



HUNTER REGION BOTANIC
GARDENS

Primary School Education Materials

PLANTS IN PLACES

Plant Adaptation to the Environment

Teacher Notes and Student Activities

This package deals with the NSW Science and Technology K-10 curriculum objective of: *Develop knowledge of the natural environment through understanding about the physical world, earth and space, and living world.*

The following curriculum outcomes are addressed:

STe-8NE, STI – 10WL, 11WL, ST2 – 10WL, ST3 – 10WL, 11WL.

The package includes a range of activities and adaptations suitable for children K-6.



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ABOUT THE HUNTER REGION BOTANIC GARDENS



We offer a variety of activities at the Gardens, including guided tours for school groups. Our resources include specialist theme gardens, the Gundabooka Trail (illustrating Koori use of native plants), a sheltered Education Pavilion with indoor display, a Botanical Library and Herbarium, and bush walking trails that display different native vegetation communities.

The Hunter Region Botanic Gardens are managed and maintained by volunteers for the enjoyment and education of the people of the Hunter Region and visitors from other areas.



PLANTS IN PLACES

This package of activities covers:

- plants and the environment
- plant structure and soil types
- plant habitats
- plant adaptations to the environment
- plant ecology

Plants in Places examines where and how plants grow and introduces students to plant ecology. Some plants grow better in open, sunny places, whereas other plants grow better in shady, cool places. Some plants will only grow in well drained soils, where other plants will thrive in waterlogged conditions.

In addition to several natural habitats in the gardens (e.g., wetlands and open forest), a variety of theme gardens (e.g., palms and grevilleas) have been created in positions that best suit those plants.



Pre-excursion school-based activities

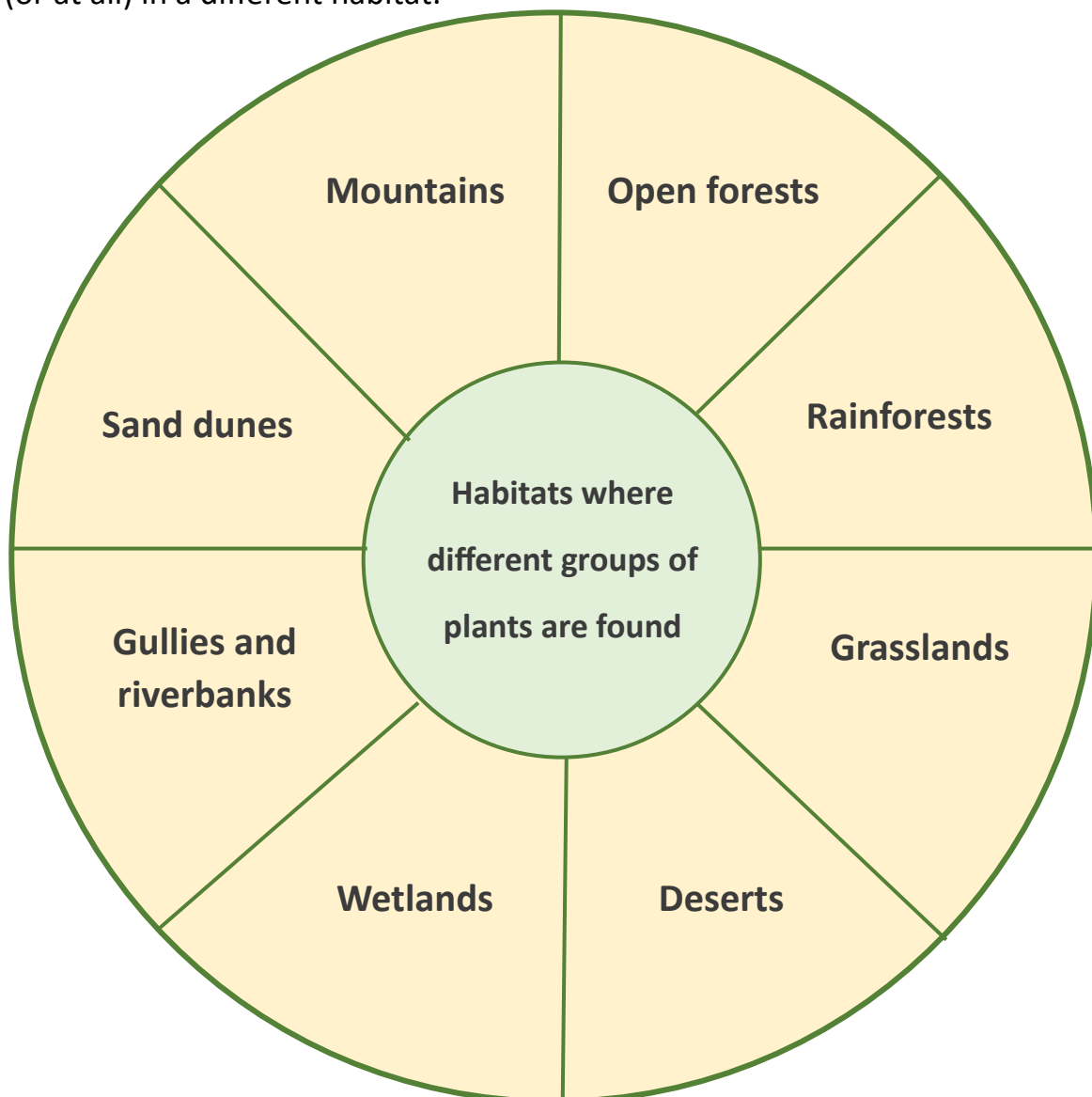
1. Introduce students to relevant vocabulary.

- Plant – a living organism that usually grows in a fixed site (e.g., grass, herb, shrub, tree, fern)
- Environment – the surroundings in which a living thing exists.
- Habitat – the natural home of a living organism.
- Adaptation – a change by which a living thing becomes better-suited to its environment.
- Ecology – the interrelationship between living things and their environment.

Pre-excursion school-based activities continued

2. Using the following habitat wheel, discuss different plant communities that children may have experienced.

Different groups of plants are found in places where growing conditions suit them. We call these places plant habitats. The collections of plants found in different habitats are known as plant communities. Some habitats are open and sunny. Some are shady and cool. Some are cold and windy. Some are tropical and humid, and so on. A plant, which suits one habitat, may not grow very well (or at all) in a different habitat.



3. Describe and contrast plants on the school grounds (e.g., height, shape, leaf type, flowers).

Possible Garden Field Excursion Locations

1. The Location Map (to orientate students)
2. The track leading to the Orchid House (passing Banks' Place)
3. The Orchid House (to experience the special environment created for growing tropical orchids)
4. The Succulents Garden (to study plant adaptations to dry conditions)
5. The Open Forest (to experience its environmental conditions)
6. The Palm Garden, and Rainforest (to contrast with the Open Forest)



STUDENT ACTIVITIES

ACTIVITY 1 Treasure hunt

Observe, collect and compare.

A straight stick

A gum nut

A leaf chewed by an insect

A brown leaf

A piece of litter

A curly leaf

A zigzag serrated leaf

A piece of bark

A colourful leaf

A feather

A Banksia pod

Something beautiful



ACTIVITY 2 Leaf rubbings

Collect a variety of different plant leaves (e.g., straight, curved, serrated) and, with paper and crayons on a flat surface, make rubbings of the leaves. Label parts of the leaf that are visible on the rubbings (e.g., leaf stalk, leaf veins, leaf edge).

ACTIVITY 3 Guessing game

Collect a variety of objects from one of the Garden's habitats (e.g., gum nuts, leaves, Banksia pods, bark) and place them in a cloth bag. Ask children to identify one of the habitat objects by touch before removing it from the bag to show others.

ACTIVITY 4 Habitat environment

Different habitats have different soil moisture, different plant heights and the plants have different types of leaves. Visit the three Garden's habitats listed below and record your observations.


	<i>Soil Moisture</i> (dry, damp, wet)	<i>Plant height</i> (small, medium, high)	<i>Leaf Size</i> (small, medium, large)
Open forest			
Succulent Garden			
Wetland			

ACTIVITY 5 What makes up a habitat?

What are some of the things that make up a habitat?

Visit one of the many Gardens' habitats. Talk about the habitat environment with your group and ask them to identify, by observing, as many habitat items they can. The items might be living things (e.g., shrubs, trees, lizards) and dead things (e.g., leaves, branches, humus).

Make a list of all the things you might find in this habitat and draw your habitat below.



ACTIVITY 6 Soil sedimentation test

Soils are an important part of every plant habitat and have a big influence on the type of plants that grow there. Soils can be very broadly classified into sandy, loamy (silt), and clay types. Our Garden's soil is sandy and the soil nutrients are concentrated into the top metre of soil.

Steps:

1. Take a small scoop of soil including the top (humus) layer
2. Pour this soil into a large glass jar (e.g., a jam jar, or coffee jar)
3. Add water to about three-quarters full
4. Shake the mixture thoroughly (preferably having a lid on the jar!)
5. Put the jar on a flat surface and allow the soil grains to settle
6. After about 5 minutes, look at the layers resulting from the separation
7. Draw a labelled diagram showing the different layers

Try this experiment with two different soils, e.g., a sandy soil, and a clayey soil.

- How long does it take for the water to go clear?
- What does this experiment tell you about the components (parts) of a soil?



ACTIVITY 7 Habitat memory trail

Have groups of up to 10 children lined up about 3-4 metres apart. Secretly show or read the first in line a habitat fact and have the message transferred down the line in *Chinese Whispers*. Check the accuracy of the message at the end of the line and discuss the meaning of the message. Rotate the child at the front of the group and repeat.

<i>Younger students</i>	<i>Older students</i>
Bark protect trees from fire.	Rough bark on gum trees is an adaptation to insulate the trunk from damage by fires.
Bark can be rough and smooth	Smooth bark on gum trees (eg. Blackbutt branches) reflects the heat of the bush fire.
Banksia pods protect seeds.	Banksia pods often need fire to open and release their seeds.
Fire helps some plants grow.	After fires, seeds fall on the ash bed which helps them grow.
Leaves have different shapes,	Shiny leaves reflect the sun and save water.
Gum leaves point down.	Eucalypt leaves often point down to keep out of the sun to save water.
Plant spikes keep animals away.	Spikey leaves help preserve water and repel animals.

NOTES FOR GUIDES

Before starting the tour

1. Review important vocabulary for the visit (i.e., habitat, environment, plant, vegetation, adaptation, ecology).
2. Question children about natural environments they're familiar with.

During the tour

1. Visit at least two Garden habitats to allow comparison of environments and plant communities (e.g., wetlands, open forest, rainforest, succulent garden).
2. Select children to carry collection bags for plant specimens collected from each visited environment.
3. Give examples of plant adaptation in each Garden environment. For example, the lack of trees in permanent wetlands, how succulents control water loss, tree height and understory in the rainforest area.

After the tour

1. Display collected Gardens specimens and review their relationship to their environment.
2. Review children's learning with questioning:

What environments did we see today?

Which habitat had the tallest trees, most water, least light?

Which habitat did the following plant specimens come from?

PLANTS IN PLACES RESOURCES

For children

[Australian Museum. Wild Kids Habitats](#)

[Skwirk. The Adaptation of Plants](#)

[Australian Network for Plant Conservation. Resources for Kids](#)

For teachers, parents and guides

[World Wildlife Fund. Wildlife and Habitats](#)

[Tourism Australia. Australia's Plants](#)

[Commonwealth Department of Environment and Heritage. Hands on for Habitat](#)

[Foundation for National Parks and Wildlife. Create a Habitat Haven](#)

[Lake Macquarie City Council. Backyard Planting Habitat Guide](#)

[Australian Broadcasting Corporation. Animal and Plant Adaptations](#)

[Australian Broadcasting Corporation, Gardening Australia. Plant Adaptations](#)

[Australian Science Teachers Association. Plant Adaptation](#)

[National Wildlife Federation. Habitat Lesson Plans](#)

[NSW National Parks and Wildlife Service. Biodiversity for Kids](#)