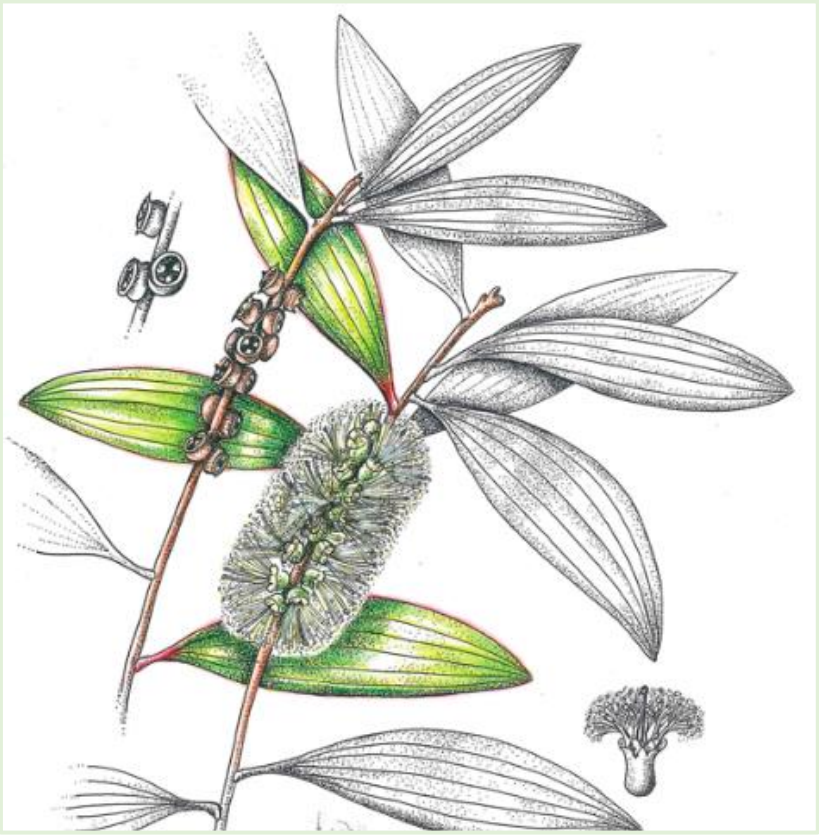
North Coast Regional Botanic Garden, Coffs Harbour

EDUCATION KIT

Art in Nature Series: SHAPE

2 JUNE 2025



Paperbark Tree (*Melaleuca quinquenervia*) by Margaret Hodgson OAM

Developed by Rowena Post

With acknowledgement to the Traditional Custodians of country, the Gumbaynggirr people, and respect to their elders.

The development of this kit was supported by funding from the City of Coffs Harbour and by the volunteers of the Friends of the North Coast Regional Botanic Garden.

Details of other available Education Kits and programs at the Botanic Garden are listed on the Botanic Garden website.

Website: **coffsbotanicgarden.com.au**
Email: coffsbotanicgarden@gmail.com
Phone: (02) 6648 4144 Information Centre, open 9am to 4pm daily.
Address: Hardacre Street and Coff Street, Coffs Harbour

Follow our Instagram: **coffsharbourbotanicgarden**

Follow our facebook: **Coffs Harbour Botanic Garden**

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Map of the Botanic Garden This map can be downloaded as a pdf from the Coffs botanic garden website. Printed copies of this map are in a visitor brochure available for free at the garden entrance.

Bus parking is available near the garden entrance. Toilets located in the entrance building. Free garden maps and copies of the Photo Set with guide notes are available at the Information Centre.

CONTENTS

1. INTRODUCTION

When we think of the shape of something we often consider the edges of an object and how these edges look. This is especially useful for working out what plant we are looking at.

Botanists use a technique called “keying out” to identify what a plant is if they do not know it already. A part of “keying out” a plant is to carefully observe the shape of a leaf, flower, and fruit of that plant. It is like being a plant detective!

Careful observation is also an important element in art making
Shapes in nature are mostly described as ‘organic’ since they mostly belong to plants or animals that were or are alive. They are often asymmetrical and ‘curvy.’ There are not many straight edges in living things!

Inorganic shapes that have uniform measurements and are described as geometric do not occur very often in our natural landscape but can be seen in many made objects and some non-living, naturally occurring shapes. A lot of made shapes and some non-living naturally occurring shapes are described as ‘geometric’ or asymmetrical shapes. Organic shapes have been used by designers to create car shapes, aeroplanes, container shapes, musical instruments, and many other things. A selection of artists who focus on organic shapes in their artistic work is included in the activities.

In this Art Kit the focus is on leaf shapes as organic shapes coming in many different varieties. Leaves can be found all year round on most plants in the Botanic Garden.

Art can bring us new understandings and with nature there is always a new way to learn.

2. NSW SYLLABUS LEARNING OUTCOMES

Each activity includes the reference numbers for the learning outcomes linking to this list below. Outcomes and indicators have been copied from the Visual Arts Syllabus NSW

VISUAL ARTS OUTCOMES AND INDICATORS STAGE 2

MAKING

VAS2.1 Represents the qualities of experiences and things that are interesting or beautiful by choosing among aspects of subject matter

A. talks about and thinks about their intentions for artmaking and recognises how these affect their selection of ideas, materials, tools and techniques and methods of working.

B. focuses on details of subject matter and areas of beauty, interest, awe, wonder and delight, eg

Facial expressions, body positions and body angles.
Activities people are involved in
The grace and speed of moving animals, birds, reptiles, fish
Contrasts in a streetscape and/or natural environments
Interior and exterior views

C. seeks to investigate traditions in art suited to different subject matter - the landscape, figure, the narrative, formal and abstract properties, the use of symbols, and uses these in their art-making.

APPRECIATING

VAS2.3 Acknowledges that artists make artworks for different reasons and that various interpretations are possible.

A. discusses reasons why artists make artworks focussing on who, where, when, why and how.

B. recognises that people have different views about artworks and their meanings that are informed by their understanding of such things as the circumstance of the work, the artist's intentions and skill, and what the work is about.

VAS2.4 Identifies connections between subject matter in artworks and what they refer to and appreciates the use of particular techniques.

A. identifies resemblances between subject matter in artworks and the features of things as they exist in the world, recognising similarities and differences in how things are represented in the artworks.

B. expresses opinions about how well subject matter that is represented in particular forms refers to the world and appreciates the skills involved to achieve these effects.

C. talks and writes about the meaning of artworks in terms of how subject matter realistically represents things in the world.

VISUAL ARTS OUTCOMES AND INDICATORS STAGE 3

MAKING

VAS3.1 investigates subject matter in an attempt to represent likenesses of things in the world.

A. closely observes details of things in the world and seeks to make artworks about these using various techniques such as proportion, perspective, composition, foreshortening.

B. uses different artistic concepts (eg colour, tone, light, scale, abstract) and explores how symbols may be used in their interpretation of selected subject matter.
C. explores subject matter of personal and social interest from particular viewpoints including issues, activities and events in the community and global environment, places and spaces, people, objects and fantasies.

VAS3.2 Makes artworks for different audiences, assembling materials in a variety of ways.

A. examines a range of concepts and their relationships to selected forms and experiments with such things as the expressive use of colour in painting or drawing, the abstract and/or monumental qualities of sculpture, the sequencing of events in a video, digital work or cartoon, those of found objects and other objects in an installation or sculptural work.
B. recognises how an audience has an influence on the kinds of works they make, and seeks. To clarify the purpose of their works and suggests alternatives about how they may proceed.
C. discusses the conditions and requirements of artworks that are made for particular purposes, sites or events and how those conditions and requirements can affect how they might go about their own artmaking.

APPRECIATING

VAS3.3 Acknowledges that audiences respond in different ways to artworks and that there are different opinions about the value of artworks

A. talks about and writes about the meaning of artworks recognising how artworks can be valued in different ways by themselves as audience members and by others.
B. identifies some of the reasons why artworks are made (eg the artist's personal interest and experience, a work commissioned for a site, a work made to commemorate an event).
C. recognises that the artist may have a different view about the meaning of the work he or she has made to the view of an audience who responds to it.
D. recognises that views about artworks change over time and are affected by different theories and beliefs.

VAS3.4 Communicates about the ways in which subject matter is represented in artworks.

A. identifies and describes the properties of different forms, materials and techniques in artworks and comments on how these are employed in the representation of subject matter.
B. discusses the artist's intention and/or the use of styles and techniques in selected works and considers the possible meaning of these works.
C. suggests how subject matter can mean different things in artworks and seeks to explain meanings by developing reasoned accounts that consider the artist, work, world and audience.
D. considers a range of artworks and their subject matter including paintings, drawings, photographs, video and digital works, sculptures, installations and buildings, prints and posters, digital animations, ceramic and fibre works.

SCIENCE AND TECHNOLOGY LEARNING OUTCOMES:

ST1-1WS-S observes, questions and collects data to communicate and compare ideas.
ST2-1WS-S plans/conducts scientific investigations to answer testable questions, collects and summarises data and communicates findings.

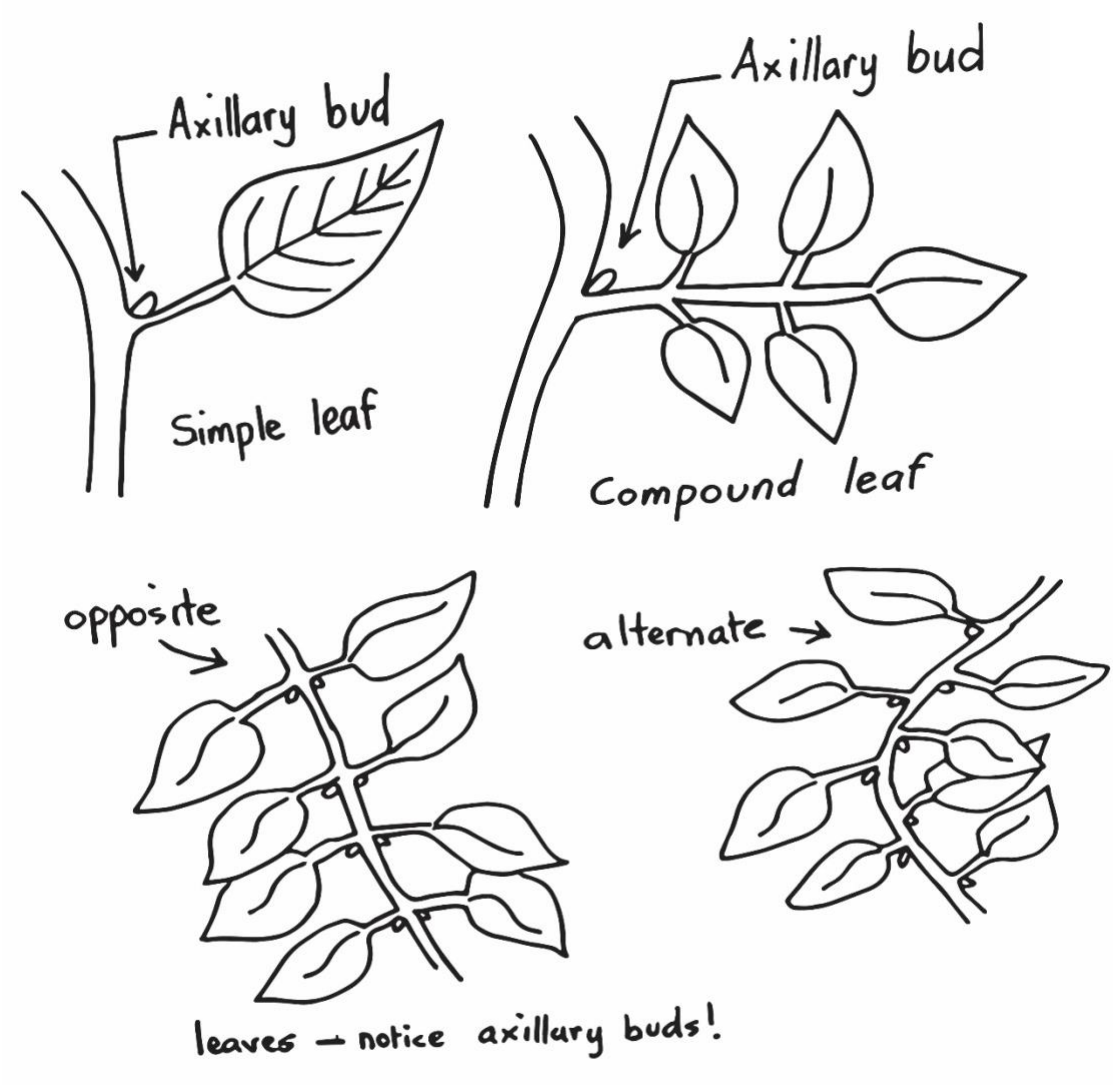
3: IN PREPARATION FOR A VISIT TO THE BOTANIC GARDEN

3.1 Investigating leaf types: Symmetry and Asymmetry

NSW Syllabus Learning Outcomes: Stage 2: VAS 2.1 B. Stage 3: VAS 3.1 A.

Outside in the school garden, students find some examples of simple leaves and compound leaves. Also, students look for examples of leaf arrangements where leaves alternate and some plants where leaves are arranged opposite to each other. There are other leaf arrangements too. Maybe they can find some different ones.

Look for the little axillary buds!



SECTION 3: In preparation for a visit to the Botanic Garden

Materials:
Large sheets of art paper (one per student)
Any chosen medium(s), e.g. marker pens/oil crayons/watercolours/pencils etc
Optional scissors to cut out final work
Good sunlight coming through a window – for tracing the line drawings against the glass.

Part 1- Symmetry

Process:

- Fold a piece of paper in half
- Draw shapes on one side of the folded paper – leaf shapes, animal shapes, or even letter shapes
- Go to the window and trace the shapes on the other side of your paper
- Unfold the paper – go around the important areas with a thick texta and evenly colour in the shapes. Use a strong colour to fill in the background.
- The students have created an artwork using symmetry

Part 2- Asymmetry

Process:

- Fold a piece of paper in half
- Draw shapes on one side of the paper – leaf shapes, animal shapes, or even letter shapes
- Ask students to exchange their artwork with a classmate
- Each classmate keeps the page folded and draws their shapes on the other part of the folded paper
- Unfold the paper – go around the important areas with a thick texta and colour in the different shapes.
- The students have created an artwork using asymmetry

SECTION 3: In preparation for a visit to the Botanic Garden

3.2 Leaves come in all kinds of shapes

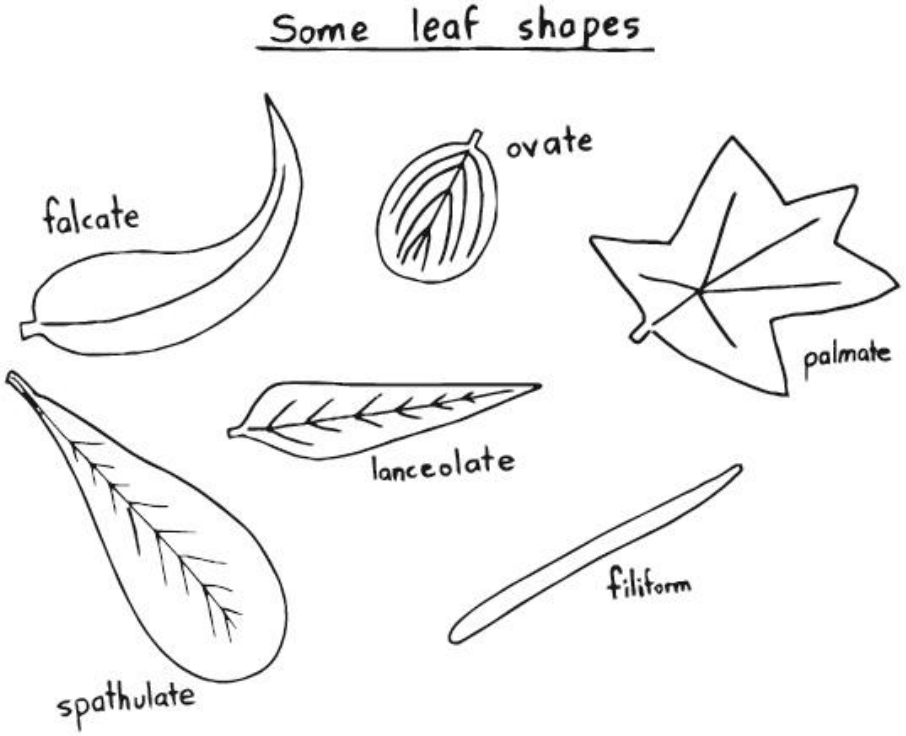
NSW Syllabus Learning Outcomes:
Stage 2: VAS 2.1 B. VAS 2.4 A. VAS 2.4 B. VAS 2.4 C.
Stage 3: VAS 3.1 A. VAS 3.1 C. VAS 3.3 A. VAS 3.3 B. VAS 3.4 A.

Materials:
Notebook or plain paper
Pencil or Graphite

Process:
Take students on a timed 'treasure hunt' with pencil and paper and see how many different leaf shapes they can find in the school grounds.
Who drew the most?
Compare pictures. Can the students match any of the shapes to these named ones below?

Questions for students to consider:

Why would anybody need to know a plant's type of leaf shape?
Why don't all plants have the same leaf shape?
Why do plants sometimes have two different types and shapes of leaves?
Why would a botanical artist be asked to make a detailed drawing of a plant?
What art materials can be used to make a detailed, accurate depiction of a plant?



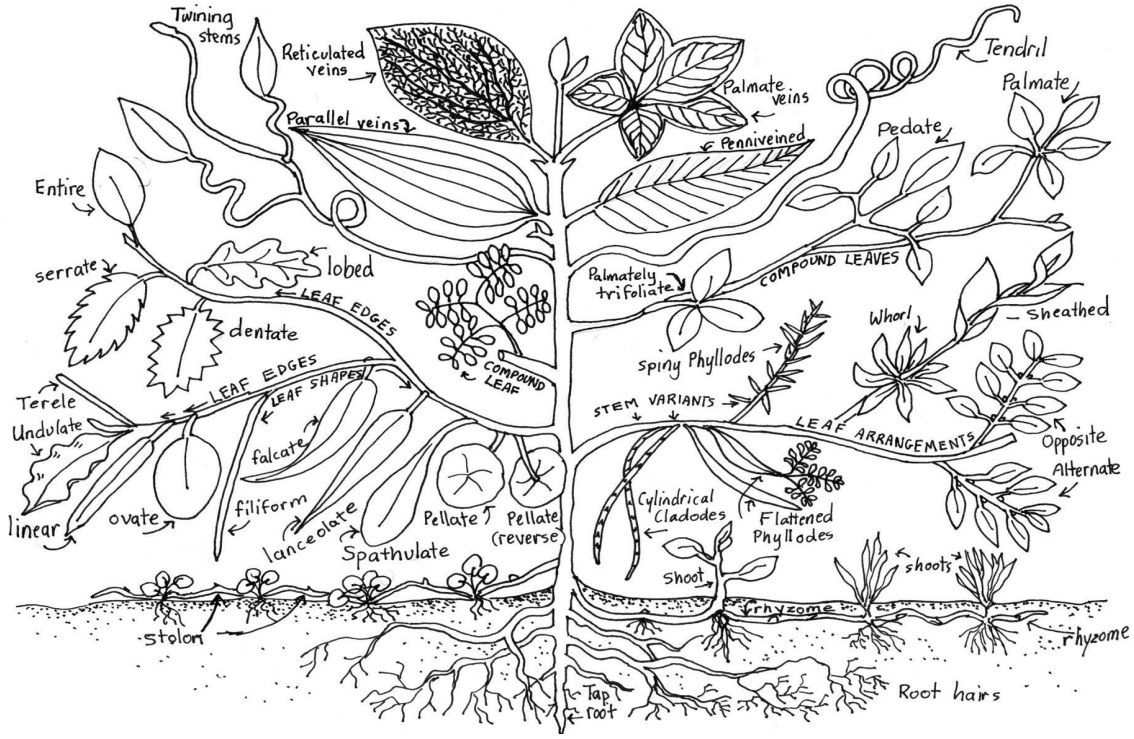
SECTION 3: In preparation for a visit to the Botanic Garden

The Shapes Plant

Illustration by Rowena Post, after an 'Imaginary Plant' by Margaret Senior

How many different shapes and arrangements of leaves can you find?

An A4 page version of this illustration is in the resources section to copy for the classroom



SECTION 3: In preparation for a visit to the Botanic Garden

3.3: Artists and artworks to explore

NSW Syllabus Learning Outcomes:
Stage 2: VAS2.3 A. VAS2.3 B. VAS2.4 A. VAS2.4 B. VAS2.4 C.
Stage 3: VAS3.2 C. VAS3.3 A. VAS3.3 B. VAS3.3 C. VAS3.4 A. VAS3.4 B. VAS3.4 C. VAS3.4 D

Process:
Investigate some of the artists and their artworks from the examples provided below.
With a focus on shapes, use the discussion questions to prompt thinking and discussion.

Discussion questions about each artist's work:

- Do the shapes remind you of any shapes you have seen in gardens or on bush walks?
- How has this artist used these shapes?
- Do you think that the shapes used are imagined or are they ones that the artist has seen in the world/garden/jungle etc?
- Is there a lot of space around the shapes or are they all crowded together?
- Which artist's work do you like the best/Why?
- How did the artist make these shapes? (pencil/wide brush/thin brush/other?)

Artists and artworks to explore and study

John Coburn (**Australian**)
John Coburn originally painted more traditional landscapes and portraits but then started to develop his unique flat, patterned style using brilliant colour combinations based on natural or organic images. For more background see: https://www.wentworthgalleries.com.au

Artwork examples: *'The Curtain of the Sun"* and *"The Curtain of the Moon"* (tapestries in the Sydney Opera House) https://www.sydneyoperahouse.com/schools/coburn-tapestries

"*Tree of Life"* (Art Gallery of NSW).
https://www.artgallery.nsw.gov.au/collection/works/OA7.1965/

Australian indigenous artists:

Mitjili Napurrula
https://mitchellfineartgallery.com/collections/mitjili-napurrula

Damien and Yilpi Marks
https://www.wentworthgalleries.com.au/artist/damien-yilpi-marks

Tjapaltjarri (Clifford Possum)
https://www.artnet.com/artists/clifford-possum-tjapaltjarri/

SECTION 3: In preparation for a visit to the Botanic Garden

Henri Rousseau (French)
Henri Rousseau used lots of overlapping shapes and colours in the plants and animals he depicted, creating a dense tropical feel and allowing the viewer to clearly see each type of plant and leaf shape.
https://www.nga.gov/features/slideshows/henri-rousseau.html#slide_2

Artwork examples:
"Merry Jesters," "Tiger in a tropical storm," "Tropical Forest with Monkeys"

Joan Miro (Spanish)
Joan Miro was an artist from the Catalan region who produced sculptures, paintings, and ceramics. There is a lot of symbolism in his paintings and many organic forms that merge and overlap.

Artwork examples: *"Ladders cross the blue sky in a wheel of fire"*
https://www.joan-miro.net/ladders-cross-the-blue-sky-in-a-wheel-of-fire.jsp
"Figure, dog, birds" "The flight of a bird over the plain III" "*Signs and Meteors*"
https://www.guggenheim.org/artwork/artist/joan-miro
"The Singing fish" https://www.joan-miro.net/the-singing-fish.jsp#google

Alexander Calder (American)
Alexander Calder was an artist known for his sculptures. He is credited with having invented the mobile. He used bold colours, organic shapes, and wire in the creation of his works. For general background see **https://www.youtube.com/watch?v=j3OqfduWdhc**

Artwork examples:
"*Rouge triumphant,*" **https://www.youtube.com/watch?v=uyIgGb8SgrE**

"Arc of petals," "The Four Elements," "Flamingo," "Eagle"
These can be found at:
https://calder.org/works/hanging-mobile/arc-of-petals-1941/

Botanical artists:
David Mackay
https://www.davidmackay.com.au/about

Sydney Parkinson
https://www.botanicalartandartists.com/sydney-parkinson.html

Zeng Xiao Lian
https://vsemart.com/zeng-xiao-lian-botanical-watercolor/#google_vignette

4: ACTIVITIES AT THE BOTANIC GARDEN

4.1 Imagine and draw plants with strange names

NSW Syllabus Learning Outcomes
VAS2.1 A. VAS2.1 B. VAS2.2 B. VAS2.3 B. VAS 2.4 A. VAS3.1 B. VAS3.2 C. VAS3.3 B. VAS3.4 A.

Materials:
Large sheets of art paper (one per student)
Any chosen medium(s) e.g. marker pens/oil crayons/watercolours/pencils etc

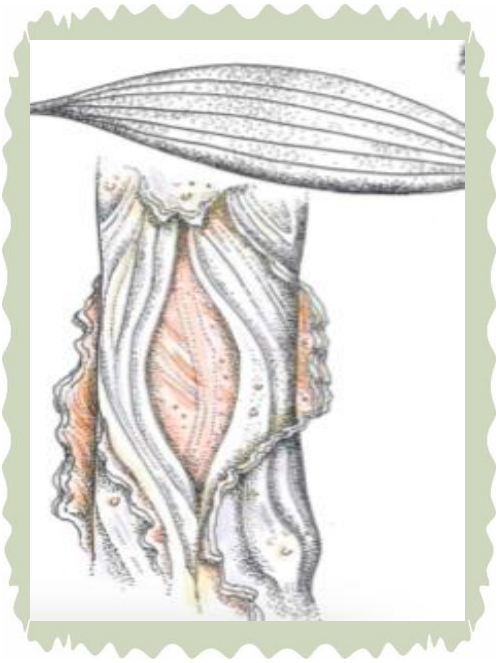
Select and copy some "Plants with Strange Names" (see full list on next page)

Process:
- Explain the difference between a common name and scientific name (see notes below)
- Students choose some of the plants from the list and draw what they think they may look like from their common names
- What shapes of leaves or types of flowers might they have? Are they thin, tall, short, spikey, round, wiggly…?
- Students may create a jungle picture of these plants. It may be a garden on a planet with three moons or a floating garden! Are there any strange creatures too? Encourage some creativity!

Common names often differ. Some plants have lots of different common names.

Scientific names are the botanical names of these plants, in the language of Latin, which are agreed by scientists and used all over the world. Every plant has a unique scientific name. This avoids confusion about which plant is being described.

The scientific name of a plant or animal is also called a 'binomial' name, meaning a 'name in two parts,' the genus name and the species name.



Paperbark

Melaleuca quinquenervia

Some names describe a feature of the plant. For example, the common name 'Paperbark' describes the type of bark.

The species name is 'quinquenervia' which combines the Latin words of 'Quin' meaning 'five' and 'nervus' meaning nerves. This refers to the 5 parallel nerve like veins along the leaf.

LIST OF PLANTS WITH STRANGE NAMES

Common Name	Scientific name
Broad-leaved Geebung	*Persoonia stradbrokensis*
Small-leaved Lilly Pilly (also called Riberry)	*Syzygium leuhmannii*
Plum Pine	*Podocarpus elatus*
Bangalow Palm (also called Piccabeen)	*Archontophoenix cunninghamiana*
Wedge Leaflet Fan Palm (also called Queensland Fan Palm)	*Licuala ramsayii*
Pepper Vine	*Piper hederaceum* (formerly: *novae-hollandiae)*
Powder Puff	*Calliandra haematocephela*
Soft Tree Fern	*Dicksonia antarctica*
Giant Fern	*Angiopteris evecta*
Birds Nest Fern	*Asplenium australasicum*
Cunjevoi Lily (also called Elephant's Ear)	*Alocasia brisbanensis*
Broad leaved Paperbark	*Melaleuca quinquenervia*
Swamp Orchid	*Phaius australis*
Broad Leaf Palm Lilly	*Cordyline petiolaris*
Narrow Leaf Palm Lilly	*Cordyline stricta*
Walking Stick Palm	*Linospadix monostachya*
Bat plants (also called Cat's Whiskers)	*Tacca integrifolia* (white)
Scribbly Gum	*Eucalyptus racemose* (formerly *signata)*
Smooth barked Apple (also called Sydney Red Gum)	*Angophora costata*
Lemon Myrtle (also called Ironwood)	*Backhousia citriodora*

Before the visit to the garden students can do some research on these plants. To make a start see Section 7: 'Photo Set with Guide Notes' for the 'Plants with Strange Names' Discovery Walk.

At the botanic garden, students can investigate the real plant to explore its shapes and textures and how it grows.

SECTION 4: Activities at the Botanic Garden

4.2 Discovery Walk at the Botanic Garden

NSW Syllabus Learning Outcomes:
Stage 2: VAS 2.1 A. VAS 2.1 B. VAS 2.4 A. Stage 3: VAS 3.1 C. VAS 3.3 C.

SEE WALK MAP AND PHOTO SET OF PLANTS IN SECTION 7

Process:
Using the list of plants with strange names above, and the Discovery Walk circuit map, find the plants in the Botanic Garden that were researched, drawn, or painted.

See Section 7 for the Discovery Walk circuit map with photos of the plants with guide notes. Laminated sets of the photo are available for free loan at the garden.

Explain how it can be confusing when people living in different places call the same plant different names. This is the problem with just using common names. Scientific names were developed to avoid confusion, so the same plant has the same name all over the world.

- Ask students to compare the appearance of the plants in real life to how they imagined them in their drawings or paintings
- Ask students to find the scientific name for the plants drawn or painted, and to write both the scientific name and the common name or names on the back of the artwork.
- Discuss why the plant might have been given its common name. (Refer to the Photo Set with Guide Notes for some clues)

5: ACTIVITIES TO BEGIN AT THE BOTANIC GARDEN AND TO CONTINUE AFTERWARDS

5.1 Make a Leaf Collage Artwork

NSW Syllabus Learning Outcomes:
Stage 2: VAS 2.1 A. VAS 2.1 B. Stage 3: VAS 3.1 A. VAS 3.3 C.

Materials: for each student:
1 large A2 sheet of art paper
2 sheets of brightly coloured A4 paper
4 sheets of white A4 paper
Paints and brushes, pencils, scissors, glue
Clipboard with 2 sheets of A4 attached
Pencil, eraser, and sharpener

Process:
While exploring the Botanic Garden:
Students take their clipboard, paper, pencil, and eraser and carefully copy about 5 or 6 different leaf shapes that they find on the walk.

The following activity can be done at school after your visit to the Botanic Garden.

Explore how to create various shades and tones of green:

- by mixing warm yellow and blue or cold yellow and blue
- by also adding very small quantities of warm red or cold red; white and/or black.

Students mix 3 different shades of green paint.
Make enough to coat one piece of art paper with each kind of green made (one shade or tint of green per page).
Mix up a purple colour and cover one art paper page and let the 4 pages dry.

SECTION 5: Activities to begin at the Botanic Garden and to continue afterwards

Students now:

- Glue the coloured A4 pages (2) onto the middle of the A2 art paper.
- Copy one type of leaf shape several times onto the back of one of the green pages (aim to end up with about 6 leaves that are about the size of the palm of a hand)
- Choose another green page and copy a **different** leaf shape onto the back several times.
- Do the same on the last green page and the purple page.
- Cut out the shapes and arrange on some coloured A4 papers.
- Experiment with different arrangements of sets of leaves. Perhaps some can be leaves on a vine or branch.
- Draw a line or two to represent a vine and a branch. Arrange the leaves so that they attach to these. Consider arranging them so that the leaves are **alternate** or **opposite** each other as they come off the vine/branch. Let some branches or vines overlap.

- Let some leaves hang over the edge of the page and allow some edges to be visible.
- Glue down the leaves.
- Add spots, stripes, veins and/or stalks to the leaves using crayons or fine paintbrushes.
- Glue each of your arrangements onto an A2 sized art paper.
- Use PVA glue to paint over one type of leaf to make them shiny.

SECTION 5: Activities to begin at the Botanic Garden and to continue afterwards

5.2 Make a Poster to Tell the Story of a Plant

NSW Syllabus Learning Outcomes:
Stage 2: VAS2.1 B. VAS2.1 C. VAS2.2 A. VAS2.2 B. VAS2.3 All. VAS2.4 All.
Stage 3: VAS3.1 A. VAS3.1 C. VAS3.2 B. VAS3.3 A. VAS3.3 B.

Materials:

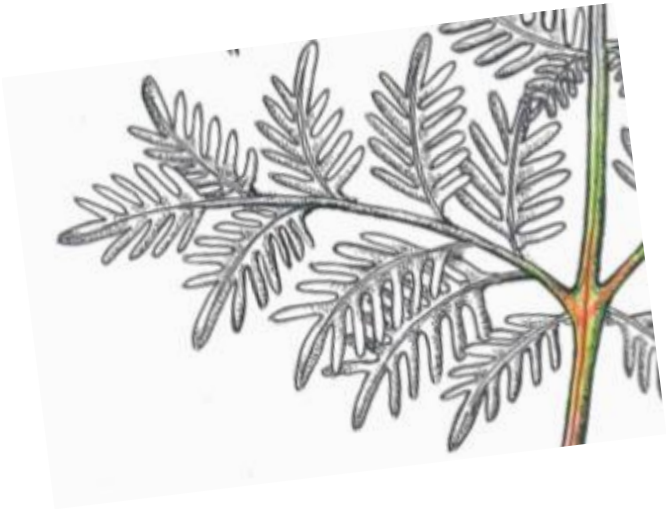
- Clip boards (one per student)
- Graphite pencils sharpeners and erasers
- A4 drawing paper (one per child and spares) for in the garden
- Magnifying glasses (optional)
- Other art materials such as felt tip markers, coloured pencils, paint, and brushes
- A2 art paper – for back at the school

Process

1. To do <u>during</u> a visit to the Botanic Garden – botanical drawing

Instruct students to:

- Choose a plant in the garden which they think is special.
- Choose small sections of the plant to draw on A4 paper - perhaps a stem with a few leaves and the fruit and flower of the plant.
- Examine each closely and include as much detail as possible in the drawing.
- If the edges of the leaves or petals look uneven, then draw them that way!
- Shade in any areas of shadow.

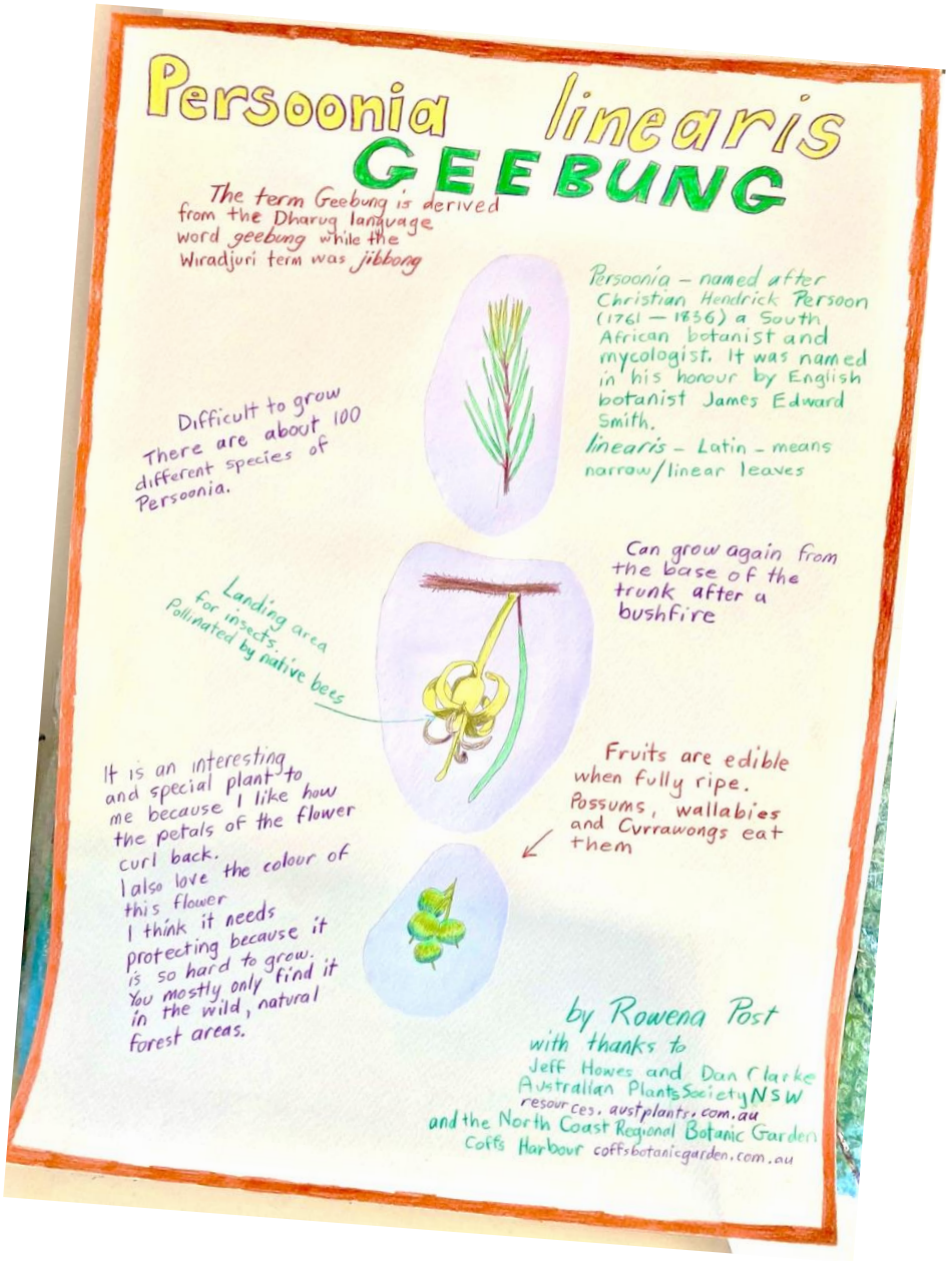


SECTION 5: Activities to begin at the Botanic Garden and to continue afterwards

2. To do <u>after</u> the visit to the garden – mounting on an A2 poster

For the plant they have chosen ask the students to:

- Mount the drawings onto the A2 page with space under or around the botanical drawing to allow room for text, facts etc. to be added.
- Research some fun facts and information about the plant and the meaning of the plant name.
- Use colour pencils, markers, or paints: add the plant name, information, and fun facts.
- Add why it is special to you, or why it needs to be protected.
- Add the name of the plant in bold letters above or below the drawings and information.
- Decorate the borders of the poster.


Persoonia linearis
GEEBUNG
The term Geebung is derived from the Dharug language word geebung while the Wiradjuri term was jibbong
Persoonia – named after Christian Hendrick Persoon (1761 – 1836) a South African botanist and mycologist. It was named in his honour by English botanist James Edward Smith.
linearis – Latin – means narrow/linear leaves
Difficult to grow
There are about 100 different species of Persoonia.
Can grow again from the base of the trunk after a bushfire
Landing area for insects
Pollinated by native bees
Fruits are edible when fully ripe.
Possums, wallabies and Currawongs eat them
It is an interesting and special plant to me because I like how the petals of the flower curl back.
I also love the colour of this flower
I think it needs protecting because it is so hard to grow.
You mostly only find it in the wild, natural forest areas.
by Rowena Post
with thanks to
Jeff Howes and Dan Clarke
Australian Plants Society NSW
resources.austplants.com.au
and the North Coast Regional Botanic Garden
Coffs Harbour coffsbotanicgarden.com.au

SECTION 5: Activities to begin at the Botanic Garden and to continue afterwards

5.3 Make a Wire Mobile

NSW Syllabus Learning Outcomes:
Stage 2: VAS 2.1 A. VAS 2.1 C. VAS 2.2 C. VAS 2.4 B.
Stage 3: VAS 3.2 All. VAS 3.3 C. VAS 3.4 A.

Emulating the artist Alexander Calder to create a moving sculpture

Materials:

- Wire coat hangers (one per student plus spares)
- Florist wire or other thin, easy to bend wire
- Round-nosed pliers and wire cutters
- Coloured cellophane sheets and clear sticky tape
- A4 paper (2 per student) for planning the shapes
- Scissors and pencils
- Fishing line for hanging.

Process:
Look up some examples of Alexander Calder's mobile creations.
Draw some of the flower/leaf/fruit shapes observed during the visit to the garden.

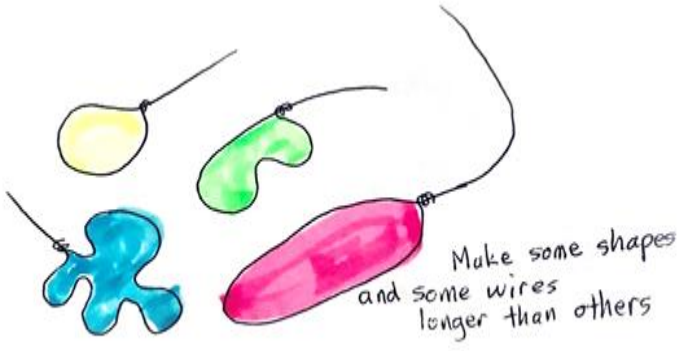
Creating the mobile:

- Aim to allow mobile parts to move in the air currents so that the colours overlap to create new shapes and colours. Avoid making shapes too small or they may not overlap much.
- Make some concept drawings of mobile designs incorporating the coat hanger as the main frame and choose one of these to create.
- The coat hanger can be cut and reshaped, but it needs to hang as planned, so careful thought must go into this process. Two hangers may be wired together. The thin wire shapes will be attached to this coat hanger framework.

- Make leaf and flower shapes out of the thin wire to reflect observations made during the visit to the garden. Make sure to leave enough wire to allow the shapes to be attached to the frame or other wire shapes, with room for some shapes to rotate or swing freely.

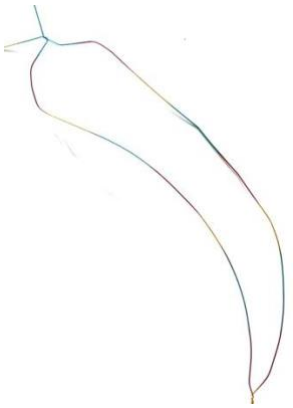
SECTION 5: Activities to begin at the Botanic Garden and to continue afterwards

Place wire shape onto a piece of cellophane



- Attach wire shape to cellophane with sticky tape. Make sure entire wire shape is covered with sticky tape
- Cut through the cellophane around the wire shape leaving a margin of about 1cm of cellophane (outer edge)
- Attach to the frame of your mobile (the coat hanger)

Hang the mobile up and test the movement




Check with students:
Does the mobile move freely and in the way that you planned?
Do some shapes overlap creating other colours?
What might you change or do differently?

Adjust or add more shapes as needed and test again.

An alternative is to use clear plastic, then paint with thin coats of acrylic paint without white, to allow the light to still pass through and create blends of colour in the mobile.

To simplify this activity, allow students to work in pairs on one mobile or have each student create one or two leaves to contribute to a class/group collaborative work which the teacher may assemble after discussion about design.

6 RESOURCES

6.1 USEFUL WEBSITES

Botanic Garden website: https://coffsbotanicgarden.com.au

- '**Nature Gallery'** - photos of plants and animals found in the Botanic Garden with their common name, scientific name, and some fun facts.
  https://coffsbotanicgarden.com.au/learn/nature-gallery/

- Coffs Harbour Botanic Garden Instagram page. New plant and animal posts each week.
  https://www.instagram.com/coffsharbourbotanicgarden/

- **Garden Information Leaflets**: Includes the Garlambirla Walk (Gumbaynggirr names of plants and their use or significance), birds and wildlife living in the garden, special garden areas such as the Glasshouse plants, Japanese Garden, and lake.
  https://coffsbotanicgarden.com.au/learn/learning-resources/

- **Useful 'Citizen Science' websites:** (to help research plants and animals)
  https://inaturalist.ala.org.au
  https://www.ala.org.au (Atlas of Living Australia)

6.2 To borrow at the garden

Laminated photo sets with guide notes for 'plants with strange names' walk

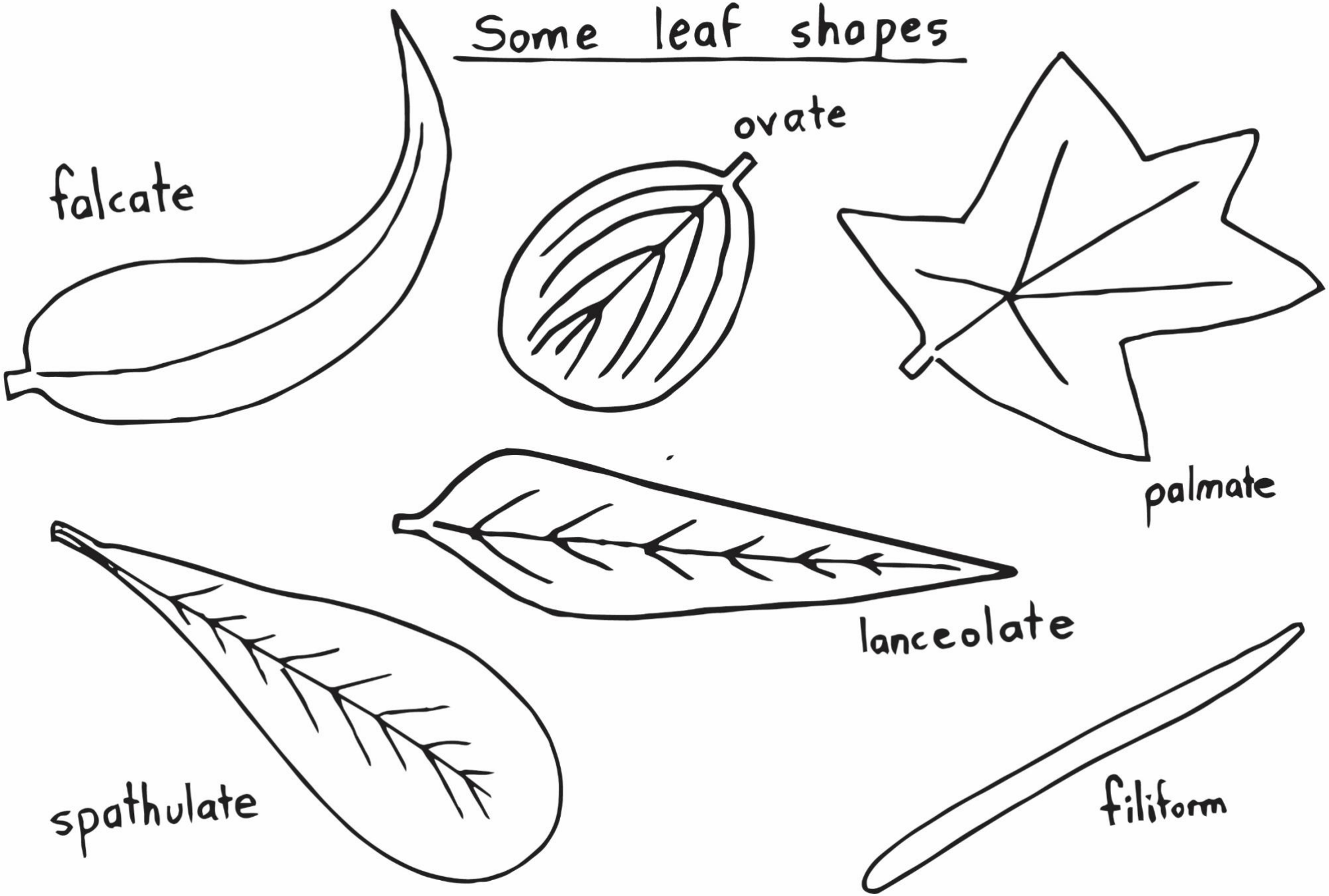
For teachers and guides of class groups to use on the Discovery Walk circuit.

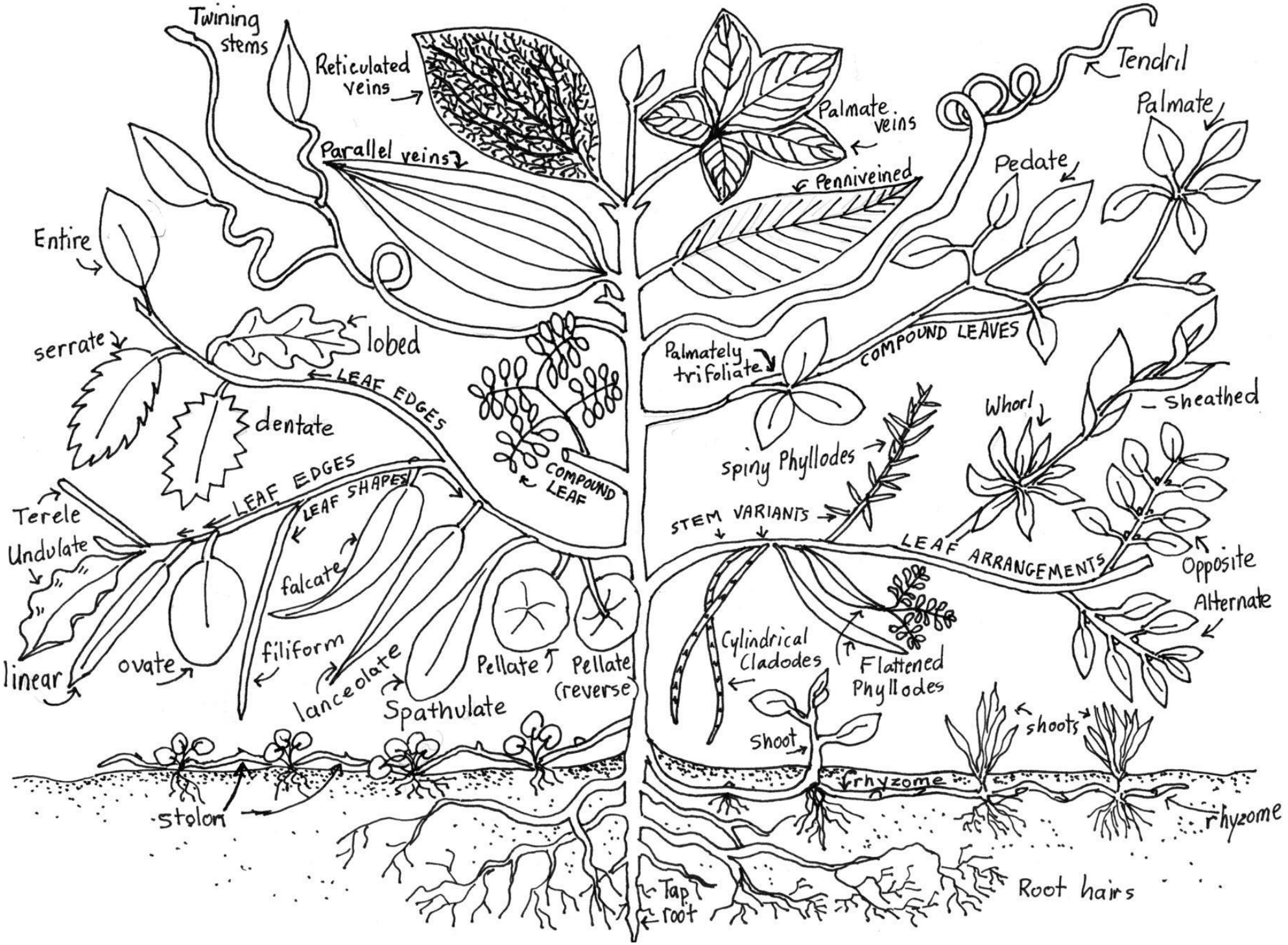
Available for free loan from the Information Centre and Shop at the garden entrance.

6.3 To copy for the classroom (following pages)

- Leaf Shapes
- Leaf Shapes Plant

Some leaf shapes




Twining stems
Reticulated veins
Parallel veins
Palmate veins
Penniveined
Tendril
Palmate
Pedate
Entire
serrate
lobed
LEAF EDGES
dentate
COMPOUND LEAF
Palmately trifoliate
COMPOUND LEAVES
Whorl
sheathed
spiny Phyllodes
STEM VARIANTS
LEAF ARRANGEMENTS
Opposite
Alternate
Terele
Undulate
LEAF EDGES
LEAF SHAPES
falcate
linear
ovate
filiform
lanceolate
Spathulate
Pellate
Pellate (reverse
Cylindrical Cladodes
Flattened Phyllodes
shoots
shoot
rhyzome
stolon
rhyzome
Tap root
Root hairs

7. PHOTO SET WITH NOTES FOR GUIDES

‘PLANTS WITH STRANGE NAMES’

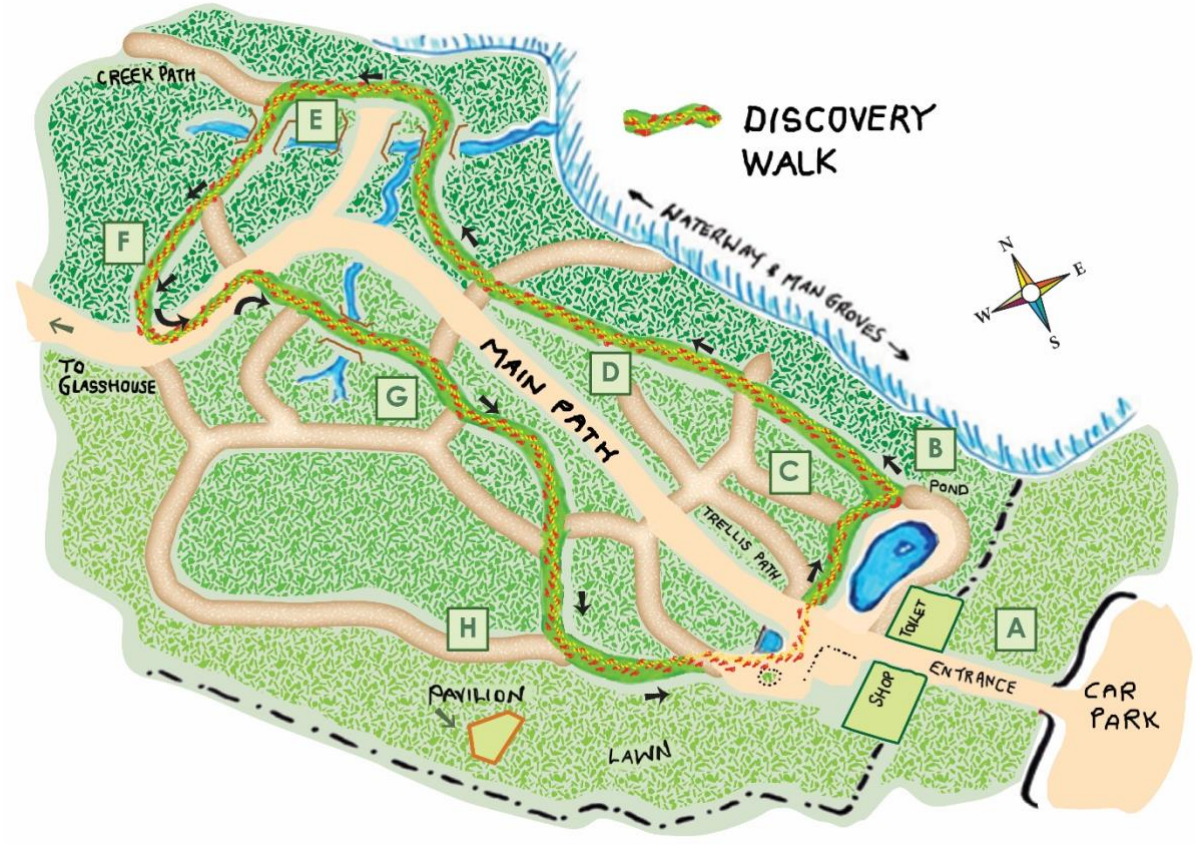
FOR THE DISCOVERY WALK CIRCUIT AT THE BOTANIC GARDEN

The following notes for teachers and guides describe the plants in the order they are found on the “Plants with Strange Names” Discovery Walk circuit at the Botanic Garden (Activity 4.2)

Laminated copies of this photo set with guide notes are available for loan at the Botanic Garden

The map below shows the route of the 150 metre Discovery Walk circuit which follows a network of narrow paths around the front area of the Botanic Garden. The capital letters ‘A’ to ‘H’ mark the location of the plants in the photo set.

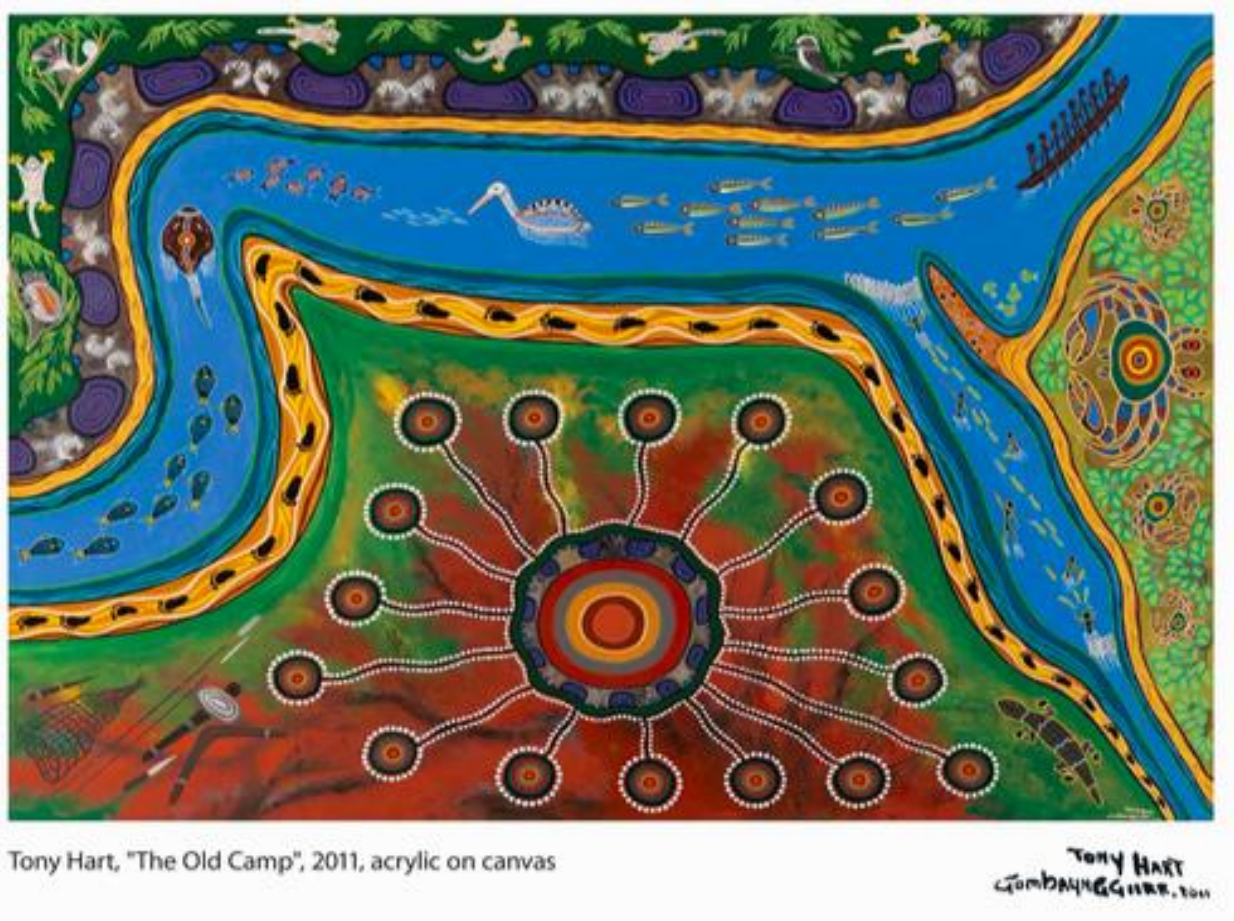
7.1 MAP OF DISCOVERY WALK CIRCUIT: ‘PLANTS WITH STRANGE NAMES’



7.2 Acknowledging the Traditional Custodians: the Gumbaynggirr

Commence the walk with an acknowledgement of the Traditional Custodians

We acknowledge that Gumbaynggirr families
lived together on this land for thousands of generations
and were known as "the sharing people" because they shared so much.
We thank the thousands of generations of Gumbaynggirr custodians
who cared for this country to keep it healthy and full of life.
We pay our respect to the Gumbaynggirr Elders living today
and acknowledge their continuing relationship to,
and care of the country, waterways, sea and sky.



A painting of the area along Coffs Creek and around the botanic garden
By Gumbaynggirr artist Tony Hart

Plant 1. LOCATION: A on circuit map. By the path from the carpark to entrance gate.

Broad-leaved Geebung

Persoonia stradbrokensis

NOTES:
The name 'Geebung" is derived from a Dharug or Aboriginal name for the succulent grape like fruit of the plant, a traditional source of food for Indigenous people across most of Australia.

'Persoonia' is named after a South African botanist Christiaan Persoon. 'Stradbrokensis' is after Stradbroke Island in Queensland where it was first described by botanist Karel Domin in 1921.

The flower of this Geebung inspired our botanic garden logo.

The very small flower starts out looking like a mini banana. The tepals (sepals and petals) then peel back around the central carpel, the female flower part, to make the chalice like appearance.

The Geebung flowers from December to June. The leaves of this species are broad. There is also a narrow leaved Geebung with similar flowers found growing by the main path opposite the Glasshouse.

https://anbg.gov.au/apu/plants/persooni.html
https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Persoonia~stradbrokensis

Follow the path between the entrance building and the pond. The Lilly Pilly is on the right (or creek) side with a plant label. The Plum Pine is 10 metres further on at the path junction.

Plant 2 LOCATION: B on circuit map. By the path on the other side of the front pond.

Small-leaved Lilly Pilly

Also known as Riberry

Syzygium leuhmannii

NOTES

The origin of 'Lilly Pilly', sometimes spelt as 'Lilli Pilli', is unknown. It came into use by early settlers in the Sydney region to refer to the edible fruits.
The new leaves of the Lilly Pilly are often pink-red in colour and change to green as they mature.

The name 'syzygium' comes from the Greek word for 'joined together', referring to paired leaves on a Jamaican species. The name 'leuhmannii' is after the German botanist Johann Leuhmann.

https://anpsa.org.au/APOL15/sep99-6.html#:~:text=The%20origin%20of%20the%20name,now%20known%20as%20Acmena%20smithii.

https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Syzygium~luehmannii
https://anfab.org.au/main.asp?_=Riberry

Plant 3 LOCATION: B on the circuit map. By the path on the other side of the front pond.

Plum Pine

Podocarpus elatus

NOTES

The dark fruit of this plant resembles small plums.

'Podocarpus' comes from the Greek words for foot 'podi' and fruit 'karpos' which refers to its fleshy fruit stems.

Podocarps descend from an ancient line of trees, related to ancient pine trees, going back nearly 250 million years to the Triassic era. Dinosaur food. Small male and female pine cones are found on separate trees.

https://www.anbg.gov.au/gardens/visiting/exploring/walks/conifers/podocarpus-elatus.html
https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Podocarpus~elatus

The tall Bangalow Palms which are common in the garden, and the shorter Wedge Leaflet Fan Palm can be seen nearby each other. Compare the leaf fronds: feather shaped and fan shaped.

Plant 4 LOCATION: C on the circuit map. By the narrow path north of the front pond.

Bangalow Palm

Also known as Piccabeen
Archontophoenix cunninghamiana

Feather shaped fronds. The base of the leaf fronds were used to carry water and the names Bangalow and Piccabeen are likely of Aboriginal origin for 'water carrier'.

'Archontos' comes from the Greek for 'ruler' which refers to the stately appearance, and 'phoenix' from a word for the date palm. Allan Cunningham was a British botanist.

https://www.anbg.gov.au/gnp/interns-2015/archontophoenix-cunninghamiana.html

Plant 5 LOCATION: C on the circuit map. By the narrow path north of the front pond.

Wedge Leaflet Fan Palm

Also known as Queensland Fan Palm
Licuala ramsayii

Fan palms have fan shaped fronds. The Cabbage Tree Palm (*Livistonia australis*) also has fan shaped fronds and can be found throughout the garden.

'Licuala' comes from the local name for the plant in the Maluku Islands of Indonesia, "leko wala'.

https://www.bushheritage.org.au/species/fan-palms

Plant 6 LOCATION: D on the circuit map. By the path from the front pond to the picnic area.

Giant Pepper Vine

Piper hederaceum (previously novae-hollandiae)

'Giant' reflects the tall growth. The seeds inside the red berries can be ground to make a substitute for pepper. Birds love to eat the red fruit. (Commercial pepper comes from *Piper nigrum,* a plant native to India.)

'Piper' is from ancient Greek for 'pepper' and "hedera' is a Latin name for ivy and likely from the Greek 'hedra' meaning to sit - referring to the grasp of the vine.

COMPARE THE LEAVES ON DIFFERENT PARTS OF THE VINE
The younger fruit bearing vine branches have smaller narrower leaves. The older larger leaves are heart shaped or palmate.

https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=in&name=Piper~hederaceum

https://www.lfwseq.org.au/peckish-pigeons-pick-pile-piper-peppers-pepper-vine-important-food-source/

Plant 7 LOCATION: D on the circuit map. By the path from the front pond to the picnic area.

Powder Puff

Calliandra haematocephela

NOTES
Powder Puff describes the flower! This tree comes from Bolivia in South America.

'Calliandra' from the Greek work 'kalli' meaning beautiful and 'andros' for male, referring to the many filaments or male parts of the flower. "Haema' refers to the blood red colour.

https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=280300

These ferns grow together near the picnic area and allow comparison of the types of fronds.

Plant 8 LOCATION: E on the circuit map. By the path opposite the grass picnic area.

Soft Tree Fern

Dicksonia antarctica

NOTES
The 'soft' in the name is a reference to the soft red-brown hairy trunk. Look under the leaves to see if there are any spore houses or 'sori'

'Dicksonia' is after the botanist James Dickson. 'Antarctica' is derived from the Latin and means 'southern'.

https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Dicksonia~antarctica

Plant 9 LOCATION: E on the circuit map. By the path opposite the grass picnic area.

Giant Fern

Angiopteris evecta

NOTES
The Giant Fern has some of the longest fronds of any fern in Australia – up to 7 metres long.
Angio is from a Greek word referring to the spores as 'winged vessels' and 'pteris' is fern. 'Evecta' is from the Greek for 'lifted up'.
https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Angiopteris~evecta

Plant 10 LOCATION: E on the circuit map. By the path opposite the grass picnic area.

Birds Nest Fern

Asplenium australasicum

Notes
Resembles large birds 'nests' and as epiphytes, they often attach high up on trunks. The broad leaves channel falling leaves to the centre to break down as food.
Asplenium is from Greek for 'spleen" referring to old erroneous beliefs that eating these plants, also called spleenworts, could cure disorders of the spleen.
https://anpsa.org.au/plant_profiles/asplenium-australasicum/

Follow the narrow path over a small wooden bridge from the picnic area and veer right to the Swamp Orchids sign by the Main Path.

Plant 11 LOCATION: F on the circuit map. By the path from the picnic area and the Main Path.

Cunjevoi Lily

Also known as **'Elephant's Ear'** and 'Spoon Lily'
Alocasia brisbanensis

NOTES
'Cunjevoi' derives from the Bandjalung language in northern NSW. The plant is also known as 'dawguway' by the Gumbaynggirr.

https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Alocasia~brisbanensis

Plant 12 LOCATION: F on the circuit map. By the path from the picnic area and the Main Path.

Broad leaved Paperbark

Melaleuca quinquenervia

Notes
Paperbark is from the type of bark. There are broad and narrow leaved species of the paperbark tree.

'Melaleuca' derives from the Greek 'melas' for black, and 'leukos' for white referring to black marks on the whitish trunks after fire. 'Quin' is Latin for 5 and 'nervus' for nerves referring to the 5 parallel veins in the leaf.
https://anpsa.org.au/plant_profiles/melaleuca-quinquenervia/

Plant 13 LOCATION: F on the circuit map. By the path from the picnic area and the Main Path.

Swamp Orchid

Phaius australis

NOTES
Swamp orchids are often found in damp soils nearby to swampy areas, as they are here in the Botanic Garden.

'Phaius' is from a Greek word for 'dusky' referring to the flower colour. See the sign board here for photos.

https://anpsa.org.au/plant_profiles/phaius-australis/

Cross over the Main Path and take the narrow path over a wood bridge toward the pavilion.

Plant 14 LOCATION: G on the circuit map. On the narrow path toward the front pavilion.

Broad Leaved Palm Lily

Cordyline petiolaris

NOTES
These plants are NOT in the Palm family but have long strap like leaves resembling some palms.
Compare the broader leaves to the Narrow Leaved Palm Lily nearby.

"Cordyline" is from the Greek for a 'swelling' on the stem to give a club like appearance.
https://anpsa.org.au/plant_profiles/cordyline-petiolaris/

Plant 15 LOCATION: G on the circuit map. On the narrow path toward the front pavilion.

Narrow Leaved Palm Lily

Also known as Slender Palm Lily
Cordyline stricta

NOTES
Compare the narrow strap like leaves to the broad leaf Palm Lily. "Stricta" is from a Latin word for 'straight' or 'rigid" referring to the long upright stems.
https://www.anbg.gov.au/gnp/interns-2012/cordyline-stricta.html

Plant 16 LOCATION: G on the circuit map. On the narrow path toward the front pavilion.

Walking Stick Palm

Linospadix monostachya

Notes
This plant IS in the Palm family. The swollen base of these straight stem palms makes a useful handle for a walking stick.
'Linospadix' is from the Greek 'linos' for 'rope' and 'spadix' to draw.

https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Linospadix~monostachyos

Plant 17 LOCATION: G on the circuit map. On the narrow path toward the front pavilion. Nearby the Palm Lillies and under the Giant Fern.

Bat plant

Also known as Cat's Whiskers

Tacca integrifolia (white flower variety)
Tacca chantrieri (black flower variety)

Both species are planted in the garden. Also found near the front pond and in the Glasshouse.

NOTES
The name 'Bat Flower' comes from the bat wing like bracts of the very large flowers.

The name 'Tacca' comes from the Indonesian name of this plant 'taka'.

This unusual genus of plants comes from the rainforests of South East Asia (from Bangladesh to southern China, Laos, Thailand and Indonesia). It is a member of the yam family (Diocoreaceae). There are also two species of Tacca found naturally in northern Australia.

FOCUS ON: The large glossy leaves help the plant to get enough light under a dark rainforest canopy.

The bat like flowers come in a range of colours from deep purple (or blackish) to brown, green and white. Under the flower are long whisker-like filaments called bracteoles. There are different theories about the reasons for the unusual flower and the long 'whiskers' but no-one is really sure. The whiskers may attract insects like midges and also allow ants to walk up to the flower from the forest floor. But insects are not needed for the pollination of this plant so the flower shape is still a mystery!

Link to Botanic Garden in Laos:
https://www.pha-tad-ke.com/the-black-bat-flower/

Background to the Tacca genus and Australian species:
https://www.mq.edu.au/__data/assets/pdf_file/0007/1301695/Plant-of-the-week-Black-Bat-Plant-Tacca-chantrieri-1a.pdf

Continue walking along the narrow path veering right to reach the front lawn and pavilion.

Plant 18 LOCATION: H on the circuit map. Next to the pavilion on the front lawn.

Scribbly Gum

*Eucalyptus racemosa (*formerly *signata)*

The 'scribbles' on the trunk are created by the larvae of a tiny moth under the thin bark before the bark sheds each year to reveal the meandering feeding trackways.

'Eucalyptus' comes from the Greek 'eu' meaning "well" and 'kalyptus' meaning cover – referring to the little cap on the flower which falls off to reveal the filaments or stamens of the flower.

https://resources.austplants.com.au/plant/eucalyptus-signata/

Plant 19 LOCATION: H on the circuit map. On the lawn just behind the front pavilion.

Smooth barked Apple

Also known as Sydney Red Gum
Angophora costata

Has no relation to an apple! The 'apple' name appears to come from early settlers noticing its bright green new leaves. It is closely related to gum trees (*Eucalyptus* genus) and has a flower and seed capsule like a gum tree. The 'smooth bark' refers to the thin bark which sheds every year to often reveal a dimpled smooth trunk.

'Angophora' is from Greek for 'vessel' or 'vase', and 'costata' from the Latin 'with ribs' referring to the ribbed vase-like seed capsule.

https://resources.austplants.com.au/plant/angophora-costata/

Plant 20 LOCATION: H on the circuit map. In front of the garage behind the pavilion – 3 trees.

Lemon Myrtle

Also known as Ironwood
Backhousia citriodora

Smell a crushed leaf. 'Citriodora' is from the Latin 'citrea' for lemon, and 'odora' for 'smell' or 'scent.
The tree is in the Myrtle or Myrtacaea family. Backhousia is from the name of the botanist James Backhouse.
https://www.anbg.gov.au/gnp/gnp14/backhousia-citriodora.html
https://tuckerbush.com.au/lemon-myrtle-backhousia-citriodora/