

Teacher Guide



Forest Education
Foundation
The stories behind our trees

Inquiry Cubes - Years 3 - 6

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Introduction

The *Inquiry Cubes* are a hands-on metacognitive thinking tool designed and made in Tasmania.

The *Inquiry Cubes* help students to activate their prior knowledge of forests, engage their critical thinking skills and participate in collaborative problem-solving.

The illustrations and vocabulary of the *Inquiry Cubes* reflect the Geography (HASS) and Science content of the Australian Curriculum and cross-curriculum priority of sustainability. They can be used as to provoke a range of inquiries in these subject areas.



Inquiry Cubes

FEF's Guiding Questions

The *Inquiry Cubes* also connect with the Forest Education Foundation's four *Guiding Questions* (outlined below), 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*.



Forest Literacy



Use of the *Inquiry Cubes* supports integration of forest literacy in the classroom, as outlined in the *Tasmanian Forest Education Plan*.

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.

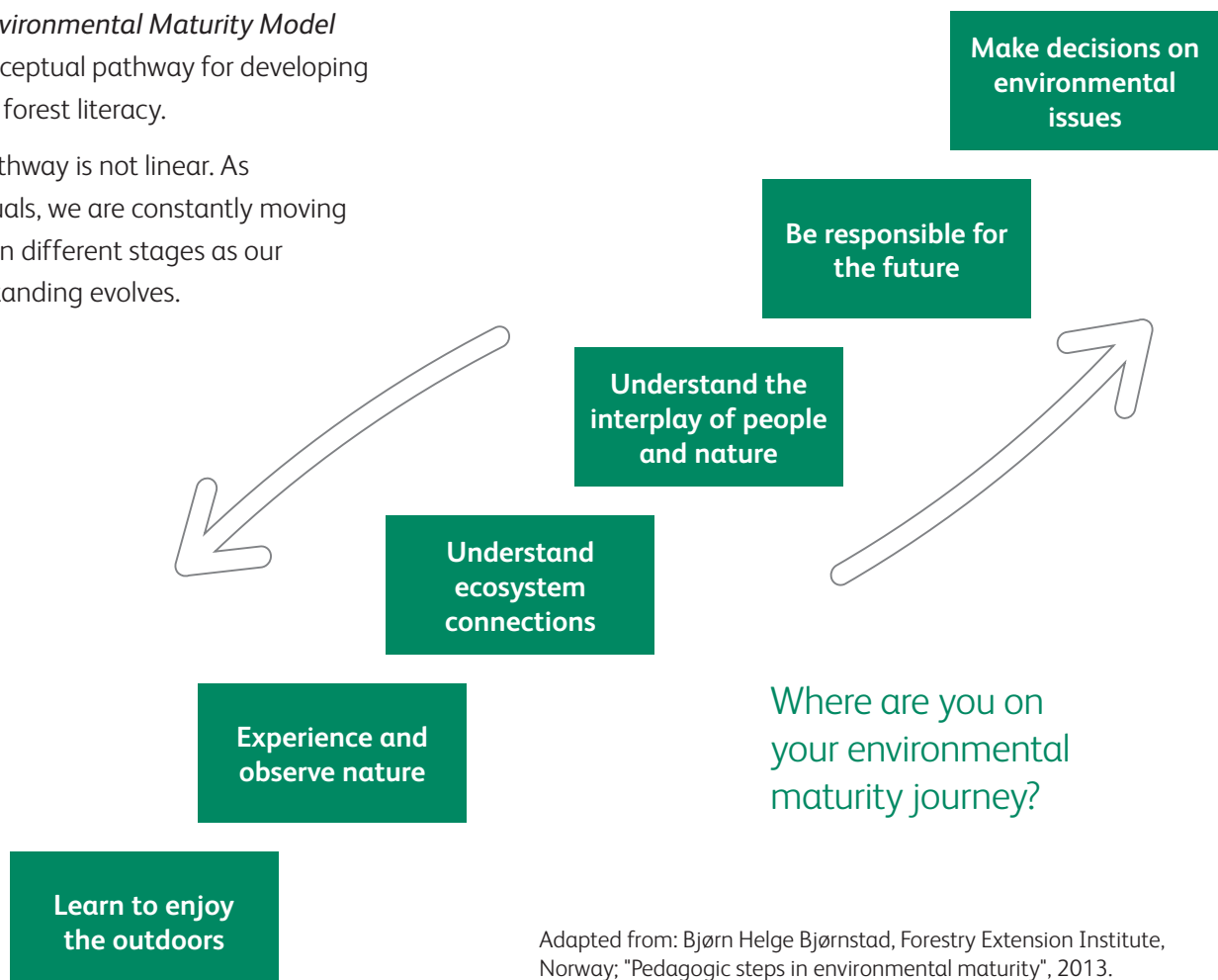
A forest literate individual can use their knowledge and skills to make informed decisions about natural and managed forest landscapes.

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 forest 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.

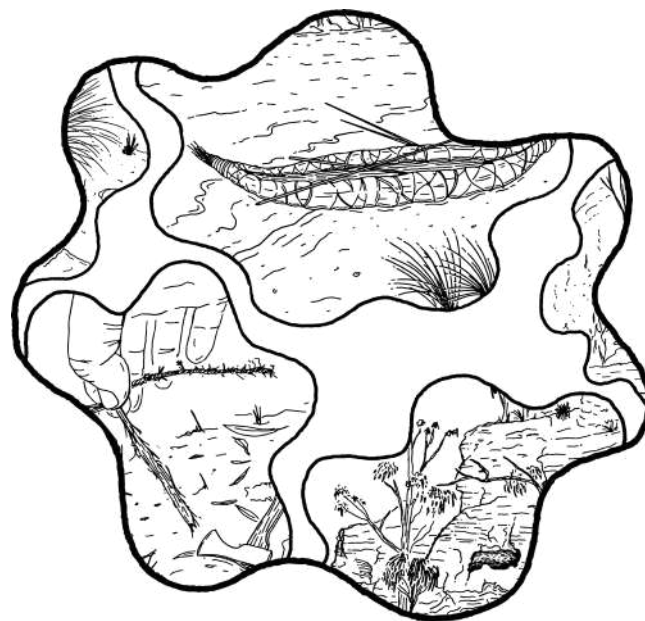
Cross Curriculum Priorities



Inquiry Cubes

Themes included in the images of the *Inquiry Cubes* explore the connection between forests, Aboriginal and Torres Strait Islander Peoples Culture and History and Sustainability. Building understanding of the multiple values of Tasmanian forests supports students to make balanced judgements in the present and future.

Exploring the diversity of environmental, social and economic values held for forest environments is essential to the sustainable futures for our forests. Engaging with palawa knowledge of, connections to and cultural practices on forest country enriches our understanding of forest ecosystems and allows Aboriginal students and teachers to see themselves and their cultures reflected in their learning.



Sustainability	Systems	SS1	All life forms, including human life, are connected through Earth's systems on which they depend for their wellbeing and survival.
		SS2	Sustainable patterns of living require the responsible use of resources, maintenance...preservation...restoration of healthy environments.
		SS3	Social, economic and political systems influence the sustainability of Earth's systems.
	World Views	SW2	World views are formed by experiences at personal, local, national and global levels, and are linked to individual, community, business and political actions for sustainability.
	Design	SD1	Sustainably designed products, environments and services aim to minimise the impact on or restore the quality and diversity of environmental, social and economic systems.

Aboriginal and Torres Strait Islander Histories and Cultures	Country/Place	A_TSICP1	First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways.
	People	A_TSIC2	First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing.
	Culture	A_TSIP3	The significant and ongoing contributions of First Nations Australians and their histories and cultures are acknowledged locally, nationally and globally.

Curriculum Links



This resource supports students to interact with the Geography (HASS) curriculum content and cross-curriculum priority of sustainability within a familiar context, forests. The curiosity provoked through initial interaction with this resource can become a platform to explore a wide range of curriculum areas.

Years 3-6

Learning Area	Strand	Code	Content Descriptors
HASS	Geography	AC9HS4K05	The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent.
		AC9HS4K06	Sustainable use and management of renewable and non-renewable resources, including the custodial responsibility First Nations Australians have for Country/Place.
		AC9HS5K04	The influence of people, including First Nations Australians and people in other countries, on the characteristics of a place.
		AC9HS5K05	The management of Australian environments, including managing severe weather events such as bushfires, floods, droughts or cyclones, and their consequences.
	Skills	AC9HS3S03 AC9HS3S04	Analyse information and data, and identify perspectives.
		AC9HS5S03 AC9HS6S03	Evaluate information and data in a range of formats to identify and describe patterns and trends, or to infer relationships.
		AC9HS3S01 AC9HS4S01	Develop questions to guide investigations about people, events, places and issues.
		AC9HS5S01 AC9HS6S01	Develop questions to investigate people, events, developments, places and systems.
Science	Biological Understanding	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.
		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.



Inquiry Cubes

Background Information

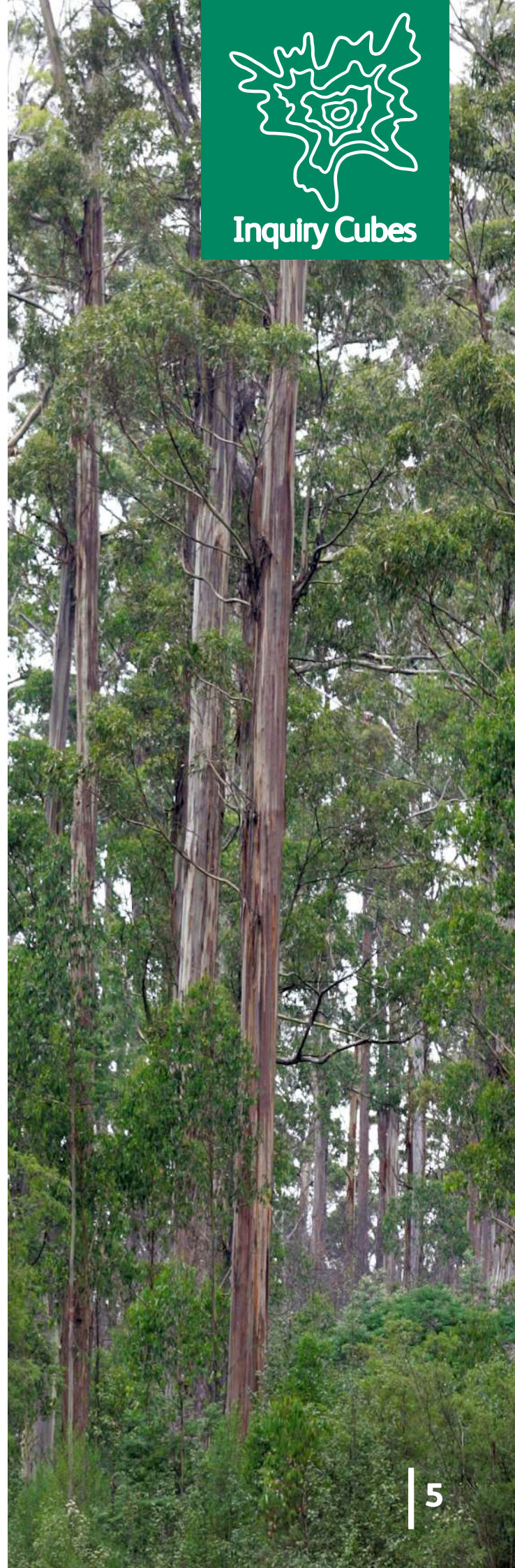
Content

6. What is a forest?

7. Why are forests important?

8-9. Behind the Illustrations

10. Visuals of Setup/Pack-up



What is a Forest?

It's a web of life - a dynamic, constantly changing community of living (biotic) and non-living (abiotic) things. From the forest floor to the canopy, a forest is much more than its trees.

A forest is an ecosystem where trees are the dominant vegetation. It includes many interconnected living and non-living components, such as plants, animals, fungi, soil, water and climate, which work together to support life.

Forests provide food and shelter for countless animals, from insects and birds to mammals and reptiles. They also support people by producing oxygen, filtering water, storing carbon, protecting soil, and supplying renewable materials such as timber. Forests offer places for recreation, cultural connection, learning and scientific research, making them valuable for both nature and communities.



Inquiry Cubes



Why are forests important?



Inquiry Cubes

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 clear the air we breathe. They are also habitat for a unique range of Tasmanian flora and fauna, helping to sustain biodiversity.



Social and 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 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.

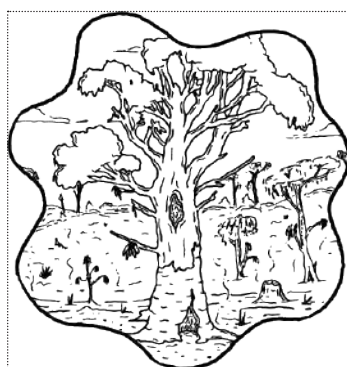


Behind the Illustrations



Inquiry Cubes

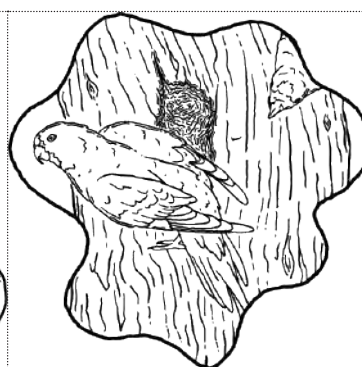
Each of the *Inquiry Cubes* has a set of 5 illustrations with a story to tell about the importance of forests. Here you can find a brief description of each image.



200 year old habitat tree with hollow and fire scarring



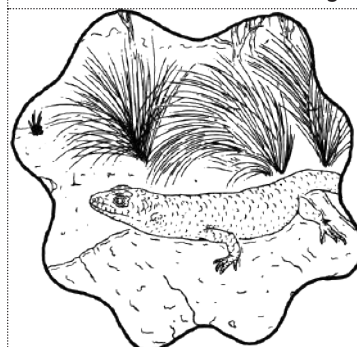
Mountain bike rider on forest track in Derby



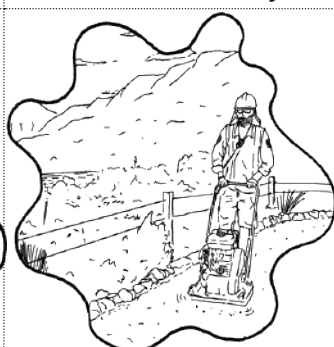
Swift Parrot perched on a tree hollow



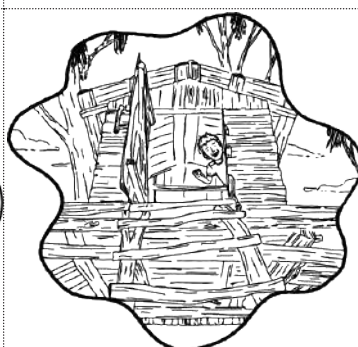
Photographer in a Tasmanian forest



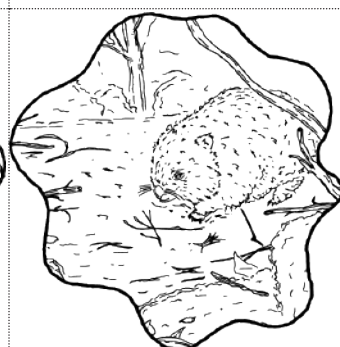
Tasmanian tree skink on grassy forest floor



Park ranger compacting a bushwalking track



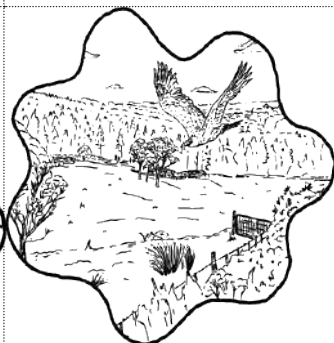
Child playing in a forest treehouse



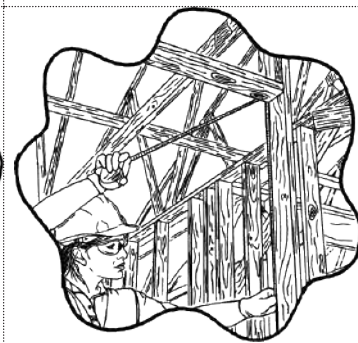
Tasmanian bare-nosed wombat



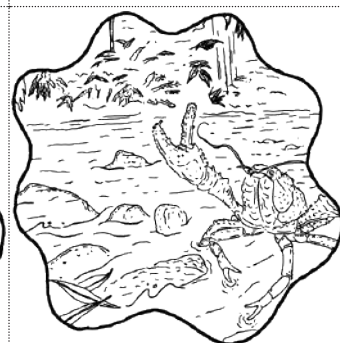
Aboriginal rope-making with native grasses



Wedge-tailed eagle above forest farmland



Builder constructing a wooden house frame

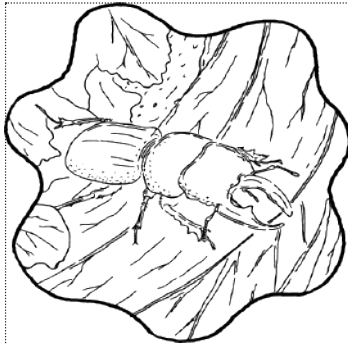


Giant Tasmanian Fresh-water Crayfish in creek

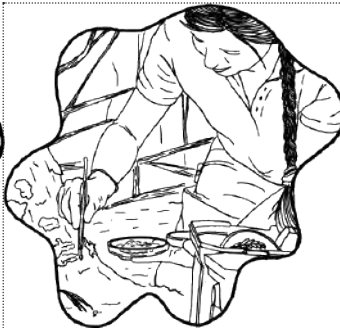
Each illustration represents one or more of the environmental, social and economic systems connected to Tasmanian forest environments.



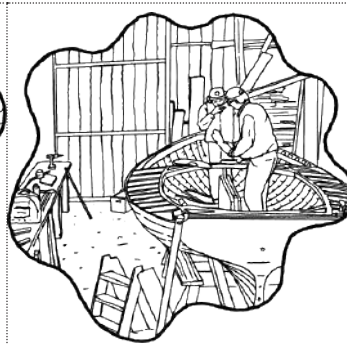
Inquiry Cubes



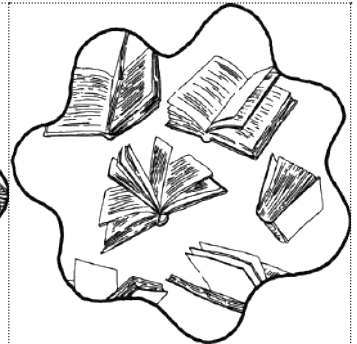
Stag beetle in leaf litter and soil



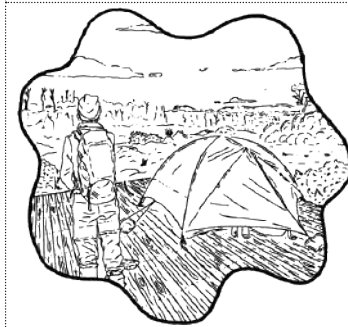
Scientist collecting moss samples



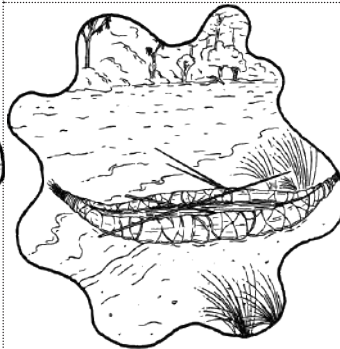
Boat being built at the Wooden Boat School



Books made of wood fibre



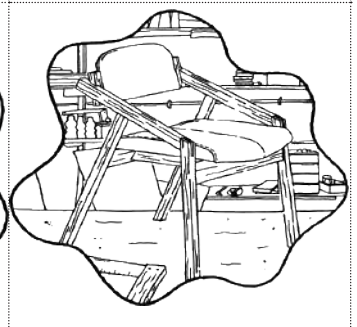
Person camping at Walls of Jerusalem National Park



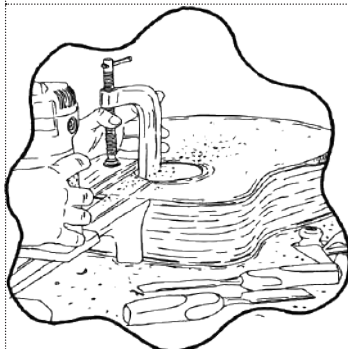
Aboriginal stringybark canoe on a riverbank



Rocky forest cliff face with rock shelters



'xo chair' made of Tasmania timber (Design Tasmania)



Guitar being crafted from specialty Tasmania timbers



Fungi growing on an old rotting log



Tasmanian tree frog beside a river



Firefighter using hose during forest fire



Forester using drone to collect data on plantation health

Visual of Setup/Pack-Up

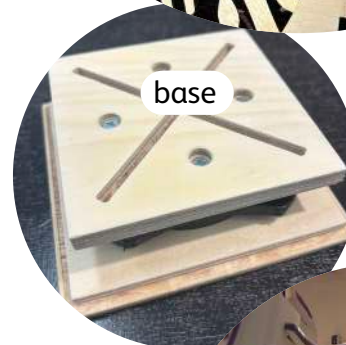


Inquiry Cubes

In the box: Cubes are kept in the foam-padded compartments in the carrier box. Extra tree pieces are kept in black bags in the open spaces.



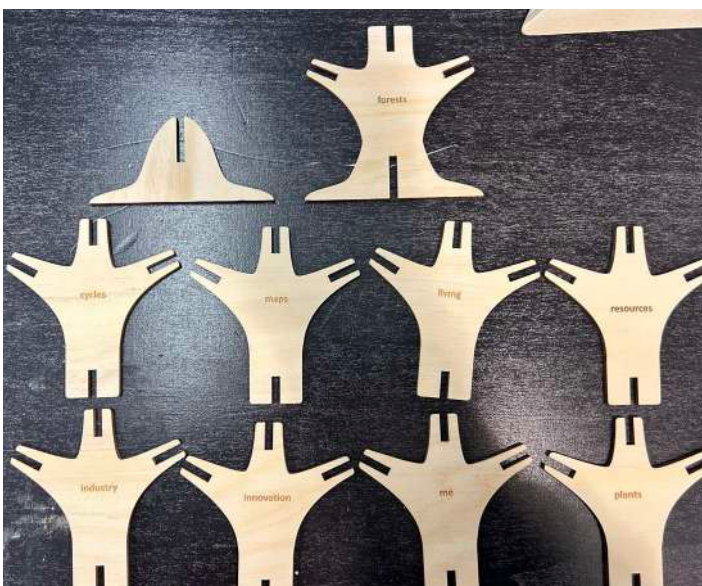
extra pieces



base

In each cube:

- Two base pieces (first row of picture below).
- Eight trunk shaped pieces (shown in rows 2 and 3 of picture below).
- One tree base (underside of cube lid - pictured right).
- All other pieces go back into their black bags and live in the open sections of the carrier box.



base placement



10 pieces packed inside cube



Inquiry Cubes

Suggested Activities

Content

12. Part A: Outside the Cubes

13. Part B: Inside the Cubes

14. Going Further

15. Curriculum Integration



Part A: Outside the Cubes



Inquiry Cubes

The *Inquiry Cubes* are designed as a provocation tool to begin your unit; to activate prior knowledge, promote discussion and facilitate collaborative meaning making.

Please note: *Students are not trying to guess what is inside the box.*

Materials: *Inquiry Cubes Lesson Presentation*, five *Inquiry Cubes* and five *Connect 5 templates* (or alternative thinking routine, e.g., *See, Think Wonder* or *See, Think, Me, We*).

Set Up:

Divide students into 5 groups and give each group a cube to share. Place the question mark facing down - What's inside will remain hidden during this activity. Open the presentation if you are using it.

Learning Sequence:

1. Introduce - Refer to slide 1

Say: There is a puzzle to be solved today, and your group will have to work together to find an answer. It's like an escape room - you have to solve the puzzle in stages.

Students may notice the opening. Tell them not to try to open it yet. You will give them a key after they solve the puzzle.

2. Explore the illustrations and make connections - Refer to the questions on slide 2

Encourage groups to pick up, discuss and connect to the illustrations.

Invite groups to share back their connections. Which illustrations can they relate to?

Are there any tricky illustrations on theirs? *Refer to slide 3* which explains some of the trickier illustrations. All others can be found on pages 8 and 9 of the *Teacher Guide*.

3. Student solutions - Refer to slide 4

After getting to know their illustrations, *ask: What word or phrase could connect all five images?* Model how to use the *Connect 5* (or alternative thinking routine) to record ideas before providing one to each group. Encourage each group to fill in the worksheet, describing each face. They record their answer/s in the center circle.

Note: Students are not trying to guess what is inside the box.

As groups report a solution to the puzzle, invite them to write or draw their solutions on a shared space (e.g., class whiteboard).

4. Solve the puzzle - Refer to slide 5

When all solutions have been recorded, celebrate each idea. Then reveal to the class the true key connecting theme: **Why forests are important**. These are the values which we consider when sustainably managing Australian forest environments.

Part B: Inside the Cubes



Inquiry Cubes

The *Forest Thinking Pieces* inside the cubes are a great way to assess the prior knowledge of your students and begin to build connections. The thoughts and ideas revealed around these key words can support your teaching plan by exposing the interests, misconceptions and gaps in knowledge of your students.

These trees can be revisited throughout the unit as students build their forest vocabulary, adding words or changing connections as their understanding grows.

Materials: *Inquiry Cubes Lesson Presentation, Inquiry Cubes, rulers, spare Forest Thinking Pieces*

Learning Sequence:

1. **Open the Cube** - *Refer to slide 6*
Show students how to use a ruler or trunk *Forest Thinking Piece* to gently twist the black keyhole on the question mark face.
2. **Build Connections** - *Refer to slide 7*
Tip out the pieces and begin by building the base of the tree. Students then read the key words and consider which connect to each other and why.
 - Once the trunk has been built, provide each group with a black bag full of extra pieces. They can use these to complete their tree.
 - Leave set-up in a display space or *refer to slide 8 for pack up visuals*.

Going Futher



Create Your Own Inquiry Cubes

- Refer to slide 9 and have students begin their own *Inquiry Cubes* connected to your unit of learning. Use the *Inquiry Cube Planner* and *Inquiry Cube Net* in Support Materials.

Extension Activities

- Invite students to become the *Inquiry Cube* experts! Have them lead students from another class through investigating the cubes.
- Read the *Forest Values* background information page to learn more about the values represented on the cubes. Print pages 8 and 9 *Behind the Illustrations* and sort the images according to each value.
- Ask students *What is a forest?* Draw, write or digitally record students' understandings.
- Create a digital or drawn brainstorm of student-generated forest vocabulary (e.g., wordclouds.com). Sort student generated words or pictures into categories. You might see patterns start to develop that you can explore.
- Give each student a focus word from the pieces and have them research the meaning of this word and its connection to forests/your unit of learning.
- Have students describe their personal connections to forests.
- Spark a new inquiry! Develop your own *Inquiry Cube* as a class or choose one from those listed below.

Year	Inquiry Questions
3	<i>How are living and non-living things interconnected in forest ecosystems?</i> Explore the living, non-living and once-living forest features represented on each cube. <i>How do plants and animals grow in forest environments?</i> Explore the differences between the life cycles of plants and animals shown on each cube.
4	<i>How are trees important to people and animals in Australia?</i> Explore what role trees are playing in images across the cubes (e.g., habitat, timber, shade...) <i>What resources do forests provide and how can we manage them sustainably?</i> Identify resources which come from forests across the images on the cube. Explore wood as a renewable resource. <i>How do producers, consumers and decomposers interact in healthy forest ecosystems?</i> Explore the producers, consumers and decomposers represented in images across the cubes.
5	<i>How do people influence the characteristics of forest landscapes in Tasmania?</i> Explore the images with a focus on the human activities and potential impacts. <i>How can we sustainably manage Tasmanian forest environments for the future?</i> Explore the environmental, social and economic values represented across all images on the cubes. Learn about the history of bushfires in Tasmania and consider the impacts these have on our environmental, social and economic systems. Investigate how fire has been and is used in forest management.

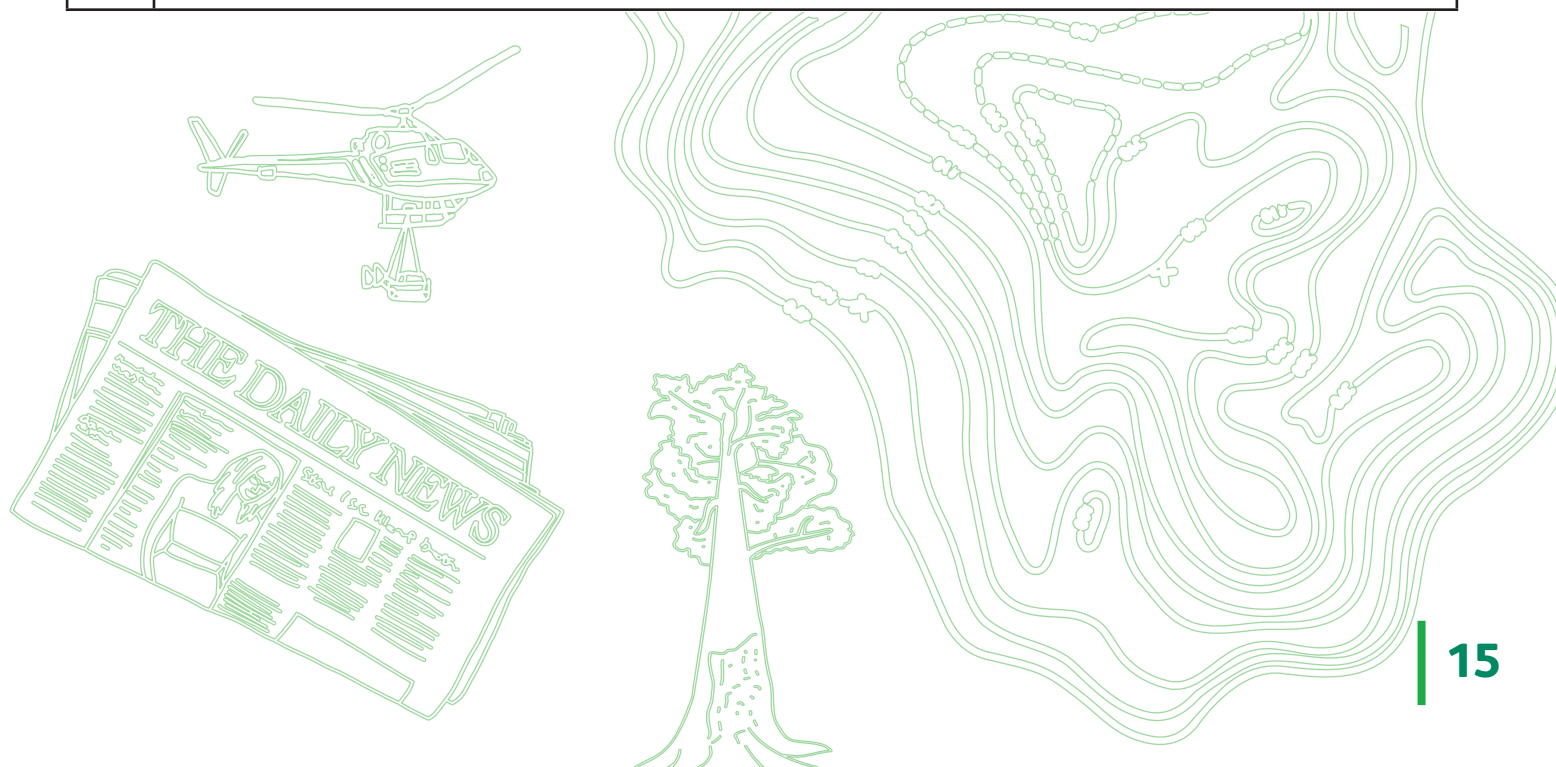
Curriculum Integration



Inquiry Cubes

The images on the *Inquiry Cubes* and the values they represent can inspire lessons across many curriculum areas.

English	Many text types can be explored by focussing on one or more of the images. Narrative writing - Use the images on your cube to inspire a narrative. Persuasive writing - Choose an image and pose a question related to it. For example, should people be allowed to camp in forests? Information report - Choose an image and write an information report related to it (e.g., the wedge-tailed eagle, Aboriginal connection to forests in Tasmania, the history of wooden boats). Instructions - Choose an image to write instructions for (e.g., how to build a treehouse, how to find a frog, how to fly a drone).
Mathematics	There are numerous opportunities to use forests as an authentic context for learning across the Mathematics strands. Number - Use the images to create and solve addition, subtraction, multiplication and division problems. Measurement - Explore the metric units involved in forest management (e.g., area of a site, number of species counted in an area, mass of timber harvested, duration spent monitoring wedge-tailed eagle nests, speed of swift parrots, diameter of habitat trees). Space - Analyse, interpret and create maps representing forest landscapes with consideration of the multiple values it may hold (e.g., farm, local reserve, national park). Statistics - Create and investigate questions of interest related to forests and their environmental, social and economic systems (e.g., survey community members to determine uses of forests for recreation). Collect, record, represent and display findings appropriate to year level.





Support Materials

Content

- **Connect 5**
- **See, Think, Wonder**
- **See, Think, Me, We**
- **Claim, Support, Question**
- **Inquiry Cube Planner**
- **Forest Inquiry Cube Net**

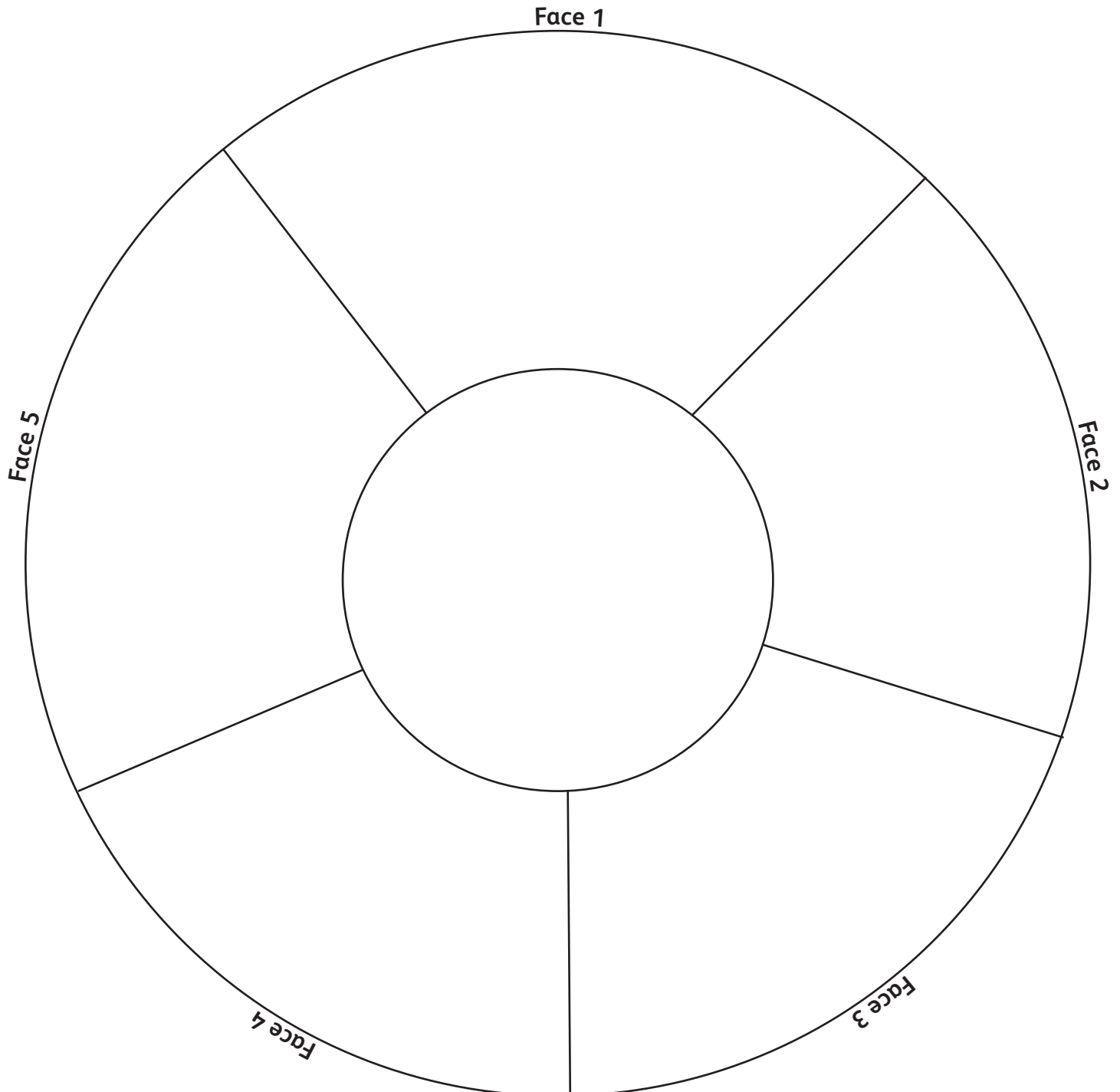
Connect 5

As a team, describe what you see on each face of the cube (1 through 5).

What theme, word or idea could connect all five faces? Look for a pattern.

Write and/or draw your answer in the center circle.

Write any questions or wonderings your group have in the box at the bottom of the page.



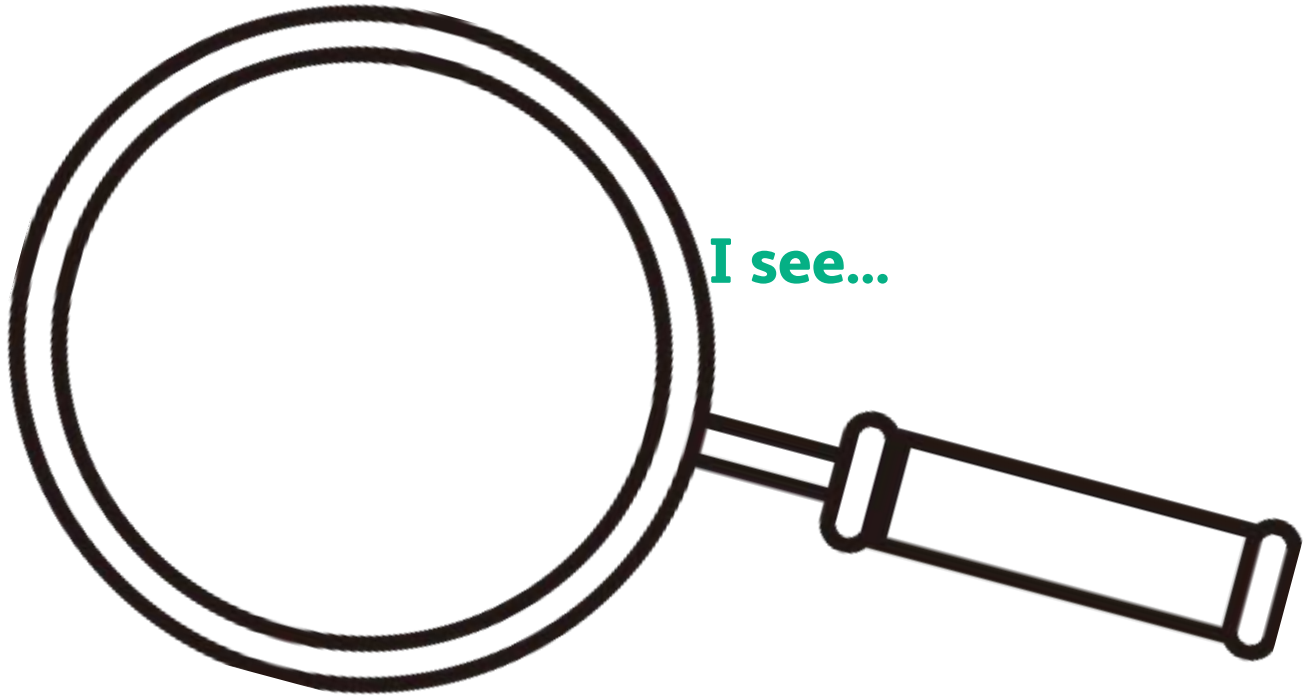
What we wonder...



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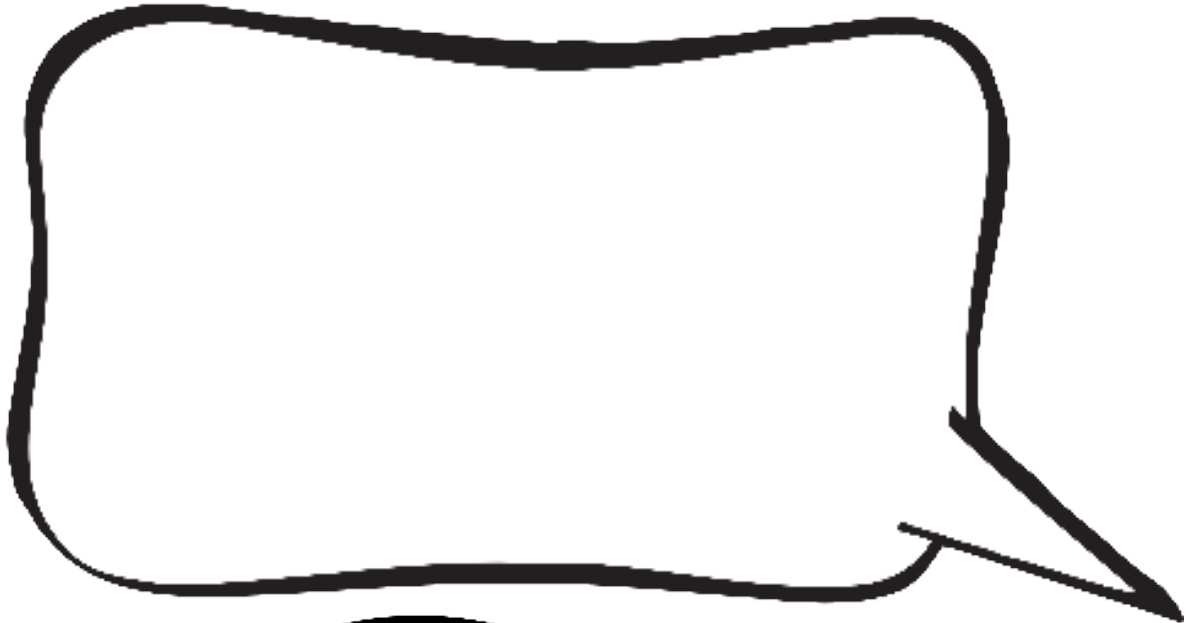
The stories behind our trees

See, Think, Wonder

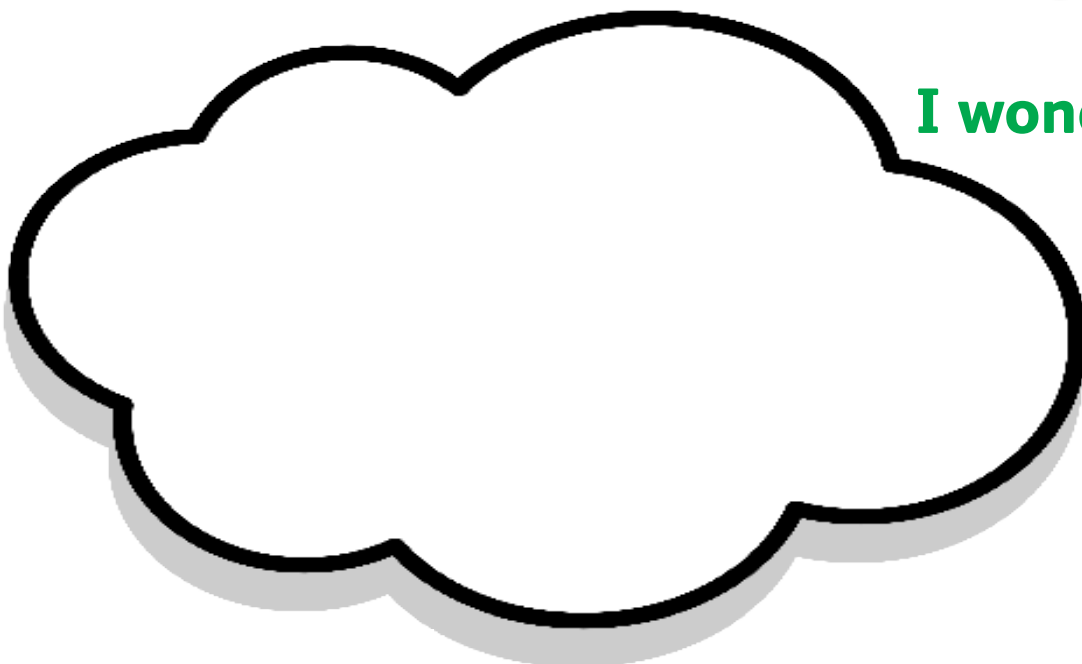


I see...

I think...



I wonder...



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The stories behind our trees

See, Think, Me, We



See - Record what you see around the cube.



Think - What one thing do you think all the illustrations connect to? What's the theme?



Me - How do you connect to one or more of the illustrations?



We - How does your community connect to one or more of the illustrations?



Claim, Support, Question

Claim (the inference)

What are the illustrations about?

Support (the evidence)

What makes you think this?

Question (the wonder)

What questions do you have?

What could you ask to explore further?

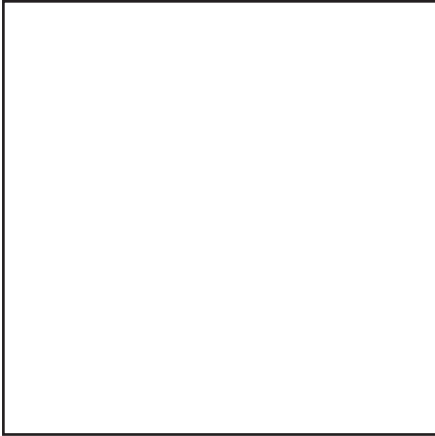


Inquiry Cube Planner

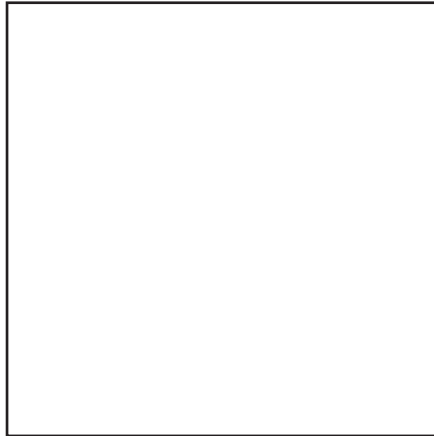
What is the theme of your cube?

Example themes may be: managing Australian environments, animal adaptations, tree life cycle...

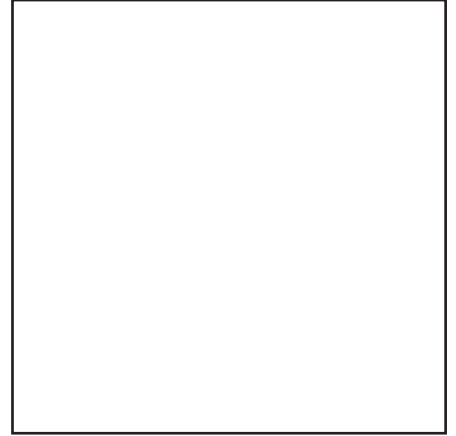
Face 1



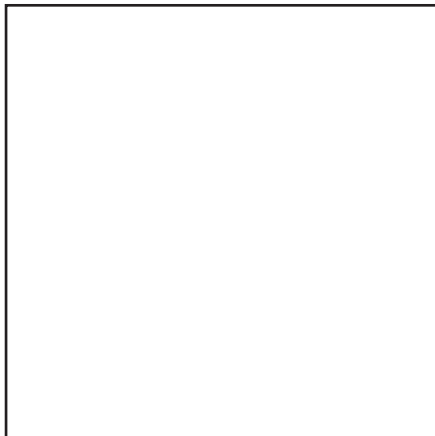
Face 2



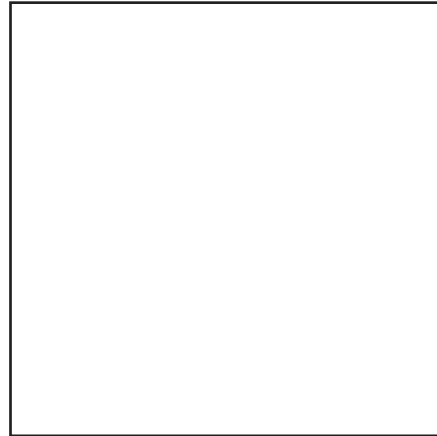
Face 3



Face 4



Face 5

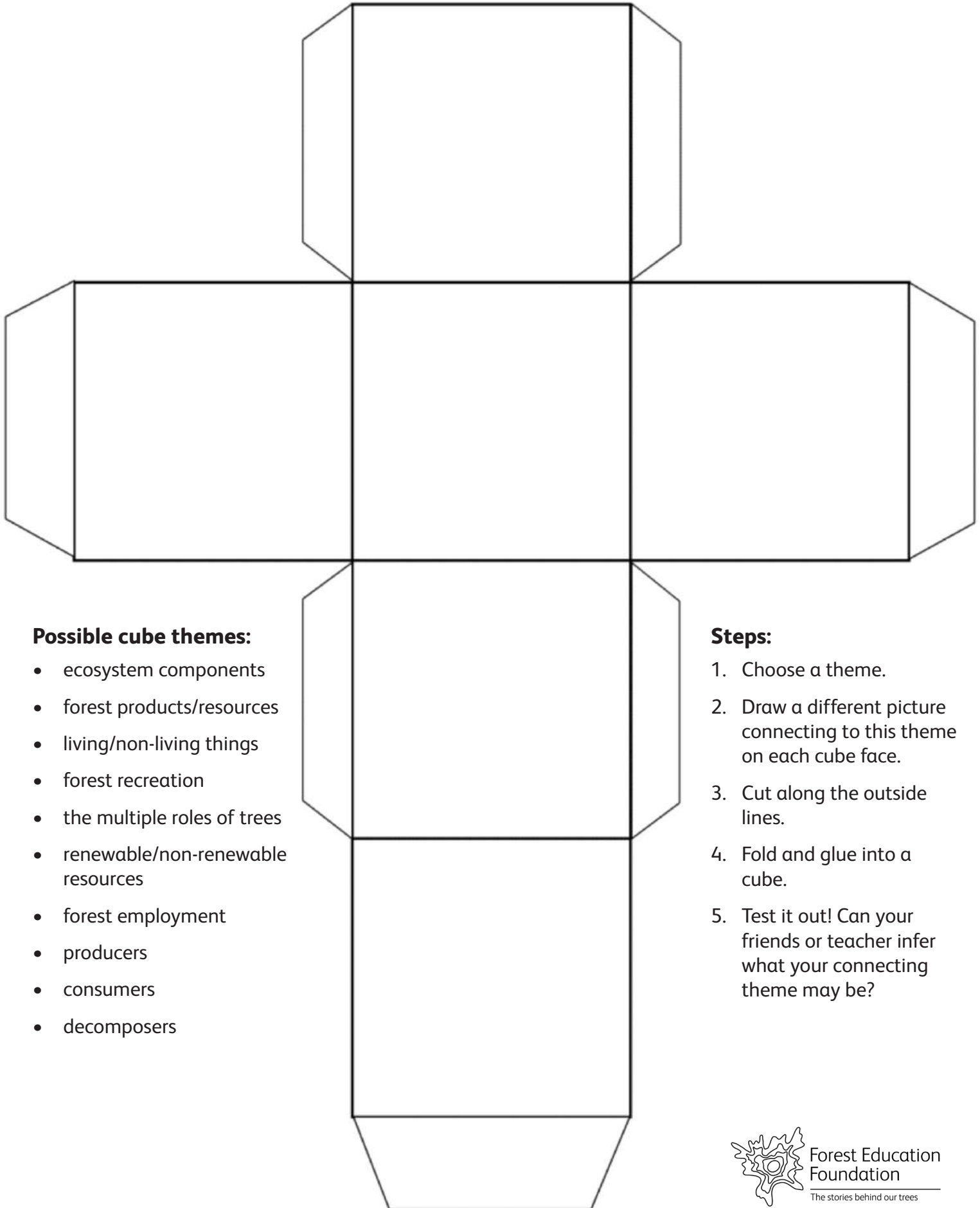


How do your images connect to your theme?



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Inquiry Cube Net



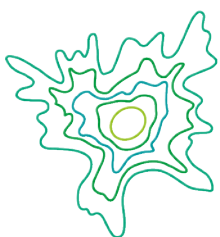
Possible cube themes:

- ecosystem components
- forest products/resources
- living/non-living things
- forest recreation
- the multiple roles of trees
- renewable/non-renewable resources
- forest employment
- producers
- consumers
- decomposers

Steps:

1. Choose a theme.
2. Draw a different picture connecting to this theme on each cube face.
3. Cut along the outside lines.
4. Fold and glue into a cube.
5. Test it out! Can your friends or teacher infer what your connecting theme may be?





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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 (Prep–12 and beyond).

For more information on all our programs, visit our website:

www.forest-education.com

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