



A Primary School
Science
Resource for
Fernglen Gardens.

Provided by the North Shore City
Council.

Written by Bridget Glasgow 1997

Welcome to Fernglen Gardens



NORTH SHORE CITY

Acknowledgements

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Map of Fernglen Gardens

The map shows a layout of gardens and facilities. At the top, there is a 'Work Space' and a 'Shade Area'. Below these are the 'Education Facility' and a 'Cafe'. The central area is filled with various garden beds, including 'Sub-Alpine Gardens', 'Rock Garden', and 'Vegetable Garden'. Trees and plants are marked with 'x' and labels like 'Kawakawa', 'Lancewood', 'Coprosma', 'Ngaio', 'Totara', 'Nikau', 'Wheki', 'Tap', 'Cabbage Tree', 'Hybrid', 'Ponga', 'Touix', 'Pool', 'Seat', 'Bushwalk', 'xwhau', 'xRimu', 'xKawakawa', 'xKau', 'xKahikatea', 'xRimu', 'xWheki'. A 'Fence' is indicated at the bottom. A 'Private Property' line is on the left. A 'Kauai Rd.' is on the right. A 'gate Entrance' is marked. A 'To Fernhouse' arrow points to the left. A 'N' arrow points to the bottom.

Teacher's Notes

The aim of these resources is to:

1. Use the special features of Fernglen and apply them to the science curriculum.
2. Focus activities and enhance the experience of being in the bush.
3. Provide worksheets that can be used as part of a unit of work that is ongoing at school and could possibly help the community and Fernglen.
4. Provide a variety of activities so that your students can return to Fernglen and either try new, or follow on, activities at different times of the year.

Worksheets can be photocopied for students or can be used as focus questions for parents and teachers to be answered orally by the students.

The Achievement Objectives are:

The Living World	Levels 1-5
Planet Earth and Beyond	Level 1.4
	Level 2.4
	Level 3.2, 3.4
	Level 4.2, 4.4

Skills	Focusing and Planning
	Gathering Information
	Processing and Interpreting
	Reporting

Each worksheet has the relevant A.O.s in small print in the top left hand corner.

Egs, L 2.1 = Living World, level 2, section 1
E 4.4 = Planet Earth and Beyond, level 4, section 4

Specific Learning Outcomes

Students should be able to:

- Recognise some of the plants in New Zealand's bush.
- Identify similarities and differences in groups of plants like *Hebes* and ferns.
- Recognise that the structure of plants relates to the function.
- Use their own body to measure plants for identification.
- Ask questions about the New Zealand bush and identify the means to research the answer.
- Observe some rare New Zealand plants and realize the need for their protection.
- Make a map of Fernglen and observe the physical features that occur naturally and those that are manmade.
- Construct a timeline of the physical changes to Fernglen.
- Observe and record a food chain in Fernglen.
- Design plant identification posters for the public.
- Mix the different types of soils from the different habitats represented in Fernglen.
- Become involved in a community environmental project.

These resources are written specifically for Fernglen but can be used for most New Zealand bush. There is some preliminary work outlined for before the trip as well as some follow up activities. For more resources on this topic and work to do in the classroom the Forestry Insight Kits and the Department of Conservation Conservation Week 1997 resource, “Te Wao Nui O Tane – Our Native Bush” provide excellent material.

This kit provides a selection of resources that covers a range of strands within the curriculum. It is hoped that schools will visit Fernglen at different times of the year to observe the seasonal changes and complete different activities. There is also an activity where students can make resources for Fernglen using the information they have gathered. These will be displayed at Fernglen in the educational facility.

What will students need to take to Fernglen: (for these activities)

- Clipboard
- Pencil, rubber, soft crayons or charcoal
- Photocopied worksheets plus extra paper
- Magnifying glass

Botanical hints for using the ‘Tree Treasure Hunt’

Leaf Descriptions

When measuring the length of leaves do not include the stalk.

Some leaves have smooth edges



Some have teeth



There are 3 different ways the leaves can be arranged on the branches:

Hand-shaped



Alternative



Opposite



Before you visit Fernglen

To achieve the most for your students and their trip to Fernglen some preliminary work in the classroom is suggested below.

1. Find students 'before views' on habitat and factors that affect habitat.
2. Students could “**Adopt a Plant**”.
These are some of the special groups of plants at Fernglen. Students could choose a plant, from the list below, and carry out research about the specific plant and the group of plants it belongs to. They could investigate the family of plants in a wider range than Fernglen provides and then classify how the plants are also related.

List of plant groups:

Ferns (Ponga, Wheki, Prince of Wales, Hen and Chicken fern, kidney fern)

Hebes (many varieties)

Metrosideros (Rata and Pohutukawa)

Flaxes (cabbage trees, Harakeke)

Other plants that could be studied:

Totara, Nikau, Ngaio, Rimu, Kauri, Lancewood, Kahikatea, Towai, Kawakawa

Many of these plants will be in the school grounds which can provide a focus for habitat ie. difference between school and bush.

Measurements can be taken along with careful observations again to compare with Fernglen.

The reproduction of the plant can be researched in school as it will not always be evident from observation.

3. Students can learn how to estimate measurements unconventionally so they do not need a lot of equipment ie. know that their middle finger measures 5 cm etc.
4. Construct a Timeline for Fernglen
5. Establish some conservation ideas and how their behaviour is important to protect the bush. Use a consequence wheel

Preliminary Worksheets for Classroom Activities

Before Ideas

Fernglen Gardens is a special New Zealand garden with a collection of plants from all over the country. These plants live in different habitats like islands, mountains, the bush, cold places, dry places and many more.

The teacher will divide the class into groups. Each group will have a large piece of paper and pen. Divide your paper into 4. Choose one person to write down all your group's ideas for each question.

1. In your groups name as many things as you can, that you expect to find at Fernglen.
2. How do you think that humans will have changed the gardens from natural bush?
3. Name all the things that affect how plants grow.
4. What would you like to learn from your visit to Fernglen Gardens?

When you come back from your trip use a different coloured pen and add to number 1, 2 and 3.

Write down all the things you have learnt for number 4.

Adopt a Plant

Your group will choose a plant that you will see at Fernglen Gardens.
Before you go you must investigate this plant so that you will know what to look for when you get to Fernglen.

Plants belong to families of plants that are similar.

What is the Maori name and the scientific name of your plant?

1. Find the family your plant belongs to.
2. Are there any members of this plant family in your garden at home or in the school grounds? How could you find out?
3. List the things about these plants that make them in the same family.
4. Where does your plant prefer to grow?
5. How does your plant spread its seeds?
6. Is your plant useful to humans? How?
7. How does your plant make more plants or reproduce?
8. Name 5 things that make your plant different to other plants in the family. You may need to take some measurements of the height, the size of the leaves or flowers or use the ideas in questions 4, 5, 6, & 7.
9. Is this plant in danger from pests or disease?
10. How could you care for your plant?

How could you find the answers?

You could:

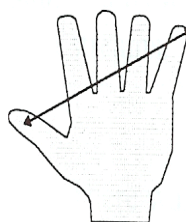
- Get the school gardener to talk to the class.
- Interview your family or people in the street.
- Go to the library.
- Use a CD ROM in your computer
- Search the Internet.

Measuring with my Body

You will need to make scientific measurements while studying your plant. When you are in the bush a ruler may be difficult to use without harming the plants. We can use our own body to make good measurements and we do not need to break the plant.

Here's how:

1. In the classroom, measure with a ruler:
 - a. The length of your little finger _____cm.
 - b. The length of your middle finger _____cm.
 - c. The length of your outstretched hand from your thumb to your little finger _____cm.



- d. The length of your outstretched arms, finger tip to finger tip _____cm.
 - e. Your height _____cm.
 - f. One large step _____cm.

Once you know these measurements you can use your body to measure part of the plant.

2. Measuring the height of the plant if it is taller than you!
Turn your back to the plant, bend over and look through your legs.
Walk away until you can see the top of the tree.
WATCH WHERE YOU ARE GOING!
This will take you about the same distance away from the tree as the tree is tall. Pace out the distance and count the number of large steps back to the tree. You know how far 1 step measures see (f) so you can work out the height in metres.

Fernglen Timeline

Before the Europeans arrived. (pre 1769)	1700	The bush was regrown and trees were added. The bush became protected and collections of rare ferns and endangered species were started. Soil was cared for, the fernhouse was built, paths were made and irrigation set up. The surrounding area was settled.
1769-1888 European settlers milled Kauri and cleared bush for pasture.	1769	
1888 – 1989 Fisher family bought the gardens to regrow bush and protect plants.	1800	Drains were built to change streams. There was no permanent settlement and the Kawerau people of the Waitemata hunted in the bush and fished in the harbour
1889 – 1997 Mrs Fisher gave the gardens to the North Shore City Council to open for the public	1888	Paths were maintained, the gazebo and building constructed. The outside fence was built and carparks provided.
	1900	
	1989	
	2000	Large trees were cut down and bush burnt off. Roads were made to transport logs and houses were built in the surrounding area.

Divide your page in half and extend the timeline until 2100.
Describe in words or draw what you think could happen in the next 103 years if:

A The Council keeps the gardens protected

B A property developer buys the gardens.



2100

How can you, your school and your Council make sure the gardens stay protected?

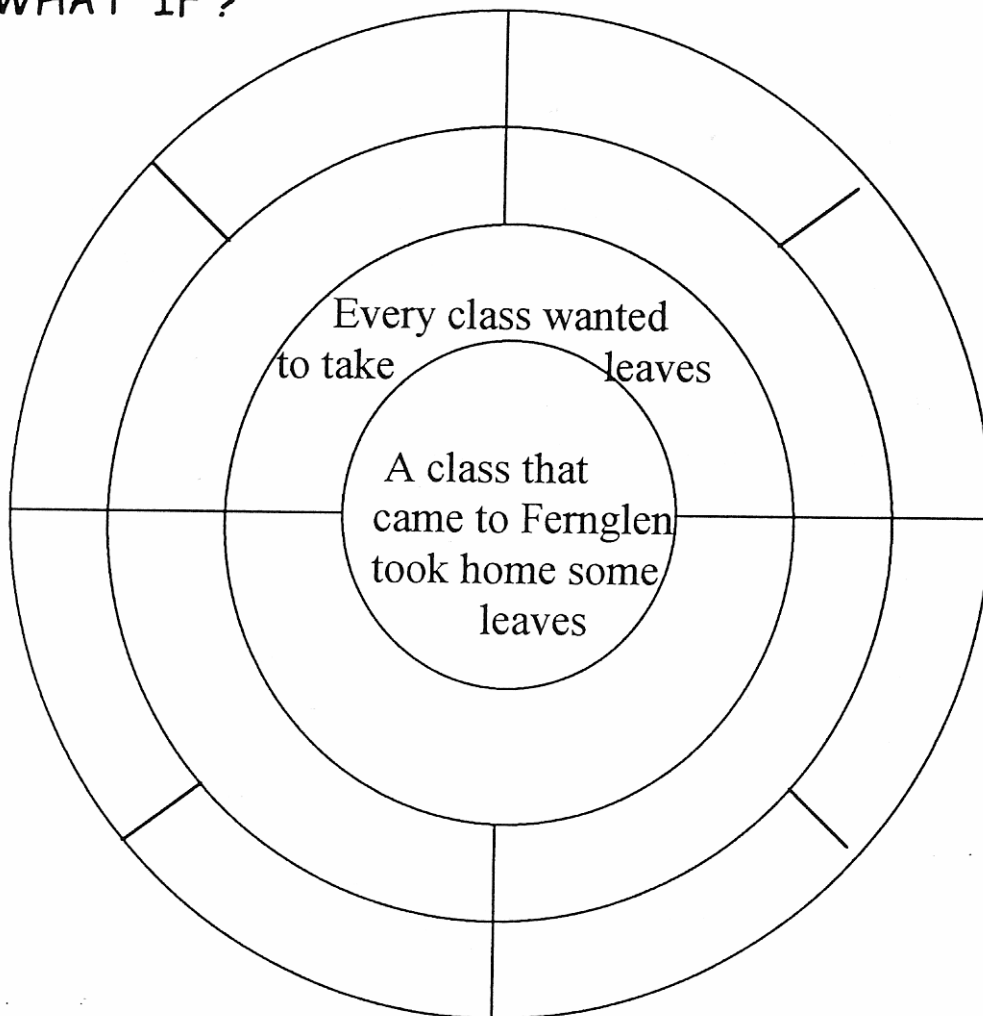
Why is it important to protect New Zealand plants and bush?

Interview your friends and family to find out why they think it is important to protect places like Fernglen.

What if?

Let us think how we can conserve our bush. Look at the consequence wheel below. Think what would happen if the event in the middle of the circle occurred. In each segment of the outside circles add your own idea about what could happen next. The first consequence has been done for you.

WHAT IF ?



You could make more Consequence Wheels using these ideas:

- A possum poisoning program is set up.
- **Non** NZ plants are planted in the bush
- NZ birds are re-introduced to the local area

Activity Worksheets for Fernglen Trip

Welcome to Fernglen Gardens

Fernglen Gardens is not a natural New Zealand bush but a special museum garden planted by a group of people that want to save rare plants and have plants from all over New Zealand in one place.

Looking at the gardens how can you tell that they are different from a natural bush?

Listen to the speaker or ask the person showing you around why the gardens were planted?

How do you think they were different in the past?

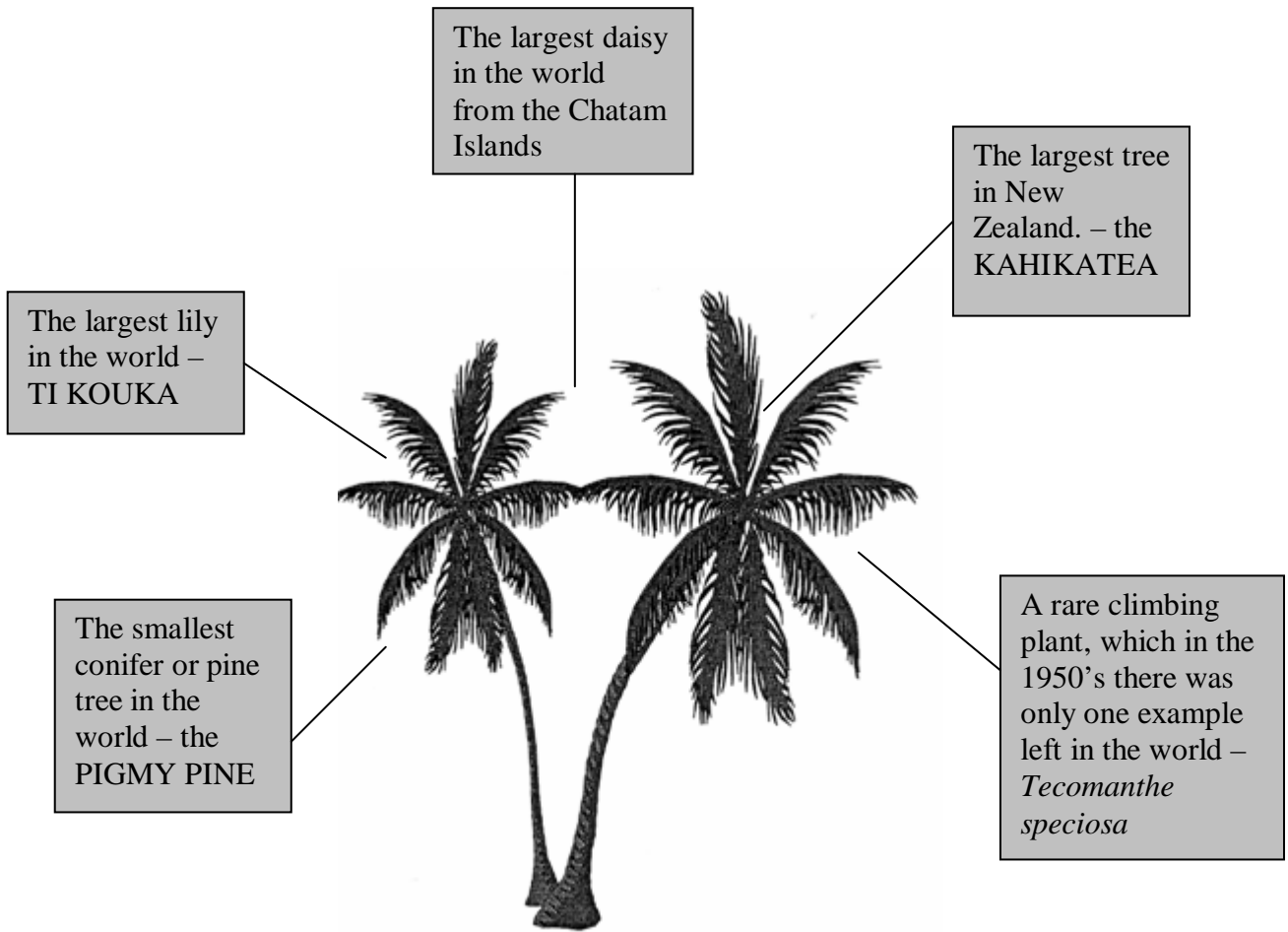
How have people changed the gardens?

Why do you think this garden is a good idea?

Ask to see if your ideas are correct.

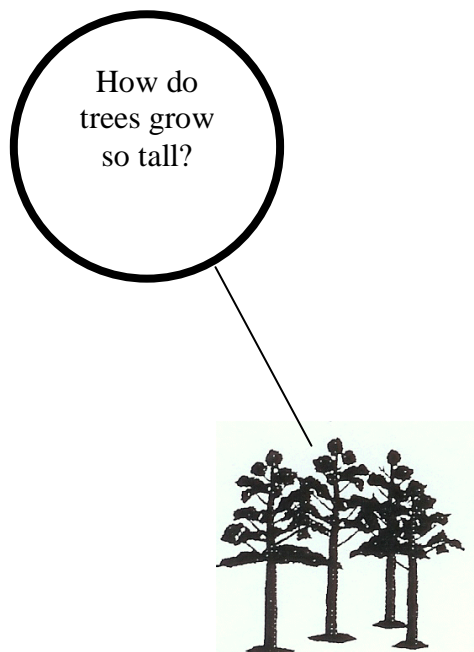
Special Fernglen Facts

Can you find?



Tree Treasure Hunt at Fernglen

Your teacher will put you into groups and you will be doing different activities in the gardens. You could name your group after a New Zealand tree.



Examples: Cabbage Tree
Kahikatea
Kauri (juvenile)
Kawakawa
Kahikatea
Lancewood (juvenile)
Nikau
Pohutukawa
Ponga
Rata
Rimu
Totara
Towai

Look carefully at the map so you can find the places you have to go. Some of these trees are marked on the map but you will have to identify them from the clues on the next pages.

Try and see if you can identify 5 different trees from the list above and then you can do a special study of your own group's tree.

Treasure Hunt of Trees

Use the clues below to identify the trees when you find them.

First let's start with the **canopy or tallest trees**.

The hard thing about identifying these trees is that we can't always see the leaves, so we have to look carefully at the bark. Use your body measurements for identification.

About 30m high

The bark is reddy brown and stringy. If you can see leaves they are stiff and prickly and small (about 2.5cm long). In Autumn you may see a green seed with a red base.

This tree is the **TOTARA**

Up to 20 to 35m high with a tall

trunk. The bark is dark brown and peels in large flakes. If you can see the leaves they are very small and prickly, like tiny scales (there maybe some on the ground). The branches will weep gracefully.

This tree is the **RIMU**

Grows to about 20m. The trunk is gnarled and dark brown with rough bark. It is a short trunk with spreading branches. The leaves are tough and green on the top with a white furry underneath (about 5-8cm long). In summer there will be large, red spiky flowers.

This tree is the **POHUTUKAWA**

This is a very tall tree about 50m with a tall trunk. The bark is grey and flakey. The leaves are very tiny and like little scales but they are soft to touch. In Autumn it will have little black seeds in an orange cup. It usually likes to live in a swamp and there used to be a stream in the gully.

This tree is the **KAHIKATEA**

This page is to identify trees that are in the **sub-canopy** part of the bush.

They are still much taller than you but you can probably see the leaves as they are under the canopy trees.

This tree grows up to 10m and is dome shaped with lots of green leaves. The leaves are about 5-7cm long with mostly smooth edges. They are covered in tiny dots in the light. In Spring and Summer there will be tiny white flowers with purple spots and in Autumn there will be small purple fruit. The leaves are alternate.
This tree is the **NGAIO**

This tree will be 12-20m tall with a long trunk that is spongy to touch like cork. The leaves grow in clumps and are very long and narrow, from 50cm to 1m. In late spring there will be sweet smelling white flowers and in Summer these will become small bluish white fruit.
This tree is the **CABBAGE TREE** or **TI KOUKA**

This is a palm tree about 10m high with a long straight trunk which has rings around it. At the top of the trunk is a large green bulb which has large leaves or fronds coming from it. At the bottom of the bulb in late spring are small pink finger-like flowers which become small red bunches of fruit. This tree is a **NIKAU**

This can be a canopy tree but in Fernglen it is not full size (about 12m). The leaves are opposite and about 3-10cm long. They are light green with a pattern of dark green veins and have large teeth. In Summer they have white fluffy finger like flowers. This tree is the **TOWAI**

This tree can grow up to 6m and has large heart shaped leaves up to 10cm long on purplish-brown branches. The leaves are opposite and smell peppery when crushed. Often they are full of holes. In Summer there are long yellow fruit. This tree is the **KAWAKAWA**.

Other Fernglen Trees

There are only young specimens of this tree in Fernglen. The bark is grey and hammer marked. The leaves are alternation to almost opposite and about 4-7cm on the younger trees. They are tough and green. An adult tree can grow to 30m high with a 3m trunk. There are male and female cones in Spring and Summer and bleeding gum is common on the trunk. This tree is the **KAURI**.

This tree is shaped like a pyramid and can reach 25m in height. It has stringy brown bark. The leaves are squashed together forming branchlets in 2 rows about 3-5mm wide. There are male and female cones which form on the ends of the branchlets. The male cones are yellow and the female cones are red and oval about 1-1.5cm long. This is a New Zealand cedar and is called the **KAWAKA**.

This tree can grow to 25m and usually starts life in other trees and sends its roots down to the ground. The leaves are opposite and thick and leathery. They are green on top and underneath with indented tips. In Summer the flowers are red spiky balls. This tree is the **RATA**.

This is a small tree reaching 6m with soft blistered light grey bark. The leaves are rounded and opposite, with teeth, about 20cm long. In Spring there are white flowers which become fluffy seed capsules with bristles. This tree is the **WHAU**.

This tree can grow to 15m high and is therefore a canopy tree. The bark is smooth grey-brown. The leaves are dark green and very glossy with no teeth. They are large leaves about 10-15cm long. In Summer there are large orange fruit about 2-4cm which are very poisonous if eaten raw. This tree is the **KARAKA**.

Large Tree Ferns

This fern grows up to 16m tall with a 30cm diameter black trunk which is covered in oval scars. The fronds droop and are up to 5m long. This fern is the tallest tree fern and is the **MAMAKU**.

This fern grows up to 10m tall. The fronds rise up before spreading and the dead frond bases remain on the trunk. The fronds are white or “silver” underneath. This fern is the **PONGA** or **SILVER FERN**.

This fern grows up to 7m tall with a blackish brown trunk, about 20cm in diameter. The frond bases remain on the trunk and the dead fronds are orange brown. The growing fronds are golden green and brown underneath. The fronds are harsh to touch. This fern is the **WHEKI**.

Individual Tree Study

Your individual tree at Fernglen Gardens

Date _____

When you have identified your group's tree you will look at the special things that help it to survive.

1. How high is your tree?

In the bush is it in the

Tick the right box

top layer

☐

middle layer (small tree/shrub)

☐

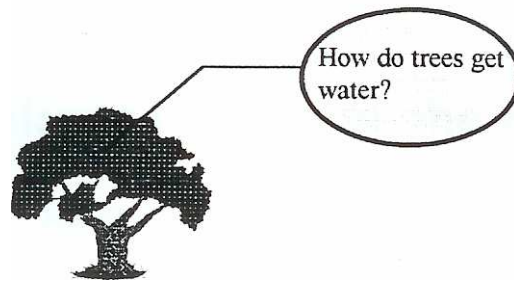
ground layer

☐

You can measure the exact height by using the method you practiced back at school

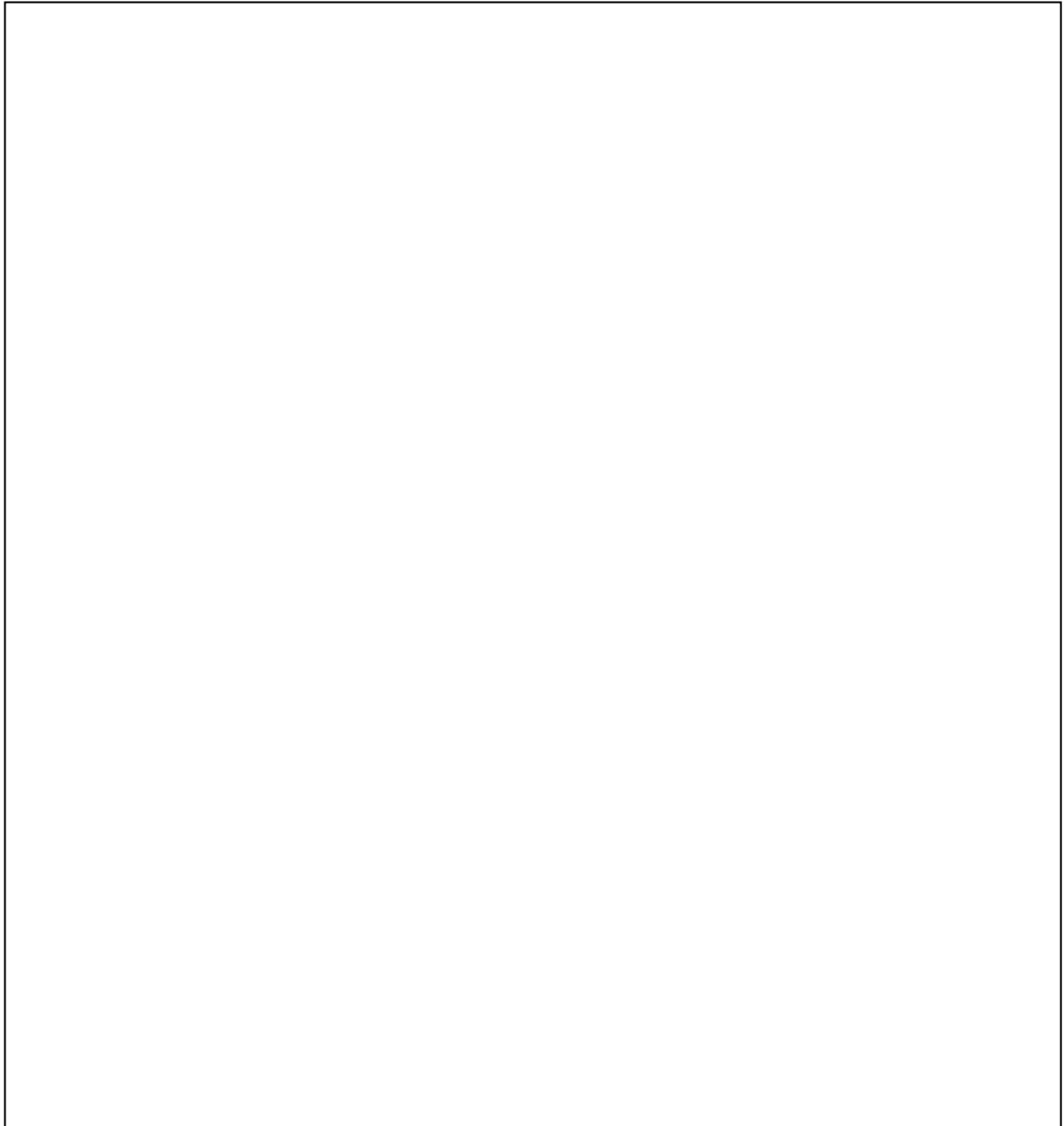
2. Name the parts of the tree that help it to grow this tall.
3. What are the things from the environment that your tree needs to grow?
4. Suggest why the tree grows to this height? What things from the environment does it get at this height?
5. Take some bark rubbings of your tree. Place your paper over the bark and rub gently over the top with a crayon – be careful of what you are standing on. You could try different parts of your tree to see if they change eg. trunk and branches. Could you use your bark rubbings to identify your tree from others? How?

Leaves



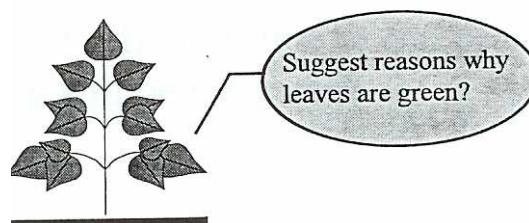
Look around your tree and see if you can find some leaves that have fallen off. Make sure they have fallen from your tree!

Draw them onto your page or shade around the edges; you can draw large leaves on the back of this sheet.



Circle the words below to describe the leaves.

COLOUR	Light green	Green
	Dark green	Other _____
EDGES	Smooth	Not smooth
SIZE	Longer than your outspread hand	
	Longer than your middle finger	
	Shorter than your middle finger	
SHAPE	Long and thin	Round and fat
TOP SURFACE	Shiny	Smooth
	Rough	Hairy
UNDERNEATH	Shiny	smooth
	Rough	hairy

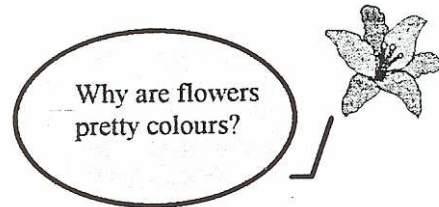


One of the reasons that trees have leaves is to **catch sunlight**.
Look at the things you have circled and tick the ones that would help the leaves to do this job.

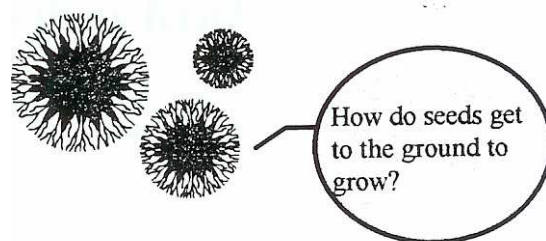
Another reason for leaves is to **trap water**. Put stars * next to the things you have circled that would help the leaves to do this job.

Reproduction

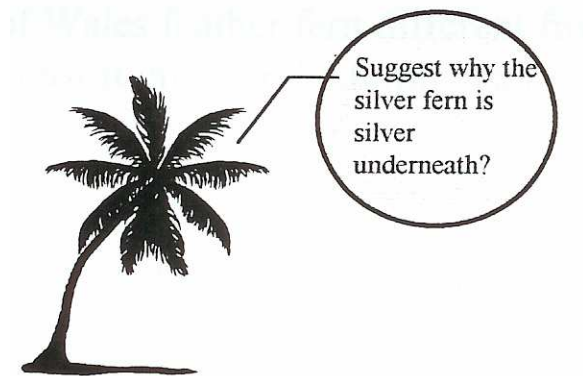
Plants have special parts for reproducing like flowers, cones and spores.



1. What does reproduction mean?
2. What special part can you find on your tree that might be used for reproduction?
3. Draw this special reproductive part
4. If you return to Fernglen at a different time of the year do you think these reproductive parts will be the same?
5. If there are no reproductive parts on the tree at the moment does this mean that the tree does not reproduce? Can you suggest why there are none?
6. What do plant reproductive parts make?



Ferns



Look at your map for the fernhouse. On the track down to the fernhouse there are also many ferns. Look for the labels.

When you have reached the fernhouse stand still inside and breathe quietly. Notice what is different in the fernhouse compared to the rest of the gardens.

Observe how much sunlight gets to the ferns.

How does the air feel?

Is it damper?

Has the temperature changed?

If you had a fern in a pot plant at home what conditions would it like to grow in?

Put your hand under the filmy fern. What can you see? What can you say about the leaves of the filmy fern?

1. How is the Prince of Wales feather fern different from the other?
Why must it grow in the fernhouse?
2. The kidney fern is part of the fern family, how do you know? How is it different?
3. Where does the *Doodia media* fern or pukupuku grow?
4. What is the difference between the Ponga and the Wheki?

Look at the underneath of the leaves of several ferns. Describe what you see.

Many of the ferns will have small round spores. What are these for?

5. The manamana fern is also called the Hen and Chicken fern. Why do you think they are called this? Do they have spores?
6. Draw one of the ferns, or just a leaf, that you particularly like. Note what special parts a fern has that other plants do not.

Looking in the Litter

When you are in the bush, get into pairs and find somewhere by yourselves where there is lots of “rubbish” on the bush floor. One of you close your eyes while the other passes objects that you find on the ground. Gently feel the object, smell it and then look at it with a magnifying glass. Describe the object in the table below and see if you can work out what it does and why it is on the bush floor.

If you pass something that is alive, tell your partner to be gentle!

Carry out this exercise with three objects each.

Once you are back at school discuss with your group why the “leaf litter” is not swept up.

Object	What does it feel like?	How does it smell?	What can you observe under the magnifying glass?	Why is it on the bush floor?
1.				
2.				
3.				

From Young to Old

Look at your map to find 2 trees called the Lancewood or Horoeke. They are growing near to each other on opposite sides of the path near the gazebo.

Observe both trees carefully. Do you think they are the same type of tree? Why or why not?

Draw or describe the shape of each tree and the leaves below or on a new page. Be accurate with your measurements.
Which tree do you find the most attractive?

These trees are the same type but one is younger and changes into the older tree after about 15-20 years.

Use the descriptions below to sort out which is the young plant and which is the adult.

I grow to 15m high with a long straight trunk and a round head. My leaves are 7-20cm long with a central rib and are pale underneath. They are alternate and can have teeth. In autumn if I am a female I will have purplish black fruit. I AM THE ADULT HOROEKA		My leaves are very long (30cm-1m) and tough and point down. They are hard and spikey because I am young and short and I do not want to be a tasty snack for animals, especially in the past when the moa was about. I have a very straight trunk a bit like a rope. I AM THE YOUNG HOROEKA
--	--	--

Have you sorted out which is which?

List all the changes that the young plant makes to become the adult.

The Horoeka or lancewood is an unusual tree in the way that it changes.
See if you can locate some baby Kauri trees in the gully at Fernglen.
Do they change when they become adults?

When you are back at school do some research on bush insects to see if they just grow small insects to bigger insects or do they change like the Horoeka. E.g. glow worms, wetas, beetles, mayflies, woodlice, stoneflies.

Making New Plants

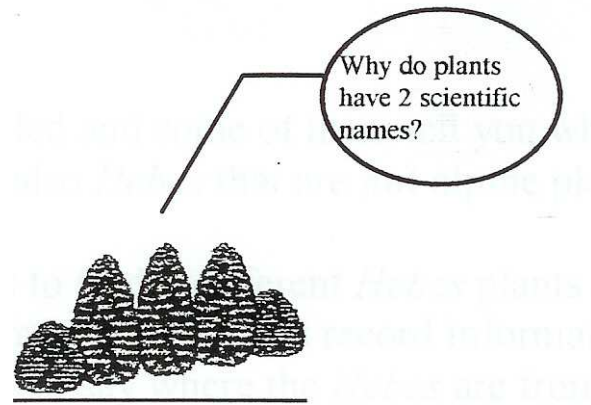
The Horoeke has a scientific name, *Pseudopanax crassifolium*. This means that it is one of the group of *Pseudopanax* plants which are geed strong trees.

Trees sexually reproduce in nature and make new plants but they only cross with the same species, e.g. one *Pseudopanax crassifolium* will only cross with another *Pseudopanax crassifolium*. However scientists can now artificially cross a *Pseudopanax crassifolium* with a *Pseudopanax lessonii* or a Houpara. This will make a new type of tree which is called a hybrid.

There are two examples of these hybrids in Fernglen marked on your map.

See if you can see the similarities to *Pseudopanax crassifolium* and the differences.

These new trees have what is called “hybrid vigour”. Find out what this means and why scientists make these new types of trees.



The *Hebes* Family

Hebes are bushes that live all over New Zealand. You may have them in your school grounds. There are many different types of *Hebes* even though they are in the same family. These plants may grow in different areas and therefore have different features to cope with each environment.

Some of the *Hebes* in this garden are alpine plants which were specially collected from the mountains.

In the troughs and pots near the main entrance are a selection of different *Hebes* and other alpine plants. **Look at your map.**

Describe the soil in the alpine troughs.

How is it different from the soil in the bush?

What other things could be different for the plants growing in the mountains compared to the plants growing in the bush?

Some of the plants are labelled and some of them tell you where they come from. There are also *Hebes* that are **not** alpine plants.

In your groups, your task is to find 6 different *Hebes* plants and from their labels and your own observations record information about them. Use the labels that say where the *Hebes* are from.

An example will be *Hebe pareora* **East Southern Alps**

Where are other types of *Hebes* found?

Describe or draw how the leaves change between alpine *Hebes* and other *Hebes* plants?

Draw the shape of a high mountain *hebe* and a low level garden *hebe*. Does the shape or size of the plants change? Can you suggest why?

Extension or follow up activity:

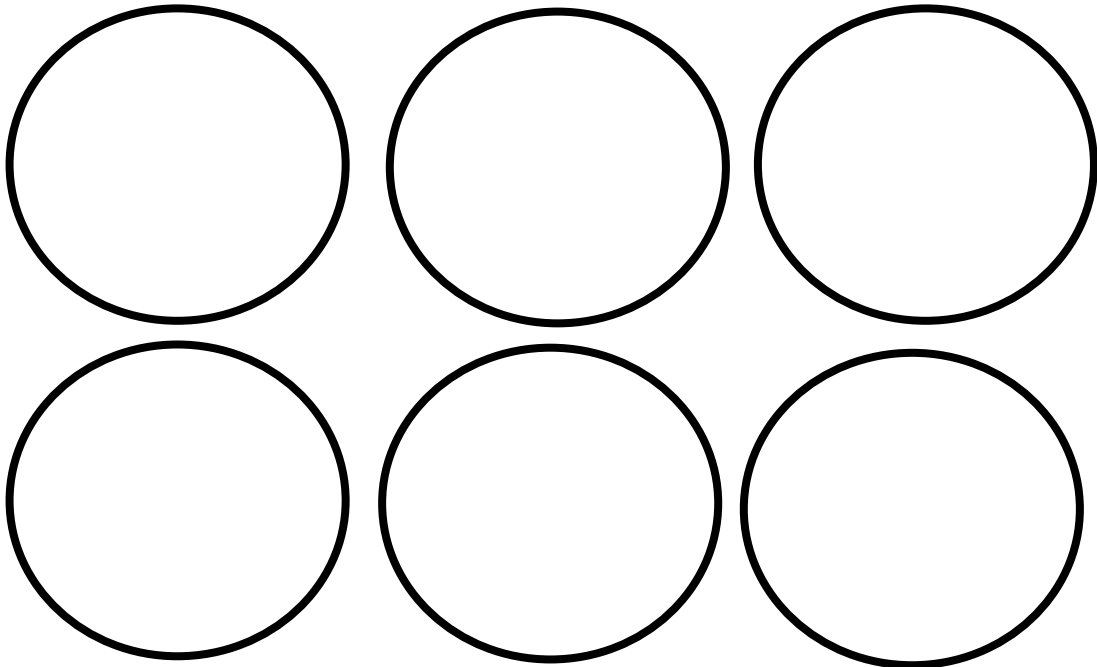
Try putting your 6 or more *Hebe* plants into groups. Give reasons for your grouping.

Or mark on a map of New Zealand where *Hebes* can be found.

Animals in the Bush

1. Name or draw as many animals that you can see in the bush.
(You can use the other side of the page if you wish)

2. Divide the animals into groups in the circles below.
(You do not have to use all the circles or you can add more).

Six empty circles are arranged in two rows of three. These circles are intended for the user to draw or name animals and then group them into categories.

Can you give each group a title.

What Eats What?

Find a plant in a quiet part of the Gardens that you can sit quietly and observe a whole plant. Fill in the answers to the questions in the diagrams on the right.

The plant needs food to grow.

Where does the plant get energy to make its food from?

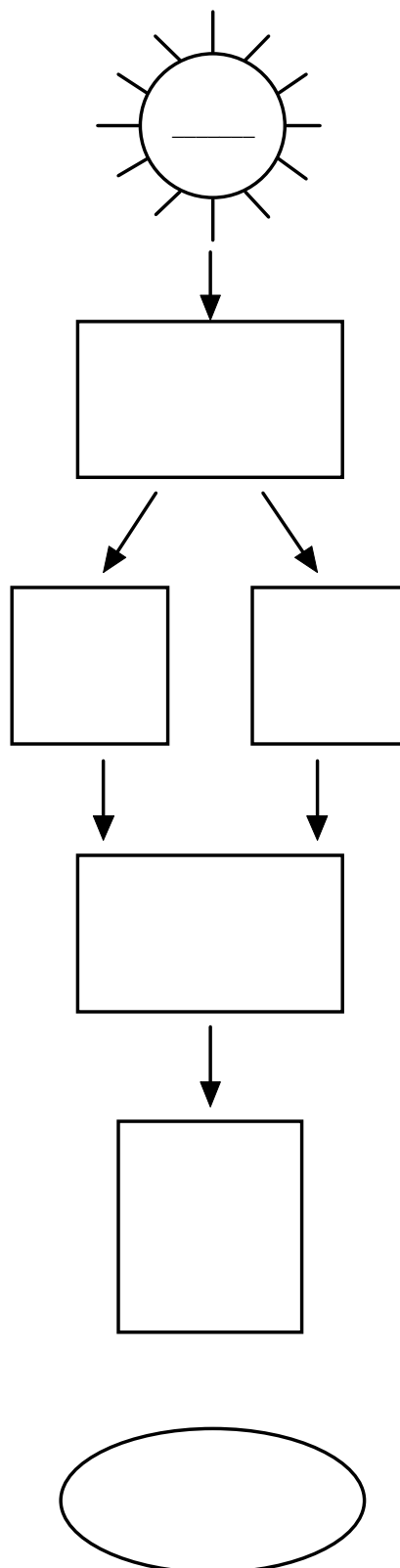
Where do you think the plant makes its food? (Hint: which part of the plant gets most of the sun). Draw the correct part of the plant.

Can you name or draw any of the animals you see eating the plant?

Can you see any animals eating the animals that are eating the plant. If so draw them or name them.

Can you suggest a large animal in the bush that may eat these small animals.

What happens to all the plants or animals when they die?



More Animals

Many animals have an effect on Fernglen Gardens. Some are needed in the gardens, some cause problems. Choose 4 animals and think of ways they are needed in the garden or ways they could cause problems. Some animals may do both. Remember humans are animals to!

**Why are they
Needed?**

ANIMAL

**What problems
do they cause?**

←

→

←

→

←

→

←

→

Can you think of plants that may cause problems in the New Zealand bush?

Making a Map

When you have walked around Fernglen draw a sketch map of the area.

Try to fit the whole garden on one page or use the outline on the next page and roughly estimate the distance to the fernhouse and the bushwalk.

On your map describe all the physical features. Things you could include are:

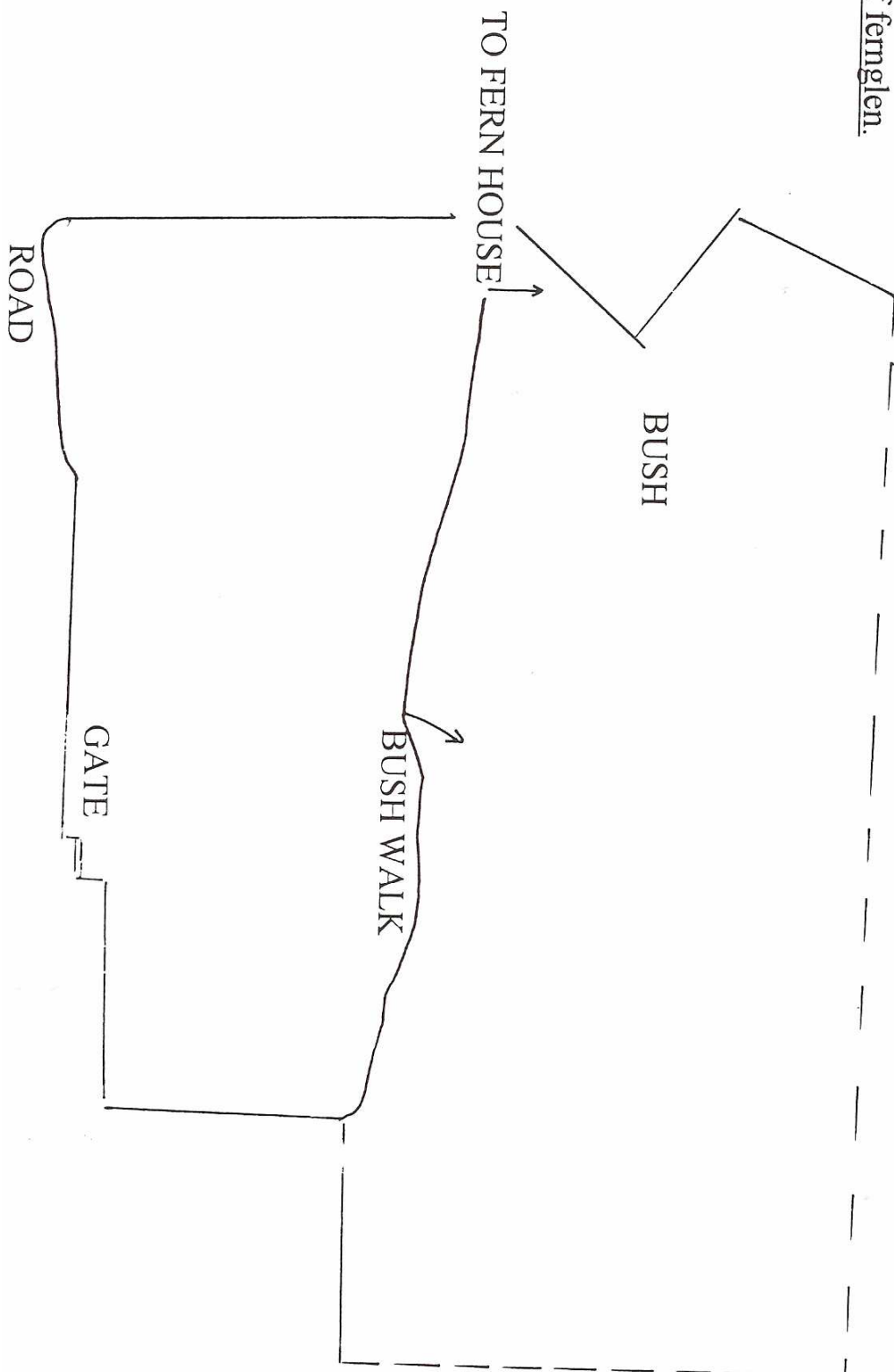
- If the land is flat or hilly
- If it is dry or damp
- If there is natural bush or planted garden
- If there are paths r pools or bridges
- What the soil is like
- The buildings
- Irrigation or water for the plants

EXTENSION

1. Underline the features that are made by humans.
Can you think of reasons why these things have been built?
2. Look at the natural features of the Gardens. Which would provide difficult conditions for plants to grow?

MAKING A MAP

Outline of fernglen.



Why Save Our Bush?

When we visit Fernglen or any New Zealand bush we need to remember to leave it as we find it unless we are improving the bush.

Before the European this bush provided Maori with many useful things, Can you think of 5 things that could be used by Maori in the bush?

1. _____
2. _____
3. _____
4. _____
5. _____

Before the Europeans there would have been many more large trees. Name some of the large trees in the New Zealand bush.

Before 1988 the Europeans cleared the bush. Suggest reasons for the bush being cut down.

In 1988 the Fisher family bought Fernglen and owned it until 1989 when they gave it to the Council. Over the 101 years the Fisher family grew back the bush and decided to grow rare and endangered plants from all over New Zealand that could be protected.

Some of the rare plants include the Prince of Wales fern, some alpine plant species and some of the

Dracophyllums. The Cabbage tree is being attacked by disease in many parts of New Zealand and scientists believe that the silver fern may now also have the disease.

In the 1950's there was only 1 plant of the climber, *Tecomanthe speciosa* left growing wild on Three Kings Island, the rest had been eaten by goats. This plant is now growing in Fernglen.

Suggest reasons why it is important to save plants from becoming extinct.

Look for these plants around Fernglen as you think about conserving plants.

Gathering Information

Look at the questions below when you are at Fernglen. During your trip you will need to find people who can answer the questions. They may be your teacher, the person showing you around Fernglen, your classmates or even yourself. You need to find a different person to answer each question correctly and then write in the name of the person underneath. See if you can remember the answers to discuss back at school.

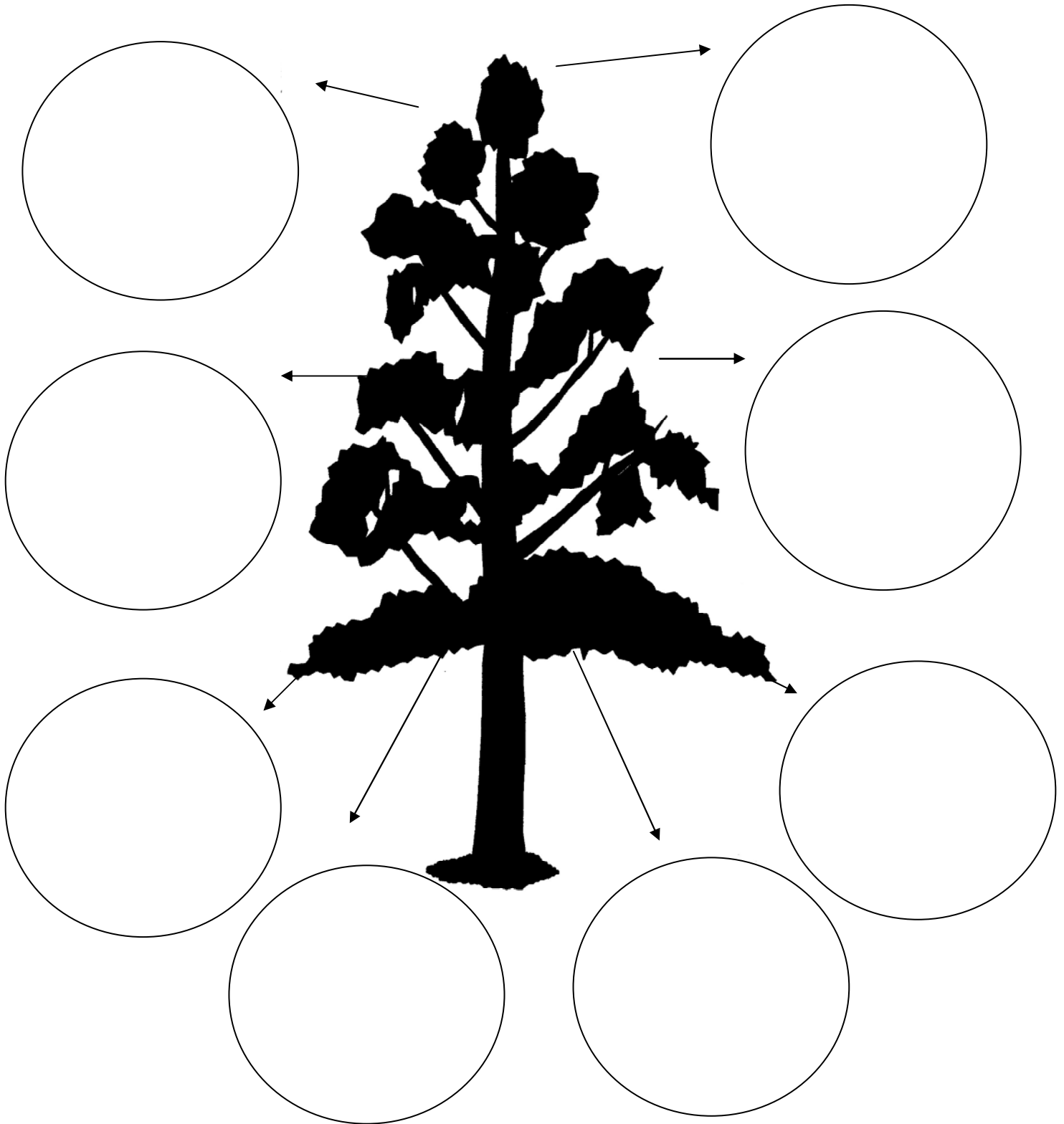
Who gave Fernglen to the Council in 1989? _____	What large tree was planted in 1920? _____	Name a rare plant that is grown in Fernglen. _____
Who manages Fernglen? _____	Who are the 'Friends of Fernglen' and what do they do? _____	What plant did Captain Cook use and why? _____
Name a plant that grows on a mountain? _____	What hours is Fernglen Gardens open to the public? _____	Who now owns these gardens? _____

When you are back at school write 3 sentences about the importance of Fernglen in the community.

Students Own Questions

Your Question Time

Fill in the circles around the tree with any questions you have while you are in the gardens.



Answers to Questions in Captions



For scientists to tell which plants are related e.g. *Hebes* and how they are different e.g. *pareora*

They are made of special cells or building blocks with a tough wall that keeps them upright and they grow up towards the light.



Because they contain green chlorophyll a chemical to trap light to make food.

From the soil, the water is drawn up into the roots and sucked up the stem / trunk by evaporation in the leaves.



To attract insects and birds for pollination

By being blown in the wind, or eaten by animal and egested, or on their coats or floating in water



There are special cells on the underneath of the leaves that reflect light but we do not know how this helps the plant

How can you help Fernglen Gardens?

When you have made a study of your individual plants you will know more than many of the other visitors to Fernglen.

- A. To share your information you could make a poster or a pamphlet to show others how to identify plants in the New Zealand bush which could be displayed in the Gardens.

Make sure that your presentation has:

- Eye catching headings
- Clearly presented and easy to read information
- Correct descriptions of your plant for identification
- How Maori used your plant

You could use:

- A computer for extra information or desk top publishing
- Drawings you have completed in the bush
- Small samples of the plant once you have permission from the Fernglen Garden committee or the Council to take them
- Naturally dyed card or homemade recycled paper with large clear headings

- B. Take large clear jars or empty 2L coke bottles with the top cut off and show the different kind of soils from the different habitats of the plants at Fernglen.

The alpine plants grow in a mixture of crushed scoria, pumice, sand and peat with some large rocks.	The bush plants grow in a mixture of clay and sandy loam soil.	Find out if the ferns need different soil or do they just need a different amount of water.
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Make up these different mixtures in the clear jars so you can see the different conditions needed. Label them clearly.

At school you could investigate which plants grow best in the different soils or does the amount of water make a difference?

Bibliography

“A Field Guide to the Native Trees of New Zealand” J T Salmon, Reed Methuen Publishers Ltd, 1986

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“Just Scrub” Centennial Park Campbell’s Bay
P. & J. Morton, Centennial Park Bush Society
North Shore City Council, 1993.

“Te Wao Nui O Tane Our Native Bush”
Department of Conservation Government Press, 1997

“Trees and Shrubs of New Zealand”
L. Poole & N Adams, DSIR Publishing 1990

“Which Native Tree? A simple guide to the identification of New Zealand Native Trees”
A Crowe, Viking Pacific, 1992

Teacher Evaluation Sheet

Please fill in an evaluation form when you have read or used the Fernglen Resource Kit and either:

FAX RESPONSE TO:

Lorraine McCowan
Education Advisory Service
Private Bag 92601
Auckland
Fax (09) 377 1571

OR POST A RESPONSE TO:

Bridget Glasgow
19 Rendall Place
Eden Tce
Auckland 1

- | | | | |
|--|---|-----|----------|
| 1. Did you use the Resource Kit? | | YES | NO |
| 2. For which age groups (in yrs)? | 5-6 6-7 7-8 8-9 9-10 >10 | | |
| 3. Were the resources relevant to Fernglen? | | YES | NO |
| 4. Were the resources relevant to the Science Curriculum? | | YES | NO |
| 5. Were the resources relevant to the topic you were studying? | | YES | NO |
| 6. Did the students find the worksheets: | Too difficult | OK | Too easy |
| 7. Did the resources help to provide a "bush experience" | | YES | NO |
| 8. Were the preliminary activities useful? | | YES | NO |
| 9. Were the follow on activities useful? | | YES | NO |
| 10. Did the students enjoy their visit to Fernglen? | | YES | NO |

Please list any of the students' questions that were difficult to answer.

Any further comments or suggestions

Thank you for your time