
Plants in Places

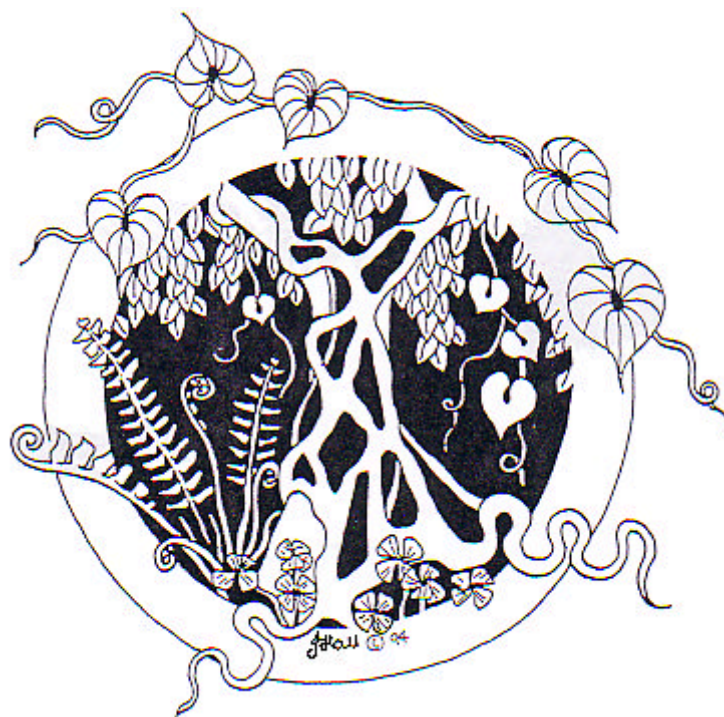
3-6

Plant Adaptation to the Environment

**Hunter Region Botanic Gardens
Pacific Highway, Motto Farm, 2324
Telephone: 049 871655**

Booking Date: _____

Booking Time: _____



PLANTS IN PLACE

Where plants are found

How plants survive in different environments

This unit looks at:

- **plants and environment**
 - **plant habitats**
 - **plant adaptations**
 - **plant ecology**
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For the teacher

Plants in Place puts the emphasis upon where plants grow and thus introduces students to- basic ideas of 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.

When people grow plants in gardens, an attempt should be made to use those plants that suit the conditions available.

For example, some plants grow best in acidic soils, others in sandy soils, others in shade, and others in full sunshine.

At the Hunter Region Botanic Gardens (HRBG) care has been taken to create the best possible conditions for different species or selections of plants for display to the public.

Thus various Theme Gardens (such as the Grevillea Garden) have been located in places which best suit those plants. Most of these specially created gardens or plantings are located within a short distance of the Visitor Centre.

Of course, the Garden has as one of its major attractions the natural vegetation, which existed there long before the Gardens was established. This vegetation comprises open forest of eucalypts, banksias and other Australian trees, shrubs and ground covers. There are also wetland areas to the north and south of the site.

The main concepts associated with this unit: **Plants in Place**, are:

- habitat
- plant habitat
- environment
- environmental conditions (including temperature, moisture, light)
- adaptations
- plant adaptations
- ecology plant ecology
- plant structures
- soil types

The Field Excursion

This Unit takes the students to the following locations at the Gardens:

1. The Location Map (to orientate the students)
2. The track leading to the Orchid House (passing Banks Place)
3. The Orchid House (to see how special conditions are created for growing orchids)
4. The Succulents Garden (to study plant adaptations)
5. The Open Forest (to experience its environmental conditions)
6. The Palm Garden, and Rainforest (to make a contrast with the Open Forest)
7. The South Swamp (to examine plants growing in waterlogged conditions)

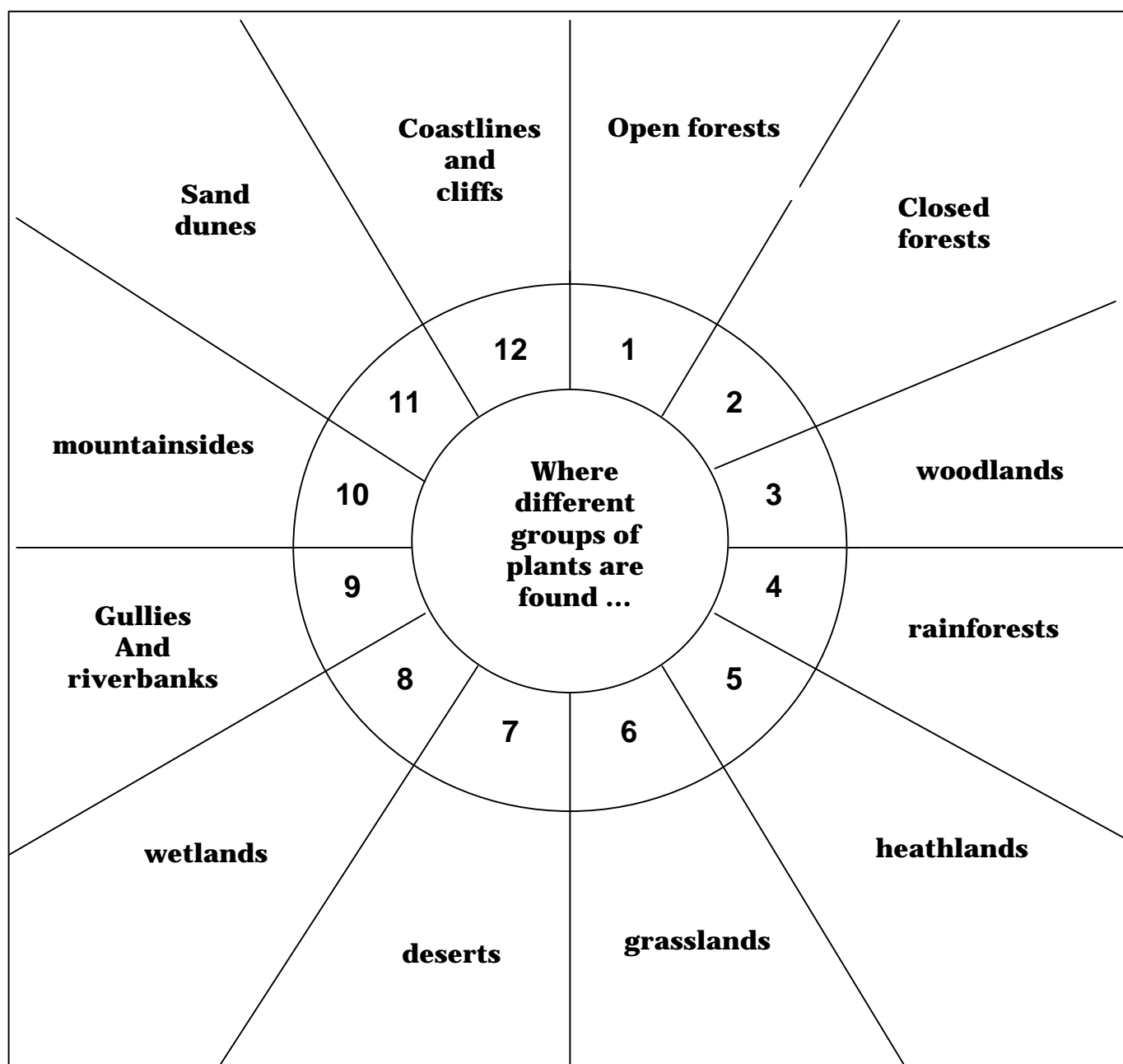
At some of these locations it is suggested that the attention of the students is drawn to the prevailing environmental conditions. A thermometer can be used to measure the temperature in the air, and in the soil. These readings should be recorded. At two different sites, a simple soil sedimentation test can be demonstrated to reveal the components of the soil.

Questions that might be asked of the students

1. What were the environmental conditions like in the Orchid House?
2. Where are orchid plants found in natural conditions in Australia and other parts of the world?
3. What different parts of succulent plants are used to store water?
4. What is the difference between a true cactus, and a leaf succulent plant?
5. What special structures do most succulent plants have to prevent them from being eaten by animals?
6. What environmental conditions did you find in the open forest?
7. How many layers of plants are there in an open eucalypt forest?
8. What does the canopy of a tree mean?
9. What is "humus"?
10. Why is humus so important for plants to grow well?
11. What is soil made up of?
12. What environmental conditions did you find in the Palm Garden & Rainforest?

PLANTS IN PLACE

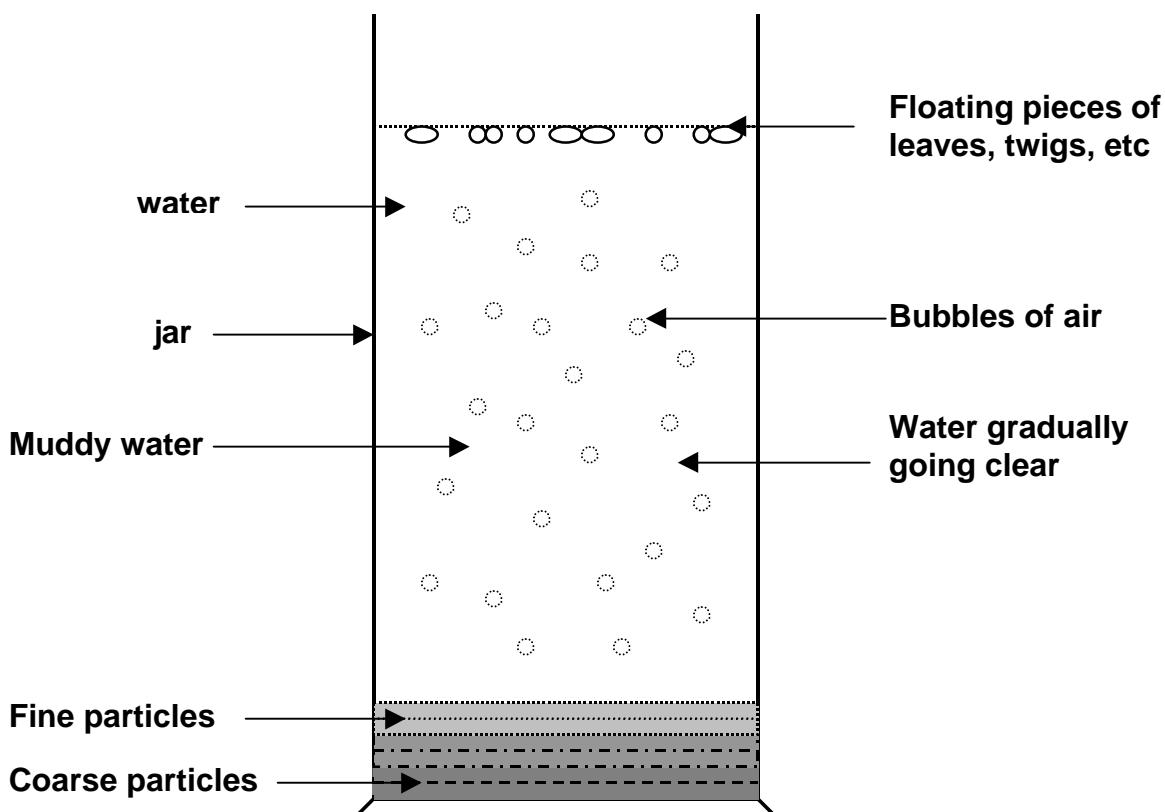
Different groups of plants are found in places where growing conditions suit them. We call these places plant habitats. The collections of plants found in different habitats are known as plant communities. Some habitats are open and sunny. Some are shady and cool. Some are cold and windy. Some are tropical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



SOIL SEDIMENTATION TEST

Steps:

1. Take a small scoop of soil
 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?



FIELD ACTIVITY 1

Each habitat has different soil temperatures and soil moisture, and the plants have different types of leaves depending on the habitat. Record your observations below.

	Soil Temperature °C	Soil Moisture Dry/Damp/VeryDamp/ Wet	Leaf Size None/Tiny/Big
A. Dry Woodland			
B. Desert			
C. Rainforest			
D. Wetland			

Get together in groups of four and compare and discuss your results.
Work together to answer the questions below.

Q: Which habitat has the hottest soil

A: _____

Q: Which habitat has the smallest leaves

A: _____

Q: Can you see a pattern in the way the leaves change compared to soil moisture ? What is the pattern ?

A: _____

FIELD ACTIVITY 2

Lie on your back. Close your eyes. Breathe deeply in and out in and out.
Just relax completely feel the soil beneath you forget about everything else.
Just relax and breathe deeply listen to the sounds of the birds.
Just relax and breathe deeply listen to the sounds of your own breathing
relax.

Now imagine you are a tree feel the earth beneath you, and imagine you are
sending roots down ... down ... deep down into the soil.
Feel how your roots connect you to the earth ... they hold you so you don't blow
over. Imagine the roots soaking up water from the soil, and sending the water up the
trunk ... you have a huge trunk ... think about water colour bark you have ... is it
rough or smooth ... dark or pale ...
Imagine your giant trunk soaring up into the sky ... and picture the water from the
earth being pulled up that trunk to the branches.

You have an enormous canopy with many, many branches
... think about how your branches look ... are they straight or curly?
... and picture your leaves
... you are a rainforest tree and your leaves are very big they are bright green and
shiny ... they are flat, facing up towards the sun.

The sun is very hot ... you can feel it in your leaves
... imagine the water that has come from the earth ... travelled through your roots up
your giant trunk ... out through the branches ... and now the water is in your leaves
... the sun is hot and it is drying the water from your leaves ... the -water is turning
into water vapour and evaporating ... and as it rises out of your leaf and evaporates
into the hot sky ... it pulls water behind it in a steady, giant column of water that
moves all the way from your roots, through your trunk, through your branches and
out your leaves into the sky.

Now open your eyes and look up.

Just relax and think about all the conditions a tree lives in
... the type of soil
... the temperature of the soil
... the moisture
... the light
... and the shade.

When you're ready, sit up.

FIELD ACTIVITY 3 - Habitat

Discussion

What are some of the things that make up a habitat?
Spend some time discussing the environment with your group and think of as many things as you can - they might be living things and dead things, and anything you can see around you here.

Make a list below of all the things you might find in a habitat

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Draw Your habitat below

FIELD ACTIVITY 4

Message Trail

Select a short walk in an open area such as the Enchanted Forest or the Eucalyptus Lawn.

Get the kids to line up in single file. Give the first person a message to pass on to the rest of the group as they walk past. It should relate to our theme of plant adaptations. The first person then stands on his/her spot, you lead off the rest in single file past the first child. As each student walks past, the first child tells him or her the message. As you are walking, choose another feature and give a message to the second student, who will stop there and tell the new message to the passing group and so on.

After telling their message, the student joins on to the back of the line. Continue until every child has had a turn and the leader is back in front. See how many messages each child can remember at the end of the trail.

Some message ideas.

Rough bark on gum trees is an adaptation to insulate the trunk from damage by fires. Smooth bark on gum trees (eg. Blackbutt branches) reflects the heat of the bush fire. Banksia pods burst open following fire, and the seeds fall onto the ash bed and grow. Shiny leaves reflect the sun and save water.

FIELD ACTIVITY 5 – Animal Game

Divide your group into two teams. Get each team to think up an Australian animal, and a set of clues that they will give the other team to help them guess what it is. The clues should start hard and get easier. For example:

Animal: Kangaroo
Clues: Four legs\; furry\; grey\; eats grass\; 1 - 2m tall\; long tail\; pouch\;

Have the kids line up facing each other about a 2 metres apart, and mark the middle with a stick. About 10m behind each team, mark a home base (use a jumper, bag etc).

The first team gives their first clue, and the opposite team tries to guess the animal. If no, the second team gives their first clue, and the other team tries to guess. This continues until the right answer is given.

Then the team that gave the last clue answers "yes" and both teams race to the home base of the team that got the answer right.

FIELD ACTIVITY 6 – Treasure Hunt

(Collect, observe and then return to bush)

A perfectly straight stick

A leaf chewed by an insect

A piece of litter

A zigzag serrated leaf

A colourful leaf

A Banksia Pod

A gum nut

A pink leaf

A curly leaf

A piece of bark

A feather

Something Beautiful