



# Biodiversity on my Land Teacher Resource and Activity Booklet Stages 1 - 4

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#### Overview

The Biodiversity on my Land Box is one of a collection of natural history boxes produced by the Australian Museum. The box, education program and the hands-on resources included were produced in partnership with the Biodiversity Conservation Trust. The box focuses on biodiversity, conservation and classification in NSW, and encourages students to explore the role of private landholders in protecting biodiversity. These concepts are covered in a range of activities suitable for students in NESA Stages 1-4, which can be found in this Activity Booklet.

Completing the activities will helps students:

- Understand what biodiversity is and the role it plays in maintaining a healthy environment;
- Why biodiversity is important both for the native flora and fauna, but also for the health of the soil, waterways and neighbouring land;
- How to survey, monitor and sample biodiversity that you have around your school or home:
- How to conserve biodiversity and encourage native flora and fauna back to your land and local area.

The *Biodiversity on my Land Box* focuses on the NESA Science K-6 Syllabus (2018), particularly the strand *Living World*. This material can be used as a guide or reference point and should not be considered the extent of the potential syllabus links for these resources. For example, written reports and presentations could be linked to the English syllabus, while creative activities could be linked to the Creative Arts syllabus.





#### What's in the Box?

#### **Panels and Books**

- 5x Double-sided Information Panels
- 6x Ecosystem Profile Posters
- 4x Diorama ID Keys
- NSW Ecosystems Floor Map
- Banbai Seasonal Calendar Poster
- Tree of Life-Rochelle Strauss
- Leaf Litter- Rachel Tonkin
- Guess Who?- Susan Hall
- 5x Conservation Champions Case Studies
- 5 x Reader copies of I am Different, We are Similar
- 1 x Classroom Reader of I am Different, We are Similar

#### **Ecosystem Dioramas**

- Arid Diorama
- Woodlands Diorama
- Forest Diorama
- Grassland Diorama

#### **Equipment**

- 1x Binoculars
- 5x Magnify Square
- 6x Puppet Gloves
- 1x Measuring tape
- 6x Carry Bags

#### **Booklets**

- Biodiversity on my Land Teacher Resource and Activity Booklet
- Biodiversity on my Land Quick Activity Instructions and Equipment List

#### Games

- Animoz: Fight for Survival Collectible Card Game
- Corridors Game
- Conservation Play
- Celebrity Heads
- Animal Snap
- Conservation-opoly
- Habitats Game
- Animal Memory Game

#### Note

All the dioramas and equipment in this box must be handled very carefully. The specimens in the dioramas are delicate and difficult to replace. Please stress to your students the importance of treating them with care. They must not be dropped, twisted or squashed. They should be repacked in the order in which they were unpacked.

Please make sure students wear provided gloves inside all Puppets for the Conservation Play to ensure other schools can use them.

#### What is the BCT?

The Biodiversity Conservation Trust (BCT) has been established by the NSW government to work with landholders to conserve biodiversity on their land. The BCT's mission is to maximise the biodiversity conservation outcomes achieved with the public and private resources entrusted in the BCT to support private land conservation, to deliver a healthy, productive and resilient environment across NSW.

The strategic goals of the Biodiversity Conservation Trust are to:

- encourage landowners to enter agreements to conserve biodiversity and support productive landscapes,
- deliver a strategic biodiversity offsetting service,
- support our landholders to conserve biodiversity on their land,
- promote public knowledge, appreciation and understanding of the value of biodiversity conservation
- invest in our people to build an engaged, professional, customer-oriented highperforming organisation, focused on achieving the BCT's purpose.



### **Background Information**

There are a few big topics in this Activity Booklet, but thankfully we have some videos that will make teaching it a breeze. Scan the QR codes or follow the link to watch us explain these concepts. These video are also useable for your slightly older students.

#### What is Biodiversity?

https://vimeo.com/515182905



#### Why is Biodiversity Important?

https://vimeo.com/515183458



#### Other Useful Links

Detailed information on different plants and animal species can be found here: <a href="https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-andplants/Threatened-species/habitat-restoration-for-threatened-pollinators-160519.pdf">https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-andplants/Threatened-species/habitat-restoration-for-threatened-pollinators-160519.pdf</a>

Most ecosystem descriptions can be found here: <a href="https://app.education.nsw.gov.au/rap/resource/access/6fccb196-b448-40b3-abd8-64dc662b8079/1">https://app.education.nsw.gov.au/rap/resource/access/6fccb196-b448-40b3-abd8-64dc662b8079/1</a>

BCT education website with digital versions of this resource and many more: <a href="https://www.bct.nsw.gov.au/biodiversity-conservation-education">https://www.bct.nsw.gov.au/biodiversity-conservation-education</a>

Australian Museum Website has many resources and support for classification here: https://australian.museum/learn/species-identification/ask-an-expert/what-is-classification/

Other Boxes can be booked here: <a href="https://australian.museum/learn/teachers/museum-box/">https://australian.museum/learn/teachers/museum-box/</a>

### **Need Support or Professional Learning?**

If you have any questions, need to organise FREE professional learning or are interested in having an expert run FREE biodiversity events at your school please contact us:

Caitlin Lawrence m: 0434 208 849 e: caitlin@petaurus.net.au



Strand	Outcomes A student:	Inquiry Question	Content Focus Students:	Skills Focus Students:	Learning across the curriculum	Suggested Activities
Living World	Describes observable features of living things and their environments (ST1-4LW-S)	What are the external features of living things?	Describe the external features of living things.     Identify and group plants and animals using their external features, eg;     native and introduced plants and animals.     worms, insects, fish, reptiles and mammals.	Collect data from observations. Record observations accurately and honestly using observational drawings, labelling, informal measurements and digital technologies. Compare observations with those of others.	Literacy     Critical and creative thinking	Activity 1, Activity 3, Activity 4, Activity 5, and Activity 13.
	Uses materials, tools and equipment to develop solutions for a need or opportunity (ST1-2DP-T)	How can we improve a local environment to encourage living things to thrive?	<ul> <li>Identify that living things live in different places that suit their needs.</li> <li>Recognise that people use science and technology in their daily lives, including when caring for their environment and living things.</li> <li>Design and produce an environment to cater for the needs of a living thing, eg;</li> <li>encourage the growth of a plant using a greenhouse or hydroponics.</li> <li>encourage the return of a living thing to a local habitat.</li> </ul>	<ul> <li>Explore and answer questions through participation in guided scientific investigations.</li> <li>Generate ideas for designing solutions for a defined purpose.</li> <li>Consider sustainable use of resources in planning and design solutions.</li> <li>Develop design ideas in response to a designed brief.</li> <li>Record design ideas using labelled and annotated drawings including simple digital graphic representations.</li> </ul>	Intercultural understanding     Civics and citizenship     Sustainability     Ethical understanding	Activity 7, Activity 10, and Activity 13
	Identifies how plants and animals are used for food and fibre products (ST1- 5LW-T)	How do humans use plants and animals?	Identify some plants and animals that are grown and used for food production.  Explore the plants and animals used in customary practices of Aboriginal and Torres Strait Islander Peoples.  Investigate ways people use scientific and technological knowledge and skills to sustainably grow plants and animals to produce fibre for clothing and or shelter.	Use a range of methods to sort and collate information. Represent information using drawings and simple tables, including digital representation methods.	Information and communication technology     Sustainability     Literacy     Difference and diversity     Aboriginal and Torres     Strait Islander histories and culture	Activity 2, Activity 10, Activity 11, Activity 13.
Earth and Space	Observes, questions and collects data to communicate and compare ideas (ST1- 1WS-S)	What are Earth's resources and how do we use and care for them?	<ul> <li>Identify and explore the use of a variety of Earth's resources including water and soil.</li> <li>Identify how Aboriginal Peoples care for Earth's resources on-Country.</li> <li>Plan and implement strategies considering conservation of resources to address sustainability and to meet personal or community needs.</li> </ul>	<ul> <li>Consider sustainable use of resources in planning and design solutions.</li> <li>Explore and answer questions through participation in guided scientific investigations.</li> <li>Generate ideas for designing solutions for a defined purpose.</li> </ul>	Sustainability     Literacy     Aboriginal and Torres     Strait Islander histories and     culture     Ethical understanding     Critical and creative     thinking     Personal and social     capability	Activity 1, Activity 10, Activity 11, Activity 13.

Strand	Outcomes A student:	Inquiry Question	Content Focus Students:	Skills Focus Students:	Learning across the curriculum	Suggested Activities
Living World	Compares features and characteristics of living and non-living things (ST2-4LW-S)	How can we group living things?	<ul> <li>Collect data and identify patterns to group living things according to their external features, and distinguish them from non-living things.</li> <li>Identify that science involves making predictions and describing patterns and relationships.</li> </ul>	Represent and communicate observations, ideas and findings, using formal and informal representations.     Produce labelled and annotated drawings including digital graphic representations.     Use a range of methods to represent data including tables and column graphs.	Critical and Creative     Thinking     Literacy     Numeracy	Activity 4.
		How are environments and living things interdependent?	Describe how living things depend on each other and the environment to survive.	Conduct scientific investigations to find answers to questions.     Collect and record accurate, honest observations using labelled observational drawings, basic formal measurements and digital technologies as appropriate.	Sustainability     Literacy	Activity 1, Activity 2, Activity 3, Activity 5, Activity 7, Activity 8, Activity 9 and Activity 13.
	Describes how agricultural processes are used to grow plants and raise animals for food, clothing, shelter (ST2- 5LW-T)	How do we create food and fibre products from animals and plants?	<ul> <li>Investigate and compare advancing technologies used in food and fibre production in Australian agriculture and those used in Traditional agriculture.</li> <li>Investigate food technologies and techniques used to produce healthy food.</li> <li>Design, plan and produce a product, system or environment to support the growth of plant and or animal that could be used in a healthy meal.</li> </ul>	Critique needs or opportunities for designing solutions through evaluating products and processes.     Consider potential resources in defining design needs and opportunity.     Investigate and research materials, components, tools and techniques to produce design solutions.	Civics and Citizenship Work and Enterprise Ethical Understanding Literacy Numeracy Personal and Social Capability Sustainability Creative and Critical Thinking	Activity 2, Activity 10, Activity 11, and Activity 13.
Earth and Space	Questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations (ST2-1WS-S)	How do natural processes and human actions change the Earth's surface over time?	<ul> <li>Investigate why the Earth's surface changes over time as a result of natural processes and human activity.</li> <li>Identify that scientific knowledge helps people understand the effect of their actions.</li> </ul>	<ul> <li>Consider sustainable use of resources and time constraints in planning design solutions.</li> <li>Use a range of methods to represent data, including table and column graphs.</li> </ul>	Ethical Understanding     Information and     Communication     Technology Capability     Sustainability     Civics and Citizenship	Activity 7, Activity 8, Activity 10, Activity 11, and Activity 13.

Strand	Outcomes A student:	Inquiry Question	Content Focus Students:	Skills Focus Students:	Learning across the curriculum	Suggested Activities
Living World	Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions (ST3-1WS-S)	How do physical conditions affect the survival of living things?	<ul> <li>Plan and conduct a fair test to show the conditions needed for a particular plant or animal to grow and survive in its environment.</li> <li>Describe how changing physical conditions in the environment affect the growth and survival of living things, for example:         <ul> <li>Aboriginal Peoples' use of fire-stick farming, and</li> <li>temperature of water in aquatic environments.</li> </ul> </li> <li>Test predictions by gathering data and use evidence to develop explanations of events and phenomena.</li> <li>Understand that scientific and technological knowledge is used to solve problems and inform personal and community decisions.</li> </ul>	<ul> <li>Pose testable questions.</li> <li>Decide which variable(s) is to be changed, measured and kept the same, in fair tests.</li> <li>Reflect on and make suggestions to improve fairness, accuracy and efficacy of scientific investigations.</li> <li>Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data.</li> </ul>	Critical and creative thinking     Ethical understanding     Information and communication technology     Numeracy	Activity 1, Activity 7, Activity 8, Activity 9, and Activity 13.
	Examines how the environment affects the growth, survival and adaptation of living things (ST3-4LW-S)	How do the structural and behavioural features of living things support survival?	Describe adaptations using existing structure or behaviours that enable living things to survive in their environment.     Describe the structural and/ or behavioural features of some native Australian animals and plants and why they are considered to be adaptations, for example:     shiny surfaces of leaves on desert plants, rearward facing pouch of a burrowing wombat, or spines on an echidna.	Compare data with predictions. Present data as evidence in developing explanations. Produce labelled and annotated drawings including digital graphic representations for an audience. Identify questions to investigate scientific ideas. Make and justify predictions about scientific investigations.	Sustainability     Information and communication technology     Literacy	Activity 3, Activity 4, Activity 5, Activity 6, and Activity 13.
	Explains how food and fibre are produced sustainably in managed environments for health and nutrition (ST3-5LW-T)	Why is it important for food and/ or fibre to be produced sustainably?	Explore examples of managed environments used to produce food and fibre, for example:     - cattle farms,     - fish and oyster farms, and     - timber plantations.     Investigate how and why food and fibre are produced in managed environments.     Identify and sequence the process of converting 'on-farm' food and fibre products into a product suitable for retail sale.     Explore plants and animals, tools and techniques used to prepare food to enable people to grow and be healthy.     Explain a sustainable practice used by Aboriginal and/ or Torres Strait Islanders communities to manage food and fibre resources.	Examine and critique needs, opportunities or modifications using a range of criteria to define a project.     Consider availability and sustainability of resources when defining design needs and opportunities.     Investigate materials, components, tools, techniques and processes required to achieve intended design solutions.	Asia & Australia's engagement with Asia     Information and communication technology     Civics & citizenship	Activity 10, Activity 11, Activity 12, and Activity 13.

Strand	Outcomes A student:	Knowledge and Understanding	Content Focus Students:	Skills Focus Students:	Learning across the curriculum	Suggested Activities
Living World	Relates the structure and function of living things to their classification, survival and reproduction (SC4-14LW)  Life Skills:  Explores the interactions of living things with each other and the environment (SCLS-20LW)  Investigates the effect of science and technology on the environment (SCLS-21LW)	LW1 There are differences within and between groups of organisms; classification helps organise this diversity.  LW5 Science and technology contribute to finding solutions to conserving and managing sustainable ecosystems.	<ul> <li>Identify reasons for classifying living things.</li> <li>Classify a variety of living things based on similarities and differences in structural features.</li> <li>Use simple keys to identify a range of plants and animals.</li> <li>Identify some examples of groups of microorganisms.</li> <li>Outline the structural features used to group living things, including plants, animals, fungi and bacteria.</li> <li>Explain how the features of some Australian plants and animals are adaptations for survival and reproduction in their environment.</li> <li>Construct and interpret food chains and food webs, including examples from Australian ecosystems.</li> <li>Describe interactions between organisms in food chains and food webs, including producers, consumers and decomposers.</li> <li>Describe examples of beneficial and harmful effects that micro-organisms can have on living things and their environment.</li> <li>Predict how human activities can affect interactions in food chains and food web, including examples from Australian land or marine ecosystems.</li> <li>Explain, using examples, how scientific evidence and/ or technological developments contribute to developing solutions to manage the impact of natural events on Australian ecosystems.</li> <li>Describe how scientific knowledge has</li> </ul>	<ul> <li>WS4</li> <li>Identify questions and problems that can be investigated scientifically.</li> <li>Make predictions based on scientific knowledge and their own observations.</li> <li>WS7.1</li> <li>Summarise data (secondary sources).</li> <li>Use a range of representations to organise data, including graphs, keys, models, diagrams, tables and spreadsheets.</li> <li>Extract information from diagrams, flowcharts, tables, databases, other texts, multimedia, resources and graphs including histograms and column, sector and line graphs.</li> <li>Access information from a range of sources, including using digital technologies.</li> <li>WS7.2</li> <li>Check the reliability of gathered data and information by comparing with observations or information from other sources.</li> <li>WS8</li> <li>Use cause and effect relationships to explain ideas and findings.</li> <li>Evaluate the appropriateness of different strategies for solving an identified problem.</li> <li>WS9</li> <li>Present ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate.</li> </ul>	Literacy Critical and creative thinking Numeracy Information and technology capability Ethical understanding  Literacy Civics and citizenship Numeracy Critical and creative thinking Information and technology capability Ethical understanding	Activity 3, Activity 4, Activity 5.  Activity 7, Activity 8, Activity 9, Activity 10, Activity 11, Activity 12, and Activity 13.
Earth and Space	Explains how advances in scientific understanding of processes that occur within and on the Earth, influence the choices people make about resource use and management (SC4-13ES) (SCLS-13ES)	ES4 Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.	<ul> <li>influenced the development of practices in agriculture, e.g. animal husbandry or crop cultivation to improve yields and sustainability, or the effect of plant-cloning techniques in horticulture.</li> <li>Research how Aboriginal and Torres Strait Islander Peoples' knowledge is being used in decisions to care for Country and Place, e.g. terrestrial and aquatic resource management.</li> </ul>	Use a recognised method to acknowledge sources of data and information.  WS5.1     Identify the purpose of an investigation.     Propose the type of information and data that needs to be collected in a range of investigation types (secondary sources).     Locate possible sources of data and information, including secondary sources, relevant to the investigation.	Critical and creative thinking     Literacy     Numeracy     Sustainability     Intercultural understanding     Aboriginal & Torres Strait Islander histories and Culture.	Activity 10, Activity 11, Activity 12, and Activity 13.

### What is Biodiversity?

Stages 1-3 Science Syllabus Teacher Support Page

#### **Learning Intention**

For students to understand what biodiversity means and why biodiversity is important in Australia.

#### **Success Criteria**

Students can:

- Break down biodiversity into bio (means life/or living things) and diversity (differences).
- Understand biodiversity is the differences between (or variety of) all living things (or organisms) found on Earth.
- Share examples of biodiversity.

#### **Inquiry Questions**

- What is the difference between a forest and a desert?
- Have humans increased or decreased the biodiversity on Earth?

#### **Key Vocabulary**

**Biodiversity-** the variety, or differences of all living organisms found on Earth.

**Habitat-** where an animal lives, eats and sleeps. Their home.

**Species-** a group of living things consisting of similar individuals able to share genes or breed.

**Plant-** a living thing that usually makes their own food through sunlight (photosynthesis), and have a waxy outer layer and are often green.

**Animal-** a living thing that has to feed itself on other animals or plants and have senses, animals can move around.

**Fungus-** a living thing that gets its food from decomposing matter in the soil rather than the sun.

#### **Lesson Plan**

#### Prior Knowledge

There is no prior knowledge required for this lesson.

#### Engage

Students watch the *Biodiversity in Woodlands* video and then brainstorm what biodiversity means. **Use this as a way to determine any misconceptions or prior knowledge students have.** 

#### **Explore**

Look at an Ecosystems Diorama in groups and identify how many different animals they can see and how many different plants they can see.

### Explain

Provide students the Activity 1 sheet (Page 13) and ask them to fill it out independently.

#### Elaborate

Think, pair and share why biodiversity might be important. Ask the students the above Inquiry questions.

#### Evaluate

Students then reflect on and fill out the sentence "I thought...., but now I know..."

#### Extension

Brainstorm as a class what animals have differences in the same species. Ask students Why is it a good thing that animals have differences even when they are the same species?

#### Resources

One Ecosystems Diorama found in the Box.

The Biodiversity in Woodlands video found at: https://www.bct.nsw.gov.au/biodiversity-conservation-education



# **Activity 1: What is Biodiversity?**

The word 'biodiversity' sounds like a big word but it can be broken down. Bio means 'life' or 'living things' and diversity means the differences between, or variety in, a group of places, people or things. Draw four animals on the word Biodiversity below. See if you can add an Australian animal with the same starting letter as the letter you draw next to it (like the echidna on the letter 'e').

Can you think of an animal that starts with Y?



See how many of the below words you can find. If you don't know what a word means, pair up with someone and see if you can work it out, and then ask your teacher for help.

Α	1	Q	0	О	С	D	F	Α	S	G	Q	F	S	Ν	G	S	D	Κ	С
Α	М	Τ	Ε	V	Z	D	L	Ν	Υ	0	Т	R	Ε	Ε	J	Р	F	R	Ν
0	С	0	U	С	٧	С	S	S	G	Т	С	Κ	C	M	Υ	Α	Н	1	Н
Т	S	Ε	J	S	1	С	R	Н	Р	R	0	Т	U	N	L	K	Z	1	Κ
Κ	Р	0	Т	C	٧	Α	K	D	Ν	Ε	S	О	J	F	1	Α	В	X	0
В	1	K	Α	Т	Н	Е	L	Ε	1	G	С	В	T	Α	٧	Α	1	D	С
Р	D	D	Ν	D	Τ	М	В	С	Ν	Κ	D	Т	G	D	1	Q	О	Υ	U
U	Ε	Р	Τ	О	L	Ε	Ε	О	S	0	В	R	Ε	D	Ν	Т	D	Ν	S
Υ	R	С	М	W	0	Н	J	S	Е	Α	L	D	S	S	G	G	Т	S	R
D	Q	U	Α	Υ	Н	Н	U	Υ	С	L	D	Υ	Н	Р	٧	F	V	О	S
Q	V	С	L	Ν	Ε	Q	Α	S	Т	Α	L	Q	R	Р	Q	0	Ε	V	Т
U	R	Α	Н	C	Ε	J	S	Т	L	U	Α	В	J	Р	Υ	N	R	Υ	Υ
В	S	Н	Q	Ι	K	D	0	Ε	В	Z	Q	Κ	N	1	0	D	S	С	Р
W	D	J	Α	Z	L	Р	F	М	K	M	Τ	0	L	Υ	Q	N	Т	В	L
S	В	Т	J	В	Z	L	С	R	R	R	R	Κ	Z	Т	F	Ε	Т	Υ	Α
Κ	Μ	Т	0	S	Τ	R	I	G	0	0	0	G	L	S	Α	S	Υ	V	Ν
Z	L	L	W	Υ	M	Т	Υ	Н	I	G	Н	Χ	R	Υ	Κ	0	М	G	Т
Ν	D	U	Q	R	Τ	М	Α	Н	G	Н	Z	0	Q	Α	Q	R	Υ	J	Q
																		L	
Κ	Н	K	Ε	Н	D	Z	Р	F	Υ	L	N	Z	Z	F	J	S	Ε	Ζ	M

#### Words

Bird
Fish
Tree
Frog
Plant
Animal
Biodiversity
Koala
Ecosystem
Species
Habitat
Spider
Insect
Grass
Living



### The Values of Biodiversity

Stages 1-3 Science Syllabus
Teacher Support Page

#### **Learning Intention**

For students to begin to appreciate and understand the values that biodiversity in ecosystems and the impact on living things.

#### **Success Criteria**

Students can:

- List some ways that biodiversity, or differences in living things, can be valuable for people.
- Think, pair and share their ideas on how biodiversity improves human happiness and wellbeing.

#### **Inquiry Questions**

- Why do trees have roots?
- What is your favourite native animal?
- Why does nature make us happy?

#### **Key Vocabulary**

**Leaf Litter-** decomposing but recognisable leaves and other debris forming a layer on top of the soil.

**Pollination-** the act of transferring pollen grains from the male anther of a flower to the female stigma.

**Biodiversity values-** the benefits provided to humans from nature e.g. clean air, water, food, happiness, recreation, and pest control.

**Ecosystem-** a community of living things that interact with each other and their environment.

#### **Lesson Plan**

#### Prior Knowledge

It is expected that students have learnt about biodiversity.

#### Engage

As a class, read Leaf Litter by Rachel Tonkin.

#### **Explore**

Provide students the Activity 2 sheet (**Page 15** for stages 1-2) (**Pages 16 & 17** for stages 3-4) and ask them to fill it out independently. Then have the students to pair and share their ideas.

#### Explain

When they are done, brainstorm as a group the above inquiry questions. Explore different ways that biodiversity can be valuable for humans. For example, pollinating insects and mammals help crops grow. Plants produce oxygen for us to breathe and filter water as it flows from hills to creeks. Ask students what their favourite activity to do outside is, or where they like to go for holidays. Discuss whether they would enjoy that holiday or activity as much if it wasn't outside in nature.

#### Elaborate

Have students work in small groups to discuss how biodiversity from one of the ecosystem dioramas could be valuable from a recreational, farming and wellbeing perspective.

#### Evaluate

Students then reflect on and fill out the sentence "I thought...., but now I know..."

#### Extension

As a class discuss:

- Do bees and bats pollinate plants the same way?
- If we didn't have animals pollinating the plants what would happen to our groceries?

#### Resources

One copy of Leaf Litter by Rachel Tonkin found in the Box.

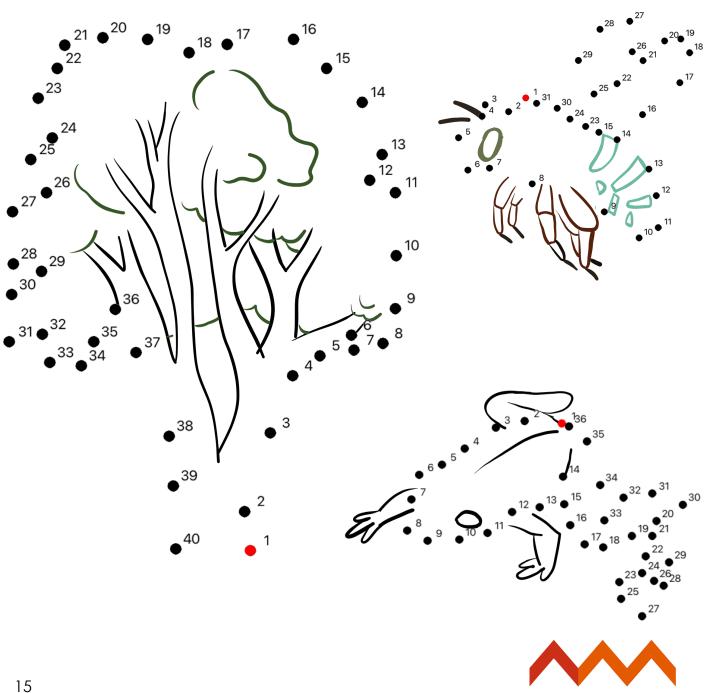
Detailed information on different plants and animal species can be found here:

https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-andplants/Threatened-species/habitat-restoration-for-threatened-pollinators-160519.pdf



# **Activity 2: The Values of Biodiversity**

Many plants and animals are valuable for humans, making food and removing pests. Bees are very important, they make honey for us to sell and make sure plants grow seeds and fruit. Frogs are valuable for humans too!! They eat insects and are an important food source for birds, snakes, and other animals throughout the food web. Complete the dot-to-dot to find some living things that help humans.



**AUSTRALIAN MUSEUM** 

# Student Activity Page 1 of 2

# **Activity 2: The Values of Biodiversity**

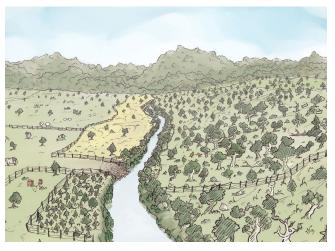
Many plants and animals are valuable for humans, making food, cleaning water and removing pests. Living things can also be valuable because they make us happier or feel better.

Pick a living thing found in each ecosystem below and write how you think it can be valuable to humans.



Living Thing:

How is it valuable to humans?\_\_\_\_\_



Living Thing:

How is it valuable to humans?



Living Thing:\_\_

How is it valuable to humans?\_\_\_\_\_



Living Thing:\_

How is it valuable to humans?\_\_\_\_\_



### **Activity 2: The Values of Biodiversity**

Pollination is the way that plants produce seeds and fruit. These seeds then form new plants. Pollen needs to be delivered from one part of the plant to another. Many animals help with pollination and without them most flowers and crops would not grow. Plants have features to attract certain pollinating animals.

Draw a line between the animals and their favourite plant below.













I am a regent honeyeater and, like my name suggests, I eat honey-like nectar. One of my favourite foods is white box nectar, which is found inside the trees fluffy white flowers.



I am a blue-banded bee, named after the blue stripes on my abdomen. I don't live in hives like other bees, but i still collect pollen and nectar! One of my favourite foods is dianella, which has purple petals and yellow pollen.



I am a rainbow lorikeet, and I bet you can tell how I got my name! I eat pollen and nectar from the red flowers of bottlebrush trees so please don't feed me jam or honey because I will get sick.



I am a flying-fox, a type of bat found all over the east coast of NSW. I love the bright pink melaleuca flowers, which I set off in search for in the early evening.



I am an eastern pygmy possum and I love woodland and heath-covered ecosystems. My favourite food is the nectar and pollen from the tall, sturdy yellow banksia flower.



What would happen if one plant species above went extinct?
What about one animal species?

### **Features of Animals**

Stages 1-3 Science Syllabus Teacher Support Page

#### **Learning Intention**

For students to describe animals based on their physical features in order to group similar species.

#### **Success Criteria**

Students can:

- Use 50% of the words in the key vocabulary.
- Compare and contrast animals based on their features.
- Group similar animals together.

#### **Inquiry Questions**

- What are some features of animals?
- How do we group (or classify) living things?
- How do these features help these animals survive?

#### **Key Vocabulary**

Habitat- a place where an animal lives, its home.

**Compare and Contrast-** to look at what is similar and different about two or more things.

Claws, ears, feathers, feet, fins, fur, hoof, legs, mane, paw, scales, skin, tail, webbed feet, whiskers, wings, arm, beak, flower, horn, leaf, root, shell, stem.

Birds, fish, groups, insects, mammals, reptiles.

**Feature-** something that makes a living thing different. This can be physical, like a bushy tail or a behaviour like being able to dig burrows.

#### **Lesson Plan**

#### Prior Knowledge

It is expected that students have learnt the definition of biodiversity.

#### Engage

Students read I am Different and brainstorm what sort of differences the animals had. **Use this as** a way to determine any misconceptions or prior knowledge students have.

#### **Explore**

Discuss the different groups that animals can come in and what features make them different. Use the white board and the *Vocabulary* above to compare and contrast amphibians, birds, fish, reptiles, mammals and insects.

#### Explain

Provide students the Activity 3 sheet (**Page 19**) and ask them to fill it out independently. Then have the students to think, pair and share their reasoning for the groups.

#### Elaborate

Choose an Ecosystem Diorama and identify some of the living things in there.

#### Evaluate

Students then reflect on and fill out the sentence "I thought...., but now I know..."

#### Extension

Discuss the difference between vertebrate (animals with backbones e.g. mammals, fish, amphibians) and invertebrate (animals without backbones e.g. worms, insects, molluscs). As a class read *Tree of Life*.

#### Resources

One Ecosystems Diorama, Tree of Life. by Rochelle Strauss and Copies of I am Different, We are Similar found in the Box.



# **Activity 3: Features of Animals**

Biodiversity is all about the differences between living things. The differences between animal and plant species are called features. Look at the animals below and compare their features to work out how we should group them.

Circle the group you think they should go in.



- o Reptile
- o Fungus
- o Fish
- o Mammal



- o Reptile
- o Amphibian
- o Insect
- o Fish



- o Fish
- o Mammal
- o Bird
- o Insect



- o Bird
- o Insect
- o Reptile
- o Mammal



- o Amphibian
- o Reptile
- o Fish
- o Mammal



- o Wallaby
- o Echidna
- o Bilby
- o Wombat



Most of these living things can be found in Western New South Wales. The book Biodiversity Conservation at Fowler's Gap has some of these.

# Classify like an Ecologist!

Stages 3-4 Science Syllabus

Teacher Support Page

#### **Learning Intention**

For students to create a dichotomous key to help identify and group species.

#### **Success Criteria**

Students can:

- Recognise differences between living things.
- Use a simple dichotomous key to classify based on these differences.
- Identify challenges there could in classifying species.

#### **Inquiry Questions**

- How do we know wombats and echidnas are different animals?
- What is the difference between an animal and a plant?
- Why is it important to classify animals when we are trying to conserve them?

#### **Key Vocabulary**

**Dichotomous Key-** a special tool that ecologists use to classify species. They work by comparing and contrasting features of plants or animals e.g. size, shape or colouring.

**Feature-** something that makes a living thing different. This can be physical, like a bushy tail or a behaviour like being digging burrows.

**Species-** a group of living things consisting of similar individuals able to share genes or breed.

**Class-** a group of species that have similar features. Scientists have grouped animals into classes to make it easier to study them.

**Ecologist-** study the relationships between living things and their surroundings, or environment

#### **Lesson Plan**

#### Prior Knowledge

It is expected that students have learnt about biodiversity.

#### Engage

As a class breakdown the term *animal* into smaller groups (classes). For example, animals can be broken down into *fish*, *insects*, *birds*, *reptiles*, *mammals*, and *amphibians*. Discuss the difference between a class and a species. Have students think, pair and share what features could be used to categorise an animal into one of these classes. Discuss in small groups or as a class.

#### **Explore**

Break the students up into four groups and provide each group an Ecosystem Diorama. Students then work together to categorise the animals in the Ecosystem Diorama into these classes.

#### Explain

Provide students the Activity 4 sheet (Page 21) and ask them to fill out page one independently.

#### Elaborate

Have students create their own *Dichotomous Key* about a species found in an ecosystem diorama.

#### Evaluate

Students then reflect on and fill out the sentence "I thought..., but now I know..."

#### Extension

Have students research how the features of a native animal help it survive in Australia.

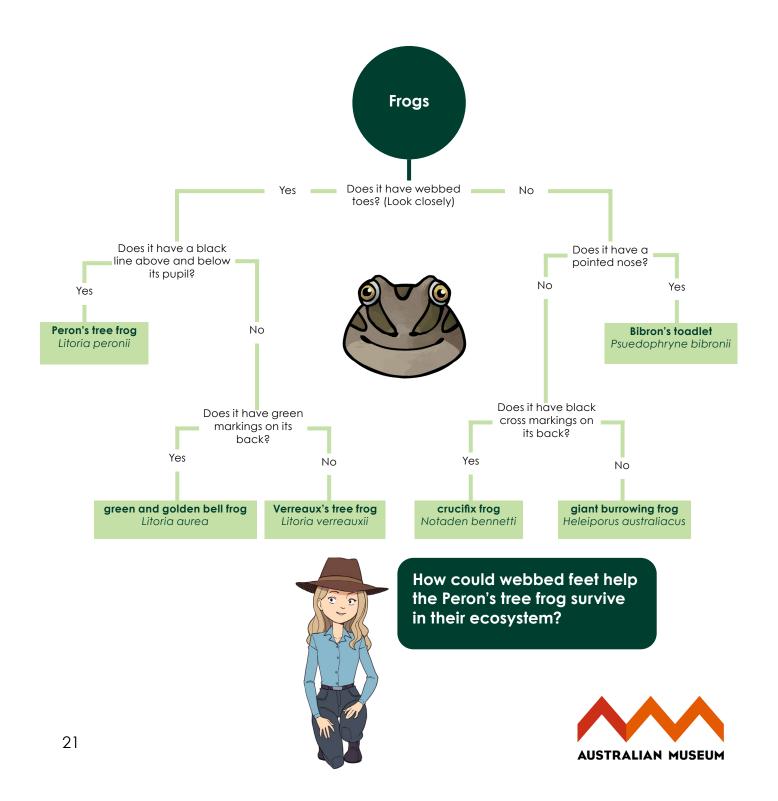
#### Resources

Ecosystems Dioramas found in the Box.



# **Activity 4: Classify like an Ecologist!**

Dichotomous keys are a special tool that ecologists use to classify species. They work by comparing and contrasting features of plants or animals e.g. size, shape or colouring. In the activity below, use the key and the pictures of frogs on the next page to identify the species. Write the species on the line next to the photos.



# Activity 4: Classify like an Ecologist!



**Species Name:** 



**Species Name:** 



**Species Name:** 



# Activity 4: Classify like an Ecologist!



**Species Name:** 



**Species Name:** 



**Species Name:** 



### **Features of Plants**

Stages 3-4 Science Syllabus

#### Teacher Support Page

#### **Learning Intention**

For students to describe plants based on their physical features in order to group similar species.

#### **Success Criteria**

Students can:

- Use 50% of the words in the key vocabulary.
- Compare and contrast plants based on their features.
- Produce labelled and annotated drawings of plants.

#### **Inquiry Questions**

- What are the physical features of plants?
- What are the differences between native and introduced plants?
- How do these features of plants support survival?
- What features of introduced plants make them a weed?

#### **Key Vocabulary**

**Tree Canopy-** the top of one or several trees.

**Leaves-** green plant parts that photosynthesise.

**Photosynthesis-** the process in which green plants use sunlight to make their own food

**Branches-** smaller limbs that come of the trunk of the plant.

**Trunk-** the main limb of the tree that transports water and nutrients from the roots to the leaves.

**Roots-** the underground part of a tree that absorbs water and nutrients. Anchors the plant.

**Bark-** the woody outer layer of a tree trunk.

Rings- the rings of a tree can help work out how old a tree is.

Flower Bud- a flower still in development.

Flower- the part of the plant that grows seeds or fruit to make new plants.

**Stem-** the main limb of the flowering plant that transports water and nutrients from the roots to the leaves and flowers.

**Root Bulbs/Tubers-** A short thick part of a root that stores energy (potatoes are tubers).

Pistil- the part in the centre of a flower that produces seed.

**Sepal-** protects the flower bud while it is developing.

Petals- the coloured part of the flower that attract birds and insects.

**Stamen-** the part of the flower that produces pollen.

**Pollen-** yellow powder produced by flowers. Insects and birds move pollen from one plant to another, and this process makes seeds.

### Lesson Plan (Double Lesson)

#### Prior Knowledge

It is expected that students have learnt the definition of biodiversity.

#### Engage

Students read I am Different and brainstorm what sort of differences the animals had.

#### **Explore**

Discuss the different groups that plants can come in and what features make them different. Use the white board and the Vocabulary above to draw and label the key features of a stringybark (Eucalyptus tenella) and a chocolate lily (Arthropodium strictum) as shown on pages 25 - 26.

#### Explain

Provide students the Activity 5 sheet (**Page 27**) and ask them to draw and label a plant from any of the four dioramas.

#### **Flaborate**

As a class discuss how these structural features support the survival of the plants in different ecosystems. If they were placed in a different ecosystem would they survive? Why or why not?

#### Evaluate

Students then reflect on and fill out the sentence "I thought...., but now I know..."

#### Extension

As a class, brainstorm a list of introduced and a list of native plants and discuss the differences in features.

#### Differentiation

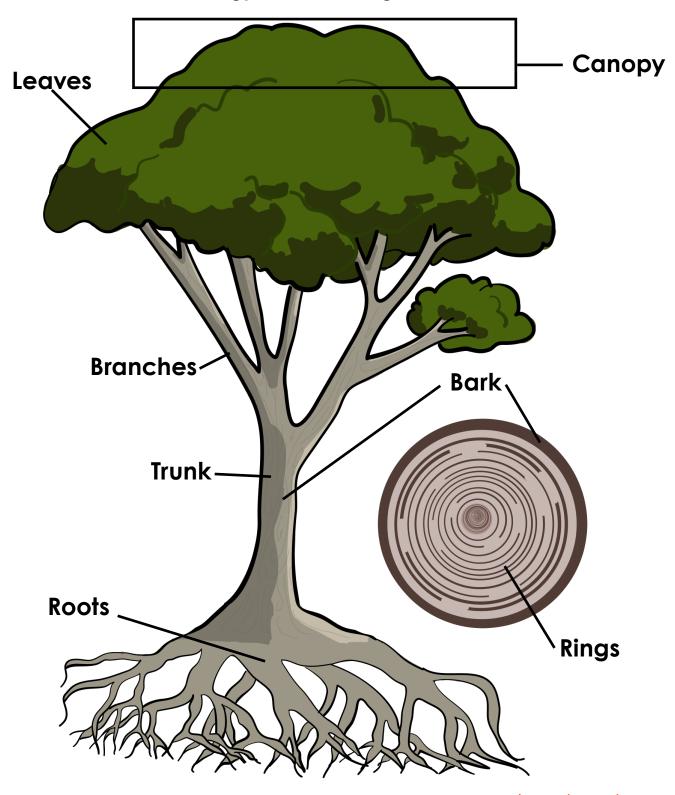
For younger stages, run the activity without explaining the parts of a flower.

#### Resources

# **Features of Plants**

Stages 3-4 Science Syllabus Teacher Support Page

# stringybark tree diagram

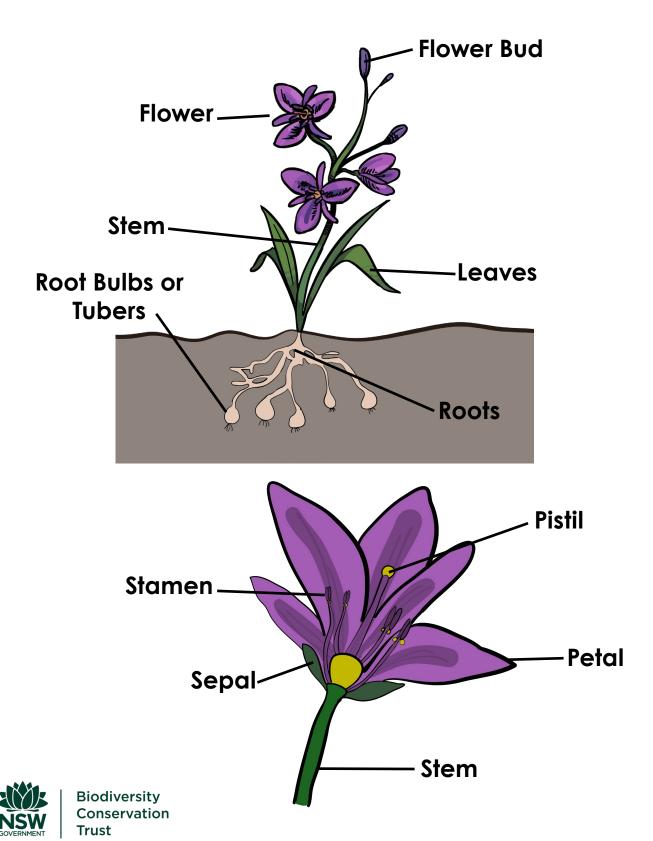




### **Features of Plants**

Stages 3-4 Science Syllabus Teacher Support Page

chocolate lily diagram



# Student Activity Page 1 of 1

# **Activity 5: Features of Plants**

The differences between animal and plant species are called features. These features help the plants survive and thrive.

Draw and label a plant from any of the four dioramas.



# **Adaptations for Survival**

Stages 3-4 Science Syllabus

Teacher Support Page

#### **Learning Intention**

For students to conduct an experiment to work out if certain adaptations of physical features or behaviours help animals survive.

#### **Success Criteria**

Students can:

- Explain adaptations using examples.
- Write a hypothesis to predict what will happen using the words "when", "if" or "then".
- Tally observations using the table and work as a class to determine the average.

#### **Inquiry Questions**

- How do the features of the moths help them survive?
- What features of the "birds" could help them catch the moths?
- Why would it be good for different moths to have different features?
- All of the moths are the same size, why is this important in an experiment?

#### **Key Vocabulary**

**Adaptation-** a special skill or physical feature that helps an animal to survive and do everything it needs to do.

**Hypothesis-** a sentence explaining what you think will happen in a situation or experiment. Eg: When I put water in a freezer, the water will turn solid.

**Observation-** the act of careful watching and listening. Make sure you write down your observations to prove your hypothesis correct or incorrect.

#### **Lesson Plan**

#### Prior Knowledge

It is expected that students have learnt the definition of biodiversity and be able to identify some features of native animal and plant species.

#### Engage

Brainstorm as a class how having adaptations is important to ensure that a species survives against threats such as disease, pests and changing habitats. Explain the experiment steps below, then students will write down their hypothesis in their notebook.

#### **Explore**

- 1. Provide each student Activity 6 sheets (Pages 29 and 31).
- 2. Each student cuts out five moths on page 1 and write their initials on the back. As they do this explain that the different colours represent genetic diversity.
- 3. Select two-to-four areas ("habitats") around the school. Each "habitat" should look different and be a minimum size of five metres. Think grass, leaf litter, or asphalt for example.
- 4. Split the class into two groups, one as "moths" and one as "birds". The groups take it in turns to be "moths" or "birds". The moths have one minute to place all of their moths in the "habitat", the birds cannot watch while this is done.
- 5. The birds then have 15 seconds to catch five moths of any colour.
- 6. Record how many moths of each colour were caught and how many of each colour survived.
- 7. Repeat in the other habitats, with the groups swapping roles.

#### Explain

As a class tally how many moths of each colour were caught and how many of each colour survived. Discuss as a class:

- Which coloured moth was caught most often?
- Which moth was caught least often?
- Did you catch different coloured moths in the different "habitats"?

#### Elaborate

Look at each of the ecosystem dioramas and as a class make a hypothesis on which coloured moth would be best adapted to each diorama.

#### Evaluate

Students then reflect on and fill out the sentence "My hypothesis was... My results are..."

#### Resources

Ecosystems Dioramas found in the Box.

Scissors. When photocopying page 29, make sure you copy it in colour.

# **Activity 6: Adaptations for Survival**





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# Student Activity Page 2 of 2

# **Activity 6: Adaptations for Survival**

Moths caught by birds							
Habitat Type	1)	2)	3)	4)	Total	Average	
White							
Black							
Brown							
Green							
Orange							

Moths caught by birds								
Habitat Type	1)	2)	3)	4)	Total	Average		
White								
Black								
Brown								
Green								
Orange								



# What is an Ecosystem?

Stages 2-4 Science Syllabus

Teacher Support Page

#### **Learning Intention**

For students to understand why different animals need different habitats.

#### **Success Criteria**

Students can:

- Define an ecosystem.
- Look at a habitat and give an example of an animal that would survive well there.
- Give examples of living and non-living things in environments.

### **Inquiry Questions**

- What are some non-living things that help animals and plants survive?
- Why do different animals live in different ecosystems?
- What is a wetland?

#### **Key Vocabulary**

**Ecosystem-** a community of living things that interact with each other and their environment.

**Wetland-** There are more than 20,000 wetlands across New South Wales, which are areas of land covered or saturated with fresh, brackish or salt water. The area doesn't need to always be wet to be a wetland, it just needs to be wet for long enough for plants and animals to be adapted to or dependent on wet conditions for part of their life cycle.

**Examples of non-living things in an ecosystem**water, sunlight, oxygen, soil and temperature.

#### **Lesson Plan**

#### Prior Knowledge

It is expected that students have learnt the definition of biodiversity and be able to identify some features of native animal and plant species, and can give some example habitats.

#### Engage

Split students into four groups. Each group is given an ecosystem diorama and the panel that goes with that ecosystem. Students think, pair and share as a group why these animals are found in this ecosystem.

#### **Explore**

Have students work as a group on Activity 7 sheet 1 (Page 33) independently.

### Explain

Brainstorm on the whiteboard non-living things in ecosystems and how they help animals or plants survive. Discuss what a wetland is and watch the BCT Wetland Video.

#### Elaborate

Have students work on Activity 7 sheets 2 and 3 (Pages 34 - 35) independently.

#### Evaluate

Students then reflect on and fill out the sentence "I thought...., but now I know..."

#### Extension

Students draw an ecosystem diorama and label the living and non-living things found in the ecosystem.

#### Resources

Ecosystem Dioramas and Panels found in the Box.

Wetlands video can be found here: https://www.bct.nsw.gov.au/biodiversity-conservation-education



# Student Activity Page 1 of 3

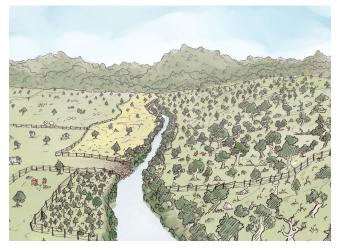
# Activity 7: What is an Ecosystem?

An ecosystem is a community of living things that interact with each other and their environment. Choose one Australian native animal that might live in each ecosystem below and write why you think the animal might live there.



Animal:

Why does it live here?\_\_\_\_\_



Animal:

Why does it live here?\_\_\_\_\_



Animal:\_

Why does it live here?\_\_\_\_\_



Animal:\_

Why does it live here?\_\_\_\_\_



# Activity 7: What is an Ecosystem?

Cut out the key words to the right to label the ecosystem below. You can even make some labels of your own.



# Student Activity Page 3 of 3

Biodiversity on my Land: Teacher Toolkit Activity 7 Stages 3-4

Fallen logs	Water plants
Soil	Trees
No rain	Mud

This hollow in the tree makes good habitat, is it a living or non-living part of the ecosystem?



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## **Ecosystem Diversity**

## Stages 3-4 Science Syllabus

## Learning Intention

For students to understand that biodiversity refers to concepts as big as ecosystems and as small as species.

#### Success Criteria

Students can:

- Use a simple formula to calculate the percentage of ecosystems.
- Explain how different animals and plants would survive or thrive better in different ecosystems.

## **Inquiry Questions**

- . Were everyone's transect results similar or different?
- Do you think this is a useful way to determine the level of ecosystem Heath-shrubland habitat. diversity within an area?
- What might be a better way to determine the percentages of different ecosystems across NSW?

#### **Key Vocabulary**

**Ecosystem-** an ecosystem is a community of living things that interact with each other and their environment. NSW has a diverse range of ecosystems within the state.

**Species-** a species is a group of living things that can reproduce.

Transect- a straight line used to count and record occurrences of species to study.

#### **Lesson Plan**

## Prior Knowledge

It is expected that students have learnt about biodiversity, species, habitats and ecosystems.

#### Engage

Students work together to create a mind map of the types of living things found in one of the ecosystem dioramas.

#### Explore

Students do the following transect activity independently (Page 39):

- Cut paper into thin, even strips (approximately 2-3cm wide) and stick them together end-to-end until you have a long strip as wide as the floor map.
- Lay your paper strip horizontally across the map and mark the paper at each spot where the map changes from one ecosystem to another.
- Using your ruler or a tape-measure, measure each section and record on your results table.
- Measure the total width of NSW along your transect and use this to calculate the percentage of each ecosystem.

#### Notes:

\*You might have more than one section of each ecosystem so add these together in the total column, while other ecosystems may not be present anywhere along your transect.

\*Make sure you note which section is which ecosystem, as well as where the east and west borders of NSW are.

#### Explain

Students think, pair and share what ecosystems made up the largest percentage and smallest percentage on their transect. Elaborate

Work as a class to answer the above Inquiry questions.

#### Evaluate

Students then reflect on and fill out the sentence I thought..., but now I know..."

#### Extension

Have students research on a computer animals they might find in each of these different ecosystems. Promote inquiry into specific adaptations animals might have to thrive in these ecosystems.

#### Resources

The Ecosystems Floor Map found in the Box.

Paper, pencils, scissors, rulers and calculators for each student.

Most ecosystem descriptions can be found here: https://app.education.nsw.gov.au/rap/resource/access/6fccb196-40b3-abd8-64dc662b8079/1



## **Activity 8: Ecosystem Diversity**

With your teacher you are going to create a transect and use the large floor map of NSW to look at ecosystem diversity in NSW.

Follow your teacher's instructions and use the following formula to fill out the table below: (Total of ecosystem + Total of NSW)  $\times$  100= Percentage of that ecosystem.

Total width of NSW along map of transectcm						
Ecosystem Diversity in NSW						
Ecosystem	Measurement of each section along the transect	Total (cm)	Percentage (%)			
Arid						
Woodlands						
Dry Sclerophyll Forest						
Semi-Aquatic						
Wetlands						
Heaths						
Rainforests						
Grasslands						
Wet Sclerophyll Forest						
Vine Thickets						



Which ecosystem had the largest percentage across your transect?



## **Food Chains and Webs**

Stages 2-3 Science Syllabus Teacher Support Page

## **Learning Intention**

For students to draw a food web of a native ecosystem.

#### **Success Criteria**

Students can:

- Create a food web that has producers, consumers and decomposers labelled.
- Describe food webs as a cycle of energy from the sun to the plants and through animals.
- Define and give examples for the terms herbivore, carnivore and omnivore.

## **Inquiry Questions**

- What food webs are humans a part of?
- Which shows how an ecosystem works better, a food chain or a food web?
- Remembering what we know about decomposition and soil formation, what is wrong with having an end on a food chain?

#### **Key Vocabulary**

**Producer-** a living thing (usually a plant) that converts energy from the sun into energy inside its cells.

**Consumer-** a living thing that eats a producer or another consumer to get energy. There are 'primary consumers' (herbivores) and 'secondary consumers' (carnivores).

**Decomposer-** a living thing (cockroach,fungus) that eats dead plant and animal material and returns nutrients to the soil.

Herbivore- a consumer that only eats plant material.

Carnivore- a consumer that only eats animal material.

**Omnivore-** a consumer that eats both plant and animal material.

#### **Lesson Plan**

## Prior Knowledge

It is expected that students have learnt about biodiversity and the value it brings to humans and other living things, habitats and ecosystems.

## Engage

Food chains help us understand who eats what in an ecosystem. They show how energy flows from plant to herbivore to carnivore to decomposer and back again. Brainstorm with the students the key vocabulary using living things in an ecosystem diorama as an example. **Use this** as a way to determine any misconceptions or prior knowledge students have.

## **Explore**

Write the following organisms on sticky notes and place them randomly on the white board – grass, cow, mosquito, fly, spider, frog, kookaburra, kangaroo, dingo, squirrel glider, human, snake. Ask the students to help arrange the organisms into a food web. Add a sun sticky note and discuss where this would go.

## Explain

Lead the class to draw a food web as shown on page 41.

#### Elaborate

Have students to work as a group on Activity 9 (Pages 42 - 43).

#### Evaluate

Students then reflect on and fill out the sentence "I thought..., but now I know..."

#### Extension

Students think, pair and share what would happen in the food web if a native animal was removed from the system, or if a pest animal was introduced?

#### Differentiation

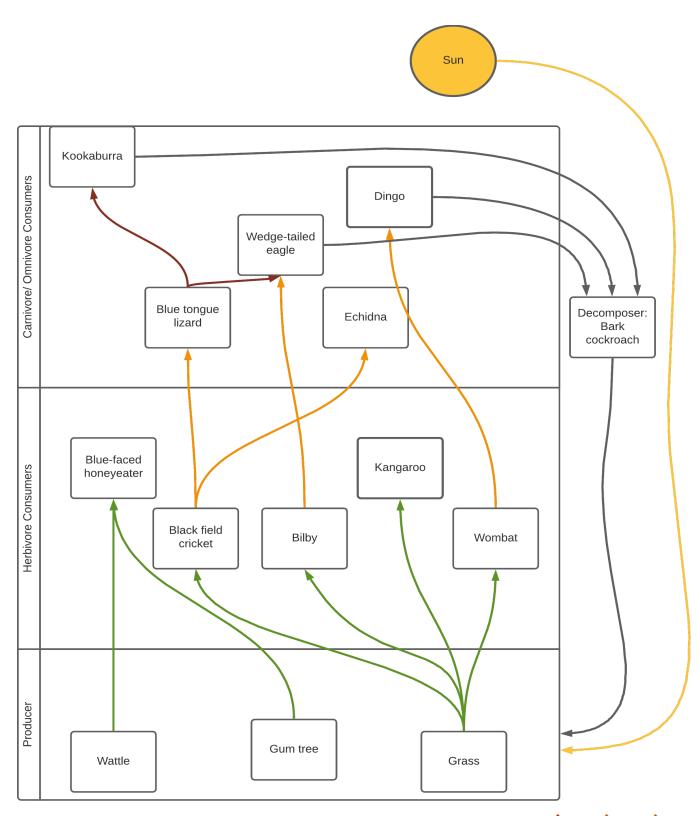
Students can instead create food chains if that is more their level, with just one example from each category.

#### Resources

Ecosystem Dioramas from the Box. Sticky notes.

## **Food Chains and Webs**

Stages 2-3 Science Syllabus Teacher Support Page





## **Activity 9: Food chains and Webs**

Select one of the ecosystem dioramas and its Information Panel. Work in groups to identify the different steps in the web.

You might need to do some more research. Who are the producers? Who are the decomposers?

Term	Definition	Living thing
Producer		
Consumer		
Decomposer		
Herbivore		
Carnivore		
Omnivore		

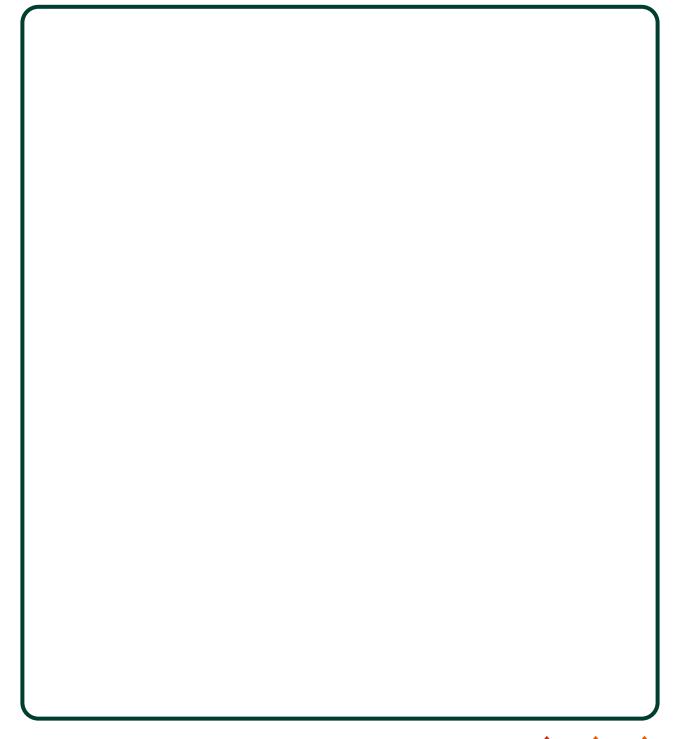


Food webs are important tools to understand how biodiversity is complex. What sort of food webs have humans in them?



Food webs combine multiple food chains so that we can see many plants and animals all in one diagram. Food webs are a way for scientists to see biodiversity and the interactions between species in a single ecosystem.

## Create a food web from your answers before





## **Biodiversity on my Land**

## Stages 1-3 Science Syllabus

## **Learning Intention**

For students to draw from their knowledge of biodiversity values, adaptations, ecosystems and food webs to design a balanced farm system.

#### **Success Criteria**

Students can:

- Create a farm plan that:
  - provides habitats for native animals,
  - has a spot to make the farmer happy,
  - has ground cover to keep the soil healthy, and
  - has crops or paddocks to make food or fibre.

## **Inquiry Questions**

- How is soil formed?
- How do we pollinate crops?
- What animals eat insects such as locusts?
- What keeps water in the soil?

#### **Key Vocabulary**

**Re-vegetation-** when humans plant trees that are meant to be in that ecosystem.

**Regeneration-** when plants drop seeds that grow into new plants.

**Biodiversity values-** the benefits provided to humans from nature e.g. clean air, water, food, happiness, recreation, and pest control.

**Soil formation-** soil is formed by the combination of physical (wind and rain), chemical (acids) and biological (decomposing animals) processes in which huge rocks are broken down into smaller particles over a long period of time.

#### **Lesson Plan**

## Prior Knowledge

It is expected that students have a competent knowledge of food webs, ecosystem services, the levels of biodiversity and the classification system.

## Engage

Students re-watch the *Biodiversity in Woodlands* video. Work as a class to brainstorm parts of the video they understand better now.

## Explore

Students work independently to design their ideal farm on page one of Activity 10 (**Page 45**). While they are working ask them the above inquiry questions.

## Explain

Students work as a class to compare the map they have drawn with the teacher one provided (**Page 46**). Create a discussion around the following:

- Areas of crops or grazing for stock on flat parts of the farm.
- A conservation area to link up with National parks and help biodiversity values.
- Good ground cover (leaf litter, logs, flowers, bushes, shrubs) for the food web and habitats.
- Creek is fenced off and stock are restricted to prevent erosion.
- Re-vegetation of a flat area with young trees.

#### Flaborate

Have students to re-draw their map and make sure that they have every part of a food web on their farm.

#### Evaluate

Students then reflect on and finish the sentence "Biodiversity is important because..."

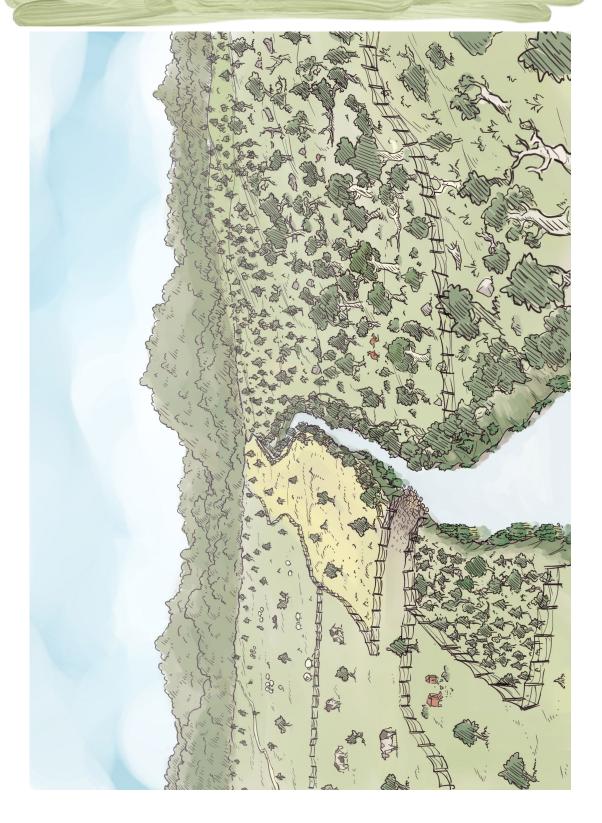
#### Resources

The Biodiversity in Woodlands video found at: https://www.bct.nsw.gov.au/biodiversity-conservation-education



# **Biodiversity on my Land**

Stages 2-3 Science Syllabus Teacher Support Page





# Activity 10: Biodiversity on my Land







## Conservation

## Stages 1-3 Science Syllabus

## **Learning Intention**

For students to identify different ways that people can conserve biodiversity.

#### **Success Criteria**

Students can:

- Come up with different solutions to conserve biodiversity.
- Create a story about protecting biodiversity on a farm.

## **Inquiry Questions**

- How can we help people conserve biodiversity?
- If you were a farmer, how would you work out if you have special native plants and animals on your farm?
- How can people that live in cities help conserve biodiversity?

## **Key Vocabulary**

**Private land conservation-** when a private landholder manages some or all of their land for biodiversity, nature or wildlife conservation purposes.

#### **Lesson Plan**

## Prior Knowledge

It is expected that students have learnt about biodiversity and the value it brings to humans and other living things, habitats and ecosystems.

## Engage

Explain the fact that NSW is 81 million hectares in area. 9% (just over 7 million hectares) is protected or conserved through national parks. Discuss what can happen to the other ecosystems of NSW, and ask the students how they think we can protect other special ecosystems, plants and animals.

## **Explore**

Read as a class *Biodiversity Conservation at the Yanko* and watch *Biodiversity in Semi-Arid Ecosystems*. Explain that in NSW, a landholder can conserve some of their land for biodiversity. Have students think, pair and share their ideas around why this would be a good thing and how this would protect ecosystems.

## Explain

Work together as a class to brainstorm the reasons some farmers want to conserve biodiversity on their land.

#### Elaborate

Have students pick an ecosystem type from the dioramas and pretend they own a farm with that ecosystem type on their property. Have students to work individually on the *Landholder Interest Form* (**Page 49**).

#### Extension

Have students research the different ways that land is protected in New South Wales, and explore which ecosystems are the most protected and which are the most threatened.

#### Resources

Ecosystem Dioramas from the Box, The Biodiversity in Woodlands video and Biodiversity in Semi-Arid Ecosystems video found at: https://www.bct.nsw.gov.au/biodiversity-conservation-education



# Landholder Interest Form



Biodiversity Conservation Trust

Are you interested in conserving biodiversity on your land?

Use this form to explain who you are, why biodiversity is important to you and how you would like to conserve biodiversity on your land.



Who are you?	
What types of ecosystems do you have on your land?	
What animals do you have on your land?	
Why is protecting biodiversity on your land important to you?	
What conservation improvements would you like to see on your land?	

## **Wellness Values of Biodiversity**

## Stages 1-3 Science Syllabus

## **Learning Intention**

For students to look at biodiversity and nature through a range of lenses and discover for themselves the value of biodiversity for wellbeing.

#### **Success Criteria**

Students can:

- Come up with different solutions to conserve biodiversity.
- Communicate concepts of biodiversity, conservation and farming through a range of mediums.
- Have fun!

## **Inquiry Questions**

- How does being outside make you feel?
- Why does nature make us feel better?
- · What activities can we only do outside?

## **Lesson Plan (Double Lesson)**

## Prior Knowledge

It is expected that students have learnt about biodiversity and the value it brings to humans and other living things, habitats and ecosystems.

## Engage

Take students outside on the grass, preferably somewhere in the shade. If you have a bush block or an area of native veg near the school take them here. Have students lay down with their eyes closed. Ask them to use their senses:

- What can they hear? Are there birds singing, frog calling, a creek or wind in the trees?
- What can they feel? Is the grass soft?
- What can they smell? Are there flowers or gum trees nearby?

## Explore

Split students into pairs or groups of 3, provide each group with a carry bag and Activity 13 sheet 1 (**Page 51** for stages 1-3 and **Page 52** for stages 3-4). Explain that the students are going on a treasure hunt. Students work in the groups and try to find one type of each category on that sheet. If they find some litter or something else interesting, they can pick them up to (provide gloves and explain that they are not to pick up glass, needles or anything sharp).

## Explain

Come back together and have each group do a bit of a show and tell about the things they found.

#### Elaborate

Discuss how the lesson made them feel, did they have fun being outside and exploring? Brainstorm the Inquiry Questions.

#### **Evaluate**

Students then reflect on and finish the sentence "Biodiversity makes me happy by..."

#### Extension

If you have school ipads or cameras, have the students take photos. Students can make collages of the items they found or their photos. Students can research how nature affects happiness levels of humans.

#### Resources

Carry bags, gloves.



## **Activity 12: Wellness Values of Biodiversity**

Biodiversity means the different living things found in an ecosystem.

Try and find one of each of the different things listed below and place it in your bag. If it is too big to place in your bag, take a photo of it or draw it below.

A chewed on leaf	A feather	
Some moss		Some fruit or berries
		-
Some bark		A flower
	•	
A shiny rock		Some seeds



## **Activity 12: Wellness Values of Biodiversity**

Nature and biodiversity are valuable for recreation and are often inspiration for artworks or photography.

Take a photo of each of the topics below, and then check it off the list.

A funny shaped cloud
A spider web
A puddle or creek
Some bark
Some litter
An animal
A close-up of a flower
A feather
An animal track
The tree canopy
Some moss
The underside of a leaf
A tree hollow
Fungi
Soil in your hands





## **Biodiversity Gala Day**

## Stages 1-4 Science Syllabus

## **Learning Intentions**

For students to communicate their knowledge of biodiversity values, adaptations, ecosystems and farm systems to problem solve under different scenarios.

#### **Success Criteria**

Students can:

- Come up with different solutions to conserve biodiversity.
- Communicate concepts of biodiversity, conservation and farming through a range of mediums.
- Have fun!

#### **Inquiry Questions**

- How can we help people conserve biodiversity?
- What can we do to let more people know about these threatened plants and animals?
- If you were a scientist, what would you like to study/do more research on?
- If you were a farmer, how would you tell your neighbours to conserve biodiversity?

## **Lesson Plan (Double Lesson)**

## Prior Knowledge

It is expected that students have learnt about biodiversity, habitats and ecosystems. Separate the students into small groups (4-6 is recommended). We recommend that you partner older students with younger students in this activity.

## Engage

Have students run a 'conference' where they discuss the above Inquiry Questions. Assign one of the older students in each group as the 'panel supporter', this person makes sure everyone has a chance to speak about each Inquiry Question (if needed give everyone 1 minute per question).

## **Explore**

Each group then works together on one of the "Gala Day" activities. Set a timer- each of these activities can run for as short or as long as you want. After the timer ends, have the groups rotate to the next activity. Each group should do all of the activities you have set out.

## Explain

When the students have gone through all of the activities, have them return to their 'conference' and talk about what they have learnt since the start of the lesson. Have they thought of anything new? Do they have different opinions on any of the Inquiry Questions?

#### Elaborate

Come together as a class to discuss the results of the 'conferences'. Prompt the students to come up with creative solutions or actions that they could do to conserve biodiversity as an individual and something the whole class could do together.

#### Evaluate

Students then reflect on and fill out the sentence "I am going to conserve biodiversity by..."

#### Extension

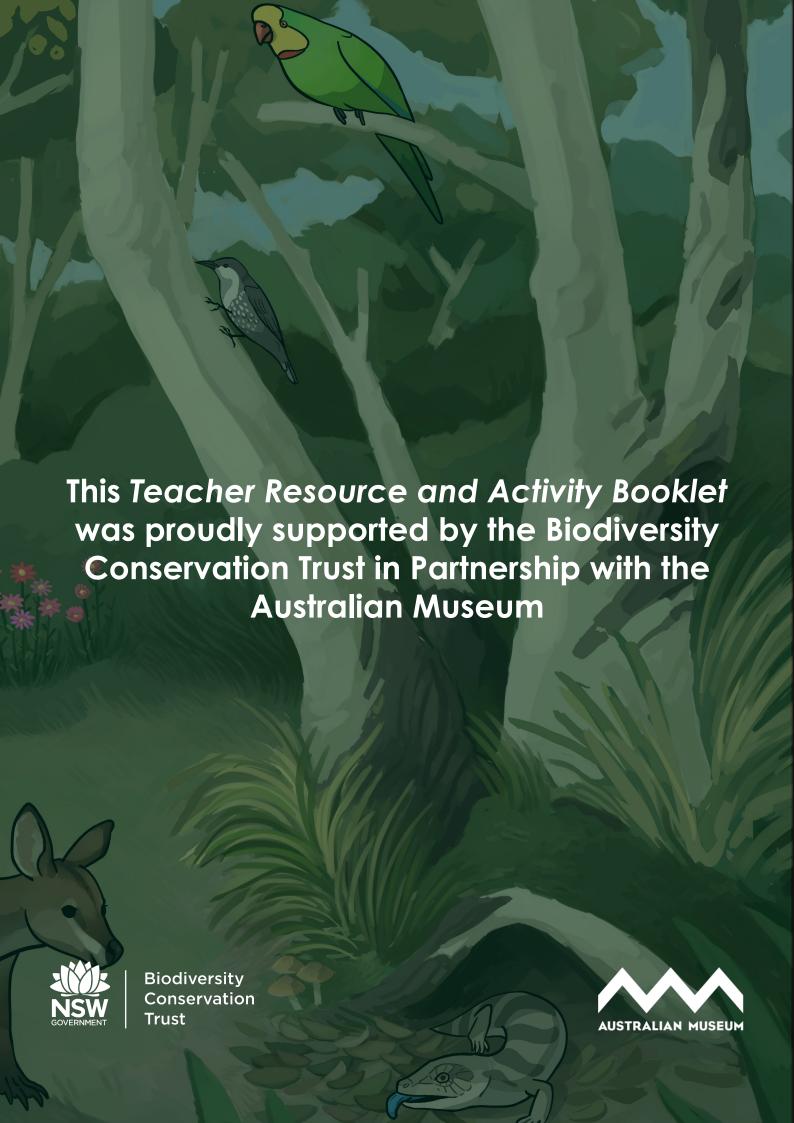
Have students create a persuasive poster about a threatened plant, animal or ecosystem. It should inform people using facts and persuade them to take action to protect or conserve.

#### Resources

The Quick Activities Booklet (the equipment list is on the back of each instruction page).









# **Cultural Values of Biodiversity**

Stages 1-3 Science Syllabus



