

Cooling

the Schools

Teacher Resource Guide: Stage 2



Recognition and Acknowledgement

We sincerely acknowledge all the Aboriginal and Torres Strait Islander People across this Country where we live and work, and pay our deepest respects to their Elders and Leaders past present, and to those emerging.

We recognise that the ongoing colonisation of Australia, and the resultant removal of Aboriginal and Torres Strait Islander People from Lands and all Waters, is intrinsically linked to the disruption of cultural disadvantage, injustice and inequity experienced by Aboriginal and Torres Strait Islander Peoples.

We honour the strengths, capabilities and adaptation shown by Aboriginal and Torres Strait Islander Peoples, families, and communities facing ongoing racism, discrimination, and further marginalisation. We celebrate the significance of their contribution in shaping a shared sense of national unity and identity.

Cultural Warning

This document may contain images of Aboriginal and Torres Strait Islander Peoples who have since passed away.



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Introduction

Greening Australia is working with students and teachers to add thousands of native trees and plants to schoolyards, creating cooler, greener, more inviting spaces for learning and play. As they plant, students learn firsthand about the environmental and cultural benefits of planting native trees for First Nations cultures, urban cooling and biodiversity.

We recommend that teachers use the activities in this booklet in the weeks preceding the incursion. This provides the students some foundational knowledge that they can then put into practice on the planting day. The activities also help students understand the importance of planting trees and how to ensure they grow and thrive.



The accompanying Plant Species List provides summary information about all the plants used as part of the Cooling the School program.

Cooling the Schools is a curriculum linked education unit and is delivered in four components:

- Lessons undertaken in the classroom led by the teacher and supported with resources and activities.
- A school incursion planting day when Greening Australia staff visit your school and plant trees with the students.
- First Nations Cultural education experience.
- Follow up activities focused on monitoring and evaluation

Watch the 13-minute [summary video](#) to get you started.





Cooling the Schools



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Australian cities are expanding at an unprecedented rate, leading to the loss of over 1.5 million hectares of natural green space. The loss of habitat in urban landscapes has significant consequences for biodiversity, since 30% of Australia's threatened species occur in and around our cities.

With fewer trees and green cover providing shade and cooling the air, some areas of our cities are also becoming hotter, meaning people are less likely to be active or getting outside – negatively impacting our physical, mental and social wellbeing.

These urban hotspots are becoming more noticeable as our climate changes, temperatures rise and heatwaves intensify. However, adding more plants to these landscapes can help to tackle this effect, and create cooler, greener spaces where people want to spend time.

Schools play a vital role as social hubs, bringing people together around a common interest: nurturing the next generation and helping lay the foundations of a bright future.

Many Australian schools celebrate our First nation's history and Cultures by providing Yarning circles and Bush Tucker gardens. These outdoor spaces provide a reflective, meditative, and sensory environment which can be enhanced by planting suitable Bush food and medicine resources.





Schools are a great place to start when it comes to showcasing the benefits of nature in cities and giving students and teachers opportunities to connect with nature, feel the benefits firsthand, be empowered to green their spaces, and take practical steps to help their wider networks reduce urban heat.

At the heart of the program is the deep respect and recognition of our First Nations people and their ongoing relationship with Country. Because all Australian schools are built on the Traditional homelands of a specific Tribal nation and clan group, we are also helping to Cool Country. First Nations Cultural education presenters will entertain and inspire students to explore and learn more about Aboriginal Culture, and why *Cooling Country* is so important for the future care and management of Country.



It's also been shown that green learning environments make a significant contribution to young people's development, both through formally structured activities and informal play. This is where they form many of their lifelong values, transferable skills, and undergo huge emotional, physical and social development. Numerous studies have also shown that exposure to and interaction with nature increases children's attention spans, focus, creative thought processes, problem solving skills, self-discipline and self-regulation.

Thanks to funding from the NSW Government's [Greening our City](#) program, the Cooling the Schools program has been delivered to hundreds of schools across Sydney, planting thousands of trees, shrubs and groundcovers.





Learning Objectives

Greening Australia's Cooling the Schools initiative works with schools to connect children with nature through free planting sessions that also empower them to create wildlife habitat, reduce urban heat and increase tree canopy cover in their schools.

The learning objectives of Cooling the Schools are:

- Understand the importance of trees in the ecosystem and how tree planting helps combat climate change, improve air quality, and support wildlife.
- Develop the skills and knowledge required for planting and caring for trees.
- Develop a deeper understanding and connection to First Nations peoples, Culture and History.
- Promote environmental awareness and responsible citizenship.
- Collaborate effectively in a group project.

Syllabus Links

The following activities connect with the Stage 2 Geography and Science curriculum.



Science

- ST2-IWS-S
- ST2-4LW-S



Geography

- GE2-1
- GE2-2
- GE2-3
- GE2-4

Inquiry Questions

- How does the environment affect the growth, survival and adaptation of living things
- Describe the features and characteristics of places and environments
- Explain interactions and connections between people, places and environments
- Compare and contrast influences on the management of places and environments
- Communicate geographical information using geographical tools for inquiry





What is Country?

Country describes the ongoing connection between Australia's First Nations peoples and the land on which they live and belong to. Just like the diversity of Australia's natural places such as Alpine, Desert, Coastal and Rainforests, so too our First Nations peoples are as diverse and dynamic, and their Culture has developed over time and space.

First Nations peoples have been connected to their Country for thousands of years and for some First Nations people, they believe that their people have been here since time began, since the Dreaming. The concept of Country embodies the deep connection a person has before arriving through birth and leaving through death, going back to their Dreaming.

Country is the living, breathing space that all Aboriginal people inherit through their ancestral lineage and through this become Custodians of their Lands, Water and all that inhabit it.



© SBourges



© John Fung

Aboriginal people rely on Country to provide food, medicine and tool making resources and although these resources are sometimes collected in abundance, aboriginal people recognise the need to gather only what is needed. This practice ensures the sustainability of that resource and its value to other living things that source it as well (*Janelle Randall-Court*).





Caring for Country

Caring for Country is the term used to describe the ongoing responsibility First Nations peoples have to their Country and all living things that exist on that Country. Australia's First Nations peoples have had and continue to have an intimate understanding of how Country works. Over thousands of years Aboriginal people have developed a deep connection and respect for their Country and have developed sustainable practices to maximize their ability to not only thrive on their Country, but to ensure that future generations will also thrive and survive.

Caring for Country is the responsibility to not only care for the living spaces but also the spiritual, including Ceremony and stories passed down that are directly related to a place. First Nations peoples continue to Care for their Country in many ways especially in the protection and conservation of their sacred sites, animals, and spiritual homelands.



For thousands of years Aboriginal people across Australia have used Fire to combat the threat of large fires on their Country particularly in the hotter months. This knowledge has been developed over thousands of years, by observation, planning and implementation. Traditional Fire management is now recognised in Australia and around the world because of the ability to apply this knowledge to Bushfire management in even our more urban environments.



Aboriginal Fire management specialists travel far and wide to teach land managers about Traditional Fire management practices and it is hoped that many more young Aboriginal people will be the future specialist and knowledge holders.





Australia's modern history has had an impact on Country and Culture, through the introduction of foreign concepts including farming practices, production of animals, growing crops and land clearing.



These are a few of the ongoing impacts to Country and Culture, however, there have been great and significant attempts to restore, heal and protect Country. Aboriginal peoples in are the leaders on how Country should be managed and the first point of engagement, giving them their rights to speak for their Country.





Background: Why are trees important?

Trees play a vital role in supporting life on Earth and their significance encompasses ecological, environmental, social, and economic aspects including:

- Trees are primary producers of oxygen through the process of photosynthesis. They absorb carbon dioxide from the atmosphere and release oxygen, making the air we breathe cleaner and more breathable.
- Trees act as natural air purifiers, filtering harmful pollutants from the air, which is especially crucial in urban environments.
- Trees act as natural carbon sinks, absorbing and storing carbon dioxide
- Trees, shrubs and ground covers are diverse ecosystems that provide habitat and food for a vast array of plants, animals, insects, and microorganisms.
- Tree roots help prevent soil erosion, which is crucial for maintaining fertile soil.
- Trees influence the water cycle by absorbing and releasing water through their roots and leaves. They help regulate rainfall patterns, prevent floods, and maintain groundwater levels.
- Trees have a moderating effect on local and global climates. They regulate temperature, humidity, and precipitation patterns, creating a more stable environment.
- Trees can absorb and dampen sound, reducing noise pollution and creating a more peaceful environment.
- Trees provide Aboriginal people with an abundance of Food, medicine and material resources, as well as host the numerous species of animal and insect species that they have hunted and gathered for thousands of years.
- Interacting with trees and spending time in natural environments has been shown to have positive effects on mental and physical health, reducing stress, anxiety, and promoting overall well-being.
- Trees enhance the beauty of landscapes, parks, and urban areas.
- Green spaces with trees offer opportunities for relaxation and recreation.





Instructions: Vegetation Map

Create a vegetation map to discover how much natural shade there is at your school.

Equipment:

- Map of the school
- Different colour highlighters
- Clipboard

Instructions

- Use Google Maps to locate your school
- Ask students to identify local landmarks
 - roads
 - buildings
 - parks
 - rivers or creeks
- Switch to satellite view on Google Maps and look at the vegetation cover in your local area.
- Scroll in to focus on your school
- Print the map and highlight the following features in different colours
 - buildings
 - COLA
 - oval
 - vegetation
- In groups walk around the vegetation areas identified on your map.
 - Do they feel cooler?
 - Can you hear more animals?
- As a class discuss why shade is important for people, plants and animals.





Background: What is a Forest?

A forest is an area that has a large number of trees. There are three types of forest: temperate, tropical, and boreal. It is estimated that forests cover approximately one-third of Earth's land area.

Australia has 125 million hectares of forest: 16 per cent of Australia's land area. This is around 3 per cent of the world's forest area and the seventh largest reported forest area worldwide.

Australia's forests are valued for their diverse ecosystems and unique biodiversity. They perform important environmental functions including storing carbon and protecting soil and water. Forests are also significant places with cultural and heritage values. They also provide access to green space used for recreational and relaxation.





The main plant layers in an Australia dry forest are the canopy layer, shrub layer and a ground layer. The canopy is the dense ceiling of closely spaced trees and their branches, while the shrub layer is more widely spaced, smaller species and seedling tree form a broken layer below the canopy. Everything that falls from the canopy and shrub layer forms part of the ground layer, along with grasses and ground covers.



Forest graphic © Karen Player

- The Canopy layer refers to trees above 12 metres. One tree can support a diverse community of wildlife, especially older trees that have developed hollows.
- The shrub layer is between 1 - 6 metres are generally bushy plants and seedling trees. This layer provides nesting sites for small birds and protection for other small animals.
- The ground layer is below 1 metre and is made up of leaf litter, logs, rocks, grasses and ground covers. This layer is critical for insects, reptiles, small mammals and birds because a healthy ground layer with fallen logs provide somewhere secure to hide.





Scientific Observations

Create a drawing of a tree or shrub in your school grounds

Location:
Description:

Look on your tree or shrub and on the ground for evidence of animals.

Scat
Tracks
Traces

Scats = poo

Tracks = footprints

Traces = Feathers, burrows, webs, insect exoskeletons, chewed leaves, cocoons, nests

Remember to tread lightly and don't disturb their home





Background: What is a Habitat?

The main habitat types in Australia are forest, rainforest, grassland and desert. Different types of trees, shrubs and grasses grow within each of these areas that are specially adapted to the soil, rainfall and temperature in each area.

A habitat is a specific place or type of environment where a particular species or community of organisms resides and interacts with its surroundings. Habitats are the physical and biological settings that support the lifecycles, growth, and survival of various organisms, ranging from microscopic bacteria to complex multicellular organisms like plants and animals.

Habitats can be as vast and diverse as lush rainforests, arid deserts, sprawling grasslands, freshwater lakes and coral reefs. Or they can be small like your local park, backyard or school grounds.

Ecologists and environmental scientists study habitats to gain insights into interactions that shape the balance of nature. The health and stability of habitats are essential for sustaining biodiversity and preserving ecological processes.



Discuss as a group some key features of each habitat type: forest, rainforest, grassland and desert

© Australian Museum





Instructions: Wildlife Habitat

Wildlife habitat is any land that can be used as a shelter, breeding ground, or a food source for animals. A Wildlife habitat is not just the plants, it is the interaction of these vegetation communities with animals, and the environmental conditions.

Equipment:

- Vegetation Map
- Clipboard
- Pencil
- Camera (optional)

Instructions:

Use the information from your vegetation map to design a habitat that will suit the needs of your local wildlife. Draw your design on the following worksheet or use a digital drawing program.

- As a class create a list using the following worksheet of the animals you have seen and heard in your local area and school.
 - Use the animal evidence (Scats, tracks and Traces) that you discovered in the Scientific Observation activity too.
 - Include the type of animal; bird, frog, mammal, reptile, insect, spider and other invertebrate.
 - List what type of habitat they need.
- When you start your design, think about what these animals need to survive i.e.; food water and shelter.
- Include some of the Habitat Features listed in your audit worksheet.





Worksheet: Animal List

Animal Name	Type	Habitat





Worksheet: Habitat Design

A large, empty rounded rectangle with a thin brown border, intended for students to draw their habitat design.

You could also build a 3D model of your habitat inside a box using material found in your backyard or local park, like sticks, bark, leaves and rocks.





Preparing for planting day

The Greening Australia team has drawn up a planting plan based on discussions during the site visit. Where possible we install up to 200 canopy and mid-storey trees, shrubs and groundcover seedlings. We will also provide up to 4 mature specimens that are over 1 metre tall.

There are a lot of steps you can take to ensure your planting day is a success. Firstly, discuss with your students the location of the planting areas. Use the pre-incursion activities to talk about why the location was chosen. Look in the Plant Species List to discuss the plants chosen for your site.

Site preparation is a key to the success of your planting day. Prepare the planting area by:

- Removing weeds and rubbish
 - Herbicide application to the grass two weeks before planting is ideal.
 - The shapes on the map can provide a guide but you and your GA can apply the herbicide where you see fit, adjusting space as necessary.
- Having mulch ready to put around the new plants
 - Mulch, before or after planting. Tree mulch can be obtained freely from local tree contractors
 - Be careful about introducing weeds and ask the contractor about what the
 - mulch is - the best quality is eucalyptus chip, hardwood chip or softwood chip in that order.
- Preparing a watering and monitoring schedule
 - This provides opportunity to engage students in caring for their new plants.
 - Ongoing watering is crucial to success, especially in the first few weeks following the planting.
 - Use the following activities to help you get started.





Planting Incursion

After your incursion make sure all the new planting areas are covered with a good layer of mulch. You can do this as part of your Monitoring and Care activities too.

Some other ideas to get everyone involved in becoming 'Guardians of the Garden' include:

- Starting a garden or environment club
- having different classes in charge of the gardens each week
- Get students to name their plants
- Name the new garden areas
- Have students from the planting classes talk about the importance of plants and looking after them at the school assembly
- Use the new gardens to get involved in some of the following environmental events:
 - World Environmental Day - June 5
 - National Tree Day - July 26
 - Biodiversity Month - September

The following activities will ensure your new plants have the best chance to thrive.

Monitoring and Care

Greening Australia has chosen species for this program that are hardy and drought resistant, however, all plants require establishment care to increase their chances to become healthy, mature and resilient individuals.

It is recommended that you consider strategies for reduce threats to your new seedlings including:

- Trampling – it is a good idea for the newly planted area to be cordoned off in some way, or boundary marked, to prevent underfoot trampling. This is especially relevant in schools as students may not be aware of the damage they are causing.
- Foraging of native plants is not considered a big risk in the Cooling the Schools program as common perpetrators such as kangaroos, rabbits,





goats and deer are not a big problem in Greater Sydney's schools. If a problem occurs with foraging, then tree guards may need to be considered retrospectively.

- Water-stress can be a problem in Australia's harsh summers. It is advisable for plants to be watered regularly beyond the initial two weeks.
 - you can also consider adding other water-wise methods such as a drip system, rain tank water captures etc.
 - Student activity - No Cost Irrigation
 - If your school has a vacation care centre, consider involving them in a watering plan during school holidays.
- Weed management is a critical component in the early life of the plants. Typically, exotic weeds and grasses can outgrow a new native tree/shrub. Grass regrowth should be controlled at least until the new plant grows higher than the grass, which can swamp the new sapling.
 - Weeds should be kept from the base of the new plants to reduce competition for water and nutrition.
 - Planting at a high density such as 1 plant per square meter will reduce weed growth through shading as well as the introduction of preferred native groundcovers.
 - Hand weeding during the first two years of the plants' lives will make a big difference to the overall success of the program.





Instruction: Making a rain gauge

Rain helps sustain life and provides water for plants to help them grow. You can determine if you need to add more water to your wildlife habitat by monitoring the rainfall. A simple way to do this is by making a rain gauge.

Equipment:

- 1.25L empty plastic bottle
- Scissors
- Small rocks
- Ruler
- Permanent Marker
- Rainfall Chart
- Thermometer
- Clipboard
- Pen or pencil

Instructions:

- Use scissors to carefully cut the top section off a 1.25L clear bottle.
- Fill the bottom of the bottle with small rocks for weight (2cm deep).
- From the top of the rock layer, mark out 1 cm intervals on the side of the bottle with a ruler and permanent black marker.
- Fill the bottle with water up to the top of the rock layer.
- Make a funnel by inverting the top of the bottle you cut off in step 1
- Place the rain gauge in near your new plants where it will be exposed to rainfall, making sure to secure around it with rocks so it doesn't fall over.
- Observe the weather each day and record the rainfall amounts and temperature on the following Weather Chart.





Worksheet: Weather Chart

Week A			
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

Week B			
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

If there has been a lot of rain, there is no need to water the garden.





Background: Why is Water Important?

Water is essential for all life and is the most abundant substance on Earth. Water covers 75% of the earth's surface, however only a very small amount is fresh water that can be used directly by people, animals and plants because:

- 97% of this water is in oceans and is too salty for people, animals or plants to use
- 2% is frozen at the north and south poles, in glaciers and on snowy mountain ranges.

Water is the only substance on Earth that naturally occurs as a solid, a liquid, and a gas. These changes of state require heat exchange which is important to the redistribution of heat energy in the atmosphere.



Water Cycle graphic © NASA

Water is a fundamental element for plant life, and its availability and proper management are critical for the health and growth of plants. Insufficient water can lead to drought stress and, ultimately, plant damage or death.

Plants need water for several essential reasons to support their growth and survival:

- Water helps transport nutrients from the soil to various parts of the plant.
- Water is a key component of the photosynthesis process. In photosynthesis, plants use water, along with carbon dioxide and sunlight, to produce glucose and oxygen. This glucose serves as the plant's energy source and the basis for its growth.
- Water is necessary to maintain the pressure in plant cells. It helps plants maintain structural integrity and prevents wilting.
- Transpiration is the process by which water is released from the stomata (small openings in leaves) into the atmosphere. This process helps to cool the plant and regulate its temperature, preventing overheating.





Instructions: Watering and more

Watering is an important part of the care and maintenance of your new plants. It is also important to remove weeds and make sure the mulch is protecting the plants.

Equipment:

- Weather chart
- Watering can

Instructions:

Create a watering and monitoring roster with the planting class is an important way to ensure your plants are healthy. You can use the following chart that includes watering every week, mulching and weeding every 2 weeks and measuring and checking for damage every 2 weeks. Otherwise, you can create your own roster.

Make sure you refer to your weather chart to add extra watering days when the weather has been hot and dry.

Week	Activity
Week A	Watering, checking mulch and weeding
Week B	Watering, measuring plant growth and checking for damage
Week C	Watering, checking mulch and weeding
Week D	Watering, measuring plant growth and checking for damage





Citizen Science programs

Citizen science projects are a great way to engage school students in scientific research and environmental monitoring. Across Australia, there are many projects that students can get involved in.



The [Aussie Backyard Bird Count](#) is a great birdwatching and monitoring projects. Students can participate in bird surveys, recording the species they see and their behaviours.

[FrogID](#) is a project by the Australian Museum that involves recording and identifying frog calls. Students can use the FrogID app to record frog calls in their local area. This data helps researchers monitor frog populations and biodiversity.

[Seek by iNaturalist](#) allows curious naturalists of all ages to earn badges and participate in challenges to observe organisms with on-screen identification using computer vision for identifications based on data from iNaturalist.

The [National Waterbug Blitz](#) is a nationwide waterway monitoring event. Everyone is encouraged to become 'citizen scientists' and investigate the health their local waterways and wetlands by exploring and identifying the waterbugs.

The [Australian Pollinator Count](#) is taking place during Australian Pollinator Week in mid-November each year. Taking part is quick and easy. You simply need to observe some flowers for 10 minutes, record the pollinators you see and register your results.





Extension Activities

There are a lot of way to extend on the activities to further your students learning.

Caring for Country

- Use the Plant Species List to identify the plants at your school that are culturally significant.
- Design and plant a Bush Tucker Garden
- Design and build a Yarning Circle

Vegetation Map

- Create a vegetation map of your local area

Scientific Observations

- Identify the sounds, scats, tracks and traces that you discovered. The following websites are great places to start.
 - <https://australian.museum/learn/species-identification/>
 - <https://www.australianenvironmentaleducation.com.au/education-resources/scats-tracks-and-traces/>
 - <https://www.australianenvironmentaleducation.com.au/noises-in-the-night/>

Habitat Audit

- Create a species list of the animals found in your local area
 - Use the species identified from the sounds, scats, tracks and traces as a starting point.
 - What habitat areas would they prefer to live?
- Install additional habitat features like an insect hotel, next boxes and frog ponds.

Design a wildlife habitat

- Have a Wildlife Habitat design competition at the school
 - Award a prize to the winner of each year
 - Investigate ways that the winning designs can implemented at the school





Monitoring and care

- Create a graph of your rainfall and temperature data
- Calculate how much carbon has been stored in your trees
 - [Tree Carbon Calculator - Rumbalara EEC](#)
- Make Natural pesticides with Gardening Australia
 - <https://www.abc.net.au/gardening/how-to/home-made-remedies/9430018>

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Greening Australia is delivering the Cooling the Schools program by planting 36,000 native trees and plants in schools across Greater Sydney, creating more inviting spaces for learning and play. The project is proudly funded by the NSW Government as part of the Greening our City program.

