

Teacher Guide



Forest Education
Foundation
The stories behind our trees

Forest Interconnections - Years 3/4

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Support Material

- See, Think, Wonder
- Mystery Bag: Forest Parts and Purposes
- Living Things Thinking Tool
- Scientific Observations
- Ecosystem Links Connections
- Life Cycle
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- Design Thinking
- SCAMPER



About Forest in a Box



Forest Interconnections

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 to Years 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.

Forest Interconnections enables students to understand the importance of forests and how they function. The kit includes magnifying glasses, specimens, Tree Time Tasks and a range of activities to tune students into the living and non-living parts of a forest, their features and the ways they are dependent on each other for survival. 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



Forest Interconnections

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.

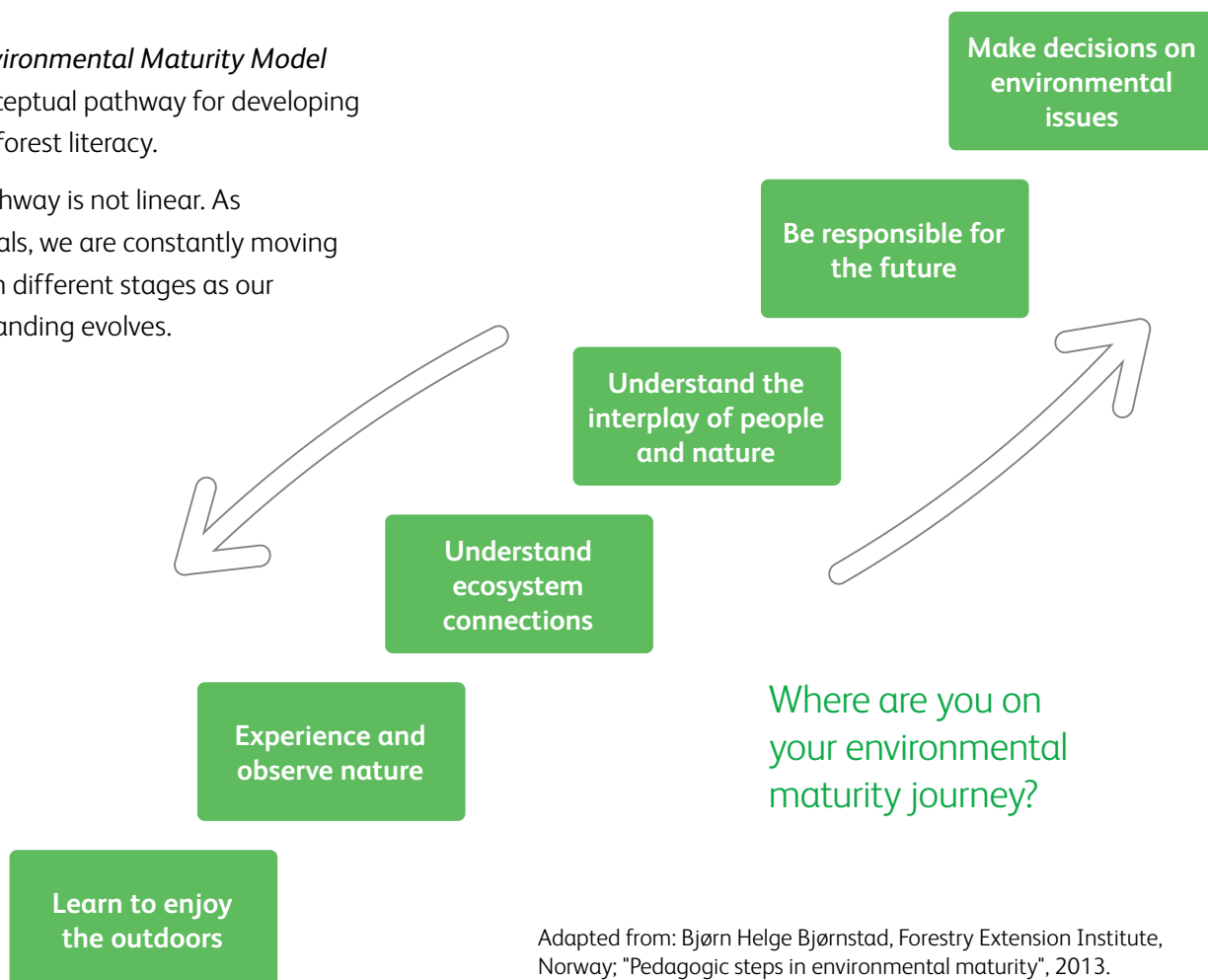
A forest literate individual can use their knowledge and skills to make informed decisions about natural and managed forest landscapes.

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.



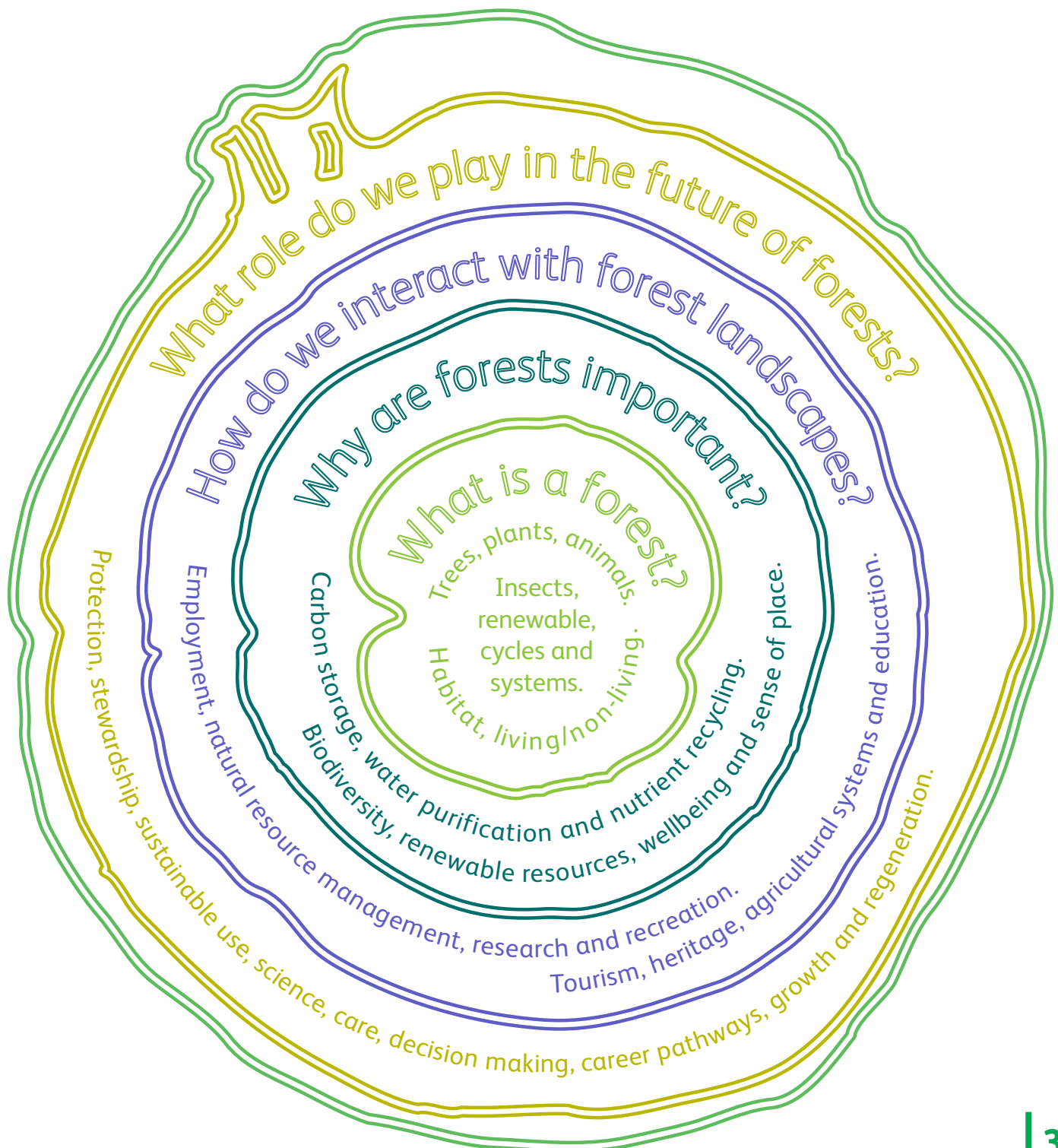
Adapted from: Bjørn Helge Bjørnstad, Forestry Extension Institute, Norway; "Pedagogic steps in environmental maturity", 2013.

FEF's Guiding Questions



Forest Interconnections

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

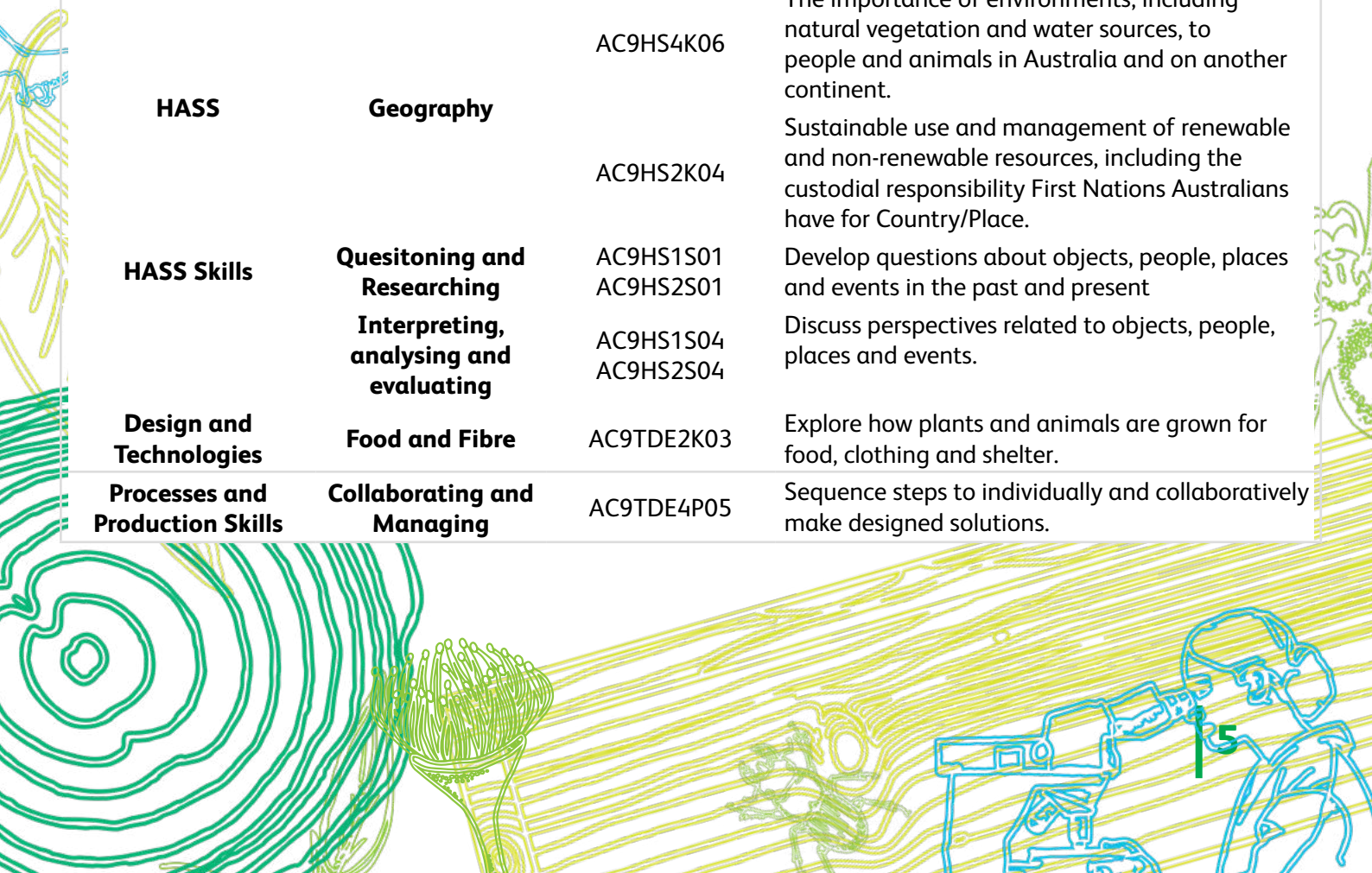
- Students make observations and identify living things in the forest, based on their features.
- Students identify the components of a forest ecosystem and the connections between living and non-living things.
- Students investigate the life cycles of living things in forest environments.
- Students explain the roles and interactions of consumers, producers and decomposers within forest ecosystems.
- Students explore how food chains represent feeding relationships between producers, consumers and decomposers.
- Students explore and explain the patterns and relationships that make a healthy forest.
- Students identify the ways people interact with forest landscapes.
- Students examine their role in the future of forest landscapes.

Curriculum Links



Forest Interconnections

Learning Area	Strand	Code	Content Descriptions
Science Understanding	Biological Sciences	AC9S3U01	Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals.
		AC9S4U01	Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships.
	Chemical Sciences	AC9S4U04	Examine the properties of natural and made materials including fibres, metals, glass and plastics and consider how these properties influence their use.
Science Inquiry Skills	Questioning and Predicting	AC9S3I01 AC9S4I01	Pose questions to explore observed patterns and relationships and make predictions based on observations.
	Processing, modelling, and analysing	AC9S3I04 AC9S4I04	Construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns.
HASS	Geography	AC9HS4K06	The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent.
HASS Skills	Questioning and Researching Interpreting, analysing and evaluating	AC9HS2K04	Sustainable use and management of renewable and non-renewable resources, including the custodial responsibility First Nations Australians have for Country/Place.
		AC9HS1S01 AC9HS2S01 AC9HS1S04 AC9HS2S04	Develop questions about objects, people, places and events in the past and present Discuss perspectives related to objects, people, places and events.
Design and Technologies	Food and Fibre	AC9TDE2K03	Explore how plants and animals are grown for food, clothing and shelter.
Processes and Production Skills	Collaborating and Managing	AC9TDE4P05	Sequence steps to individually and collaboratively make designed solutions.





Forest Interconnections

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What is a Forest?

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.

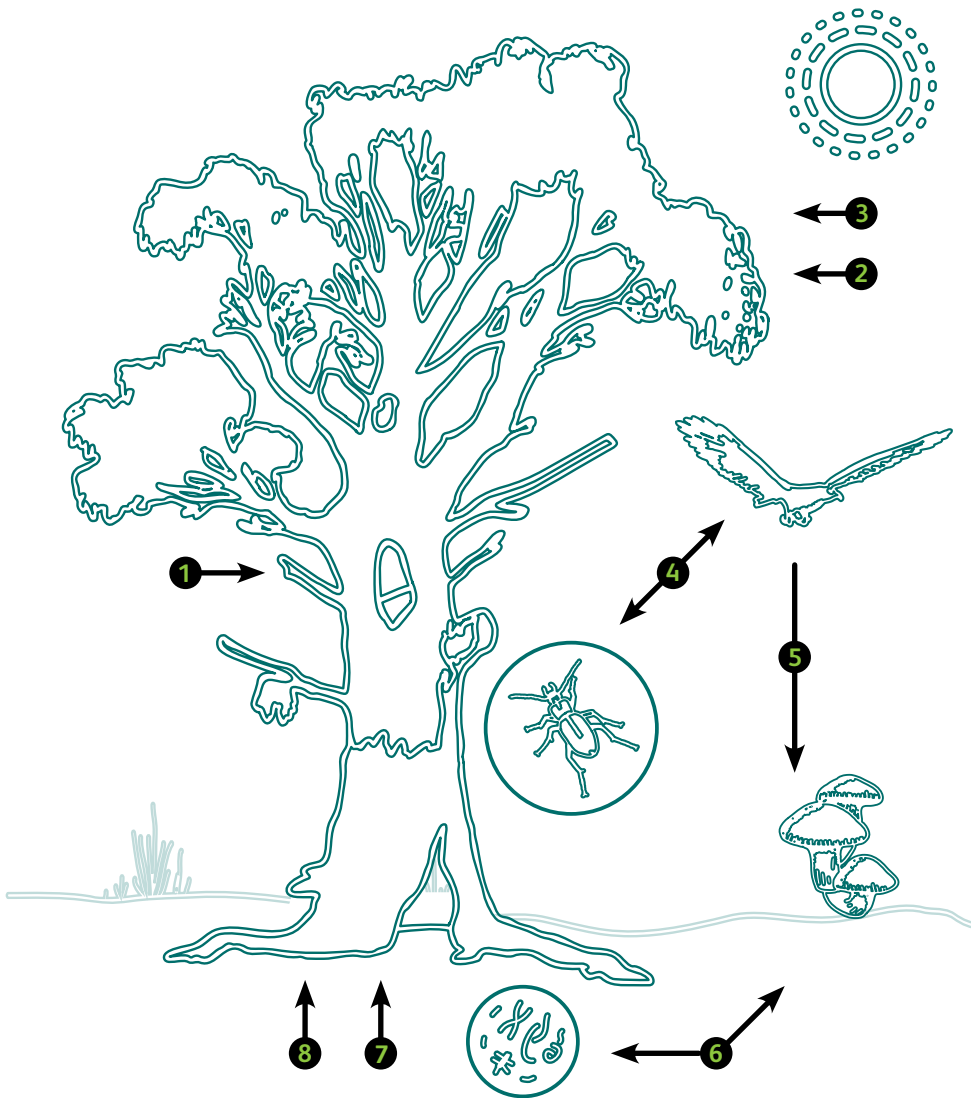
Forests play a vital role in sustaining the life forms and atmosphere of our planet. Forests provide a habitat for all the living things contained within them. Beyond the trees, the forest is also made up of soil, water, other plants, animals, birds and insects. Many of these things are dependent on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



Forests Ecosystems



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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.

These plants are the producers, as they grow, they provide food for some of the forest's consumers, plant-eating animals and insects, which browse on leaves and seeds. Other animals in the forest prey on the consumers themselves – birds eat insects, carnivorous mammals scavenge for carrion.

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.

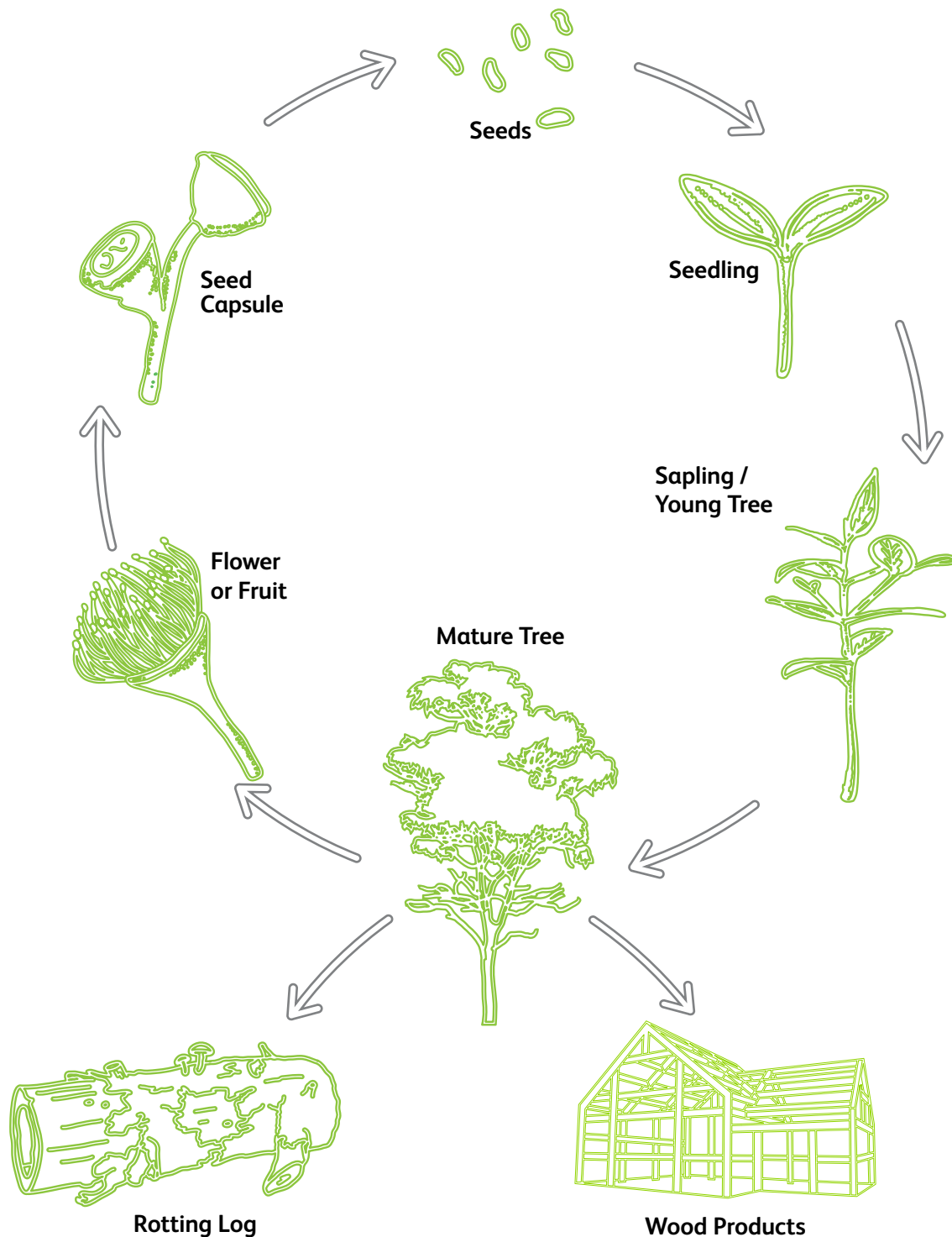
In a forest ecosystem, life starts with the sun. Its ultra-violet light enables green plants to create their own nutrients through photosynthesis, using simple chemicals present in soil, water and air.

Eucalypt Life Cycle



Forest Interconnections

Eucalypts are the tallest flowering plants (angiosperm) on Earth and are a prominent species in the Australian landscape. There are over 900 species native to Australia, 29 of these are found naturally in Tasmania. Eucalypts have distinctive features and characteristics that make up their life cycle.



Eucalypt Life Cycle



Forest Interconnections



Seed

If conditions are right, a seed will germinate by releasing itself from the seed capsule, initiating the growth of roots down into the soil and the first shoots above the soil towards sunlight. Seeds need optimal moisture, temperature and sunlight in order to germinate.



Seedling

In the early stages of growth the tree is known as a seedling. This seedling requires enough light, air, water and nutrients in order to continue to grow. This is a particularly vulnerable stage of a eucalypt's life cycle.



Sapling / Young Tree

To reach this stage an established seedling must compete with other forest species for resources. Eucalypt saplings often have broad, horizontal leaves in order to capture the most sunlight and lack thick bark or hard, woody stems. They are particularly susceptible to being eaten by forest herbivores.



Mature Tree

The eucalypt is now able to reproduce. Mature trees are characterised by a hard, woody stem (trunk), covered in a layer of protective bark. The tree will have an established crown (top of the tree) and an extensive root system. The tree is now able to produce flowers to allow for reproduction.



Flower / Fruit

All eucalypts produce flowers; some annually, others biennially, some in winter and others in spring. Eucalypts rely on active pollination from animals, such as insects, birds and mammals and have bright, sweet smelling flowers to lure pollinators. If pollination occurs, the flower is fertilised and a fruit develops.



Seed Capsule

Once a flower is fertilised, the cup like base of the flower dries, enlarges and forms a woody fruit (capsule) containing the seeds. This is often called the 'gumnut'. Seeds can then be dispersed by the wind, animals or even on water to start the cycle all over again. Some seed capsules rely on fire as a mechanism to open and disperse their seeds.



Rotting Log



Wood Products

The lifecycle of a eucalypt can end at any stage, but there are specific pathways for mature trees.

When a tree dies its job is not done. A rotting log is an important part of a forest ecosystem; decomposing and adding nutrients to the soil and providing shelter and food for living things.

Other mature trees can be harvested for use as renewable resource for everyday purposes including buildings, musical instruments and paper products.

Food Chains and Webs: Producers, Consumers and Decomposers



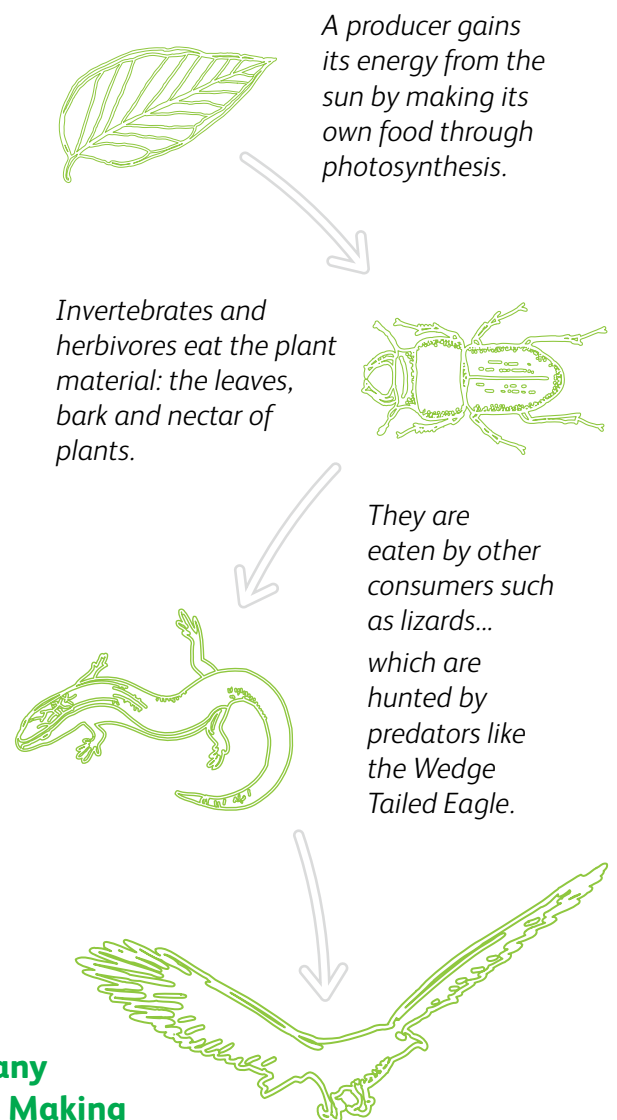
Within each ecosystem, matter moves in a continuous nutrient cycle through a food web.

All living things need energy to live and grow. Energy moves through the system from plants, to plant eaters (herbivores), to meat eaters (carnivores), to decomposers and back to plants.

Producers are living things that use energy from the sun to produce their food through photosynthesis. **Consumers** are living things that get their energy from eating other living things. **Decomposers** are living things that recycle and keeps the forest healthy by breaking down dead material.

Cycles and food webs in forests, such as Tasmania's three main forest types, vary according to populations of producers, consumers and decomposers that live there. Decomposers such as bacteria, fungi and some invertebrates are especially important members of food webs in forest habitats. Their role is to break down the tough, woody fibres of vascular plants, enabling the nutrient cycle to begin all over again.

When multiple food chains are looked at together, many food relationships can be identified across the chains. Making these cross-connections is how you make a food web.



Forest Glossary



Forest Interconnections

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.

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

Predator: An animal that hunts other animals for food.

Prey: An animal that is eaten by another animal.

Producer: Plants that use energy from sunlight to make their food through photosynthesis.

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

Roost: A place where animals with wings nest or sleep.

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.

Trunk: The woody stem of a tree.

Understory: The layer of trees and shrubs between the canopy and the forest floor.

Interactive Roll Over



Forest Interconnections

The *Interactive Roll Over* is designed to support your students' learning experience as they interact with Forest in a Box. Click the illustrations which illuminate when you roll over them. Each icon presents a forest topic and includes either a definition, explanation, key information or link to video content. There are key questions in some content boxes which encourage critical thinking about new concepts and promote 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/>

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Forest Thinking



Forest Interconnections

Learning Intentions:

Identify students prior knowledge and guide inquiry.

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. By beginning your explorations with only a central word or question you can tune your students into the unit and assess prior knowledge. This will also support your teaching plan, exposing students' interests, misconceptions and gaps in knowledge.

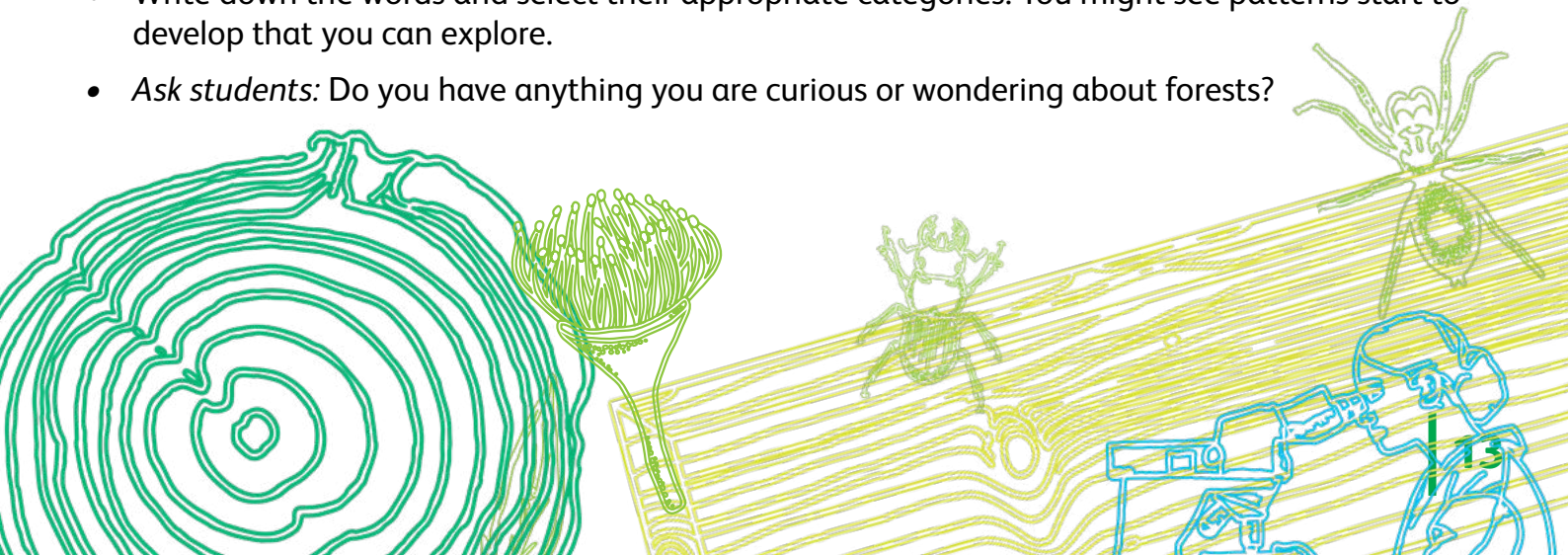
As your unit progresses the map can record your learning journey as students' knowledge builds and develops. As you make a new connection and evolve your students forest literacy you may introduce a new word or question to your map to explore. There are also blank cards for your students to develop their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



Take a Closer Look



Forest Interconnections

Curriculum Links

Science - Year 3

Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)

Science - Year 4

Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships (AAC9S4U01)

Science Inquiry Skill - Year 3/4

Construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns (AC9S3I04)

Learning Intentions:

Students observe and identify the features of living, once-living and non-living things in a forest.

Students explore the concept of interdependence between the living parts of a forests.

Materials: *Forest Specimens, Specimen Cards, magnifying glasses, Mystery Bag, See/Think/Wonder sheet, Mystery Bag: Forest Parts and Purposes sheet, Scientific Observation sheet*

Tuning in: Explain to the students that when we think about a forest, we often focus on the obvious features, the things that stand out, but even the smallest things are important to a forest. Every part of a forest is vital to keeping a forest healthy.

Finding out:

- *Mystery Bag:* Fill the bag with specimens or other forest items you have collected. Pull items out one at a time.
 - Give the students clues about the specimen and play a guessing game.
 - Have a student come forward and be the clue provider - encourage scientific and new vocabulary (living, non-living, once-living etc).
 - Reveal a specimen without explanation and conduct a *See/Think/Wonder* as a whole class, small groups or individually.
 - Choose a specimen and model how to use the *Mystery Bag: Parts and Purposes* activity to explore its role in a forest ecosystem. This activity requires students to come up with three answers for each question, encouraging deeper critical thinking.
- Explore the concept of scientific representations by completing labelled diagrams of the specimens using the *Scientific Observation* sheet.
- Explore different ways to represent the specimens with different mediums (watercolours, clay, thick markers, model).
- Encourage students to explore with their families and find more specimens for the class. Use *Forest Museum* to organise a class display.

Living or Non-living



Forest Interconnections

Curriculum Links

Science - Year 3

Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)

Learning Intentions:

Students identify the characteristics of living and non-living things.

Students sort and classify living, once-living and non-living things found in a forest.

Materials: *Forest Specimens, Living or Non-living cards, Living Things Thinking Tool worksheet, Access Living or Non-living interactive online*

Forests ecosystems are composed of living, once-living and non-living things. For something to be considered living it must grow and change, reproduce, respond to the environment, produce and excrete waste and use energy from the sun or food. Non-living things do not meet all of the criteria above and were never alive.

Tuning in:

Provide students with a collection of forest items (*Forest Specimen* items can be used) and ask them to sort them according to living, once-living and non-living things. Record their initial discussions and ideas. Alternatively, have students draw a forest and label items according to these categories, draw individual items for each or sort the *Living or Non-Living cards* without guidance.

Finding out:

- Explore your school grounds and have students collect or sketch examples of living/non-living things. Discuss how they might handle/care for living things, leaving anything that may be damaged if collected.
- Students might photograph the items they find or complete the *Living Things Thinking Tool*.

Guiding questions:

- What makes something living? How are they different to non-living things?
- What features do ALL of the living things we found/drew have in common?
- Do any non-living things have a feature that is the same as a living thing? Which one?
- How are the living things different from the non-living things?

Living or Non-Living



Forest Interconnections

Have students discuss different places/habitats that they are familiar with and suggest what living and non-living things are found there. For example; the school, their backyard, the beach, the park or the forest.

Tuning in: Explain that together you are going to explore the living and non-living parts of a forest. Guide collaborative classification of the *Living or Non-living* cards as a group using the following questions as a guide:

- Does it grow?
 - Does it move?
 - Does it respond to changes in the environment?
 - Does it reproduce?
- Does it need food and water?
 - Does it produce/excrete waste?
 - Does it need air?
 - **Is it living or non-living?**

How are we connected?

- Assign each student a *Living or Non-living* card.
- Explore and discuss how the living and non-living components of the forest are connected.

Guiding questions:

- Can you find someone else who has a card that you might be connected to? Why/how?
- Who has a card that helps you survive?
- Is there someone who has a card that shelters/protects someone else?
- Does someone have a card that provides you with energy? How?

Taking your learning further:

- Tell a story linking and demonstrating the dependence between the living and non-living parts of a forest.
- Consider what might happen if a non-living part of the forest was threatened or not available.
- Access the online *Living or Non-living* interactive.

Producers, Consumers, Decomposers



Forest Interconnections

Curriculum Links

Science - Year 4

Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships (AAC9S4U01)

Learning Intentions:

Students identify the characteristics of producers, consumers and decomposers.

Students sort and classify producers, consumers and decomposers.

Materials: *Food Web cards, Definition cards*

Tuning in: Display the *Living Things cards* and have small groups work together to decide how they would sort them. Is there more than one way? Encourage creative thinking.

Finding out: Once ideas are explored, sort the plants from the animals as a class (note - fungi is neither plant nor animal). *Ask:* What are the differences between these two groups? Record ideas. Lead towards the answer: plants produce their own energy from sunlight while animals must eat other living things for their energy.

Discuss the *producer and consumer definition cards* and add them to your word wall/display area.

Introduce the decomposer cards as a third group. *Ask:* Why are these grouped together? Discuss the decomposer definition and add to the wall/display.

Sorting out: How are we connected? Assign each student a *Living Thing* or *Decomposer* card and have them find partners who they would interact with in a forest. Repeat to demonstrate the complexity of interconnections.

Taking your learning further:

- Assign or have students to choose a decomposer, producer or consumer to research. Create shared or individual information reports.
- Have each student choose a Tasmanian producer, consumer or decomposer to draw or make a model of. Make them into a class display, set of posters or even class book!
- Construct a table and explore the school or a local area, recording all the producers, consumers and decomposers you come across.
- Visit the school garden and explore the compost - What decomposers can you find?
- Create your own classroom compost and study the decomposers as they break down food waste over time.

Food Web



Curriculum Links

Science -Year 4

Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships (AAC9S4U01)

HASS -Year 4

The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent (AC9HS4K06)

Science Inquiry Skills - Year

Construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns (AC9S3I04 / AC9S4I04)

Learning Intentions:

Students recognise the relationships and interactions between producers and consumers.

Students understand the importance of producers (vegetation) for animals in forest ecosystems.

Materials: *Food Web - Food Chain, Species Cards* and coloured tape

Setup: You will need a large room or open space to complete this activity, and time to arrange it. Distribute *Species Cards* across the room, with producers closest to the start and top predators furthest away. Place a block on each card. Group students into 2-3, each with a *Food Chain* ring set and a coloured ribbon to trace the links between species.

Tuning in: Explain that you are going to explore the interactions and connections between producers and consumers in the forest.

Ask: What does 'food chain' make you think of? How do living things get energy? How do you think plants and animals are connected?

Finding out:

1. Each group is going to begin at the lowest level of the food chain: A producer. You will explore the way energy moves through a forest as plants and animals are eaten/consumed.
2. You must **carefully** use the ribbon to trace your journey.
3. Start at number 1 on your *Food Chain* cards and find the image that matches it. When you have found it, wind the ribbon around the block.
4. Continue through your numbers until you end your journey at a predator.
5. Reflect on your journey and record the steps in your food chain.
6. When complete, discuss the whole web as a class.

Taking your learning further:

- Consider what might happen if a part of the food web was removed or a new species was introduced.
- Have students represent their food chain and research the species in their chain.

Pack up instructions:

1. If you pull at your ribbon everyone will get tangled.
2. Slowly retrace your steps as you wind the ribbon back up.

Ecosystem Links



Forest Interconnections

Curriculum Links

Science - Year 3

Science involves making predictions and describing patterns and relationships (ACSHE050)

Science -Year 4

Living things depend on each other and the environment to survive (ACSSU073)

Learning Intentions:

Students identify the components of a forest ecosystem.

Students recognise the relationships between living things and non-living parts of a forest.

Materials: *Ecosystem Links magnets, Ecosystem Links Connections*

Tuning in: Revisit the Living or Non-living activity. *Ask students:* What are the living parts of a forest? Record ideas. Is one part more important than the other? Can a forest exist without one of these parts?

Finding out: A forest ecosystem includes all the living and non-living parts of a forest and the interactions between them. Healthy forests rely on parts of the ecosystem interacting and working together. Every part, living and non-living, plays an important role in the forest.

- Using the *Ecosystem Links magnets*, introduce each living part of a forest. *Ask students:* What is their role in the forest? What features do they have? Why are they important?
- *Ask students:* Is our ecosystem complete? What are we missing? Can you name all the non-living parts of the forest?
- Once students have developed an understanding of these groups, encourage them to form links between them; how are they interacting? Unlike the food web activity, which focuses on feeding relationships between living things, the links can extend to habitat use or basic survival needs, such as, air or water. Start with links between a living and non-living component, gradually increasing the complexity by introducing new cards.

For Example:

- Vascular plants** depend on **sunlight** in order to make their food (photosynthesis).
- Rocks** provide a warm place for **reptiles** to bask in the sun.
- Beetles** eat the wood in a **rotting log**, returning important nutrients to the **soil**.

Taking your learning further:

- Are there any non-living parts of a forest that every living thing needs to survive?
- How are people connected to the forest ecosystem?
- Can you think of a way that trees are connected to every part of the ecosystem?
- Create a paper chain of ecosystem links using *Ecosystem Links Connections*.

Eucalypt Life Cycle



Forest Interconnections

Curriculum Links

Science - Year 3

Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)

HASS -Year 4

The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent (AC9HS4K06)

Learning Intentions:

Students investigate the life cycle of Eucalypts in forest environments.

Students recognise different factors that may impact on the life cycles of Eucalypt trees and the living things that live among them.

Materials: *Eucalypt Life Cycle* information page, *Access Eucalypt Life Cycle* interactive online, *Life Cycle Spinner*

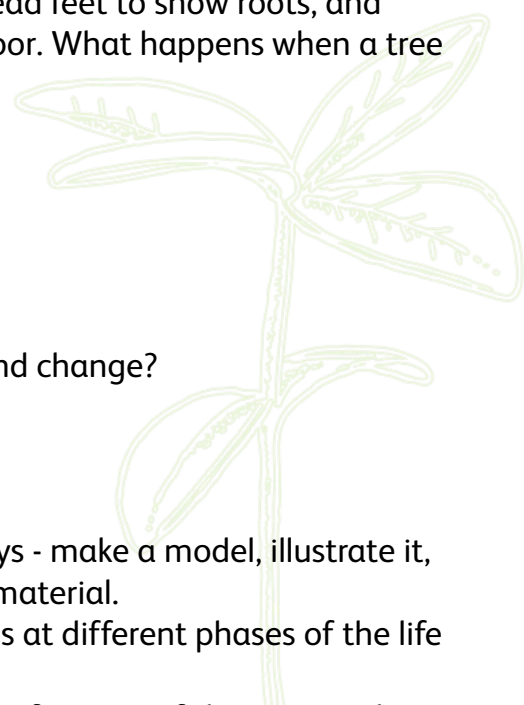
Tuning in: Access the online *Eucalypt Life Cycle* interactive online. Explore and identify the life stages of a tree in the forest. Match the life stages to the images. Role play the life cycle of a tree. Curl up in a tight ball and become a seed, kneel to grow into a seedling, stick up arms as branches, wiggle fingers for leaves, stand up and grow tall, spread feet to show roots, and carefully fall over to die and become a rotting log on the forest floor. What happens when a tree dies? Is its role in the forest over?

Guiding questions:

- Are trees living things? How do you know?
- How do trees start their life?
- What do trees need to survive and grow?
- What changes occur to a tree during its life?
- How are trees connected to other living things as they grow and change?
- Does every seed become a mature tree? Why?

Taking your learning further:

- Have students represent the eucalypt life cycle in different ways - make a model, illustrate it, write a song. Use the *Eucalypt Life Cycle* sheet in the support material.
- Explore how other living things are connected to Eucalypt trees at different phases of the life cycle.
- *Life Cycle Spinner* - Have a student spin the dial and explore the features of the stage indicated and the ways the trees cycle may be interrupted.
- Research and record life cycles of other plants and animals to compare.
- Explore the world of wood products while can be made from harvested mature trees.



Forest Features



Forest Interconnections

Curriculum Links

Science - Year 3

Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)

HASS - Year 4

The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent (AC9HS4K06)

Learning Intentions:

Students explore the basic structure of forests.

Students understand the interconnections between the living and non-living parts of a forest.

Materials: *Forest Features* Resource, *Food Web Cards*, Access *How are forests structured?* on the Interactive Roll Over (green beetle)

A forest is more than just its tallest trees. Forests generally consist of three distinct layers; the forest floor (ground cover), understory and canopy. The structure and species of plants found within these layers help to determine the forest type, as well as influence the variety of living things found within.

Tuning in:

Ask students: What is a forest? What living and non-living things would you find in a forest? Do all forests look the same and if not, why not?

Finding out:

1. Access the online video *How are forests structured?* (by clicking the green beetle on the *Interactive Roll Over*).

Guiding questions:

- What is the function of each layer in keeping forests healthy?
- How are the layers connected?
- How can the canopy help the plants growing underneath? How can the canopy make their growth more challenging?
- Consider the role of decomposers on the forest floor? Why is their job in the forest so important? What would it look like if they were not there?

2. Using the *Forest Features* resource, encourage students to add the labels provided and consider appropriate labels to represent the important structural features of the forest.

Taking your learning further:

- Select an animal card from the *Food Web* activity. Consider the animal's physical features, diet and habitat to identify which layers of the forest the animal would interact with and how - living, feeding etc.
- Create a forest mural or diorama to represent the layers and features of a forest.

Very Important Vegetation



Forest Interconnections

Curriculum Links

Design and Technologies - Year 3/4

Describe the ways of producing food and fibre.
(AC9TDE4K03)

HASS - Year 4

The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent
(AC9HS4K06)

Learning Intentions:

Students identify the important roles trees play in different environments.

Materials: *Eucalypt Life Cycle* place cards, *Very Important Vegetation table*, *Vegetation Location cards*, *Access Our Daily Wood* interactive online

Tuning in: *Ask students:* Who has a tree where they live? What is that tree doing? Students can generate a variety of answers from growing fruit to holding a swing, to being chopped for firewood. Alternatively, visit a tree in the school grounds. *Ask:* Why is it important? What is it doing? You've started exploring the importance of vegetation in different environments!

Finding out:

- Collaboratively research and record a class definition of vegetation. Brainstorm Tasmanian examples.
- Explore the key words from the *Very Important Vegetation table* and explain any unfamiliar vocabulary (e.g., shelter, habitat, erosion prevention, oxygen, urban spaces etc).

Sorting out: Divide students into small groups with one *Vegetation Location* card each. *Ask students:* What types of vegetation are in the picture/would be growing at your location? What are the trees doing in your picture? What is their role? Do they have multiple roles?

Have students work together to complete the *Very Important Vegetation table*, identifying the roles that their tree is/is not performing.

Taking your learning further:

- Have students choose a 'tree role' to investigate (e.g., trees for medicine, trees for urban spaces, trees for animal habitat). Students can create a short information report explaining how trees are used for this important role.
- Visit the *Interactive Rollover* online resource and locate *Our Daily Wood* to learn about the amazing diversity of products made from trees.
- Research the vegetation in a different part of Australia or a different country. Use a Venn diagram to explore the similarities and differences. Do they have similar roles?

Renewable Resources



Forest Interconnections

Curriculum Links

<p>Design and Technologies</p> <p>Year 3/4</p> <p>Explore how plants and animals are grown for food, clothing and shelter (AC9TDE2K03)</p>	<p>Sciences - Year 4</p> <p>Examine the properties of natural and made materials including fibres, metals, glass and plastics and consider how these properties influence their use (AC9S4U04)</p>	<p>HASS - Year 4</p> <p>Sustainable use and management of renewable and non-renewable resources, including the custodial responsibility First Nations Australians have for Country/Place (AC9HS2K04)</p> <p>The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent (AC9HS4K06)</p>
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Learning Intentions:

Students explore renewable and non-renewable resources through design.

Materials: Collection of objects, SCAMPER

Tuning in: As humans we interact with our environment in many ways. Our physical environment provides us with the air we breathe, the water we drink, our food and shelter, it meets our needs... and our wants. The natural resources that we need to survive can be grouped into two categories, renewable and non-renewable.

- Visit the Interactive Rollover online resource and locate *Why Wood - Trees as a Renewable Resource* (yellow eucalypt) to learn about wood as a sustainable resource for products.

Non-renewable resources only exist in limited supply and when they are used up, they are gone forever. The access to these resources can also have a large impact environmentally. Fossil fuels are a non-renewable resource, their formation/creation takes millions of years. Some mineral resources even enter our atmosphere as shooting stars.

Renewable resources can be infinite if replenished through natural and human activity. A tree may naturally die or be harvested for timber and new trees grow through reseeding or replanting. In order for a resource to be renewable it must be managed carefully.

Finding out: *Ask students:* What are the characteristics of renewable and non-renewable resources? Why might we use non-renewable resources? What can you see in our classroom that is a renewable/non-renewable resource?

Record a list of students observations.

Look at the list of objects that include non-renewable resources. *Ask students:* Are there alternatives that could be used to replace the non-renewable resources? Why might this be important?

Choose an object in your classroom (or prepare a range of objects) – Write a list of all the materials it is made with (eg., plastic, wood, steel). Explore which parts are renewable and which are non-renewable. Discuss what each material is derived from. Can the material be substituted?

Design Challenge



Forest Interconnections

Curriculum Links

Design and Technologies Year 3/4 Explore how plants and animals are grown for food, clothing and shelter (AC9TDE2K03)	Sciences - Year 4 Examine the properties of natural and made materials including fibres, metals, glass and plastics and consider how these properties influence their use (AC9S4U04)	HASS - Year 4 Sustainable use and management of renewable and non-renewable resources, including the custodial responsibility First Nations Australians have for Country/Place (AC9HS2K04) The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent (AC9HS4K06)
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Learning Intentions:

Students explore design solutions for sustainable product development.

Materials: *Our Daily Wood* online resource, *Design Thinking Model*, SCAMPER, *Wood Products*

This activity is structured around the *Design Thinking Model*. The *Design Thinking Model* is the process of converting an idea into reality.

Tuning in: Why might designers use wood products? What are some of the benefits of using wood? What might be the challenges of using wood?

Finding out:

Ask: Provide students the opportunity to explore the unique and creative product designs made from wood. Develop a success criteria. Encourage students to consider - What is the challenge? What is the ultimate goal?

Imagine: Support students to choose an already existing product to adapt and substitute for wood and renewable resources, or design an entirely new product out of wood. It does not have to be something completely unique, it could be an everyday object. Encourage students to consider possible challenges and solutions.

Plan: Students develop a visual plan of their design. Can your entire design be made from renewable materials? If not, why not?

Create: Students collaborate to build a model.

Improve: Students evaluate how they can improve on their design using SCAMPER.

Taking your learning further:

- Invite someone who works with wood to visit your classroom to share their design process and why they use wood.
- Borrow the [Forest in a Box - Design and Make](#) kit to take your Design Thinking further.



Forest Interconnections

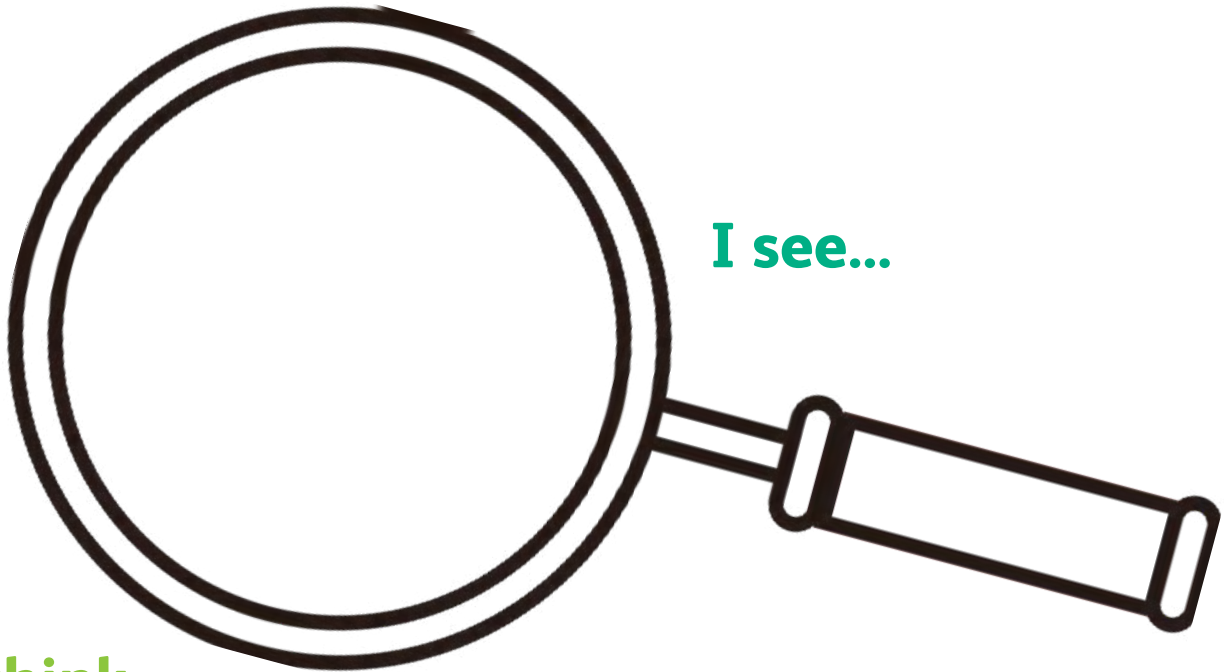
Support Materials

Content

- See, Think, Wonder
- Mystery Bag: Forest Parts and Purposes
- Living Things Thinking Tool
- Scientific Observations
- Ecosystem Links Connections
- Life Cycle
- Very Important Vegetation Table
- Design Thinking

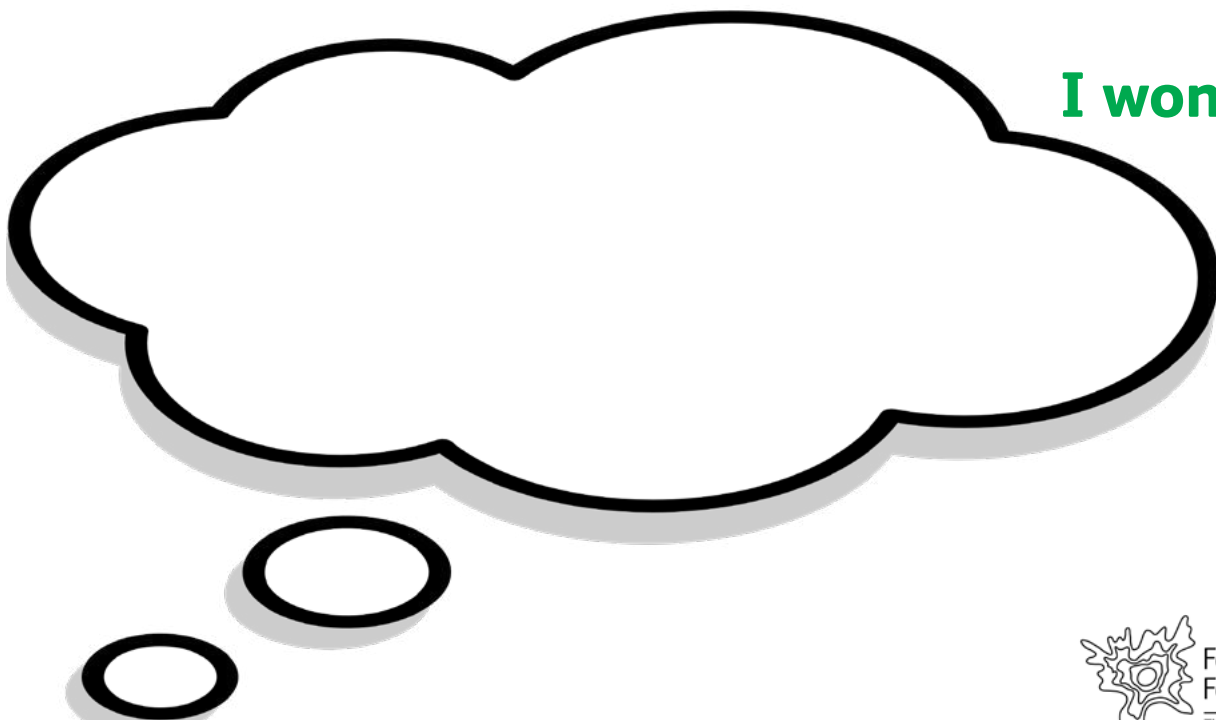
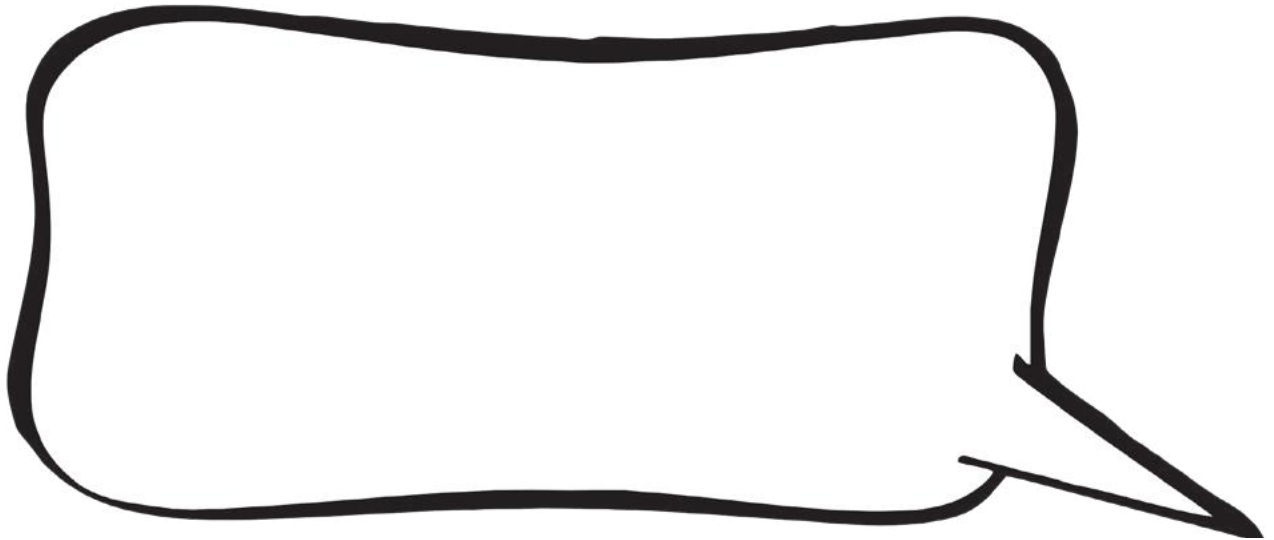


See, Think, Wonder



I see...

I think...



I wonder...

Mystery Bag: Forest Parts and Purposes

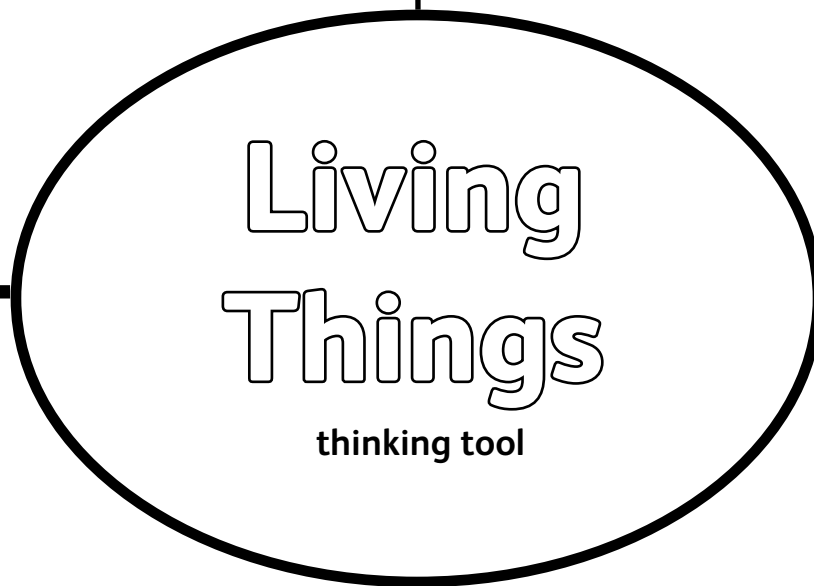
<https://pz.harvard.edu/thinking-routines>



What is this item?	↑	↑	↑	↑
What are the parts?	↑	↑	↑	↑
What is this connected to in a forest?	↑	↑	↑	↑
How could this item change over time?	↑	↑	↑	↑

Definition

Features of Living things



Things that are living

Things that are non-living

Scientific Observations

- What can you see?
- What do you wonder?
- What have you learnt?

Draw a picture



Write a sentence about your specimen

Ecosystem Links

Connections

sunlight

glue

soil

glue

rocks

glue

air

glue

rotting log

glue

leaf litter

glue

water

glue

fire

glue

Ecosystem Links

Connections

What links can you make between the living and non-living parts of the ecosystem? Illustrate the strips and make a paper chain of forest connections.

reptiles

glue

mammals

glue

birds

glue

amphibians

glue

beetles

glue

fungi

glue

bryophytes

glue

lichen

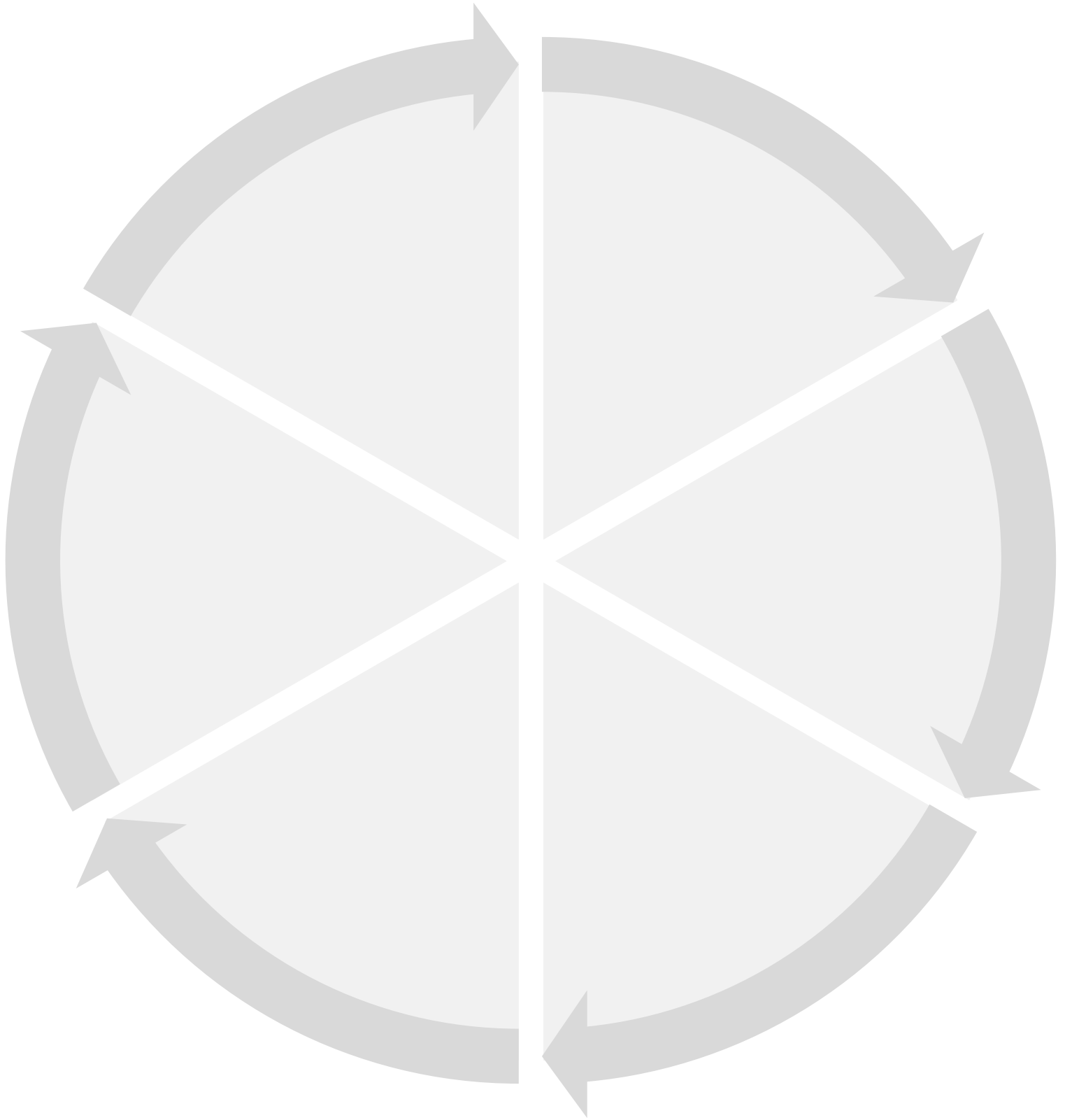
glue

vascular plants

glue



Life Cycle



Very Important Vegetation Table

What important role/s is your tree performing where it is growing? Complete the table below and count the total roles for your tree!

Where is your tree growing? _____

My tree is...	Yes	No
Providing shade		
Providing animals with habitat		
Sheltering livestock		
Cooling urban places (e.g., your neighbourhood, the city)		
Protecting crops being grown on farms		
Preventing erosion (from wind or rain)		
Producing oxygen		
Being harvested for wood products		
Filtering water through their roots		
Being grown for medicine		

Total number of roles: _____

DESIGN THINKING

Improve

Ask

Imagine

Create

Plan



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Substitute

Substitute something out of the original object.

What could be used instead?

Combine

Combine elements from another object.

Is there another object or idea which could be used to improve this design?

Adapt/Alter

Change or add to the object.

Can materials be changed or added to improve the sustainability of this design?

Modify

Change the size or one part of the object.

What can be made higher, bigger or stronger?
What features can be added?
What can be made smaller or removed?

Put to another use

Explain other uses for this object.

Are there any other ways this object can be used?
How could this object be reused as it is?

Eliminate

Remove part of the object.

What can be removed without changing how it works?
How can this be made simpler?

Rearrange

Change the arrangement of the parts.

What can be moved around?
Can the layout be changed at all?



Goal: Use SCAMPER to improve an object and make it a more sustainable product.

Substitute

Put to another use

Combine

Eliminate

Adapt

Rearrange

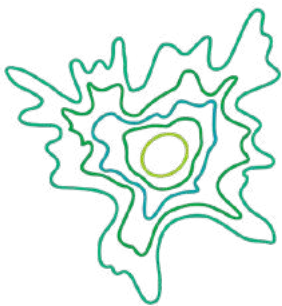
Modify

Sketch your object



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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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