An introduction to:

Identifying and Planting Native Trees

horizons
REGIONAL COUNCIL

The aims of this resource are to provide teachers with an:

- Introduction to how to identify native trees, and how to ID some common tree species;
- Learning about forest ecosystems and the role of each layer in the forest, and to;
- How to use this learning in planning for restoration tree planting;
- Examples of plant species for habitat planting at school/centre

Role of Trees in Our Ecosystem

Trees and plants are essential for life on Earth. Plants are living things which provide many necessary resources to support humans and animals:

- Food
- Shelter
- Habitat
- Oxygen
- Nutrients
- Medicines
- Building materials

Trees also protect soils, preventing erosion and loss of top soil. They filter water, keeping it clean. Trees are important regulators of our climate: storing carbon and reducing climate change.

Why look at trees?

- Identifying which native trees are present in your environment can tell you about the environmental conditions, which animals might live in the area, and any underlying issues that may be present.
- It will help you to understand what is happening there, and which habitat and foods are available for birds and insects.
- If you want to do some restoration planting, you'll know what plants are there and what's missing which will help support your plan of action.

***Note all activities discussed here are available as print ready resources in Appendix 1 the end of the resource.**

NATIVE FOREST TYPES IN THE HORIZONS REGION

In the Horizons region there are about 30 different types of forest. We describe these as either warm, mild, cool and cold forest types.

1. *Warm Forests*

Warm forest types grow where summer temperatures are typically more than 20 degrees, there is no frost, in low altitude areas. They can be in high or low rainfall areas.

Examples of warm forest types in our region are tōtara, mataī dominated forests in drier areas, and tawa, tītoki forests in wetter areas. Trees like titoki and kohekohe are common features of warm forests. Another common warm forest type in our region is swamp forest, which is dominated by trees like kahikatea and pukatea that can live in soils that are always wet.

In the Horizons region, warm forests grow on the Horowhenua, Manawatū and Whanganui coasts but the largest area of historically was the Manawatū Plains. Nowadays there is not much warm forest left in our region. All warm forest types are classed as Critically Endangered in our region.

2. *Mild Forests*

Mild forest grows at slightly higher altitude areas where there is typically good rainfall and average summer temperatures are a bit lower – between 15 and 18 degrees.

Mild forest types were (and still are) the most common type of forest in our region. They are found mainly in the Whanganui, Manawatū and Tararua hill country. For example, the whole of the Whanganui National Park is mild forest.

There are many different types of mild forests and they are very diverse forests. There are some that are dominated by tawa (e.g. most of the Whanganui region), some dominated by rimu (e.g. around National Park/Waimarino, Ohakune and Taumarunui), some dominated by kamahi (e.g. around the Central Plateau), and some dominated by beech trees. Many mild forest types were extensively cleared in our region, in places such as around the Manawatū and Tararua hill country, and are now classed as Critically Endangered.

3. *Cool Forests*

Cool forests are found around the foothills of the mountain ranges in the northern parts of our region, for example on the edges of the Tongariro National Park and the upper Rangitīkei River hill country.

Two types of cool forest are found only around the Taihape, Pukeokahu and Moawhango areas, where there is often extreme levels of frost and drought. They are dominated by podocarps (kahikatea, tōtara and mataī) with ribbonwood and kowhai trees. They also typically have many types of shrubs that have tiny leaves on interlocking branches (‘divaricating plants’). These forest types are very rare now and are classed as Critically Endangered.

Other types of cool forests around the Ruahine Range and Mt Ruapehu where the summer temperatures are quite cold but not frosty, are usually dominated by beech trees (red, silver and mountain beech). They have generally suffered less loss but are still not very common so are classed as Endangered or Vulnerable.

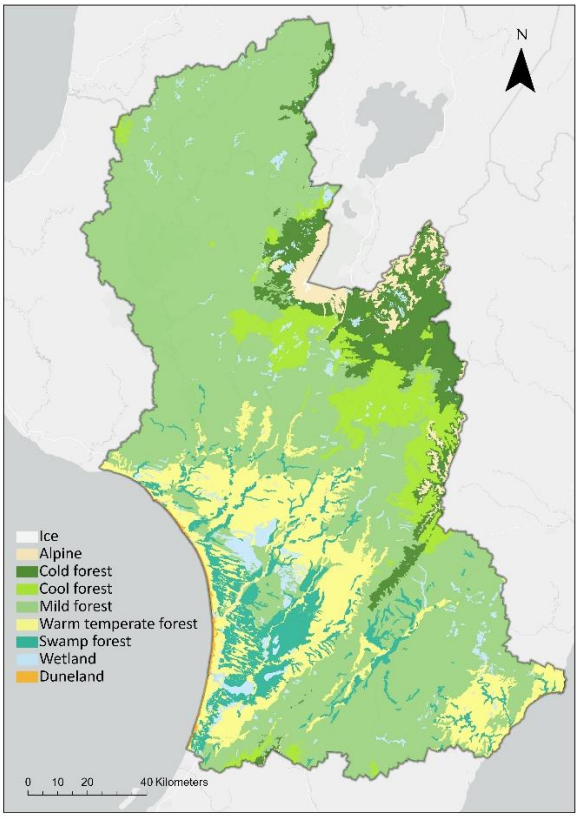
4. *Cold Forests*

Cold forest types occur in the mountainous areas of our region where it is very cold, even in summer. They occur around the 'treeline' and usually grade into subalpine scrub vegetation. They are dominated by trees that are adapted to cold conditions, like pahautea, mountain tōtara and mountain beech. Cold forests have not been affected by historical forest clearance but some are naturally rare so are classed as Endangered or Vulnerable.

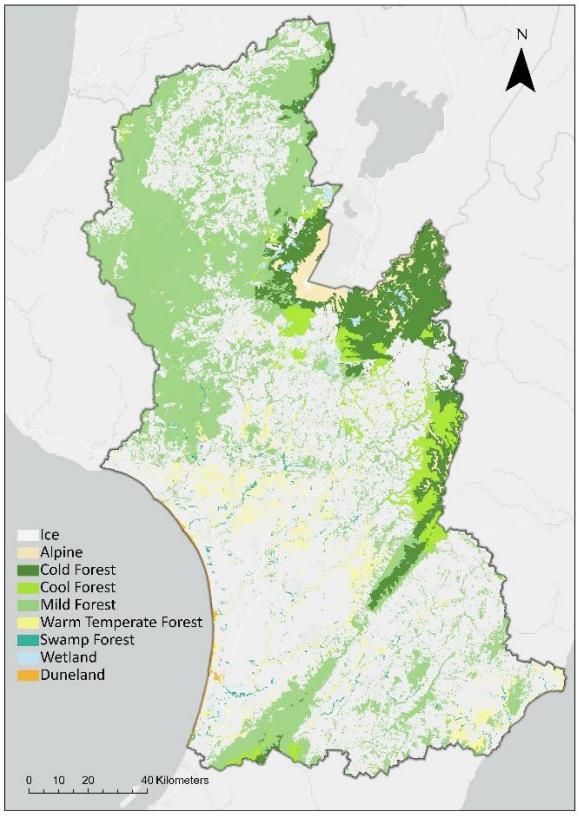
The main features that shape the types of forest we have and where they are, are temperature, soil type, rainfall and volcanic activity.

The maps below show what types of forest were historical found in the Horizons region, and what we see now.

(taken from Horizons Regional Council's the State of Environment Report 2025)



Past vegetation cover



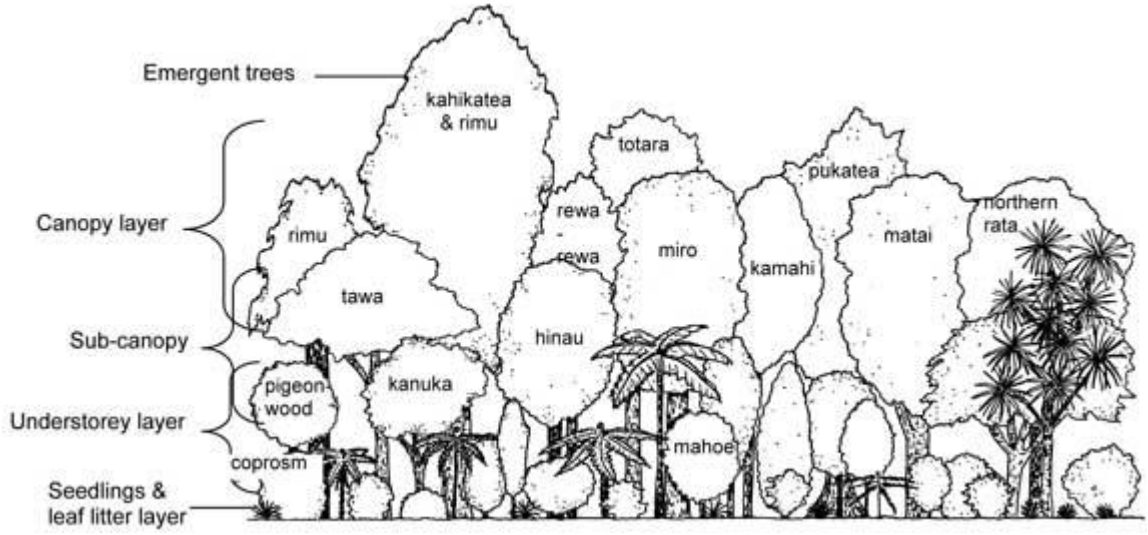
Current vegetation cover

THE FOREST ECOSYSTEM

When discussing the role of each forest layer (stratification), and what trees we might find in each, you can use the analogy of a house.

A forest is made up of many layers, each with their own role in the ecosystem. By using the house analogy, you can highlight themes of structure, community, and interconnectedness. Just as a house provides shelter and defined spaces, a forest offers a habitat with distinct zones and ecological roles for its inhabitants. Furthermore, both a forest and a house rely on interconnected systems for stability and function – the roots of trees mirroring foundations, and the relationships between trees mirroring the structure of a community.

Below is a typical NZ forest and examples of the types of trees you find in each layer.



Think of the structure of a forest like a house:

The <u>Forest Floor</u> (leaf litter layer) is the carpet/foundations

- Typically a damp place, where mosses, lichen, ferns and fungi thrive.
- Multitudes of animals live in this layer, including wētā, giant land snails and velvet worms.
- Many New Zealand birds, and the short-tailed bat, also spend a lot of time on the forest floor, hunting insects.

The <u>Understory layer</u> (or the undergrowth) is the furniture

- Consists of taller ferns, young trees and shrubs, such as kawakawa, mānuka
- In undisturbed native bush this layer is very thick with plants, making it hard to walk through easily.
- The plants in this layer are no taller than about 5 meters.

The <u>Sub-canopy layer</u> is the ceiling

- Trees living in this layer are adapted to lower light levels and damper conditions
- Typically made up of tree ferns, nīkau palms and small trees such as māhoe, kōwhai, makomako and horopito, and younger canopy trees.
- The plants in this layer normally grow to around 10 meters in height.

The Canopy is the roof

- Roof of the bush.
- The trees in this layer form a dense foliage that filters both rain and sunlight for the layers below, keeps forest at more even temps, softens rainfall, and reduces wind. Like a down jacket.
- They typically grow to around 20 meters tall. Trees in this layer include tawa, beech and cabbage trees / Tī Kōuka.

The Emergent trees are the chimney

- Trees in this layer grow even taller, often over 30 meters, and tower over the bush.
- Adapted to make the most of light and exposure, this is one aspect that allows them to grow that big.
- These trees are more spread out and do not form a canopy.
- Emergent trees include rimu, tōtara, kaihikatea and matai.

(If you want to know what the walls of our house are, these are the forest edges)

Ideas to Support Learning about the Forest Structure

Introduction and Brainstorming:

- Begin by asking students to brainstorm what a house needs to function (walls, roof, foundation, furniture, etc.).
- Then, introduce the idea of a forest as a complex ecosystem and ask them to think about what a forest needs to function (trees, soil, water, animals, etc.).
- Guide them to see the connections between the two. For example, a forest needs trees to provide a framework, just like a house needs walls and a roof.

Building the Analogy:

- Divide students into groups.
- Each group could be assigned a specific part of a house to represent (e.g., foundation, walls, roof, windows, doors, furniture).
- They then brainstorm how a corresponding part of the forest ecosystem would function in the same way.

For example:

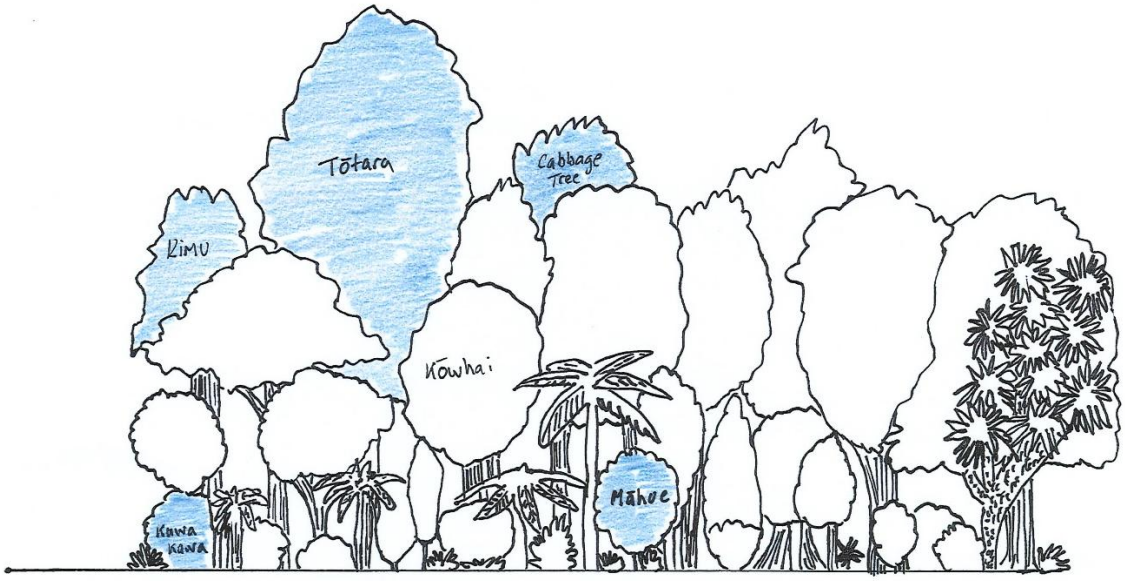
- Foundations: The forest floor (soil, roots) supports everything above, just like a house foundation.
- Walls & Roof: Trees provide the structure and shelter, similar to the walls and roof of a house.
- Windows: Openings in the canopy allow sunlight and air to enter, like windows in a house.
- Doors: Places where animals can enter and exit, like gaps in the forest or trails.
- Furniture: Understory plants and fallen logs provide habitats and resources for smaller animals.
- Electricity/Plumbing: The flow of water and nutrients through the forest ecosystem.

Creative Expression and Sharing:

- Students could create a visual representation of their analogy (drawing, collage, diorama).
- They could also write a short story or poem using the analogy.
- Groups can then present their work to the class, explaining their connections.

If have your own school bush area/or one you visit regularly, once your students have identified the trees in your space (see Tree Identification section), they can record what layers of the forest they are in.

You can use the blank forest structure diagram to either shade or write the names of the trees.



Example of shading and naming trees in your green space

Another option could be to use flagging tape and number each tree you would like your students to identify (you don't have to ID all trees/plants just a selection), and complete a simply table to show what they have, and which layer they are in

	Emergent trees	Canopy layer	Sub-canopy layer	Understory layer	Forest floor
Example				Kawakawa	
1					
2 …..					

Talk about the results

- What forest layers are missing in your bush?
- What types of plants could be missing?
- What actions do you want to take to improve the area?

TREE IDENTIFICATION

Basic tree identification involves leaf shape and arrangement of leaves on a stem. However, a simply tree bingo using pictures is a good starting point.

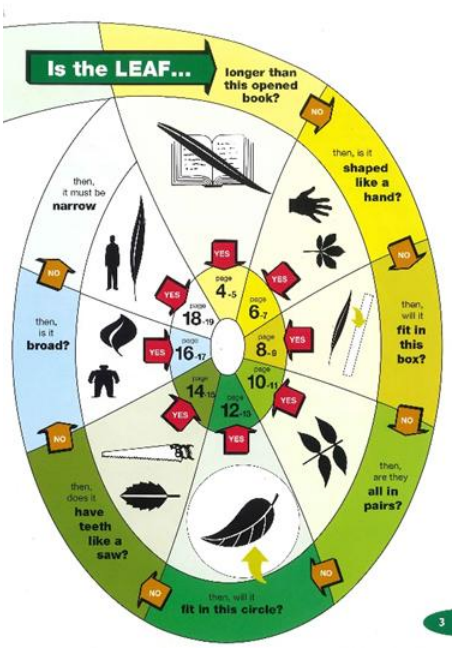
1) Tree Bingo – see Appendix 1 for tree species

You might need to contextualise this resource for your area as some plants might be missing, or you might want to add others. Option to include the additional task below.

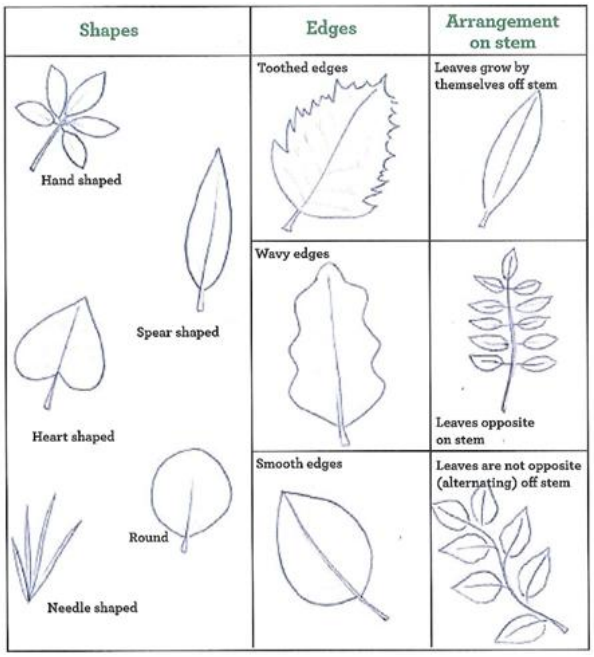
2) ID using leaf shape and arrangement of leaves on stem

To help start your students develop their basic skills in tree identification they need to know different leaf shapes, textures, whether their edges are toothed, and how the leaves are arranged on their stem.

Provide cuttings from different tree species and use copies of Andrew Crow *The Life Size Guide to Native Trees* book to identify different trees.



First page of Andrew Crowe's *The Life Size Guide to Native Trees* book



Shapes, edge and leaf arrangement on stems

Using *The Life Size Guide to Native Trees* to identify a plant sample

3) Extended activity – describing other features such as texture and colour

Drawing leaves will help your students to explore their leaves in more detail. You could ask them to draw each of their leaves and make additional notes on other features they have noticed such as:

- Texture – how does the leaf feel? Is it thin, thick or leathery?
- Is the leaf shiny or dull looking?
- Does it have fine hairs covering it?
- What colour is it? Does it have any strips or patterns?
- Is the leaf the same colour on both sides?
- Does it have a smell? (e.g., lemonwood leaves when crushed smell like lemons!)

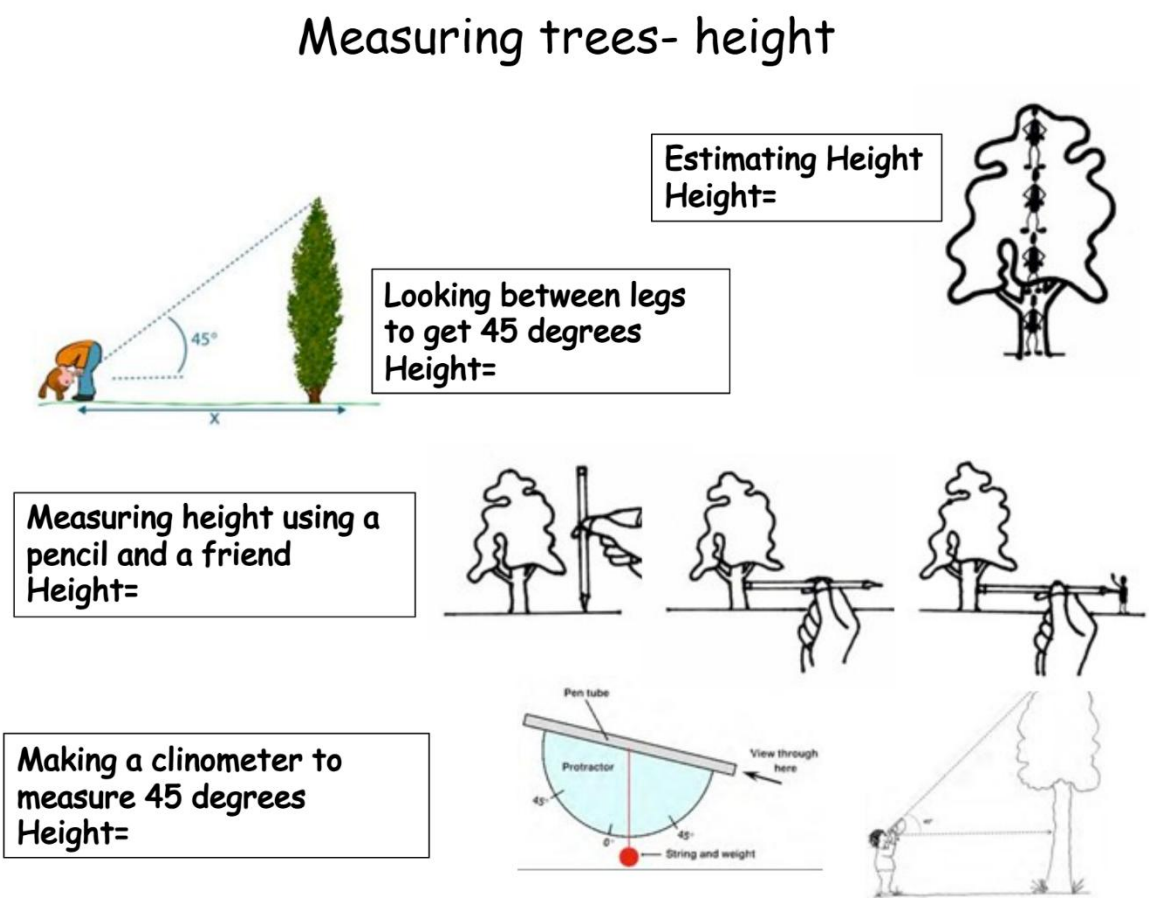
Notes:

a. Although we don't want to advocate regularly breaking stems off trees which seems destructive to the environment, tree ID requires students to be able to look closely at leaves. If you have enough smaller adult trees in your green space to do this, then you may not need to provide samples. However, many of our native trees are large and so leaves are out of reach. In this respect, it is ok to pick a few samples but only as many as you require. Assess your green space to see what works for you.

b. When picking samples ensure you try and pick adult foliage as the leaves of many of our native trees look different in adult and juvenile forms.

c. The number of leaf samples you will pick will depend on what is growing in your green space, how much time you have allocated to the activity and the age of your students. For younger students, stick to about five different trees.

HOW TO ESTIMATE A HEIGHT OF A TREE – THREE DIFFERENT WAYS



1. **Look between your legs**
   - Stand with your back to the tree, about as far as you estimate the tree height is from the tree.
   - Look backwards, through your legs. You are trying to just see the top of the tree.
   - You will need to move towards or away from the tree until you are just able to see the top of the tree.
   - The distance you are from the centre of the trunk is the tree's height.

2. **The "Pencil Trick" Method**

What you need:

- A pencil, stick, or ruler
- A friend
- A measuring tape or big steps to count

How it works:

1. Stand far enough from the tree so you can see the whole thing.
2. Hold the pencil up vertically, at arm's length.

3. Make sure the pencil tip lines up with the top of the tree. It's easiest to hold the pencil at the bottom.
4. Move towards or away from the tree until your thumb lines up with the ground level, while keeping the tip of the pencil on the top of the tree
5. Turn the pencil sideways so it lies flat in the air — the part between your thumb and the top is now horizontal.
6. Ask your friend to walk from the base of the tree out to where the end of your pencil is pointing.
7. Measure the distance your friend walked — that's about the **height of the tree!**

3. The Shadow Method

What you need:

- A sunny day
- A measuring tape or meter stick
- A friend

How it works:

1. Measure how tall YOU are (ask a partner to help).
2. Measure the length of your shadow on the ground.
3. Measure the length of the tree's shadow.
4. Use this simple rule:

If your shadow is **2 meters** and you're **1.5 meters tall**,
and the tree's shadow is **10 meters**,
then the tree is about:

1.5 ÷ 2 = 0.75
10 × 0.75 = 7.5 meters tall

You can help students plug in their numbers with a calculator or a worksheet.

Optional Extension: Build a Paper "Sight Tool" (Clinometer)

What you need:

- A protractor (or printed semicircle)
- A straw
- A string
- A paper clip or washer (as a weight)
- Tape

How to use:

1. Look through the straw at the top of the tree.
2. Let the string hang straight down and note the angle it shows.
3. Measure how far you are from the base of the tree.
4. (An adult or teacher can help calculate using this):

Height ≈ distance × tan(angle) + your eye level

MEASURING VOLUME OF WOOD IN A TREE

If you want to do more maths with trees, once you have measured the height of a tree you can also work out the volume of wood in a tree.

Why measure wood volume?

- *Tree structure and growth* - measuring trees helps students understand how trees grow, their internal structure, and the relationship between diameter, height, and volume.
- *Ecosystem Importance* - calculating tree volume can be a starting point for discussions about the role of trees in carbon sequestration, oxygen production, and overall ecosystem health.
- *Sustainability and Conservation* - understanding tree volume and its relation to resource use (e.g., paper production) can raise awareness about sustainable practices and forest conservation.

How to measure volume of wood

To measure tree volume, students will need to estimate tree diameter and height, and then use a formula to calculate volume.

You will also need to introduce them to special maths number called pi (π) which is valued at approx. 3.14. Pi is used for maths with circles.

To calculate

1. Measure the *circumference* of the tree at waist height with a tape measure. Write this down in metres.
2. The *radius* is half the *diameter*. To find the radius of the tree trunk, use a calculator to do the calculation, radius = circumference divided by 2 times π, so:

   $$\text{Radius} = \frac{\text{circumference of tree}}{2 \times 3.14}$$

3. Estimate the height of the tree using any of the methods highlighted above.
4. Find the volume of tree using the calculator, volume = height x π x radius x radius

Example:

Circumference of tree - 70cm = 0.7m

Height of tree – 4.5m

Radius = $\frac{0.7m}{2x\ 3.14}$ = 0.111

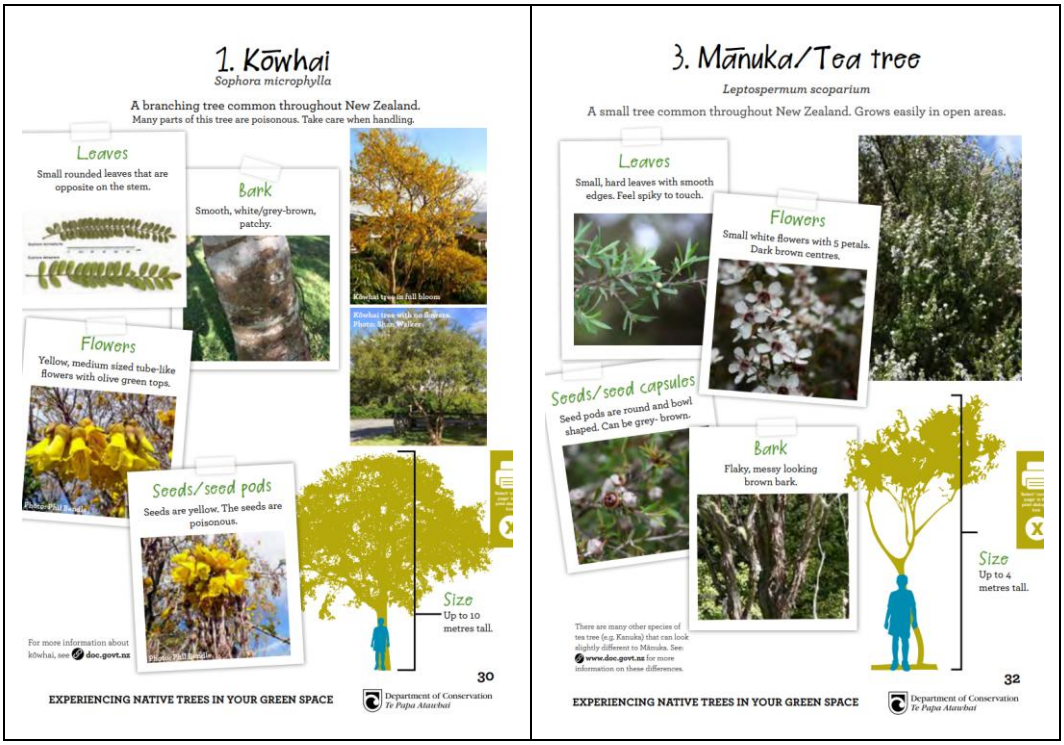
Volume = 4.5 x 3.14 x 0.111 x 0.111 = 0.174m^3 (cubic metres)

BARK, FRUITS AND BERRIES

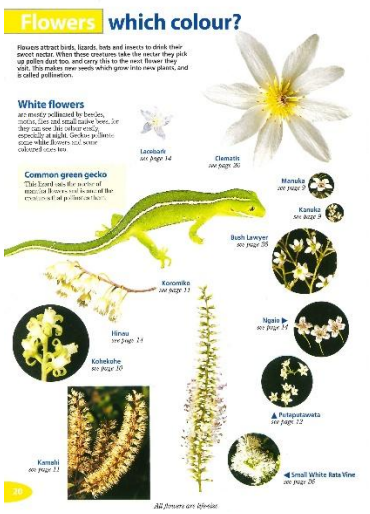
As well as looking at leaves, you can look at other tree features to identify them. This is particularly useful as big mature trees can be very tall and so the leaves are often out of sight.

On walks through the bush you can often see fallen fruits or flowers. You can also look at the bark of trees as often they are can be distinctive. Here are some resources you can use.

DOC's *Experiencing Native Trees in your Green Space* resource has a section at the back which shows the seed/fruit, flowers and bark of a range of trees



Andrew Crowe's book *The Life Size Guide to Native Trees* has some excellent identification pages on bark, seeds and fruits.



Other ideas:

- Bark Bingo – take photos of different tree bark in your green space for your students to ID
- Create some art through bark rubbings of different tree species

RONGOĀ MĀORI

There are many resources you can use to explore the traditional uses for trees and plants. Connect with your local iwi/hapū and ask them.

One resource which can give you some information was developed by Manawatū District Council's Kawakawa native plant nursery, Their *Propagation Guide Manawatū* contains brief notes on traditional uses. A link to this is under the propagation section below, or search for this online.

A BRIEF INTRODUCTION TO HABITAT RESTORATION

These are some brief notes of what to think about when looking to either start a planting project at your school/centre. Students can be involved in all of these steps.

A key thing to remember is that once you have planted up the work doesn't stopped. You need to look after the plants for a few years, clearing weeds around them, perhaps even watering them so give them every chance of survival. You need to plan for this.

1. **Choose a goal -** why do you want to plant?
    - Attract birds, insects, lizards
    - Generally increase biodiversity
    - Rongoā supplies, etc.
    - Create an education resource
    - Add some smaller or bigger trees to add different layers to an existing bit of native bush structure.

2. **Prepare a site plan**
    - Draw the area you have in mind (especially if it is a new area you want to plant)
    - Indicate which areas can get very wet or very dry, the wind direction, areas of shade/sun - this is helpful in plant selection.
    - If you are adding natives to an area, what existing vegetation there is

3. **Prepare the site for planting**
    - Make sure you completely remove any pest plants before planting
    - Typically, you would spot spray with a herbicide where each of your plants will be placed to kill off the grass so the area is clear for planting. But if you are not keen on using chemicals, then you can lay cardboard or equivalent on each spot to kill off the grass. Note that you would need to give lots of lead in time for this option.
    - If you don't do this stage, be prepared to put some more energy into maintenance.

4. **Plant Selection**
    - Eco-source your plants. This means source your plants from someone who has gathered seed/plant material close to your location. This ensures a greater chance of success as they are already adapted to your local conditions.
    - Select plants suitable for your site and purpose (see plant lists). Remember to look at how high each type grows so you can create your forest layers.
    - Calculate the number you need in total for your area. Roughly speaking, placing plants at 1m spacing covers the ground quickly with less maintenance required.
    - Planting will depend on your location but roughly plant from May-August.

5. **Post-planting**
    - Look after your plants. Young plants need light and air around them to grow. Clear weeds regularly (at least every six months).
    - Look for damage from unwanted pests such as rabbits or possums. You may need to add plant guards or look at pest repellent spray, and perhaps look to set up pest animal traps.

6. **Monitor your progress**
    - Take photos as your plants grow. You can use your growing plants in lots of parts of the curriculum.

Appendix 2 contains has a list of native plants, where they are best planted, and what animals do they support.

NATIVE PLANT PROPAGATION

Propagation of native trees/plants may require more preparation that just putting seeds in the ground. Some have hard seed pods, sticky fruits in a capsule, flaky seeds in a pod, or fluffy seeds in a capsule. So preparation for sowing maybe be required.

Resources:

There are many resources available online. Heree are a couple:

Book - *The Propagation of NZ Native Plants by Lawrie Metcalf*

Manawatū District Council's Kawakawa native plant nursery have also developed a guide . The Propagation Guide Manawatū is a practical, locally-focused resource for anyone interested in growing native plants from eco-sourced material.

Developed by the experienced team at Kawakawa Nursery, this guide brings together years of hands-on propagation knowledge combined with insights from passionate local experts in the field. It features plant varieties specific to the Manawatū district, offering step-by-step guidance on how to propagate native species using seeds, cuttings, and other techniques drawn from the local environment.

You can download your free copy from their website, or click this link if you're reading this online

SUGGESTED RESOURCES

Copies of Andrew Crowe *The Life Size Guide to Native Trees*

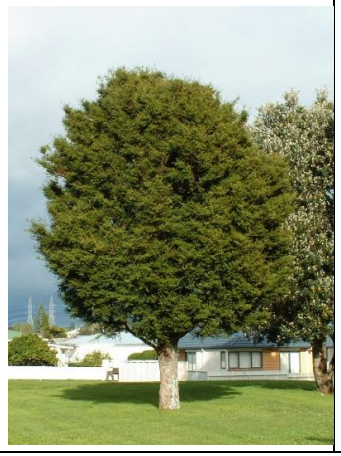
DOC's *Experiencing Native Trees in your Green Space* resource https://www.doc.govt.nz/globalassets/documents/getting-involved/students-and-teachers/experiencing-native-trees-in-your-green-space.pdf

KIDS GREENING TAUPŌ
Kia tangi ai te tini parirau *to hear the sound of many wings*

Kids Green Taupō – search for native plants/trees https://www.kidsgreeningtaupo.org.nz/education-resources-and-activities

APPENDIX 1 - Print ready resources available on the next page

1. TREE BINGO

Name	Tree/Plant	Leaf	Write something about the tree
Karamu			Example: • Leaves are shiny • Flowers/fruits grow off main stem • Leave has smooth edge not toothed • Feels thick to touch
Totara			

Name	Tree/Plant	Leaf	Write something about the tree
Kōwhai			
Cabbage Tree			

Name	Tree/Plant	Leaf	Write something about the tree
Māhoe/ Whitewood			
Rimu			

Name	Tree/Plant	Leaf	Write something about the tree
Titoki			
Miro			

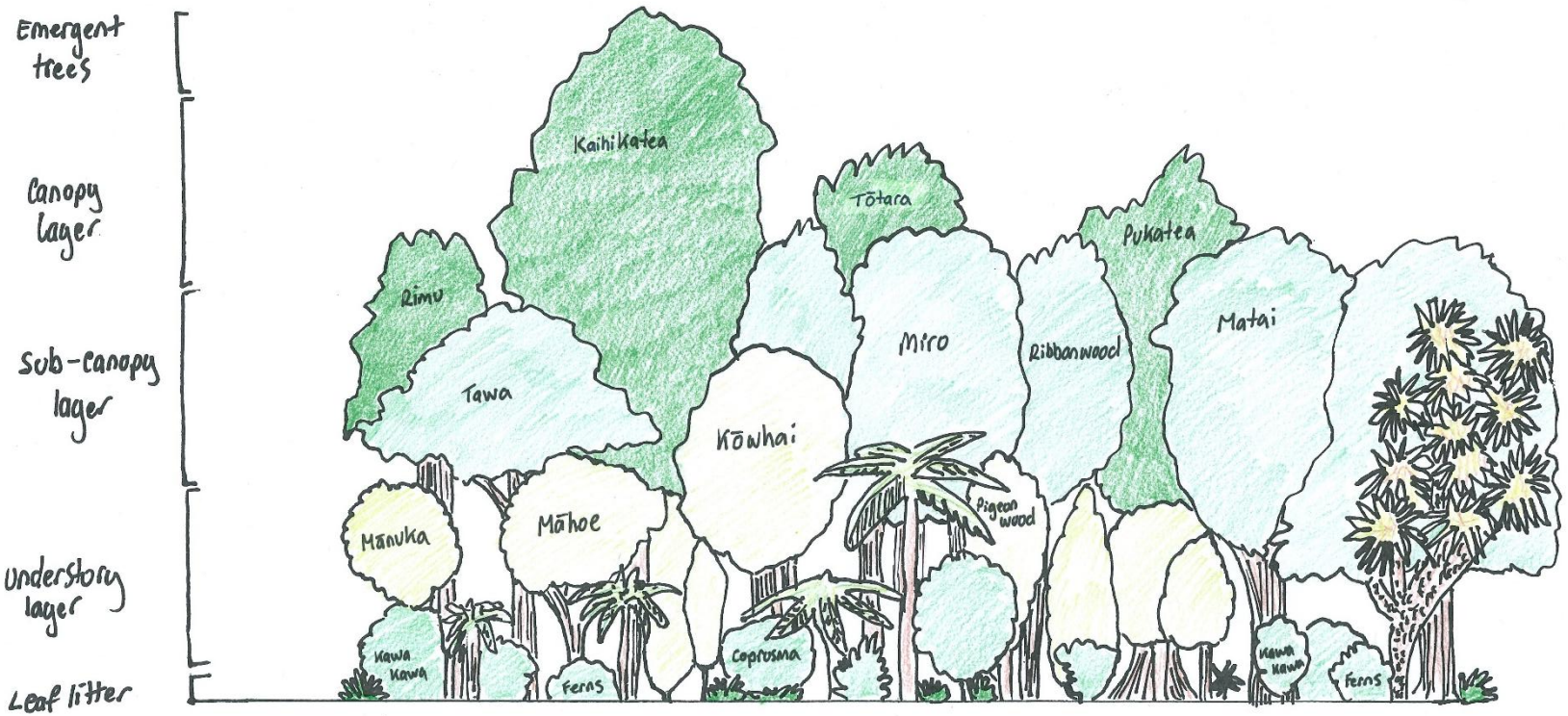
Name	Tree/Plant	Leaf	Write something about the tree
Tarata/ Lemonwood			
Kawakawa			

Name	Tree/Plant	Leaf	Write something about the tree
Harakeke/ flax			
Mānuka			

Name	Tree/Plant	Leaf	Write something about the tree
Nikau Palm			
Pūriri			

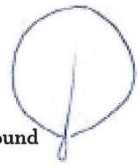
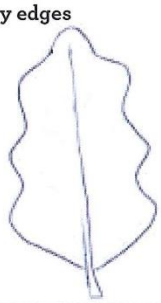
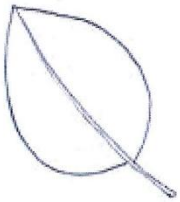
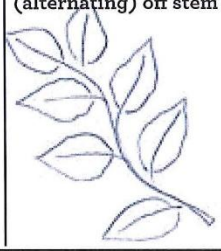
Name	Tree/Plant	Leaf	Write something about the tree
Whauwhaupaku/ five finger			
Horoeka/ Lancewood			

FOREST LAYERS




Emergent trees
Canopy layer
Sub-canopy layer
Understory layer
Leaf litter

This chart gives some examples of leaf features. Other features include: texture, size, coatings and colour. These can also be used as cues for grouping.

Shapes	Edges	Arrangement on stem
 Hand shaped  Spear shaped  Heart shaped  Round  Needle shaped	Toothed edges  Wavy edges  Smooth edges 	Leaves grow by themselves off stem   Leaves opposite on stem Leaves are not opposite (alternating) off stem 

APPENDIX 2 – Native Plant Lists

		Growth		What can the plant tolerate				Bird Food		Bees (flowering time once mature	Lizards	Suitable Habitats			
Botanical Name	**Common Name**	**Growth Rate**	**Height at maturity (m)**	**Dry soil**	**Shade: light, medium, heavy**	**Wind**	**Frost**	**Food for: tūi, bellbird**	**Food for: Kererū**			**Wetland**	**Riparian**	**Bush**	**Coastal**
Plants to 6 meters															
Arthropodium cirratum	rengarenga	fast	0.5	yes	L	yes					Habitat				yes
Carex secta	purei	med	1			yes	yes					yes	yes		
Coprosma robusta	karamū	fast	4			yes	yes	yes					yes		yes
Coprosma propinqua	mingimingi	ned	4			yes	yes	yes			Food	yes	yes		
Cortaderia fulvida	toetoe	med	2			yes	yes						yes		
Dodonaea viscosa	akeake	fast	4	yes		yes								yes	yes
Leptospermum scoparium	mānuka	fast	6		M	yes	yes			yes	Food	yes	yes	yes	
Muehlenbeckia astonii	shrubby tororaro	med	2			yes	yes				Habitat				
Muehlenbeckia complexa	pōhuehue	med	1	yes		yes	yes	yes			Habitat				
Piper excelsum	kawakawa	med	2		M			yes	yes					Yes	
Phormium tenax	harakeke / flax	med	2	yes		yes	yes	yes			Food	yes	yes		yes
Veronica species	hebe / koromiko	fast	2	yes		yes	yes			yes	Food		yes	yes	yes

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Plants to 6 - 8 meters															
Aristotelia serrata	makomako / wineberry	fast	8		L	yes	yes	yes	yes					yes	
Coprosma repens	taupata	fast	6	yes		yes		yes			Food	yes	yes	yes	yes
Griselinia littoralis	kapuka / broadleaf	slow	6	yes		yes		yes	yes					yes	yes
Myrsine australis	māpou / red matipo	slow	8	yes		yes	yes	yes	yes				yes	yes	yes
Pseudopanax arboreus	whauwhaupaku / five finger	fast	8	yes		yes	yes	yes	yes	yes			yes	yes	yes
Schefflera digitata	patē	med	6	yes				yes	yes					yes	
Plants 8-10 meters															
Alectryon excelsus	tītoki	slow	8				yes	yes	yes			yes	yes	yes	
Hedycarya arborea	porokaiwhiri / pigeonwood	med	10		H	yes			yes					yes	
Hoheria sexstylosa	houhere / lacebark	fast	8	yes		yes	yes			yes		yes	yes	yes	yes
Melicytus ramiflorus	māhoe	fast	8	yes	H	yes	yes	yes	yes			yes	yes	yes	yes
Pittosporum tenuifolium	Kōhūhū	fast	8	yes	M	yes	Yes	yes				yes	yes	yes	
Rhopalostylis sapida	nīkau	slow	8	yes	H	yes			yes					yes	yes

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Plants 10 - 20 meters															
Cordyline australis	tī kouka / cabbage tree	med	12	yes	L	yes	yes	yes	yes	yes	Habitat	yes	yes	yes	yes
Kunzea robusta	Kānuka	fast	20	yes		yes	yes			yes				yes	yes
Pittosporum eugenioides	tarata / lemonwood	fast	12			yes	yes	yes		yes		yes	yes	yes	
Plagianthus regius	mānatu / ribbonwood	fast	15		M	yes	yes			yes			yes	yes	yes
Pseudopanax crassifolius	horoeka / lancewood	med	12		L	yes	yes	yes	yes					yes	
Plants over 20 meters															
Sophora microphylla	kōwhai	med	25	yes	L	yes	yes	yes	yes	yes			yes	yes	yes
Dacrycarpus dacrydioides	kahikatea	med	50				yes	yes	yes			yes		yes	
Dacrydium cupressinum	rimu	slow	22			yes	yes	yes	yes			yes	yes	yes	yes
Podocarpus totara	tōtara	fast	30		L	yes	yes	yes						yes	
Pectinopitys ferruginea	miro	med	22		L		yes		yes					yes	
Prumnopitys taxifolia	matai	med	22		L	yes	yes		yes					yes