

Teacher Guide



Forest Education
Foundation

The stories behind our trees

Forests: Thriving and Surviving - Years 5/6

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Support Material

- See, Think, Wonder
- Forest Types: Name, Describe, Act
- Forest Types - Compare and Contrast
- Leaf Detective
- How To Use a Microscope
- Microscope Observation
- Tree Ring Chart



About Forest in a Box



Thriving and Surviving

Forest in a Box is a loan package that provides activities and resources to support teachers to integrate curriculum aligned forest education into their classrooms. There are a range of kits catering from Prep to Year 6. The kits are not presented as units of learning, but stand alone experiences and tools that can be weaved into any program. Forest in a Box activities support the development of the knowledge and skills involved in forest literacy.

Forests: Thriving and Surviving enables students to understand forest systems and how they function. The kit includes microscopes, specimens, *Tree Time Tasks* and a range of activities to tune students into the different forest types of Tasmania, their features and the ways living things are adapted to their surroundings. The kit activities are supported by online interactive content accessed on the *Forest Interconnections Teacher Portal*: <http://www.forest-education.com/forest-interconnections/>

The Forest Education Foundation also offers incursions and excursions to further explore these topics with your students. Visit our website to find out more <http://www.forest-education.com>



Forest Literacy



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The Suggested Activities in Forest in a Box support the *Tasmanian Forest Education Plan: A Framework for supporting forest education in Tasmania*. The Plan illustrates how forest literacy can be integrated across the curriculum through teaching and learning.

Forest literacy refers to the knowledge and skills involved in understanding forests and our interactions with these environments.

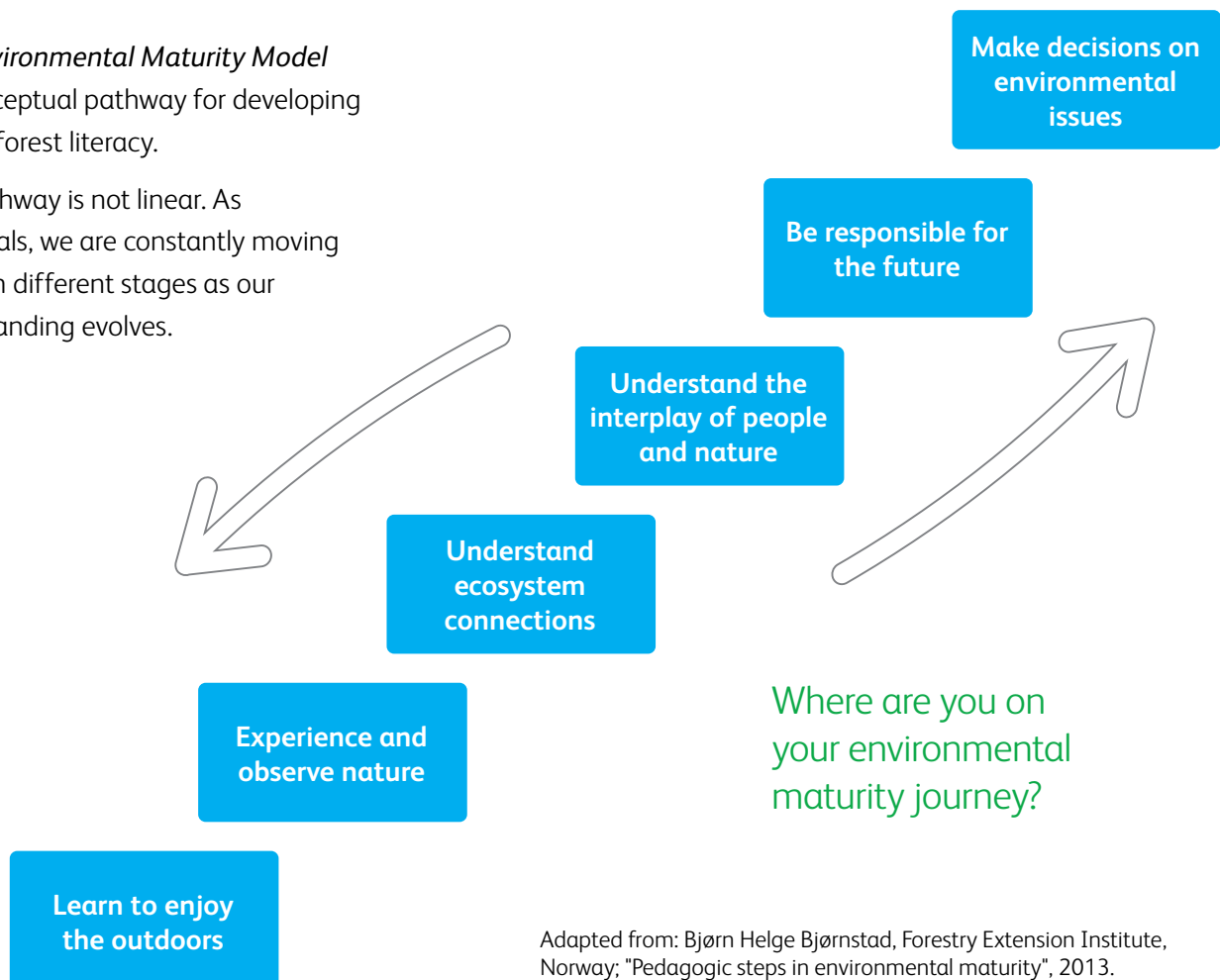
A forest literate individual can use their knowledge and skills to make informed decisions about natural and managed forest landscapes.

Forest literacy enables students to:

- Appreciate our forests and their place in them.
- Understand the ecological web.
- Comprehend the interactions and outcomes of cycles and flows in forest systems.
- Realise their connection and dependence on forests landscapes.
- Recognise the complexities of managing dynamic natural resources for a range of purposes.
- Make informed decisions and act as stewards for the future of forest landscapes and resources.

The *Environmental Maturity Model* is a conceptual pathway for developing greater forest literacy.

This pathway is not linear. As individuals, we are constantly moving between different stages as our understanding evolves.



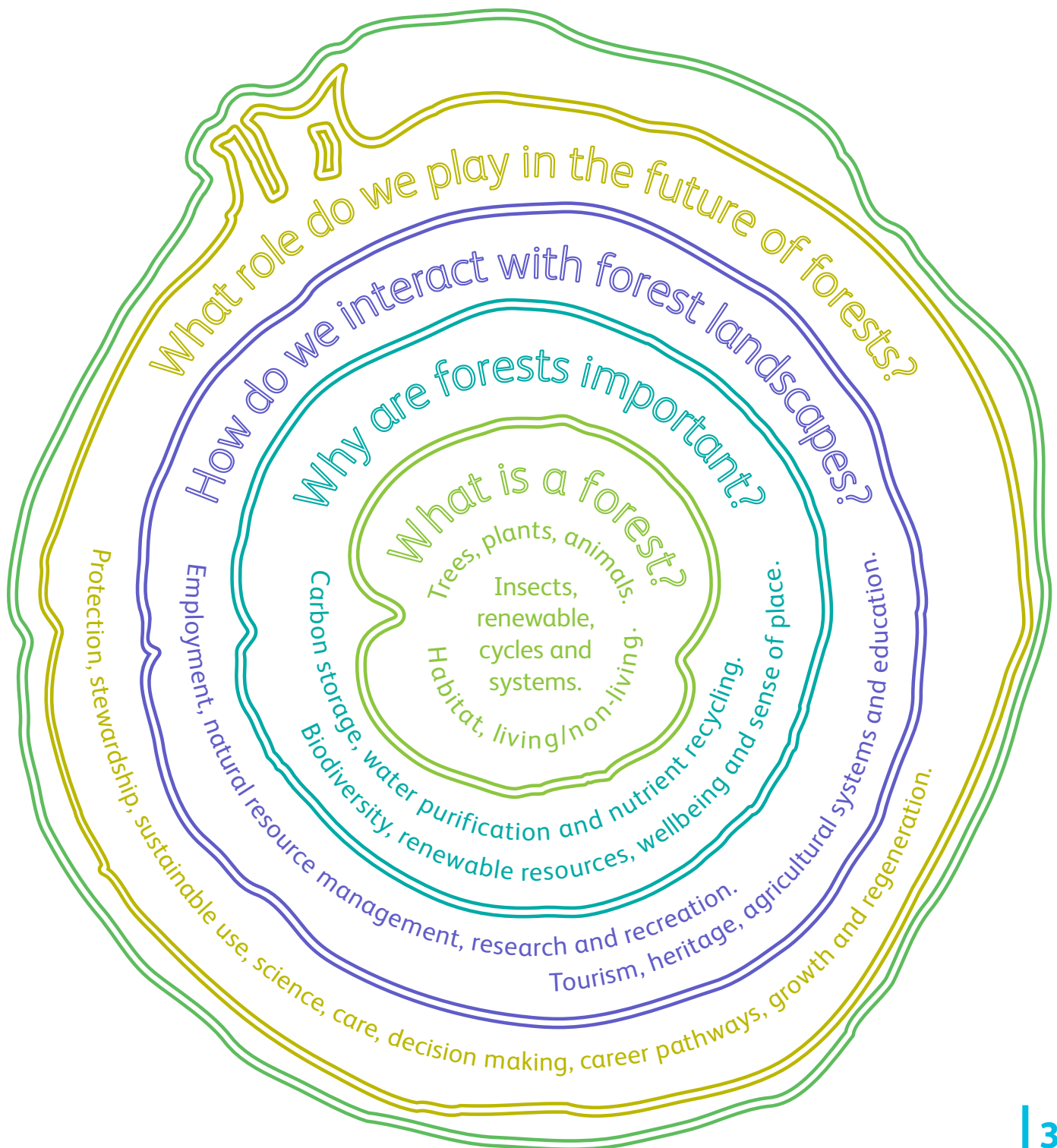
Adapted from: Bjørn Helge Bjørnstad, Forestry Extension Institute, Norway; "Pedagogic steps in environmental maturity", 2013.

FEF's Guiding Questions



Thriv'ing and Surv'iving

The Forest Education Foundation's four *Guiding Questions* (outlined below) are designed to build upon each other as a scaffolding tool, enabling students to progress from a fundamental awareness to a deeper understanding of forests. See how they can be used to integrate forest literacy from Prep to Year 12 in the *Tasmanian Forest Education Plan*.





Learning Outcomes

- Students explore the environmental, social/cultural and economic values of forest environments.
- Students identify the physical conditions of different forest types.
- Students identify how physical conditions impact the growth and survival of forests species.
- Students explore the structural features of living things found in a forest.
- Students understand the role of fire in wet and dry eucalypt forest types.
- Students identify how adaptations of living things enable their survival in forest environments.
- Students explore the influence of First Nations Australians on the characteristics of forests.
- Students explore the importance of Science in managing forests for the future.
- Students consider their role in the future of forest landscapes.

Curriculum Links



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Learning Area	Strand	Code	Content Descriptors
Science Understanding	Biological Sciences	AC9S5U01	Examine how particular structural features and behaviours of living things enable their survival in specific habitats
		AC9S6U01	Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions
Science Inquiry Skills	Planning and Conducting	AC9S5I03	Use equipment to observe, measure and record data with reasonable precision, using digital tools as appropriate
		AC9S6I03	
	Processing, Modelling and Analysing	AC9S5I04	Construct and use appropriate representations, including tables, graphs and visual or physical models, to organise and process data and information and describe patterns, trends and relationships
		AC9S6I04	
HASS	Geography	AC9HS5K05	The management of Australian environments, including managing severe weather events such as bushfires, floods, droughts or cyclones and their consequences
		AC9HS5K04	The influence of people, including First Nations Australians and people in other countries, on the characteristics of a place
	Civics and Citizenship	AC9HS5K07	How citizens (members of communities) with shared beliefs and values work together to achieve a civic goal
HASS Skills	Questioning and Researching	AC9HS5S01	Develop questions to investigate people, events, developments, places and systems
		AC9HS6S01	
	Interpreting, Analysing and Evaluating	AC9HS5S03	Evaluate information and data in a range of formats to identify and describe patterns and trends, or to infer relationships
		AC9HS6S03	
Design and Technologies	Food and Fibre Production	AC9TDE6K03	Explain how and why food and fibre are produced in managed environments





Thriving and Surviving

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What is a Forest?

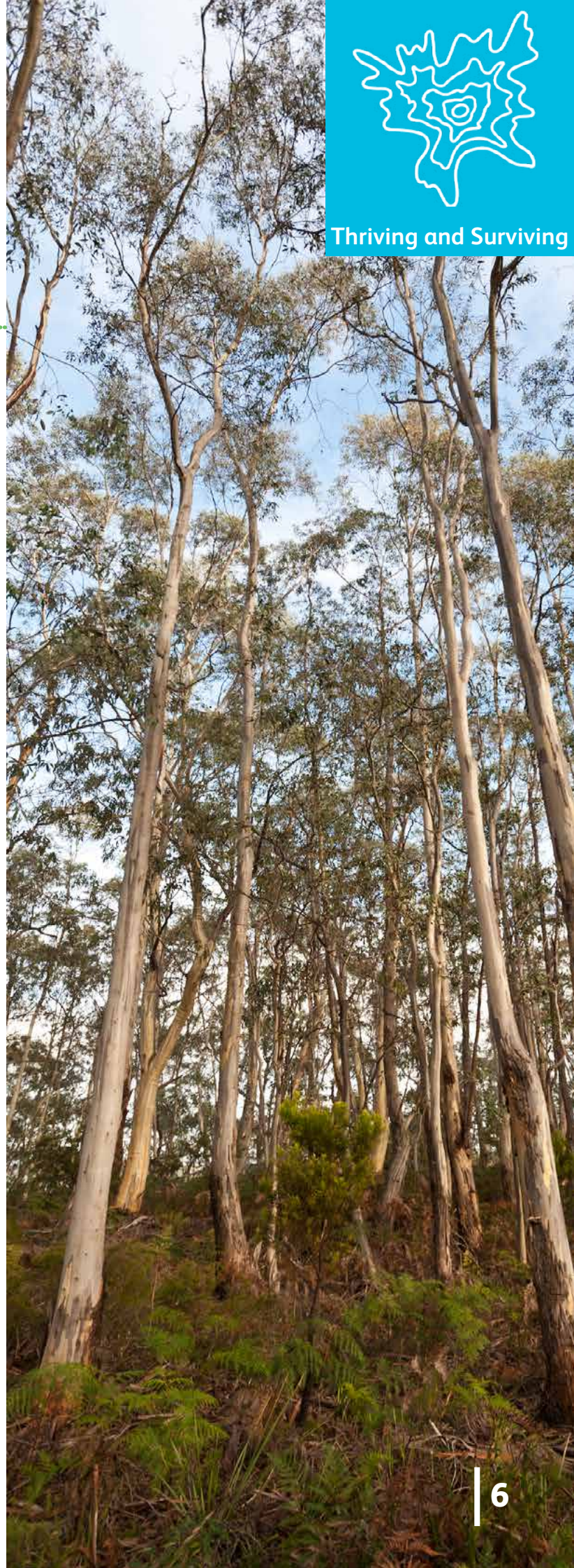


Thriving and Surviving

It's a web of life - a dynamic, constantly changing community of living things - from the subsoil to the canopy, a forest is much more than its trees.

A forest is a complex ecosystem characterised by a dominance of tree cover- a living web of many different animal and plant species. No two forests are the same and are a result of the interactions and interdependence between biotic (living) and abiotic (non-living) components of the environment.

Forests play a vital role in sustaining the life forms and atmosphere of our planet. Forests provide a habitat for all the living things contained within them. Beyond the trees, the forest is also made up of soil, water, other plants, animals, birds and insects. Many of these things are dependent on other living and non-living things within the forest for their health and survival.



Forest Values



Thriving and Surviving

When we look at a forest landscape what we see is greatly influenced by our understanding of the values associated with forests. Alongside identifying our personal values for these spaces, it is important to recognise the diversity of values which forest landscapes hold. Exploring multiple values increases student understanding of the local, national and global importance of forest landscapes.

Environmental Values

Forests play a vital role in sustaining the life forms and atmosphere of our planet. They help keep our water clean, prevent soil erosion and clean the air we breathe. They are also habitat for a unique range of Tasmanian flora and fauna, helping to protect biodiversity.



Social/Cultural Values

When asked why forests are important, answers will vary from good health and wellbeing, sense of place, recreation, historical importance, aesthetic values... our connections to forests are diverse and multifaceted.

The social and cultural values of forests are often difficult to define and are profoundly personal. Examining a diverse range of individual and community perspectives on forest values helps students to understand why making decisions about our forests can be complex.

Economic Values

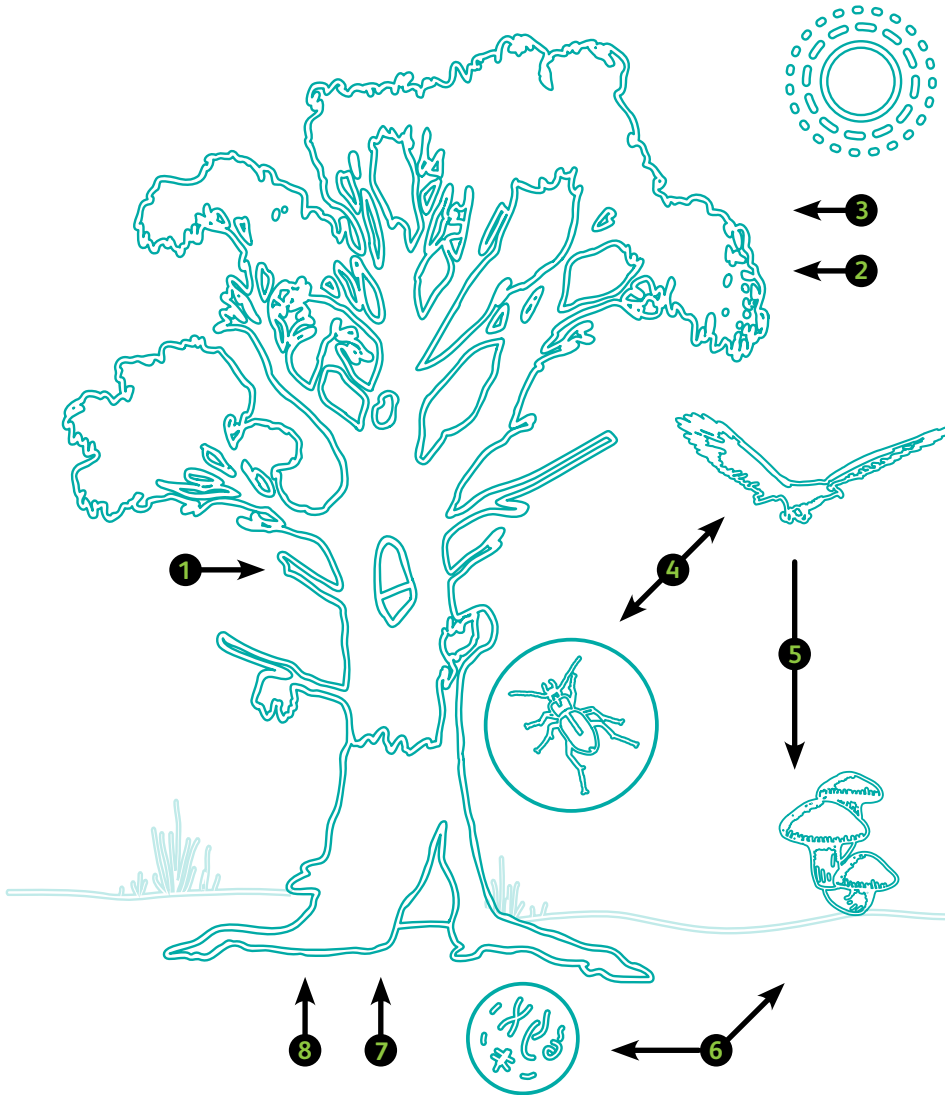
Forest services and products are an important component of Tasmania's economy. These can range from employment opportunities, to wood, food and medicine products for global markets. Recognising the importance of forests economically supports students to understand the interconnectedness of the environmental, social/cultural and economic forest systems in Tasmania. Developing this understanding supports students in becoming active and informed decision makers who can explore strategies for managing these systems sustainably.



Trees and forests influence and are influenced by their surrounding environment. Understanding basic ecological principles and how they apply to forests helps students appreciate the characteristics of forest ecosystems.

But all the producers and consumers put together are greatly outnumbered by the most numerous, but least obvious, creatures in the forest, the decomposers. These are the fungi, invertebrates and soil bacteria. The decomposers break down the plant and animal material that falls on the forest floor, recycling its nutrients to nourish new growth and to ensure the cycle of life in the forest ecosystem continues.

An ecosystem can be as big as an entire cool temperate rainforest or as small as a pool of water in alpine heathland. Both may support a community of interdependent plants and animals.



- 1 Producer
- 2 Carbon dioxide used by growing plants
- 3 Light Energy
- 4 Consumers
- 5 Body wastes and dead remains of producers and consumers
- 6 Decomposers
- 7 Water
- 8 Nutrients

A forest is a complex web of life, a solar-powered community of plants and animals that depend on each other for their growth and survival.

Biodiversity, a wide variety of plant and animal species, is a key element of a healthy ecosystem.

In a forest ecosystem, life starts with the sun. Its ultra-violet light enables green plants to create their own nutrients through photosynthesis, using simple chemicals present in soil, water and air.

Forest Classification



Thriving and Surviving

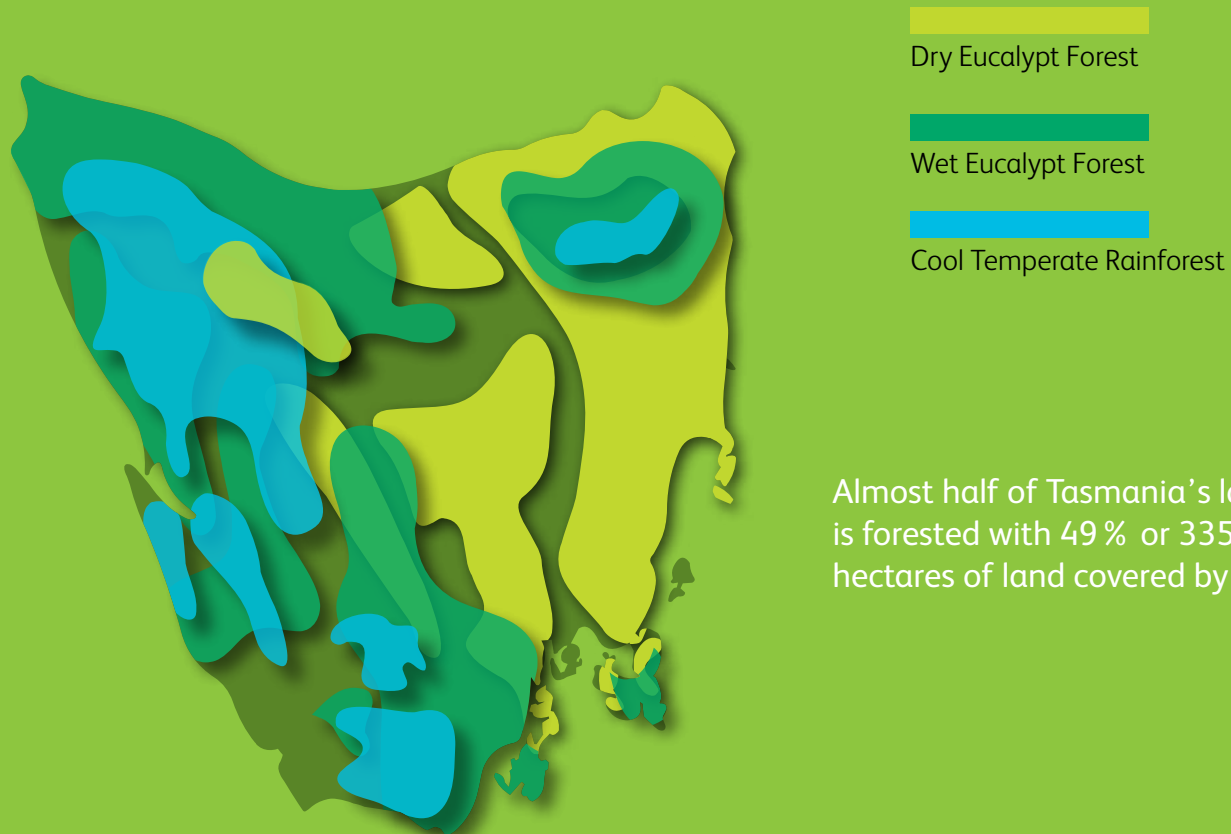
Classifying and differentiating forests into biomes and types helps students to understand the forests in their community, in Tasmania and other forests around the world.

Trees can be classified into family, genus and species groups based on their seeds, leaves, flowers and other tree parts.

Different forests grow in different places – Tasmania's forests vary according to changes in the physical conditions; in soil type, geology, rainfall, climate, topography and fire history and behaviour.

Many different forest types exist in Tasmania, often named by their dominant tree species. Common forest types include Dry Eucalypt Forest, Wet Eucalypt Forest, Mixed Forest and Cool Temperate Rainforest.

Tasmania's Forest Types



Almost half of Tasmania's land surface is forested with 49 % or 3354000 hectares of land covered by forest.

Forest Classification

Physical Conditions



Thriving and Surviving

Dry Eucalypt Forest



- Open and sunny with hard leaved shrubs, sedges and grasses between Eucalypt trees.
- Of Tasmania's 29 species of Eucalypt, 25 are found in the island's Dry Eucalypt Forests.
- Typically less than 40 meters in height.
- Trees can 'spread out' due to open space.
- Trees are different ages due to frequent low intensity fires that occur every 5 -25 years.
- Each fire encourages new eucalypt seeds to grow.
- Provides habitat for a much wider range of native animals, birds and plants than other forest types.

Wet Eucalypt Forest



- Fast growing conditions produce tall straight trees.
- Dense understorey, restricting sunlight from reaching the ground.
- Many fallen and decaying logs on the forest floor.
- Broad-leaved understory plants adapted to capture as much sunlight as possible for photosynthesis.
- Even aged Eucalypts regenerate by infrequent, but intense fires.
- In the absence of fire, Wet Eucalypt Forests cannot regenerate.
- Trees can grow up to 85 meters and above – these are classified as Giant Trees and are protected.

Cool Temperate Rainforest



- 95 % of Australia's Cool Temperate Rainforest occurs in Tasmania.
- The structure and composition varies depending on altitude, land form and soil.
- Eucalypt are not found in Tasmania's rainforests, instead special species such as Myrtle, Sassafras, Leatherwood and Huon Pine grow.
- Many fallen and decaying logs on the forest floor.
- Rainforests do not need fire to regenerate – seedlings of Rainforest trees can establish beneath a shady canopy. When a mature tree falls, a gap appears and the seedlings grow upward towards the light.

Eucalypt Adaptations



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Fire has been a constant visitor to Tasmanian forests for millions of years. It has shaped the evolution of many plant species and communities. In fact, many species are not only adapted to fire, but actually have features that help to promote it.

Fire is an essential part of the life cycle of many plant communities, including Dry Eucalypt Forests and Wet Eucalypt Forests. Fire behaves differently, however, in each of these systems.

A key difference between Eucalypt and Rainforest trees is that Eucalypts are adapted to and take advantage of major, widespread disturbances of the forest canopy, especially those caused by fire.

Individual trees of different species can withstand the effects of fire to varying degrees, but all Eucalypt forest types depend on fire to some extent for regeneration. Eucalypt seed release is often triggered by fire, when tough, woody capsules empty their contents onto a nutrient-rich ash seedbed from which all the understorey competition for light, water and nutrients has been removed. Browsing animals are driven out for a time, and the heat-treatment of soil reduces the numbers of plant-eating insects and soil organisms during the short, but crucial early growth period.

Adaptations for survival



Epicormic buds on the tree's branches and trunk which sprout when triggered by stress, such as wildfire. They quickly sprout if a Eucalypt loses its crown. The new shoots produce green foliage that helps the tree to survive.

Hard woody capsules that protect seeds high in the canopy, where heat may be intense, but lasts for a very short time as the oil-rich leaves burn rapidly.



Lignotubers are swellings that develop at ground level in young Eucalypts. Food is stored, allowing new growth to sprout if the tree is damaged.

Adaptations for Survival



How does this adaptation help Masked Owls survive?

Long, powerful legs Masked Owls use their strong, powerful legs to take down prey. Having long legs also helps them to reach for their prey on the forest floor.

Sharp Talons Masked Owls have 4 toes, with a sharp talon on the end of each. These talons are designed to pierce and kill the prey in one swift movement. Their toes and talons also assist in holding onto tree branches when perching.

Silent flight feathers All Owl species have a special fringe that lines the edge of their wings, softening the air as it moves over the wings during flight. This helps owls to reduce the amount of noise they make when flying through the forest, making it much easier for them to catch their prey.

Brown feathers Masked Owls are perfectly camouflaged for a life amongst the trees. Their brown feathers blend in with the surrounding bark and branches, making it harder for both prey and predators to spot them.

Large, forward facing eyes Some owl's eyes are so big they can account for 3% of their body weight. Having large eyes helps them to see in very low light conditions, perfect for hunting at night. Like humans, their eyes face the front. This gives them binocular vision and helps them to find prey from afar.

Sharp, hooked beak The Masked Owl is a carnivorous bird, and their beak is perfectly adapted for this diet. The sharp, hooked end is able to rip and tear apart prey. As they do not have teeth to chew their food, larger prey needs to be torn into smaller pieces before being swallowed.

The beak also points downwards, ensuring they have clear vision at all times.

Facial disk The stiff feathers around the face form the facial disk, a common feature in owls. It helps to direct sounds towards their ears. This is useful when listening for prey on the forest floor.

Flexible neck Owls are not able to move their eyes from side to side or up and down. To help them see their surroundings, they have an extremely flexible neck. Owls can see in almost all directions just by turning their head without the need to move the rest of their body. This helps owls to find their food, as well as avoid potential predators.

Forest Glossary



Thriving and Surviving

Adaptation: Adaptations are structural features and behaviours that help living things survive.

Bark: The tough outside covering that protects a tree.

Branch: The part of a tree that grows from the trunk of a tree and reaches for the sun.

Camouflage: When a living thing blends into its surroundings to hide from predators.

Canopy: The branches and leaves of trees at the top of a forest.

Carnivore: An animal that only eats meat.

Consumer: A living thing that gets its energy from eating other living things.

Crown: The branches at the top of a tree.

Decomposer: A living thing that recycles and keeps the forest healthy by breaking down dead material.

Ecosystem: All the living and non-living parts of a forest and the relationship between them.

Flower: The part of a plant that blooms and makes seeds to produce new plants.

Forest: A large area dominated by trees and other living and non-living things that depend on each other to survive.

Germination: The beginning stage of growth when a plant emerges from a seed.

Habitat: A home for living things that provides them with food, water, shelter and space.

Herbivore: An animal that eats plants.

Leaf: The often flat, green part of a plant that makes its food through photosynthesis.

Leaf Litter: The bark, leaves and twigs that fall from a tree to the forest floor.

Nectar: A sugary liquid found in many flowers.

Omnivore: An animal that eats both plants and other animals.

Photosynthesis: The process of a green plant using energy from sunlight to make its food.

Physical Conditions: The atmospheric and geological features of an environment which influence what grows there (e.g., precipitation, temperature).

Predator: An animal that hunts other animals for food.

Prey: An animal that is eaten by another animal.

Pollination: A part of a plant's life cycle. Insects, animals and wind take pollen to other flowering plants to help produce seeds.

Renewable Resource: A natural material/energy that can be replenished by natural cycles.

Root: The part of a tree that grows underground and takes in water and nutrients.

Seed: The part of a plant that grows into a new plant.

Seed Capsule: A case that holds and protects a plant's seeds.

Tree: A tall woody plant over 2m tall with a trunk.

Tree Hollow: A hole in the trunk or branch of a tree that gives animals a place to shelter and nest.



Interactive Roll Over

The *Interactive Roll Over* is designed to support your students' learning experience as they interact with Forest in a Box. As you roll over the different illustrations, active links will become illuminated. Each icon presents a forest topic and includes either a succinct definition, explanation, key information or a link to video content. There are key questions in some content boxes to encourage critical thinking about new concepts and support forest literacy.



The *Interactive Roll Over* content is grouped according to colour and aligned to the *Tasmanian Forest Education Plan's* Guiding Questions:

1. What is a forest?
2. Why are forests important?
3. How do we interact with forest landscapes?
4. What role do we play in the future of forests?

The Forest Education Foundation offers Professional Learning to teachers around the *Tasmanian Forest Education Plan* and its implementation. The *Tasmanian Forest Education Plan* is a framework that illustrates how forest education can be embedded from Prep to Year 12.

There is no prescribed way to use this resource. The resource may be used as provocation, to tune students into content or to prompt classroom discussion. It may also guide your unit planning.

Access the *Interactive Roll Over*: <http://www.forest-education.com/interactiverollover/>



Thriving and Surviving

Suggested Activities

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Forest Thinking



Thriving and Surviving

Curriculum Links

Science - Year 5/6

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083/ ACSHE100)

Learning Intentions:

Students activate and share prior knowledge.

Materials: *Forest Thinking* cards

Forest Thinking is a great way to assess students' knowledge and build connections. There is no prescribed way to utilise the cards - they may provide provocation for thought or guided discussion; they may be slowly presented to students as the unit progresses. Students can be encouraged to form inquiry questions related to different words as they are presented, or to predict and/or question their place in the forest ecosystem. This will also support your teaching plan, exposing students' interests, misconceptions and gaps in knowledge.

As your unit progresses the map can record your learning journey as students' knowledge builds and develops. As you make a new connection and evolve your students forest literacy you may introduce a new word or question to your map to explore. There are also blank cards for your students to develop their own *Forest Thinking* key words.

Why not display your map for students to reflect on and for families to share in your journey? You may like to develop this as a classroom display that can be added to as you learn more. You might encourage students to illustrate their thinking and record their new learnings, as your unit progresses. Pair this with a word wall to record new language students learn throughout the unit.

Tuning in:

Ask students: What is a Forest?

- Have students think of as many words and ideas as they can about forests.
- *Ask students:* Where would they fit on the *Forest Thinking* map?
- Write down the words and select their appropriate categories. You might see patterns start to develop that you can explore.
- *Ask students:* Do you have anything you are curious or wondering about forests?
- What scientific inquiries could be relate to forest ecosystems?

Forest Types:

Physical Conditions



Thriving and Surviving

Curriculum Links

Science - Year 5

Examine how particular structural features and behaviours of living things enable their survival in specific habitats (AC9S5U01)

Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students explore the physical conditions of Tasmania's three main forest types.

Students identify how conditions impact the growth and survival of forest species.

Materials: *Forest Types Sorting Cards*, *Forest Classification* information page, *Who Am I?* cards, *Forest Types: Name/Describe/Act* thinking routine, *See/Think/Wonder* thinking tool, *Forest Types Posters*, *Forest Type Venn Diagram*, *Access Forest 360* online interactive

This task encourages students to collaborate and engage their critical thinking skills to sort and classify forest images.

Tuning in: Provide small groups of students with a pack of the *Forest Types Sorting Cards*. Let them explore the images and sort them according to their own observations and discuss their reasoning as a class. When they have had an opportunity to sort them, ask them to carefully observe the images and sort them into three groups - Dry Eucalypt, Wet Eucalypt and Cool Temperate Rainforest. Provide the *Forest Classification* information page while sorting, or after their first attempt as an opportunity to check their initial groupings.

Finding out:

- With the correct groupings formed, have students flip the cards over and look at the physical conditions on the back. Lead students through connecting the physical condition with features of the forest they belong to. For example: how a high amount of sunlight impact the species which grow in a dry eucalypt forest.

Guiding questions:

- How could you sort these images?
- How would you describe the groups you have made?
- Which five words would your group choose to describe each forest type?
- What plant and animal species would suit each forest type and why?

Going further:

- Use the *Who Am I?* cards and consider which habitats would meet the needs of each animal.

Forest Types: Physical Conditions



Thriving and Surviving



Tuning in: Access the online resource *Forest Types 360*. This resource is designed to be projected onto the class smart board or student devices. Alternatively, use the *Forest Types Sorting cards* and/or *Forest Types posters*.

Finding out:

- Begin by observing the *Forest Types 360* images and discussing as a class any further observations they can make about the forest type.
- As you move the mouse around the forest there are key questions and information links to explore by rolling over and clicking the hot-spots.

Options for taking your learning further:

- Using the *Forest Classification* information page and posters, as well as information collected from the previous tasks, complete the *Forest Type Venn Diagram* activity. This activity provides students with the opportunity to compare and contrast forest types, as well as process various sources of scientific information.
- Have students choose a forest type and compete the *Forest Types: Name/Describe/Act* thinking routine. Individuals or small groups are challenged to carefully observe one forest type (e.g., cool-temperate rainforest), name three specific parts (e.g., vibrant green of leaves, ferns, straight trunks), dig deep to describe that part and then consider the role/function it plays in that forest.

Adaptations for Survival



Thriving and Surviving

Curriculum Links

Science - Year 5

Examine how particular structural features and behaviours of living things enable their survival in specific habitats (AC9S5U01)

Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students explore and recognise the concept of adaptation.

Students identify the adaptations of Tasmanian Masked Owls and their role in its survival.

Materials: Access *Tasmanian Masked Owl - Adaptation for Survival Interactive* here <http://www.forest-education.com/adaptations-for-survival/>

This task is designed to introduce students to the concept of adaptations. To explore how features and behaviours of living things are related to their survival and the system they live in.

Tuning in: Adaptations are structural features and behaviours that help living things survive and reproduce in particular environments, as well as cope with changes to climatic conditions and availability of resources, such as habitat and food sources.

Structural adaptations are the physical features of a living thing. This includes features, such as body covering (fur, skin, scales or feathers), claws and talons, tail shape and size, as well as, more complex features such as electro-receptors in the bill of a Platypus. In plants, structural adaptations can include different types of bark, leaves and protective features, such as thorns.

Behavioural adaptations are the actions a living thing can take to survive. For example, being nocturnal to avoid predators, or the heat of the day, is a behavioural adaptation used to increase chances of survival. The adaptations of the plants, animals, fungi and moss within forests and how they are all interconnected is what make these landscapes unique. In understanding how living things survive in a forest, humans can develop a better understanding of how forests function, the impacts of our interactions and our role in the future of forests.

Ask students:

- What do animals need to survive?
- What do plants need to survive?
- What challenges might there be living in a forest?

Adaptations for Survival



Thriving and Surviving

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This introductory task focuses on an endemic species of owl, the Tasmanian Masked Owl. This owl is the only large forest owl that dwells in Tasmania's forests. It plays an important role in forest food webs as a top order predator.

Finding out:

Introduce students to images of the Tasmanian Masked Owl. Encourage students to make observations about the structural features they can see. Record their observations.

Access the *Tasmanian Masked Owl Interactive*. This infographic summarises the key adaptations of the Masked Owl, as well as information on habitat, diet and feeding strategies. The labelled features are examples of structural adaptations, while behavioural adaptations include nocturnality and hollow use for nesting.

Students will then make inferences about how these adaptations help the Tasmanian Masked Owl to survive in a forest environment. A teacher resource information sheet can be found in the Support Materials.

Guiding questions:

- Which structural features of the owl are related to catching prey?
- Which features help the owl to remain undetected in the forest?
- What are some of the behavioural adaptations of the Masked Owl?
- How are trees important to this animal's survival?
- The Tasmanian Masked Owl is listed as an endangered species. Why is it important to have a scientific knowledge of this species and its adaptations?
- Owls don't have teeth to chew their food. Instead, they swallow their meals whole, bones and all! They regurgitate the undigestible parts; fur, bones, feathers, claws and teeth in what is called a pellet. Why could this behaviour be considered an adaptation?

Taking your learning further:

- The Masked Owl is a bird of prey. Research another bird of prey in Tasmania. What features do they have in common with the Masked Owl? How are they different?
- The Masked Owl is found in both Dry and Wet Eucalypt Forests. Consider which of these adaptations would be more important in the different forest types.
- Imagine you lived in a forest. What adaptations would you need to survive?
- Design your own forest dwelling animal, considering the adaptations it might need to survive.

Fire and Forests



Thriving and Surviving

Curriculum Links

Science - Year 5

Examine how particular structural features and behaviours of living things enable their survival in specific habitats (AC9S5U01)

HASS- Year 5

The management of Australian environments, including managing severe weather events such as bushfires, floods, droughts or cyclones, and their consequences (AC9HS5K05)

HASS- Year 5

The impact of the development of British colonies in Australia on the lives of First Nations Australians, the colonists and convicts, and on the natural environment (AC9HS5K02)

Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students identify how the adaptations of some forest species help them to survive fire.

Materials: *Adaptation to Fire* cards and descriptors, *Looking After Country with Fire* by Victor Steffenson. Interactive Rollover (purple flame - Fire management, purple log loader - Native Forest Management).

Tuning in: We are going to think about fire and forests. *Ask students:* What do you think about when I say fire? What do you know about bushfires in Tasmania? Are all bushfires disasters? Record students preliminary thinking about the positive and negative impacts of fire on forest landscapes.

Ask students: If you were a tree in the forest how would you feel about fire? What if I told you some forests and trees need fire to survive? What if I said fire can be used as a tool?

Finding out:

Using the *Adaptation to Fire* cards provided, observe some of the adaptations used by Eucalypt trees. These adaptations help them to survive during, and regrow after a fire has passed through a forest landscape. Match the descriptor cards to each adaptation. The cards can be used to prompt classroom discussion, guide independent research tasks and help build scientific vocabulary.

Read *Looking After Country with Fire* by Victor Steffenson and discuss the Aboriginal use of fire to manage land. Discuss the impacts of colonisation to Aboriginal land management practices and forests following the establishment of British colonies in the 1800s.

Taking your learning further:

- Use the interactive rollover to gather more information on fire as a management tool and native forest management.
- Encourage students to create a role play of fire in a eucalypt forest.
- Write a story to describe the way fire interacts with eucalypt forests.
- Consider the role people play in managing fire in forests.

Take a Closer Look



Thriving and Surviving

Curriculum Links

Science - Year 5

Examine how particular structural features and behaviours of living things enable their survival in specific habitats (AC9S5U01)

Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students identify how the adaptations of living things in a forest help them to survive.
Students use scientific equipment to make observations and draw simple conclusions.

Materials: Microscopes, Forest Specimens, *Specimen Cards*, *How to Use a Microscope*, *Microscope Observation* recording sheet

This activity focuses on the adaptations of smaller things found in the forest, as well as understanding their role in forest systems. Students can use the microscopes provided to record information about each specimen, draw scientific diagrams of each or simply just enjoy using the microscope to learn about the forest. There are 15 information cards, some of which can be matched to included specimens.

Tuning in: *Explain* - Today we are going to learn to use a device that gives us a whole new perspective on the forest. We get to see something that we can't see with just our eyes. We are going to use a microscope.

Ask students: Has anyone used a microscope before? What do microscopes do?
These are called ocular lenses - *point to microscope lenses*. When we look through these, we see something at 10 times its normal size. Demonstrate how to use the microscopes - Access *How to Use a Microscope* in supporting materials.

Finding out:

Begin by allowing students to explore with the microscopes: Learn how they work and become curious. Once students understand how to focus, encourage them to think about what they are seeing up close. Guide students to consider the adaptation they may be able to observe and how the adaptation helps the living thing to survive in the forest. Students can record their observations on the *Microscope Observation* recording sheet.

Taking your learning further:

- Encourage students to bring in interesting objects from home or explore your school yard to find objects to view under the microscopes.
- Represent the contrast of objects at their normal size and magnified size in scientific drawings.
- Collect fresh plant specimens and cut slices to observe cells up close.

Who am I?



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Learning Intentions:

Students explore the structural features of living things found in a forest.
Students identify how the adaptations of living things in a forest help them to survive.

Materials: *Who am I?* cards

Tasmania has some unique and amazing native animals that dwell in our forests. The Tasmanian Devil is the world's largest surviving carnivorous marsupial. The largest freshwater invertebrate in the world, the Tasmanian Freshwater Lobster grows to 80cm long and can weigh 6kg. The Wedge Tailed Eagle has a wing-span of 2.5 metres. An important part of caring for forests landscapes is for students to wonder and be curious about our forests. Learning about our native wildlife helps students connect with our forests and encourages forest literacy.

Tuning in: We are going to think about the different animals that live in Tasmania's forests and the features they have to help them survive.

Ask students: What Tasmanian forest dwelling animals can you name?

Randomly distribute a *Who am I?* card to each student, let them read their description and then guess what Tasmanian animal it might be. Once they have had the chance to think about their animal, reveal the images and have students place their description next to the animal they think is correct.

Guiding questions:

- How are trees important to each of the animals? Food, shelter, nesting etc.
- What are the differences and similarities between the animals?
- What forest type might you find these animals in? Why?
- Are there any connections between the species? For example, which of the animals might eat the beetle?
- What type of habitat does the animal live in? How is the animal adapted to its environment?

Taking your learning further:

- Encourage students to research a Tasmanian forest dwelling animal and develop their own *Who Am I?* card- You might like to leave these in the box for other schools to enjoy.

Leaf Detective



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Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students identify how the adaptations of plants in a forest help them to survive.

Students make observations and identify how conditions impact the growth and survival of forests species.

Materials: *Leaf Images* or samples, *Forest Type Pictures*, *Leaf Detective* observation sheet

The leaves of a tree tell us a lot about the conditions it grows in. In fact, by looking at the features of many Tasmanian plant species you can sometimes determine which forest type they grow in. In the Forest in a Box kit there are images of different plant species leaves, alternatively you can collect your own from local forests.

Tuning in: Hold up a leaf. We are going to become leaf detectives. We are going to look closely at the different leaves of the plant species that grow in Tasmania. Every leaf gives us clues about where it lives and the conditions it must adapt to, in order to survive.

Ask students: What might we look for to discover where the plant is growing?

Finding out: Observe each *Forest Type* image and recap the features of the forest. Brainstorm the features of the three main forest types and the challenges that plants may have in those environments. For example, Dry Eucalypt Forest - lots of browsing mammals, Wet Eucalypt Forest - dark, wet conditions.

- *Ask students:* What might be the challenge for a plant living in these conditions? Record the challenges students suggests next to each forest type picture.
- Select a plant to observe and explore as a group. Encourage students to look closely at the plant image (or specimen).
- *Ask students:* What do you notice about the leaves of this plant? What might this tell us about where it lives?
- Break students into small groups and provide a leaf for them to explore. Students complete *Leaf Detective* observation sheet.

Taking your learning further:

- Encourage students to bring plants from home or explore your school yard to identify the adaptations of non-native plants.
- Explore the other parts of the plants and how they might be adapted.

Adaptation Design



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Science - Year 6

Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (AC9S6U01)

Learning Intentions:

Students identify the adaptations used by trees' to survive in forest environments.
Students analyze information and draw simple conclusions about leaf structure and adaptations.

Materials: *Adaptation Design* cards, model making materials

Tuning in:

Review the different types of plant adaptations discovered during Leaf Detective.

Ask students:

- How are plants adapted to their environment?
- What physical conditions might they need to be adapted to?
- What structures do plants use to survive?

Explain to students that they have the challenge of designing a plant that must be adapted to a specific condition.

Finding out:

- Hand out *Adaptation Design* cards.
- In pairs students must draw a design for a plant considering how it might be adapted to meet its needs, based on the card provided. Students must label and justify their design.
- Students create a model of their plant.

Taking your learning further:

- Explore some unique and fascinating plant adaptations from around the world.

People and Forests



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Curriculum Links

HASS - Year 5

The environmental and human influences on the location and characteristics of a place and the management of spaces within them (ACHASSK113)

Science - Year 5/6

Investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions (AC9S5H02)

Design and Technologies - Year 5/6

explain how people in design and technologies occupations consider competing factors including sustainability in the design of products, services and environments (AC9TDE6K01)

Learning Intentions:

Students explore how forests are managed, considering multiple perspectives.

Students explore the importance of Science in managing forests for the future.

Materials: *Conceptual Framework* question cards, *Story Teller Library*, *Tree Ring Chart*, *Access Roll Over interactive*, *Forest Values* information page

When learning about forest landscapes, it is important to consider all the functions of forests; environmentally, socially/culturally and economically. Having an awareness of these functions helps students to understand the interplay between people and forests.

Tuning in:

This is an opportunity for students to begin exploring their own personal connections to forests. *Ask students:* How are you connected to forests? Why are forests important to you?

Finding out:

- Explore the four *Conceptual Framework* questions and *Roll Over Interactive*. Encourage students to consider multiple perspectives and values.

Guiding Questions:

- Who likes going out in the forest?
- What do you love about forests?
- What are the different roles and occupations people have related to forests?

Taking your learning further:

- Access the online resource *Story Teller Library*. Encourage students to explore the different Story Teller profiles. Choose one profile to investigate further. What information have you learnt? Think of 3 questions you could ask the Story Teller. What is their role in the future of forests?





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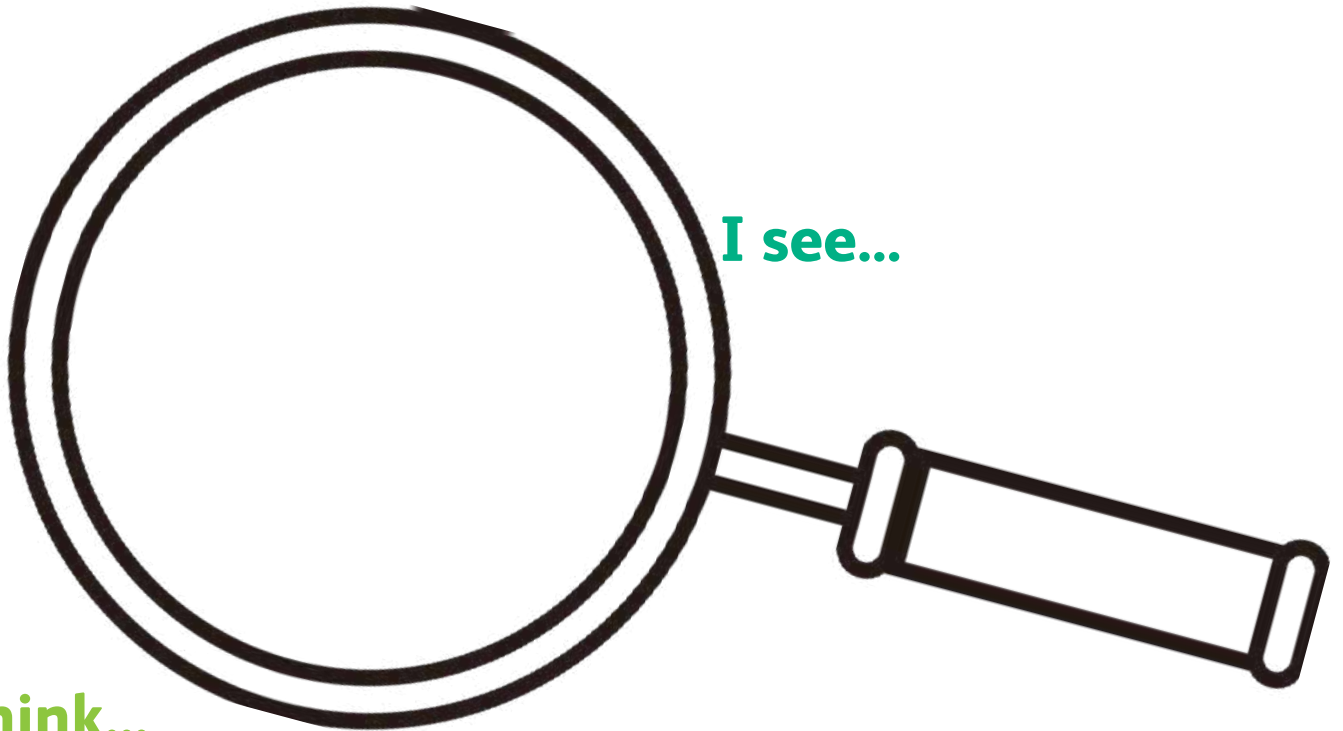
Support Materials

Content

- See, Think, Wonder
- Forest Types: Name, Describe, Act
- Forest Types - Compare and Contrast
- Leaf Detective
- How To Use a Microscope
- Microscope Observation
- Tree Ring Chart

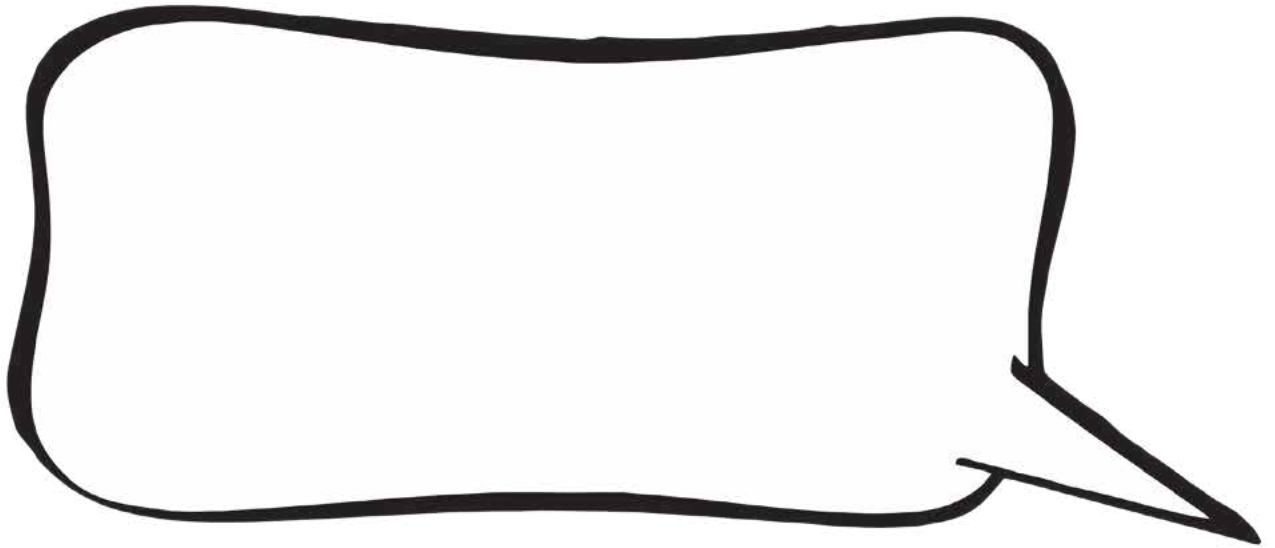


See, Think, Wonder

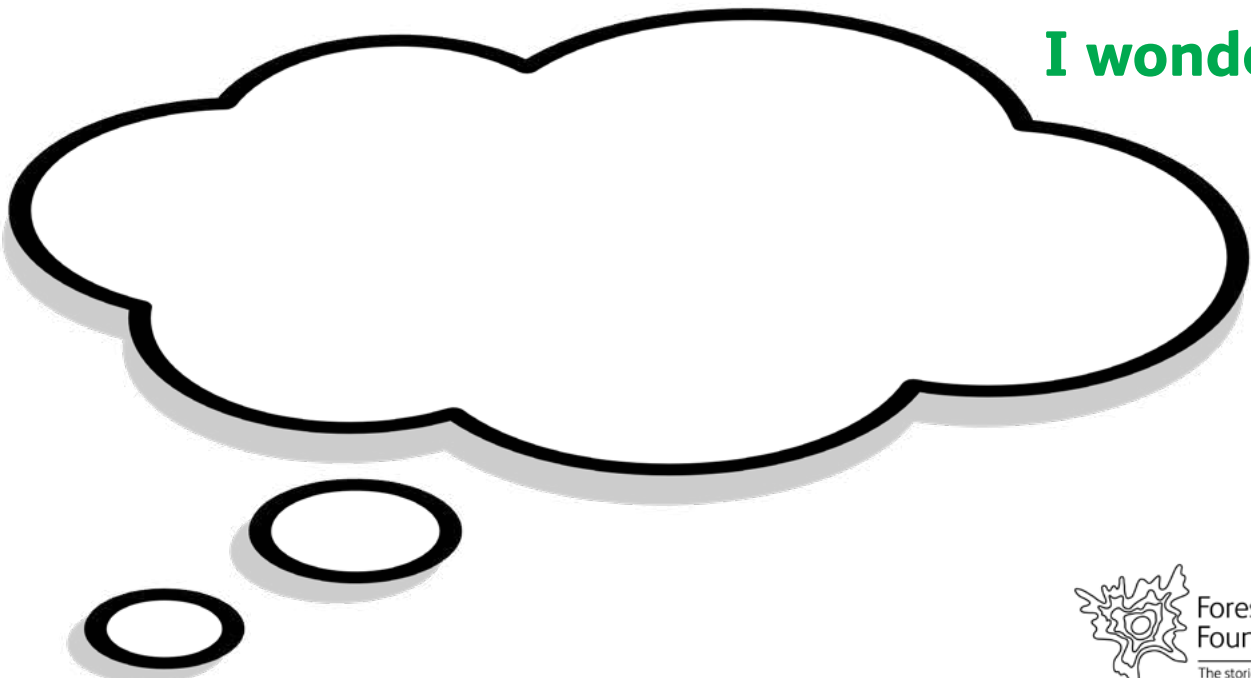


I see...

I think...



I wonder...



Forest Types: Name - Describe - Act

<https://pz.harvard.edu/thinking-routines>



Name three parts of this forest type.	↓			
Describe these parts in detail.	↓			↓
What are the actions of this part in a forest? What are they doing?	↓			↓

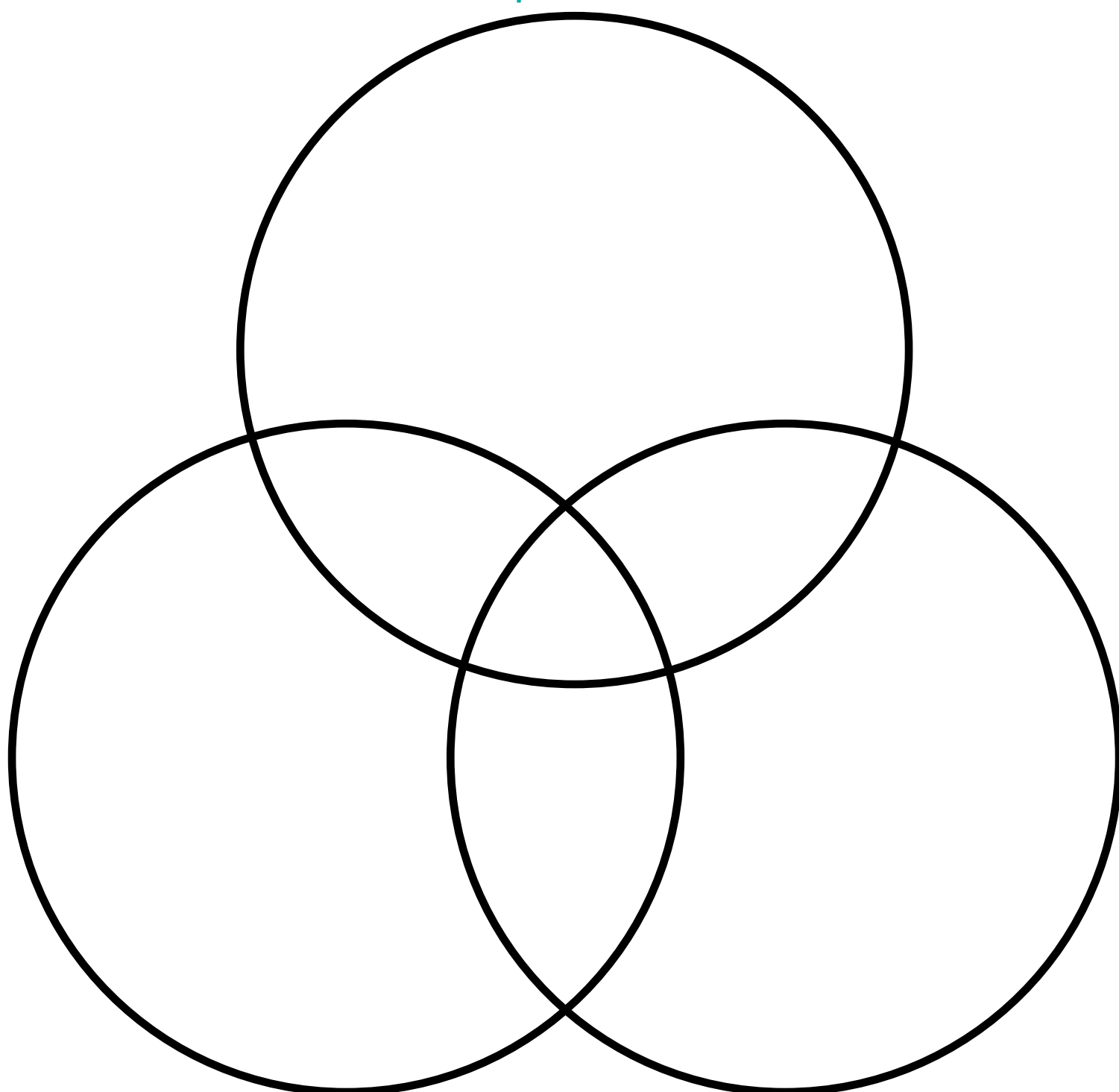


Forest Types

Compare and Contrast

Using the Venn Diagram describe the features of each forest type- Dry Eucalypt, Wet Eucalypt and Cool Temperate Rainforest. Record the similarities and differences between the forests. Identify which features are shared between all forest types - these go in the centre.

Cool Temperate Rainforest



Wet Eucalypt Forest

Dry Eucalypt Forest

Leaf Detective

- Describe your leaf/leaves**
- What shape is your leaf?
 - How are the leaves arranged?
 - How big are the leaves?
 - Do they have any special coverings?
 - Why might they look like this?

	Draw your leaf/leaves	
	How might the features help the plant survive?	What does the feature tell us about the conditions the plant grows in?
	What forest type do you think the plant grows in?	



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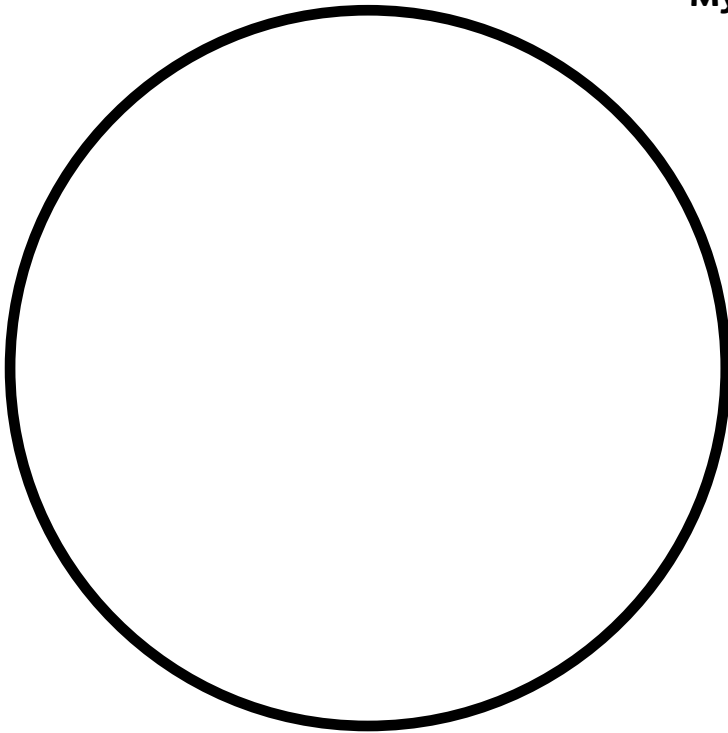
How To Use a Microscope:

1. Set your microscope on a tabletop or other flat, sturdy surface where you will have plenty of room to work.
2. Plug the microscope's power cord into an outlet.
3. Place a specimen on the centre of the microscope stage, directly over the clear glass.
4. Turn your microscope's light source on, make sure you are turning the top light on. Do not touch the light source, it can get hot!
5. Looking through the eyepiece, turn the focus knob until the outlines of the granules become visible. Carefully move the specimen into the centre, if you need. As you slowly turn the focus knob you are actually moving in and out of many layers of the specimen.
6. Record your observations.

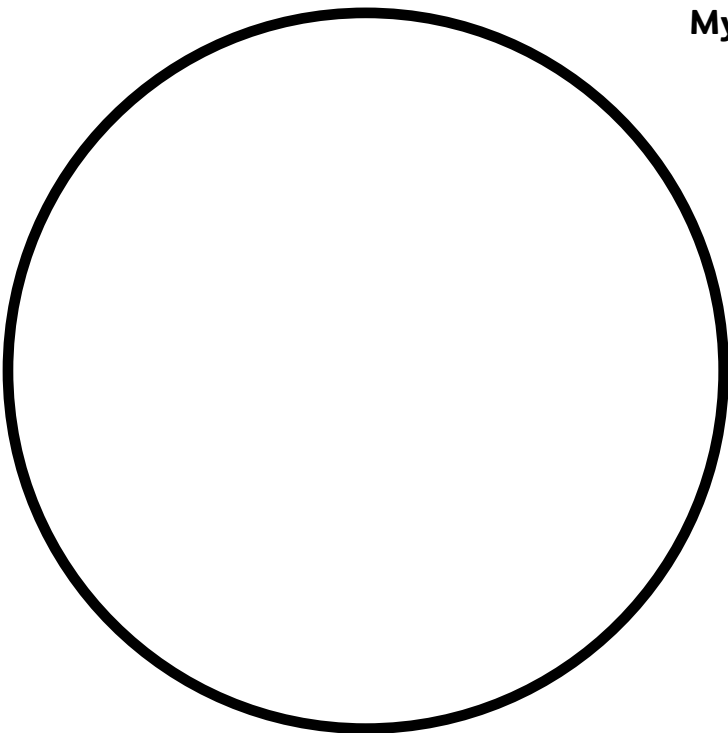


Microscope Observations

- What can you see?
- What adaptations can you observe?
- Does anything surprise you?



My Observations:



My Observations:





Thriving and Surviving

What role do we play in the future of forests?

How do we interact with forest landscapes?

Why are forests important?

What is a forest?



Forest Education
Foundation
The stories behind our trees



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Contact the FEF

The Forest Education Foundation Inc. (FEF) is a not-for-profit educational institution staffed by qualified and experienced teachers.

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