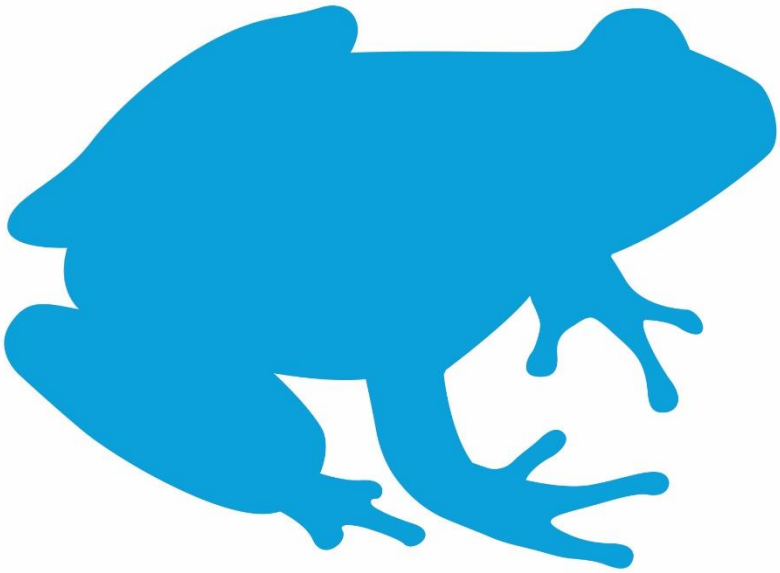


Module 1: F-2

Calling all frogs

Melbourne Water Frog Census

Melbourne Water
Enhancing Life and Liveability

Calling all frogs (Foundation–Year 2)

Lesson plan

Introduction

Many types of frogs living in Melbourne's waterways can be identified by their distinctive calls. The diversity of frog species in a waterway is a good indicator of its ecological health. Learning to identify frog calls will help students understand which frogs are in their local area and the importance of frogs to the waterway. Students will also explore the different stages of a frog's life cycle.

These activities use digital applications such as Melbourne Water's Frog Census app to develop students' ICT skills.

The Frog Census app is a powerful citizen science tool that enables students, their families and the wider community to contribute to understanding the biology and distribution of frog species in Melbourne; information that will help to develop effective policy and management strategies to conserve and enhance these populations.

Victorian Curriculum F–10[1] links:

Science

Foundation–Level 2

Science Understanding

Science as a human endeavour

People use science in their daily lives (VCSSU041)

Biological sciences

Living things have a variety of external features and live in different places where their basic needs, including food, water and shelter, are met (VCSSU042)

Living things grow, change and have offspring similar to themselves (VCSSU043)

Digital Technologies

Digital Systems

Identify and explore digital systems (hardware and software components) for a purpose (VCDTDS013)

Data and Information

Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (VCDTDI014)

Activity 1: Listen to the music

Students explore the calls that frogs make, how they live and what they eat.

Activity 2: Frog call treasure hunt

Students go on a treasure hunt to match pictures of frogs with their calls and identify local frogs by their calls.

Activity 3: Growing and changing

Students build models of the stages in a frog's life cycle.

Activity 4: Conducting a frog census in our local area—excursion or at-home activity

Students and their families collect frog call data in their backyard for the Frog Census, a citizen science initiative managed by Melbourne Water.

Activity 1: Listen to the music

In this activity students listen to frog calls to understand that each type of frog sounds different. First, they will listen to a chorus of frog calls as they sound in nature and then to each frog call separately.

Equipment

Frog Census app (available from the App Store for Apple and Play Store for Android devices) <https://www.melbournewater.com.au/frogcensus>

A beginners guide to frog identification

https://www.melbournewater.com.au/search?search=a+beginners+guide+to+frog+identification

Pictures books about frogs such as *Five green and speckled frogs, A frog in the bog* and *From tadpole to frog* (Appendix—Resources)

The dulcet tone of frogs Melbourne Water YouTube video https://www.youtube.com/watch?v=qFLeN5gNQXA [0:48]

Computer or digital device with a digital projector or interactive whiteboard for whole class discussions

Speakers

Preparation

Set up the YouTube video or Frog Census app for frog calls.

Make blank cards to use for a word wall.

Activity steps

What do frogs sound like?

1. Without telling students what they are listening to, play the Melbourne Water YouTube video, *The dulcet tone of frogs* (audio only).

   You could also play a selection of frog calls from Melbourne Water's Frog Census app. To do this, tap Frogs in the app. Each frog has a sound button on the right hand side of the screen that can be pressed simultaneously to create the effect of an orchestra of frogs. Each call lasts for approximately 10 seconds.

2. Ask students to listen carefully. What is making that noise? Take a variety of student ideas.

Frog word wall

3. To explore what students already know about frogs, ask them to brainstorm—say or write—words they associate with frogs and things they already know about frogs.
4. Create a word wall with each word on a separate card. For example, *small*, *brown*, *green*, *croak*, *four legs*, *tadpoles*, *slimy*, *water*.

Exploring frogs

5. Ask students to think of one question about frogs they would like answered.

You could voice-record their questions or students could write their own question down. They could also be typed on the computer to be displayed on the electronic whiteboard and saved for later reference.

6. Choose one question as an example e.g. what do frogs eat? Ask students to predict what they think the answer is.
7. Spend some time showing students how to research their frog questions using the following resources (refer to the Equipment list for links):
    - picture books about frogs
    - *A beginners guide to frog identification*

      This booklet contains general information on diet, calls and habitat of frogs found in the Melbourne area. It also contains information about specific frogs.
    - Frog Census app

      Click on a frog to see extra information about its habitat, size, diet and key identifying features.

Explaining frogs

8. Working in small groups, students discuss what they discovered and then share their answers with the class.
9. Record the answers on a whiteboard using pictures or words. Add new words to the word wall.
10. Ask each student to share something surprising they found during their research.

Additional activity or at-home activity

Download Melbourne Water's colouring sheets from <https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Frog-Census.aspx>

The three colouring sheets feature a frog life cycle, a growling grass frog and frogs of Melbourne. Students can colour these creatively or choose a frog and match its real-life colours.

Activity 2: Frog call treasure hunt

In this activity, students learn to identify a variety of frog calls heard in your local area. Students have a treasure hunt to find 'frogs'—a hidden laptop or tablet device displaying the image of a frog and playing its call.

Equipment

Images of local frog species. These can be found in:

- *A beginners guide to frog identification*

  https://www.melbournewater.com.au/community-and-education/waterwatch-programs/frog-census

  Frog Census app (available from the App Store for Apple and Play Store for Android devices) <https://www.melbournewater.com.au/frogcensus>

A *Frog calls of Melbourne* (image and audio) PowerPoint file for each frog you want to use (Frog Census Years Foundation–Year 2 resources).

Five or six laptops or tablet devices

Speakers

Computer or digital device with a digital projector or interactive whiteboard for whole class discussions

Preparation

Find a place in the school yard, around the classroom or in the gymnasium to set up a treasure hunt.

Select five or six frog species that are found in your local area. These can be located using the Atlas of Living Australia: a searchable national biodiversity database. For instructions about how to find the frog species in your local area, refer to the *Frog Census Years 7–8 Activity 1: Finding our frogs*.

Download the PowerPoint file for each frog. The files are password protected for copyright purposes so select 'Read only'. Play the call by clicking on the speaker icon. When you play each file, the call will loop continuously.

Using five or six separate laptops or tablets, upload a different frog call to each laptop or tablet. Place a computer or tablet in each hiding spot. They should be well hidden so students use their sense of hearing instead of sight. Separate the 'frogs' far enough from each other so the students can distinguish between the different calls. Start playing the PowerPoint presentations on each device when the students are not in the area. You might need an accomplice to do this for you and to supervise the space until you are ready to play.

Activity steps

Citizen Science

1. Discuss with students that it is not only scientists that do scientific research; we can all play a part in observing what is around us. One way to do this is to record what we see and hear.

2. Organisations like Melbourne Water keep records of the places where frogs are found in Melbourne. This helps us learn where they live and how to look after their habitat. We can use the Frog Census app to do that.

Frogs of Melbourne

3. Explain that frogs are hard to see but relatively easy to hear: if we know what to listen for. We can use a frog call to identify the type of frog we hear.
4. Show students laminated pictures of frogs found in Melbourne (or your local area) and play/replay their calls using the Frog Census app. Alternatively, you could display digital frog images on a whiteboard.

Treasure hunt

5. Students go on a treasure hunt to see if they can find all species of frogs just by listening to the calls.
6. Once everyone has found each frog, discuss the calls. Some questions might include:

   Have you heard these noises outdoors?

   Where have you heard frogs?

   Why might frogs live there?

   Why do you think frogs call? (*Only male frogs call when they are looking for a mate. The female frogs listen to hear which male frog sounds the best*.)
7. Alternatively, you could play a guessing game with students. Using the laminated pictures of frogs, hold up each frog and play the frog calls. Students guess which call belongs to which frog.

Call to action

8. Explain that frogs are found in healthy creeks, rivers and wetlands. They can't tolerate much pollution so if frogs are around, it's a good indication that a waterway is healthy.
9. Explain that rainwater runs over roofs, road and driveways into our rivers, creeks and bays. This stormwater picks up anything that is lying around. Ask students what they can do to keep waterways clean. Suggestions could include:
   - pick up litter and dog poo and put it in the bin
   - don't put chemicals such as soaps or paints into the stormwater drain.

Extension activity

Find out more about frogs and their calls—including the times of the year you are most likely to hear them call and how they make their calls. The *A beginners guide to frog identification* would be a useful resource for this activity.

Activity 3: Growing and changing

In this activity, students create a model to demonstrate the different life cycle stages of frogs.

Equipment

A copy of *Life cycle of a frog* (Worksheet 1) for display

For each student:

one golf ball-sized ball of plasticine

one gum leaf

two gumnuts (or similar leaf)

one copy of *Life cycle of a frog* (Worksheet 1)

Activity steps

Frog life cycle

1. Ask students to consider how some animals change the shape of their bodies as they get older. Think about a human baby. How many legs, arms, and heads do babies have? How many do adults have? They are the same, just bigger. Animals like frogs and butterflies are very different. For instance, baby frogs (tadpoles) look very different to adult frogs. The body shape of frogs changes as they grow older.
2. Display the *Life cycle of a frog* diagram (Worksheet 1) and explain that students will make a model of the life cycle of a frog from egg to adulthood. Give each student a copy of Worksheet 1, a ball of plasticine, two gumnuts and one gum leaf.

   Show students how to make their model. For each stage, display a picture of each life cycle stage and point out the stage in the frog life cycle diagram.

   a) Create a ball with the plasticine—this is the frog egg.

   b) Morph the egg into a tadpole by putting a gum leaf at the end of the ball and using two gumnuts as eyes.

   c) 'Grow' the tadpole some back legs by pinching off some of the plasticine and adding legs to the back of the tadpole's body.

   d) 'Grow' the tadpole some front legs by pinching off some of the plasticine and adding legs to the front of the tadpole's body.

   e) Explain that the tadpole is now becoming an adult frog and students are to remove their tadpole's tail (gumleaf). They have now morphed their frog from egg through to adult frog. Introduce the scientific term 'metamorphosis'; this is the word we use for the dramatic changes in form at each stage.
3. Take photos of the models at each stage. Some could be put on display to show the various life cycle stages.
4. Students dismantle their model frogs and return the materials. Use some of the photos of different stages to review the activity.

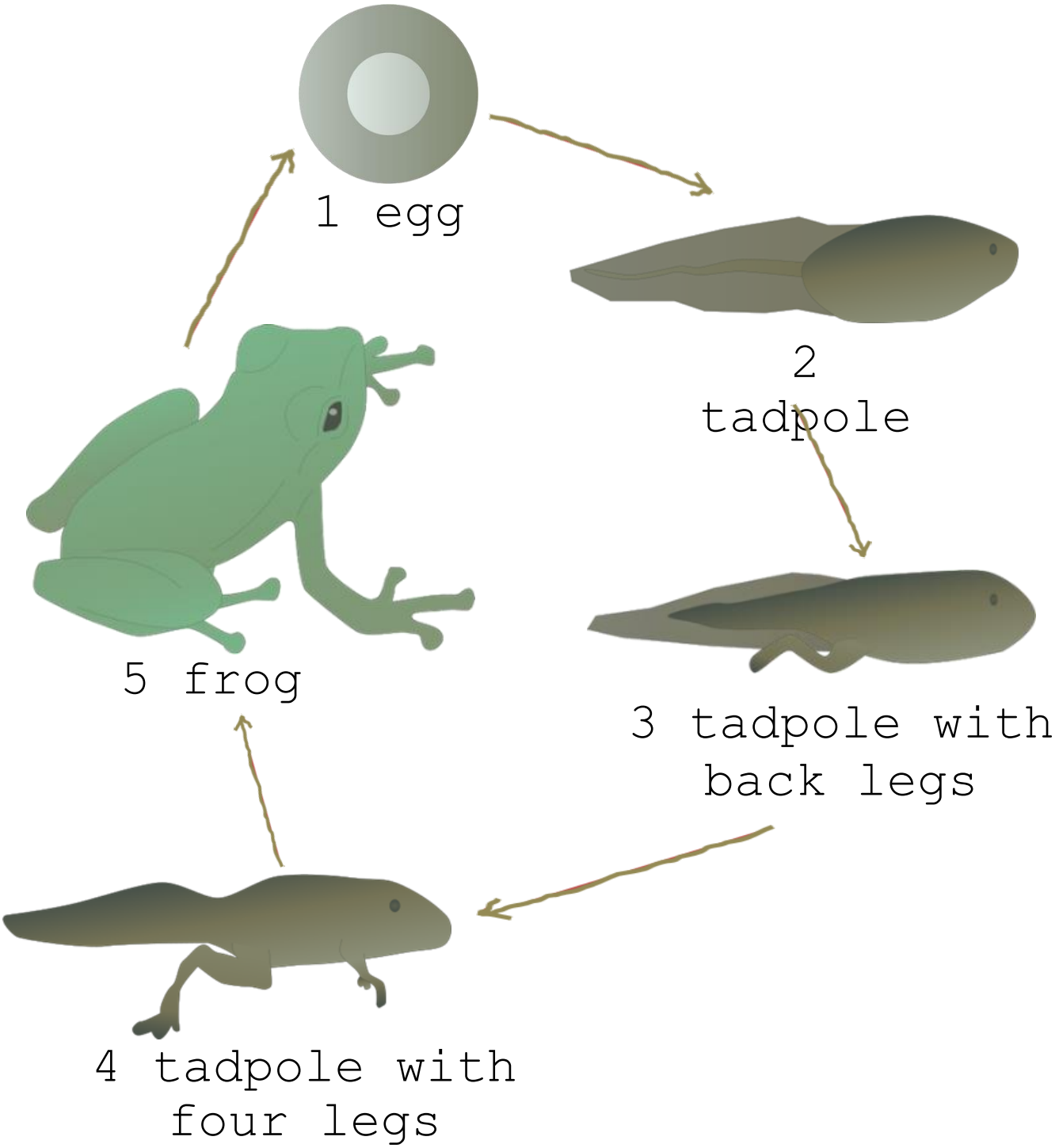
Extension activity

Ask students to search YouTube for videos of a frog's life cycle.

Students can use the photos of their models to make a PowerPoint presentation or short video with a tablet device.

Worksheet 1

Life cycle of a frog



Source: Tracey Saxby, Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/imagelibrary/)

Activity 4: Conducting a frog census in our local area—excursion or at-home activity

Giving students the opportunity to explore their local environment provides benefits on many levels. There is an increasing volume of literature which suggests that interaction with the natural environment—even impacted urban environments—leads to improved well-being and both cognitive and behavioural function and development[2].

In this activity, students and their families have the opportunity to be citizen scientists: collecting meaningful and useful data for the Frog Census, an initiative managed by Melbourne Water.

Students can monitor frogs with their parents as an at-home activity. Conduct an evening Frog Census survey in your backyard to find out whether you have frog friendly habitat on your doorstep! The best time to hear frogs is about 30 minutes after sunset. While the frogs themselves may be difficult to find, in breeding season they are easily heard.

Using the Frog Census app or another recording device, students record frog calls and identify the frogs and gain an appreciation of the ecology of their habitat.

Information about how and when to conduct a frog survey and prevent the spread of frog disease and stay safe are included in the *Frog Census Handbook* available from <https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Frog-Census.aspx>

The Frog Census app, developed by Melbourne Water, makes frog monitoring easy and provides a great opportunity for Melbourne students to contribute to this important citizen science project (<https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Frog-Census.aspx>). The app can be used on both Apple and Android devices.

Alternatively, you can download resources from the Melbourne Water Frog Census web page above. Students can record frog calls and send the Frog Census datasheet and sound files to Melbourne Water as per the instructions on the web page.

[2] This paper is just one of many available online:
De Young, R. et.al. 2017. Some psychological benefits of urban nature: Mental vitality from time spent in nearby nature. In A. M. Columbus (Ed.) Advances in Psychology Research 116. Chapter 4 (Pp. 93-120) Hauppauge, N.Y.: Nova Science Publishers. Available from <https://deepblue.lib.umich.edu/handle/2027.42/136087 >

Appendix

Teacher background

Key messages

The key messages for students are:

- frogs can be found in healthy creeks, rivers and wetlands
- protecting frogs' habitat includes keeping our waterways clean from litter and other pollution
- we can help understand where frogs are using the Frog Census app
- understanding a frog's life cycle helps us to understand frogs.

Frog facts

Reproduction

Frogs call during their reproductive season. The calling frogs are males who are trying to attract females and warn other males to keep their distance.

Frogs can lay as many as 4000 eggs in frogspawn.

Species

There are more than 4000 types of amphibians in the world, but Europe has very few–only 45 species.

Australia has 216 species of frogs and over 30 species are found in Victoria.

Body features

The eyes and nose of a frog are on top of its head so it can breathe and see when most of its body is under the water. Frogs can breathe through their skin as well as with their lungs.

Frogs have long back legs and many species have webbed feet for jumping and swimming.

Certain frogs can jump up to 20 times their own body length in a single leap.

Frogs have excellent vision and hearing. They don't have external fleshy ears like we do, but a large eardrum just behind the eye. As well as using their eyes to see, frogs use their big, bulgy eyes as part of the feeding process. A frog's tongue is used for catching prey rather than eating, so when a frog catches something they close their eyes tight and push the food down their throat with their eyeballs.

Diet

Frogs absorb water through their skin so they don't need to drink.

All frogs found in the Melbourne area are carnivores. Different species of frogs prey on different types of animals, but in general they will eat anything living that fits in their mouth. Smaller species live on small insects like flies and other invertebrates, while larger species eat large insects, small lizards and other frogs.

Threats

Frog species are in decline globally. Four species have become extinct in Australia. Threats include:

- invasive plants and animals
- land clearing
- pollution
- diseases, such as the deadly Chytrid fungus (an infectious disease contaminating frogs worldwide). This disease also affects many vulnerable species.
- Climate change

Habitats

Frogs are typically found in and around aquatic environments such as swamps, lakes, dams, creeks, streams, rivers and occasionally even backyard swimming pools. They are more likely to be found in areas with different types of native plants, particularly those that grow into the water like reeds, grasses and sedges. They are also often found in bodies of water with shallow sections which the frogs use to call from and lay their eggs.

Adaptations

Some adaptations of frogs:

- nocturnal behaviour so as not to attract predators
- soft skin that must stay moist, making them susceptible to foreign substances in waterways
- produce toxic secretions to deter predators
- highly camouflaged to blend into their environment
- bright colours to warn of toxins
- require damp conditions or water to breed
- lay eggs in water which hatch into gilled tadpoles
- tadpoles use gills to breathe oxygen in water
- gills develop into lungs
- tadpoles develop legs
- frogs breathe air
- frogs live in areas that shelter them.

Calls

Frogs have a wide range of calls––some of which sound like ‘typical’ frog calls and others which are often confused with insect or bird calls.

Only male frogs call. They call to find a mate and to warn away other competing males. Frogs make calls by passing air through the voice box and using their puffed out throat pouches to amplify the sound. The calls of closely related species are sometimes similar.

Useful links

Frogs of Australia—The Amphibian Research Centre

This web site contains a wealth of information about frogs <http://frogs.org.au>.

14 Fun facts about frogs—Smithsonian Institution

This web page provides interesting and obscure facts about frogs you can share with students <http://www.smithsonianmag.com/science-nature/14-fun-facts-about-frogs-180947089/>.

Resources

Taylor, MJ & Knight, F 2009, *Field Guide to the Frogs of Australia*, CSIRO Publishing.

Robinson, M 1998, *A field guide to the frogs of Australia: from Port Augusta to Fraser Island including Tasmania*. Reed Books.

Anstis, M 2002, *Tadpoles of South-Eastern Australia: a guide with keys*, Reed New Holland.

Holton-Ramirez, T & Ramirez, A 2013*, The Little Corroboree Frog*, Magabala Books.

Ganeri, A 2006, *From tadpole to frog*, Harcourt Education.

Zemlicka, S 2012, *From tadpole to frog*, Lerner Publishing Group.

Burris, P 2003, *Five green and speckled frogs*, Scholastic.

Wilson, K 2003*, A frog in the bog*, Little Simon.