Cardinia Shire Council

Biodiversity unit: Fabulous frogs

Level 3 and 4

May 2022

About this unit

This unit gives students the opportunity to learn about frogs and their status in the environment. Students will learn what frogs require, assess their school garden, and plan and design an area providing frog habitat.

This unit focuses on native frog species.

Students will learn

- How to use their senses when making a scientific observation
- The unique features and needs of tadpoles and frogs
- The lifecycle of a frog
- The threats to the survival of frog species
- To consider a range of factors when planning and designing a habitat

Suggested sequence of activities

1. Observing a habitat
2. Finding out about frogs – part one
3. Finding out about frogs – part two
4. Why are frog numbers declining?
5. Planning a frog habitat
6. Designing a frog habitat
7. Extension – Creating a frog habitat

Developed by:
Gould League for Cardinia Shire Council

Victorian Curriculum links

Domain	Content description
Language / Expressing and developing ideas	Learn extended and technical vocabulary and ways of expressing opinion including modal verbs and adverbs (VCELA273)
Science Understanding / Science as a human endeavour	Science knowledge helps people to understand the effects of their actions (VCSSU056)
Science Understanding / Biological sciences	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (VCSSU057) Different living things have different life cycles and depend on each other and the environment to survive (VCSSU058)
Geography / Geographical Knowledge / Diversity and significance of places and environments	Types of natural vegetation and the significance of vegetation to the environment, the importance of environments to animals and people, and different views on how they can be protected; the use and management of natural resources and waste, and different views on how to do this sustainably (VCGGK082)
Design and Technologies / Creating Designed Solutions / Generating	Generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques (VCDSCD029)
Design and Technologies / Creating Designed Solutions / Producing	Select and use materials, components, tools and equipment using safe work practices to produce designed solutions (VCDSCD030)
Design and Technologies / Creating Designed Solutions / Evaluating	Evaluate design ideas, processes and solutions based on criteria for success developed with guidance and including care for the environment and communities (VCDSCD031)
Design and Technologies / Creating Designed Solutions / Planning and managing	Plan a sequence of production steps when making designed solutions (VCDSCD032)
Critical and Creative Thinking / Meta-Cognition	Consider concrete and pictorial models to facilitate thinking, including a range of visualisation strategies (VCCCTM018) Examine an increased range of learning strategies, including visualisation, note-taking, peer instruction and incubation, and reflect on how these can be applied to different tasks to reach a goal (VCCCTM019) Investigate a range of problem-solving strategies, including brainstorming, identifying, comparing and selecting options, and developing and testing hypotheses (VCCCTM020)

Activity 1: Observing a habitat

Learning outcomes

Students will conduct a ‘sensory’ observation, demonstrating their ability to collect and record data.
Instructions

1. Before taking the students outdoors, have a brief class discussion about habitats.

- What is a habitat?
- What different habitats might exist in the school grounds?
- What do living creatures need to get from their habitats in order to survive?

2. Take the students outdoors and ask the students to sit in a quiet, comfortable position on the ground.

- Ask the students to be silent for one minute to observe the environment around them.
- Think about what you can see, what you can hear, what can you feel, what you can smell. When the minute is up, ask the children to share their observations.
- Which of these observed elements of the environment are living and which are non-living? How do we know?

3. Return to the classroom and make a list of all things observed, heard or felt during the minute of silence.

- List in two columns according to ‘living’ and ‘non-living’.
- How do we know which things are living? What are the characteristics of living things? (i.e. movement, breathing, eating, growing).
- What do living things need to help them survive? (food, water, shelter, mate for breeding). These needs must be available in their environment for survival. most living things have a preferred habitat that provides them with what they need to survive. Not all creatures survive in the same type of habitat. Different species have different needs.

Activity 2: Finding out about frogs – part one

Learning outcomes

Students will learn about frogs and their habitats. Students will learn about the life cycle of frogs and what they need to survive.

Resources

- Frog life cycle cards or pictures (Appendix 3)

Instructions

1. Give students a few minutes in small groups to write down all the words they know that have something to do with frogs. Then ask them to share their words and use a whiteboard to list all the words. Underline any words that are new to some students. Ask the students to remind you to add more words as they are discovered during this unit.

2. Have students sit on the floor ready to view and listen to different local frog calls. Frogs are often well camouflaged, and they usually hide in vegetation or under logs. So, we don't often see them, but we might hear them. The male frog calls, sometimes to establish territory and often to attract a mate. Some frog species are only heard in the warmer months, but some species will call all year, particularly after rain. Frogs can be heard at all times of the day, and a common time to hear them is soon after sunset.

Different frogs make different calls and recognising the different calls is often the best way to identify what species of frogs live in your neighbourhood. There are eight frog species found in Cardinia Shire. If you click on the following links, you will be able to hear the unique call of each species.

Growling Grass Frog (*Litoria raniformis*) Southern Toadlet (*Pseudophryne semimarmorata*) Striped Marsh Frog (*Limnodynastes peroni*) Spotted Marsh Frog (*Limnodynastes tasmaniensis*)	Southern Brown Tree Frog (Litoria ewingi) Common Froglet (Crinia signifera) Whistling Tree Frog (Litoria verreauxi) Pobblebonk or Eastern Banjo Frog (Limnodynastes dumerili)

3. Frogs move through some very different stages in their lifecycle. Organise the students into small groups. Give a set of the frog lifecycle cards to students in small groups and ask them to put them in order.
4. When each group is happy with their sequence, talk through the stages:

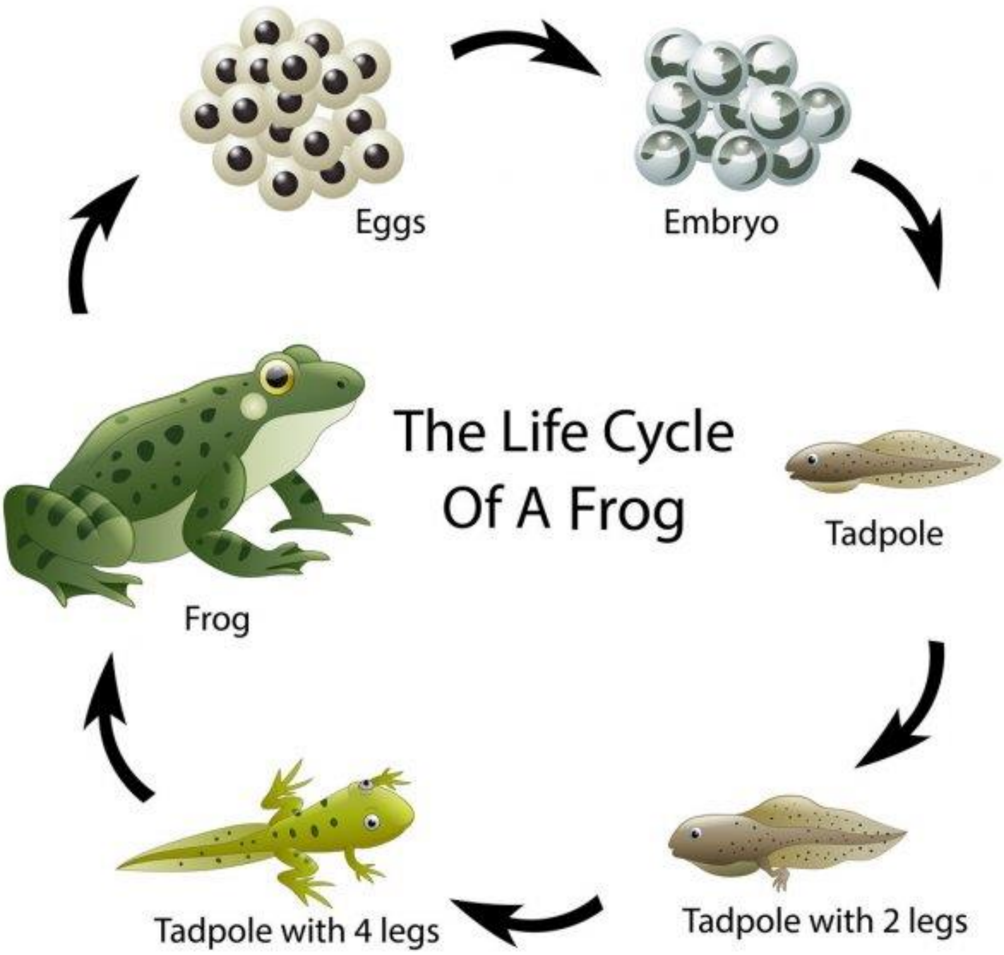
Eggs – Frog eggs don't have a shell like a birds egg, they have a jelly-like casing. Most frogs lay their eggs in the water, or very close to the water.

Tadpoles – live in fresh water, and feed on algae and plants in the water. The water plants are very important because they not only provide food, but also oxygen for the tadpoles. They have teeth like tiny rasps for filing away at pond plants and a tail that helps them swim.

Metamorph – as the tadpole starts to change into a frog, it will grow legs. The back legs grow first, then the front legs and its tail will shrink. (The tail is absorbed and provides nutrition for the developing frog; it doesn't drop off). When a frog is at the stage where it has legs but still has a tail it is called a Metamorph (or sometimes a Froglet).

Frog – the frog doesn't live in the water anymore. It lives on the land, and now has lungs, so it needs to breathe the air. Frogs eat invertebrates like mosquitoes and flies, and sometime small vertebrates (like little lizards). They have a sticky tongue to help them catch food and a wide mouth. Frogs have large, bulging eyes. They have excellent eyesight, but their eyes also help them to swallow their food! They can squeeze their eyes in to help push the food down, which they swallow whole. Frogs have strong back legs to help them jump.

Figure 1. The life cycle of a frog



Activity 3: Finding out about frogs – part two

Learning outcomes

Students will be able to identify the features of a preferred habitat for frogs and some of the threats to frog survival, frogs are very sensitive and require a very specific kind of habitat.

Resources

- Melbourne Water frog lifecycle video www.youtube.com/watch?v=aZk7flee5M0
- The Dodo fascinating facts on frog lifecycles video www.youtube.com/watch?v=gmlaclb3K2o
- Fabulous frog factsheet – one per student
- Council's gardens for wildlife frog friendly pond factsheet www.cardinia.vic.gov.au/gardensforwildlife

Instructions

1. Watch this video by Melbourne Water which explains the frog lifecycle and introduces other important information including frog habitat (5.51 mins) www.youtube.com/watch?v=aZk7flee5M0

Note: The Dodo provides a short (3.10 mins) and visually fascinating video of the frog lifecycle, showing the transformation from eggs to frog (not Australian frogs): www.youtube.com/watch?v=gmlaclb3K2o

2. Referring to the Melbourne Water video, participate in a class discussion focusing on frog features, what is required in a frog habitat, what frogs need to survive and possible threats.

3. Give students the fabulous frog facts sheet and discuss the information on the sheet. Make a note of new words and add them to the board if necessary.

Possible new words

- Amphibian – means on land and in water. They start in fresh water and use gills to breathe. When grown they develop lungs and must breathe air.
- Camouflage – is well hidden in its environment.
- Carnivore – eats meat.
- Habitat – the environment best suited to an animal (provides the food, water and shelter it needs)
- Invertebrate – doesn't have a skeleton. Includes insects and other mini-beasts. Metamorph – the phase in the lifecycle when the frog still has a tail (also sometimes called a Froglet).
- Metamorphosis – the process of transformation.
- Vegetarian – eats plants.
- Vertebrate – has a skeleton.

Citizen science

Your students might be inspired to get involved with the Melbourne Water frog census. There is a downloadable app and an opportunity to be involved as citizen scientists by contributing to data about frogs in your local area. This could be done as a class, with an excursion to a local wetland, or students can even do it from their own back yards with their family members. www.melbournewater.com.au/water-data-and-education/get-involved/be-citizen-scientist/frog-census

Activity 4: Why are frog numbers declining?

Learning outcomes

Students will be given the opportunity to further investigate the threats to frog survival and discuss possible solutions.

Resources

- Call to action sheet for students or one for the class (Appendix 2)

Instructions

Many frog species are in decline, and some are believed to be extinct in Australia already. What would be some of the threats to frogs' survival?

Teachers note

Teachers may like to give students an opportunity to research why frog populations are under threat, giving them access to books or online resources. The students may focus on one specific aspect of the habitat needs of frogs or tadpoles.

Discuss some of the reasons why frog numbers might be decreasing and how we can help. Prompt the students to focus on the frogs' needs for food, water and shelter as a starting point. Some suggestions:

- Polluted water – frogs have thin skin which absorbs water, so they are very sensitive to poisons and pollution. Most pollution comes from stormwater that makes its way to creeks and wetlands after it rains. We can help by picking up litter and making sure leaves, detergent, fertiliser, oil, chemicals other things are not washed down drains.
- Pets – pets and introduced animals can prey on frogs. Cats in particular are natural hunters and have been known to hunt and eat frogs. We can help by keeping our pets under control and away from wetlands and ponds.
- Loss of habitat – there are less natural wetlands in the environment, as our cities and suburbs grow. We can help by keeping areas of our gardens, and maybe our schoolground "frog-friendly" – providing mulch, native plants, logs and rocks to hide in, and ponds for tadpoles to grow.
- Climate Change is another threat to frogs.
- Disease – Frogs are susceptible to a disease caused by the chytrid fungus. This fungus can spread from frog to frog through the water. It affects some frogs more than others. The colourful Corroboree Frog is one species that is sadly on the brink of extinction.

It is important to emphasize to students that it is illegal to catch tadpoles or frogs as that they are both protected. Catching and relocating frogs or tadpoles can harm them and could also lead to the spread of disease from one area to another.


An opportunity to reflect on what has been learned and how we can respond. Now that we know more about frogs and some of the problems they face, are there some actions that we could take, that would help their survival? Ask students to discuss in pairs, what they have learned and how they could help frogs. Ask for feedback of their ideas.


Students can write their own pledge or promise (Appendix 2).

- We have been learning about frogs. I found out that… (something they have learned)
- I will help make the environment safer for frogs by… (one way they can help protect frogs).

Additional resources

Australian Guide to Frogs and Reptiles, by Bob Winters Published by Gould League
www.gould.org.au/product/australian-guide-to-frogs-and-reptiles/

Frogs of Australia Poster Published by Gould League
www.gould.org.au/product/frogs-of-australia-archive/

Amphibian Research Centre website provide a wealth of information about frogs, including information according to local areas: http://frogs.org.au

Activity 5: Planning a frog habitat

Learning outcomes

Students will use their knowledge of frogs to choose a suitable site.

Resources

- Fabulous Frogs Fact Sheet
- Plan of the schoolground.
- Pond. There are lots of things you can repurpose to use as a pond. An old basin, bath or pond mould can be used, or even use an appropriate garden plastic to line a depression or dip in the ground. If the pond doesn't have naturally sloping sides you will need to place rocks and logs frogs can climb out easily.
- Strong mesh to cover the pond. The mesh from an old screen door could be repurposed for this (stops kids falling in and may help keep some predators out).
- Australian native tree mulch, rocks, logs, and plants for both in and around the pond. (Please see list of appropriate plants on Cardinia Shire's gardens for wildlife frog friendly pond factsheet from Lesson 1)

Instructions

We've learned so many interesting things about frogs. One of the problems they face is a loss of habitat, so this activity focuses on providing a "Frog Friendly" area and pond in the schoolground.

1. **Recap on frog facts – comparing frogs to tadpoles.**
   Invite students to brainstorm a list of the differences between frogs and tadpoles. Make a list on the whiteboard. Some of the differences may include:

Tadpoles	Frogs
Eat algae and pond plants (vegetarian)	East insects and small creatures (carnivore)
Lives in water	Lives on land
Breathe through gills	Breathe through lungs
Swim	Hop
Has tail	Has legs

   There are some significant differences between frogs and tadpoles. For example, they shelter in different places and eat different foods. We are going to need to think about both of their needs when we create a habitat that will attract frogs.

2. **What do frogs and tadpoles need in their habitat?**
   All creatures have a preferred habitat that must provide all the things they need. A good place to start thinking what will be important in the frog habitat is to think about food, shelter and water. If we are going to design an area in the schoolground that frogs and tadpoles might like to live in, what do we need to provide for them?

Ask the students for suggestions about:

- Food: what do tadpoles eat? What do frogs eat? The habitat needs to provide the right kind of food.
- Shelter: what makes a nice home for tadpoles? What makes a nice home for frogs? The habitat needs to give the kind of shelter that both frogs and tadpoles need.
- Water: where will their water come from? To support both frogs and tadpoles.

- Make a list of all the important elements that would need to be available in a habitat suitable for frogs and tadpoles.

Some important facts to bring to the discussion:

- Most frogs spend their time out of the water, but lay their eggs in water, where the tadpoles will grow. The tadpoles will need clean water that has some indigenous water plants growing in it to provide food and oxygen for the tadpoles.
- A pond that has either sloping sides, or rocks and logs in place, to help frogs get in and out of the water.
- The area around the pond needs to have damp cool places for frogs to hide in. Near the edge of the pond you can grow Australian native grasses. Rocks and logs nearby can provide damp places to hide. It can be helpful if this area is naturally low lying, but plenty of natural mulch and plants will help provide cool spots. This area can be referred to as the “frog bog”.
- If the area is well covered with tree mulch and plants, it will also provide an attractive habitat for the insects and mini-beasts (invertebrates) that frogs like to eat.
- An ideal area for a pond would be sunny in the morning but have protection from the hot westerly sun.
- The pond will need to have appropriate aquatic plants established in it to provide tadpoles with food and oxygen.
- The habitat would be best in a quieter part of the playground, not where lots of children are running and playing ball games.
- It is important that the frog habitat is placed well clear of any area that may have fertilisers, weed killers, or any other chemicals. Make sure your pond is not in a spot that will receive ‘run off’ from such areas.

3. **Students identify a suitable site in the schoolground.**
   Give the students a plan of the schoolground. Ask them to look at their plan and help students to find familiar features on the plan to help them understand it. If the students are not very experienced at reading maps and plans it is worth spending some time doing this.

4. The students are given some time to **examine the school plan and identify and mark** any possible sites in the schoolground that they think would be appropriate for a frog habitat, keeping in mind the criteria discussed (this could be done individually, in pairs or small groups).

5. **Compare and discuss their ideas.**

Activity 6: Designing a frog habitat

Learning outcomes

Students will improve their problem-solving skills and learning strategies during the design process.

Resources

- Paper and markers for students to use to design their own frog habitat.

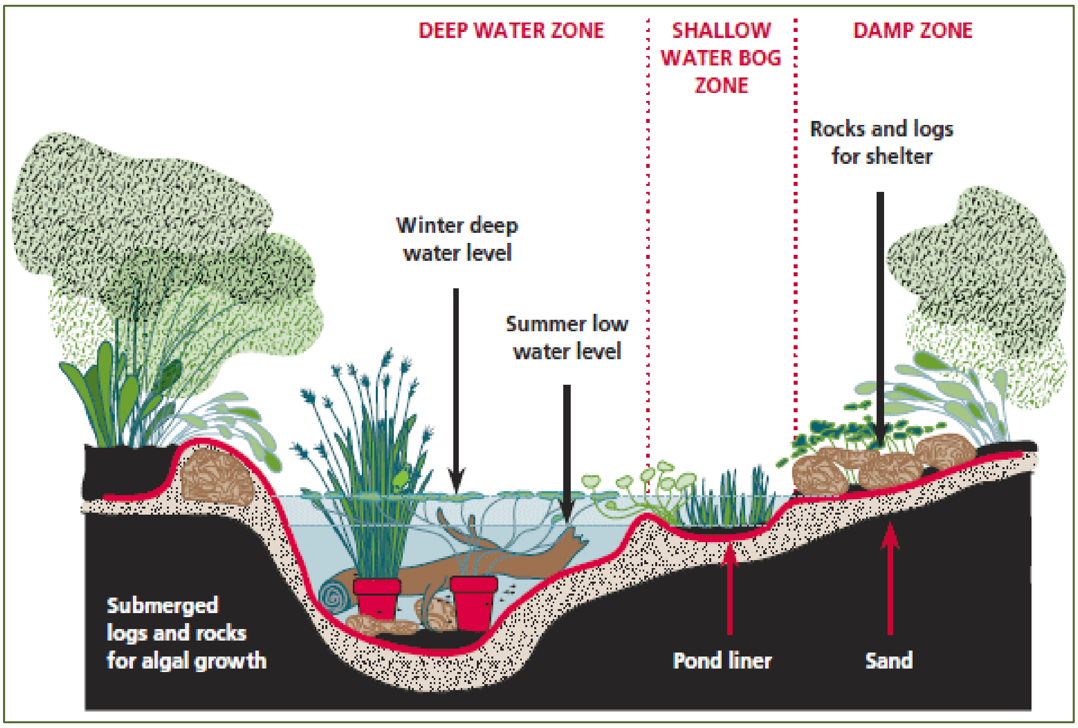
Instructions

1. Take a walk around the schoolground with the students, looking at some of their suggested sites, discussing the advantages and disadvantages of the different areas.
   - Is this area sunny in the morning and sheltered in the hotter parts of the day? (Taller trees or buildings to the west providing some shade).
   - Is this an area that won't be too disturbed by school students?
   - Does the area already have some good ground cover, mulch and maybe even some native or indigenous plants? (It helps to have a good start!)
   - Guide the students during the site inspection walk to help select a suitable site for your frog habitat.

2. Students design and draw their own ideal frog habitat (see Figure 2 for the elements needed for a frog pond)
   - Distribute paper and markers to students.
   - The students now have an opportunity to use their imaginations to design and draw their ideas for an ideal frog habitat.
   - They may want to use both words and pictures to describe their ideas and to show what they have learned about frogs and frog habitats.

Students are invited to share their designs, and to explain the choices they have made in their design. Make a display of the student's designs in the classroom.

Figure 2. Elements needed in a frog pond



Activity 7: Extension – Creating a frog habitat

Learning outcomes

Students will learn what people need to create a thriving habitat.

Instructions

The next step is to construct the area, which will most likely require some extra adult help. Consider inviting parents for a special working bee to help the students construct the frog habitat, or enlisting expertise already available within the school, such as school garden staff.

Find out if there is a local Landcare Group or a 'Friends of' group of a local park or wetland area nearby. These groups often have great expertise and enthusiast volunteers who might like to help your class construct and plant a frog friendly area in your schoolground. They will possibly be an ongoing source of advice for maintenance and problem-solving needs that might arise too.

If you are happy to proceed on your own, both the Cardinia Shire and Sustainable Gardening Australia links below have very clear instructions including lists of appropriate plant species for planting both in and around the pond area. These plant species will be available at your local indigenous plant nursery. Appendix 1 also has a list of frog friendly plant species.

Teacher note

It is important to note that frogs and tadpoles are protected and it is illegal to collect them. You cannot collect and relocate either frogs or tadpoles. Providing the type of habitat that supports them will eventually attract frogs to your pond.

Additional resources

Australian Guide to Frogs and Reptiles, by Bob Winters Published by Gould League
www.gould.org.au/product/australian-guide-to-frogs-and-reptiles/

Frogs of Australia Poster Published by Gould League
www.gould.org.au/product/frogs-of-australia-archive/

DELWP Fact sheets about some of Victoria's amphibian species
www.wildlife.vic.gov.au/our-wildlife/amphibians

Cardinia Shire's gardens for wildlife frog friendly pond factsheet
www.cardinia.vic.gov.au/downloads/download/606/gardens_for_wildlife_fact_sheets_–_cardinia_shire_council

Sustainable Gardening Australia support to build a frog bog/pond
www.sgaonline.org.au/frog-ponds/

List of local indigenous plant nurseries
www.cardinia.vic.gov.au/downloads/download/359/local_indigenous_plant_nurseries_-_cardinia_shire_council

Appendix 1: Frog friendly plant species

Table 1. Emergent plants

A plant which grows in water but which pierces the surface so that it is partially in the air.

Common name	Species name
Water ribbon*	*Triglochin procerum*
Cumbungi	*Typha orientalis*
Tall spikerush	*Eleocharis sphacelata*
River clubrush	*Schoenoplectus validus*
Water plaintain	*Alisma plantago-aquatica*
Mud dock	*Rumex bidens*

Table 2. Submergent plants

A plant that is completely beneath the surface of water. Most submergent plants are firmly rooted in the soil.

Common name	Species name
Common spikerush	*Eleocharis acuta*
Curly pondweed	*Potamogeton crispus*
Blunt pondweed	*Potamogeton ochreatus*
Fennel pondweed	*Potamogeton pectinatus*
Hornwort	*Ceratophyllum demersum*
Eelgrass	*Vallisneria gigantean*

Table 3. Floating plants

A plant that floats on the surface of the water with its roots trailing in the water

Common name	Species name
Water ribbon*	*Triglochin procerum*
Floating pondweed	*Potamogeton tricarinatus*
Swamp lily	*Ottelia ovafolia*
Ferny azolla	*Azolla pinnata*
Floating duckweed	*Lemna spp.*

** Water ribbon occurs in both emergent and floating forms*

Appendix 2: Call to action

We have been learning about frogs. I found out that…

I will help make the environment safer for frogs by…

Appendix 3: Lifecycle of a frog

Enlarge to A3. Print and cut out all the pieces to make your own frog lifecycle kits for students (source: DepositPhotos.com)

Eggs

Embryo

Tadpole

Tadpole with 2 legs

Tadpole with 4 legs

Frog