Identify plant specimens

AHCPCM303A

Overview

By the end of this topic, you should be able to:

- Observe the plant specimen
- Inspect plant morphological features
- Determine status of health
- Identify the specimen
- Report on the process results

Observing plant specimens

- Through your horticultural practice, you will be required to work with a range of plants, from native plants to large non-native trees

- As part of your job, you will be required to recognise plants for clients and/or organisations
  - As a goal, plants common to the region should be able to be named (common and botanical names) from their overall features
  - Nevertheless, you may be required to investigate some specimens further after recording your observations of their features

Naming plants

- The rules or system of naming plants in known as nomenclature
  - A number of plants may have the same common name, however each plant has a unique scientific name
- The scientific name of a plant consists of the following parts:

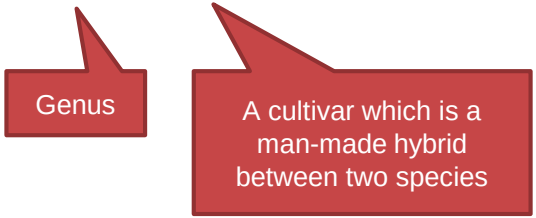
FAMILY NAME	*Genus name*	*species name*
Family name is written in capital letters. The modern FAMILY NAME always ends in ACEAE	Genus: A group of related plants. Latin word written in italics, starts with capital letter.	Species: One kind of plant within the genus Latin word written in lower case and italics.

Naming plants

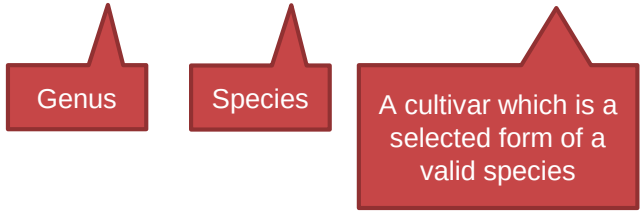
- Names for cultivars (= cultivated varieties) are added after a valid scientific name at the genus or species level
  - The cultivar is not Latinised is put in single quotes and is not italicised

- Some examples:

***Grevillea* 'Robyn Gordon'**



***Grevillea rosmarinifolia* 'Rosy Posy'**



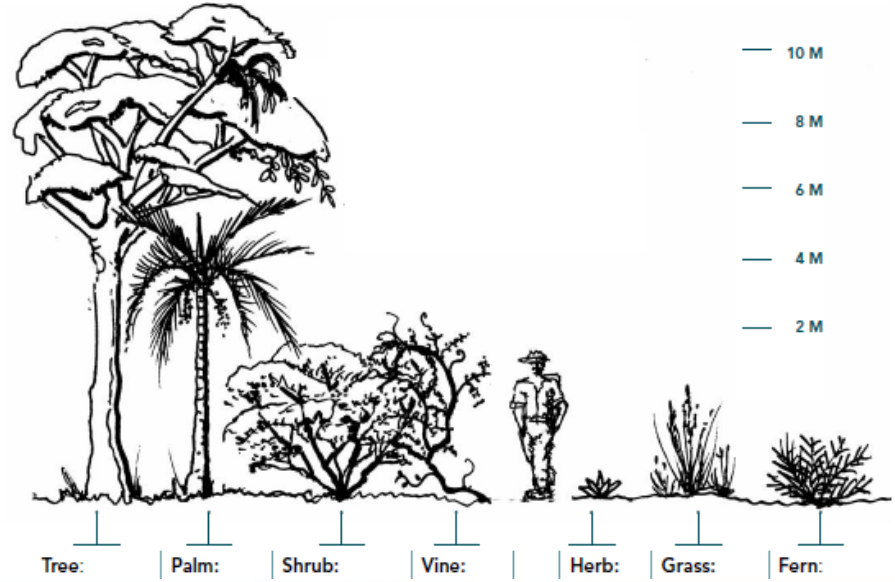
Collecting plant information

- If you are unable to identify a plant from memory, you should collect the following details on a plant information sheet to be able to identify/name it:
  - Height
  - Growth habit/form (including stem type)
  - Leaf type (i.e. simple or compound)
  - Flower details
  - Fruit
  - Colours and textures (e.g. bark)

Supportive photographs help with identification –
to compare with other plants or when collating information for a plant database

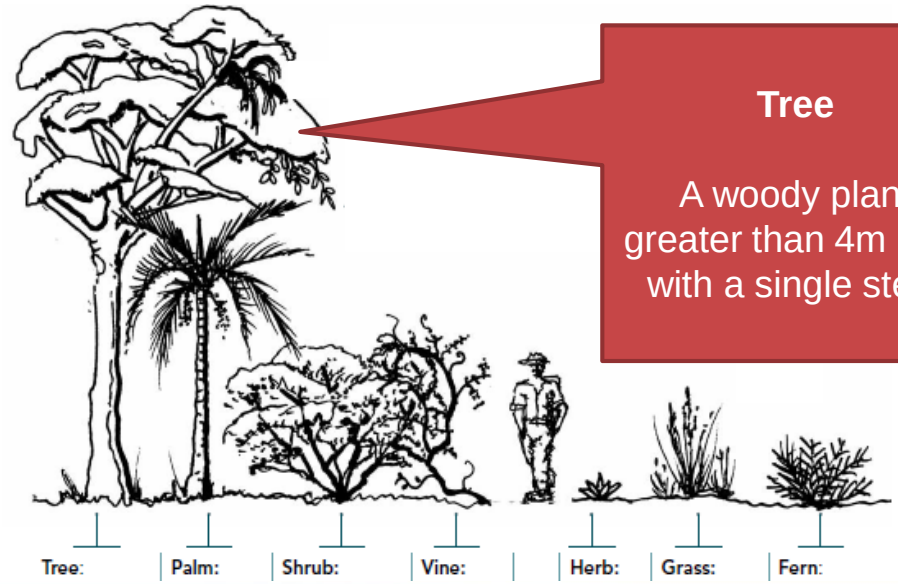
Plant height

- Height can help distinguish various plant types



Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

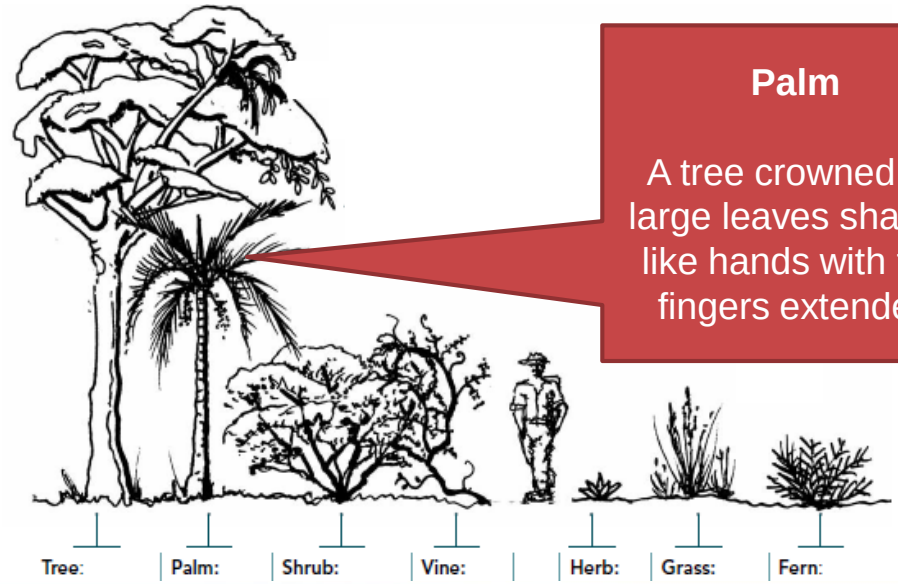


Tree

A woody plant greater than 4m high with a single stem

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

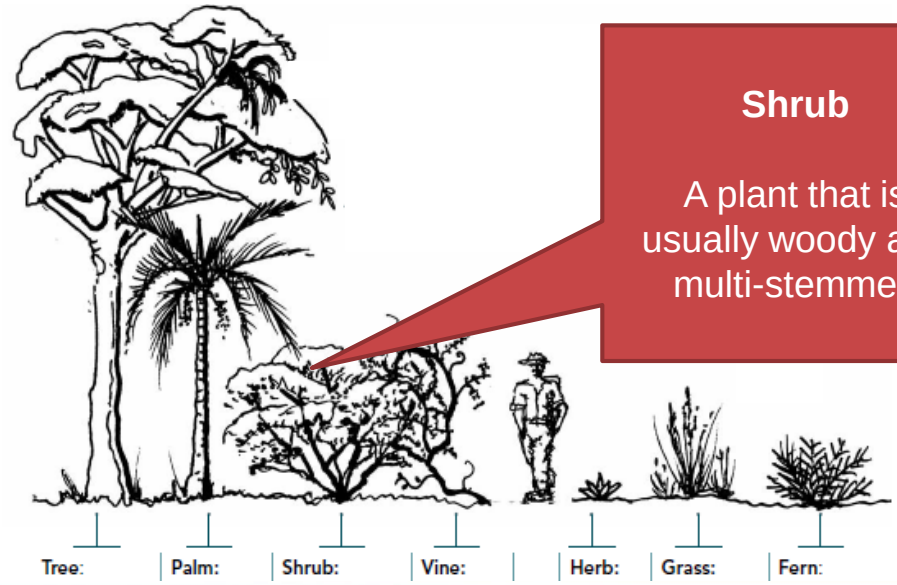


Palm

A tree crowned by large leaves shaped like hands with the fingers extended

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

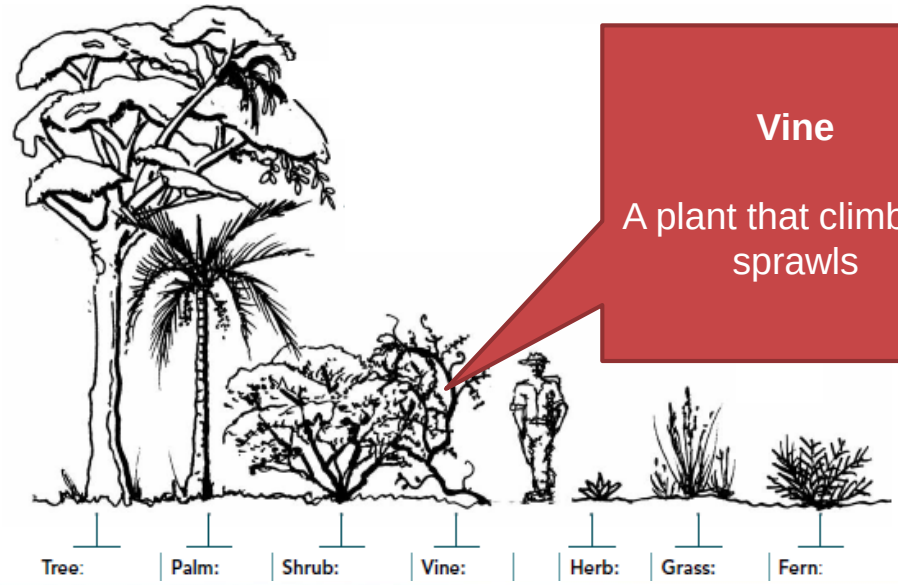


Shrub

A plant that is usually woody and multi-stemmed

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

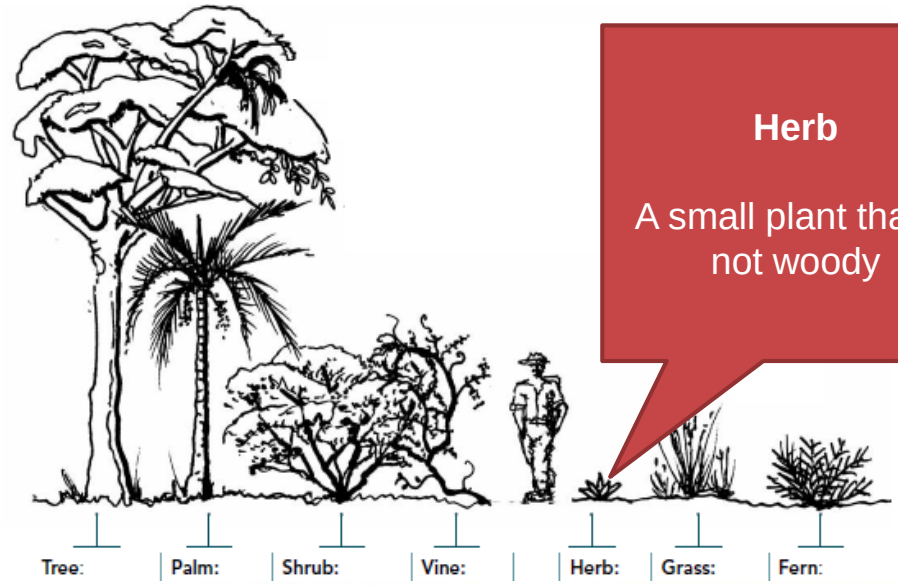


Vine

A plant that climbs or sprawls

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

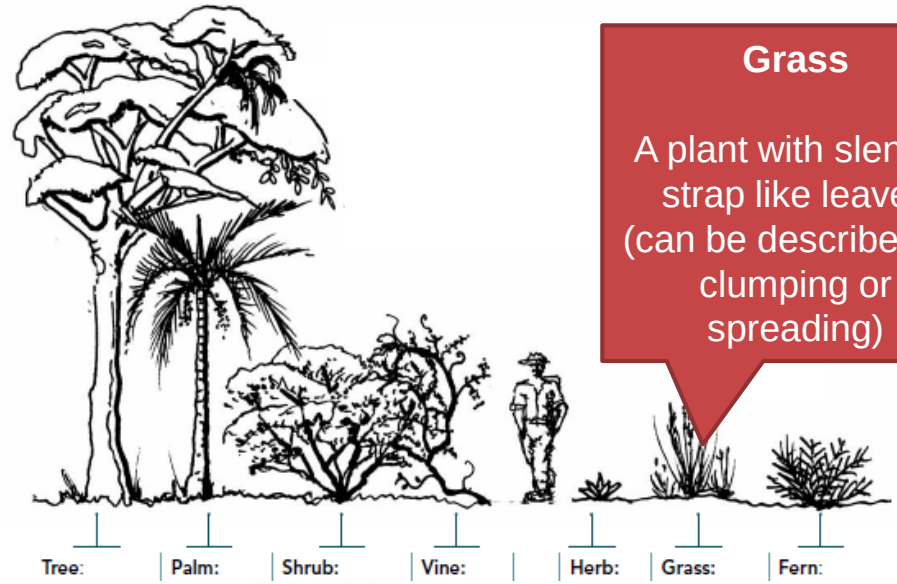


Herb

A small plant that is not woody

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form

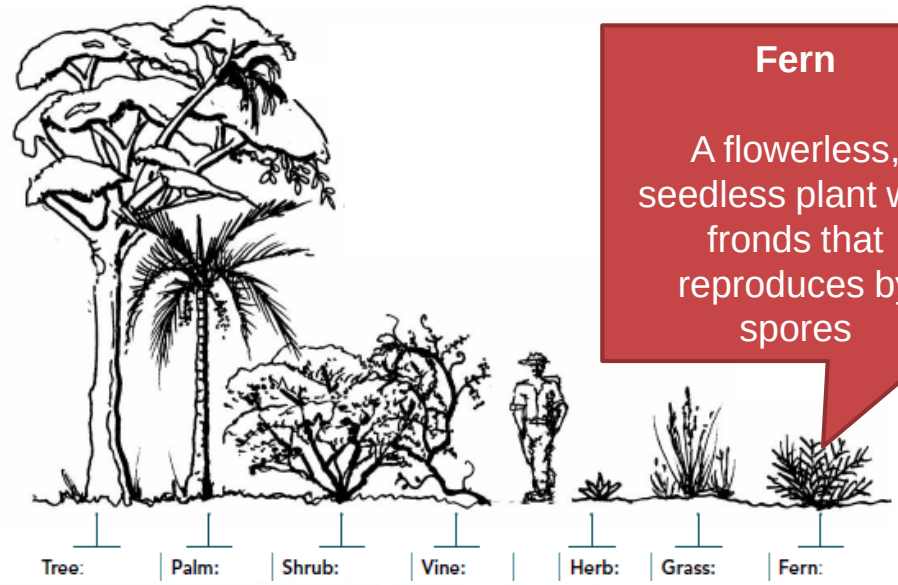


Grass

A plant with slender strap like leaves (can be described as clumping or spreading)

Source: Aboriginal Landcare Education Program: Recognise Plants

Growth habit/form



Fern

A flowerless, seedless plant with fronds that reproduces by spores

Source: Aboriginal Landcare Education Program: Recognise Plants

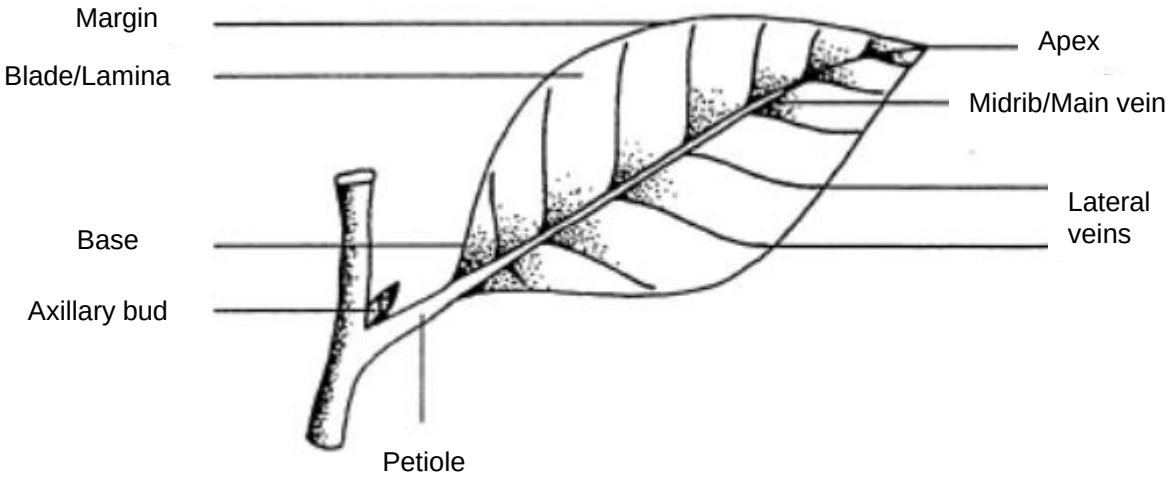
Growth habit/form

- There are a range of plant habits/forms (i.e. shapes), including:

Columnar	Fastigiate	Narrow dome	Upright, cane-like	Vase	Weeping or pendulous
					

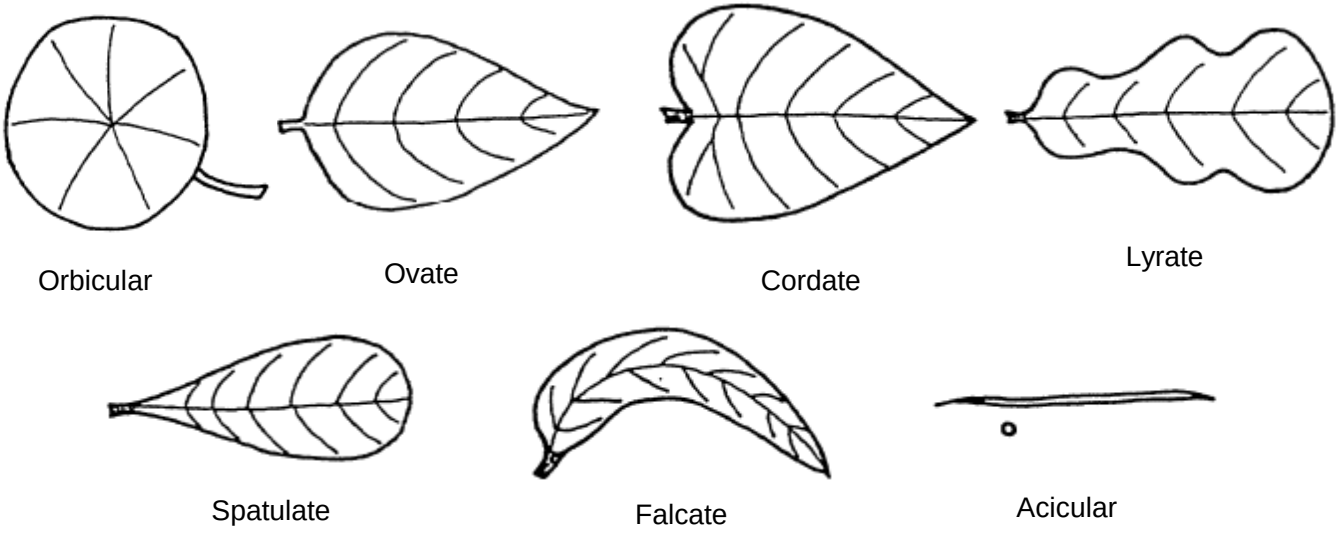
Simple leaf

- The parts of a simple leaf are shown below:



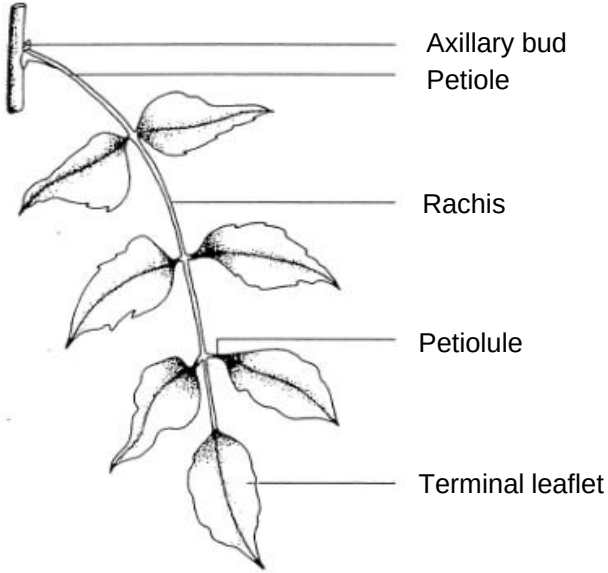
Simple leaf shapes

- There are a range of simple leaf shapes, including:



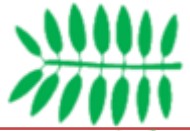
Compound leaf

- The parts of a compound leaf are shown below:



Compound leaf types

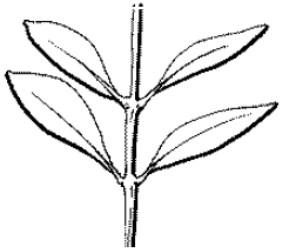
- There are a range of compound leaf types, including:

Type	Description	Image
Palmate	Leaves with several leaflets emanating from one point.	
Pinnate	A compound leaf which has a row of leaflets on each side of the rachis.	
Bipinnate	Pinnately compound leaves in which the leaflets are themselves pinnately compound. Also called “twice-pinnate”.	
Trifoliolate	Leaves with three leaflets.	

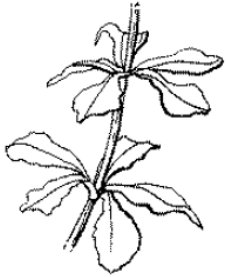
Leaf arrangement

- Leaves of all types can be arranged in various ways.

alternate



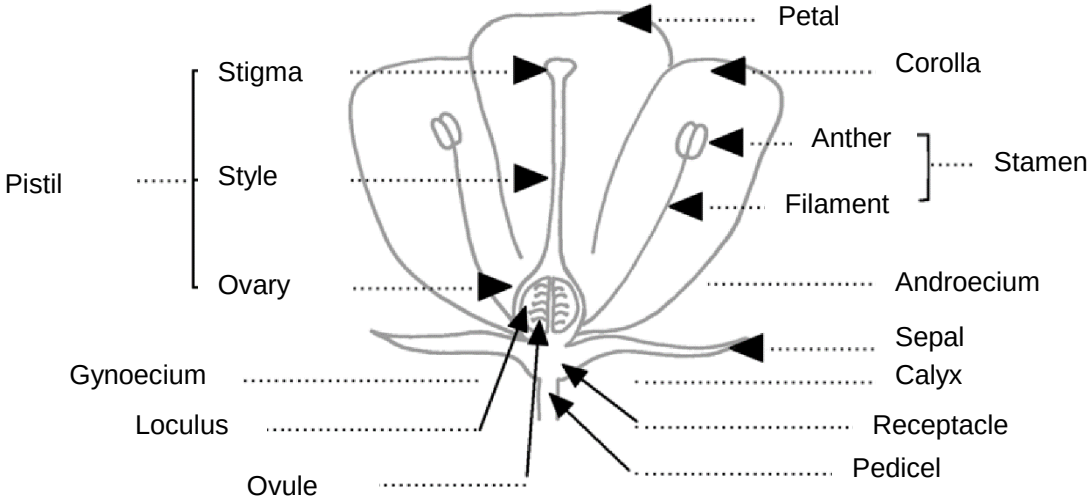
opposite



whorled

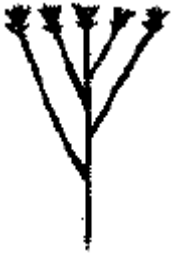
radical

- The parts of a flower are shown below:



Flowers

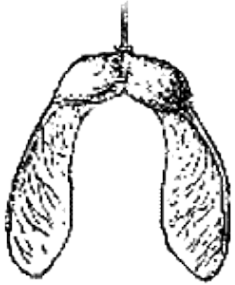
- Flowers can be arranged in a variety of different ways:

Solitary	Umbel	Raceme	Spike	Corymb	Panicle
					

Source: Aboriginal Landcare Education Program: Recognise Plants

Fruit

- The fruit of a plant is part of the mechanism by which the plant reproduces itself. The fruit contains seeds.
- There are a variety of plant fruits, including those shown below
  - Within each of these categories are further sub-categories of plant fruit

Cone	Winged	Acorn	Pod
			

Source: Ohio Public Library Information Network: http://www.oplin.org/tree/fruit/byfruit.html

Fruit

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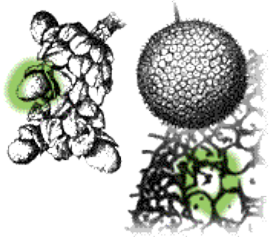
Tightly packed seeds	Nut enclosed by a husk	Clustered fruit in small capsules	Without husks or capsules
			

Source: Ohio Public Library Information Network: http://www.oplin.org/tree/fruit/byfruit.html

Flowering plant types

- Flowering plants are separated into two groups:

	Monocot	Dicot
Seed	Have only one seed leaf inside the seed coat	Have two seed leaves inside the seed coat
Germination and leaves	Produces a single leaf, which looks long and narrow, like the adult leaf	Produces two seed leaves which come in different shapes and sizes
Root pattern	Fibrous roots	Tap-root system
Flower	The parts are in threes	The parts are usually in fours or fives

Bark

- Barks of trees vary enormously. Some of the more common types include:

	Corky bark	The trunk has deeply furrowed bark with thick corky cells, these cork cells tend to have thin-walls and are filled with air
	Cracked bark	As a trunk increases in size, great tension on the bark can cause vertical and/or horizontal cracking
	Fibrous bark	Stringy types of bark made from closely held fibres

Source: Aboriginal Landcare Education Program: Recognise Plants

Bark

- Barks of trees vary enormously. Some of the more common types include:

	Fissured bark	The trunk has a net-like pattern from splitting of the outer and inner bark
	Flaky bark	Pieces of bark crack and come away from the surface
	Peeling bark	The bark on the trunk separates like thin wrappers, peeling from where a layer breaks.

Source: Aboriginal Landcare Education Program: Recognise Plants

Bark

- Barks of trees vary enormously. Some of the more common types include:

	Scaly bark	The trunk has small patches of bark that shed giving a scaly appearance
	Smooth bark	The trunk can be smooth and very glossy to dull, generally it has a very thin outer bark

Source: Aboriginal Landcare Education Program: Recognise Plants

Bark

- Eucalypts are often grouped by their bark type:

	Rough barks	Types include: stringybarks, bloodwoods, boxes, peppermints and ironbarks (e.g. *Eucalyptus phoenicea* Scarlet Gum)
	Smooth barks	Types include: scribbly gums and white gums (e.g. *Eucalyptus alba* White Gum)

Source: Aboriginal Landcare Education Program: Recognise Plants

Health status

- If you are unable to identify a plant specimen after observing its morphological features, you should determine its health status
  - Diseases, pests or deficiencies can be indicative of plant groups
- For example:
  - European house borer (*Hylotrupes bajulus*) is a destructive pest of seasoned coniferous timber including pine, fir and spruce
  - Black Sigatoka (*Mycosphaerella fijiensis*) is a fungal leaf spot that affects banana plants
- See this list of significant pests and diseases in Queensland and the plants they affect

Pests and diseases can carry over from one season to the next

Plant pests

- Examples of pests include:

African Black Beetles

Cowpea aphids

Cutworm

Fire ants

Fruit fly

Mealybugs

Rutherglen bug

Snails

Some pests are of such concern that you are legally required to report sightings to the Government

Plant pests

- The presence of pests can be seen in various ways:
  - Pests are visibly seen on plants (e.g. caterpillars)
  - Damage to plants
    - Curled or wilted leaves
    - Fruit have sting marks
    - Leaves are eaten
    - White covering on leaves and stems

Plant pests

- Insects interact with plants in varying ways.
- Observing the damage caused to a plant gives clues as the kind of pest that has caused the damage.

Pest	Use of mouth
Aphids, assassin bugs, mosquitos	Piercing and sucking
Dragonflies, grasshoppers, beetles	Chewing
Housefly	Sponging
Moths and butterflies	Siphoning

Plant diseases

- Diseases in plants can be caused by micro-organisms, such as:

Bacteria	Fungi	Viruses	Nematodes
Causing: • **Blights:** Chlorosis, browning and death of plant tissues (e.g. leaves, branches, twigs or flowers) • **Canker:** Appearance of dead tissue • **Galls:** Swollen masses of abnormal tissue • **Wilting:** Loss of rigidity of non-woody parts of plants • **Fruit rotting**	Causing: • **Canker:** Appearance of dead tissue • **Galls:** Swollen masses of abnormal tissue • **Ink spot:** Causes blackening of leaves and flower stems • **Mould/Mildew:** White powdery spots • **Rot:** Decay roots, stems, wood flowers, and fruit • **Rust:** Brown pustules on the underside of leaves with yellow speckling on the upper leaf • **Wilting:** Loss of rigidity of non-woody parts of plants	Causing: • **Canker:** Appearance of dead tissue • **Distortion:** Irregularly shaped lesions • **Scaling** • **Yellowing**	Causing: • **Visible nodules on plant roots** May transmit and acquire viruses by feeding on infected roots

Environmental data

- Gather data about the environment in which the plant lives to assist with its identification – such as:
  - Location
  - Distribution of the plant in the area
  - Environmental influences (e.g. aspect, climate, soil pH/moisture/drainage, weather)
  - Plant lifecycles

- Ways to establish such information include:
  - Speaking to locals – actively listen and question, as necessary
  - Additional research (e.g. observation, maps, scientific data)

Plant environments

- Plants can be recognised by their environments:

Environment	Description
Alpine	Mountain areas covered with snow. Plants are usually low growing.
Mallee	Areas of small multi-stemmed eucalypts.
Mulga	Low rainfall with hot summers.
Rocky outcrops	Areas of rock where plant roots have to search for moisture in the cracks.
Tropical	High rainfall and heavy vegetation.
Wetlands	Permanently or periodically under water.

- Plant lifecycles contribute to plant identification:

Classification	Description
Annual	Plants which grow, flower, seed and die in one year or part of a year.
Biennial	Plants which require 2 years to grow, flower, seed and die.
Deciduous	Trees and shrubs which are leafless during a portion of the year.
Evergreen	Plants that have leaves all year round.
Perennial	Plants which live more than 2 years.

Collating information

- Information and photographs of an unknown plant's morphological features, health status and environment should ideally be collated digitally in the form of a database
  - Electronic cataloguing allows for easy retrieval at a later stage, as the labelled information can be searched using the computer

- Example database categories:

Source: University of Connecticut: http://hort.uconn.edu/search.php

Collating information

- If collecting physical specimens, ensure you follow the steps below:
  1. Get approval
  2. Select equipment
  3. Collect specimen
  4. Press specimen
  5. Mount specimen
  6. Store specimen

When collecting plant samples, make sure you include leaves, flowers and fruits/seeds.

Try to get as much information about a plant as you can without harming it.

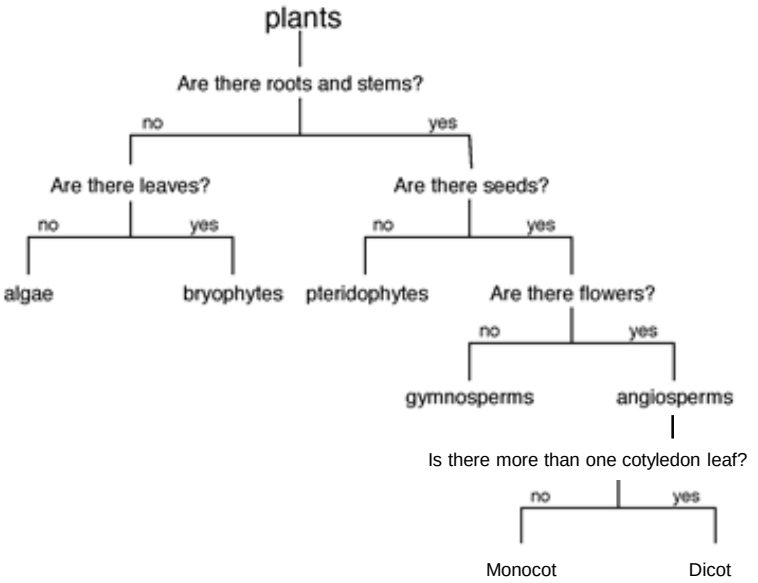
Any physical specimens can be documented using a digital camera (or illustrated) to support the collected information

Using collected information

- Information and photographs collected about the plant can be compared against the following references to establish the plant's identity:
  - Internet
    - A wealth of knowledge, but you need to use accurate descriptions
  - Field guides and picture books
    - Work well if you have well documented local flora, otherwise it can be very time consuming
  - Databases
    - A range of botanical databases can be accessed from the Australian National Botanical Gardens here
  - Taxonomic key
    - Useful tools guiding researchers towards the known name of an organism

Example taxonomic key

- A taxonomic key consists of a series of statements of the plants involved.
  - The statements are grouped and require a choice to be made.
  - This leads to another set of statements where another choice is made.
  - You proceed from one choice to another until you arrive at the answer.



Reporting results

- You are not required to go through ever stage of the plant identification process (i.e. morphological features, health status, environment) once you have identified the plant.

- Once you identify the unknown plant, you are required to document a report which outlines:
  - The identification process undertaken
  - Details of the data that was compiled (qualitative and quantitative)
    - Highlight key identifying features observed in the process
  - The identification of the unknown plant
    - Botanical name – to cultivar level where possible

Consider the backgrounds and abilities of your client when formulating the report

Seeking assistance

- Your ability to recognise plants will improve as you gain more experience.
  - However, there will be many occasions when you need to seek advice from your supervisor.

- You should seek help from your supervisor when:
  - You do recognise the plant at all
  - You do not have information to help you recognise the plant
  - You are unable to find all the information you need
  - You want to clarify something about the plant