

# BOTANY BASICS

The many types of plants



## Unit Overview

Students will explore the basics of botany through hands-on activities and immersion in the natural world, viewing plants from the perspectives of visual artists, botanists and scientists. Learning about the biodiversity of their local area through the examination, identification and classification of the plants that grow there, students will develop a greater understanding and awareness of the world around them.



# Contents

This pack contains:

- two pre-incursion lessons
- two post-incursion lessons
- post-unit recommendations
- student and teacher resources.

The facilitated incursion can be arranged through Nursery and Garden Industry Victoria.

| Lesson | Title                                                     | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <b>The World of Plants – Similarities and Differences</b> | Classifying plants into groups based on observable characteristics, features, or properties that they have in common helps us organise this vast biodiversity. Students survey the school site, identify plants by group and develop awareness of plants in the local area.                                                                                                                                                                                                               |
| 2      | <b>Botanical Drawing – The Basics</b>                     | Examining plant features in botanical illustrations provides a snapshot of life as a botanical illustrator, inspiring individual creativity in botanical drawing. Students take time to examine, draw and label plant specimen parts.                                                                                                                                                                                                                                                     |
| 3      | <b>Incursion – Where on Earth Do You Live?</b>            | Take a step back and think about where we live: the traditional custodians, the land and water, the biodiversity, the history and the future. Students explore aspects of their local natural spaces, learning how to read the landscape and appreciate the role of plants in the ecosystem. They will get up close with plants, identifying growing features and adaptations, as well as choosing one to inspire their own botanical drawing.                                            |
| 4      | <b>Extreme Conditions, Extreme Plants</b>                 | We all know that plant adaptations are amazing; this lesson takes adaptation to the extreme. How do plants live in harsh places where humans find it inhospitable? Students investigate the adaptations that allow plants to survive in extreme environments. They examine extreme conditions and determine extreme ecoregions where plants respond with ingenious adaptations. This exploration inspires a design challenge and informs discussion about plant adaption into the future. |
| 5      | <b>Citizen Scientists – ClimateWatch</b>                  | Students get outdoors to refine their skills in plant identification using the extensive resources available in the ClimateWatch app. They learn about Citizen Science opportunities and how their understanding of local plants can contribute to understanding the bigger picture of biodiversity, as well as how plants, animals and fungi are responding to climate change.                                                                                                           |

# Curriculum Links

## Cross curriculum priorities – Sustainability

| Systems                                                                                                                                                                         | Futures                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>The biosphere is a dynamic system providing conditions that sustain life on Earth.</li> </ul>                                            | <ul style="list-style-type: none"> <li>Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.</li> </ul> |
| <ul style="list-style-type: none"> <li>All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.</li> </ul> |                                                                                                                                                                                                    |

## Content Descriptions

| Biological Science                                                                                                                                       | Science Skills                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| There are differences within and between groups of organisms; classification helps organise this diversity (VCSSU091).                                   | Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (VCSIS108).                                                        |
| Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093).                  | Construct and use a range of representations including graphs, keys and models to record and summarise data from students' own investigations and secondary sources, and to represent and analyse patterns and relationships (VCSIS110).      |
| Visual Arts                                                                                                                                              | Geography                                                                                                                                                                                                                                     |
| Explore visual arts practices as inspiration to explore and develop themes, concepts or ideas in artworks (VCAVAE033).                                   | Spiritual, cultural and aesthetic value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander peoples, that influence the significance of places, and ways of protecting significant landscapes (VCGGKI20). |
| Explore how artists use materials, techniques, technologies and processes to realise their intentions in artworks (VCAVAE034).                           |                                                                                                                                                                                                                                               |
| Experiment with materials, techniques, technologies and processes in a range of art forms to express ideas, concepts and themes in artworks (VCAVAV035). |                                                                                                                                                                                                                                               |

# Background Teacher Information

The teaching and learning opportunities in this unit require a basic understanding of botanical illustration and citizen science. The recommended resources provide information that cover all aspects required.

- ANBG TopDraw Drawing Aussie Flora Teaching Resource for botanical drawing
- ClimateWatch provides information about citizen science and using the app. More detailed information about the science components available at ClimateWatch in schools.

# Important Vocabulary

**Organism:** a living thing; includes plants, animals, fungi, algae, bacteria and other microbes

**Biodiversity:** the variety of life on earth

**Habitat:** the locality in which a plant or animal naturally grows or lives

**Biome:** a community of plants and animals living together in a certain kind of climate

**Ecoregion:** The eight Australian ecoregions contain geographically distinct groups of plants and animals that have evolved in relative isolation, separated by features such as oceans or high mountain ranges

**Common Plant Name:** what most people generally call the plant

**Scientific Plant Name:** a more specific and unique plant name; made of two words; the first word is the plant's genus, the second is the species

**Genus:** a large group of different but closely related organisms. A genus contains more organisms than a species

**Species:** the most detailed form of classification of living things; a group of organisms capable of interbreeding and producing fertile offspring

**Biological classification/Scientific classification/taxonomy:** classification is the process of arranging organisms, both living and extinct, into groups based on similar characteristics

**Adaptation:** characteristics of living things that help them survive in their environment

**Botanical illustration:** This is a form of art where the artist draws a plant exactly as it looks. Botanical drawing combines art and science in a useful and beautiful way

**Climate change:** describes a change in the typical weather for a region – such as high and low temperatures and amount of rainfall – over a long period of time

**Citizen science:** when 'ordinary' people do experiments or research to help scientists learn more about the world around us and solve real world problems.

## How to use these resources

The *Branch Out* units of learning have been developed in such a way as to allow for adaptation, differentiation and improvisation. Lessons can be modified to suit the needs of your school and your students, and where desired, teachers are encouraged to 'branch out' and follow their own curiosity and that of the students in their classrooms. It is also encouraged that where possible, teachers adapt or supplement lessons with resources that reflect their community and surrounding area.

Each lesson is structured with an introduction, key learning experiences and a summary. This structure can be modified and adapted to suit different instructional models and lesson durations.

Assessment can be developed at the discretion of the teacher or teaching team. There are many opportunities for rich and meaningful assessment throughout these lessons that has the potential to be formal or informal, formative or summative, and differentiated depending on the assessment and reporting requirements of the schools, student needs and the specific goals of teachers or teaching teams.

# 1 THE WORLD OF PLANTS

## – SIMILARITIES AND DIFFERENCES

### Lesson purpose:

To understand that there are differences within and between groups of organisms and classification helps organise this diversity.

### Required prior knowledge for teachers:

Teachers should have a basic knowledge of how organisms are grouped based on similarities and differences. This can be common names, such as tree, shrubs, grasses, annuals etc. or scientific hierarchical, such as kingdom, family, genus etc.

### Learning objectives:

Students will:

- group a variety of organisms based on similarities and differences in particular features
- recognise hierarchical and common classification systems
- use keys to identify organisms surveyed in a local habitat.

### Success criteria:

By the end of the lesson, students can:

- identify and classify living things
- explain how living organisms can be classified into major groups based on observable similarities and differences.

### Key vocabulary:

- **Organism:** a living thing; includes plants, animals, fungi, algae, bacteria and other microbes
- **Biological classification/Scientific classification/taxonomy:** classification is the process of arranging organisms, both living and extinct, into groups based on similar characteristics.

### Materials:

- Major Plant Groups Teaching Resource
- a map of school site for each student and one larger map for the class (A3 size is preferable)
- device to take photos.

### Resources:

**Britannica Kids:** This website has clear information with images and videos for both teachers and students.

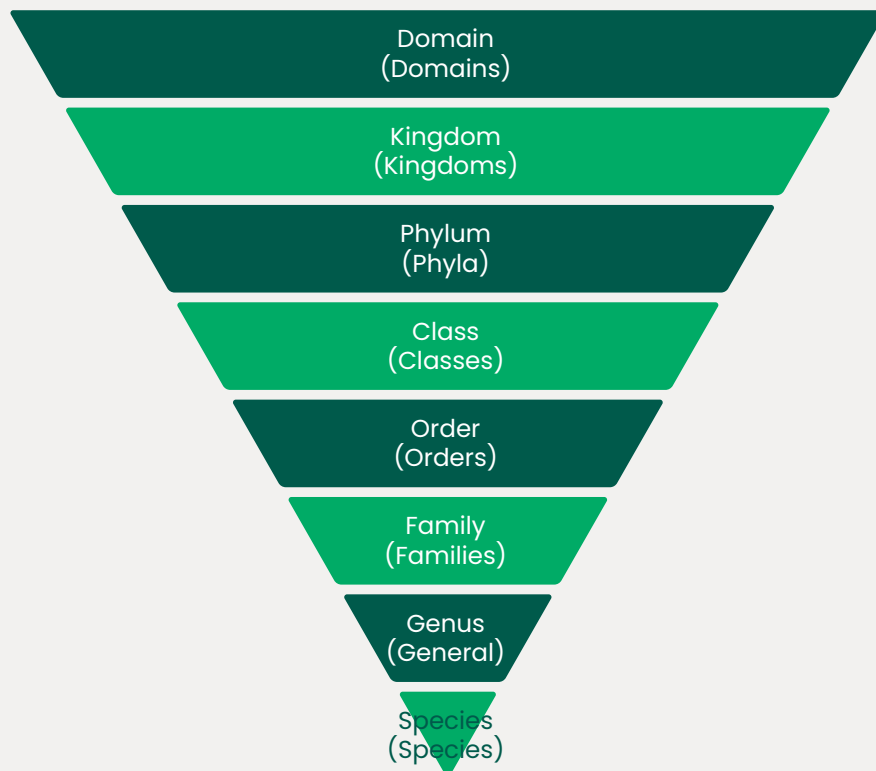
**Optional extension activity:** To explore the world of Australian Plant Families, this resource from the Australian Botanic Gardens has information and activities.

# LESSON STEPS

## Introduction

1. Explain that in biology, organisms are organised into groups based on similar characteristics. There are scientific hierarchical classification systems and a range of different common groupings that are used.
2. View and discuss the scientific hierarchical classification. Ask students why this more complex system would be needed and who might use it.

### How animals are classified



3. Explain that organising plants by their size and the nature of their stem is going to be a useful way for students to begin classifying plants. The major groups they will be categorising plants into are: trees, shrubs, herbs and vegetables, climbers and creepers, grasses and groundcovers. Explain that within these groups, some plants are also classified as annuals and perennials. Other plant groups include bulbs, corms and tubers, cacti and succulents, ferns, palms and cycads, orchids.
4. Ask students whether they believe fungi is a plant. Encourage them to justify their responses.
5. Share the **Major Plant Groups Teaching Resource** and discuss student responses. Ask students what characteristics a gum tree, a lemon tree and an almond tree might share that explains why they are classified in the same group. Choose two other major plant groups and discuss their similarities and differences. Ask students to discuss why they are organised into these groups.

## Main body

1. Explain to students that they are going to explore the school grounds to survey the different types of plants that are growing onsite or nearby. They will work in small groups to survey the school grounds for examples of plants in each of the common groupings. They will create symbols for each plant group and add a legend/key to their group's copy of the school site map.
2. Draw student's attention to their school map and discuss the task. Ask students to suggest some places on the map where different types of plants are likely to be found. Share ideas for symbols to represent trees, shrubs, herbs and vegetables, climbers and creepers, grasses and groundcovers. Students can create the key/legend for their own plant site maps.
3. Allocate either defined areas for different student groups or general access for all students to the whole site. Confirm time frame for outdoor activity and prepare devices to take photos. Explain that students will need to work with their group to collect photos of different types of plants and use their legend/key to mark their location on their group copy of the school map. Accompany students outside to complete the survey.

## Reflection and closure

1. As a class, discuss student group findings. Ask questions, such as:
  - Was it easy or difficult to find the different plant samples?
  - Were you surprised by anything that you found?
  - Were the plants you found growing close together or apart?
  - Were there areas where there were lots of different plants together, such as trees, shrubs and grass?
  - Did you notice any wildlife, such as birds, insects, frogs, etc.? What species?
  - Why are there different plants around the school?

# 2 BOTANICAL DRAWING

## – THE BASICS

### Lesson purpose:

To examine the creative and scientific practice of botanical drawing and examine plant parts.

### Required prior knowledge for students:

Students will require a basic knowledge of plant anatomy.

### Required prior knowledge for teachers:

Basic knowledge of drawing techniques and natural forms. Refer to ANBG *TopDraw Drawing Aussie Flora* Teaching Resource.

### Learning objectives:

Students will:

- explore visual arts practices as inspiration to explore and develop ideas in artworks
- explore how artists use materials, techniques, and processes in creating botanical illustrations
- experiment with techniques when creating botanical drawings
- examine plant parts in detail.

### Success criteria:

By the end of the lesson, students can:

- observe how artists select and apply different visual arts techniques to express concepts and ideas
- select information about botanical artists and artworks as inspiration for their artworks
- create botanical drawings
- recognise detail of plant parts.

### Key vocabulary:

- **Botanical illustration:** This is a form of art where the artist attempts to draw a plant exactly as it looks. Botanical drawing combines art and science in a useful and beautiful way.

### Materials:

- a sharpened 'B' pencil or a fine, felt tip pen
- A4 cartridge paper or copy paper
- a botanical specimen – collect from school grounds, a garden or nursery rather than from the bush. Try to gather a selection of different flowers and leaves. Simple flowers are ideal, especially lilies and daisies for flower dissection.

### Optional materials:

- a magnifying hand lens
- a craft knife.

These materials will allow students to view specimens in greater detail.

### Resources:

*TopDraw: Drawing Aussie Flora* Teaching Resource

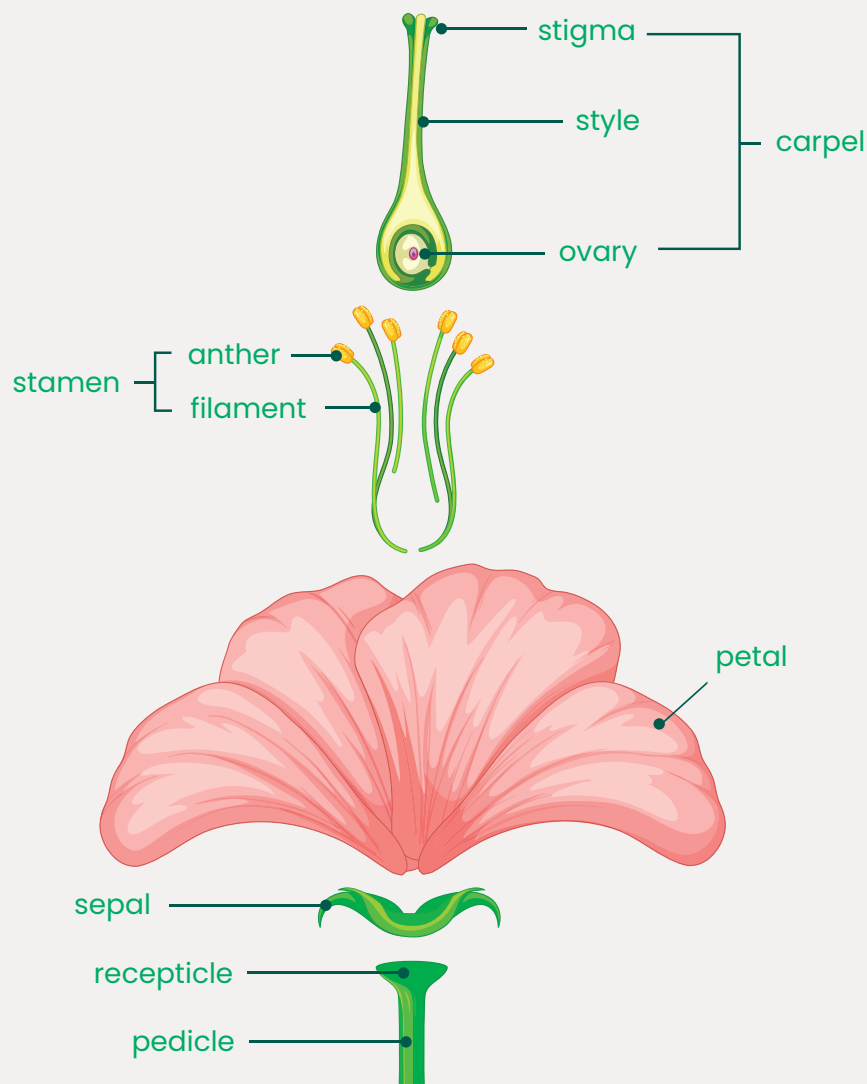
Catherine Wardrop Botanical illustrator (5:17)

Flowering Plants by Exploring Nature – Teaching Resource

## LESSON STEPS

### Introduction

1. Display a range of botanical images from the **TopDraw Teaching Resource** to prompt introductory discussion.



2. Explain to students that Catherine Wardrop is a botanical illustrator who works at the Royal Sydney Botanic gardens. View the video 'MBT – Botanical Illustrator' on YouTube.
3. After viewing, ask students questions, such as:
  - What do you think it would be like to be a botanical illustrator?
  - What would you enjoy about it?
  - What would be challenging?

## Main body

1. Prepare necessary materials. Refer to **Top Draw: Drawing Aussie Flora Teaching Resource** as a guide. Explain to students that they are going to be creating their own botanical illustrations.
2. Explain that when observing a specimen it is important to take time to observe the flower. Explain that when observing, students can carefully pull their specimen apart to notice each part. Encourage them to keep these parts as they will draw them separately before drawing a whole specimen. They can swap and share to have access to different forms. See 'Observing a Plant Specimen' on Page 3 of *Top Draw: Drawing Aussie Flora* for more information.
3. Choose an appropriate space that will enable students to become comfortable outdoors, away from distractions and with consideration of the natural elements of sun, shade, wind etc.
4. Ask student to find some leaves that show some differences. Encourage them to draw them, looking carefully to see how many differences you can find. See 'Plant Parts: Leaves' on Page 3 of *Top Draw: Drawing Aussie Flora* for more information.
5. Ask students to collect some flowers and examine the different parts, firstly with the flower as a whole and then cut in half. Ask students to draw and label the flowers. For more information refer to the **Flowering Plants Teaching Resource** and 'Draw a flower' on Page 9 of *Top Draw: Drawing Aussie Flora*.
6. Prompt confident students to develop skills further with techniques of stippling and shading.

## Reflection and closure

1. Encourage students to share their drawings, their experiences with the plants and ideas about botanical drawing.
2. Ask questions, such as:
  - What did you notice about the plants you drew?
  - Were any details surprising?
  - What are you wondering?

# 3 WHERE ON EARTH DO YOU LIVE?

## – INCURSION

### Lesson purpose:

- To classify plants into groups and investigate the biodiversity of a local area
- To refine the creative and scientific practice of botanical drawing and draw a whole specimen
- To develop awareness of reading a landscape.

### Required prior knowledge for students:

Student will require:

- experience of basic botanical drawing
- understanding of major plant groups
- understanding of plant growth needs and adaptation
- some knowledge of local plants collected during student surveys.

### Required prior knowledge for teachers:

- *Top Draw: Drawing Aussie Flora* Teaching Resource for botanical drawing.
- *Reading the Land* by David Holmgren for teacher knowledge – video explaining how and why to read the landscape (start at 8:26)
- *Aboriginal Science Day – Reading and Living in the Landscape* video for teacher and student knowledge (7:21).

### Learning objectives:

Students will:

- identify plants and plant groups
- conduct a biodiversity investigation
- experience aspects of reading a landscape
- explore visual arts practices and the natural world as inspiration to develop ideas in botanical artworks
- experiment with and refine techniques when creating botanical drawings.

### Success criteria:

By the end of the lesson, students can:

- identify and classify plants and plant groups
- conduct a biodiversity audit
- propose actions to use plants to improve the school landscape and increase biodiversity
- create botanical drawings
- identify aspects of reading a landscape.

### Key vocabulary:

- **Adaptation:** characteristics of living things that help them survive in their environment
- **Biodiversity:** the variety of life on earth
- **Climate change:** describes a change in the typical weather for a region – such as high and low temperatures and amount of rainfall – over a long period of time.

### Materials:

*For botanical drawing – school to provide:*

- fine felt-tip pens
- A4 clipboards
- A4 paper.

*For biodiversity audit – Facilitator to provide:*

- biodiversity audit sheets, either electronic or paper
- student-created Plant Site Map (school to provide – optional)
- pen
- clipboard.

# 4 EXTREME CONDITIONS, EXTREME PLANTS

## Lesson purpose:

To investigate the adaptations that enable plants to survive in extreme environments.

## Required prior knowledge for students:

Students will need to know that plants have features and adaptations that help them survive in their environment.

## Required prior knowledge for teachers:

There are 14 ecoregions found across the globe. Ecoregions contain geographically distinct groups of plants and animals that have evolved in relative isolation, separated by features such as oceans or high mountain ranges.

This classification system was developed by the conservation organisation, WWF, as a more comprehensive conservation tool than simply looking at ecosystem types, or biomes, based on climate and vegetation. Each ecoregion contains several biomes and biomes may transcend ecoregion borders.

## Learning objectives:

Students will:

- explore and define extreme conditions and extreme plant adaptations
- examine Australian climatic conditions and ecoregion characteristics
- investigate extreme conditions and associated plant adaptations.

## Success criteria:

By the end of the lesson, students can:

- explain how particular adaptations aid survival in extreme environments
- describe plant adaptations suited for particular Australian environments
- design a plant adaptation.

## Key vocabulary:

- **Adaptation:** characteristics of living things that help them survive in their environment
- **Ecoregion:** The eight Australian ecoregions contain geographically distinct groups of plants and animals that have evolved in relative isolation, separated by features such as oceans or high mountain ranges.

## Materials:

- access to devices for research
- 'Extreme Conditions, Extreme Plants' worksheet

## Optional materials:

- drawing materials for botanical illustration

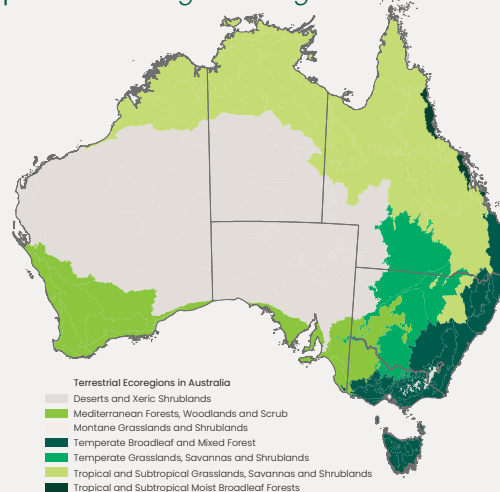
## Resources:

Extreme Plants: From Plant to Planet with Nellie Nilsen | BBC Earth

Climatic Extremes | Geoscience Australia Teaching Resource

Australia's ecoregions – DCCEEW Teaching Resource  
Extreme Conditions, Extreme Plants Investigation – Student Worksheet

### Map: Australia's eight ecoregions



Source: Department of Climate Change, Energy, the Environment and Water. 2022.  
<https://www.dcceew.gov.au/environment/land/nrs/science/ibra/australias-ecoregions>

Information about Australia's climatic extremes can be found here:  
<https://www.ga.gov.au/scientific-topics/national-location-information/dimensions/climatic-extremes>

## LESSON STEPS

### Introduction

1. Explain that plants adapt to survive in their environments, and some plants can survive and thrive in extreme environments.
2. Brainstorm as a class: what is a harsh or extreme environment? Ask students to share their initial ideas and write them on the board. Explain that most definitions explain it as an environment that is considered very hard to survive in due to its considerably extreme conditions such as temperature, rainfall, accessibility to different energy sources or under high pressure. Discuss and share examples of these extreme conditions.
3. Ask students to consider plantlife in these environments. Ask questions, such as:
  - What kinds of plants could live in these extreme conditions?
  - What extreme conditions do they face?
  - What adaptations could they make to survive?
4. View 'Extreme Plants: From Plant to Planet' video to show adaptation examples; from growing fire-resistant bark to mimicking the smells of dung through environments such as arid deserts, freezing tundras and towering forests.
5. Discuss the adaptations seen in the videos with the class. Encourage them to discuss those which they found particularly interesting or ingenious.

## Main body

1. Ask the class where there might be extreme environments in Australia. Explore the following conditions and collate responses in a mind map.
  - **Temperature and rainfall:** Explore and discuss temperature and rainfall conditions and determine if these are indicators of extreme environments in Australia. View Geoscience Climatic Extremes for information and maps.
    - o **Temperature:** Australia is a land of extremes with temperatures ranging from highs of 40°C in the central desert regions to below freezing in the higher regions of the country's southeast. Sometimes these extremes can be experienced on a single day.
    - o **Rainfall:** Rainfall in Australia is highly variable with low average annual rainfall over most of the continent, intense seasonal falls in the tropics and an arid centre. The effects of this widely varied rainfall pattern and Australia's drainage system can lead to parts of the continent being in drought but inundated by waters from rainfall thousands of kilometres away.
    - o **Other weather events:** consider the impact of additional conditions caused by wildfire, droughts, floods and heatwaves.
  - **Ecoregions:** Ecoregions contain geographically distinct groups of plants and animals that have evolved in relative isolation to survive in different environments. View Australia's ecoregions map to show the vegetation, climatic conditions and other characteristics of each ecoregion. Include the marine environment in the discussion, as an area with extreme conditions being under high pressure.
    - o Discuss and determine which Australian ecoregions have conditions to be extreme environments. Add information to mind map for student reference.
2. Provide '**Extreme Conditions, Extreme Plants Investigation**' Worksheet to guide student investigation and allow device access for research. Students will investigate the adaptations that allow plants to survive in extreme environments.
  - **Task 1:** Students explore an extreme Australian environment and choose an ingenious plant adaptation to research further. Using this research and the student worksheet, students create an 'Extreme Plant Profile'.
  - **Task 2:** Students design an 'Extreme Plant' with adaptations to thrive in extreme conditions of their choice using the student worksheet.

## Reflection and closure

1. Students share their Extreme Conditions, Extreme Plant designs in small groups.
2. Reflect on commonalities and differences of plant adaptations in relation to the extreme conditions they face in different ecoregions. Ask questions, such as:
  - What extreme plant adaptations would be most beneficial as climate conditions change into the future?

# 5 CITIZEN SCIENCE

## – CLIMATEWATCH

### Lesson purpose:

To extend knowledge and understanding of plants on site by surveying plants in the local area and sharing data with the wider community through a national database.

### Required prior knowledge for students:

Students will require:

- some knowledge of plants in the local area gained from initial survey, biodiversity audit and botanical observations
- basic understanding of climate change.

### Learning objectives:

Students will:

- explore species lists, survey and identify organisms in a local habitat,
- explore differences within and between groups of organisms to classify,
- contribute to building the wider community understanding of climate change,
- collaboratively and individually plan, conduct and record data on a fieldwork investigation,
- describe situations where scientific knowledge has been used to solve a real-world problem.

### Success criteria:

By the end of the lesson, students can:

- explain how living organisms can be classified based on observable similarities and differences
- identify and classify living things in groups
- create local species lists and record data from fieldwork
- understand the purpose of citizen science
- understand aspects of climate change.

### Key vocabulary:

- **Biodiversity:** the variety of life on earth
- **Climate change:** describes a change in the typical weather for a region – such as high and low temperatures and amount of rainfall – over a long period of time
- **Citizen science:** when ‘ordinary’ people do experiments or research to help scientists learn more about the world around us and solve real world problems.
- **Species:** the most detailed form of classification of living things; a group of organisms capable of interbreeding and producing fertile offspring

### Materials:

- device with access to ClimateWatch
- students’ own Plant Site Map from previous sessions
- recording sheets for survey.

### Background teacher knowledge:

ClimateWatch general information.

The students will require access to the ClimateWatch app for this lesson. Refer to ManagingClimateWatchClass for clear information to set up your class.

Detailed scientific information available in this Climate Watch Module 1: Introducing the Science.

**Resources:**

BTN Citizen Scientist Kids (3:32) Teaching Resource.

ClimateWatch home teaching and learning resource

Guide to Climate Change Student Resource

Introducing the Science resource for teaching and learning – to clarify science concepts.

ClimateWatch introduction clip (2:27)

How to ClimateWatch Teaching and Learning  
information sheet

Identifying a Species – Basics Teaching resource

Identifying a Species in greater depth. Section 3.3 –  
Identifying a Plant.

Creating and Managing Classes ClimateWatch  
Teaching resource

Recording Sheet for Plants Student worksheet

Citizen Scientist programs – Student Resource from  
Environmental Education Victoria (EEV)

## LESSON STEPS

### Introduction

1. Engage the whole group in a brief brainstorm to activate prior knowledge about citizen science and related science topics. Ask students whether they have heard the term 'citizen science' before and ask them for either a definition or to guess what it might mean.

**Optional:** Watch 'BTN Citizen Science Kids' for a brief look at citizen science in action. Discuss and clarify scientific concepts. Provide students access to **A Guide to Climate Change for Kids Teaching Resource**, which responds to common questions about climate change in clear language.

### Main body

1. Introduce students to the ClimateWatch app by viewing the ClimateWatch introduction clip together. Ask students questions, such as:
  - What do you now know about being a citizen scientist?
  - What do you still want to know?
  - Why might the ClimateWatch app be useful for us?
2. Students will use their knowledge of the plant species on their school site to make sighting submissions and contribute to the bigger picture of biodiversity in the local area. Share the 'How to ClimateWatch' and 'Identifying a Species' resources with students to ensure that they are well prepared.
3. Ensure that all students are able to access the ClimateWatch app. Model the process of identifying a species from the specified list. Discuss any questions to ensure students are comfortable and confident before they go outside to begin.
4. Allocate student groups, outdoor sites and adequate time frame. Previously found plants might be a familiar place to start. Students will use the Recording Sheet for Plants to take notes to go with their photo. It is recommended that students submit their species online when they are finished searching outdoors and are back with the whole group in class.
5. Encourage students to decide on their best photo and upload image. Upload data from the fields in the recording form and submit.

**Extension recommendation:** extend species list to include other species, such as birds or insects.

## Reflection and closure

1. Invite students to gather in a discussion circle. Share experiences of their experience with surveying plants and submitting records into the ClimateWatch app. Ask questions, such as:
  - Which of the species that you found were new to you?
  - Which ones had you seen before?
  - Given what you already know and with the information provided on the app, how do you think the species you identified might be affected by climate change and why?
  - What have you have learned about your local environment?
  - What are you still wondering?

**Extension activity option:** refer to the Citizen Scientist information sheet from Environment Education Victoria (EEV) for other programs that students may be interested in participating in.

### Excursion recommendations

|                                                                                                                                                                      |                                                                                                                            |                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Local Botanic Gardens and National Parks offer engaging excursion opportunities.                                                                                     | Visit your local plant nursery for ideas to increase the biodiversity at your school.                                      | Visit local art galleries to see local artworks, especially those inspired by the environment. |
| ClimateWatch have an extensive list of trail sites on their website, across Victoria that offer opportunities for citizen science, bush walks and botanical drawing. | Contact your local Landcare group for more ideas about places to go for bush walks, citizen science and botanical drawing. | Invite local botanists or agricultural professionals to speak to students at school.           |

# MAJOR PLANT GROUPS

## We classify plants by:

- **Body** – size, height and general shape or type of bark
- **Nature of stem** – size, colour, strength
- **Branch placement** – at base or higher up
- **Fruit or seed** – size, shape
- **Flowers** – colour, size, structure.
- **Leaf type** – shape and arrangement on stem
- **Habitat**

There are five main groups of plants – trees, shrubs, herbs and vegetables, climbers and creepers, grasses and groundcovers.



# MAJOR PLANT GROUPS

## We classify plants by:

### Trees

Trees are vital to life on Earth. They provide oxygen and shade, store carbon, stabilise the soil and give food and shelter to many animals and insects. Trees provide nuts and fruit.

**Size:** Trees are the tallest plants and are at least 4 m and over when mature.

**Stems:** Single woody main stem/trunk with no or few branches on the lower section.

### Shrubs

Shrubs are usually classified as deciduous or evergreen. They provide food and shelter to a range of different animals and insects.

**Size:** Medium, usually 1–6m

**Stems:** Several stems, usually woody stems

### Herbs and Vegetables

Vegetables are parts of plants that provide food eaten by humans. This includes leaves, stems, flowers, fruits, roots and seeds. Herbs are plants used for flavouring, food, medicine, or perfume.

**Size:** Small, less than 1m

**Stems:** Non-woody, in a range of forms

### Climbers and Creepers

Climbers grow up or along a support, and include plants such as peas. Creepers grow horizontally along the ground, such as pumpkin vines, and some are classified as groundcovers.

**Size:** Low

**Stems:** Weak

### Grasses and Groundcovers

Groundcover plants are low growing and cover the ground in a range of ways, such as lots of clumps, spreading with underground rhizomes, creepers or prostrate shrubs. Grasses can be cultivated in lawns, grown in paddocks as stock feed, or native ground covers.

**Size:** Low

**Stems:** Grass has no stems



# MAJOR PLANT GROUPS

Within these major plant groups, plants may also be classified as:

## Annuals

A plant that completes its life cycle in one season: germination, growing to maturity and production of seeds. Many vegetables and some herbs are annuals.



## Perennials

A plant that lives for more than two years.



## Natives

A native plant is originally from Australia.



## Indigenous

An Indigenous plant is originally from the local area within Australia.



## Exotics

An exotic plant has been introduced from another country.



## Deciduous

Plants that lose their leaves at the end of their growing season.

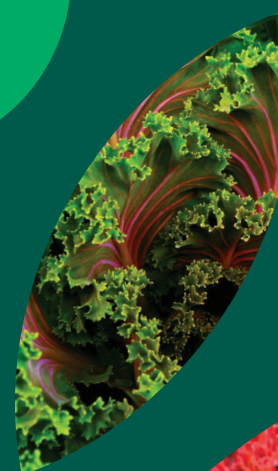


## Evergreen

Plants that have leaves that remain functioning for more than one growing season.

# BOTANY BASICS

Student Resource



# 4 EXTREME CONDITIONS, EXTREME PLANTS

Investigate the adaptations that allow plants to survive in extreme environments.

## Extreme plant profile EXAMPLE

### Activity:

Choose an extreme environment to investigate.  
Find a plant adaptation that interests you to investigate further.  
Record your findings.

### Access resources:

Australia's ecoregions – DCCEEW  
Climatic Extremes | Geoscience Australia

### Plant name

Banksia

### Main plant group/s

Trees and shrubs

### Plant anatomy

Draw and label the flower and plant parts.

### Adaptative features

Hard, woody seed pods that open after a fire to release seeds.

### Explain how the adaptations enable the plant to survive

The fruits are hard, woody seed pods that protect the seeds from the fire. They open soon after the fire to release the Banksia seeds to germinate into the ash-rich, post-fire environment. The fire helps clear space for them to grow without having to compete with bigger plants for sunlight and water.

### Extreme Conditions

Fire

### In which Australian ecoregion/s do you think this plant would grow?

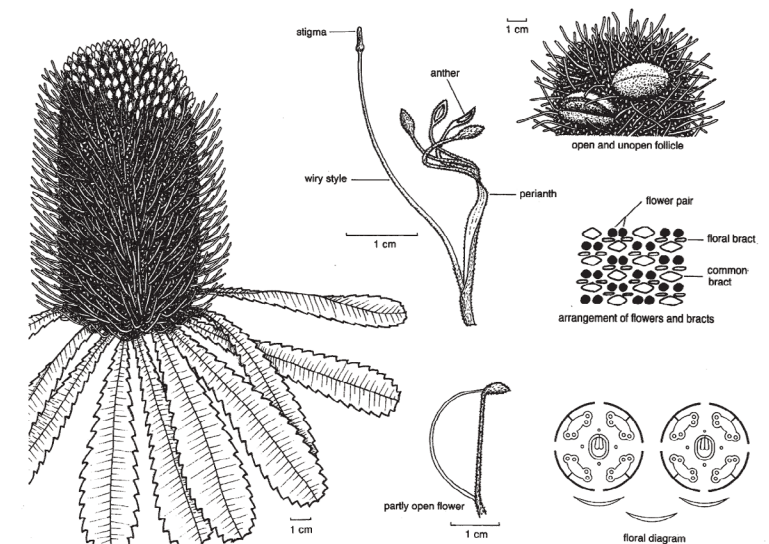
Temperate broadleaf and mixed forests.  
Mediterranean forests, woodlands and scrub.

### Give reasons why you think the plant is well suited to this ecoregion.

Most banksia species are found on the west and east coasts, some along the north coast. They don't grow well in harsh arid areas or wet/humid rainforests. Their fire adaption suggests they would grow where they are more likely be exposed to bushfire.

### Explain why you chose this extreme plant.

The banksia adaptation to fire is ingenious! I think the design of the seed pod and the whole process of protecting the seed from the impacts of bushfire, as well as foraging animals, through to releasing it at the best time and in the best conditions to grow is really interesting.



*Banksia serrata*  
Artist: © Murray Fagg

# 4 EXTREME CONDITIONS, EXTREME PLANTS

Investigate the adaptations that allow plants to survive in extreme environments.

| Extreme Plant Profile                                                  |                    |                                            |
|------------------------------------------------------------------------|--------------------|--------------------------------------------|
| Plant name                                                             | Main plant group/s | Plant anatomy                              |
|                                                                        |                    | Draw and label the flower and plant parts. |
| Adaptative features                                                    |                    |                                            |
|                                                                        |                    |                                            |
| Explain how the adaptions enable the plant to survive                  |                    |                                            |
|                                                                        |                    |                                            |
| Describe the extreme conditions                                        |                    |                                            |
|                                                                        |                    |                                            |
| In which Australian ecoregion/s do you think this plant would grow?    |                    |                                            |
|                                                                        |                    |                                            |
| Give reasons why you think the plant is well suited to this ecoregion. |                    |                                            |
|                                                                        |                    |                                            |
| Explain why you chose this extreme plant.                              |                    |                                            |
|                                                                        |                    |                                            |

# 4 EXTREME CONDITIONS, EXTREME PLANTS

## Design challenge

Design an **Extreme Plant** with adaptations to thrive in extreme conditions of your choice.

**Plant name**

**Main plant group/s**

**Plant anatomy**

Draw and label the flower and plant parts.

**Adaptative features**

**Explain how the adaptations enable the plant to survive**

**Describe the extreme conditions**

**In which Australian ecoregion/s do you think this plant would thrive?**

**Useful websites:**

Plant adaptation Royal Botanic Gardens Sydney – Epic Survivor plant adaptations

Australian Ecoregions info and map can be found at Australia's ecoregions – DCCCEW

Biome/environment information: What's it like where you live? MBGnet

Climatic Extremes information and maps from Geoscience Climatic Extremes | Geoscience Australia

BBC Earth – Extreme Plants: [https://youtu.be/7-\\_C1WaCnno](https://youtu.be/7-_C1WaCnno)



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