

WEEDBUSTERS

An integrated
teaching resource
for Primary Schools



Foreword

The WEEDBUSTERS resource kit has been designed and produced for primary schools in the Bay of Plenty by the Community Relations and Pest Plant teams from Environment Bay of Plenty. The resource is aimed at Level 3, Years 5-6 but could be adapted to any level of primary school teaching.

The WEEDBUSTERS kit contains an educational video/DVD and teaching resource with lesson outlines, exciting activities, teacher notes, weed fact sheets, field trip ideas and suggested action approaches to assist in the management and control of weeds.

Please do not hesitate to contact the Education Officer when planning or carrying out this unit. If you need an expert for a weed walk or would like to find out more about weeds in your local area, then we will be glad to help you.

For further information please contact:

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*“If you want to plan for **1** year plant rice.*

*If you want to plan for **10** years plant trees.*

*If you want to plan for **100** years, educate children”*

Confucius

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Introduction

WEEDBUSTERS is an integrated teaching resource linked to Level 3 in the curriculum. The emphasis throughout this resource is to increase students' knowledge and understanding of pest plants (weeds) in the Bay of Plenty and encourage action 'for' the environment by enabling students to take part in projects and activities that help with the management and control of weeds in our natural environment.

The resource is split into three sections;

- Investigate **about** the environment
- Explore **in** the environment
- Take Action **for** the environment

The first set of activities for each lesson are considered to be essential learning while the extra activities are designed as extension activities that will enhance the learning process even more.

The timeframes for each lesson could be a day or a week depending on extension activities, reflection and discussion.

Weeds and Environmental Education

Through the exploration and development of the Weed theme students will develop:

- awareness and sensitivity to the quality of the Bay of Plenty's natural environment and biodiversity
- knowledge and understanding of our environment and how weeds have an impact on it
- attitudes and values that reflect feelings of concern for our natural environment
- skills involved in identifying, investigating and problem-solving issues related to weeds
- a sense of responsibility through participation and action as individuals and as members of a group, in addressing the issues of weeds

(Refer to Environmental Education in New Zealand Schools, Ministry of Education, p.9)

Key concepts

Environmental Education in New Zealand also examines the concepts of interdependence, sustainability, biodiversity and personal and social responsibility for action. These concepts underpin many of the activities in this unit.

Bay of Plenty background information

The Bay of Plenty takes in the full sweep of the coastline from Lottin Point in the east, to Waihi Beach in the west. On the landward side, the region is mostly bound by the watersheds of the catchments flowing into the Bay of Plenty. This includes the lakes in the Rotorua district. On the ocean side, the region includes 18 offshore islands extending out to the 12 nautical mile boundary. The area of the region is 21,836 square kilometres comprising 12,253 square kilometres of land and 9,583 square kilometres of coastal marine area.

Over the last 150 years the Bay of Plenty land cover has changed significantly and now the largest categories are indigenous forest, plantation forest and pasture. There have been large areas of wetlands and indigenous forests and scrub converted to pasture, exotic forests, cropping, horticulture and residential areas from various human activities.

Many of the region's natural and physical resources, and many economically important activities, can be adversely affected by pests or by inadequate pest management. Pests are organisms such as plants and animals that are not native to New Zealand but which have become established here and threaten our health, indigenous plants and animals, heritage, or economy (Bay of Plenty Regional Pest Management Strategy, 2003 - 2008).

Pest plants can be invasive and competitive and thrive where their natural enemies are absent. They can smother native plants, trees and ground covers and often do very well in the New Zealand climate.

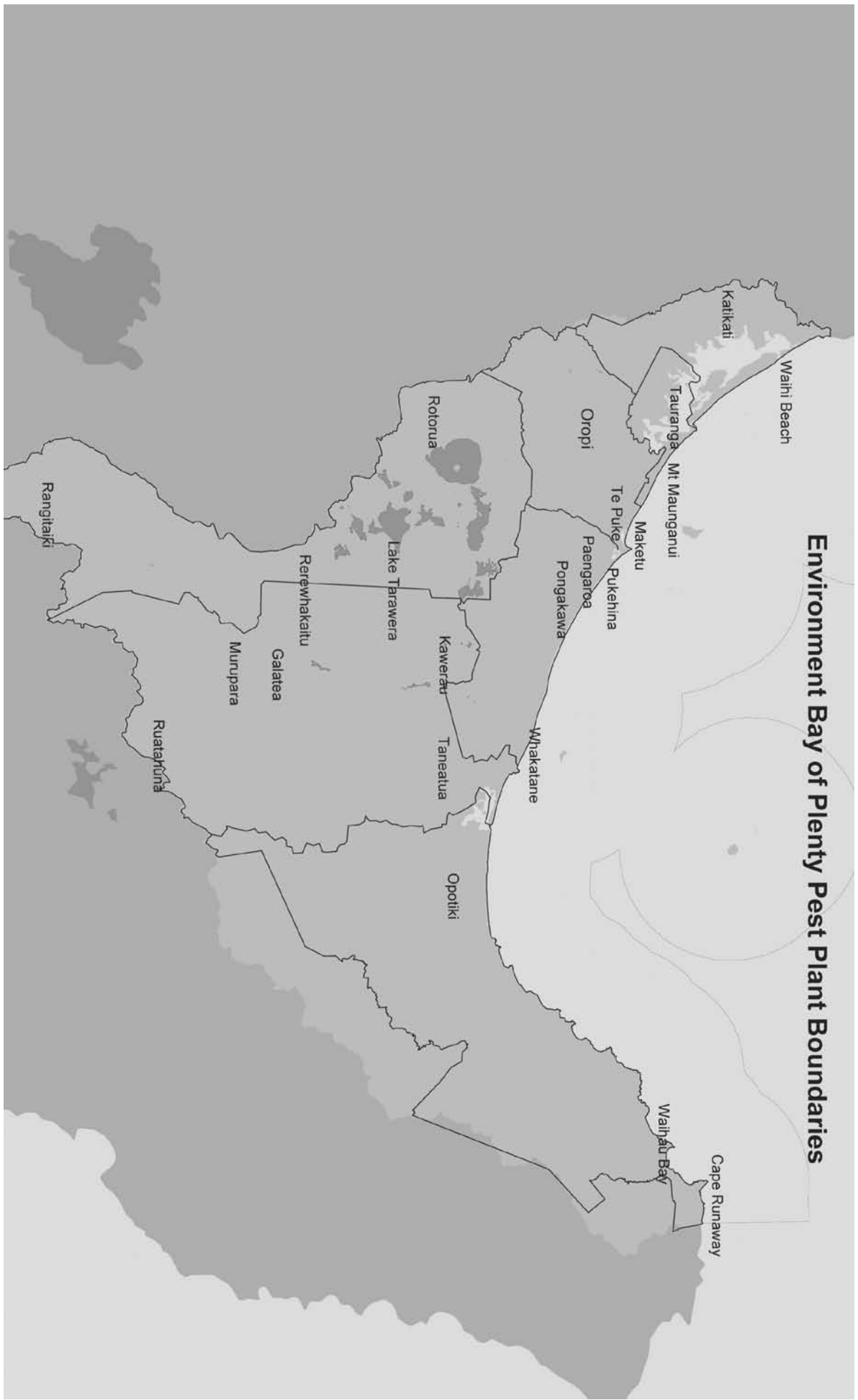
Everyday weeds that pop up, for example oxalis, do not do any real damage and are a nuisance rather than an environmental threat. What Environment Bay of Plenty is concerned about is invasive weeds that could potentially threaten biodiversity, economics and our health.

We need to take an active role in the management and control of weeds in order to maintain the biodiversity of our unique natural environment.

In carrying out weed management activities and action projects we will not only protect our natural environment but our economic well-being and own health and safety too.



Environment Bay of Plenty Pest Plant Boundaries



Feedback form

Evaluation of 'Weed Busters'

Send to: Education Officer
Freepost Environment Bay of Plenty
PO Box 364
Whakatane 3158

1 What age are your students?

2 How would you rate the level of information in this teaching resource? (circle one)
too low quite low right level quite high too high

3 How did you and the students find the learning activities? (circle one)
useless average good useful excellent

Your comments:

4 Which part of the resource did you find the most useful during your unit?
Please explain why?

5 Did your class undertake an action project for the environment as part of this unit?
If so please explain.

6 What other information would have been useful included in this resource?

Thank you very much for your feedback. If you have photos or examples of class work you would like to share, contact us and we may be able to put it on our website.



Curriculum objectives

The following are aspects of The New Zealand Curriculum that we feel relate strongly to this resource.

Some relate to specific activities, while others will be met as a result of a well integrated unit. The resource works well in combination with an inquiry style learning unit.

Directions for learning

Vision

Young people will be confident, connected, actively involved, lifelong learners.

Values

Inquiry and curiosity; diversity; community and participation; ecological sustainability; integrity; respect.

Key competencies

Thinking; using language; managing self; relating to others; participating and contributing.

Principles

High expectations; learning to learn; community engagement; future focus.

Science				
<p><i>Understanding about science</i></p> <ul style="list-style-type: none"> • appreciate that science is a way of explaining the world and that science knowledge changes over time 	<p><i>Investigating in science</i></p> <ul style="list-style-type: none"> • build on prior experiences, working together to share and examine their own and others' knowledge • ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple models 	<p><i>Communicating in science</i></p> <ul style="list-style-type: none"> • begin to use a range of scientific symbols, conventions and vocabulary 	<p><i>Participating and contributing</i></p> <ul style="list-style-type: none"> • use their growing science knowledge when considering issues of concern to them • explore various aspects of an issue and make decisions about possible actions 	<p><i>Living world</i></p> <p>Life processes</p> <ul style="list-style-type: none"> • recognise that there are life processes common to all living things and that these occur in different ways <p>Ecology</p> <ul style="list-style-type: none"> • explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced
<p>English</p> <p><i>Listening, reading and viewing</i></p> <p>Depending on the path students take most aspects of the English curriculum could be relevant.</p>		<p>Social sciences</p> <ul style="list-style-type: none"> • understand how groups make and implement rules and laws • understand how people view and use places differently 		
<p>Health and physical education</p> <p><i>Personal health and physical development</i></p> <p>Safety management</p> <ul style="list-style-type: none"> • identify risks and their causes and describe safe practices to manage these 		<p><i>Healthy communities and environments</i></p> <p>Community resources</p> <ul style="list-style-type: none"> • participate in communal events and describe how such events enhance the well-being of the community <p>People and the environment</p> <ul style="list-style-type: none"> • plan and implement a programme to enhance an identified social or physical aspect of their classroom or school environment 		
<p>Social sciences</p> <ul style="list-style-type: none"> • understand how groups make and implement rules and laws • understand how people view and use places differently 		<p>Mathematics</p> <p><i>Geometry and measurement</i></p> <p>Shape</p> <ul style="list-style-type: none"> • represent objects with drawings and models <p>Position and orientation</p> <ul style="list-style-type: none"> • use a co-ordinate system or the language of direction and distance to specify locations and describe paths 		<p>Visual arts</p> <p><i>Developing practical knowledge</i></p> <p>Visual arts</p> <ul style="list-style-type: none"> • explore some art-making conventions applying knowledge of elements and selected principles through the use of materials and processes

Teaching and learning approaches

Several different teaching and learning approaches are mentioned in the Weedbusters unit. They are explained in more detail below:

Pool of knowledge

A visual display tool which shows the development of ideas and understandings. The pool becomes a useful resource for learning and reflection as your unit progresses.

- In the centre of the 'Pool' record key words that capture thoughts, feelings and experiences that arise from a focusing or experiential activity.
- Around the key words, record any initial questions from things you are uncertain of or confused about as a result of the discussion.
- Agree as a class which questions are 'hot' questions to be answered during the learning process.
- After each major stage in your learning process, return to your Pool of Knowledge and add another 'ripple' around the central Pool by recording the key insights, images or concepts of your class.
- Use the Pool to recap, generate new understandings and vocabulary, stimulate discussion and reflect as you go along.

Brainstorming

Brainstorming is a way of quickly generating and collecting ideas around a topic. The subject of the brainstorm is written or drawn on a page and ideas or words are called out and recorded around the subject. Ideas are not judged, assessed or discussed during the brainstorm.

Sticky note brainstorming

Write your topic at the top of a sheet of paper, then begin brainstorming, placing an idea on each sticky note. This allows you to move the ideas around later to group, sort or categorise.

Mind mapping

A mind map begins with placing your topic in the centre of the page. Each idea you have is written on a branch that connects to the centre topic. If you have an idea that links to a branch then draw another smaller branch off it and write your idea on the line. Use colour on the branches to connect ideas and pictures to express thoughts. Eventually you will end up with a mind map of your ideas and thoughts.

You can see an example of a mind map on page 63.

Experiential games

These are a personal and effective way of drawing out feelings and emotions as well as enhancing knowledge and skills. 'Reflective thinking' always follows an experiential game. In the experiential game participants experience a process or situation as if they were part of it, observe and reflect on their experiences and gain an understanding of concepts and generalisations.

Learning log

A learning log is a reflective tool that helps students to track their personal learning journey. Learners can express their feelings, insights and reflections. It could be a personal booklet containing prompts e.g.

- I was surprised to find that...
- I really liked...
- I felt that...
- I want to learn more about...

Or have places where students can draw their experiences and learning.

Storyboards

A storyboard tells of events – how things were, what happened, who did what, what was achieved and what people thought and felt along the way. Storyboards can be used to encourage students to express how they have been involved in a process and as a visual tool to reflect on later. They are also useful for communicating to others about what the process has been.

Source: *The Enviroschools Kit*



Part 1: Investigate

Overview:

The 'investigate' section of the Weedbusters Unit has been designed to encourage learning about weeds in our environment. The environmental education concepts of sustainability, biodiversity and interdependence are introduced through experiential games and independent learning activities.

Timeframe:

The 'investigate' section could be explored over two to four weeks. The first set of activities for each lesson are considered to be essential learning with extra activities included if you wish to carry the learning ideas further.

Assessment activity:

The Weedbusters quiz, Template 1, has been designed as a diagnostic and summative assessment for students. It should be completed before starting the 'investigate' section and used again at the end of the unit. Please send us some of your students' results along with the feedback form so we can evaluate the resource.

Key concepts:

- What is a weed and where do we find them?
- What are 10 common invasive weeds in the Bay of Plenty and how can we identify them?
- Why are weeds a problem in New Zealand?
- How and why are weeds introduced and spread around the Bay of Plenty?
- How do we manage weeds?
- What is biological control?



What is a weed and where do we find them?

Learning outcomes:

- Students will be able to explain what a weed is.
- Students can name the different areas where weeds are found and can give reasons why weeds may live there.

Resources required:

- Wicked Weed video/DVD
- Weedbusters Quiz Template 1 Page 51
- Wicked Weed Video/DVD Review Template 2 Page 53

Activities:

Note: Complete the Weedbusters Quiz, Template 1 before beginning this lesson.

- 1 Go outside as a class and check out your school environment. Find plants that you think are weeds. Why might they be weeds? Discuss.
Brainstorm the meaning of the word 'weed'. (You could do this as a class or in small groups.) What do the students understand about the word weed? Where have they heard it being used before? What does the dictionary say? Discuss the words 'Pest Plant' and how it is another word for weed. Record the students' ideas and start to build up a Pool of Knowledge. Share and display the class Pool of Knowledge.
- 2 Watch the Wicked Weed Video/DVD. Students could complete the focusing questions on Template 2 on the first or second viewing of the video/DVD.
- 3 As a group, review the students recorded answers and add any additional ideas to your Pool of Knowledge.

Extra activities:

- Design a fun cover page for your topic book, PowerPoint presentation or booklet. Include your definition of what a weed is and draw the places where you would most likely find them.
- Explore the ideas about why weeds may grow in particular places. (This idea could be followed up on the Weed Walk where children are in the environment and can see the actual weedy places.)
- Woody Weed is the weed mascot for Australia. He educates children about the impacts of weeds across the ditch. Using KidPix or Paint, or other art mediums, create a New Zealand version of Woody Weed. Explore the animation tools in KidPix and share your creation with the class.

Reflection:

- Can you explain to a friend what a weed is?
- What kind of area do you live in?
- Could weeds be living in your area?

Teachers' notes:

A simple definition of a weed is a plant growing in an area where it is not wanted and has a harmful impact.

Weeds usually have been introduced to New Zealand by people and can have impacts on our activities like farming or recreation, our native environment or our health.

Weeds can come in any shape and size and can be any type of plant for example, tree, shrub, annual, vine or water plant.

Weeds have the ability to reproduce and spread easily and have the potential to invade weed-free areas taking over more desirable plant species.

Weeds can invade anywhere that plants can grow, including the following areas—native bush, beaches, farmland, gardens, roadsides, streams, lakes and waterways.

Weeds can live in these areas for some of the following reasons—large open spaces, people dumping garden rubbish, gardeners planting them in their backyard, dispersal of seeds.



What are 10 common invasive weeds in the Bay of Plenty?

Learning outcomes:

- Students can name and identify 10 common invasive weeds in the Bay of Plenty.
- Students can draw and label the main identifying characteristics of at least one of these invasive weeds.

Resources required:

- GO WEED Cards Template 3 – make up laminated sets..... Page 55
- Weed Match-Up Cards Template 4 – make laminated sets. Page 59
- Mind map Template 5..... Page 63
- Pest Plant Fact Sheets - www.envbop.govt.nz
- 'Pest plants and animals of the Bay of Plenty' booklet

Activities:

The following games could be played as a whole class or in small groups. Resources 4 and 5 could be on hand for extra information if required. Have fun!

1 GO WEED game (based on Memory)

- Place the GO WEED cards face down in the middle of your group. Turn two cards up and show everyone. Put the cards back down in the same place if they do not match. Next person takes two cards and tries to make a pair of the same weed e.g. Wild Ginger. The person with the most pairs at the end of the game wins.

2 Weed match up

- Match up the weed pictures with their correct descriptions. Read the descriptions carefully.
- Extend yourself and play like GO WEED, making pairs with the picture and description cards.
- Match up Challenge: Challenge your friends or have a team competition using the description cards. Each card has five clues on it. Beside each clue is a number that translates to points. Elect one person to be the caller. The caller selects a description card and reads out the first clue. If a team guesses the name of the weed on clue number 1, they get five points and another card is selected. If no one gets the clue the caller reads out the second clue worth four points, then the third clue worth three points until a team gets the correct weed. The team or person with the most points wins.
- Weed Charades: Use both the picture and description cards to act out what a weed would 'look' like. Complete the warm up first to get a feel for how these weeds move. Warm Up. Move around the class acting out the following words: arching, prickly, climbing, smother, droopy, ragged, spiky, creeping.

3. Mind map

- Create a mind map of the 10 common invasive weeds in the Bay of Plenty region. Combine your art and word-smart skills together to map out where these weeds are found and what their main characteristics are. Check out the mind map example and teaching methods section for ideas.

4 Art attack

- Create a pencil sketch of one of the 10 common invasive weeds with its identifying characteristics. Develop your sketch to create a crayon and dye or pastel artwork. Display your artworks. You may be able to use them as part of an action project later in the unit.

Extra activities:

What weed am I?

- Write the names of the 10 common invasive weeds on individual sticky labels (you may have to do two sets.) Stick one name onto each student's back. The aim of the game is to find out which weed you are by asking only Yes/No questions e.g. Am I a spiky weed? Do I smother plants? Students will need to be familiar with the descriptions of the weeds. Challenge them to guess their name in less than 10 questions.

Reflection:

- Have you seen any of these weeds in your local area?
- Do any of the common invasive weeds have the same characteristics?
- Add any new ideas to your class **pool of knowledge**.



Teachers' notes:

The 10 common invasive weeds in this activity are part of a large list that Environment Bay of Plenty Pest Plant Officers manage and help landowners control. They are not necessarily the greatest threats to the environment but are all invasive and are relatively easy to find.

To find out which weeds occur in your school's neighbourhood, contact us or check out the lists below and refer to 'Pest plants and animals of the Bay of Plenty' or fact sheets. Latin names for all weeds can be found on the fact sheets or on the 'Protect NZ' card included in the kit.

10 common/easily identified weeds in the Bay of Plenty

Wild Ginger	Gorse	Wandering Willy	Japanese honeysuckle
Woolly nightshade	Blackberry	Ragwort	Privet (Chinese and tree)
Jasmine	Pampas		

Common weeds listed by preferred environment

These lists are by no means exhaustive and many weeds can occur in any environment.

Beach/coastal

Moth plant	Smilax	Boneseed	Pampas
Privet	Kikuyu	Blackberry	

Farming/orchards

Privet	Mignonette / Madeira vine	Blackberry	Ragwort
Wandering Willy	Nodding thistle	Wild kiwifruit	Japanese honeysuckle
Woolly nightshade	Gorse	Japanese walnut	Climbing dock
Barberry	Moth plant		

Bush

Wild ginger	Old man's beard	Climbing spindleberry	Japanese honeysuckle
Privet	Banana passionfruit	Blackberry	Climbing asparagus
Wandering Willy	Ragwort	Gorse	Jasmine

In or near rivers, lakes, drains

Buddleia	Japanese walnut	Pampas	Green goddess lily
Oxygen weed	Parrot's feather	Hornwort	Wandering Willy
Salvinia	Water hyacinth		

Gardens

Green cestrum	Cathedral bells	Mexican daisy	Gunnera
Wild ginger	Privet	Blue morning glory	Lantana
Banana passionfruit	Plectranthus	Wandering Willy	Woolly nightshade
Jasmine	Moth plant	Green goddess lily	Climbing asparagus
Mignonette / Madeira vine			



Why are weeds a problem in NZ?

Learning outcomes:

- Students can give reasons why weeds can be a problem for economics (e.g. farming), our environment and our health
- Students can discuss the different views people have about weeds

Resources required:

- Weed Wipeout Instruction Card Template 6.....Page 64
- Problems with weeds chart Template 7.....Page 66
- Internet & computer access
- Weedy Web Guide Template 8.....Page 67
- Weedy Feelings Template 9.....Page 68
- Weedy Views chart Template 10.....Page 69
- Newspaper Critique Template 11a, 11b, 11c.....Page 70

Activities:

1 Round one match up – natives versus weeds

- Play the game ‘Weed Wipeout’ to help demonstrate the impact weeds have on native plants and explore the concepts of interdependence and biodiversity in the environment.
- Reflect on the Weed Charade Warm up from the previous lesson and discuss how weeds can harm the environment e.g. smother, creep, climb. Introduce the concept that weeds can also harm your health and economic activities, before moving to the research activity.

2 Research activity

Aim: To find examples of the impact weeds have on the environment, our health and economics.

- Set up three stations around the classroom, 1) Pest Plant Fact Sheets; 2) Computers with Internet access plus the Weedy Web Guide; 3) Poisonous Plants poster and fact sheets.
- Split students into three groups to rotate through the stations to complete the ‘Problems with Weeds’ chart.
- Collate students’ findings using the sticky notes brainstorming technique to complete a class problem chart. Add to your Pool of Knowledge.

Note: The Landcare Research website www.landcareresearch.co.nz has fabulous information related to the environment and economics, while the poisonous plants poster will be the most useful for investigating health concerns. Environment Bay of Plenty’s Pest Plant Fact Sheets cover all three areas.

When is a weed not a weed?

Many people hold different views about weeds. The following activities are designed to show students that some weeds can have their place.

3 Role-play 'Weedy feelings'

Aim: to investigate the different views people have about weeds.

- Assign a card to small groups of 2-3 children. Give them time to practice their role then present each 'Weedy Feeling' back to the class.
- Divide the class into two groups, for or against blackberry depending on the card they hold. Ask 'Are weeds a problem to everyone?' Let this discussion lead on to the next activity.

4 Researching different views

Aim: to investigate the different views people have about weeds.

- There are plants that some people call weeds but others find useful. Research the different viewpoints around pine trees, kiwifruit, privet and nodding thistle.
- The Weedy Views chart lists different groups that have an interest and viewpoint about each plant. Select one or two groups from each column to investigate. What are their views about that particular plant? Do they have a use for that plant? Do they think that plant is a problem? Explain your answers.

Note: www.botanical.com has great historical and medicinal information about weeds.

Extra activities:

- Invite a local farmer, gardener or horticulturist into your class to share their experiences with weeds. Students could create an interview sheet so they can find out the views the guest speaker has about weeds.
- Newspaper Critique – Template 11a, 11b, 11c. Read the three newspaper articles from papers from around the Bay of Plenty and answer the questions or identify some of the views different groups have about weeds by conducting a newspaper search. From the articles, put together a storyboard of people's views or map out the weeds and views on the enclosed map of the Bay of Plenty region. If you would like a copy of past weed articles from around the region, please call us!
- Investigate the traditional uses of native plants by Maori, for example, herbal remedies, weaving and food. What impacts could weeds have on some of the traditional uses of these native plants?

Reflection:

- How can weeds be a problem in New Zealand?
- Are weeds a problem to everyone?



Teachers' notes:

Weeds are harmful for a number of reasons and can be classified as environmental, economic or health weeds.

Economic weeds are plants that are harmful to economic activities such as agriculture or forestry. They can replace crops and pasture grasses and cost New Zealand approximately \$40 million in lost production, productivity or control costs.

Environmental weeds are plants that invade native bush, wetlands, streams and many other habitats with detrimental effects. Weeds can multiply quickly, replacing native plants and changing the habitat so it is no longer suitable for native animals. Weeds can form dense mats which smother seedlings and stop native plants from germinating. Vines can grow up and strangle or smother trees. Aquatic weeds can clog up waterways and reduce food for our native fish.

Weeds can also be harmful to people's health causing skin rashes, allergies and hay fever. Some weeds are also poisonous.

Introduced plants and animals are the biggest threat to New Zealand's biodiversity. Biodiversity is the number and variety of all life, plants, animals and micro-organisms, the genes they contain and the ecosystems they form.

Biodiversity is important because it is essential to the ecosystem processes that make life possible.

In healthy ecosystems, plants, animals, micro-organisms and the physical world are in balance with each other. All plants, animals and micro-organisms live in a particular set of conditions (including physical, chemical and biological conditions) called a niche. Weeds can invade a niche of native plants and take their place. Some weeds are such aggressive competitors they can take over the niches of many plants. However, the plants they take over from may have fed insects, which in turn pollinated fruit that was then eaten by native birds. These insects may not be able to eat the new weed plant, so they die or move away. This has a flow-on effect within the ecosystem, which is now out of balance, threatening other insects, plants and animals in a ripple effect.

See <http://www.landcareresearch.co.nz/education/weeds/weedinfoa-2.asp> for a great diagram demonstrating this concept.

Many people value our natural environment in the sense of cultural identity (traditional Maori uses of native plants for medicinal, craft and everyday uses), recreation (tramping, photography), tourism or economics (farming and horticulture). Each generation of people have the responsibility to act as kaitiaki (guardians) of our biodiversity and natural resources to ensure our country remains unique.

How and why are weeds introduced and spread?

Learning outcomes:

- Students can give reasons about how and why weeds were, and still are being, introduced into New Zealand.
- Students can describe the different ways weeds are spread and suggest methods of how we can help reduce weed dispersal.

Resources required:

- The Tale of Wild Woolly Template 12Page 73
- World Map
- Pest Plant Fact Sheets
- Wicked Weed Video/DVD
- Wicked Weed Video/DVD Review Part 2 Template 2Page 53
- Weedy Web Guide 2 Template 13.....Page 74
- Weedbuster Investigation Template 14Page 75

Activities:

- 1 Read the story 'The Tale of Wild Woolly'. In groups investigate the how and why of weed introduction. Use the Pest Plant Fact Sheets and a world map to chart the introduction of some of the Bay of Plenty's common invasive weeds. Be sure to include the reason behind why each weed was introduced e.g. privet was introduced from China as an ornamental and hedging plant. Make a class wall display with your findings.
- 2 Watch the Wicked Weed Video/DVD to find some of the ways in which weeds are spread. Complete Part 2, Template 2, of the Wicked Weed video/DVD review.
- 3 a Investigate how weeds are spread using the Landcare Research website. Answer the questions on Weedy Web Guide 2, as you navigate through the site. You may like to work in small groups. Discuss as a class and add any new ideas to your Pool of Knowledge.
- 3 b Conduct investigations into seed transport. Use the 'Weedbuster Investigation' to look at how humans and livestock can transport seeds. (note: socks simulate the hairy feet of livestock (sheep, cattle etc) that transport seeds while an additional investigation into how cars can carry seeds shows how humans can transport seeds too.) Go on to create your own investigation.
- 4 Design a poster that shows the ways in which humans spread weeds around. Suggest how we can help to halt the spread of weeds, for example, by taking garden rubbish to the dump.



- 5 Getting Creative. Use your knowledge gained in the previous activities to create a story, poem or cartoon strip that shows how a particular weed has come to New Zealand and how it has spread around. Share your learning with your class – you may be able to turn someone's creative ideas into a class play.

Extra activities:

- Why do weeds do so well in New Zealand? Investigate the climate and terrain of the countries where some of our weeds originally came from. Are there similarities between our countries that could suggest why they like it here? Why are they not a problem in their home country? See www.landcareresearch.co.nz – 'Why do some weeds grow better than native plants?'
- Put yourself into the shoes of an international traveller who has visited a farm in England and has bought his/her gumboots back home. What would you have to consider when bringing your gummies home? Go to the school section at www.protectnz.co.nz and check out the 'New Wicked Biosecurity Website' link made just for kids. Design a pamphlet or brochure to inform other people about what to do when you arrive back in New Zealand from an overseas trip.

Reflection:

- How have weeds been introduced into New Zealand?
- How could you and your family help to stop the spread of weeds?
- Add any new ideas to your Pool of Knowledge.

Teachers' notes:

Weeds have been introduced into New Zealand in a variety of ways.

Historically, settlers coming to New Zealand missed the familiar plants of home so they brought some with them for crops, food for livestock (e.g. wheat and barley) and for their gardens (e.g. gorse, woolly nightshade and privet).

The large movement of troops and equipment during World War II also accounts for weed introduction.

More recently weeds have been introduced for agriculture (pasture grasses) forestry (pine trees) and horticulture (kiwifruit). Many people grow plants in their gardens that are from other countries because they are pretty while over half of New Zealand's aquatic weeds were introduced as ornamental plants for fish tanks!

Seeds are spread into new areas in four main ways;

Wind - some seeds have a shape adapted for being carried in the wind e.g. pampas seeds are like feathers).

Water - seeds and fragments of stems from plants living close to waterways are transported by rivers and streams to new areas e.g. Wandering Willy.

Animals - animals such as birds and lizards eat the fruit of weeds and fly/run off with the seeds inside their gut. Eventually the seeds are passed out of the gut unharmed in the animal's poo. e.g. wild kiwifruit and woolly nightshade.

The plant itself - some plants have seed pods or seed heads that burst open, dispersing the seeds into the environment e.g. gorse and moth plant pods.

Weeds can also be spread by vegetative dispersal where stems break off and re-root where they land e.g. Wandering Willy, or some have long roots or runners that can produce shoots from the mature plant e.g. blackberry, kiwifruit.

Humans are also responsible for weed transport by dumping garden rubbish on roadsides and in the bush, selling weeds in nurseries, dumping fish tank plants into local waterways, picking up weeds or part of plants on vehicles and boats and by trampers carrying seeds in their boots.

Source: Landcare Research website – www.landcareresearch.co.nz



How do we manage weeds?

Learning outcomes:

- Students can describe different methods used to manage weeds.
- Students can explain the different safety procedures used with each control method.

Resources required:

- Pest Plant Fact Sheets
- Pest Plants and animals of the Bay of Plenty booklet
- Wild Weed Wipeout – Part Two Template 6Page 64
- Wild Weed Crime File Template 15Page 76

Activities:

- 1 Investigate the different control methods used by Pest Plant Officers and land owners in the fight against weeds. Use the Pest Plant Fact Sheets and the 'Pest plants and animals of the Bay of Plenty' booklet for your research. Be sure to include any important safety tips when using different control methods! You may find a chart helpful to record your findings with the headings 'Weed', 'Control methods', 'Safety tips'.
- 2 Round Two Match Up - Native Plants versus Weeds. Play the game 'Wild Weed Wipeout - Part 2' to help demonstrate how weeds can be managed and explore the concept of interdependence in the environment.
- 3 Wild Weed Crime File – Wanted for crimes against the environment! Create a crime file poster with all the important facts about your weed. Check out the example in Template 15.

Extra activities:

- Independent close reading and inquiry – explore the different methods of control for weeds as listed in the Pest Plant Fact Sheets and 'Plant Pests of the Bay of Plenty'.
- Investigate the differences between the use of chemical and organic control methods. Think about cost, the length of time for eradication to occur and impacts on the environment.

Reflection:

- How does Environment Bay of Plenty manage weeds?
- What safety tips do we need to consider when using each method of control?

Teachers' notes:

Environment Bay of Plenty's Regional Pest Management Strategy gives an indication of the relative importance of the weeds that Pest Plant Officers actively control.

See Appendix 1 for a summary of the weeds classified under 'Eradication, Total Control, Progressive, Boundary and Regional Surveillance'.

Weed control methods

There are four basic weed control methods:

1 Mechanical control

At the simplest level, this involves simply pulling weeds out by hand. In some situations machines may be used to mow weeds. Machinery is often used to dig out willows on a river bank or to crush gorse in a paddock. Diggers are often used to remove aquatic weeds that are choking drains. Boats with special equipment have been used to remove weeds from lakes.

2 Chemical control

There are hundreds of chemical formulations, known as herbicides, which are used for the control of weeds. They act in different ways and have different uses. They are all toxic to a greater or lesser extent and should be used with caution. Children should never be allowed to use them and adults should always wear protective clothing and follow the label instructions carefully.

There are two main groups of herbicides:

- Those which act on **contact** with the plant and only destroy the plant material directly exposed to the chemical and have no effect on the root system, e.g. paraquat (Preglone).
- Those which are **systemic**, i.e. the herbicide is translocated from the leaves around the plant in its sap so that the entire plant is killed, e.g. glyphosate (Roundup).

Some herbicides, such as glyphosate, will kill many different kinds of plants. Others are more selective such as Grazon which has little effect on grasses and is therefore often used by farmers.

Some herbicides remain in the soil for some time, e.g. Escort, while others are quickly biodegradable, e.g. glyphosate. Some are particularly toxic to fish and should never be used near waterways. Spray drift can be a problem, damaging nearby plants or



people. Orchardists are particularly wary of this problem.

3 Cultural control

In this category are activities such as:

- Planting native plants which will eventually shade out weeds.
- Careful stock management on farms which can minimise the spread of some weeds.
- Gardeners disposing of their weeds responsibly and not dumping them down a convenient nearby bank.
- Not allowing nurseries to propagate or sell invasive plants.

4 Biological control

Notes in next lesson.

What is biological control?

Learning outcomes:

- Students can describe what biological control is and can name a biological agent used for one of our common weeds.

Resources required:

- Landcare Research Fact Sheets or Internet site – www.landcareresearch.co.nz
- WeedBuster Wordfind Template 16..... Page 77

Activities:

1 Group Case Study. Choose a biological control agent used for one of our common weeds e.g. ragwort flea beetle used to help control ragwort. Research these questions and present your case study in an interesting format.

- What is the name of your biological control agent?
- Where does it come from?
- How does it work?
- Is your biological control agent successful in controlling your chosen weed?
- Are there any special safety procedures or things to consider with your agent?
- Draw a picture of your biological control agent.

2 Complete the WeedBuster Wordfind on biological control. Find and write the meanings to any words you are unsure of.

Reflection:

- Can you describe what biological control is?
- Add any new ideas to your Pool of Knowledge.



Teachers' notes:

Biological control is when one living organism is used to control another.

In recent years insects and fungi have been found which eat or damage particular species of plant. These insects are often bred and released to help deal with a particular weed problem.

All of our weeds are introduced plants which arrived here without the natural biological controls associated with them in their countries of origin. A good example is ragwort. The ragwort flea beetle was introduced into New Zealand a few years ago. It can only survive on ragwort. It lays its eggs at the base of the plant and these hatch into larvae. The larvae eat the roots of the plant, eventually killing it. It has been a very successful method of controlling ragwort and its population, and once introduced to an area is self sustaining. It has had obvious benefits for farmers.

Landcare Research is the organisation who research and import biological control agents. Biological control will rarely wipe out a plant but are a useful control aid. New biological control agents undergo years of trials and studies before being released. Scientists have to make sure they will not harm any other plants, carry diseases or pose any threat to the environment.

Part 2: Explore - the field trip

Overview:

The field trip is a chance for hands-on learning in the environment. Contact us for advice on weeds and weed walks in your local area. Alternatively, take your pest plant guide and design a weed walk through your school grounds, local gully, garden, bush or reserve, as described over the page.

Timeframe:

You could spend either a half or full day out in the field.

Key concepts:

- Knowing and finding plants that are weeds.
- Investigating how weeds may have got to the areas you find them in.
- Discussing possible action projects to improve your local environment.
- Being out in the environment is a fantastic learning opportunity for classes. It enables students to explore, investigate, work together and experience the outside environment. Arranging a field trip or even an exploration of your school grounds is central to the learning.



Weed walk

Learning outcomes:

Students will be able to

- identify weeds and weedy areas in their local environment.
- assess the impact weeds have on the environment.
- identify possible action projects to help the environment.

Possible explorations IN the environment.

Weed walks

- Explore your school grounds, local park, reserve, farmland, gully, bush or community area for weeds and weedy areas.
- Map your school or local area showing the names of the weeds, where weeds were found and their numbers. You could collect this data out in the field then graph or map the information back in class.
- Use the Weed walk ID Sheet Template 17 (page 78), 'Plant Pests of the Bay of Plenty' and Environment Bay of Plenty's fact sheets to help students identify weeds and assess the impact they have on the environment.
- Record your exploration and weed finds with a digital camera or video/DVD camera. The images could be used back in class for identifying purposes or as part of an action project.
- Investigate how weeds may have got to the areas where you found them. Are there any obvious signs, for example seeds, boats, vehicles?
- Check out the differences between weeds and native plants. Conduct leaf or bark rubbings of weeds (non-poisonous) and natives and compare their characteristics.
- Explore the surrounding habitats of weeds and natives for animals or insects. Compare the amount and variety of things found. Why might there be differences?
- Contact a local person who may be affected by weeds (farmer, gardener or horticulturist) and invite them to join you on your Weed walk. They could provide some great expertise or a different viewpoint.
- Explore some common weeds for biological control agents at work, e.g. gorse or ragwort. Investigate the seed pods of gorse or the root structure of ragwort to see if the biological agent is present.

Making a weed collection (or herbarium)

Learning outcomes:

- Students can identify, dry, label and display weed samples collected from their local environment.

Teachers' notes:

The aim of this activity is to create a weed collection or herbarium that will help to build a picture of weeds in your area, school ground, property or backyard. Once completed your class's herbarium could become a useful tool to help others identify and recognise weeds and may become part of an action project.

Note: When out in the environment collecting weeds it is important to take safety into account. DO NOT collect any parts of the following plants as they may be harmful to your health; Woolly nightshade, Moth plant and Privet.

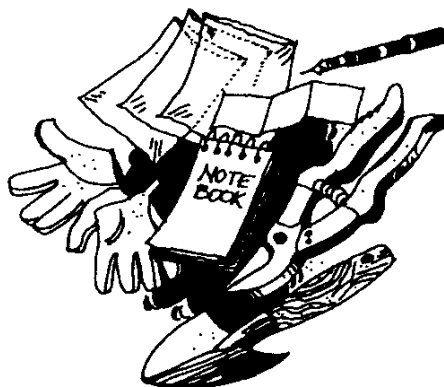
Part A - Finding weeds in your area

For this part of the activity, you will need to look for and collect weeds in your area.

What you will need

To collect three weeds, you will need:

- three plastic bags – ziplock bags are good
- three labels
- a notebook
- pencils
- secateurs and a trowel
- gardening gloves



What to do

- 1 When you did the 'investigate' section you would have found out what weeds you have in your area. Ask the students: what are the characteristics of a weed? How can you tell that a plant is a weed?

Look for the following signs.

- A creeper or climbing plant that has smothered all other plants and trees in an area.
 - A plant that has formed dense stands which may be impenetrable or very prickly.
 - A plant that has taken over an area (for example, choking a stream bank).
 - Ask local residents or gardeners.
- 2 Once you have found a weed or what looks like a weed, take time to look at it before you collect it.

Note: When out in the environment collecting weeds it is important to take safety into account. DO NOT collect any parts of the following plants as they may be harmful to your health; Woolly nightshade, Moth plant and Privet.

- 3 Sketch your weed and write down some observations about the plant. For example, note the flower colour, draw what the seeds look like, record the size and shape of the plant, and why you think it is a weed.
- 4 Collect your sample. This should include samples of different parts of the plant i.e. a leaf, seed, flower, piece of stem or root. This is very important when you come to identify the plant later on. It is difficult (and sometimes impossible) to identify plants from leaves alone.

The following checklist should help.

- Try to include flowers, fruits (even if they are woody) and leaves when you collect your weed. Also include bark, seeds and roots of the weed if you can.
- For weeds that are trees or shrubs take a small branch, collect flowers, fruits and seed and some bark, if possible.
- For a small plant or grass, it is best to include the whole plant.
- If the plant has underground runners, stems, bulbs or tubers, a sample of these should also be included.

It may take several goes to collect all parts of the plant. Keep looking.

- 5 Put your specimens in a plastic bag to take back to the classroom. Put a label or sticker on each plastic bag. Be careful not to drop plant fragments or seeds on the way. (Be careful not to leave your plastic bags in the sun, or your plant samples will wilt.)

Part B - Preserving and identifying the weeds

What you will need

You will need the following to preserve three weeds:

- plenty of newspaper
- heavy books
- three sheets of paper (about the size of one tabloid newspaper sheet or A3)
- pencils and a ruler
- clear glue
- scissors
- three herbarium labels Template 18..... Page 79

What to do

Recording information about the weed

- 1 As soon as you get back to the classroom, record information about the plant on the herbarium cards you have made or use Template 18. Record a collection number, your name, when you collected the plant, and where from. Also record how the plant was growing and why you identified it as a weed.

Pressing and drying your weed samples

- 2 Spread your weed sample on half of a sheet of newspaper. You may have to trim the weed to show important details such as the flowers and fruits. Remove any crumpled leaves. Make sure you keep each plant separate.

It is important to arrange and dry plant samples carefully. Damp plants will become mouldy and, if not carefully arranged, the features of the plant are hard to see.

- 3 Fold the piece of newspaper over to cover the plant sample.
- 4 Separate all weed specimens by several sheets of newspaper (put three pages between each weed). Heavy books and house bricks are sometimes used for pressing plants.
- 5 You should change your newspaper regularly until your weeds are dry (this may take up to three to four weeks). During the first week, change the paper every second day, then two or three times for the following weeks.



Mounting weed specimens

- 6 When the weed has dried, lightly fix the specimen to one of the large sheets of paper, using clear glue. Leave space to stick the herbarium card you have filled out in the top right-hand corner. Make sure that you attach the right herbarium card to the right weed.
- 7 Allow the glue to dry before placing the weed specimen in clear plastic sleeves. Any weed seeds can be placed in a packet or an envelope and stapled to the sheet of paper.

Identifying your weeds

- 8 Using the characteristics you wrote down as well as the weed sample you have mounted, identify your weeds using Environment Bay of Plenty's 'Pest Plants of the Bay of Plenty' and fact sheets. You may have already identified your weed out in the field. Create a classroom display of your weed samples.

This activity was adapted from the SchoolLink Information Sheets, produced by Greening Australia-Queensland.

Part 3: Take Action!

Overview:

Taking part in an Action Project gives students the chance to put all their learning into practice. Students become the decision makers and feel empowered when planning and completing an action project. Taking action for the environment is about taking responsibility and knowing you can make a difference.

Use the Action Planner as a guide to clarifying ideas and planning your project and the Action Evaluation as a means of explaining and justifying your project. See our website www.envbop.govt.nz for information about our Environmental Enhancement Fund to see if you qualify for funding.

Timeframe:

Action projects may take any length of time. If you are removing and replanting a 'weedy' site you may adopt the area and return every term to check out its progress or alternatively students may decide to do a one-stop flyer drop in their local neighbourhood.

Key concepts:

- Developing a sense of responsibility for the environment.
- Participating in an action project that will benefit the environment.
- Everyone can make a difference.
- Respect for other ideas in the action planning and decision making process.



Action ideas

Learning outcomes:

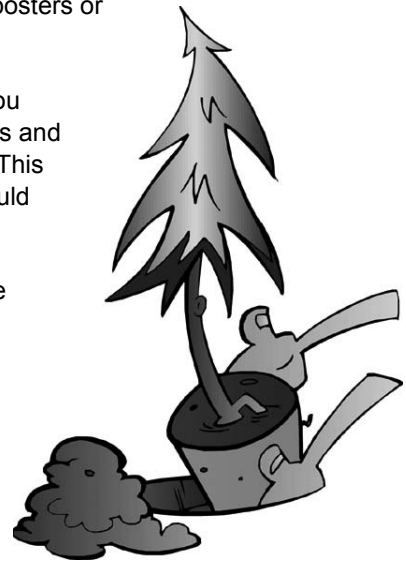
- Students will take part in an environmental project, developing a sense of ownership, responsibility and take action for the environment.

Resources required:

- Action Planner Template 19 Page 80
- Action Evaluation Template 20 Page 81

Action ideas

- Design pamphlets about the weeds found in your local area. You could include information about why they are a problem and how people could get rid of them. You may be able to send the pamphlet home with your school newsletter or do a drop in your local neighbourhood.
- Create bright and informative posters to be displayed in your school or even at your local library or shopping centre. Get the weed message out into your community.
- Organise a weed event at your school and invite your community. You could set up a weed walk around your school grounds and create labels for each plant. This can be a great chance to show off your Pool of Knowledge, crime file posters or even your dried herbariums.
- Adopt an area in your school or local community that you could take care of. You may have to get rid of the weeds and prepare the ground for a new planting of native plants. This could be an on-going action project that your school could be responsible for weeding and maintaining.
- Organise a weed swap where people are given a native plant for every weed they bring in. You may be able to get native plants donated and arrange for the swap to take place at your local transfer station to encourage people to get rid of their weeds properly.



- Put on your green fingers and have a go at growing native plants. Get in touch with your local plant nursery and see if they can provide some expertise. You may be able to set up your own propagating unit and plant the native plants you grow in your school grounds. (see the Trees for Survival programme www.treesforsurvival.org.nz) for information on how you could set up a growing unit in your school.
- Set up your own school environmental group. Arrange meetings and plan how you could inform other kids in your school about weeds and other environmental issues.
- Undertake the Gorse Spider Mite biological control study. You may get up to a stage where you could be releasing them in your local environment.



Gorse spider mite study

The following is a possible action project that students and teachers could investigate, if feasible. The gorse spider mite is a common biological control agent used for gorse and is relatively easy to rear. You may have found it out in the field during the 'explore' section.

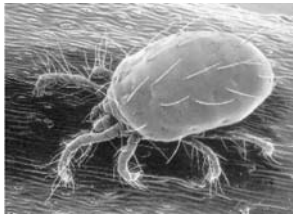
How to rear gorse spider mites

Spider mites live in communal webs on gorse bushes.

The adults are brick red in colour, females are smaller than the size of a pinhead and the males are even smaller.

New adults feed for two weeks before they begin to breed. The warmer the temperature the faster gorse spider mites can breed. The entire life cycle, from egg to adult, takes around 6 weeks at 15°C, but can take only 3 weeks at 23°C.

Eggs are brownish and laid in clusters tucked in close to the gorse stems. Spider mites have six juvenile stages. Juveniles are smaller and more orange in colour than adults.



Gorse Spider Mite viewed under a microscope



Adult spider mites and eggs viewed under a microscope

Materials needed for your spider mite colony

- rearing cage
- fluorescent lamp
- timer for lamp
- gorse sprigs*
- trays for adults and nursery
- oasis foam (from the florist)
- milkshake containers

* Fresh gorse sprigs 20-30cm long will need to be harvested by students weekly/fortnightly.

Setting up the spider mite breeding colony

Step 1:

Place the rearing cage in position in your classroom, away from direct sunlight.

Step 2:

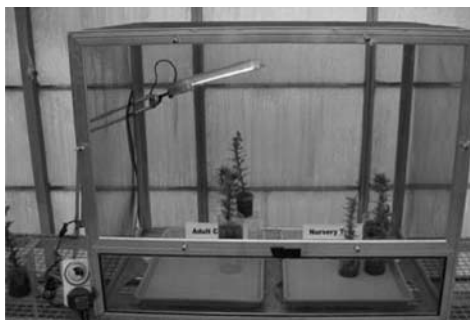
Set up the fluorescent light in the corner of the cage and plug into a power point using the timer.

Step 3:

Set the timer for 16 hour days and 8 hour nights, i.e. Set it to come on at 6am and go off at 10pm.

Step 4:

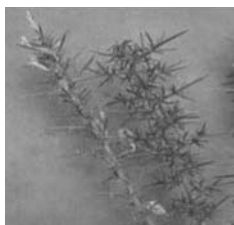
Place the nursery tray and adult tray inside the cage. On the adult tray put the sprig with the supplied mites.



Harvesting gorse sprigs

Fresh gorse sprigs will need to be collected regularly to replenish the mites food supply. Locate a healthy infestation of gorse.

Using a sharp pair of secateurs, take cuttings/sprigs from mature plants, approximately 20 - 30 cm long. The mites prefer the harder, older growth that is at least a few months old. It is a good idea to wear thick gloves (e.g. welding gloves) to protect your hands from the spines of the plant.



As the sprigs are collected, place them into a plastic bag. Seal the bag until the food is ready to be used. When transporting the bag containing the food material, ensure that it is not left in direct sunlight, as this will cause the material to deteriorate and wilt. The mites will not feed on poor quality food. A healthy food supply is required to maintain a healthy colony of spider mites.

On Mondays, collect enough cuttings/sprigs to supply the spider mites with food for one week. Store extra sprigs in a cool environment, preferably in a fridge, in a sealed plastic bag for up to a week. Discard any unused cuttings on Fridays and collect fresh sprigs again the following week.

Adding new sprigs to the gorse colony

The gorse mites will feed and lay eggs all the way up the stem of gorse. When they reach the top it will be necessary to add a fresh sprig of gorse.

Gorse spider mites are attracted to the light and will move together as a colony towards the tip of the sprig as they feed. The mites will not descend the sprig to feed once they have made their way to the top. They will remain in large numbers, spreading out to the ends of the webbing, congregating together on the gorse spines. Once the mites begin clustering at the top of the shoots, they must be transferred to new food material so that they do not starve. If fresh gorse is not supplied the mites may run off the gorse looking for food.



Gorse spider mites in their communal web.

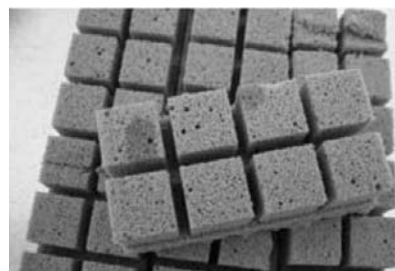


Gorse spider mites ready to migrate. They have come together in an icicle-like drip.

NB. How fast the mites move up the cuttings and cluster at the ends of shoots will depend on the temperature and how fresh and healthy their food supply is.

Step 1:

Place some Oasis foam cubes into a container and fill with water until the oasis is completely wet, tip out any excess water. Ensure that the foam is kept wet at all times.



Step 2:

Take a freshly collected sprig of gorse, and remove the lower spines by pulling them downwards so that there is 4-5 cm of clear stem to hold. Insert the stem of the fresh gorse sprig into the Oasis foam. Only insert the stem about half way.



Step 3:

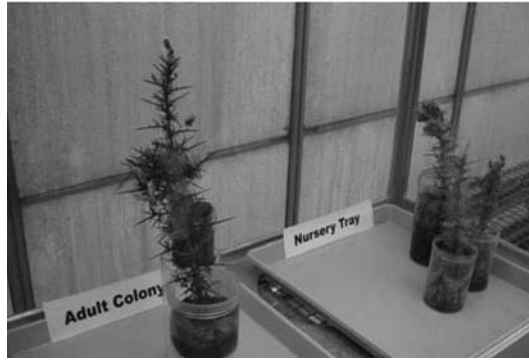
Place this fresh cutting in the container alongside the original sprig. Arrange the original sprig so that it sits on an angle, its tip in contact with the base of the fresh cutting. This will allow the mites to transfer themselves onto the new cutting. It may be necessary to stand the fresh sprig on top of another container to ensure that the mites transfer to the bottom of the new sprig.



Step 4:

Once the mites have moved across to the new cutting, do not discard the original sprig. It will contain tiny eggs and juvenile mites left behind by the advancing breeding colony. The original cutting should now be placed on the tray labelled 'Nursery'.

There should now be two trays in your rearing cage, one with the advancing 'Adult' breeding colony and another set up as a 'Nursery' for the eggs and juvenile mites.



When the adult mites again begin clustering at the top of the cutting in your breeding colony, repeat the above steps. Remember to keep the old sprigs and place them in the 'Nursery'. The juveniles may also move up to the top of the sprig when there is no food left. When this happens, use the same method to transfer them to a new sprig as was done with the adult colony.



Useful websites

www.envbop.govt.nz/Land/Plants/Fact-Sheets.asp

- Environment Bay of Plenty fact sheets online.

www.weedbusters.co.nz

- National Weedbusters website with resources and latest news.

www.arc.govt.nz/environment/plants-and-animals

- This website has a “search for a plant” section.

www.landcareresearch.co.nz/education/index.asp

- Weeds in New Zealand website- teaching resources and activities.
- Biological control information- basics, safety, guidelines for release, success stories.

www.biosecurity.govt.nz

- Good information and resources for schools.

www.doc.govt.nz/templates/defaultlanding.aspx?id=32841

- Department of Conservation management strategy on weeds and weed information.

www.rnzih.org.nz/pages/weednameslist.htm

- Royal NZ Institute of Horticulture.
- Image Gallery of NZ weeds and book references.

www.forest-bird.org.nz/enjoynat/backyardHabitat/Index.asp

- Forest & Bird Backyard Biodiversity information.
- How to create a native habitat in your backyard including ‘Dealing to invasive weeds’ and ‘Planning your native habitat’.

www.maf.govt.nz

- Some information on weeds and regulations.

www.livingheritage.org.nz

- Celebrating New Zealand's heritage and taonga.
- Create a class/school website about a weed/ecosystem project you are working on.

www.niwa.cri.nz/rc/prog/aquaticplants

- New Zealand Institute of Atmospheric and Water research.
- Aquatic weed management.
- Suggested action projects for schools 'What can you do?'

www.weedbusters.info

- Australian Weedbusters Website- activities and resources, information about Australia's Weedbuster Week.

www.nrm.qld.gov.au/education

- Queensland Government Natural Resources and Mines.
- Fact sheets, teaching resources and information on 'Developing your schools grounds for learning and education'.

www.treesforsurvival.org.nz

- Charitable trust promoting the growing and planting of native trees.

www.enviroschools.org.nz

- Enviroschools programme website.

www.botanical.com

- Plant photos and references.



Funding options

Weedbusters – www.weedbusters.co.nz/funding/initiative_fund.asp

- Up to \$2,000 per application. Download application form from this website.

Mazda Foundation – www.mazdafoundation.org.nz/guidelines.aspx

- Three funding rounds 31 March, 30 June and 30 September for environmental conservation and awareness as well as an education section.

Tindall Foundation – www.tindall.org.nz

- Funding for Environmental Education and Habitat Protection.

Lottery Environment and Heritage Grant – www.cdgo.govt.nz/available-grants/

- Projects that promote, protect and conserve New Zealand's natural, physical and cultural heritage.
- Four funding rounds: 26 February, 21 May, 20 August and 19 November.

NZ Glass Environmental Fund – www.recycleglass.co.nz/fund.htm

- To give students an opportunity to undertake environmental studies.
- Between \$250 and \$10,000.
- Expressions of interest due 31 March. Full applications close 31 May.

WWF Environmental Action Fund – www.wwf.org.nz/index.php/new_zealand_conservation/education/the_learning_fund/

- To support schools & communities who, as part of their learning, are taking hands-on action to address an environmental issue.
- Two funding rounds: 1 April and 1 September.

Environment Bay of Plenty - Environmental Enhancement Fund – www.envbop.govt.nz/Environmental-Enhancement-Fund.asp

- Funding requests for less than \$5000 can be made at any time throughout the year.
- Funding requests for \$5,000+. Applications open 16 June and close 31 July.

Glossary

Aquatic weeds - weeds that live in waterways (e.g. lakes, rivers, streams).

Biodiversity - the number and variety of all life-forms: all the different plants, animals and micro-organisms (e.g. bacteria), the genes they contain and the ecosystems they form.

Biological control - when one living organism is used to control another.

Communal - living together as a group.

Control - to stop a plant growing and spreading by removing it, cutting it, using herbicides or biological control agents.

Ecology - the study of how organisms relate to each other and their environment.

Ecosystem - a group of plants and animals and micro-organisms that interact and their physical and chemical environment.

Endemic - naturally occurring in a country and nowhere else.

Eradicate - to destroy or get rid of completely.

ERMA - the Environmental Risk Management Authority, which controls the importation of new organisms.

Fly - insect with only one pair of wings.

Forestry - growing trees for timber or woodchips, etc. (e.g. pine plantations).

Horticulture - commercial growing of flowers, fruit or vegetables.

Indigenous - native to a country but may be found naturally elsewhere.

Introduced species - have been accidentally or deliberately introduced by people. Not found naturally in New Zealand.

Infestation - to inhabit or overrun in large numbers.

Insect - small invertebrate animal with six legs, 2-4 wings, and a body divided into three parts (head, thorax and abdomen).

Interdependence - the relationship between all living things and their physical environment.

Invasive - naturalised plants that have spread from the place of introduction and are taking over habitats.

Invertebrate - small animal without a backbone spinal column.

Kaitiaki - guardian.

Manage - to keep under control.

Monoculture - a large area covered by a single plant species (or a single plant variety).

Native - found naturally in New Zealand.

Naturalised plant species - species that have escaped from cultivation (gardens, forest plantations, etc.) and can reproduce (without help from people).



Natural enemies - Predators, parasites, diseases of an organism (plant or animal) that help to keep the population (numbers of organisms) under control.

Niche - a situation specially suited to nature.

Organism - an individual plant or animal.

Pest Plant - another name for weed.

Seed dispersal - seeds are carried away from the parent plant (e.g. by animals, wind, water). The plant can spread when a seed is carried to a new environment suitable for growth.

Sustainability - using natural resources in a way that ensures they are there for future generations and maintaining the balance between the social, economic and environmental needs of people and those resources.

Vegetative dispersal - some plant species have stems that break and can form a new plant. Roots may grow underground and pop up or produce new shoots and form a new plant.

Weed - a plant growing where it is not wanted.

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Environment Bay of Plenty (1999). Bay of Plenty Regional Policy Statement, Environment Bay of Plenty Regional Council, Whakatane.

Environment Bay of Plenty (2003). Bay of Plenty Regional Pest Management Strategy. Environment Bay of Plenty Regional Council, Whakatane.

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Stanley, Margaret. Manaaki Whenua Landcare Research, <http://www.landcareresearch.co.nz/education/weeds> (accessed August 2002).

Environment Bay of Plenty Regional Pest Management Strategy:

Plant pests

This is a brief summary only. Refer to the strategy for the full text.

Eradication pest plants

Low incidence, high threat.

Environment Bay of Plenty will monitor and destroy infestations found.

Alligator weed	Kudzu vine	Marshwort	African feather grass
Nassella	Royal fern	Senegal tea	Water poppy
Spartina	White edged nightshade		

Total control pest plants

Low incidence, high threat.

Environment Bay of Plenty requires land occupiers to control infestations on their land and works with industry groups to assist with control.

Wild Kiwifruit

Progressive control pest plants

High incidence, high threat.

Environment Bay of Plenty requires land occupiers to control infestations on their land and supports community initiatives. Environment Bay of Plenty may undertake pest control.

Apple of sodom	Asiatic knotweed	Banana passionfruit	Boneseed
Bushy asparagus	Cathedral bells	Climbing spindleberry	Heather
Lantana	Lodgepole pine	Old man's beard	Variegated thistle
Wild ginger	Woolly nightshade	Yellow flag	



Boundary control pest plants

High incidence, high threat.

Environment Bay of Plenty requires land occupiers to control infestations on boundaries with clean properties.

Blackberry within 10 m of boundary

Gorse within 10 m of boundary

Ragwort within 50 m of boundary

Regional surveillance pest plants

Uncertain incidence or threat.

Environment Bay of Plenty monitors infestations, encourages voluntary control and supports community initiatives. Environment Bay of Plenty may undertake pest control.

Blue morning glory	Cestrum spp.	Chilean rhubarb	Climbing asparagus
Darwin's barberry	Houttuynia	Italian buckthorn	Japanese walnut
Jasmine	Mexican devil	Mexican feather grass	Mile-a-minute
Mist flower	Moth plant	Pampas	Madeira / mignonette vine
Parrots feather	Privet	Purple loosestrife	Purple nutsedge
Snow poppy	Tree of heaven	Wild green-goddess lily	

Template 1: Weedbuster's quiz

1 Which of the following statements best describes what a weed is?

- a An ugly or prickly plant growing in your garden
- b A plant growing in the wrong place at the wrong time.
- c Any plant that is not a native

2 Are weeds good or bad? Explain your answer.

3 Name four weeds

a
b
c
d

4 Which one of the following is a weed? (Circle the correct answer)

- a Totara
- b Flax
- c Woolly Nightshade
- d Pohutukawa

5 True or false? (Circle the correct answer for each of the following)

- a All plants that are introduced from other countries are weeds. T / F
- b Not all weeds are introduced – they may be native. T / F
- c Many of New Zealand's weeds were introduced deliberately. T / F
- d Weeds are always ugly. T / F
- e Some aquarium plants are weeds. T / F



6 Describe three ways in which weeds can be spread

a
b
c

7 Describe two ways in which weeds affect people

a
b

8 Describe two ways in which weeds affect the environment

a
b

9 List three ways we can control weeds

a
b
c

10 List three ways you can help to stop the spread of weeds

a
b
c

Prevention is better than cure. Our best bet is to stop weeds escaping into the bush in the first place. One weed in a garden can easily spread into the bush. Be on the lookout and take action against weeds.

Template 2: Wicked weed video/DVD review sheet

Part 1:

1 What is a weed/pest plant ?

A weed is a ...

2 What can weeds damage in our environment?

3 Where can weeds be found? Give one reason why they may be living there.

1: Farm land - there is lots of open space

2: _____

3: _____

4: _____

5: _____

6: _____

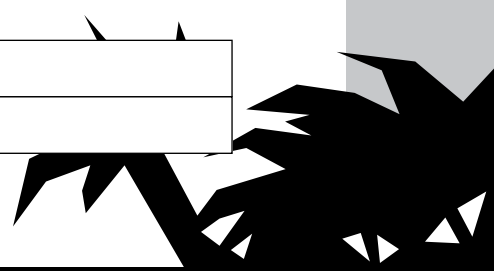
7: _____

Review your answers with the class and add any new ideas to your 'Pool of Knowledge'.

Part 2:

1 What two weeds have taken over our sand dunes in the Bay of Plenty?

2 Where do these two weeds come from?



3 Why was Woolly Nightshade brought to New Zealand?

4 How do weeds spread themselves around the Bay of Plenty?

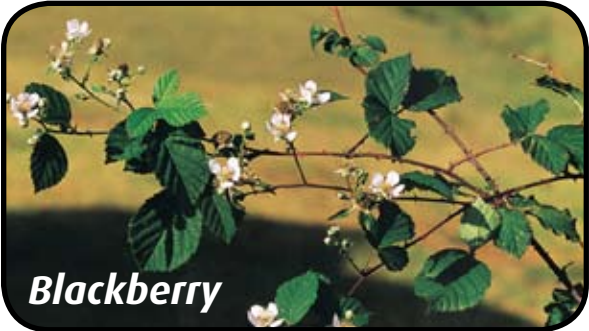
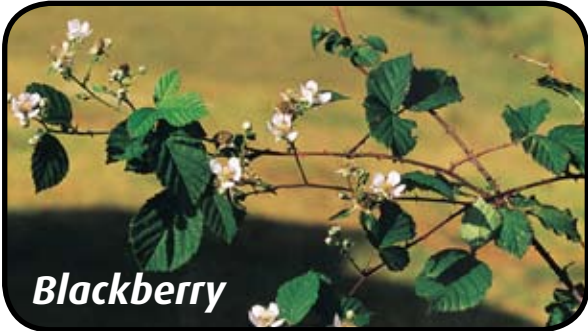
5 How can you stop weeds from spreading around the Bay of Plenty?

6 What could you plant in place of a weed that is taken out?

7 Are there any safety tips we need to remember when finding and taking weeds out?

Notes:

Template 3: GO WEED card masters





Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Privet



Privet



Ragwort



Ragwort



Wandering willy



Wandering willy



Wild ginger



Wild ginger



Woolly Nightshade



Woolly Nightshade



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.



Go Weed.

Template 4: Weed match up cards



Found everywhere and spreads quickly (5)
Can take over whole paddocks and hillsides (4)
Birds love its berries and spread them everywhere (3)
Has long, arching, prickly stems (2)
Its tasty berries can be made into jam (1)



Farmers don't like it (5)
Was brought from England to grow as hedges (4)
Grows in paddocks and pine forests and by roadsides (3)
Has bright yellow flowers (2)
Is very, very spikey (1)



A climbing plant that can smother native bush (5)
Common along roadsides (4)
Its creamy flowers have a sweet smell (3)
Has small black berries (2)
Was brought from Japan as a garden plant (1)



Often planted in gardens (5)
Is a climbing plant that can smother other plants (4)
Starry white flowers have a nice scent (3)
The flowers are used to flavour Chinese rice and tea (2)
A girl's name (1)



Introduced from South America as food for cows (5)
Each flower head has 100,000 seeds which blow away in the wind (4)
Is a kind of grass with long droopy leaves (3)
Grows in big clumps, taking over from other plants (2)
Has long feathery flower heads up to five metres long (1)

*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*





Grows into a big bush or tree with small dark green leaves (5)
 Birds spread the berries all over the place (4)
 Very common and takes over from native plants (3)
 Often grown as a hedge (2)
 Has white flowers which may cause asthma (1)



About 50cm tall with ragged leaves and an unpleasant smell (5)
 Common in paddocks (4)
 A farmer's enemy (3)
 There is a flea beetle whose larvae eat its roots (2)
 Has bright yellow flowers (1)



Has white starry flowers but does not seed (5)
 Creeps along the ground (4)
 Forms a dense mat preventing any other plants from growing (3)
 Likes to grow in the shade – especially in native bush (2)
 Any piece of the plant can make roots and grow (1)



Has thick tuberous roots that form a dense layer (5)
 Has big banana-like leaves (4)
 Does not grow very tall but spreads and nothing can grow through it (3)
 Has spectacular yellow and red flowers with a nice scent (2)
 It has a relative which produces a spice used in cooking (1)



Can grow into a small tree and become a small forest (5)
 Was brought from South America as a garden plant (4)
 Has purple flowers and yellow berries (3)
 Has big, pale, furry leaves (2)
 The crushed leaves have a very unpleasant smell, like kerosene (1)

*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



*Weed
match up.*



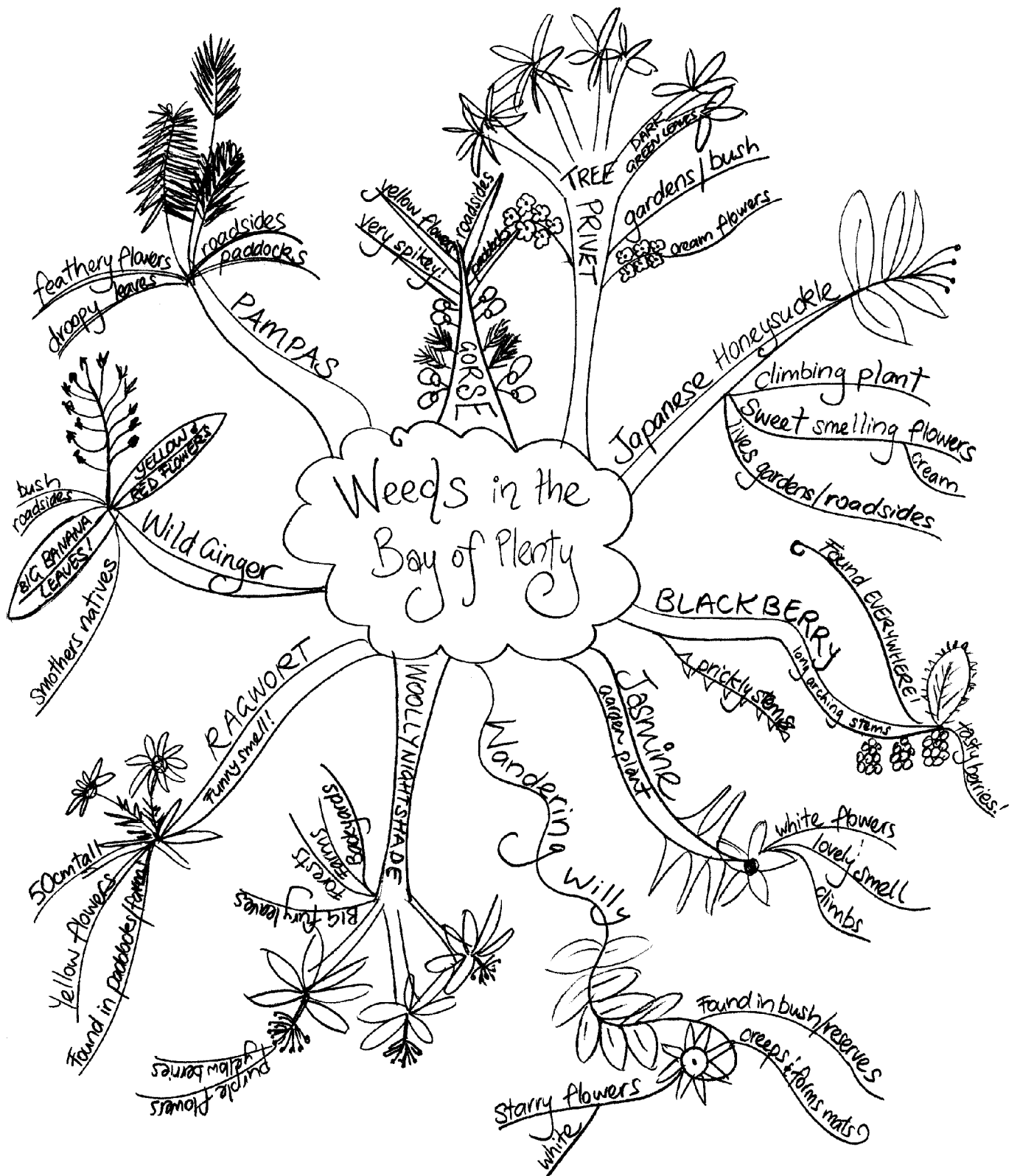
*Weed
match up.*



*Weed
match up.*



Template 5: Mind map



Template 6: Weed wipeout instruction card

Activity: Weed wipeout! – Notes for the facilitator.

Time: 20 minutes

This experiential game is about the threat of weeds and the effect they can have on an ecosystem when there are no controls in place.

Round one wipeout – The impact of weeds on native plants

- Mark out an area approx. 15m x 15m.
- Designate two people to be weeds.
- The rest of the class are all native plants. They are allowed to walk within the boundaries.
- Let the two weeds loose among the native plants. The weeds hold hands and start running around tagging native plants with their free out-stretched hands.
- The tagged native plants then die and join the line of weeds. Still holding hands in one big line the weed group moves forward trying to catch the remaining native plants with the two people on each end of the line being the only weeds able to tag. When the weed group becomes more than three they break off to form pairs.
- As more native plants are tagged their numbers decrease until none are left.

At this point STOP the game and facilitate a discussion:

Discussion and reflection

Why are the weeds so destructive? They strangle and cover native plants and with the large numbers they eventually kill all the plants.

Why are the native plants so important? Answers may include; they are special to New Zealand, they provide a habitat for the creatures that live there, they are important to Maori cultural traditions etc.

What will happen if weeds are not controlled? Biodiversity (range of plants, animals and micro-organisms) will be lost. Ecosystems will be destroyed.

Round two wipeout – Weed control.

***to be played after lesson 5**

Set out the area as in round one.

Start out with two weeds tagging the native plants. This time introduce one of the weed control measures below. The person who is designated to carry out the control measures runs around the boundary markers and at a predetermined point enters the playing area and tries to reduce the weed numbers in the following ways;

Biological Control – person ‘flies’ around and tags weeds who then become native plants.

Herbicides – place a small white disk on the ground in the playing area. If a weed stands or runs over the disks they die of poisoning and rejoin the game as a native plant.

Mechanical (weeders) – person enters the playing area and walks around tagging weeds who become a newly planted native plant.

Stop the game after five minutes to see what effect the measure has had. Start again by introducing a second measure. Stop, process, and introduce a third and so on until the plants are obviously on top. The overall effect is that the plants will be more likely to survive.

Discussion and reflection

What role do biological control, herbicides and weeders play? They make the population sustainable by helping to stop the spread of weeds.

How much energy do the control measures expend running around the boundary? More than the weeds.

What are some of the problems we face with weeds? There are no natural enemies to help keep weed numbers down. Weeds like the climate and soil of New Zealand and reproduce easily.

Do we want weeds taking over our native plants? No. Weeds threaten the biodiversity of our country and can cause health and economic problems.

Finish



Template 7: Problems with weeds

<i>Name of weed</i>	<i>Problem</i>		
	<i>Environment</i>	<i>Economics</i>	<i>Health</i>
Ragwort, thistle		Replace crops or pasture grass Reduce crop production	
Old mans beard	Smother's native plants and stops sunlight and nutrients from getting to the plant		
Privet			May cause hayfever and asthma

Template 8: Weedy web guide 1

Jump onto the Internet and type in this address (your teacher may have set it up as a bookmark).

www.landcareresearch.co.nz

Click on **Education**

Click on Weeds in New Zealand.

Check out all the fantastic information and activities. This is the home page for the Weed Website.



Find the information button and click on it. There is lots of information about weeds here. This page could be useful later on.

Find the question...Why are weeds bad?

Your challenge is...

- 1 To investigate how weeds can affect economics and the environment.
- 2 To find out what damage weeds can do to the ecosystem.

Use this web page to find out the information you need. You may like to record your answers onto your 'Problems with Weeds' chart or print out any tables or diagrams you think will help you complete the challenge.



What does the word ECOSYSTEM mean?



Template 9: Weedy feelings

Learn to understand different points of view. Here is a list of people and the different ways they feel about blackberry. Take a card and act out the role to your class.

Sheep and cattle farmer

"Blackberry takes over my land, and leaves my livestock with less grass to eat."



Volunteer weeder belonging to "friends of Dunlop's Bush Reserve"

"The only good blackberry is dead blackberry—it's really hard to get rid of."



Berryfruit producer

"Blackberries are an important part of my livelihood – without blackberries, my business would be ruined."



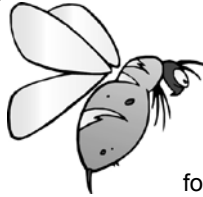
Conservationist

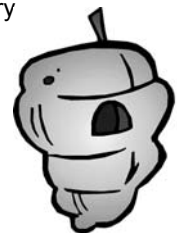
"Blackberry is spreading fast and is having a really bad effect on the ecosystem."




Bird-lover
"Blackberry is a great source of food for the birds. I love watching the waxeyes and blackbirds in amongst blackberries."




Beekeeper
"Blackberry pollen is a very important food for bees – it keeps the hives going when other flowers may be in short supply."



City worker

"I love picking blackberries, fresh fruit is good for you. I love blackberry jam too."

Fisherman

"Blackberry is a painful plant – literally. It often blocks our way to rivers and streams and we either have to turn back or spend the next couple of hours pulling blackberry prickles out of our hands."



Source: <http://www.landcareresearch.co.nz/education/weeds/weedactivities-3.asp>

Template 10: Weedy views chart

Each group on the chart has a different view about each plant. Choose one or two groups from each column and investigate their views. The following questions may help to guide your research.

<i>Pine trees in the McKenzie Basin</i>	<i>Kiwifruit in the Bay of Plenty</i>	<i>Privet</i>	<i>Nodding Thistle</i>
Forestry company	Kiwifruit growers	Gardener	Gardener/landowner
Tree pruners	Kiwifruit packhouse	Garden shop	Herbalist/naturopath
Wood mill	Lifestylers	Neighbour	Sick person
Sheep farmers	Environment Bay of Plenty	Environment Bay of Plenty	Environment Bay of Plenty
DoC	Local bush walkers	DoC	District/City Council
Tourists	DoC	Local old peoples home	Health authority
District/City Council	Forest and Bird	Forest and Bird	Food lover
Environment Bay of Plenty		Health authority	
		Local school	
		Local kindy	



Template 11a: Newspaper critique

Taming the wild kiwifruit

KIWIFRUIT grows well in the Bay of Plenty, which is good for growers and good for exports. But when it starts to infest roadsides and winds its way into native bush it becomes a weed and action has to be taken.

For the third year, Environment Bay of Plenty, HortResearch and kiwifruit exporting company Zespri International Ltd are funding contractors to tackle infestations of the weed in the kiwifruit heartland of Te Puke.

Later in the control season, which runs until April, the two-man team will spend time in other locations, including Katikati, Rotorua and Opotiki.

Environment Bay of Plenty plant pest co-ordinator John Mather says the last few years of sustained effort have seen substantial progress in controlling the population of old, well-established vines growing in gullies within the Te Puke district. Because of this, much of the current control work was with younger vines less than seven years old.

"We think we're doing pretty well in preventing the further establishment of kiwifruit as a weed. However, we can't afford to slow down."

University students, employed by Environment Bay of Plenty, will continue to record and map infestations around Te Puke and elsewhere in the region over the next few months.

**Te Puke Times,
Feb 2003**

Taming the wild kiwifruit

- 1 When does kiwifruit become a weed?
- 2 What organisations are taking action to tackle wild kiwifruit?
- 3 What other parts of the Bay of Plenty are being affected by this weed?
- 4 Find the meaning of these words: exports, infestation, sustained, substantial.
- 5 How do you think wild kiwifruit escapes out into the environment?

Template 11b: Newspaper critique

New agent in the Bay's battle against thistle

Many Bay of Plenty farmers have sporadically battled Scotch thistle for decades.

Now Environment Bay of Plenty hopes to help them fight the prickly plant pest by using biological control for the first time.

Plant pest officer Richard Mallinson recently released a batch of Scotch thistle gall fly larvae at a specially selected site near Rotorua, hopeful that the insects will thrive – and successfully breed – in the area's chillier climate.

A native of Europe, Scotch thistle gall fly (*Urophora stylata*) is closely related to the Nodding thistle gall fly, which was released in the Bay of Plenty 2½ years ago and seems to

be establishing quite well. "So we are hopeful of a similar result with this one."

It is not the fly itself but its larvae which damage thistles by affecting seed production.

Studies

Studies in Switzerland have shown that an average of four galls per flower head (and some may support 20 larvae) can reduce the amount of viable seed by 80%.

In Canada the flies attack as many as 90% of flower heads and have reduced seed production by 60%.

Scotch thistle gall flies will not kill off

thistles altogether, Mr Mallinson warns. "But, if the population grows, over time they can weaken thistles enough to make a difference for farmers in the region."

It is likely to be several years before the results of the trial are known.

Environment Bay of Plenty received larvae from Landcare Research, which imported its first shipment from Australia in 1997.

Two further shipments of the flies were imported from Australia and the United States in 1999.

Coast and Country, Dec 2002

New agent in the Bay's battle against thistle

- 1 How long have Bay of Plenty farmers been fighting Scotch Thistle?
- 2 What biological control agent has been released to fight this prickly plant?
- 3 How does this agent damage the thistle?
- 4 How do you think farmers feel about Scotch Thistle?
- 5 Find the meaning of these words: decade, thrive, viable, larvae.



Template 11c: Newspaper critique

BANANA PASSIONFRUIT

Passiflora mixta, P. Mollissima

Banana passionfruit is a climbing vine that is becoming more and more a weed nuisance. In areas of Nelson - Marlborough it is the most significant weedy vine. In Hawaii over 50,000 hectares were infested by the plant until comprehensive, and very costly, weed control work was started. It is fast growing and can quite quickly cover a small tree.

Back home in Opotiki it has been cultivated as a food plant, the fruit being quite pleasant when fully ripe. Unfortunately a lot of birds enjoy the fruit as well and the seeds are spread in their droppings. Rats and possums are probably in on the dispersal job as well. It is now quite common to see banana passionfruit in rough gullies and shelterbelts in the Tablelands - Woodlands area.

The flowers are as distinctive as the fruit. They have a long, green tube behind a bright pink star shaped flower. They do not form clusters of flowers, rather single flowers hang from the vine. The fruit starts off green but matures to be quite yellow, like a short banana.

Pull small vines out, roots and all. Larger ones need some herbicide on the stump. A strong mix of glyphosate applied as soon as the vine is cut will do the job. Environment Bay of Plenty is interested in the location of wild banana passionfruit. You can phone us on 0800368 267 if you see some.

Written by Pete McLaren, Plant Pest Officer,
Environment Bay of Plenty.

Opotiki News, Dec 2002

Banana passionfruit

- 1 What kind of plant is the banana passionfruit?
- 2 What is banana passionfruit grown for in Opotiki?
- 3 How is this weed being spread?
- 4 What does this weed look like?
- 5 What could you do if you see banana passionfruit growing in your area?

Template 12: A Tale of Wild Woolly

This is not a tale of the past, but one of the present – an environmental horror story of sorts detailing the sneaky and ruthless rise of the notorious weed Wild Woolly.

It all began when Great Grandfather Woolly Nightshade left his homeland in Brazil. As a gardener's companion he set sail for the sunny shores of Aotearoa, New Zealand. No one suspected the chain of events that would follow his migration – no one except Great Grandfather Woolly Nightshade.

This old plant was a weed on a mission – the crafty stowaway planned to take over as much of the countryside as possible and create a weed empire spanning the nation. When he arrived in Auckland, he impressed and dazzled the local gardeners with his Brazilian charm.

He was an interesting looking chap with his suits of furry green leaves adorned with purple flowers. People all over Auckland fell in love with him and before long Great Grandfather Woolly Nightshade had firmly established his family in many local gardens.

Many years later Great Grandfather Woolly Nightshade's plan of creating a weed empire has come true but there is a new leader now, the most feared, cunning and aggressive of all the Nightshade clan - Wild Woolly.

Wild Woolly's destructiveness knows no boundaries. Spread by birds, he is overrunning farmers' pastures and taking over urban reserve areas and native forest margins. People who are unlucky enough to have a run in with him often come away with irritations to the skin, eyes, nose and throat. Worst of all Wild Woolly has gained the reputation of being able to go and grow from the top of the South Island to the top of the North Island. He seems to be unstoppable.

But what Wild Woolly hasn't counted on is the special branch of Weedbusters being trained in schools around the Bay of Plenty. These Weedbusters are planning to match Wild Woolly's tactical moves at every turn by distributing his crime file around their local areas in an effort to uncover and later destroy his devious plots. These Weedbuster experts have many more tricks and action projects up their sleeves so Wild Woolly's time could nearly be up.

So the tale ends here, but the battle to rid Aotearoa of Wild Woolly still continues. As you hear this story, remember that you can help. Become a Weedbuster and keep your eyes peeled for Wild Woolly and his partners in crime. Look out the window right now, explore your garden at home or your local school's area. Do not be fooled, Wild Woolly is still at large and he must be stopped in his tracks.



Template 13: Weedy web guide 2

Jump onto the Internet and type in this address (your teacher may have already set this up as a bookmark to go straight to the Weeds in New Zealand page.) www.landcareresearch.co.nz

Find the information button and click on the question



'How do weeds spread?'

Write your answers on this sheet. Good luck Weedbuster.

Seed Dispersal:

- 1 List the four main ways that weeds are spread into new areas:

a
b
c
d

- 2 Explain or draw a picture that shows how animals spread seeds.

--

Vegetative dispersal:

- 3 Vegetative dispersal is where weeds are spread by having brittle stems which _____ easily and re_____ and take root w_____ t_____ l_____ making n_____ plants. For example wandering w_____. Some other weeds have l_____ roots or r_____ that can produce shoots from the mother plant. An example is b_____.

Humans:

- 4 Humans give weeds a helping hand when it comes to transporting them around. (Hint: Some of the words may be in colour.)
- a) Dump _____ r_____ on roadsides or in the b_____.
 - b) Sold in n_____ and _____.
 - c) Dump f_____ in w_____.
 - d) Cars, 4 _____ and m_____ carry seeds in their tyres, bumpers and m_____.
 - e) _____ collect seeds on boots and clothes.
 - f) Accidentally in s_____ c_____ or by p_____.

Well done. Check your answers with others in the class. Are there any new ideas you could add to your class Pool of Knowledge?

Template 14: Weedbuster investigations

Seed transport

Aim: To investigate how seeds move from one place to another.

Equipment: An old pair of socks.
A3 sheet of white paper
Stopwatch

Method:

- 1 Go to a grassy/scrubby area and put your socks on over your shoes. Walk around the area for one minute.
- 2 When your minute is up, stop walking and carefully take off your socks and turn them inside out.
- 3 Take your socks back to the lab (classroom) for examination.
- 4 Pull off any seeds and group them by size, shape, colour. Count the number of seeds you found and record the details on a chart. (You could graph these findings as part of the results section.)

Results: We found...

Conclusion:

Write up your own investigation. Choose from one of these ideas or make up your own.

- 1 Are seeds transported by vehicles? (take samples from car mud flaps.)
- 2 Are seeds found in the soil? (take soil samples and look for seeds.)
- 3 Do weed seeds have special shapes that help to transport them? (you could look at their different features with a microscope.)



Template 15: Wild weed crime file

WANTED

DEAD or ALIVE

**Pretty Priveta Tree
alias Privet**



Wanted for invading and taking over stands of native trees. Suspected of causing allergies like hay fever and asthma.

Description: A small to large tree with dark green glossy leaves, Pretty Priveta Tree has small cream coloured flowers that have a strong smell.

She is spread by birds who eat the berries and drop the seeds in their poo and by humans who plant her in their garden.

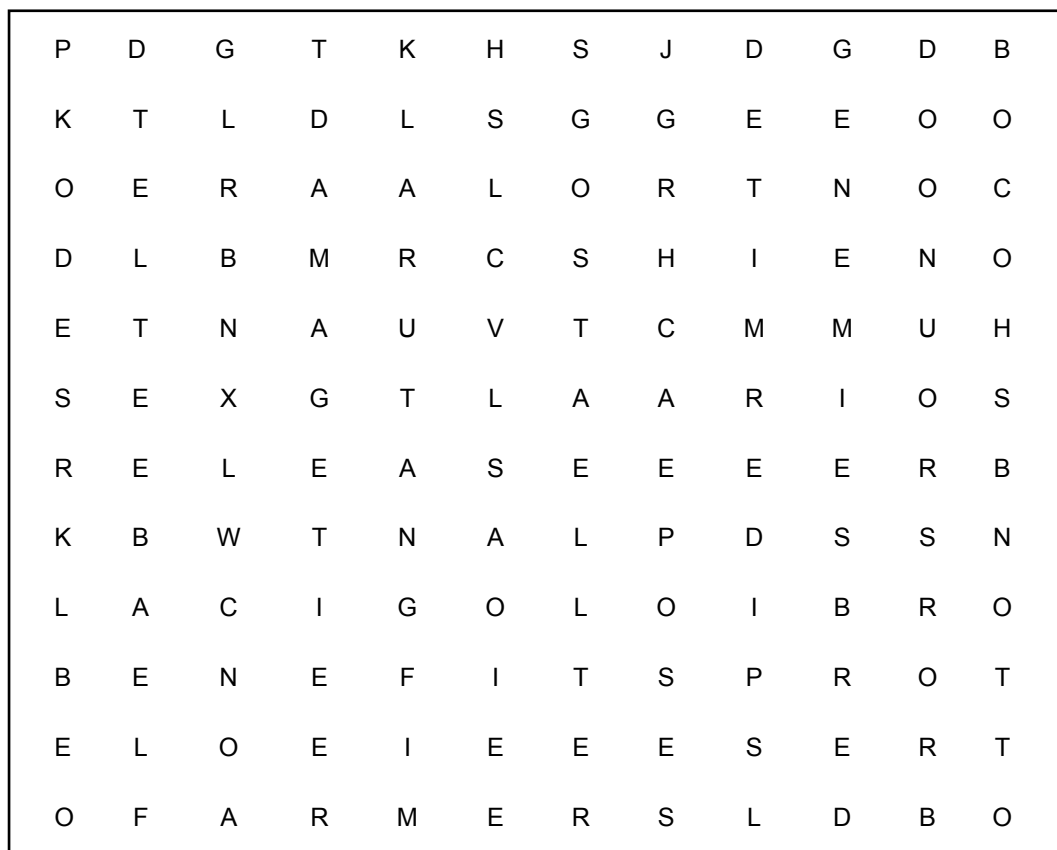
Pretty Priveta can be approached if seen on the streets.

Ways to control her: Pull or dig out her babies and get rid of them by composting or taking to green waste centre.

Reward offered: A weedbuster certificate.

Contact info@envbop.govt.nz if you see her on the loose.

Template 16: Weedbuster wordfind



The hidden words are all about biological control. See if you can find the following words:

biological

plant

eat

damage

flea beetle

spider mite

eggs

control

bred

release

larvae

benefits

farmers

natural

enemies



Template 17: Wicked weed walk ID sheet

Name of weed:

Where I found it: (circle one)

bush park garden reserve beach roadside other:

Describe the weed's habitat: (e.g. living in the shade under native plants, very wet)

What does the weed look like? (circle one)

tree

bush

vine

groundcover

shrub

Describe the weed: (e.g. height, size, shape of leaves, colour of flowers, seeds)

How do you think the weed got there? (e.g. dumped garden rubbish, wind carried seeds...)

Sketch of weed.

Flower close Up

Seed close up

Leaf close up

Template 18: Weed herbarium

Collector's name:

Collection number: Date of collection:

Plant's common name:

Botanical name:

Location: District:

Locality:

Type of plant (circle one): tree shrub vine annual water other

Weedy characteristics:



Habitat (including landform, soil, other vegetation):



Collector's name:

Collection number: Date of collection:

Plant's common name:

Botanical name:

Location: District:

Locality:

Type of plant (circle one): tree shrub vine annual water other

Weedy characteristics:



Habitat (including landform, soil, other vegetation):

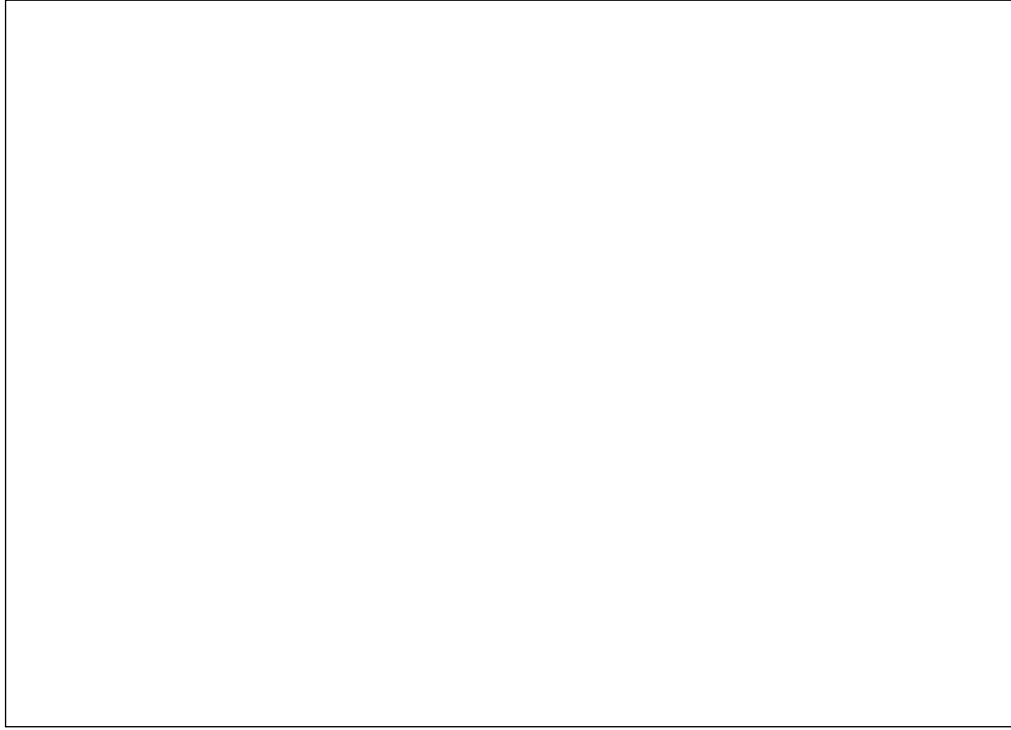
Template 19: Environmental action planner

What is the issue?	
What is your vision?	
What skills will you need to do your action project?	Who do you need to ask permission from to do your action project?
What action project could you do to achieve your vision?	
Reality Check (do these actions lead to your vision?)	Evaluation (did your actions result in movement toward your vision?)
How will you find out how people think and feel about the issue?	How will you tell others about what you are doing?
What information will you need to do your action project?	

Template 20: Action evaluation

1 What is the name of your action project?

Draw or insert a photo of your action project here.



2 Explain how you did your action project.

3 How does your action project help the environment?

4 What was the best thing about doing your action project?

5 What advice would you give to someone else who is doing an action project?

