Woodland and Rainforest Communities

A stage 2 HSIE/SCIENCE unit written by Marg Pike (Teacher Librarian, Vincentia Primary School) and Toni McLeish (Rural Liaison Officer) focusing on the Grassy Box Woodlands.

If we are to have a future, we need to look after our environment.

Do you know what your local plant community is?

Thankyou to John Wheeler (Manilla Landcare), Sandy Gayford (Photography), Julie Kennelly (Thalgarrah Field Studies Centre), Neil Smith (Tamworth Regional Office), Richard Pike (Parent Helper), Geoff Bridger (Cascades Field Study Centre) and Bill O'Neill (Manilla Central School) for their positive support and input.

Borah Reserve, Manilla, North West NSW

A rare Grassy Box Woodland

	Part 1 - Plant communities in Australia Activity 1.1 Research plant communities in Australia, types and distribution. Build knowledge about Australian plant communities: ▪ Australia has many different types of native(natural) plant communities. o **Forests - Open** (less than 70%PFC) found from the coast to the tablelands in areas of high rainfall. Up to 40 metres high. **Closed** (more the 70%PFC) Rainforest being the rarest type of closed forest, they are found in the humid areas mostly with in 100km of the east coast. o **Woodlands** (10 - 30%PFC) mostly found west of the great dividing range, areas of low rainfall and climate extremes. Less than 30 metres high. Grassy Woodlands dominated by a grassy under story being the rarest, occurring on the better quality soils. o **Scrub and Shrub land** plants are less than 2 metres tall and mainly occur in the arid and semi arid regions of Australia. o **Heath land** is generally coastal and often subjected to salty windy conditions. o **Grasslands** are found generally in semi arid regions on better quality soils. Activity 1.2 Look at the plant communities map and mark where you live. Have students determine what their local plant community is. Work sheet proforma M1. Plant Communities in Australia. Activity 1.3 Brainstorm what environmental factors might influence the what plants can grow where. For example: temperature, rainfall, wind, light, soils, altitude. Understand that as you travel inland from the coast the climate changes and so does the vegetation. As the rainfall gets less most of the plants get smaller. Look at maps of Australia which show climate, (rainfall and temperature) again mark where you live to determine the climatic factors which influence your natural community. Background teacher information M1, Rainfall and Temperature ranges in Australia M2, Climatic regions in Australia. Complete Worksheet proforma M1, Plant communities of Australia.	**ENS2.5 Describes places in the local area and other parts of Australia and explains their significance.** ***Students will:*** o Name and locate natural features in their local area and evaluates their significance. o Give reasons why particular activities may be associated with particular natural features and places. o Compare natural features, sites and places in their local area with other locations in Australia. o Compare ways in which members of the community use features of the local area to meet their needs. o Describe how people can construct and modify environments. o Uses geographical terminology to describe natural features in their local area. o Locate and map areas in Australia. o Compare use of a local environment with another environment in Australia. o Discuss the different environments found in Australia. Focus in on woodland environments – discuss areas covered by woodland– now & in past. *Students will know, understand & appreciate:* o The significance of ecological interactions in Australian environments. o That the Australian environment is diverse and that there are many natural features of the environment. o That the features of the Australian environment and its interactions change over space and time, both naturally and as a result of human activities. o That the conditions of the Australian and local environment may be measured and that its quality may be assessed and is relevant to the human condition. **Science & Technology BES2.3** o That environments are sometimes modified to fulfill new and different requirements. **Science & Technology LTS2.1** o That plants and animals live in environments that supply their needs. **Science & Technology LTS2.2** o That change occurs throughout the lifetime of living things. **Science & Technology LTS2.3** o That living things depend on other living things to survive.

	PART 2 A CLOSER LOOK AT WOODLANDS ***Investigate the woodland community, & recognise its importance.*** **Learning Activities:** o Use factual books, videos, Internet Sites, CD ROMS, guest speakers and other available resources (Background teacher information M3, Woodland community information sheet.) to develop understandings of: ▪ What is woodland? ▪ What does a grassy woodland look like? (photo M1&2) ▪ Where in the world are grassy woodland communities? ▪ Where do we find grassy woodland communities in Australia? (Background Teacher information M4, Grassy box woodland distribution map) ▪ What types of grassy woodlands exist in Australia? ▪ What natural environmental factors influence grassy woodland communities? (photo M3) ▪ How have plants adapted to living in their environment? (photos M4,5 & 6) ▪ Who are the other community members that depend on the woodland community for survival, other than humans? ▪ Why are woodland communities important members of your community? ▪ What is threatening the woodland community? ▪ How can we manage our woodlands better? <u>Activity 2.2</u> o Locate and map local area, including significant woodland communities. Invite a local person with this knowledge to speak to the class. (Bushcare, DLWC, Greening Australia, RLPB, Landcare)	**Science & Technology ESS2.2** o That there are benefits and problems associated with human changes to the physical environment. **Science & Technology LTS3.2** o The activities of people can change the balance of nature.

Part 3

Woodland community members

Investigate the behaviour of plants & animals in a woodland environment & the way they are interdependent, with study of specific birds, mammals, reptiles or amphibians.

What living things are found in woodlands? Are they native to the area or introduced? What impact do they have on the environment?

Activity 3.1

- Brainstorm all flora & fauna children think they will find in the woodland. (Background Teacher information, M5, Woodland plants & M6, Woodland fauna)
- Categorise- native/introduced animals, plants, birds, water life & insects. Refer to this list as more is learnt about woodland environment, and after excursion. Add/delete as necessary.

Investigate the importance of plants in the local environment.

Develop the understanding that:

- Trees provide us with valuable timber and timber products;
- In grazing areas, trees give shade and shelter for stock, reducing then effects of heat, cold and wind;
- Windbreaks reduce the effects of wind erosion;
- Along creeks and riverbanks, trees protect and stabilise the banks, which decreases erosion meaning better water quality.
- Trees help hold the soil in place and prevent soil erosion, especially on steep slopes
- Trees, especially natives, have a vital role to play in the preservation of native wildlife, providing food, shelter and breeding sites.
- Trees provide comfort for people and beauty in our environment.
- Shrubs provide protection and habitat for small birds.
- Grasses and other ground covers increase biodiversity.
- Groundcovers hold the top soil in place preventing soil erosion.
- Groundcovers provide food and shelter for native wildlife.
- Plants are identified by looking at their physical characteristics. Fruit, buds and bark.

Activity 3.2

- Collect leaves and fruit (seed bearing part) from native trees in school playground. Identify leaf shape and group using key. (Background teacher information M7, Leaf shapes) Students draw and label leaves, do leaf rubbings.
- Identify fruit types using key. (Background teacher information M8, Native fruit types)

	Activity 3.3 o Using library research, the students will understand that they can identify the type of woodland by determining the dominant (tallest) Eucalyptus tree by using bark identification. (Box bark, Stingy bark, Iron bark or Gum smooth bark) Teacher Background information M9 o Students can also determine whether the woodland is a shrubby woodland or a grassy woodland by observation. For example you may observe a grassy under story with few shrubs and the dominant tree has box bark. This would be called a Grassy Box Woodland. ***Investigate the interdependence of wildlife and plants.*** Activity 3.4 o Brainstorm all flora & fauna children think they will find in the woodland. Categorise- native/introduced animals, plants, birds, water life & insects. Worksheet proforma M2, Community members. Activity 3.5 o Habitat connections Worksheet proforma M3, Fauna & habitat connections. o Refer to this list as more is learnt about woodland environment, and after excursion. Add/delete as necessary. Activity 3.6 o Students select a native animal from the above list – Complete an animal report. Work sheet proforma M4 , Animal report ***Investigate the importance of birds in the woodland.*** Activity 3.7 o Prior to field trip familiarise students with woodland birds. Undertake a bird walk & invite a local bird enthusiast along to help spot & identify birds. Make a list of birds sighted. o In small groups students research a bird they may see in the Woodland – e.g. red capped robin, regent honeyeater, blue wren, mistletoe bird, kookaburra, currawong, silver eye, restless flycatcher, brown tree creeper, turquoise parrot, sacred kingfisher. Use scaffold to organise information – shelter & food needs, predators etc. Work sheet proforma M5, Bird research. Activity 3.6 o Make a list of rules for visiting the woodland site – remove litter, no fires, stay on tracks, no dogs or cats. o Build knowledge through an excursion to woodland areas. **See Woodland Field Study units**	

- Assess the health of a woodland community in your local area. Worksheet proforma M6, Woodland Health check

- Students review important facts about the woodland to reinforce what they've learned:

1. Review facts about the woodland with your students. How is this ecosystem unique? Why should we protect woodlands? What are the different layers of the woodland?

Activity 3.7

- Students give their opinion of how and why they value features in their local natural community, through spoken and written discussion.
- Make posters to tell people about how important woodlands are & how they can help look after them.
- Participate in local events to promote environmental awareness and care.

Activity 3.8

- Compare the features of woodlands with those of the rainforest using direct experiences such as excursions and indirect experiences such as video, E-mail contact and factual books.

PART 4

Investigate RAINFORESTS

Activity 4.1

- Use factual books and information videos, Internet Sites, CD ROMS, guest speakers and other available resources (Background teacher information M10, Rainforest community information sheet) to develop understandings of:
  - What is a rainforest?
  - What does a rainforest look like?(photo 7&8)
  - Where in the world are rainforests?
  - Where do we find rainforests in Australia?
  - What types of rainforests are found in Australia?
  - What natural environmental factors influence rainforest communities? (photo 9)
  - How have the rainforest plants adapted to living in their environment? (photo 10, 11&12)
  - Who are the other community members that depend on the rainforest for their survival, other than humans?
  - Why are rainforest communities important members of your community?
  - What is threatening the rainforest?
  - How can we manage our rainforests better?

	Activity 4.2 o In groups students write a report about rain forest animals and their adaptations. Students will learn about animals' unique characteristics and behaviour and how they must adapt to their environment Work sheet proforma M4,Fauna report Activity 4.3 o Use literary books and videos to encourage an appreciation of, & empathy with, the rainforest environment (see resource list) Activity 4.4 o Organise a field trip to the rainforest involving activities to raise awareness and understanding of the rainforest environment eg. ▪ View tubes to isolate features in the environment. ▪ Look carefully at a mini environment using a length of string or hoop as focus area. Note results in graphic, tabular or report form. ▪ Use colour cards to encourage children to become observant of the environment. ▪ Use mirrors to assist students to focus on part of the environment. ▪ Use specimen boxes and tubes to focus on close inspection (mini beasts, leaves etc.) ▪ Use blindfolds to enable students to lead each other to trees & later identify the tree. ▪ Use camera and video to record observations made in the field. ▪ Take rubbings and make sketches of the environment. ▪ Listen to and record (eg. sound maps) the sounds of the rainforest. Use triangulation to identify sounds. Activity 4.5 o Students review important facts about the rainforest to reinforce what they've learned: 1. Review facts about the rain forest with your students. How is this ecosystem unique? Why should we protect the rain forest? What are the different layers of the rain forest? Activity 4.6 Divide the class into small groups to play the interactive quiz on the "Rain Forest Puzzle" site (see resource list). Students will unscramble a rain forest	

image as they click on the correct answers.

Part 5

Comparisons

Investigate the connections and differences between the woodland & rainforest communities.

Activity 5.1

- Use photos or video footage taken on field trip to make comparisons and identify similarities between the 2 environments. (photos M1 to M12)
  Work sheet proforma M7, Woodland scene & M8, Rainforest scene

Activity 5.2

- Students review important facts about woodlands and rainforest to reinforce what they've learned:
  Worksheet proforma M9, Woodland & Rainforest word search

Activity 5.3

- Using the data gathered from the weather activities make comparisons between the two environments. Are there any connections? What are the most significant differences? How does the weather influence plant & animal life in an environment?

Develop the understanding that the survival of rainforest and woodland communities are under threat and that people can make a difference to their survival.

Activity 5.4

- Draw on observations and data from field trips and factual information to determine the ways that both communities are threatened. Record this information covering areas such as:

  - Clearing
  - Soil erosion
  - Climate change
  - Habitat destruction
  - Water quality

Glossary

Adaptation: A behaviour or body structure, which makes an organism more successful in its habitat.

Biodiversity: The variety of living things, that includes animals, plants, fungi and bacteria, and the ecosystems in which they live.

Buttress roots: Solid, thick roots of a tree that grow down into the forest floor from the tree trunk helping to keep trees stable.

Canopy: The branches and leaves of the tallest trees which make a cover over the forest..A canopy can be unbroken as in a rainforest, or broken as in a dry forest or woodland.

Carbon dioxide: A gas made of carbon and oxygen which is in small amounts in the atmosphere and is needed by plants for photosynthesis.

Communities: Integrated groups of species inhabiting a given area that influence one another's distribution, abundance and evolution.

Conservation: The use and management of natural resources that saves (conserves) them for future generations.

Convection: The flow or movement of air.

Decomposers: Tiny plants and animals (fungi and bacteria) that break down dead plants and animals so they can be used by living things. This is an important part of every food chain. On land, most decomposers live in soil.

Decomposition: The act of breaking down or decaying into basic elements and compounds.

Deforestation: The clearing of forests by cutting or burning trees.

Dominant species: The tallest and most common plant type.

Ecosystem: A group of living things in a natural environment that depend on each other to grow and live.

Endangered: In danger of extinction if current trends affecting its population continue.

Environment: A general area or place. It can be a large area such as a global environment or a small one such as the environment on a rock.

Epiphytes: Plants that depend on another for survival but do not live off their host, unlike parasites. They improve the environment.

Erosion: Rocks and soil get washed away by water or blown away by wind. If there are no plants to hold soil together in the roots, soil erosion can happen very fast.

Feral animal: A domestic, non-native animal that has become wild. Feral animals include the cat, pig, goat, buffalo, cattle, donkey, horse, fox and rabbit.

Food web: A connected cycle of plant and animal food producers, consumers and decomposers.

Foliage: The leaves of plants and trees.

Forests: Dense growth of tall trees and other plants.

Fungi: Small spongy plants that
decompose other plant matter which has fallen to the forest floor. (Fungus is the singular.)

Habitat: The home of an animal including its food, shelter, space, breeding sites and surroundings.

Humus: Fertile topsoil which is made of decomposed plant or animal matter.

Indigenous: People, plants or animals that live naturally in a place.

Interdependent: Individual things which rely on each other to survive.

Leaf litter: Leaves from trees and shrubs that have fallen onto the ground and are decomposing, very rich in minerals and nutrients needed by plants to grow.

Life cycle: The stages of growth and development of all living things.

Lignotuber: Swollen stem to store excess food.

Organism: A living being.

Parasite: A plant or animal that lives and feeds off another, sometimes killing the other as it grows and takes over.

Percentage Foliage Cover (PFC): The percentage of sky covered by the foliage of the dominant plant when viewed from below.

National parks: Large areas containing unspoiled natural landscape, plants and animals. These parks are for enjoyment, education and inspiration and are protected and managed to preserve their natural qualities.

Nature reserves: Areas of scientific interest that contain special wildlife or other natural features. They are managed for scientific and education purposes, not for recreation.

Naturalised: Adapted so well to local conditions and is so wide spread that it appears to be native.

Photosynthesis: The way plants use the sun, water and carbon dioxide to make food. Oxygen is produced as a result of this process.

Pollution: Harmful substances that are added to the water, air or land.

Reforestation: Replacing trees in an area where they have been cut down.

Renewable resources: Resources that can be replaced, eg pine forests, mud bricks.

Scavengers: An animal that feeds on leftovers on the ground.

Soil: A mix of rock, water, minerals and many living organisms, especially minibeasts.

Transpiration: The elimination of excess water through pores in plants.

Understory: The lowest layer of plants in a forest.

Weeds: Introduced plants that do not belong to an area. They are mostly plants that have been introduced from other countries, and include parthenium, coolati, paterson's curse, St John's wort, chillean needle grass.

Wildlife: Includes both native animals and plants. It does not include feral or domestic animals.

Resources

Narrative Texts:

Baker, Jeannie 1987, ***Where the Forest Meets the Sea,*** Julia MacRae Books, Sydney. A wonderful story about the Daintree Rainforest.

Lewington, A 1992, ***Antonio's Rainforest,*** Wayland Publishers, England. The true story of a young boy' life in the Brazilian rainforest where his family has lived for many generations, collecting rubber.

McRae, R 1991, ***Cry Me a River,*** Angus & Robertson, Australia. Picture book about pollution spoiling a river.

Seuss, Dr 1971, ***The Lorax,*** Random House, New York. Book about what happens when people misuse the forest. It illustrates the potentially devastating effects of massive deforestation. After reading it would be useful to talk about the message behind the story and how it relates to what is now happening to the world's tropical rainforests.

Riddell C. 2000 **The Chronicles of Thumpus Wumpus,** Harper Colins. Book about a loveable wild creature and how humans impact on his life.

Non Fiction Texts:

Asimov, Isaac. ***Why are Rain Forests Vanishing?*** Gareth Stevens Inc., 1992.

Bailey, D. ***First Forest Facts.*** Macmillan. 1989.

Baker, L 1990, ***Life in the Rainforests,*** Two-Can Publishing, London.

Bright, M 1991, ***Tropical Rainforests,*** *Aladdin* Books, London.

Buckle, M. ***House of Sprouts: Australian Forests.*** Oxford University Press. 1988.

Burch, Joann. ***Chico Mendes: Defender of the rain forest.*** Millbrook Press, 1994

Canizares,S and Chanko, P 1999, ***Rainforest,*** Reading Discovery series, Scholastic, Sydney.

Canizares,S and Chanko, P 1999, ***Who Lives*** **in** ***the Rainforest?,*** Reading Discovery series, Scholastic, Sydney.

Canizares,S and Chanko, P 1999, ***Rainforest Colours,*** Reading Discovery series, Scholastic, Sydney.

Cheng, C 1994, ***The Eyespy Book*** **of** ***Rainforest Animals,*** Scholastic, Sydney.

Creamer, H. ***A Landholder's Guide to Threatened Species.*** Available from National Parks and Wildlife Service. 1999.

Crome, F 1982, ***Rainforests, The Australian Environment,*** Hodder & Stoughton, Australia.

Dorfman, Gilliam. ***Birds.*** Illustrated by Phil Weare, Ladybird Press, 1986.

Fairley, A. ***Australian Habitats: Eucalypt Forest.*** Methuen. 1981.

Ganeri,A 1992, ***Exotic Rainforests,*** Readers Digest, Australia.

George, Jean C. ***One Day in the Tropical Rain Forest.*** Crowell Junior, 1990.

Gibbons, Gail. ***Nature's Green Umbrella-Tropical Rain Forests.*** Morrow Junior Books, 1994.

Guccione, Leslie Davis. ***Nobody Listens to Me.*** Scholastic Inc., 1991.

Hamilton, Jean. ***Tropical Rainforests.*** Blake pub., 1990.

Hamilton, Virginia. ***Jaguarundi.*** Illustrated by Floyd Cooper, Blue Sky, 1995.

Hogan, Paula. ***Vanishing Rain Forests.*** Gareth Stevens, 1991.

Houghton, G. & Wakefield, J. ***Living in Australian Forests & Woodlands.*** Macmillan. 1990.

Ingpen, R. & Dunkle, M. ***Conservation.*** A thoughtful way of explaining conservation to children.

Langley, A *1986,* ***Jungle.,*** Wayland Publishing, England.

Leggett, Jeremy. ***Dying Forests.*** Marshall Cavendish Corp., 1991,

Morrisey, D. ***Changing Our World,, Saving the Forests.*** Macmillan. 1993
Mutel, Cornelia F. and Mary M Rodgers. *Our Endangered Planet: Tropical Rainforests*. Lerner Pub. Co., 1991.
Parish, S. ***A Souvenir of Australian Rainforests.*** Steve Parish Publishing Pty Ltd. 1997.
Pickard, J. ***Rainforest.*** Scholastic. 1999
Ruiz de Larramendi, Alberto. ***Tropical Rain Forests of Central America.*** Children's Press, 1993.
Sayre, April Pulley. ***Tropical Rain Forest.*** Twenty-First Century Books, 1994.
Stone, Lynn M. ***The Amazing Rain Forest.*** Rourke Corp., 1994.
Taylor, B 1992, ***Rainforest.*** Look Closer series, Angus & Robertson, Australia.

Internet Sites and computer Resources:

Amazon Interactive: http:www.geog.umn.edu/~schaller/amazon
Australian Science and Technology on the Internet. http://www.nla.gov.au/oz/sciencew
Bureau of Meteorology: http://www.bom.gov.au
Cadbury Yowie – Rainforests: http:www.cadbury.com.au/yowie/rainforests
http://falcon.jmu.edu/~ramseyil/silverstein
***Manilla Bird Routes and White Box Woodland*:** http://www.manilla-info.net/index
***Rain Forest Action Network*:** http://www.ran.org/ran
Rain Forest Alliance: http://www.rainforest-Alliance.org
Rainforest Lesson Plan: http:www.edu/caw/lessons/rainforest
Science for Kids. http://www.nla.gov.au/oz/sciencew.html#scho
***Science in the Rain Forest*:** http://www.pbs.org/tal/costa_rica
The Earth Foundation Home Page: http://www.earthfound.com.au
Threatened Species in Australia http://www2.deakin.edu.au/aqua_sci/threatsp/fauna
The Wet Tropics World Heritage Rainforest: http://rainforest-australia.com/wet%20tropics%20world%20%20heritage.htm
Department of Land & Water http://www.dlwc.nsw.gov.au
Murder Under the Microscope http://www.microscope.aone.net.au
Water Bug Surveys http://www.streamwatch.org.au/bugs.index
National Parks and Wildlife Service http://www.npws.nsw.gov.au
State Forests of NSW http://www.forest.nsw.gov.au/contact.htm
Environment Protection Authority http://www.epa.nsw.gov.au
The Somewhat amusing world of Frogs
http://www.csu.edu.au/faculty/commerce/accounts/frogs/frog.htm
Greening Australia http://www.greeningaustralia.org.au
Bushcare http://www.nht.gov.au/programs/bushcare.
National Landcare Program http://www.dpie.gov.au/agfor/landcare/nlp.
Birds Australia http://www.birdsaustralia.com.au
Worldwide Fund For Nature http://www.wwf.org.au
Gould League http://www.gould.edu.au
Kangaroo Island research centre http://www.echidna.edu.au

Audio/Visual Resources:

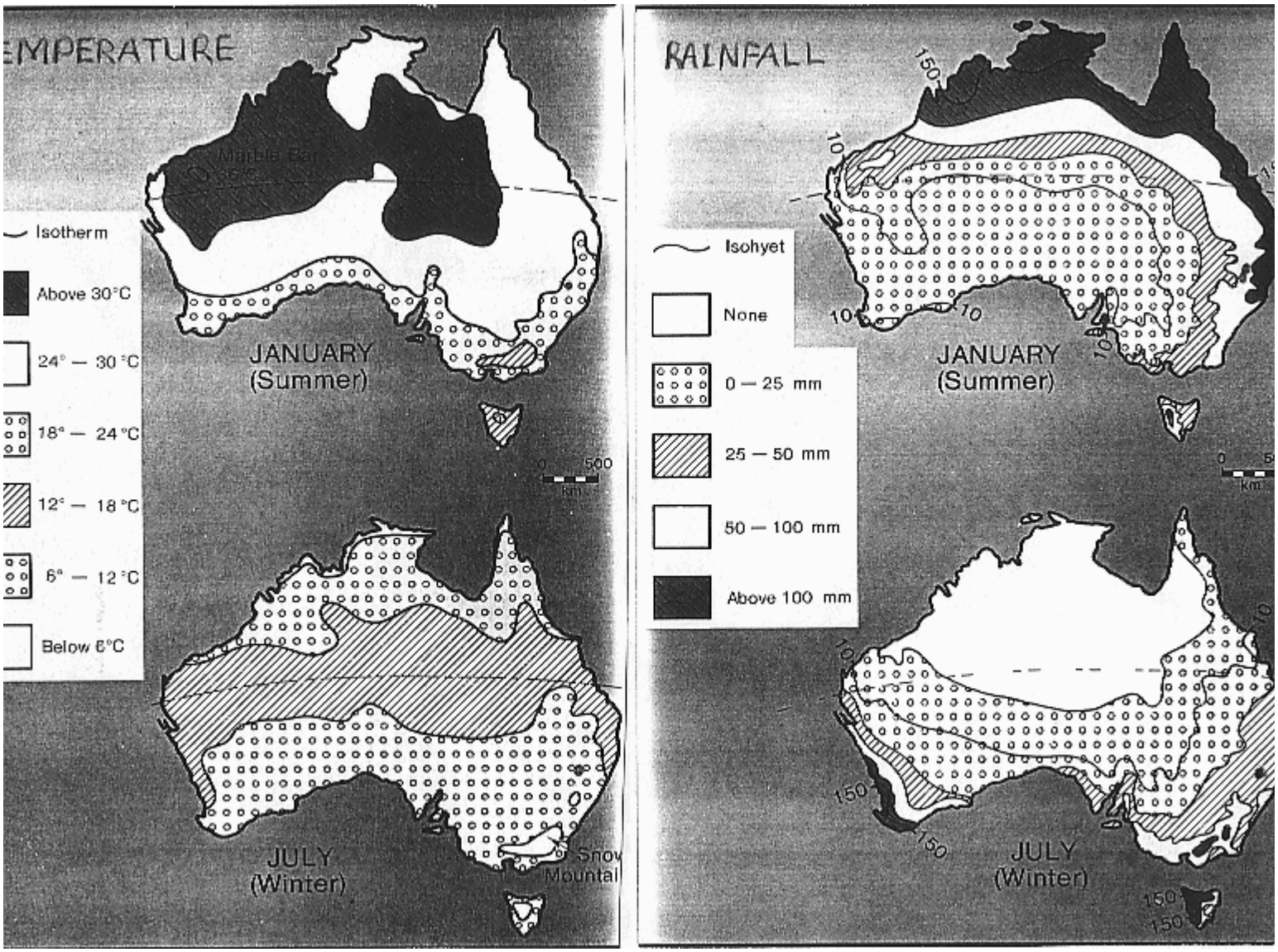
Exploring the Rain Forest. Paley, Jane. Video Treasures, 1994.
The Lorax. Seuss. Fox Video, 1989.
Once Upon a Forest. Grosvenor, Charles. Twentieth Century Fox, 1993.
Totally Tropical Rain Forest. Wood, Joan F. Columbia Tristan Home Video, 1994.
Under the Canopy, A Guide to the Rainforests of NSW. National Parks and Wildlife Service. Available from Dorrigo Rainforest Centre, PO Box 170, Dorrigo, 2453.
Australian Birds Woodlands. GEO Wildlife Documentaries, available through Birds Australia on line birding Shop. http://www.thebirdingshop.com.

INDEX
Pupil Worksheet, Background Teacher Information and Photos

Background Teacher Information

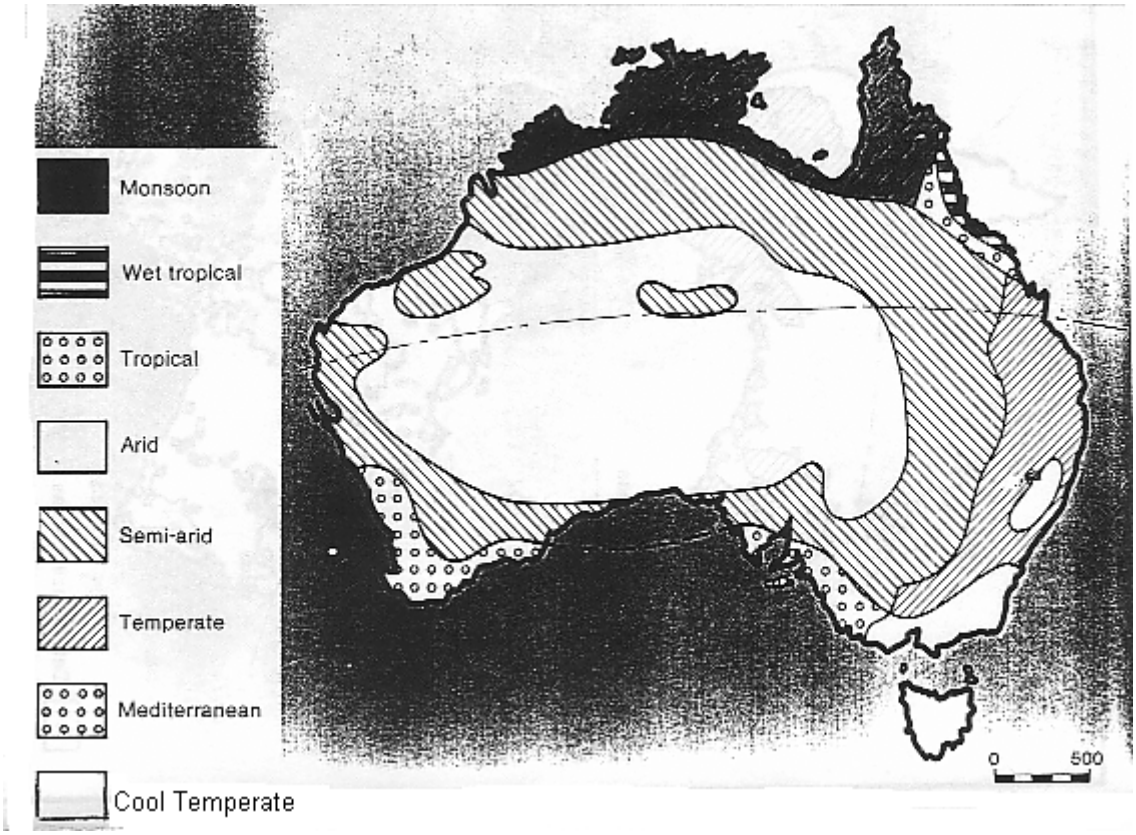
Photos

Teacher Background information M1



Teacher Background information M2

Climatic Zones in Australia



Teacher Background Information M3

All About Grassy Woodlands

What is a grassy woodland?

A woodland is broadly defined as having less than 30 % of the sky covered by the foliage of the dominant plant species when viewed from below. The dominant plant species being a tree. (appendix Specht: Structual Vegetation Types)

What does a grassy woodland look like?

Woodlands consist of three layers of vegetation, canopy, under story and ground cover.

Woodlands are generally classified by the type of the dominant tree, but for more accuracy, the significance of the two other layers of vegetation give more detail. Grassy woodland or shrubby woodland depending on whether the under story is dominated by shrubs or grasses.

Grassy woodlands**:**

- scattered trees.
- few or no shrubs.
- great diversity of grasses and ground dwelling plants.

GRASSY WHITE BOX WOODLANDS once covered several million hectares of the wheat-sheep belt of the slopes of NSW. Only ·01% of Grassy White Box Woodlands remaining in good condition. Occuring in scattered patches where the land has not been developed.

Shrubby woodlands:

- scattered trees surrounded by
- many types of shrubs or smaller trees
- less diversity of grasses and ground dwelling plants.

Shrubby woodlands are more common found in the rocky, hilly areas with poorer quality Shrubby woodlands are characterised by scattered trees surrounded by many types of shrubs or smaller trees with less diversity of grasses and ground dwelling plants.

Shrubby woodlands are more common found in the rocky, hilly areas with poorer quality soils, generally above the grassy woodland areas.

Where in world are grassy woodland communities?

Australian grassy box woodlands are unique in the world!
African savannah in temperate regions of South Africa, Zimbabwe, Tanzania and Okavangga Delta are somewhat similar.

Where do we find grassy woodland communities in Australia?

Grassy woodlands once covered the western slopes and plains of Eastern Australia.

Much of this area now supports some of the most highly valued agricultural land in Australia.

Nearly 90% of Australia's temperate woodlands have been cleared

What types of grassy woodlands exist in Australia?

Woodlands types are determined by the dominant tree species.
Grassy woodlands can be divided into three groups relating to bark types:

1. Grassy Box woodlands: Grassy White box woodlands.
   Grassy Yellow box woodlands.
   Grassy Grey box woodlands.
   Grassy Poplar box Woodlands
2. Grassy Gum woodlands:
3. Grassy Ironbark woodlands

What natural environmental factors influence grassy woodland communities?

Climate:
Woodlands inhabit areas where they experience climatic extremes. Periods of wet followed by long dry spells or excessive heat followed by cold frosty conditions.

Average annual rainfall 500 – 800 mm
Temperature range 0 - 40° C

Soils:
Grassy woodlands are found on deep heavier more fertile soils and alluvial flats along rivers.

How have the plants adapted to living in their environment ?

Features that make the Eucalyptus tree better suited to its particular environment.

- **Small leathery leaves – adaptation to dry conditions**
- **Thick bark – insulates the living tissue in the trunk from the heat of fire.**
- **Hard woody fruits - insulate the seeds against the heat of fires.**
- **Epicormic (dormant) buds under the bark which are stimulated into growth when the tree looses its leaves from fire or insect attack.**
- **Lignotubers – swollen underground stem that stores plant foods that allows the plant to survive long periods of stress, such as drought. The lignotuber also contains dormant epicormic buds which shoot after damage to the above ground parts.**
- **Leaves hang vertically to minimise the surface being hit by the sun. This reduces solar heating and increases convectional cooling.**

Who are the other community members that depend on the woodland community for their survival?

The White Box Woodlands of north west of NSW are home to a biologically diverse range of over 100 plant species, 150 birds, 16 bats, 17 native mammals including humans, 8 introduced mammals, 49 reptiles and 15 frog species, all members of the White Box Woodland community, living together and interacting with one another, enjoying the same environmental conditions, an ecosystem.

The plants provide the animals with habitat, a home with areas for feeding, roosting, migration, nesting and rearing young as well as primary production. Tree Hollows; Fallen logs; Under story shrubs; Native grasses rushes and sedges; Wet or damp areas; Watercourses; Flowering trees and shrubs; Rocks and boulders; Caves and overhangs; Seasonal cracks in the soil and pasture, all of which contribute to the well being of the community members.

Grassy Woodlands contain many rare and threatened species of plants and animals. For example the Golden Sun Moth, Turquoise parrot, Regent Honey eater, Yam daisy and Squirrel Glider.

Why are woodland communities important members of your community?
Woodland communities provide us with:

- Improved Water Quality.
- Farm Timber.
- Shade / Shelter.
- Habitat for insect eating animals.
- Nutrient Cycling.
- Drought resilient pasture.
- Reduced soil erosion.
- Resources, such as forestry timber, cut flowers and bush tucker.
- Reduced Climate Change.
- Improved Aesthetics

What is threatening the woodland communities?

For the past 200 years, Australian woodland has had to face new struggles. European settlers introduced foreign plants and animals and farming practices, which were not natural to our country. The new settlers did not understand the damage they were causing to woodland communities. Some of these activities can still be seen today.

Woodlands today are under threat from:

1. Clearing vegetation
2. Inappropriate fire regimes
3. Invasion by weeds and disease
4. Constant Grazing by stock
5. Wood Collection
6. Chemical and nutrient drift
7. Feral Animals
8. Stick picking
9. Bush Rock Collection

- *Clearing vegetation*
- Isolated, fragmented small unsustainable remnants
- less diversity of plants and animals
- less food and shelter for native animals
- soil erosion and rising water tables. (Salinity)
  - *Inappropriate fire regimes*
- Whole remnants burnt leaving no safe area for fauna.
- Changes in the balance of plants. Some will adapt but not all.
- Less diversity of plants and animals
  - *Invasion by weeds and disease*
- Native plants choked out or out competed by introduced plants that have naturalised.
- Less diversity of native wildlife who are dependant upon native plants being choked for habitat and food.
  - *Constant Grazing by stock*
- Plants not given a rest which enables them to complete their life cycle. flower and seed.
- Over time the plant dies out.
- Reduced seedlings.
- Loss of biodiversity
  - *Wood Collection*
- Removal of dead standing or fallen hollow habitat trees.
- Loss of species who can't find a home, possibly insect consumers.
- Increased insect populations
- Loss of organic matter.
  - *Chemical and nutrient drift*
- Plant defoliation.
- Directly kill plants and animals.
- Alter the environment so plants that cannot adapt slowly die out.
  - *Feral Animals*
- Kill native animals
- Eat native plants
- Soil erosion by disturbing soil or over grazing.
- Compete for habitat with native plants and animals.
  - *Stick picking and Bush Rock Collection*
- Loss of reptile habitat.
- Reduced litter for nutrient recycling.
- Loss of reptile habitat
- Removes micro climates that protect many small delicate plants

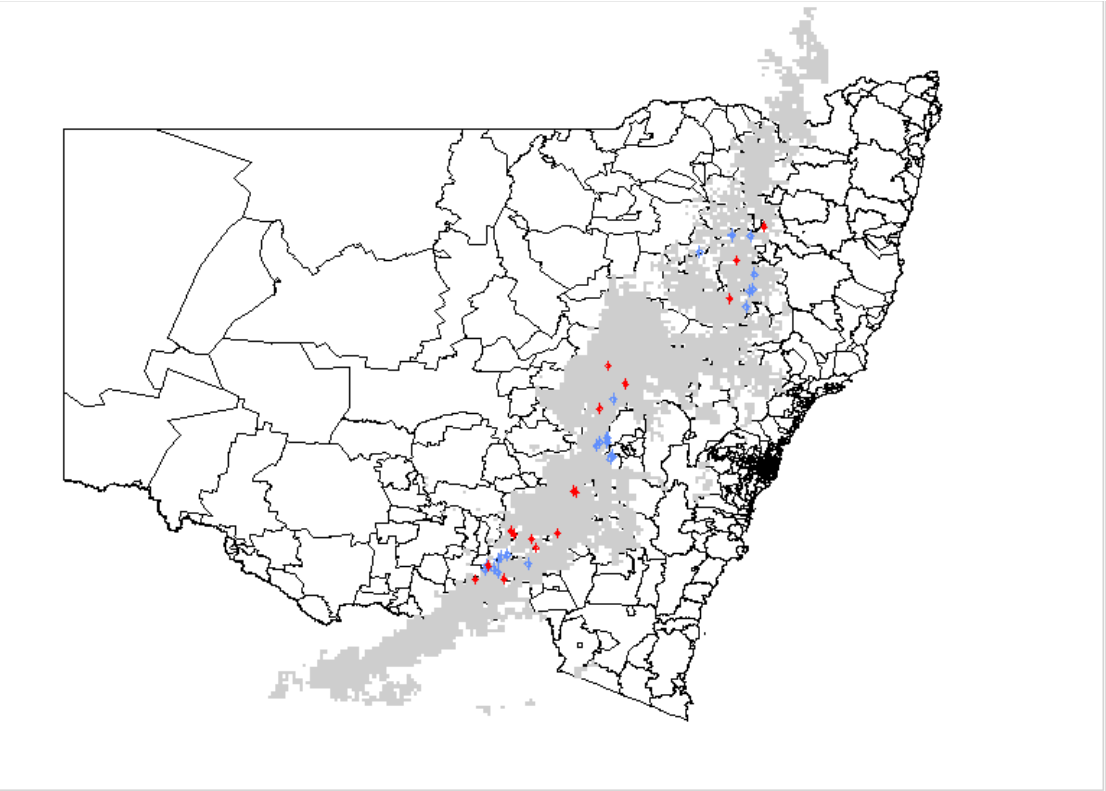
How can we manage our woodlands better?

- Stop clearing and start planting corridors of vegetation to join remnants together.

- If using fire as a management tool, burn patches leaving safe areas for fauna.
- Research the most appropriate time and frequency to burn.
- Be aware of the weed species in the remnant and remove.
- Control feral animal.
- Rest remnant from stocking to allow plants a chance to reproduce.
- Preserve all hollow trees.
- Cut firewood from younger live trees, which will grow back. Leave firewood to dry.
- Don’t remove rocks and sticks.

Teacher Background Information M4

GRASSY BOX WOODLANDS
Distribution map



Background Teacher Informatiom M5
Grassy Woodland Plants

Latin Name	Common Name
Native Species	
Trees	
Eucalyptus albens	White Box
Eucalyptus melliodora	Yellow Box
Eucalyptus camaldulensis	River Red Gum
Eucalyptus moluccana	Grey Box
Eucalyptus populnea	Bimble box
Eucalyptus dealbata	Tumble down gum
Angophora floribundah	Rough Barked Apple
Exocarpos cupressiformis	native cherry
Notelaea microcarpa var microcarpa	Native Olive
Geijera parviflora	Wilga
Brachychiton populneus	Kurrajong
Callitris endlicheri	Black Cypress Pine
Callitris glaucophylla	White Cypress Pine
Alphotinia excelsa	Red Ash
Alectryon sudentatus	Holly-leaved birds eye
Ficus rubiginosa	Port Jackson Fig
Maytenus cunninghamii	Yellow berry bush
Santalum lanceolatum	Northern Sandlewood
Capparis mitchellii	Wild Orange
Canthium oleifolium	Wild lemon
Shrubs	
Acacia implexa	Hickory wattle
Acacia salicina	Cooba
Acacia decora	Western showy wattle
Breynia oblongifolia	Coffee bush
Dodonea viscosa	Sticky Hopbush
Dodonea boroniifolia	boronia-leaved hop bush
Olearia viscidula	Sticky Daisy Bush
Bursaria spinosa	Sweet Bursaria
Pimelea neoanglica neoanglica	Poison Pimelea
Indigofera adesmiifolia	Leafless Indigo Indigo
Grasses and Ground covers	
Austrodanthonia sp	Wallaby Grass
Themeda australis	Kangaroo grass
Poa sieberiana/labilladieri	Snow Grass
Bothriochloa macra	Red Grass
Dichanthium sericeum	Blue Grass
Cymbopogon refractus	Barbed-Wire Grass
Austrostipa scabra	Speargrass
Austrostipa verticillata	Speargrass
Chloris	Windmill grass
Enteropogon acicularis	Curly windmill
Elymus scaber	Wheat grass
Panicum effusum	Hairy panic
Sorghum leiocladum	Wild sorghum
Sporobolus creber	Slender rats tail grass
Dichopogon fimbriatus	Nodding chocolate lily
Microseris lanceolata	Yam Daisy
Goodenia pinnatifida	Scrambled eggs

Bulbine bulbosa	Bulbine lily
Diuris chryseopsis	Golden moth orchid
Glycine tabacina	Variable Glycine
Clematis microphylla	Small-leaved Clematis
Pandorea pandorana	Wonga Wonga vine
Jasminum didymum ssp lineare	Native jasmin
Rubus parvifolius	native rasberry
Cymbidium cavaliculatum	tiger orchid
Cheilanthes distans	Bristly Cloak Fern
Convolvulus erubescens	Pink Bindweed
Dichondra repens	Kidney Weed
Geranium solanderi	Native Geranium
Dianella revoluta	Blue flax Lilly
Lomandra filiformis	Wattle Mat-rush
Abufflon oxycarpum	Flannel Weed
Ajuga australis	Austral Bugle
Arthropodium milleflorum	Vanilla Lily
Polygala japonica	Milkwort
Senecio quadridentatus	Cotton Fireweed
Solanum sp.	Wild Tomato
Swainsona galegifolia	Smooth Darling Pea
Verbena officinalis	Roe-top
Vittadinia muelleri	Narrow Leafed New Holland Daisy
Vittadinia cuneata	Fuzzweed
Wahlenbergia communis	Bluebell

Background Teacher Information M6

SELECTION OF FAUNA FOUND IN WHITE BOX WOODLANDS.

(compiled by Phil Spark 2000)

ARBOREAL MAMMALS

Koala Phascolarctos cinereus Status: Vulnerable
Once present in White Box and Red Gum communities throughout the state. Now found in the better remnants, preferring high nutrient soils.

Squirrel Glider Petaurus norfolcensis Status : Vulnerable
Likely to be present in the larger and less disturbed remnants of White Box. Known to feed on White Box nectar and incise the trunk to lick sap, also feeds on invertebrates. Lives in small hollows singularly or in family groups.

Common Brushtail Possum Trichosurus vulpecula
A common inhabitant of white box remnants, dependent on large tree hollows. Feeds on leaves, herbs, fruit, and flowers.

Sugar Glider Petaurus breviceps
A small glider is usually present in the better remnants of the slopes. It occupies small hollows just big enough to squeeze in, often in family groups. It feeds on nectar, sap of acacias, and invertebrates.

Ringtail Possum Pseudocheirus peregrinus
An uncommon inhabitant of woodlands, this species prefers the shrubby woodlands of the upper slopes. It feeds on the leaves, blossoms and fruit. It will shelter in a stick nest or a tree hollow.

Feathertail Glider Acrobates pygmaeus Status : Common
Likely to be present in White Box remnants, Lives in hollows with very small entrances in family groups of three or four. Feeds on nectar and invertebrates.

Yellow-footed Antechinus Antechinus flavipes Status : Common
Likely to be present in the larger less disturbed remnants of White Box on the upper slopes, low shrub cover enhances its environment. Lives in family groups in very small hollows in trees or fallen timber. Feeds on invertebrates and small reptiles.

TERRESTRIAL MAMMALS

Common Dunnart Sminthopsis murina Status : Common
Likely to be present in White Box woodland/grassland. Lives singularly under logs or rocks, or in logs. Feeds on invertebrates and small reptiles.

AMPHIBIANS LIKELY TO BE FOUND IN WHITE BOX WOODLAND

Arboreal Frogs

LITORIA caerulea **Green Tree Frog**
A common arboreal frog, found in tree hollows or rain water gutters and tanks. Distribution state wide.

LITORIA peronii **Peron's Tree Frog**
A common frog found on vegetation in wet areas, active throughout summer, resides in tree hollows. Distribution state wide.

LITORIA rubella **Desert Tree Frog**
A common arboreal frog, resides in tree hollows. Distribution very large, top two thirds of Australia.

Terrestrial Frogs

CRINIA parinsignifera **Brown Froglet**
A very small frog found in moist areas with good ground cover, distribution inland NSW.

CRINIA signifera **Brown Froglet**
A very small frog found in moist areas with good ground cover, ranges considerable distances away from water sheltering in litter, distribution slopes tablelands and coast of NSW.

LIMNODYNASTES tasmaniensis **Spotted Marsh Frog**
A common frog throughout, found under logs, debris, or soil cracks in moist areas, forages widely in adjoining woodlands. Distribution state wide.

LIMNODYNASTES fletcheri **Barking Marsh Frog**
A common frog of the floodplain, barks like a dog, found under bark, logs, and in soil cracks in moist areas, it forages throughout adjoining woodland areas. Distribution inland NSW.

UPEROLEIA rugosa **Wrinkled Toadlet**
An uncommon frog found after heavy summer rain, appears to forage widely. Distribution central and north eastern NSW.

UPEROLEIA laevigata **Smooth Toadlet**
An uncommon frog found in moist areas, calls from grass bank adjacent to water. Distribution slopes, tablelands, coast NSW.

PSEUDOPHRYNE bibronii **Bibron's Toadlet**
An uncommon frog found across eastern NSW and Vic in moist locations in a variety of vegetation communities.

LITORIA latopalmata **Broad Palmed Frog**
A common frog found along streams and moist areas, forages well away from water, active after summer rain. Distribution northern half of NSW.

LITORIA lesueuri **Lesueur's Frog**
A common frog found along rocky creeks and streams of the tablelands, coast and western slopes of eastern Australia.

Burrowing Frogs

LIMNODYNASTES ornatus **Ornate Burrowing Frog**
An uncommon burrowing frog, found only after heavy spring or summer rain. Distribution north eastern NSW.

LIMNODYNASTES dumerilii **Banjo or Eastern Pobblebonk**
Widely distributed frog of eastern NSW and Vic found in most vegetation communities. Very distinctive "Bonk" call.

LIMNODYNASTES terraereginae **Northern Banjo or Northern Pobblebonk**
This frog occurs in woodlands and forest north of Inverell to Cape York found in most vegetation communities near permanent water holes after rain.

NEOBATRACHUS sudelli **Painted Burrowing Frog**
A common burrowing frog found after heavy spring rain, distribution inland NSW.

SNAKES

Pythons

MORELIA spilota **Carpet Python**
A nocturnal python found in hollow trees, and abandoned buildings, eats mammals and birds. Distribution eastern and central NSW, a grey form occurs in Western NSW.

LIASIS maculosus **Eastern Childrens Python**
An uncommon nocturnal and semi-arboreal python found under bark, rock slabs and rock crevices. Distribution north of Inverell.

DEMANSIA psammophis **Yellow-faced Whip Snake**
A diurnal snake found in most forest and woodland habitats, eats skinks, frogs and reptile eggs. Distribution State Wide.

FURINA diadema **Red-naped Snake**
A nocturnal snake of forests, woodlands and grasslands, found in brown clay areas of the floodplain under logs, eats skinks. Distribution State Wide.

PSEUDECHIS porphyriacus **Red-bellied Black Snake**
A common snake in moist areas where frogs are abundant, usually found under large slabs of timber, bark, or rock, also eats small reptiles, mammals and fish. Distribution eastern half of NSW.

PSEUDECHIS guttatus **Blue-bellied Black Snake**
An uncommon snake of the woodlands, found beneath logs and litter or old burrows, eats small reptiles, frogs, and small mammals. Distribution Central NSW.

PSEUDONAJA textilis **Eastern Brown Snake**
A common snake, inhabits a variety of forests, woodlands, and grasslands throughout NSW, usually occupies an old burrow, eats small lizards, mammals and frogs. Distribution State Wide.

SIMOSELAPS australis **Coral Snake**
An uncommon nocturnal burrowing snake, found under rocks and logs, eats lizards and reptile eggs. Distribution northern half of NSW including coast.

SUTA spectabilis
An uncommon nocturnal snake of the woodlands and open forests of the slopes and floodplain, usually found under rocks, bark or logs, active in winter, eats skinks. Distribution eastern half of NSW.

VERMICELLA annulata **Bandy Bandy**
An uncommon nocturnal snake of the woodlands, usually found under well embedded rocks or logs, eats blind snakes and burrowing skinks. Distribution eastern two thirds of NSW.

HOPLOCEPHALUS bitorquatus **Pale-headed Snake**
A threatened nocturnal and partially arboreal snake, often found under the bark of trees, eats frogs and small lizards. Distribution is north eastern NSW.

Blind Snakes
RAMPHOTYPHLOPS nigrescens **Blind or Worm Snake**
A burrowing snake found in soil beneath rocks, logs and debris, thought to eat termites and insect larvae. Distribution eastern NSW

RAMPHOTYPHLOPS wiedii **Blind or Worm Snake**
A burrowing snake found in soil beneath rocks, logs and debris, thought to eat termites and insect larvae. Distribution inland from Walgett to the Tablelands.

SKINKS
Legless Lizards
ANOMALOPUS leuckartii **Legless Lizard**
A common reptile found in White Box woodland throughout the north west slopes, found in litter and under logs in moist locations.

ANOMALOPUS mackayi **Legless Lizard**
A rare burrowing skink, found in moist locations under large embedded logs, or decaying material, in shady sites, known to eat mealworms, prefers rich black soil.. Distribution restricted to northern central floodplain and lower slopes, found in White Box communities in the vicinity of Wallangra.

CARLIA tetradactyla **Southern Rainbow Skink**
A common skink of the White Box woodlands, terrestrial and diurnal, found under logs, rocks and ground debris. Distribution the slopes and central NSW.

CRYPTOBLEPHARUS virgatus **Wall Lizard**
A common arboreal skink found on logs and trees in White Box woodland.

CTENOTUS robustus **Striped Skink**
Found in most terrestrial habitats, grass, litter, logs, eats insects and small skinks. Distribution Eastern and Central NSW.

CTENOTUS taeniolatus **Copper-tailed Skink**
A common skink of the woodlands occurring in hilly terrain of the upper slopes, usually found under rocks in. Distribution eastern NSW tablelands and slopes.

EGERNIA cunninghami **Cunningham's Skink**
A common large skink of the open forests and woodlands of the tablelands and slopes, often found in rock crevices or in hollow logs and tree stumps. Diet primarily herbivorous but also eats insects.

EGERNIA modesta
A common large skink in woodlands of the upper slopes, restricted to north west slopes and north, found in rock crevices and logs. Eats insects.

EGERNIA striolata **Tree Skink**
Found in tree hollows, under bark or in logs, eats insects plants and fruit. Distribution State Wide.

EULAMPRUS tenuis
An arboreal skink, found in small cracks or holes made by Wood Grubs in White Box trees. Distributed from north west slopes to coast.

EULAMPRUS quoyii **Eastern Water Skink**
Found along stream banks basking on roots, logs, or rocks. Distribution eastern NSW.

LAMPROPHOLIS delicata **Grass Skink**
A common small skink found in shrubby woodlands of the upper slopes, found in litter and debris, distribution eastern NSW.

LERISTA muelleri
A burrowing skink found under logs and decomposing litter in drier communities, often in sandy soil types, eats small arthropods. Distribution Central and Western NSW.

LERISTA bougainvillii
An uncommon burrowing skink found in woodlands of the slopes usually under rocks or logs. Eats arthropods.

LYGISAURUS foliorum
A very small skink found in woodlands and open forests of the north west slopes. Usually in leaf litter at the base of trees.

MORETHIA boulengeri **Boulenger's Skink**
A common small skink found under logs and litter, eats insects.
Distribution State Wide.

TILIQUA scincoides **Eastern Blue-tongued Lizard**
Shelters under low shrubs, logs, rocks and litter, diet includes insects, eggs, and vegetation. Distribution eastern and central NSW.

GECKOS
UNDERWOODISAURUS milii **Thick-tailed Gecko**
A nocturnal and terrestrial gecko, found foraging for insects at night on rocks or on the ground, found under rocks or debris by day. Distribution most of inland NSW.

UNDERWOODISAURUS sphyrurus **Border Thick-tailed Gecko**
A terrestrial nocturnal gecko found under bark, logs or rocks in areas of leaf litter in a shaded position. Distribution north west slopes.
OEDURA robusta **Robust Velvet Gecko**
A nocturnal and arboreal gecko found in cracks and small hollows of White Box trees, found foraging on the ground or on tree trunks at night.

OEDURA tryoni **Southern Spotted Velvet Gecko**
A nocturnal gecko both arboreal and terrestrial found under bark of dead trees and under rocks. Distribution north west slopes.

OEDURA lesueurii **Lesueur's Velvet Gecko**
A nocturnal gecko found foraging at night on rocks usually found under rock exfoliations and in rock crevices. Common in shrubby White Box of the slopes.

DIPLODACTYLUS williamsi **Soft-spined Gecko**
A nocturnal and arboreal gecko found in woodlands and Callitris forests found at night foraging in shrubs or on limbs of trees, eats insects. Distribution Central slopes and plains of NSW.

GEHYRA dubia **Northern Dtella**
A nocturnal and arboreal gecko found under loose bark of standing or fallen trees, eats insects. Distribution Northern slopes and plains and Central NSW.

GEHYRA variegata **Tree Dtella**
A common nocturnal and arboreal gecko found under rocks and loose bark of standing or fallen trees, eats insects. Distribution Inland NSW.

HETERONOTIA binoei **Prickly Gecko**
A very common gecko found under logs, rocks and litter in a variety of forest and woodland habitats, eats insects. Distribution Inland NSW.

SNAKE LIZARDS
LIALIS burtonis **Burtons Legless Lizard**
A legless lizard found in most forest and woodland habitats state wide. Eats skinks and small snakes.

PYGOPUS lepidopodus **Common Scaly-foot**
A diurnal legless lizard found in ground debris and fallen timber, feeds on spiders and insects. Distribution Central and Eastern NSW.
DELMA tincta
An uncommon reptile found in woodlands of inland northern NSW under logs, rocks and debris.

DELMA plebia
An uncommon reptile found in woodlands and open forests of the slopes of northern NSW under logs, rocks and debris.

GOANNAS
VARANUS varius **Lace Monitor**
An arboreal goanna found in most forest and woodland types, eats insects, reptiles, eggs, nestling birds, and carrion. Distribution central and eastern NSW.

DRAGONS
POGONA barbata **Eastern Bearded Dragon**
A common dragon seen perched on fence posts in most habitats, eats insects and small lizards and snakes. Distribution Central and Eastern NSW.

AMPHIBOLURUS nobbi **Nobbi Dragon**
A small common dragon found in White Box woodland on the northern slopes, usually seen perched on fallen timber or stumps.

AMPHIBOLURUS muricatus **Jacky Lizard**
A common dragon of eastern NSW, diurnal and semi-arboreal, often found in logs.

LOPHOGNATHUS gilberti **Gilbert Dragon**
A common diurnal and semi-arboreal dragon found north and west of Inverell in woodland communities. A very fast running dragon, often found in logs.

PHYSIGNATHUS lesueurii **Eastern Water Dragon**
A common reptile found along streams of the western slopes of the Great Divide.
Often perched on a limb above water.

BATS

LITTLE MASTIFF **Mormopterus planiceps**
Fast high flying bat, roosts and breeds in tree hollows, trapped at water holes in Central and Western NSW.

LESSER LONG-EARED **Nyctophilus geoffroyi**
Common bat throughout all NSW, breeds and roosts in tree hollows.
Trapped in riverine corridors and White Box woodland.

GOULD'S LONG-EARED **Nyctophilus gouldi**
Common bat throughout eastern NSW, breeds and roosts in tree hollows.
Trapped in riverine corridors and White Box woodland.

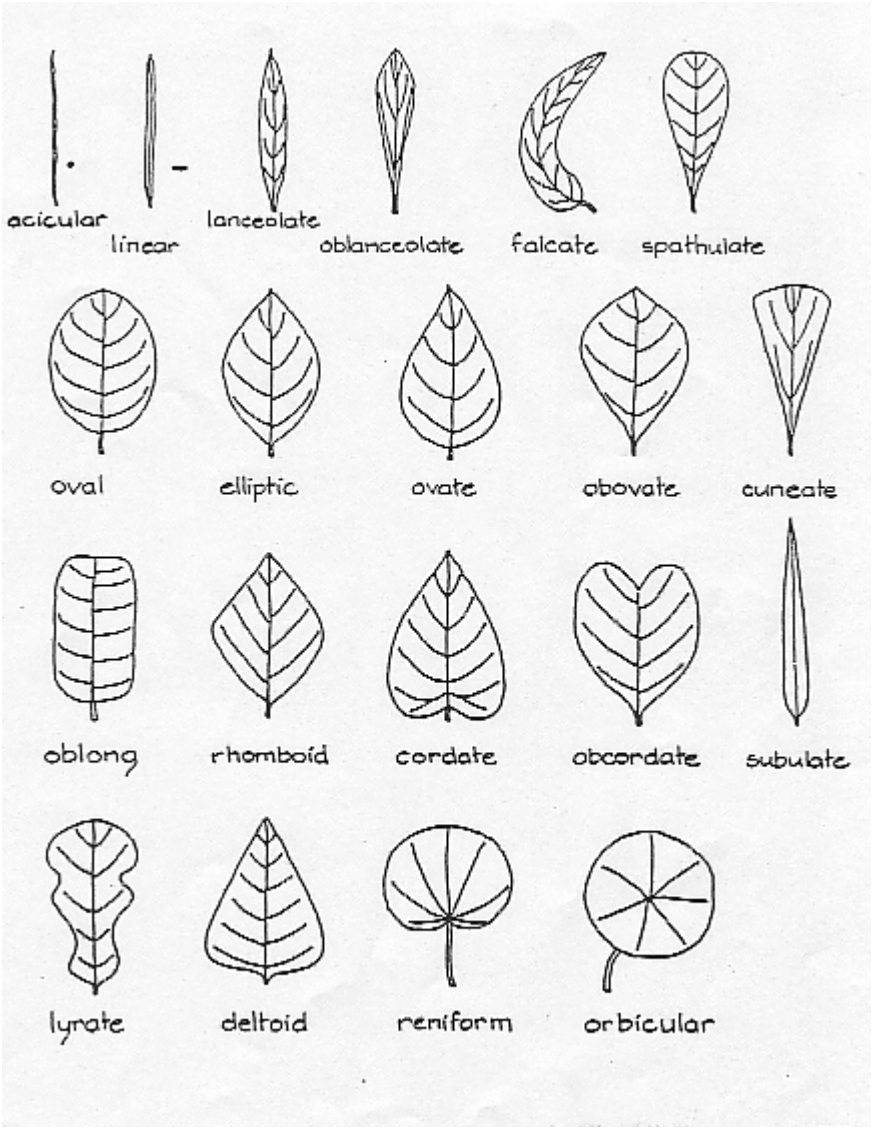
GOULDS WATTLED **Chalinolobus gouldii**
Common medium size bat found throughout most of NSW, trapped in riverine corridors and White Box woodland. Roosts in tree hollows.

PALE EPTESICUS **Vespadelus vulturnus**
Common small bat found throughout NSW, roosts in tree hollows

LITTLE PIED BAT **Chalinolobus picatus** Status : Vulnerable
Likely to occur in the northern half of the distribution area of White Box. Recorded in White Box woodland at Ashford. Thought to be a cave dweller but also likely to utilise tree hollows, eats insects and requires free standing water.

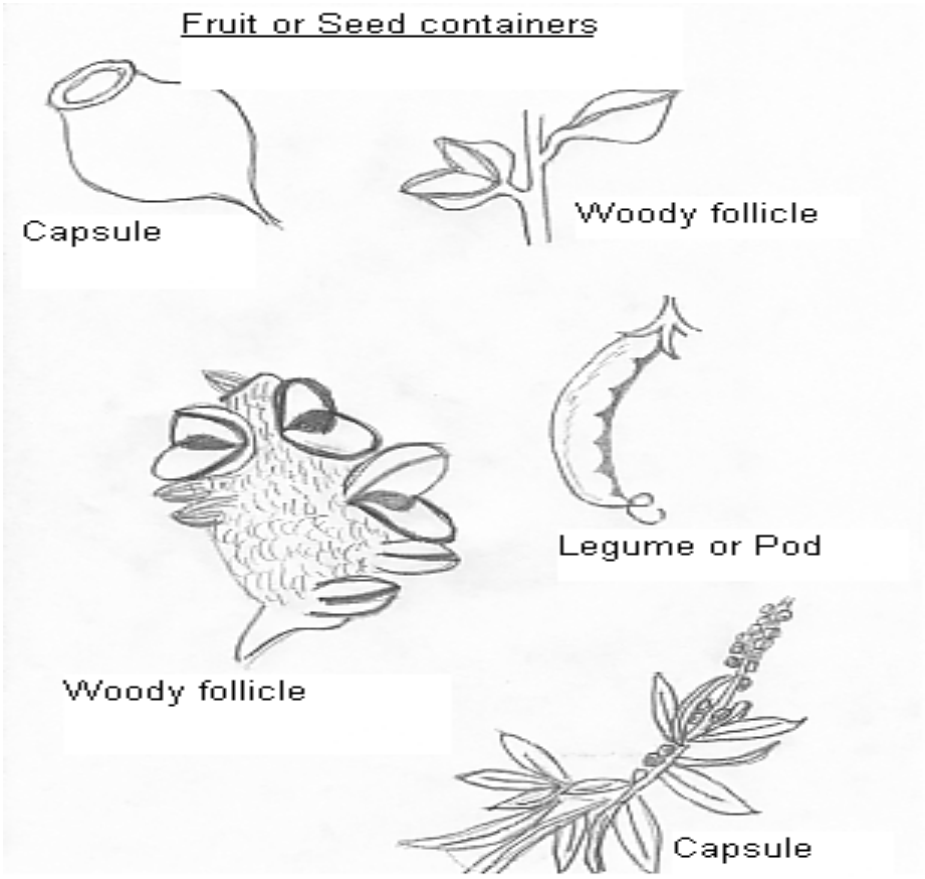
Background Teacher Information M7

Leaf shapes

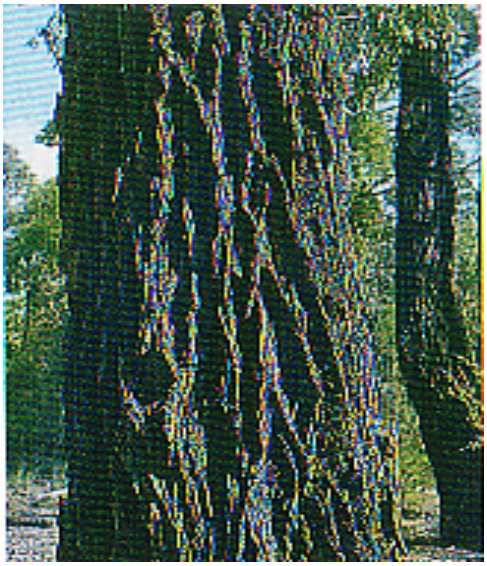


Background Teacher Information M8

Fruit Shapes



BOX BARK



IRON BARK

STRINGY BARK

GUM BARK

SOME EUCALYPTUS BARK TYPES

Background teacher information M10

Background Teacher Information M9

ALL ABOUT RAINFORESTS

What is a rainforest?

A rainforest area is broadly defined as having a 'closed' canopy of trees which excludes at least 70% of the sky when viewed from below.

Rainforests cover only about 0.25% of Australia compared to under 6 % of the world.

Rainforests are the most complex and diverse ecosystem on earth and are a valuable source of drugs and medicinal chemicals.

Rainforests contain about 1/2 of all Australia's plant species & about 1/3 of Australia's mammal & bird species.

What does a rainforest look like?

Rainforests are very dense, humid, wet forests with different layers of vegetation.

1. Emergent:

Giant trees that are much higher (up to 81 m) than the average canopy height. It houses many birds and insects.

2. Canopy:

The upper parts of the trees (20 to 40 m). This leafy environment is full of life in a tropical rainforest and includes: insects, birds, reptiles, mammals, and more. The canopy is can be so dense that it allows little light to penetrate the forest floor.

3. Under story:

A dark, cool environment under the leaves but over the ground. Palms and ferns that have adapted to low light conditions live here, or suppressed seedlings that have been there for years waiting for a break in the canopy to admit light and stimulate growth.

4. Forest Floor:

The forest floor is covered in moist decaying leaf litter and other dead material, teeming with animal life, especially insects. The largest animals in the rainforest generally live here.

Where in the wprld are rainforests?

Tropical rainforests are found in a belt around the equator of the Earth.

Where do we find rainforest communities in Australia?

Scattered pockets of rainforest are found on mountain tops and protected valleys within 100 km of the East coast of Australia.

What types of rainforest are found in Australia?

Different soil types, altitude, rainfall and evolutionary history have produced many different rainforest communities including:

Tropical **Temperate**

Subtropical **Dry Rainforest**

What natural environmental factors influence rainforest?

Climate

Most rainforests are moist, humid and warm.
The rain is more evenly distributed throughout the year in a tropical rainforest (even though there is a little seasonality).
In a temperate rainforest, there are wet and dry seasons. During the "dry" season, coastal fog supplies abundant moisture to the forest.
The temperature in a rainforest never freezes and never gets very hot.

Soil

The soil in a tropical rainforest is only about 8-10 cm thick with thick clay beneath the top layer. When damaged, the soil of a tropical rainforest takes many years to recover. Temperate rainforests have soil that is richer in nutrients, relatively young and less prone to damage.

How have rainforest plants adapted to living in their environment?

- Buttress roots- Some rainforest trees have adapted to the shallow soils in their environment by developing roots that spread out about the base of the trunk making the tree more stable.
- Large horizontally held leaves- Under story plants tolerant of low light conditions, catch as much light as possible with their large leaves, held up to the sun.
- Drip Tips on leaves-drain water from the leaf to prevent lichens and other small plants growing on their surface,
- Suppressed Seedlings-Young plants that germinated many years ago remain small waiting for a break in the canopy to admit light and stimulate growth
- Liana's- thick woody vines that scale the great heights of the trees to share in the light.
- Trees with stinging hairs on their branches and leaves to discourage insects and animals, such as possums, from feeding on the leaves.

Who are the community members that depend on the woodland community for their survival , other than humans?

Rainforests are homes for millions of plants and animals. Compared to other plant communities they contain greater diversity and intensity of species. For example the tropical rainforest of North Queensland represents about 0.1% of the land surface of the continent, contains 30% of marsupial species, 60% of bat species, 18% of bird species, 30% of frog species, 23% of reptile species and 62% of butterfly species in Australia. Some 54 species of vertebrates are unique to the area.

Tropical rainforests have a greater diversity of plants and animals than temperate rainforests.

In temperate rainforests, most of the animals are ground dwellers and there are fewer animals living in the forest canopy.

Why are rainforests important?

Rainforests are one of the oldest ecosystems on Earth and have taken the last 60 million years to evolve. Tropical rainforests make up only 6 - 8 %of the Earth's surface but support half of all known species of life. Scientists believe there are more than five million species of plants, insects and animals living in the rainforests but only 1/4 of these have been identified. It is thought that 80 % the world's insects live in tropical forests.

Rainforests:

- recycle and clean water.
- make oxygen and remove carbon dioxide from the atmosphere
- hold cures to many deadly illnesses
- support insects which could be used to control pests
- provide more than 1000 fruits and vegetables
- support biodiversity

What is threatening the rainforests?

Rainforests are a complex balance of plants and animals called an ecosystem.
In the past, Australian Aboriginals have found food, shelter and medicine within the rainforest, but have done so, without damage to the ecosystem.
Today human involvement is threatening the rainforest environment through:

- Fire
- Weed invasions
- Feral animal invasions
- Uncontrolled tourism
- Pastoral use – may damage remnant forest. Trampling by cattle may damage under story and introduce weeds.
- Weather and climate eg. Wind damage, landslides.
- Global warming

How could we manage our rainforests better?

- Controlling fire and invasion of weeds from surrounding areas.
- Management of fire including hazard reduction outside rainforest and active fore suppression.
- Management of weeds through eradication and bush regeneration and revegetation.
- Eradication of feral animals.
- Management strategies to ensure sustainable visitation.
- Cooperative programs with rainforest neighbours.

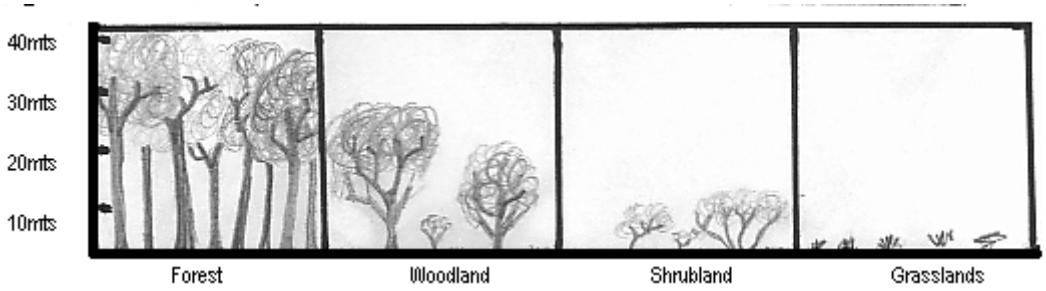
Pupil Work sheet M1

Name_____

PLANT COMMUNITIES IN AUSTRALIA

Colour in the Woodlands

F = Forest
W = Woodland
S = Shrubland
D = Desert



Your local Natural Community

Plant community_____
Climatic Region_____
Rainfall – Summer range _____Winter range_____
Temperature – Summer range _____Winter Range _____

Pupil Worksheet M2

My Woodland/Rainforest Ecosystem

Name: _____ Date: _____						
Living Things	**Where they are found**					
	water	**soil**	**rock**	**trees**	**fallen logs**	**leaf litter**
Native animals:						
Non-native animals						
Native plants						
Non-native plants						

Pupil Worksheet M3

Name: _____

Woodland plant and animal connections.

List animals that live in trees and shrubs.

_____

_____

- List the different habitat types that can be found in trees and shrubs.

_____

_____

List animals that live on the ground.

_____

_____

- List the different types of habitats that can be found on or in the ground.

_____

_____

List animals that live in water habitat

_____

_____

- List the different types of habitats that can be found in and near water?

_____

_____

Pupil Worksheet M4

Name: _____

Woodland/Rainforest Animal Report

General Description:

Habitat:

Diet:

Reproduction:

Interesting Facts:

Name: _____

Woodland/Rainforest Bird Research

Bird: _____
What does my bird look like?

Bird: _____
Where is my bird found?

Bird: _____
What does my bird eat?

Bird: _____
When does my bird breed and where does it nest?

What threats does my bird face?

Pupil Worksheet M6

Name_____

Woodland Health Check

HOW HEALTHY IS YOUR GRASSY BOX WOODLAND? Answer true or false to these questions.	
There are big old trees with hollows.	
There are young and old trees.	
There are dead trees, still standing and fallen on the ground.	
Trees look healthy, not dead on top.	
There are some shrubs.	
The ground is covered with native grasses and herbs.	
Not many weeds.	
This area is near other woodlands.	
This woodland is bigger than 6 football fields.	
TOTAL NUMBER OF TRUE ANSWERS =	

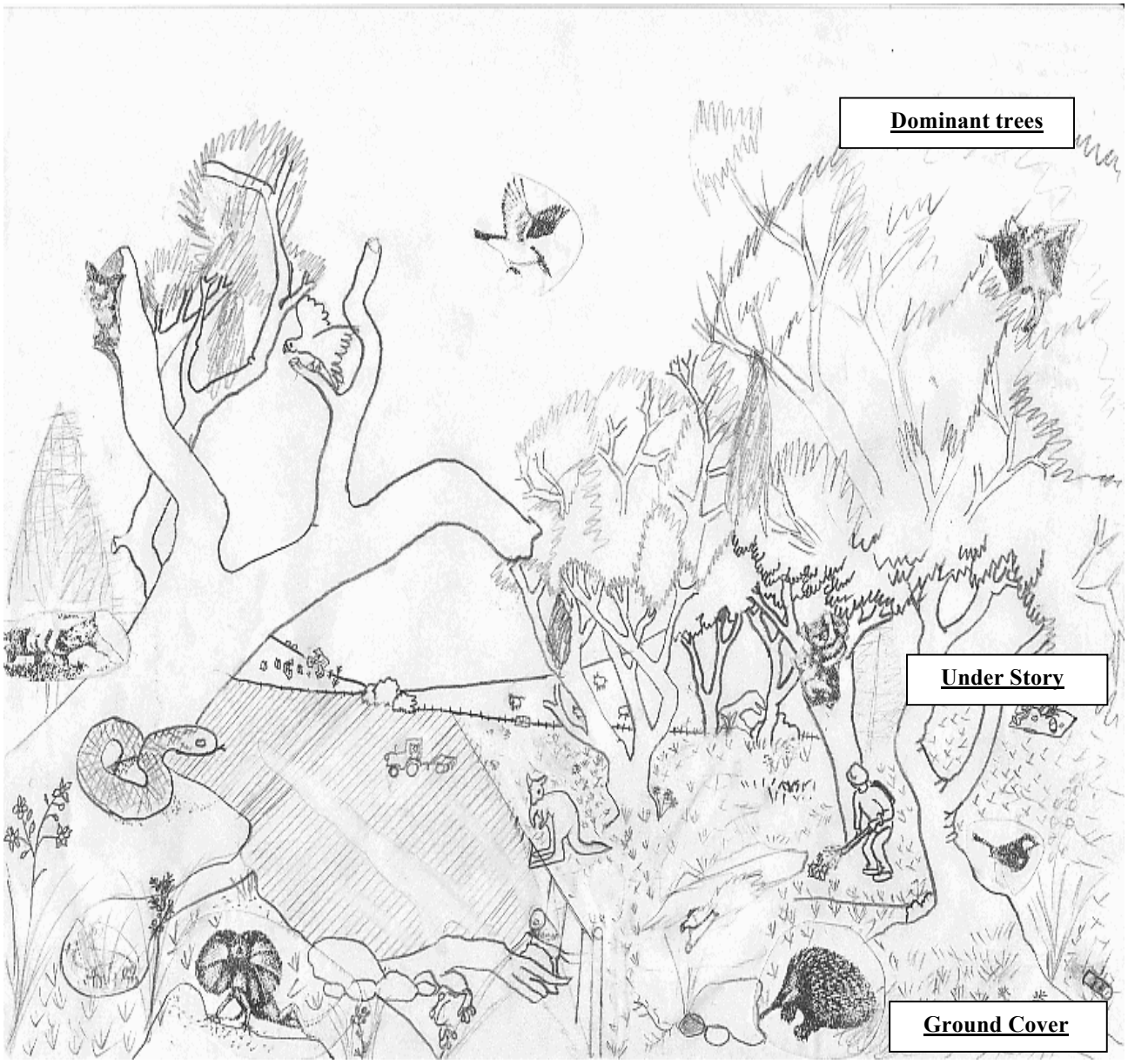
Number True scores	**=**	**Condition of your woodland**
6-9		Healthy
3-6		Unwell
0-3		Limited life

The Woodland is _____.

Pupil Worksheet M7

Woodland Community

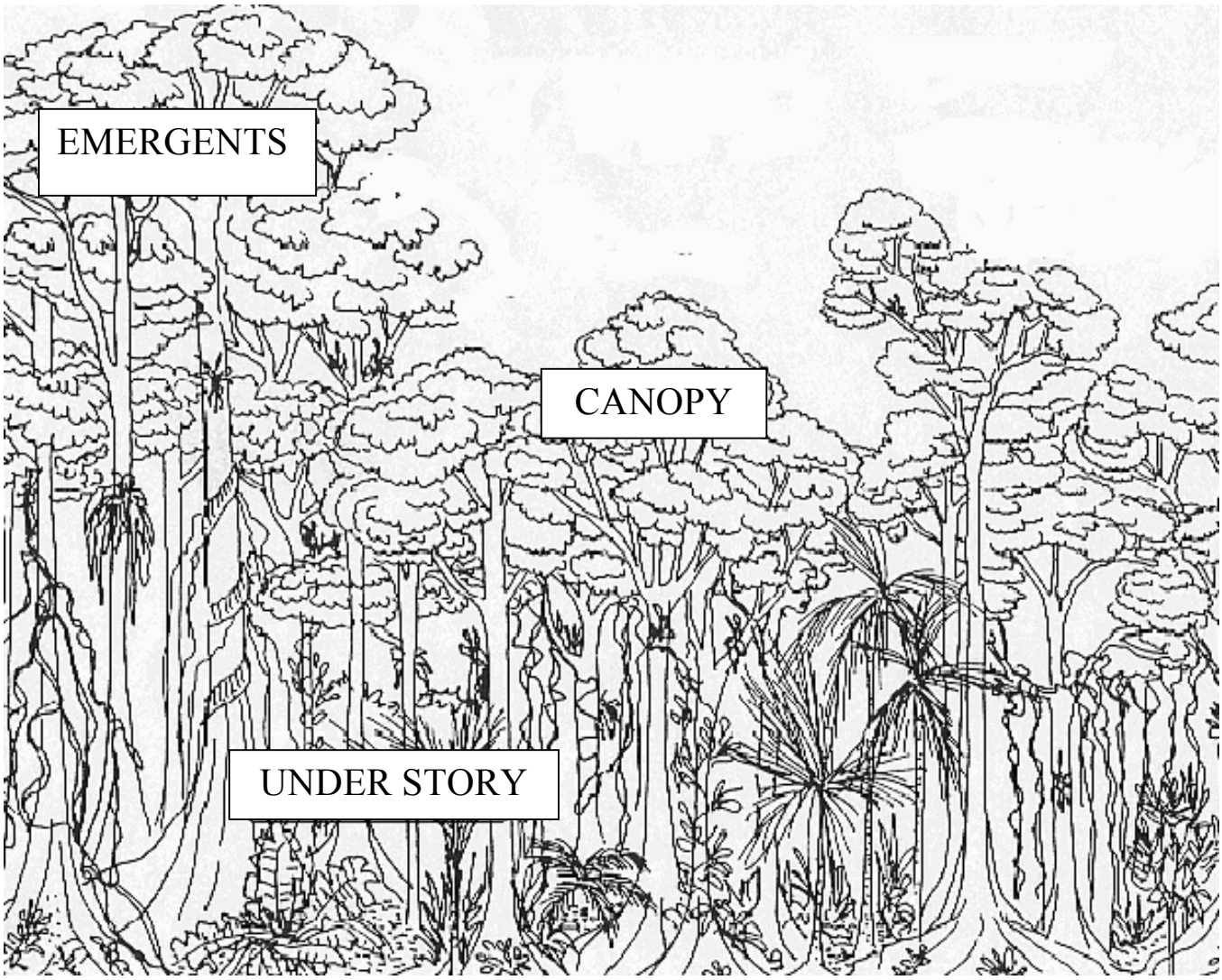
Name_____



Pupil Work Sheet M8

RAINFOREST COMMUNITY

Name: _____



Pupil Worksheet M9

Name: _____

Woodland/Rainforest Word Search

b	i	o	d	i	v	e	r	s	i	t	y	a	e	a	t	r	t	n	f
u	q	w	e	r	t	y	g	d	f	g	d	s	c	v	t	n	n	o	s
t	k	l	p	o	i	u	g	a	d	f	e	g	o	b	a	a	e	i	g
t	f	u	n	g	i	h	n	s	d	i	r	g	s	a	t	t	d	t	r
r	e	m	n	v	b	m	m	b	t	e	e	f	y	m	i	i	n	a	a
e	r	o	s	i	o	n	e	i	v	v	g	f	s	n	b	v	e	r	s
s	a	i	u	y	h	f	n	f	f	c	n	d	t	t	a	e	p	i	s
s	l	f	g	h	j	u	m	i	o	v	a	d	e	a	h	d	e	p	e
r	e	r	a	c	m	g	h	d	l	h	d	g	m	b	c	s	d	s	s
o	d	a	x	m	v	b	b	s	i	i	n	b	m	b	s	d	r	n	v
o	a	d	o	g	a	n	a	k	a	l	e	a	v	e	s	b	e	a	b
t	m	c	n	h	c	d	s	f	g	d	u	y	a	e	s	r	t	r	e
s	e	n	v	i	r	o	n	m	e	n	t	t	r	d	f	g	n	t	n
a	e	a	f	l	i	g	n	o	t	u	b	e	r	t	o	h	i	g	d
m	i	s	t	l	e	t	o	e	a	k	l	y	a	r	r	m	n	b	a
z	x	c	v	k	m	n	b	v	c	t	g	w	f	h	e	r	l	k	l
y	u	i	o	p	w	i	l	d	l	i	f	e	w	j	s	e	s	a	k
e	u	c	a	l	y	p	t	u	s	r	d	e	e	y	t	s	c	f	m
t	r	e	w	w	e	r	t	y	o	e	s	d	r	t	s	d	d	g	n
c	i	m	r	o	c	i	p	e	l	s	a	s	o	i	l	c	x	v	b

Biodiversity
Buttress roots
communities
ecosystem
endangered
environment
epicormic
erosion
eucalyptus
feral
foliage
fungi
forests
grasses
habitat
interdependent
leaves
lignotuber
mistletoe
native
soil
transpiration
weeds
wildlife