Australian National Botanic Gardens

Lesson Plan

Module 1

Plant Life Cycles

We acknowledge the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging.

Plant Science Learning Hub

Students need a space to learn that is fun and rewarding. The Australian National Botanic Gardens has developed a Plant Science Learning Hub that aims to inspire and engage students in plant science and the stories surrounding Australian flora. With clear links to the Australian Curriculum for school years four to six, the Plant Science Learning Hub will provide a valuable resource for students and educators.

- **Plant Life Cycles**
- Plant Structure
- Pollination
- Seeds

This series provides educators with authoritative plant science content that has a uniquely Australian perspective. The Gardens manages globally significant scientific collections of living plants and herbarium specimens of Australian native flora. We provide educational experiences for students from pre-primary to tertiary levels, leveraging our scientific collections, participation in national and international conservation projects and outreach programs to engage the community in valuing, conserving, and appreciating Australia's diverse plant heritage.

Module learning objectives

The following learning objectives apply to the Plant Life Cycles Module.

1. Understand the life cycle of a flowering plant.
2. Investigate and describe the life cycle of one or more native Australian plants.
3. Identify the differences and similarities between the life cycles of flowering plants and animals.
4. Recognise and describe how environmental conditions or events can trigger seed germination and affect plant life cycles.

Each lesson within the lesson plans and the field kits has individual learning intentions appropriate to the activity.

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Lesson Two: Learning about the life cycle of flowering plants

LEARNING INTENTIONS

Students will be able to:

- Identify the life cycle stages of a flowering plant.
- Apply the life cycle stages to several specific Australian plants.
- Understand there are differences and similarities between the life cycles of flowering plants and animals.

CURRICULUM LINKS

This material provides opportunities for students to engage in the following Australian Curriculum content descriptions (Version 9.0):

Science understanding

AC9S3U01 compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (Year 3)

AC9S5U01 examine how particular structural features and behaviours of living things enable their survival in specific habitats (Year 5)

AC9S6U01 investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions (Year 6)

Science as a human endeavour

AC9S5H02 investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions (Year 5)

AC9S6H02 investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions (Year 6)

Science inquiry

AC9S3I01 pose questions to explore observed patterns and relationships and make predictions based on observations (Year 3)

AC9S3I03 follow procedures to make and record observations, including making formal measurements using familiar scaled instruments and using digital tools as appropriate (Year 3)

AC9S3I04 construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns (Year 3)

AC9S3I05 compare findings with those of others, consider if investigations were fair, identify questions for further investigation and draw conclusions (Year 3)

AC9S4I01 pose questions to explore observed patterns and relationships and make predictions based on observations (Year 4)

AC9S4I03 follow procedures to make and record observations, including making formal measurements using familiar scaled instruments and using digital tools as appropriate (Year 4)

AC9S4I04 construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns (Year 4)

AC9S4I05 compare findings with those of others, consider if investigations were fair, identify questions for further investigation and draw conclusions (Year 4)

AC9S5I01 pose investigable questions to identify patterns and test relationships and make reasoned predictions (Year 5)

AC9S5I04 construct and use appropriate representations, including tables, graphs and visual or physical models, to organise and process data and information and describe patterns, trends and relationships (Year 5)

AC9S5I05 compare methods and findings with those of others, recognise possible sources of error, pose questions for further investigation and select evidence to draw reasoned conclusions (Year 5)

AC9S6I01 pose investigable questions to identify patterns and test relationships and make reasoned predictions (Year 6)

AC9S6I04 construct and use appropriate representations, including tables, graphs and visual or physical models, to organise and process data and information and describe patterns, trends and relationships (Year 6)

AC9S6I05 compare methods and findings with those of others, recognise possible sources of error, pose questions for further investigation and select evidence to draw reasoned conclusions (Year 6)

CONTENT INFORMATION

What is a life cycle?

A life cycle is the series of stages all living organisms, including plants and animals, go through from the beginning of life until the end.

- The life cycle of seed-producing plants begins as a seed, which grows into a mature plant capable of producing seeds itself.
- Non-seed-producing plants like ferns develop from spores to a mature plant.
- The life cycle of most mammal species follows the stages of fertilisation, live birth, maturity and death.

Life cycles repeat again and again. One complete life cycle can range from days to centuries in length.

Similarities and differences between plant and animal life cycles

Plant and animal life cycles may look different, but they have many similarities. All life cycles begin with birth (or germination), have a period of growth and reproduction and end with death.

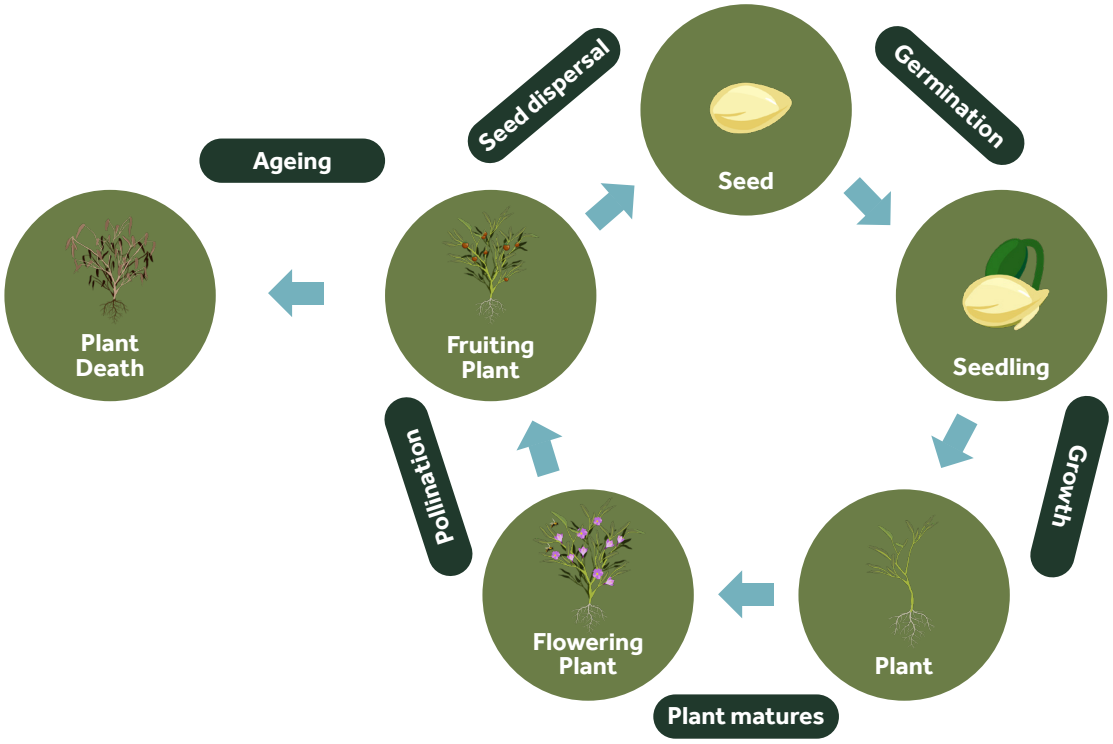
Animals begin life either as an egg or via a live birth. The juvenile animal then grows and matures into an adult. When they reach maturity animals mate and reproduce, requiring the combination of male and female genetic information to produce offspring.

Some animals go through periods of physical change called metamorphosis. For example, caterpillars make cocoons, pupate, and emerge as butterflies whereas tadpoles develop into frogs. Fish, reptiles, birds and mammals do not go through periods of metamorphosis.

While all types of plants and animals reproduce to create their offspring, there are a number of differences between the life cycles of plants and animals. For example, animals such as amphibians, birds and reptiles lay eggs, but plants and most mammals do not.

LIFE CYCLE STAGES AND PROCESSES OF A FLOWERING PLANT

The generalised life cycle of a flowering plant goes through the stages of **seed, seedling, plant, flowering plant** and **fruiting plant**. Eventually the plant will age and the life cycle will end in the stage of **plant death**, but this may not happen until it has completed the fruiting plant stage many times.



1. Seed

A plant's life begins as a **seed**. Once dispersed, seeds of some species will germinate straight away, assuming that temperatures, light and water availability are good enough. Seeds of other species have additional requirements and have evolved ways to postpone germination until they experience very specific conditions. They do this through dormancy mechanisms or very particular germination requirements (or both). For example, some seeds only germinate when they experience specific temperatures, light conditions, rain events or a bushfire - or sometimes a special combination of factors! Some seeds may wait years in the soil seed bank until conditions are just right for germination. Once the seed experiences dormancy alleviation, or receives the right cues for germination, the seed will take in water through its outer layer, the **seed coat,** which will expand and crack open. The **embryo** inside is made up of a shoot and a root that emerge from inside the seed and begin to grow.

2. Seedling

Once a seed has germinated it begins to grow into a **seedling**. Its roots grow down into the soil and its shoot grows upwards towards the sun, even if the seed is upside down in the soil. The shoot develops into a stem with either one or two 'leaves'. These first leaves are called **cotyledons** and are not considered 'true leaves'. Cotyledons provide the developing seedling with nutrients (that are stored in the leaf-like structures) until it grows true leaves that can produce food through **photosynthesis**.

3. Plant

Over days, weeks, months or years the seedling matures into a **plant**. Its roots, stems and branches grow thicker and stronger, allowing it to support the growing plant and structures such as leaves and flowers.

Mature plants make their own food through **photosynthesis**, using the green pigment **chlorophyll** in their leaves to combine energy from the sun, carbon dioxide and water to make sugar, while releasing oxygen as a by-product. The sugar produced in the leaves is called **glucose**, but the plant can convert this to other **carbohydrates** to store it, such as **fructose**, **sucrose**, **starch** or **cellulose**. The roots, seeds, stems and fruits can be storage sites for these carbohydrates, allowing the plant to produce sweet nectar in flowers, sweet flesh in their fruits and to have access to food when environmental conditions are tough.

4. Flowering plant

When the plant is ready to reproduce it produces **flowers**. The male parts of the flower are called the **stamen**, comprised of the filament and anther, and the female parts are called the **pistil**, comprised of the stigma, style, ovary and ovules. Some flowers have only male parts, some have only female parts, and some have both male and female parts together. For more information on flowers and plant structure check out the **Plant Structure Teachers' Notes**.

5. Fruiting plant

A flower can move from the flowering stage to the fruiting stage of its life cycle when it is pollinated. Pollination occurs when the pollen grain (a male reproductive material) that is produced in the anther moves to the stigma (female reproductive part). When this happens on the same plant it is called self-pollination. When pollen moves from one plant to another it is called cross-pollination.

Pollination can occur with help from animals (notably insects), wind or water. Native bees, flies, butterflies, moths, beetles, thrips, birds, possums, bats and even reptiles can act as pollinators, helping Australian plants to reproduce.

For more information on pollination check out the **Pollination Teachers' notes**.

Once pollen lands on the stigma of the flower **fertilisation** can occur. This process involves the male **gametes** (reproductive cells) from the pollen grain mixing with the female gametes (**ovules**) contained in the **ovary**. When the ovule has been fertilised it can develop into a **seed**.

The ovary wall then develops into a **fruit** that surrounds and protects the newly formed seed. Some fruits contain just one seed, such as *Macadamia integrifolia* and many *Syzygium* (lily pilly) species, but most fruits contain many seeds, such as *Eucalyptus* and *Banksia* species.

Fruits come in many colours, shapes and sizes! Some fruits are **fleshy** and sweet to attract animals to eat them and spread the seeds contained inside. Other fruits are tough, like *Macadamia* 'nuts',

and others are leathery or dry, like *Acacia* pods. Fruits can be woody, spiky, juicy, sticky, large or small, and their different properties allow them to protect and spread their seeds in different ways.

The seeds contained in the fruits need to be **dispersed** to allow the plant life cycle to start again. Seed dispersal can happen with help from animals, wind, water or gravity, and different fruits are adapted to different methods of dispersal.

5. Plant death

Life cycles can repeat again and again, however eventually the plant will age and die. Depending on the species of plant, plant death could occur after one or hundreds of seed-producing cycles.

INQUIRY QUESTIONS (ENGAGE)

Explain the learning intention for the lesson and introduce the topic to the students.

If you have not already shown the videos produced by the Australian National Botanic Gardens in a previous lesson, you could use one or both of these to engage students. The life cycle story starts in Video 1 at the National Seed Bank, which collects and provides long-term storage for the seeds of Australian plant species. We look at germination cues in the seed bank laboratory. Video 2 continues the life cycle story in the nursery where seedlings are grown into mature plants which then flower and bear fruit. The videos explore the life cycle stages of a plant through seed, seedling, plant, flowering plant and fruiting plant. The videos also discuss the processes that allow the life cycle to move between stages, these are germination, growth, maturation, pollination and seed dispersal. The videos are appropriate for use through any of the Plant Life Cycles Module and can be used to engage students at the beginning of a lesson, or to summarise key information and show some real-world applications at the end of a lesson.

These videos can be found in the plant life cycles resources section of the Plant Science Learning Hub.

Life Cycles Video 1 - Seed to seedling
Life Cycles Video 2 - Seedling to seed dispersal

Ask the students a series of questions such as:

What is a life cycle?

What do you know about life cycles?

What do you know about plant life cycles?

How do plants reproduce?

What work is done at botanic gardens to support plant life cycles?

STRATEGIES TO FACILITATE QUESTIONING AND DISCUSSION:

- Talk with a partner (turn and talk).
- Think, Pair, Share. (Project Zero Thinking Routine)
- KWL Chart to track what a student knows (K), wants to know (W) and has learned (L) about a topic, can be used before, during and after research projects.
- Write in journal and share with others.
- Individual student writing.
- Drawing.

Record students' answers and wonderings on the board or a flipchart.

[1] The Think, Pair Share thinking routine was developed by Project Zero, a research center at the Harvard Graduate School of Education. Project Zero adapted this routine from Frank Lyman: Lyman, F. T. (1981). The Responsive Classroom Discussion: The Inclusion of All Students. In A. Anderson (Ed.), Mainstreaming Digest (pp. 109-113). College Park: University of Maryland Press.

The See, Think, Wonder thinking routine was developed by Project Zero, a research center at the Harvard Graduate School of Education.

LESSON SEQUENCE (EXPLORE)

There are three activities in this lesson:

In Activity 1, students will See, Think and Wonder about plant life cycles (Project Zero Thinking Routine).

In Activity 2, students undertake an art activity to explore the life cycle of a flowering plant.

In Activity 3, students compare life cycles of plants and animals using the provided worksheets.

ACTIVITY 1 – LIFE CYCLES: SEE, THINK, WONDER (PROJECT ZERO THINKING ROUTINE)

In this activity, students will be introduced to the concept of plant life cycles. Students will be shown a series of images from the life cycle of a familiar Australian native plant. They will not be told what the connection between the pictures is but will complete an 'I see, I think, I wonder' thinking routine.

To do this, you will need:

- See, Think, Wonder Worksheet for each student (if using for an individual activity) with three boxes for 'I see', 'I think' and 'I wonder' (available in the Resources section of this document)
- A series of pictures that show a plant at different stages of its life cycle (these can be found as the Resources: Plant Life Cycles available in the Resources section of this document)
- Prepared Resource: Native Plant Life Cycles Worksheet cut into cards for ordering (available in the Resources section of this document)
- Student copies of Resource:Native Plant Life Cycles
- Student copies of Resource: Life Cycle Worksheet
- Life Cycle Poster (this graphic is also on the presentation)

The [1]See, Think, Wonder thinking routine was developed by Project Zero, a research center at the Harvard Graduate School of Education.

Instructions Part 1:

1. Explain to students how to participate in the See, Think, Wonder thinking routine.
    - In the 'see' section students explain what they can see in the pictures. They might describe each image and what it shows.
    - In the 'think' section students explain what they think these pictures are showing. In this section you might get responses such as 'I think this is a wattle', 'I think this shows a seed growing', 'I think this shows the same plant at different times in its life'.
    - In the 'I wonder' section students record anything that the pictures are making them wonder.
2. Show the students the life cycle stages image collection by displaying it on a smartboard or through printed pictures. The images are available in the PowerPoint presentation. Discuss with the class what they see and what they think these pictures are showing.

3. Students complete the 'I think, I See, I Wonder' Worksheet. This can be done individually or in groups.
4. After the worksheets have been completed bring students back into a group discussion. Allow students to share some of the things they think the pictures show and what they are wondering. Prompt class discussion with questions.
5. Worksheets can be pasted into their science journal.

Discussion Points:

What do these pictures show?

Can this concept be applied to other plants?

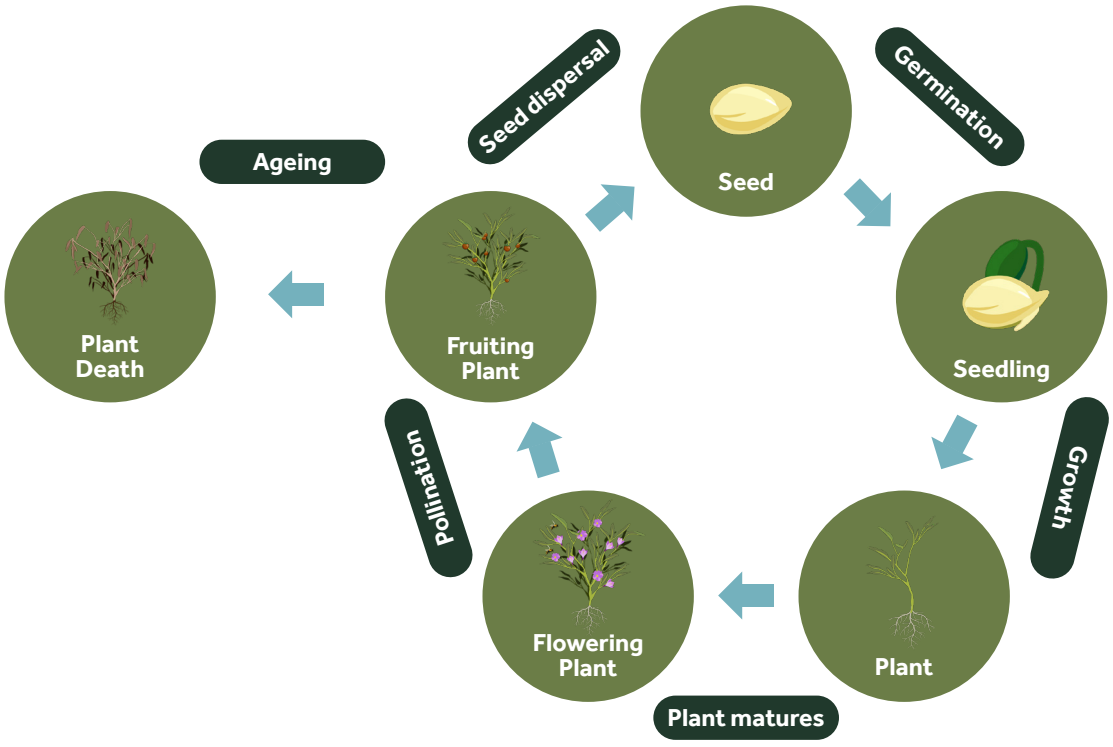
Can this be applied to animals?

Why is it important to know about life stages of a plant?

What are you wondering?

Instructions Part 2:

1. The students should have developed an awareness that the images are of plants at different stages of the life cycle. The worksheet: Native Plant Life Cycles, has two examples of the life cycle of an Australian native plant. Cut the images into separate cards and have the students work in groups. Allow students time to put the cards into the order they think is correct.
2. Show students the Life Cycle Poster and have them check the order of their cards against the poster and identify the stages.
3. Hand out the Native Plant Life Cycle worksheet. Students should label the worksheet and draw a plant at each life cycle stage.
4. Worksheets can be retained in each student's science journal.

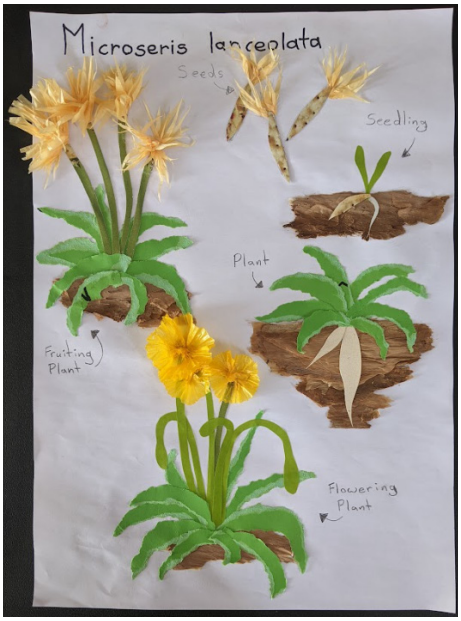


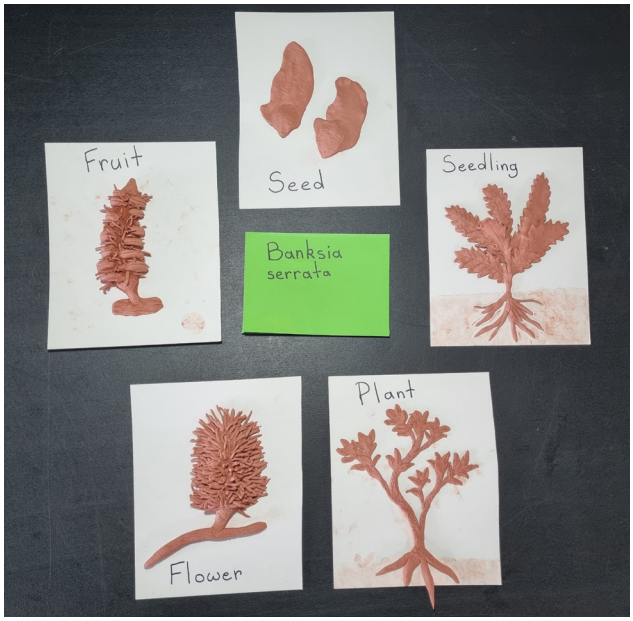
ACTIVITY 2 – EXPLAINING THE STAGES OF THE PLANT LIFE CYCLE

In this activity, students will create an art piece to accompany an explanation of each stage of the life cycle. Depending on time available, each student can create an entire life cycle sequence or a single life cycle stage to contribute to a whole-class life cycle art piece.

To do this, you will need:

- White art paper/card
- Scissors
- Glue
- Coloured paper
- Natural materials collected from the local area* (e.g. bark, dried leaves)
- Recycled materials (e.g. carboard boxes, plastic containers, scrap fabrics)
- Old magazines/newspapers





Instructions:

1. Recap with students the stages of the life cycle for a flowering plant they covered in the first activity. You may like to do this by looking at the Life Cycle Poster (available in the Resources section at the end of this document).
2. Explain to students that they will be creating visual representations of plant life cycles through collages. These artworks will be accompanied by an explanation of what is happening to the plant at that particular stage of its life cycle. Display example works for students to use as inspiration.
3. Provide students with recommendations for plants to focus on. Use the Native Plant Life Cycles Worksheet (available in the Resources section of this document) Some examples include banksia, bottle brush (Callistemon species), paper daisy (species from the family Asteraceae), eucalypt or similar. Using a range of native plants to create these artworks will build a resource bank for the class to use.

4. Explain to students the resources you have available to make this collage and some strategies to build texture and detail into their work. For example, instead of cutting out a single piece of paper to show a stem or a leaf cut multiple pieces from different sources to build texture and dimension. Teachers may like to allow time to go and collect natural materials from the local area for use*.

5. Work with students to create small explanation cards to display with each life cycle stage. This could include information such as a description of the life cycle stage, the process that allowed the stage to occur (e.g. germination, pollination etc.) or an interesting fact.

Note: any type of artwork can be created in this activity using materials like clay, playdough, boxes, recycled materials, paints, pencils etc.

*** General Guidance for Collecting and Exploring our Natural Environment**

The general principle of 'leave no trace' applies any time we are in our natural environment. Respect the environment, take your rubbish with you, stick to paths, don't make campfires unless permitted to do so, respect wildlife by not feeding or otherwise interacting or interfering, and leave what you find (unless permitted to take plant material).

Many of our activities ask students to use real specimens or examples collected from the field. Collection in your school grounds presents no problems; however, if you want to collect outside of the school grounds, you need permission from the landowner or managing authority and potentially a collecting permit.

For private property, contact the landowner.

For government managed property, contact the managing authority.

In addition, do not remove plants from an area without permission and do not plant anything anywhere (outside the school grounds or permitted area) without permission.

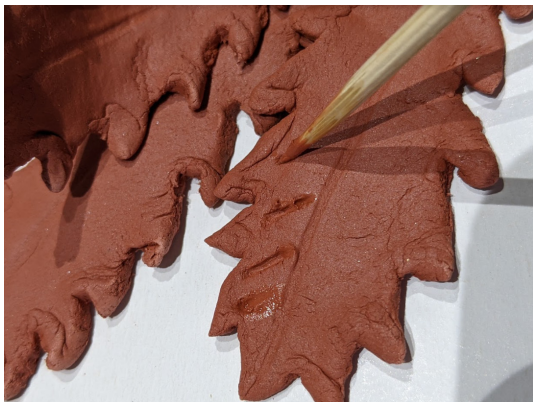
Discussion Points:

What features in your artwork show that your plant is at a particular life cycle stage (e.g. fruit, f owers etc.)?

Why is it important to know the life cycle stages of a plant?

How have other people in your class chosen to represent the life cycle stages?

What does a plant need to move from one life cycle stage to the next?

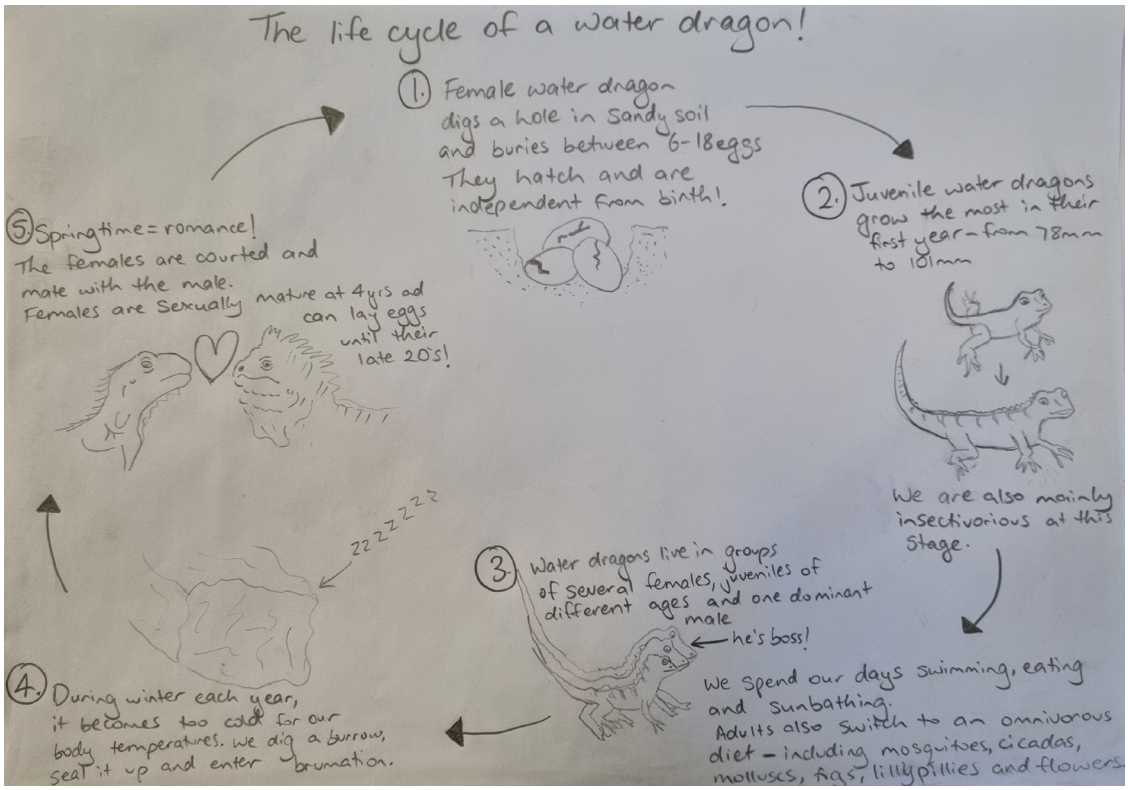


ACTIVITY 3 – COMPARING THE LIFE CYCLES OF PLANTS AND ANIMALS

In this activity, students will learn about the life cycles of some of the animals at the Australian National Botanic Gardens and explore how their life cycles differ from the life cycle of a flowering plant.

To do this, you will need:

- Access to the internet or other research tools such as encyclopedias, library resources and fact sheets (linked below)
- Resource: Researching Animal Life Cycles (found at the end of this document).



Instructions:

1. Discuss with students the key features of living things (all living things respond to their environment, are made up of cells, breathe, eat, grow, move, reproduce and have senses).
2. Focus in on life cycles and what the class already knows about plant life cycles.
   Pose the question '*how are animal life cycles different and/or similar to plant life cycles?*'
   (Living things have the same life cycle - birth, growth, reproduction and death).
   Explain that students will be researching an animal life cycle to compare to a plant life cycle.
3. Split the class into groups of 3 or 4.
4. Explain the research tools provided and how to use them – encyclopedias, library resources or fact sheets.
5. Select one (or more) of the animals we often see at the Australian National Botanic Gardens:
   - Water Dragon (*Intellagama lesueurii*) - research lizard life cycles.
     Australian Museum factsheet.

- Superb Fairy-wren (*Malurus cyaneus*) - research bird life cycles. Australian Museum factsheet.
- Blue-banded Bee (*Amegilla cingulata*) - research bee life cycles. Australian Museum factsheet.
- Macleay's Swallowtail Butterfly (*Graphium macleayanum*) - research butterfly life cycles. Australian Museum factsheet.
- Eastern Banjo Frog, also known as Pobblebonk Frog (Limnodynastes dumerilii) - research frog life cycles. Australian Museum factsheet.

The Australian Museum provides fact sheets on a variety of mammals, birds, reptiles, marine life and more. These can be a starting point for the students' investigation.

6. As a group students research their chosen animal and explore the life cycle stages of its life. They could do this as a group or independently and then compile their research.
7. The Resource: Researching Animal Life Cycles can be found at the end of this lesson plan and may help guide students.
8. The groups need to create a labelled diagram of the life cycle of the animal they researched, including key findings about its habitat, distribution, food source and a description of its appearance. Alternatively, you could suggest that students create a poster, a cartoon or comic strip (either informative or comedic), or create a poem, song or dance.
9. Groups present their findings to the class.
10. Facilitate a discussion with the class on the similarities and differences found between plant and animal life cycles. Create a whole class T chart to record these similarities and differences. Students can use post-it notes to record their ideas and add to the T chart (available in the Resources section of this document).

Discussion:

What are the major life cycle stages of living things?

What are the similarities and differences between the animal life cycles we researched and what we know about the life cycles of flowering plants?

What are some interesting things we learned about the life cycles of animals?

CONCEPTS EXPLAINED AND VOCABULARY DEFINED (EXPLAIN)

The following resources are provided to assist teachers to facilitate a class session to explain concepts and terms that have been introduced to students through the activities.

- Plant Life Cycles Teachers' Notes (these can be found in the Plant Science Learning Hub).
- If you have not already shown the videos produced by the Gardens in a previous lesson, you could use one or both of these to engage students. The life cycle story starts in Video 1 at the National Seed Bank, which collects and provides long-term storage for the seeds of Australian plant species. We look at germination cues in the seed bank laboratory. Video 2 continues the life cycle story in the nursery where seedlings are grown into mature plants which then flower and bear fruit. The videos explore the life cycle stages of a plant through seed, seedling, plant, flowering plant and fruiting plant. The videos also discuss the processes that allow the life cycle to move between stages, these are germination, growth, maturation, pollination and seed dispersal. The videos are appropriate for use through any of the Plant Life Cycle Module and can be used to engage students at the beginning of a lesson, or to summarise key information and show some real-world applications at the end of a lesson.
- These videos can be found in the plant life cycles resources section of the Plant Science Learning Hub.

  Life Cycles Video 1 - Seed to seedling
  Life Cycles Video 2 - Seedling to seed dispersal

APPLYING AND EXTENDING THE LEARNING (ELABORATE)

Applying the learning

Write a story book. Write a story book for a younger age group showing the awesome life cycles of plants. You could create characters, build a story line and illustrate your book.

Representing plant life cycles through art. Select another medium to represent your plant life cycle. Create a comic or cartoon strip (either informative or comedic), or create a poem, song or dance. Share this with your class.

Make a plant life cycle time lapse video. Find a young seedling in your garden and take photographs each day to capture its growth. Use a photo or video app to stitch them together into a movie.

Brainstorm a research question and design an investigation. Was there something you wondered in the Activity 1 - Life Cycles 'I See, I Think, I Wonder' activity that has not been answered yet? Is this something you can now investigate? Design your investigation. Make predictions as to what might happen. Carry out your investigation. Collect data (information) and present it in a visual way.

Extension ideas for further research.

Research 'How do introduced species impact Australian native plants?'. How can we support the life cycles of Australian native plants at our school? Write a report.

Research 'Threats to plants during different stages of their life cycle: how do these affect one plant and the whole population?'. For example, investigate how fire and drought events can affect the germination or fruiting stages of a plant life cycle. Write a report.

Take action. Reflect on what you learned in this module and propose action to benefit Australian native plants. This could be presented as a poster about plant life cycles to educate a wider audience or a letter to the school leaders explaining how we can support the life cycles of Australian native plants in the school.

Life cycles in the billabong. Aboriginal and Torres Strait Islander peoples understand the value of billabongs and utilise the life cycles of certain species of plants and animals that are part of billabong ecosystems. This knowledge and value has allowed Aboriginal and Torres Strait Islander people to survive in some of the harshest places on the continent. Read the University of Melbourne article exploring this topic and record relevant information in your science journal.

https://indigenousknowledge.unimelb.edu.au/curriculum/resources/billabongs

QUESTIONS AND ACTIVITIES FOR REFLECTION (EVALUATE)

Students review and reflect on their learning journey by:

- Revisiting the learning intentions:
  Students will be able to:

  Identify the life cycle stages of a flowering plant.

  Apply the life cycle stages to several specific Australian plants.

  Understand there are differences and similarities between the life cycles of flowering plants and animals.

- Revisiting the original inquiry questions:

  What is a life cycle?

  What do you know about life cycles?

  What do you know about plant life cycles?

  How do plants reproduce?

  What work is done at botanic gardens to support plant life cycles?

- Identifying further questions.

  What questions haven't I had answered yet?

- Identifying what they learned from others and their own research.

  What new knowledge do I have about plant life cycles that I didn't know before?

RESOURCE – WORD BANK

life cycle	**germination**	**growth**	**pollination**
reproduction	**seed dispersal**	**seed coat**	**embryo**
fertilisation			

RESOURCE – SEE, THINK, WONDER WORKSHEET

SEE - WHAT DO YOU SEE?

THINK - WHAT DO YOU THINK ABOUT THAT?

WONDER - WHAT DOES IT MAKE YOU WONDER?

LIFE CYCLE OF A DESERT RAISIN (*SOLANUM CENTRALE*)
PLANT FAMILY: SOLANACEA

Plant matures	Seed dispersal	Ageing
Pollination	Germination	Growth
Seed	Plant	Fruiting Plant
Seedling	Flowering Plant	Plant Death

RESOURCE – NATIVE PLANT LIFE CYCLES

Instructions:

1. Cut the images below into separate cards and work in groups to place the pictures in the order you think is correct.
2. Check your work against the Life Cycle Poster and look at the names of each of the stages.
3. Your teacher will give you a Life Cycle Worksheet. Label the worksheet and draw a plant at each life cycle stage.
4. Glue your work into your science journal.

Life Cycle of a Banksia (*Banksia menziesii*)
Plant Family: Proteaceae

Plant matures	Seed dispersal	Ageing
Pollination	Germination	Growth
Seed	Plant	Fruiting Plant
Seedling	Flowering Plant	Plant Death

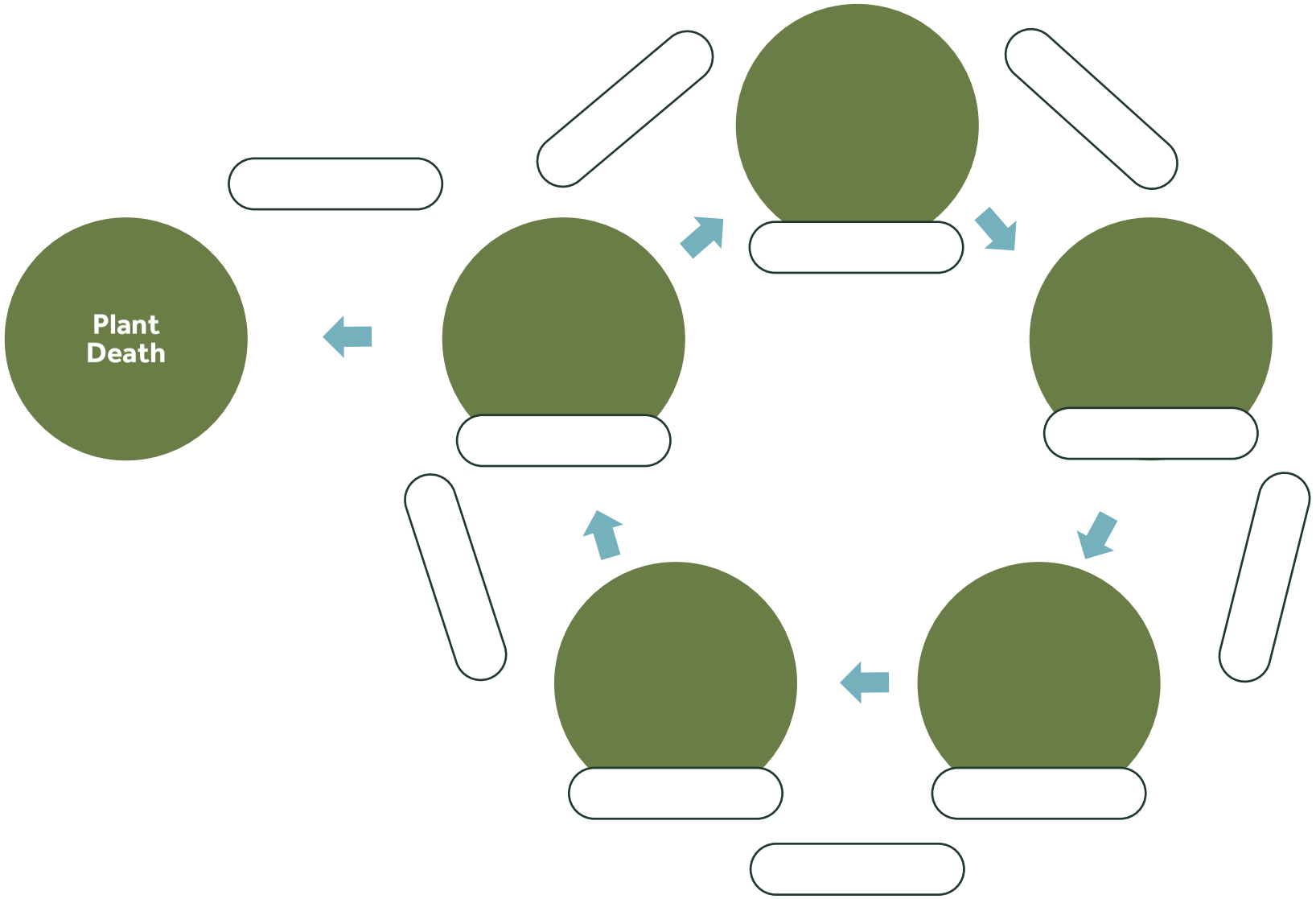
Life Cycle of a Eucalypt (*Eucalyptus polyanthemos*)
Plant Family: Myrtaceae



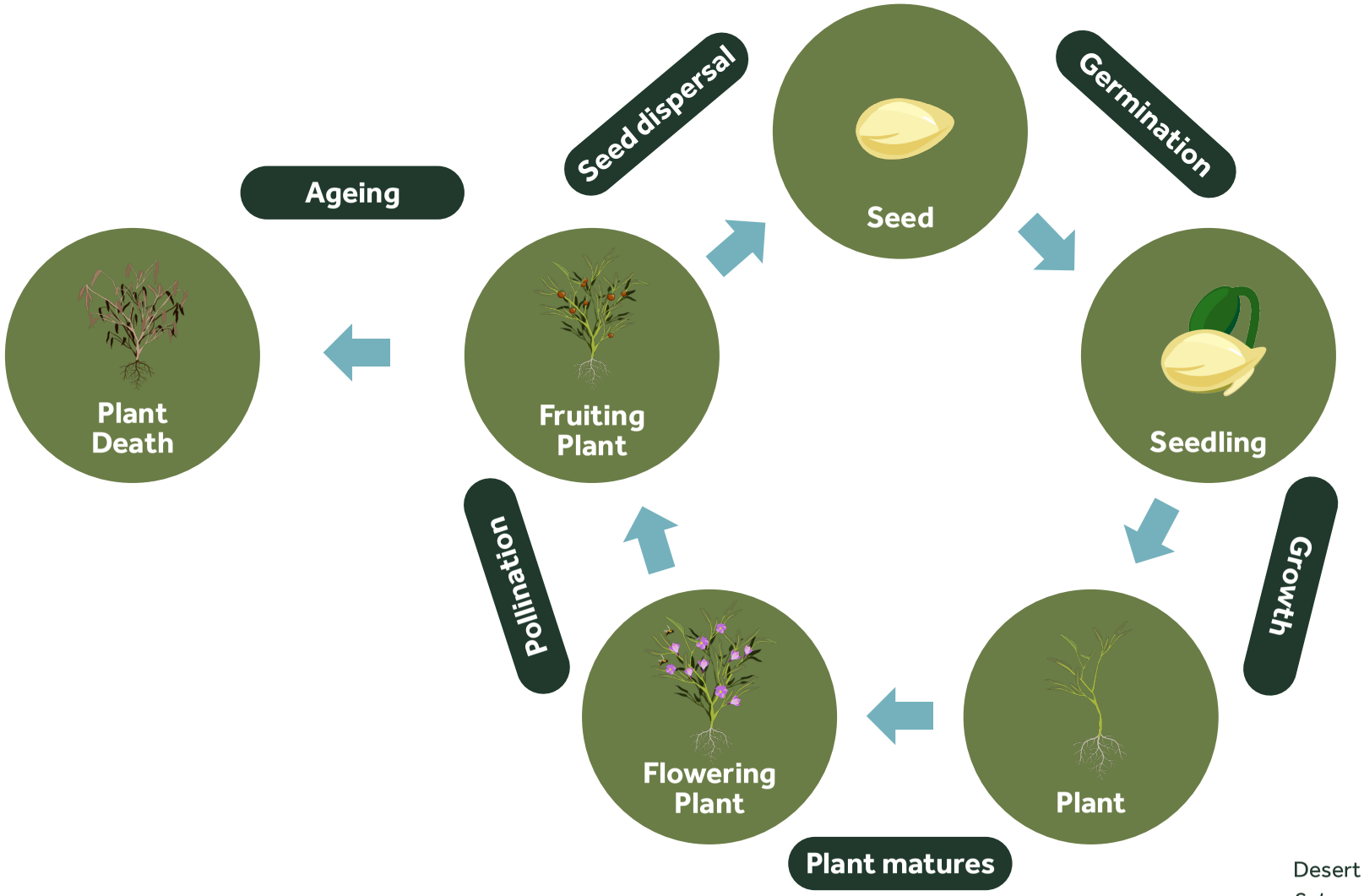


Plant matures	**Seed dispersal**	**Ageing**
Pollination	**Germination**	**Growth**
Seed	**Plant**	**Fruiting Plant**
Seedling	**Flowering Plant**	**Plant Death**

RESOURCE – LIFE CYCLE WORKSHEET

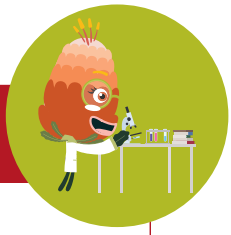


RESOURCE – LIFE CYCLE POSTER



Desert Raisin
Solanum centrale

RESOURCE – RESEARCHING ANIMAL LIFE CYCLES



COMMON AND SCIENTIFIC NAMES:

CHARACTERISTICS:

WHERE DOES IT LIVE? (DESCRIBE ITS HABITAT AND SHOW IT ON THE MAP)

DESCRIBE OR SHOW THE LIFE CYCLE

WHAT ARE THE SIMILARITIES AND DIFFERENCES BETWEEN THE LIFE CYCLE OF YOUR ANIMAL AND THE LIFE CYCLE OF A FLOWERING PLANT?

RESOURCE – T CHART TEMPLATE

RESOURCE: STUDENT REFLECTIONS

Consider displaying sentence starters or questions, such as below, in the classroom. Alternatively they could be turned into laminated thought bubbles that are directly passed to students. Students could choose two or three to complete in their journal then share their responses with the class.

End of lesson reflections	
Today I discovered ...	I am most proud of ...
I want to know more about ...	I feel confident about ...
Something new I found out was ...	I am enjoying ... because ...
I am excited about ...	I am confused by ...
Something I am finding interesting is ...	Today I asked ...
The most challenging thing was ...	A question I have is ...

Guiding students to reflect on their own thinking	
I am starting to think differently about ...	This idea is useful for ...
I got stuck when ... and I got back on track by ...	Some things I didn't understand are ...
I figured out that ...	To help me understand better I will ...
I solved a problem by ...	Before I didn't know ...
I first thought ... but then I realised that ...	Now I realise/know ...

Reflecting on stewardship and taking action	
This information can make a difference by ...	Something I will now help others understand is ...
It is important to know about this because ...	I can make a difference by ...
Something I will now do as a result of my learning is ...	An action I/we can take is ...
Something I want to do next is ...	If we don't ... the consequences could be ...
	It is important to ... because ...

End of unit reflections – where I was and where I am now	
I used to think ...	**Revisit** your first journal entry. What do you understand now that you didn't back then?
Now I know ...	
This causes me to (re)think/ wonder ...	
I didn't know how to ...	**Review** your work so far. What has been the biggest discovery/learning/ challenge?
Now I can ...	
In the future I will ...	**Reconsider** your initial ideas. Have your ideas changed? If so how?

Source: Adapted from the *Animal adaptations: year 5 Australian science curriculum focus, 2016, by the Great Barrier Reef Marine Park Authority, licenced under Creative Commons licence CC-BY-NC-SA from: http://hdl.handle.net/11017/2990'.*

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