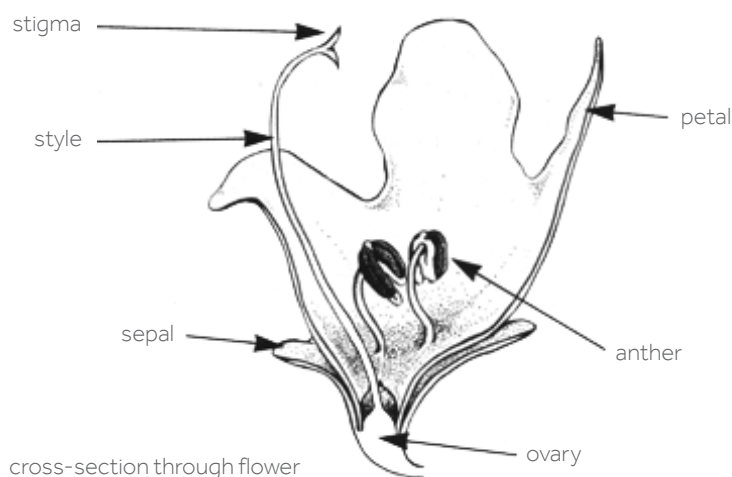
## Interesting facts

- Most plants in this family contain oils that make them fragrant
- Members of the Lamiaceae family are important to humans as they include several edible herbs such as rosemary, thyme, basil and oregano. Please note that these herbs are not native to Australia
- Lavender is a member of the Lamiaceae family that is commonly used as a perfume
- Fragrances are produced by plants to entice pollinators, discourage microbes and fend off predators



*Westringia dampieri*

## Flower structure of the genus *Prostanthera*



# Family Mimosaceae

In Australia the best-known members of the genus *Acacia*, or wattles, of which there are about 950 species.

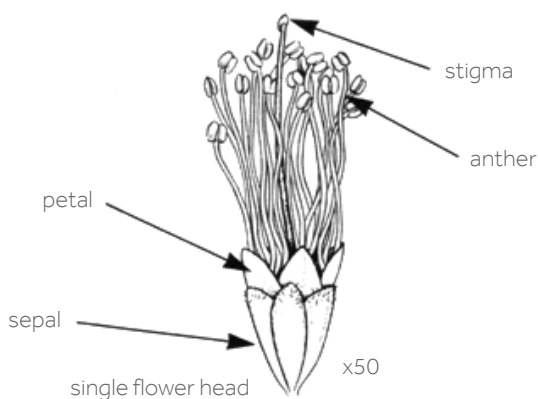
## Characteristics

- ground covers to shrubs and tall trees
- leaves are often bipinnate in seedlings and often are replaced by flattened modified leaf stalks (phyllodes)
- flowers have four to five sepals and petals which are very small. Each flower has numerous stamens
- flowers are grouped together into a head, forming fluffy balls or rods
- fruit is a legume (pod) containing several seeds
- are nitrogen fixing, colonising land after clearing or burning. They provide cover and extra nitrogen to the soil for plants which are slower growing
- are fast-growing and many species are short lived

## Interesting facts

- Aboriginal people use the hard wood of *Acacia aneura* (also known as Mulga) to make spears, digging sticks and long narrow shields.
- Mulga seeds were also eaten by Aboriginal people after being cleaned and ground into a paste or roasted over fire. The sugary gum from the tree was eaten raw or dissolved in water to make a sweet drink.

## Flower structure of the genus *Acacia*



*Acacia flexifolia*



*Acacia longifolia* subsp. *sophorae*



# Family Myrtaceae

Four important genera in the family Myrtaceae are:

- *Eucalyptus*
- *Callistemon*
- *Melaleuca*
- *Leptospermum*

## Characteristics

- range from woody shrubs to tall trees
- leaves are aromatic, containing oil glands
- flowers may be white, pink, red, purple or yellow. They usually have five sepals and petals and many stamens. The stamens are long and conspicuous
- in eucalypts, the petals and sepals are joined to form a cap over the bud
- fruit is generally woody

## Interesting facts

- This family is very important to Aboriginal people. Water can be collected from the roots of certain mallee eucalypts. The wood and bark of eucalypts and melaleucas can be used to make tools and utensils such as shields, spear throwers and bowls. Edible grubs and insects are also collected from some eucalypts.



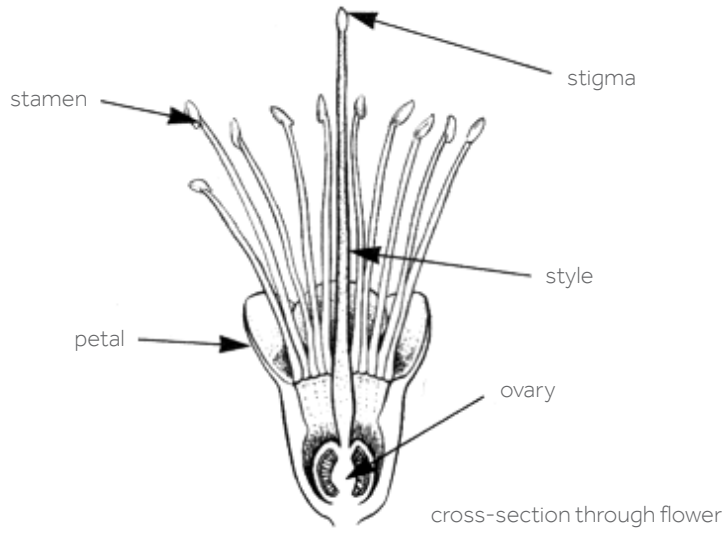
*Eucalyptus caesia* subsp. *magna*



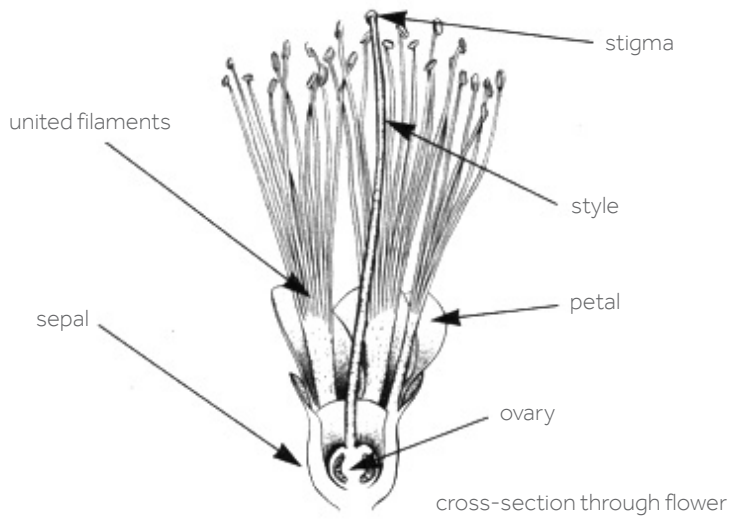
*Callistemon pearsonii*



Flower structure of the genus *Callistemon*



Flower structure of the genus *Melaleuca*



Fruits of various eucalypt species



# Family Proteaceae

Some well-known genera in the Proteaceae family are:

- ***Banksia***
- ***Hakea***
- ***Grevillea***
- ***Telopea***

## Characteristics

- can be small shrubs, ground covers or large trees
- leaves are tough and leathery
- flower heads are made up of several small flowers. The flowers are made up of petal-like tepals which are united. Each flower has four stamens (male parts) and a long, protruding carpel (female part). The stigma is initially held between the stamens, forming a loop
- fruit is usually hard and woody

## Interesting facts

- Many species produce abundant nectar, which has been used by Aboriginal people throughout Australia to make a sweet drink.
- Timber from *Grevillea robusta* (Silky Oak), a rainforest member of the family, is used to make furniture.
- Most are pollinated by birds (honeyeaters).



*Telopea speciosissima*

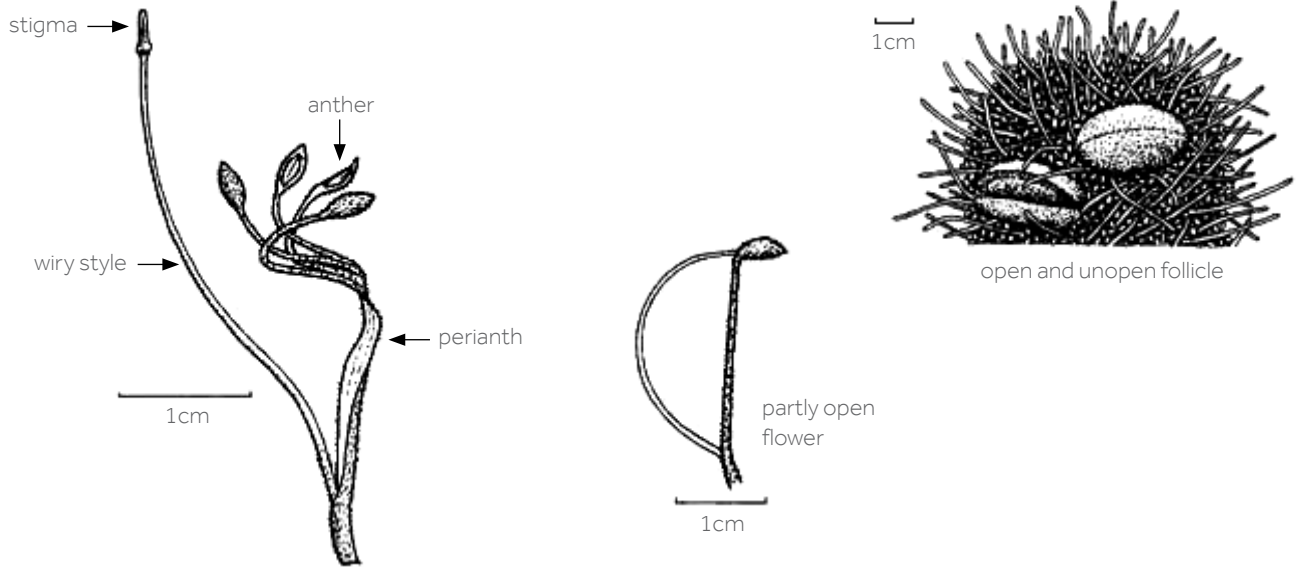


*Banksia marginata*

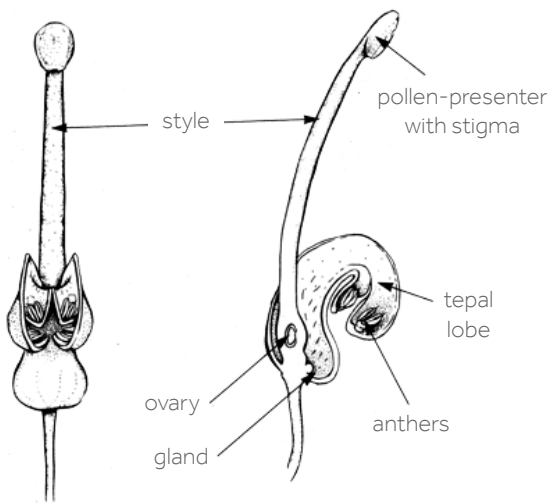


*Grevillea asteriscosa*

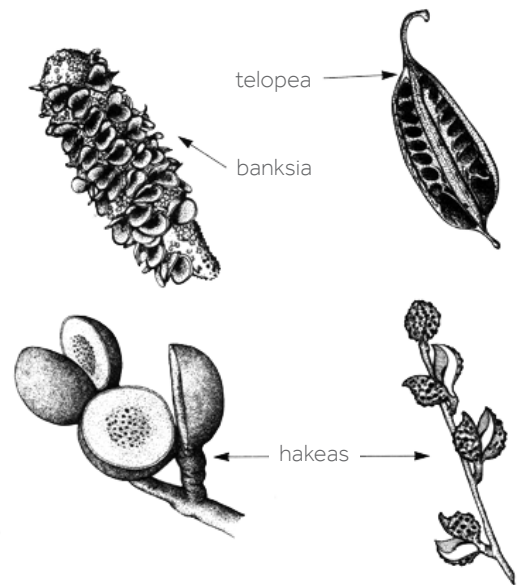
Flower structure and woody fruits of the genus *Banksia*



Flower structure of the genus *Grevillea*



Woody fruits of the family Proteaceae



# Family Rutaceae

Four genera from the family Rutaceae are:

- *Correa*
- *Boronia*
- *Eriostemon*
- *Crowea*

## Characteristics

- are usually small to medium shrubs
- leaves are often aromatic, containing oil glands
- flowers have four to five sepals and petals and are white, yellow, purple, pink or red in colour
- fruit is a capsule which releases seed very quickly when ripe *Correa* species

## Interesting facts

- *Boronia*'s are known for their magnificent scent, however some people cannot smell it at all.
- *Correa baeuerlenii* flowers and leaves smell like bubblegum.

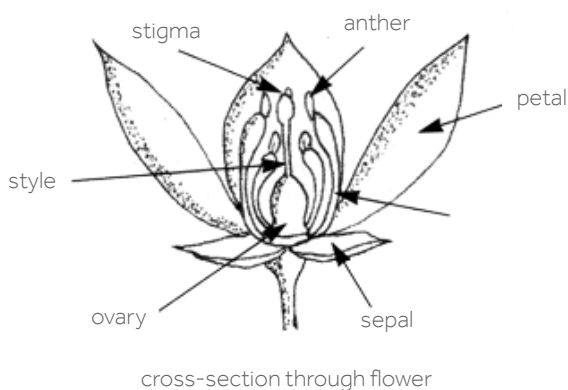


*Correa reflexa* 'Canberra Bells'



*Boronia repanda*

### Flower structure of the genus *Boronia*



### Flower structure of the genus *Correa*

