

## Activity Title:

# Native dune plants – what lives where and why?

## Focusing questions

- What plants live on the sand dunes?
- Where do different plants live on the dune?
- What are the characteristics of different plants living on the sand dunes?
- What do different plants contribute to the dune?

## Resources required

- PowerPoint presentation – 2a Native dune plants – what lives where and why? basic or advanced (basic includes 25 native species, advanced includes 37)
- Dune plant sequence diagram – page 60
- Plant cards – page 47
- Vegetation characteristic cards – page 61
- Teacher answer sheet – page 62
- Copying: copy the dune plant sequence diagram onto A3 sheets of paper – one per group OR provide students with A2 sheets of paper to create their own version of this diagram. Copy and cut out enough sets of plant cards for one set per group.

## Prior learning

- 1a Tahatai – different coastal environments
- 1b Beach brainstorm
- 1c Beach diagram

## Method

- 1 The objective of this activity is to look at native dune plants living in the dunes – what are they? Where are they found in the dunes? What are their relative characteristics and contributions to the dune?
- 2 View the PowerPoint presentation **2a Native dune plants – what lives where and why?** before using it with the class. Identify good places to stop for discussion. Have some questions already identified. For example: Which of these plants have students seen on the beach? Why do taller plants live further back on the dunes? What are native plants? What does indigenous mean?

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Native dune plants – what lives where and why?

### Environmental Education Aspect:

About the environment

### Environmental Education Concept:

- Biodiversity
- Interdependence

### Curriculum Links:

- Social Science
- Science

### Suggested Curriculum Level:

Any

### SUSTAINABILITY TIP!

Laminate dune plant sequence diagrams and plant cards for future re-use.

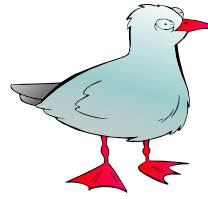


- 3 Use the PowerPoint presentation to look at **Native dune plants – who lives where and why?** There are two versions of this PowerPoint. The basic version has a reduced number of plant species represented. The advanced version has the full complement of 37 plant species represented in slides. For most groups, we recommend the use of the basic version. The remainder of this activity can be conducted irrespective of which set of slides are used. There are 25 plant species represented on the plant cards and these plants are included in both PowerPoint presentations.
- 4 Break into small groups. Each group has an A3 size copy of a blank dune plant sequence diagram (provided on page 60) or each group creates their own diagram using an A2 piece of paper. Hand out a copy of the plant cards to each group. Students place plant cards in the four different zones on the dune plant sequence diagram. Some plants might sit on the transition line between different zones. In working out what plants go where consider the following:
  - The height and other physical characteristics of the plant.
  - The plant's ability to deal with salt water, spray and sand movement.
  - How the plant is pollinated and seed spread (there are few native insects on the foredunes).
  - Soil requirements – can the plant live on sand or does it require other organic matter?
- 5 Once all plant cards have been used up hand out the vegetation characteristic cards. Place these cards along the bottom of the diagram indicating which vegetation groups have which characteristics.
- 6 Use the teacher answer sheet to correct student placement of plant cards. Note that in some cases plants can be found in more than one zone.
- 7 Consider:
  - Did each group get the same labels correct or incorrect?
  - What characteristics are evident of plants in each zone?
  - How do plants from each zone contribute to the dune system – what would the dune be like if these plants were not there?

### Possible next steps

- Conduct a comparison of the characteristics of sand dune vegetation with those of other coastal ecosystems such as estuaries.
- 2b Introduced dune plants and weeds – an activity looking at what introduced plants live on our dunes and why these are a problem.
- 2c Colonising space: the function of runners, suckers, berries and seeds – an activity that looks at the role of runners, suckers, berries and seeds amongst dune plants in the dune environment.
- 2d Plant ID – an exercise in native dune plant species identification.
- 2e Plants of the local sand dune community – a field activity to investigate what plants are growing amongst local sand dunes. Get students to draw the different plant species onto the beach diagram.

# Plant cards



## TIP!

For more detailed information on and to view other images for each plant click on the photo to go to the relevant page on the New Zealand Plant Conservation Network website [www.nzpcn.org.nz](http://www.nzpcn.org.nz)



### **Kōwhangatara, (spinifex) *Spinifex sericeus* [60cm high]**

A silvery-green spiky-looking grass that spreads quickly. Long runners grow across bare sand with plants developing along them. Animals like rabbits don't like to eat them very much but cars and people running over them do harm the soft growing tips. The seed heads look just like spiky balls and are pollinated and spread by the wind and water. Spinifex doesn't mind the salt water and spray or being blasted with sand blown by the wind.



### **Pīngao, *Desmoschoenus spiralis* [80cm]**

This plant is from the sedge family. It is a bronze-green colour but in winter it turns more gold-orange. It traps sand really well with runners like the spinifex. Pīngao is not a tough plant and is easily damaged from being eaten and tramped on. Outer leaves from the fully grown Pīngao plants are sometimes taken for weaving (kete and tukutuku panels especially). The seeds are pollinated and spread mostly by the wind. It doesn't mind the salt water and spray or being blasted with sand blown by the wind.



### **Hinarepe, (sand tussock) *Austrofestuca littoralis* [60cm]**

This plant looks like clumps of light-brown, tall grass. It has golden seed heads. There are not very many Hinarepe plants left in the Bay of Plenty, so we need to take care of them and plant more. Seed is pollinated and spread mainly by the wind. It doesn't mind the salt water, spray and being sand blasted.



### **Waiū-o-kahukura, (shore spurge) *Euphorbia glauca* [80cm]**

This is a very beautiful plant with blue-green leaves. The flowers are a deep maroon colour. It is also very good at trapping sand. It is almost extinct in the North Island - there are hardly any plants left at all here and so we need to look after them and plant more. Animals like eating it, especially rabbits. This plant can be damaged by a lot of salt spray and sand blasting. Seeds are pollinated and spread mainly by the wind.



### **Tauhinu, *Ozothamnus leptophylla* [1.5m]**

Tauhinu is a really tough plant and can handle salt the most. It sometimes grows right on top of the sand dunes where it is really windy and salty. It has small silver-green leaves and lots and lots of bunches of small cream flowers in summer time. Tauhinu can handle some salt spray and sand cover. Seed are pollinated and spread mainly by the wind.





**Wiwī, (knobby clubrush) *Ficinia nodosa* [1m]**

Wiwī is a tough plant with strong dark green stems and dark brown clusters of seeds near the tips of the stems. Wiwī is found in lots of places, from on top of the sand dunes to wet dips and hollows. It can handle salt spray and sand blasting. Seed are pollinated and spread mainly by the wind.



**Pōhuehue, (wire vine) *Muehlenbeckia complexa* and Puka, *M. australis* [variable, from 0.3 to 1m]**

This is a creeping vine which is very tough and can climb up other plants and fences. It also grows along the ground. Pōhuehue has brown stems and bright green leaves. Te Rauparaha's copper butterfly caterpillar only eat these plants; they can't live without them. The silver berries that grown on it in autumn are often eaten by pheasants. It can cope with some spray and sand. It doesn't like to live on the sand, more where there is a little soil and leaves etc for water and food. Birds, native insects and lizards pollinate and spread the seeds.



**Tarakupenga, (sand coprosma) *Coprosma acerosa* [0.5 to 1.0m]**

This plant has orange-brown bumpy stems that grow all twisted through each other. It has narrow green leaves. In autumn it has shiny blue or silver berries. Tarakupenga is not found in a lot of places any more, especially in the eastern Bay of Plenty. It can handle small amounts of salt spray and sand and does trap a little sand. It likes to live where there is some leaves and soil. Birds, native insects and lizards pollinate the flowers and spread the fruit.



**Perehia, (sand wind grass) *Lachnagrostis billardierei* [40cm]**

A native dune grass with outstanding fine gossamer-like seed heads, coloured pink when young, that were used for dried arrangements when plants were more abundant. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Anawhata, (carex) *Carex testacea* [35cm]**

This very hardy and adaptable plant is frequently seen in reserves, traffic islands and increasingly in garden plantings. The flowing rich orange tussock-like foliage sways in the wind. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand).







**Taupata, *Coprosma repens* [2-3m]**

The very shiny bright green leaves of this native plant are well known in many gardens globally, but it now occurs only locally on our dunes, although it would have formerly been abundant. The numerous contrasting orange berries are attractive and great food for native birds and reptiles through summer/autumn. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Toetoe, *Cortaderia fulvida* [1m leaves, 3m flowers]**

Many people confuse this graceful native dune inhabiting plant with the invasive pampas grass. It is smaller, less common and more elegant than pampas, and does not have the large accumulation of dead leaves that burn easily or harbour rats. Flowers in spring/early summer, compared to autumn for pampas, and is not a weed threat. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Oioi, (jointed wire rush) *Apodasmia similis* [90cm]**

Not a common plant on our dunes, preferring damp hollows; abundant on estuary margins. The stems move gently in the wind (oioi = shake gently), and are coloured from soft green to rich orange, depending on the environment they grow in. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Autetaranga, (sand daphne) *Pimelea arenaria* [20cm]**

Only about six of these attractive plants remain on the mainland Bay of Plenty dunes, although greater numbers still occur on Matakana Island. Soft green foliage clothes this multi-stemmed low growing plant. They produce many small, orange-centred, cream flowers in spring. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Ti kōuka, (cabbage tree) *Cordyline australis* [Up to 12m]**

Often considered to be a plant of wetland margins, these also grow naturally on dunes. The copious flowers are intensely fragrant, the berries are great bird food. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.





**Harakeke, (NZ flax) *Phormium tenax* [leaves 2m, flowers 3m]**

Stiff upright leaves and red flowers on tall stalks that attract nectar-feeding creatures like birds, lizards, and bees (including native bee species). Seed pods are black. Adaptable, but best planted in damper dune hollows. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Ngaio, *Myoporum laetum* [1m to 6m]**

Glossy, waxy willow shaped leaves. The open habit makes it a good shade tree, and great for kids to climb. The 10mm white flowers with red or purple "freckles" attract many insects, and are followed by large numbers of small purple berries in autumn/winter. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Karo, *Pittosporum crassifolium* [2m to 5m]**

A popular small tree in gardens. Seeds spread by birds are resulting in natural establishment of seedlings in some dunes. Leaves are similar to pōhutukawa. The deep crimson velvety flowers appear in early spring, with a delightfully sweet nocturnal scent. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Houpara, (coastal fivefinger) *Pseudopanax lessonii* [2m to 5m]**

Leathery glossy leaves usually arranged in three to five "fingers", with toothed edges. Quite versatile as it will grow in the open or under trees. Produces copious small black berries most of the year that are attractive to birds, making it is self-seeding in dunes near existing specimens. This plant will tolerate small amounts of salt spray and sand movement. Collects and traps some sand. Requires organic matter in the sand to help retain moisture and nutrients (can't just live on shifting sand). Flowers/fruit pollinated and spread by birds, native insects and lizards.



**Wharangi, *Melicope ternata* [2m to 6m]**

Striking lime-green glossy and wavy leaves that have a lemon scent when crushed (it is related to citrus). The small green fragrant flowers in early spring (attractive to bees) mature to many shiny black seeds through spring/summer, contrasting nicely with the leaves.





**Mānuka, *Leptospermum scoparium* [up to 2m]**

This plant is well known to gardeners, but again, is now very uncommon in our dune areas. Where it is found, it seems to favour open exposed sites where it is often wind-shorn. The numerous usually white flowers are produced over an extended period from spring to late autumn, providing a nectar source for a range of creatures.



**Whau, *Entelea arborescens* [2m to 5m]**

The very large, distinctive, heart-shaped soft leaves up to 250mm long give this small tree a distinctly tropical appearance. The large clusters of yellow centred white flowers each up to 30mm across are very attractive, both to humans and insects. Only about four to six plants left on the Bay of Plenty dunes, probably as the leaves are relished by stock.



**Pōhutukawa, *Metrosideros excelsa* [3m to 20m]**

No Bay of Plenty beach is complete without these beautiful iconic trees. They can grow more seaward than this zone. Now cattle droving has stopped, seeds are germinating and growing naturally on rotting driftwood near dune crests. The lower branches of tall trees can be trimmed for great views through them, and for people shade in hot summers. The bountiful, nectar-laden crimson flowers provide nutrition for vast numbers of native creatures, including lizards.



**Pūriri, *Vitex lucens* [10m to 20m]**

The “food tree of the forest” is also locally common on parts of our coast. The shining dark green slightly “blistered” looking leaves provide a great contrast to the abundant 25mm long soft-red nectar-laden flowers. These are produced through most of the year, as are the 20mm succulent (to birds) berries, hence the “food tree” name tag.

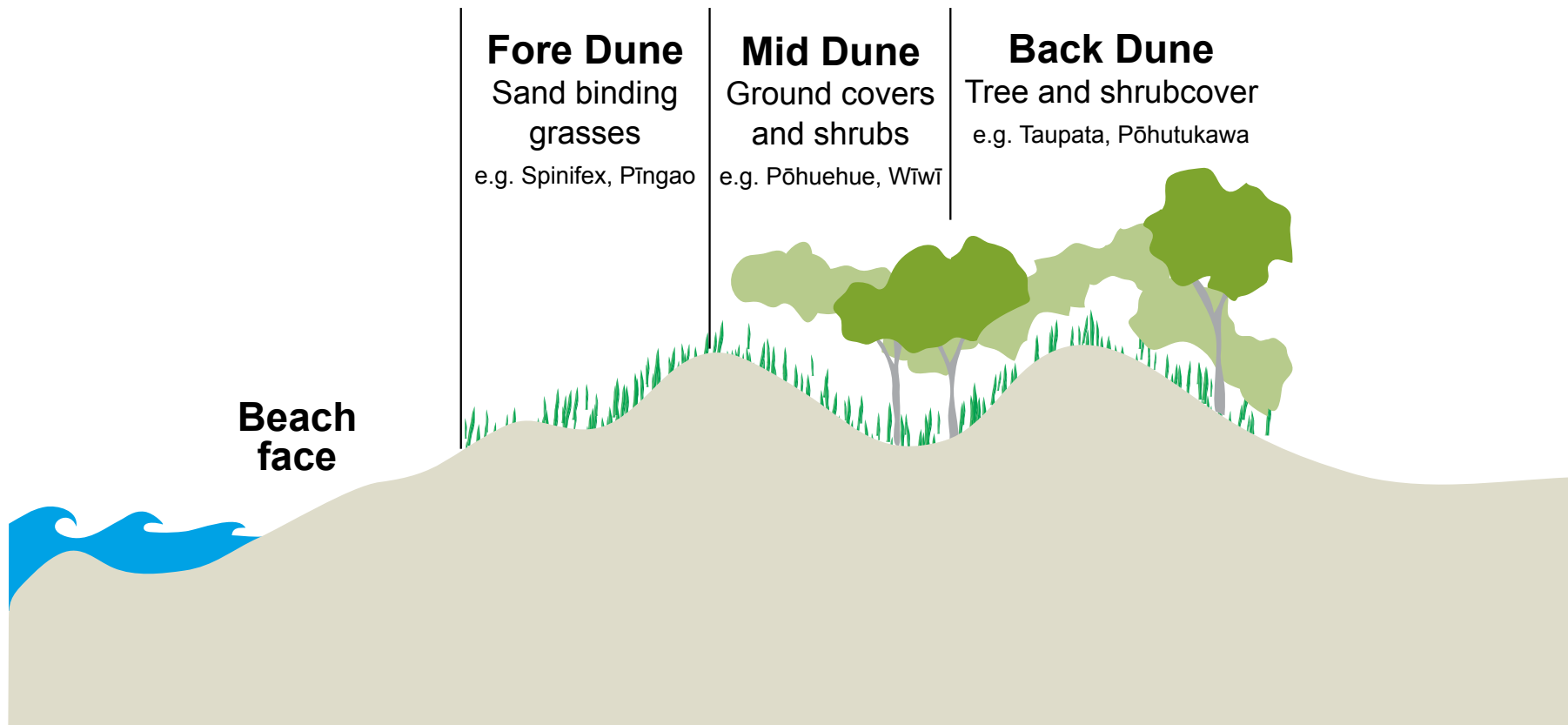


**Kohekohe, *Dysoxylum spectabile* [10m to 15m]**

The very large glossy leaves are made up of three to four pairs of leaflets. Long panicles of attractive flowers (up to 40cm long) are produced in autumn, emerging, unusually, directly from the trunk. Flowers are seldom seen however, as possums eat them voraciously.



# Dune plant sequence diagram





# Vegetation characteristic cards

Maximum tolerance of salt water, spray and sand blasting.

Almost totally reliant on wind for dispersion and pollination of seeds.

Moderately tolerant of salt spray and some sand movement.

Predominance of wind dispersion and pollination of seeds.

↓ Decreasing tolerance of salt spray and sand movement.  
Most of these plants will still collect and trap some lower velocity sand.

↑ Increasing supply and requirement for organic matter in the sand (to help retain moisture and nutrients).

↑ Flowers/ fruit increasingly pollinated, used and spread by birds, lizards and native insects.



# Teacher answer sheet

Zone	Plant	Vegetation characteristics		
A and B	Kōwhangatara	Maximum tolerance of salt water, spray and sand blasting	Almost totally reliant on wind for dispersion and pollination of seeds.	
A and B	Pīngao			
A and B	Hinarepe			
A and B	Waiū-o-kahukura	Moderately tolerant of salt spray and some sand movement.	Predominance of wind dispersion and pollination of seeds.	
B and C	Tauhinu			
B and C	Wīwī			
B and C	Pōhuehue	<p>↓ Decreasing tolerance of salt spray and sand movement. Most of these plants will still collect and trap some lower velocity sand.</p>	<p>↑ Increasing supply and requirement for organic matter in the sand (to help retain moisture and nutrients).</p>	<p>↑ Flowers/ fruit increasingly pollinated, used and spread by birds, lizards and native insects.</p>
B and C	Tarakupenga			
B and C	Perehia			
C	Carex			
C and D	Taupata			
C	Autetaranga			
C and D	Tī kōuka			
C and D	Harakeke			
C and D	Ngaio			
C	Oioi			
C and D	Houpara			
C and D	Karo			
C	Toetoe			
D	Wharangi			
D	Mānuka			
D	Whau			
D	Pōhutukawa			
D	Pūriri			
D	Kohekohe			