

Trees on Farms



Image thanks to Private Forests Tasmania



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Trees on Farms - Secondary Teaching Resource

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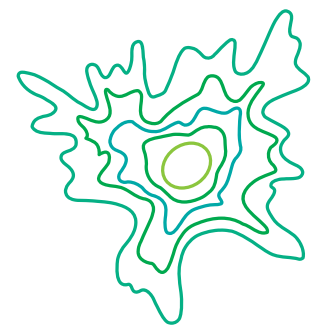


Image thanks to Private Forests Tasmania

The Forest Education Foundation (FEF) can support *Trees on Farms* programs with class visits, field trips and learning opportunities with industry professionals (subject to location and accessibility).

Contact us to discuss options for implementing a *Trees on Farms* program in your school:

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A PDF version of this document is available, with active hyperlinks to case studies and video resources. Email the FEF to access: info@forest-education.com

Why Trees on Farms?



Agricultural landscapes are constantly changing - as populations increase worldwide, so does demand for food, water and fuel. Alongside this increasing demand is the need to reduce carbon dioxide (CO₂) emissions. One positive action that is helping to meet global demand for resources, while also helping to improve the carbon balance is planting trees and caring for landscapes.

Planting trees on farms provides benefits for the environment, landowners and society as a whole. While some trees are planted to become a long term feature of the landscape, others are planted with the intention of being grown, harvested and replanted - helping to improve the carbon balance in the global system.

As well as planting trees on farms, managing native vegetation communities, including forests, also brings benefits to the overall health of the property. Native vegetation enhances biodiversity values, connects patches of remnant forests and provides future wood resources.

There has never been a better time to plant trees - whether on the farm, at school or in your backyard.

About this Resource

This resource has been produced by the Forest Education Foundation to provide support for teachers wanting to explore *Trees on Farms* in the secondary teaching space (Years 7-12). The learning opportunities and guiding questions can be modified to suit the capabilities and interest of the students as necessary. This resource compliments the Department of Education Food and Fibre Production: Planning Guides.

The themes presented are closely aligned to course content within the TCE Agricultural Systems Level 3 course and the Agricultural Enterprise Level 2 course. Some possible topics to explore include; ecosystem services, sustainable resource use and management, global cycles, economic considerations, policy and governance of trees on farms.

This resource was developed with support from the Department of Education Revitalising School Farms program and Private Forests Tasmania - Tree Alliance.

Forest Literacy



Trees on Farms

The Suggested Activities in *Trees on Farms* support the *Tasmanian Forest Education Plan: A Conceptual Framework* for educating Tasmania's K–12 students about forests. The plan's goal is to help students become forest-literate, so that they:

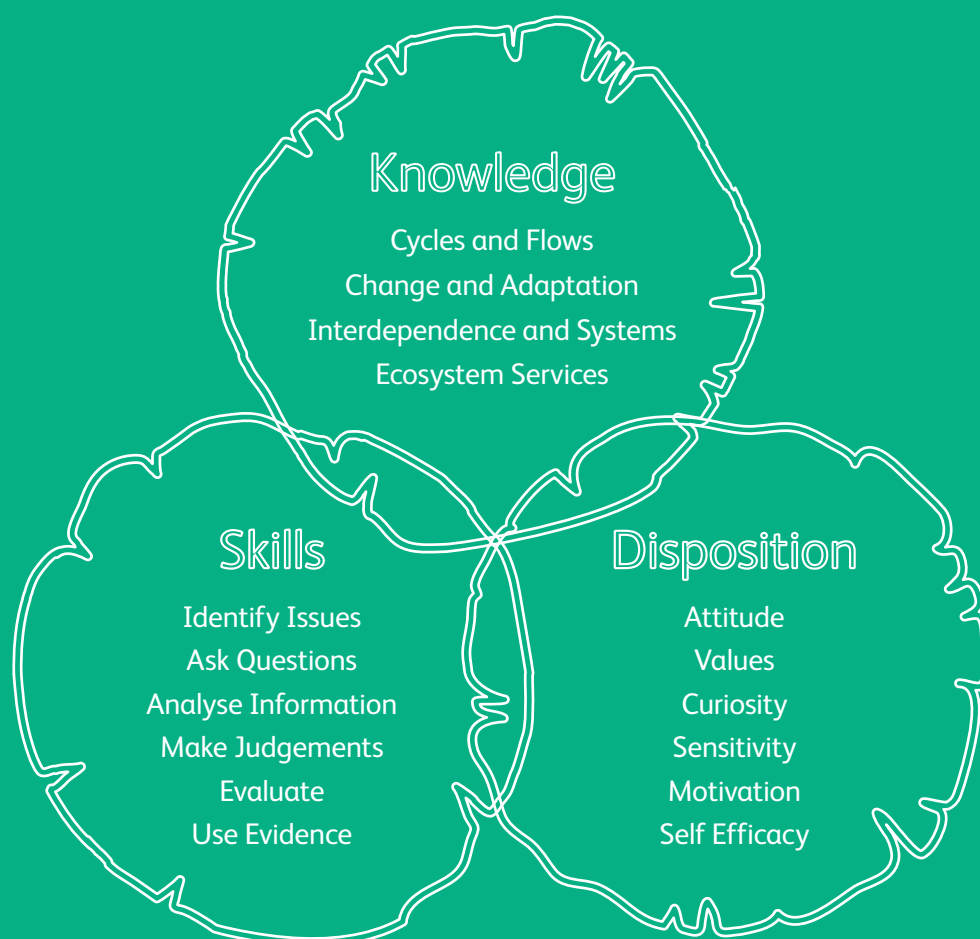
Appreciate the importance of forests and understand forest systems. A forest literate student can make informed decisions about forests and act for the future of forests – integrating environmental, economic and social/cultural perspectives.

Forest Literacy is multifaceted – it embodies a student's knowledge, skills and disposition.

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.

What is Forest Literacy?



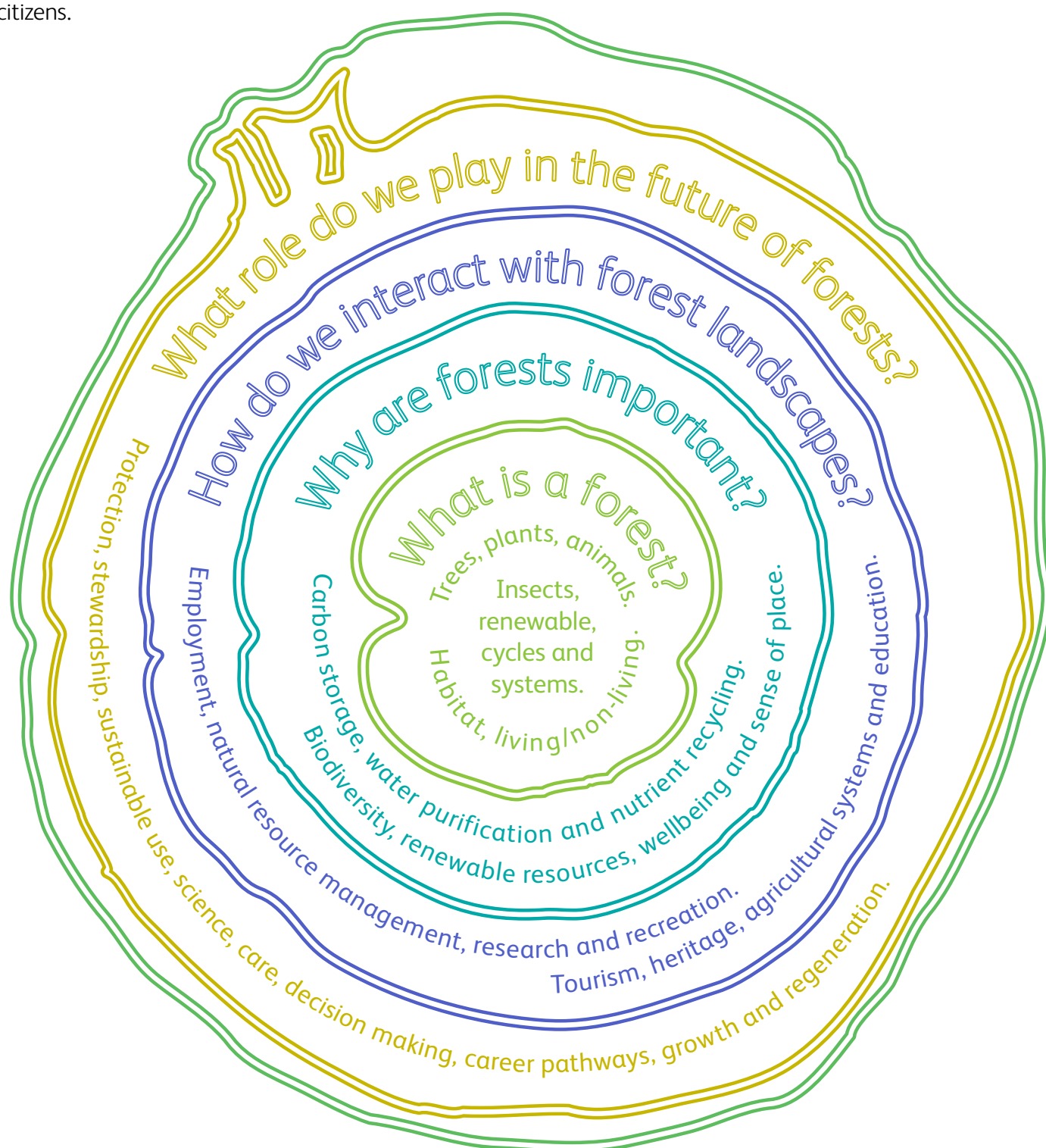
Conceptual Framework

Questions



Trees on Farms

These questions build upon each other as a scaffolding tool, enabling students to progress from a fundamental awareness to a deeper understanding of forests. Each question supports students to become increasingly more knowledgeable and capable of actively contributing to decision making processes, as forest literate citizens.



Curriculum Connections (Years 7-10)

Content Connections - Years 7/8

Design and Technologies: Knowledge and Understanding

KEY CONTENT: Food and Fibre Production

Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032)

Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)

Key Interdisciplinary Connections

Learning Area	Year	Content Descriptors
Science	7	Interactions between organisms, including the effects of human activities can be represented by food chains and food webs (ACSSU112) Some of Earth's resources are renewable including water that cycles through the environment but others are non-renewable (ACSSU116)
	8	Multi-cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce (ACSSU150)
Geography	7	The classification of environmental resources and the forms that water takes as a resource (ACHGK037)
	8	Different types of landscapes and their distinctive landform features (ACHGK048) Human causes and effects of landscape degradation (ACHGK051)

Content Connections - Years 9/10

Design and Technologies: Knowledge and Understanding

KEY CONTENT: Food and Fibre Production

Investigate and make judgements on the ethical and sustainable production and marketing of food and fibre (ACTDEK044)

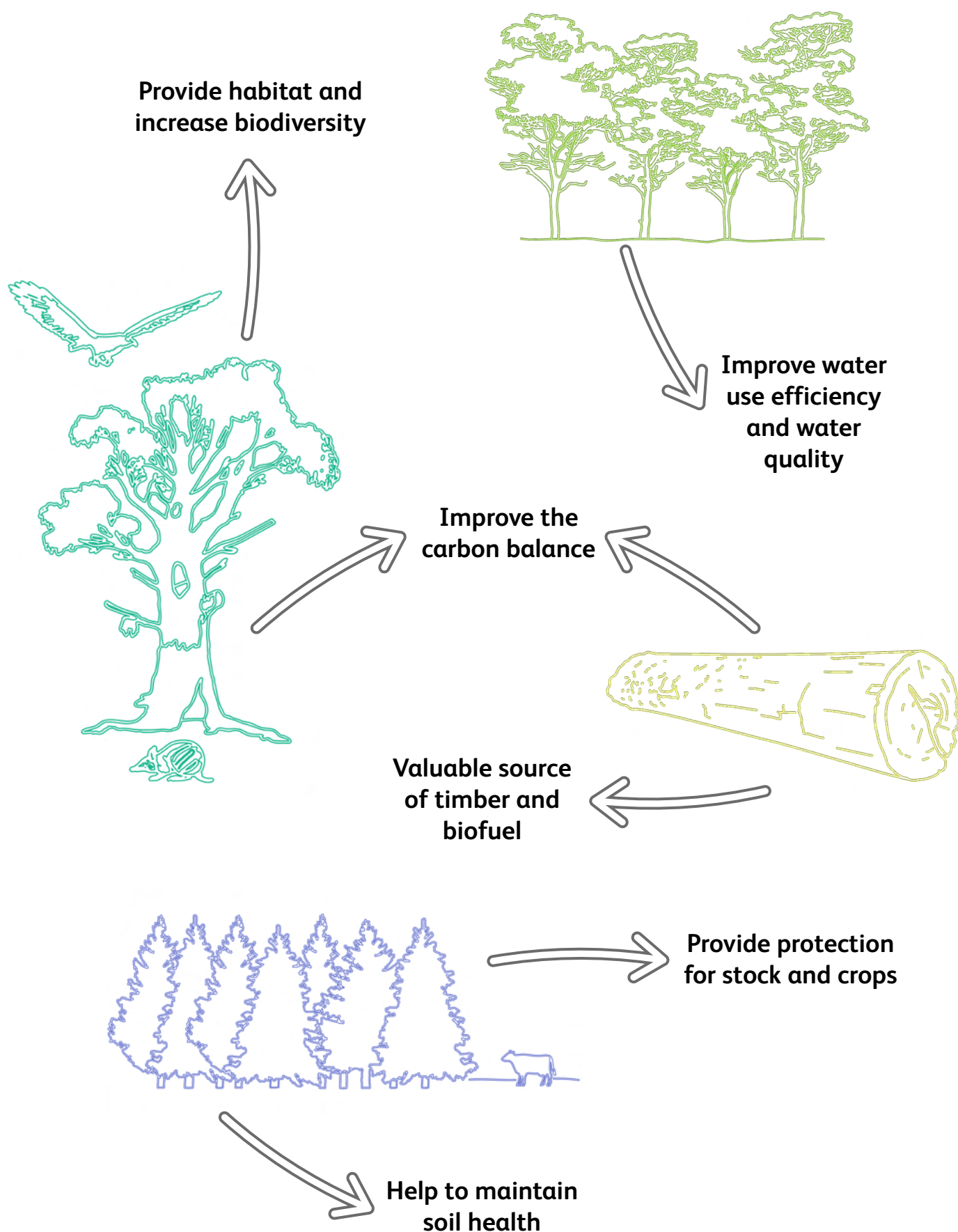
Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)

Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (ACTDEK041)

Key Interdisciplinary Connections

Learning Area	Year	Content Descriptors
Science	9	Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)
	10	Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere (ACSSU189)
Geography	10	Human-induced environmental changes that challenge sustainability (ACHGK070)

What are the Benefits of Trees on Farms?



Trees Improve the Carbon Balance



Trees on Farms

Key Understandings

Planting trees on farms has the potential to have a positive impact on a global scale. Trees, like other plants, create their own food source through photosynthesis.

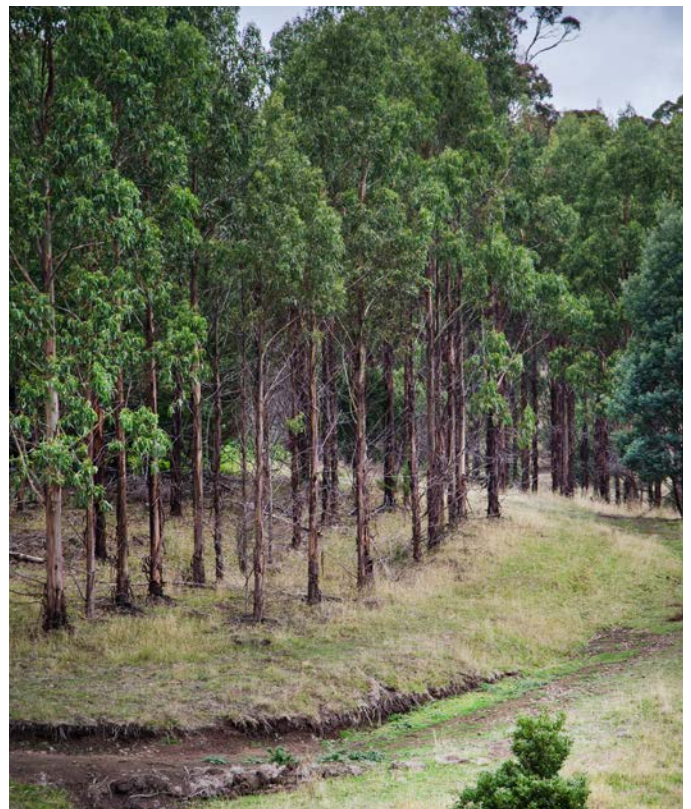
- The carbon that the tree absorbs from the atmosphere is stored in the tree, its leaves, branches, bark and wood.
- Carbon is also stored in the wood products produced from planted trees, and managed forests, within the farm landscape.

Learning Opportunities

- Research some of the initiatives governments are using to encourage farmers to plant trees on their farms as part of carbon offset schemes.
- Create a diagram of the farm landscape that indicates some of the key ways carbon can be produced, captured and stored.
- Compare the carbon footprint of different everyday materials such as steel and concrete. How does timber compare to these?

Resource

[Tree carbon storage tape measure](#)



Questions to Explore

- What are some of the key sources of carbon emissions and sequestration in food and fibre production?
- Planting trees, harvesting and replanting is a win-win for the environment, society and land owners. How can these benefits support each other?
- What role do trees play in contributing to sequestration of carbon in the soil?
- How is the carbon cycle linked to other cycles in nature such as the water or nitrogen cycle?

Trees are a Valuable Source of Timber and Biofuels



Trees on Farms

Key Understandings

Trees on farms can be grown for many values, including the production of timber products. Wood is one of the most useful, natural and renewable resources available.

- Sustainably managed native forests and trees on farms provide other benefits to the productivity and health of the farm over their growth cycle.
- Trees are a source of biofuel - an energy source made from organisms and their products (biomass) such as wood and plant matter, algae, or animal fats.
- Wood pellets, a type of biofuel, are made from recycled wood waste - wood shavings and sawdust, and are held together with the trees natural glue. They can provide energy to domestic, commercial and industrial markets.

Learning Opportunities

- Explore the career opportunities related to growing trees in forests and working with forest products.
- Visit a timber mill and learn about how trees are transformed into wood that we can use for everyday products.
- Investigate the applications of different timber types. E.g, softwoods vs hardwoods , special species such as blackwood or myrtle etc.
- Learn about the ways trees are managed throughout their lifecycle to increase the quantity and quality of timber products available.



Case Study

[Agroforestry improves enterprise income](#)

Video Resource

[Why farmers should plant trees now, and manage them for the mass timber buildings of the future](#)

Questions to Explore

- What happens to the carbon stored in trees when they are harvested for timber products? What effect does this have on the carbon balance?
- What are the different types of wood products that could be sourced from managed trees in a farm landscape?
- How are native forests managed differently to plantation forests?
- How can the use of biofuels have a positive impact on the carbon footprint of our society - now and into the future?

Trees Provide Protection for Stock and Crops



Trees on Farms

Key Understandings

Shelterbelts are rows of trees grown in farm landscapes to provide protection for stock and crops from the elements; wind, sun, rain etc.

- Shelterbelts can be managed for a range of timber products.
- There is more to a shelterbelt than just planting trees in rows. Land owners need to consider: The species, number of rows, spacing between rows and individual trees, prevailing wind direction, topography, as well as opportunities for the future.

Learning Opportunities

- Examine the use of trees in your local area - school yard, farm, parks, residential areas, etc.
- Visit a local shelterbelt and identify the key features of the plantation - species, configuration, height, etc.
- Use satellite mapping tools to identify the configuration of trees on a landscape level.
- Design a model shelterbelt.
- Analyse data of lamb mortality rates in paddocks with/without shelterbelts.
- Design an experiment to determine the effect of shelterbelts in helping to reduce wind speeds in adjacent paddocks.



Image thanks to Private Forests Tasmania

Case Studies

- [Planting trees in the harsh Midlands provides much needed shelter](#)
- [Shelter improves Lucerne yield](#)
- [Shelter increased pasture production by 30 %](#)

Questions to Explore

- How could livestock and crops benefit from shelterbelts?
- How would you design a shelterbelt to suit a specific location and maximise its benefits?
- What are some of the other potential benefits of a shelterbelt in the farm landscape?
- What are some of the challenges associated with shelterbelts?

Trees Improve Water Use Efficiency and Water Quality



Trees on Farms

Key Understandings

When trees are planted alongside other crops, they help reduce the amount of water lost through soil evaporation. This helps to improve water efficiency.

- Trees planted around streams and dams can improve the water quality by reducing run off of chemicals and sediments into water sources and help to stabilise the bank.
- Problems caused by salinity can be addressed by planting trees.
- Trees planted alongside creeks and dams can provide many important benefits to the farm ecosystem.

Learning Opportunities

- Explore the relationship between a trees physiology and water uptake and use.
- Compare and contrast the features of a riparian ecosystem to the adjacent terrestrial ecosystem. Consider both biotic and abiotic factors.
- Conduct water sampling in a local waterway to measure factors such as turbidity, temperature, salinity, pH, etc.
- Determine the importance and presence of indicator species of plants and animals in bodies of water.
- Design an experiment to determine the impact shade can have on water temperature and evaporation rates.



Image thanks to Private Forests Tasmania

Case Studies

- [Strategic tree planting to restore eroded gullies and improve farm productivity](#)
- [Trees reduce paddock water loss \(evaporation\)](#)

Video Resource

[Diversification, protecting the land, and leaving a legacy. How Chris White is growing the future](#)

Questions to Explore

- What are some of the key water pollutants present in the agricultural landscape?
- How do trees help to filter water?
- How can trees help to alleviate the impacts of salinity?
- How do trees help to lower evaporation rates?
- What impacts can water quality have on food and fibre production?
- How are trees able to have all these positive impacts on water use (efficiency) and water quality?

Trees Help to Maintain Soil Health



Trees on Farms

Key Understandings

The quality of soil can deteriorate due to erosion from wind and water removing the topsoil. This erosion can significantly impact crop growth and yield. Trees can help to maintain soil health by reducing the exposure to wind and the impact of water washing away the fertile soil. Trees help to hold the soil together and increase soil infiltration (the amount of water soaking into the soil).

- Trees improve soil health by adding organic matter to the soil through decomposition of leaf litter and roots.

Learning Opportunities

- Explore the characteristics and features of different soils by conducting a range of tests, such as; water retention, presence of gases, soil composition and soil texture.
- Create a model catchment and assess the quality of the catchment with and without trees in the landscape.
- Examine samples of soil under a microscope to determine the presence of soil biota.

Video Resource

[Planting trees helps this Coal River Valley winery maintain its sustainable farming methods](#)



Image thanks to Private Forests Tasmania

Questions to Explore

- In what other ways do trees help develop and maintain healthy soils?
- When farmers are working the land to grow crops or preparing a site for tree planting, how can they minimise the impacts on the soil structure and health?
- What are some of the key factors that could influence soil erosion caused by wind and water in the farm landscape?
- What role do decomposers (animals that consume dead and decaying material) play in producing and maintaining healthy soils?

Trees Provide Habitat and Increase Biodiversity



Trees on Farms

Key Understandings

Biodiversity is the variety of all life forms, plants, animals and microorganisms, their genes, and the ecosystems they inhabit.

Planting trees and managing native forest and vegetation on farms can help to provide important habitat for a range of species and has the potential to increase the biodiversity of an area.

Learning Opportunities

- Collect data on the plants and animals found within a local patch of forest.
- Conduct a tree hollow survey and assess the quality of habitat trees in an area.
- Research habitat requirements of different Tasmanian native animal species. Design solutions to improve or provide these habitats in the agricultural setting.
- Plan and conduct a biodiversity planting in your school farm/playground. Research native plant species to your area and wildlife they are likely to attract.
- Explore the concept of connectivity between remnant vegetation in the farming landscape. How can planting trees contribute to improving wildlife corridors?



Images thanks to Simon Grove

Video Resource

[How strategically planted trees have transformed Nosswick](#)

Questions to Explore

- Trees attract birds and other wildlife species. What positive impacts could increased bird life have on the productivity of a farm?
- How can native vegetation promote plant pollinators? What is the impact for farm productivity?
- Soil Biota consists of the living things found within the soil; microorganisms, fungi, animals and plants. How can trees help to increase soil biota? What benefit does this have for agricultural productivity?

Planting Trees on Farms



Trees on Farms

There is a lot of planning and preparation that goes into planting trees on farms. Often a land owner will start to plan years in advance before even putting the first seedling into the ground. When planting trees on farms, you must consider these important questions:

Why are you planting?

What role will your trees play on the farm? Is it a shelterbelt or biodiversity planting? Do you want to improve the soil or even the appearance of the farm? Do you want to grow the trees for timber?

What other reasons could there be to plant trees on farms?

What will you plant?

The reason you are planting will influence your decision to plant native or exotic species.

Different species of trees require their own set of unique conditions to grow, and can provide a range of benefits to the landscape. Do you want trees that are fast growing? Do you want to attract pollinators to the site?

Where will you plant?

Choosing the right site for your trees is crucial. Important factors that will influence your trees survival and growth include:

- Temperature
- Moisture availability
- Drainage
- Nutrients
- Weeds

What are some other factors?

How will you plant and protect your trees?

Preparing the site for planting helps give the new trees the best chance to grow. What steps will you need to take to prepare the soil and remove weeds? How will you protect your seedlings from browsing mammals? Is there fencing already in place? Is there risk of fire? Will you need to prepare a fire break?

Glossary



Trees on Farms

Biodiversity: The variety of all life forms, plants, animals and microorganisms, their genes, and the ecosystems they inhabit.

Biofuel: An energy source made from organisms and their products (biomass) such as wood and plant matter, algae, or animal fats.

Decomposition: The process whereby living things break down into simpler compounds.

Carbon Emission: The release of carbon into the atmosphere.

Carbon Sequestration: Removal of carbon from the atmosphere and its storage in vegetation, soils or elsewhere.

Connectivity: The vegetation links between patches of forest in a landscape, facilitating species movement.

Erosion: A process whereby geological material (soil, rocks, dissolved material) is transported from one location to another.

Habitat: The environment where living things normally occur.

Plantation: Intensively managed stands of trees, created by regular placement of seedlings or seeds.

Remnant Vegetation: Natural vegetation that stills exists in the landscape with at least 50% of the original canopy, 70% of the original height and is composed of the same species that would exist if the vegetation community were undisturbed.

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

Riparian Zone: The interface between land and a flowing water body such as a stream or river. Vegetation found along watercourses is called riparian vegetation.

Salinity: The measure of salt present in soil or water.

Shelterbelt: Planting of single or multiple rows of vegetation along edges of paddocks to provide shelter from the elements.

Soil Biota: living things found within the soil; microorganisms, fungi, animals and plants.

Water Efficiency: The practices and policies that maximise the benefits gained from every unit of water used.

Water Quality: A property of water associated with the levels of particles, nutrients and chemicals present in the water.

Yield: The amount of agricultural production harvested per unit of land area.

Sources

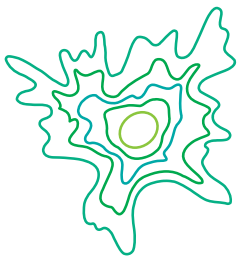
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About The FEF

The Forest Education Foundation Inc. (FEF) is a not-for-profit educational institution staffed by qualified and experienced teachers. The Foundation has been providing learning experiences for teachers and students throughout Tasmania for over 25 years (K-12 and beyond).

For more information on all our programs, visit our website:
www.forest-education.com

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