FrogID

FrogID Project Resources

**Build Your Own Frog Pond
With FrogID and Bunnings**

frogid.net.au

1. Background

Bunnings and the Australian Museum

Bunnings and the Australian Museum (AM) have partnered together on a world-leading citizen-science project called FrogID.

This national campaign, launched in November 2017, is focused on one of our most threatened animal groups – frogs. The rapid disappearance of frogs is a warning about the rate of environmental change as their physiology and life-cycle makes them highly sensitive to changes on land and in water.

The goal of the Bunnings and the AM partnership is to engage with local schools and communities through the Bunnings network to:

- create habitats that attract and support frogs at schools around Australia while raising awareness about the importance of frogs and the environment

- promote the FrogID app and recruit 'froggers' (FrogID users) to participate in a program that is helping to provide an important snapshot of Australia's environmental health.

FrogID is supported by the FrogID app. Developed by the AM in partnership with IBM, the FrogID app uses the latest in audio recording technology to record frog calls. Identification of frogs by appearance is almost impossible for many species, but identification using frog calls is remarkably accurate. The AM has worked with IBM to develop a mobile application using frog 'audio DNA', which enables members of the public and students to accurately identify species and their habitats all through their smart phone. By using the FrogID app and engaging communities, the AM will be able to track changes in frog populations and so gauge the effect of environmental change on different frog species.

About the Australian Museum

Established in 1827, the AM, is the nation's first museum, and the fifth oldest natural history museum in the world. The AM enriches the community by researching, exhibiting, educating and communicating the relationships between people, cultures and the natural environment. The AM, located in Sydney, is the custodian of an unrivalled collection of more than 18.5 million objects spanning culture and natural history.

About Bunnings

Bunnings is the leading retailer of home improvement and outdoor living products in Australia and New Zealand. Bunnings employs over 40,000 team members and operates over 250 warehouses. Bunnings understands that their operations have an impact, both on the communities they work in and more widely. It is fundamental to the Bunnings business to meaningfully participate in local neighbourhoods and schools and to have a long term focus on sustainability.

Resources

This document provides details on the FrogID project and building frog ponds including:

- How to use the FrogID app

- Designing a frog pond

- Building a frog pond with Bunnings

- Links to FrogID learning resources including activities.

About Frogs

Frogs are amphibians that evolved 350 million years ago. Most amphibian species have two parts to their life cycle (amphibian means 'both life') the first in water during the egg and larva stage and the second on land during the adult stage.

There are five native families of frogs in Australia as well as a sixth introduced family:

- Tree Frogs, the Pelodryidae, which can be divided into climbing, ground-living and water-holding frogs as well as tree-dwelling, ground dwelling and almost all entirely aquatic species, as well as burrowing frogs.

- Ground Frogs, the Myobatrachidae and Limnodynastidae, are unique to the Australian region and have adapted to also live in a wide range of habitats.

- Narrow-mouthed Frogs, the Microhylidae, which have toe discs for climbing and are mostly walkers rather than leapers. Unlike most other Australian frogs, they have direct development where the froglets develop in the egg without a tadpole stage.

- True Frogs, the Ranidae, which have long hind legs that allow them to swim and leap well. There is only one species of True Frog in Australia.

- Toads, the Bufonidae, have a thick dry skin, as well as different bone structure to other families of frogs. The introduced Cane Toad is the only toad in Australia.

Frogs live on all the large landmasses of the world, except Antarctica and Greenland. They are most common in the warm, wet tropics, but they also live in rainforests, deserts, alpine areas and above and below ground.

Frogs require moisture to survive and to breed. Most frog species are nocturnal and are therefore more active, and vocal, after dusk. Given their reliance on water for breeding, frogs tend to call more after rain. Some frog species breed almost all year, others will only breed (and therefore call) a few nights a year.

While the best time to hear frogs is typically the warmer months, as most frog species choose to breed in the spring and summer, some frog species prefer the cooler months. Others, such as the desert-dwelling Eastern Water-holding Frog (Cyclorana platycephala), will just call anytime that it rains enough.

In almost all frog species, only males call. As every species has a different sounding call, you can identify frog species just by listening. The typical calls that we hear frogs make are male frogs advertising themselves as potential partners, hoping that female frogs will be attracted to them. Because the aim of the encounter is to breed, male frogs typically call in or near water (ponds, dams, streams and wetlands), where eggs are most often laid and tadpoles develop.

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2. FrogID Project

a. Summary

The FrogID app and website include details of all 240 Australian native frogs including images, call recordings, habitats and breeding times. Download and search the FrogID mobile app and become a citizen scientist by recording frog calls in your garden or local area. Data collected from the FrogID app will help scientists determine where frogs are most at risk of habitat loss, climate change and disease.

b. Why are frogs important?

Frogs play a vital role in many food webs, as both predators and prey. Frogs are major predators of insects and other invertebrates, including pest species. As prey, they provide food for birds, fish, snakes and other larger animals.

Frogs are often the first animals to be affected by environmental change, and so may act as biological indicators of the state of the environment. Their special permeable skin makes frogs susceptible to environmental changes. Climate change, habitat destruction, introduced species and disease all have detrimental effects on frog populations. Due to the various threats against frog populations and their rapidly decreasing numbers, conservation efforts have become vital to their survival.

c. How will FrogID and Bunnings help frog conservation?

In urban areas, human development has reduced the natural habitat available to frogs. Through the FrogID project and with support from the Bunnings network, frog habitats will be built in local schools. This will help conservation efforts and improve the health of urban and suburban ecosystems.

d. How will the FrogID app help frog conservation?

In Australia, we have lost at least four species of frog already to extinction, and many more are at risk. One of the biggest problems we face is that we still know so little about our native frogs, for example, where they are and how they are doing. The FrogID app aims to make learning about Australian frogs, what is happening to them, and the importance of conserving frogs, easy. With the FrogID app, people from all over the country can record frog calls and identify frogs in their area using their smartphones. Using the FrogID app helps scientists determine where our native frog species are found, what habitats frogs need to survive and how frog species are responding to environmental change. Collecting this information and making use of it in conservation efforts could be crucial to saving Australia's frogs.

e. How does the FrogID app work?

Download

- Firstly, the FrogID app, iOS app or Android app must be downloaded to a smartphone device.

- There is a quick 'How to' section that can be used on the app, accessed via the 'About' section in the 'Profile' screen.

- It is necessary to allow the FrogID app to know your location. Click 'Allow' for FrogID to access your location while you are using the app.

- It is recommended to download offline content to your phone such as the images and calls of the frogs in the app. If you are in a remote location or have limited internet access you will be able to use all the features of FrogID without being connected to the internet.

Profile

- A profile must be created to submit a call. Log in on the 'Profile' section or create a profile by signing up with an email address.

- The Profile page enables you to view:
  - ° all the calls you have recorded
  - ° calls you have submitted
  - ° calls that have been verified as a frog species
  - ° calls that cannot be determined or are not frogs.

Explore

- The first section in the FrogID app is the 'Explore' screen, featuring over 240 species of frog in Australia. All the frog species can be discovered by scrolling left through the circular buttons or 'Bubbles' or in the list view below this area. If you have allowed the app to access your location in settings, the larger circular buttons will show the frogs that are most common in your area and that are likely to be calling now. Scrolling right the bubbles become smaller and the further right you go, the frogs that are less likely to be around are displayed.

- Selecting a frog will show you the details about that frog. Scrolling down there is a brief description of the frog species, a description of their preferred habitat, a distribution map, breeding biology description and the other frog species that are similar. You can move to the next frog in the list using the arrows in the top right of the screen.

Filter

- In the top left of the screen you can click on 'Filter' to refine the selection of frogs seen on the Explore screen such as:
  - ° 'Near Me' will use your phone location service to only show frogs in your regional area
  - ° 'Calling Period' selects frogs that are calling in a particular month
  - ° 'Habitat' selects the environment and water body you are exploring.

Record

- The next section in the FrogID app is the 'Recording' section which is where the sounds of the frog are recorded and there is the opportunity to enter notes and photographs. The app needs to be given permission to access your mobile's microphone, for recording to work, which should be completed in the Settings on your phone. Press the red button on the app to start recording a frog call. At least 20 seconds of recording the call is required. When you reach more than 20 seconds recording you can stop the recording by pressing the red record button again.
  - ° Additional information can then be added to the recording which is useful in helping to validate the call and for building the frog species database. For example, select the type of habitat where the recording was done and the water body type.
  - ° The frog call can now be sent by pressing 'Submit'. As the app provides information on frogs in your location you can find a similar match to your frog, however, you don't need to do this to submit your frog call.

What happens next

- If you are in reception, calls will be submitted to the AM for expert identification, they will show up in your "Submitted: Pending Verification" section of your Profile.

- If you are not in reception, they will show up in your "Submitted: Pending Upload", and you will need to open up your app again when in reception or Wi-Fi and the calls should automatically sync and upload to the AM.

- Make sure all your calls are submitted, any that haven't will show up under "Not submitted".

- You will get an email and your app will be updated when your recordings have been identified.

- For further information, visit the FrogID website, frogid.net.au

OUR FROGS ARE AT RISK

f. Building the frog pond

How to build a frog pond

Not all frogs live or breed in the same kinds of habitat. Frogs are typically found in and around wet environments such as wetlands, creeks, streams and other pools of water. Frogs are attracted to native plants, in particular reeds and grasses that grow in wet environments. Within these environments, frogs call and lay their eggs. When building a frog pond, it is important to consider the frog species in your area and their preferred habitat and construct your pond in a way that will attract these frogs. By using the 'Near Me' or 'Habitat' filter on the FrogID app, you can discover a comprehensive list of frog species in your surrounding area.

Provided below are two methods for building a frog pond:

- Building a prefabricated frog pond
- Building a frog pond from scratch

Bunnings has all the equipment required to construct the two options and Bunnings team members will be able to guide you as to your requirements.

General considerations before you get started

- The first decision is where to build the frog pond. The following things should be considered when you are looking for a suitable location:
  - º Build the pond away from existing large trees to avoid roots and leaves falling in which may contaminate the water.
  - º Avoid areas where pesticides are used or receive run off from industry or other urban developments.
  - º Check with your local council regarding any restrictions on building the frog pond and if there is a requirement for protection such as a fence.

  - º Consider electricity supply, cabling and piping that may be underground and make sure there is access to additional water supplies if required. Ponds need water all year round however; the depth of the pond water can increase or decrease over time.
- A frog pond will attract frogs which can be noisy! Be aware of neighbours, that may be annoyed by frog calling, when selecting the site of your pond.
- A frog's permeable skin makes it vulnerable to chemicals that may be present in your garden. You should avoid the use of pesticides and herbicides in the areas surrounding your pond. These chemicals will be harmful to your frog population and will deplete their main source of food. Frogs have a largely insect diet which means they act as a natural pesticide!
- In order to attract tree frogs, it may help to provide additional shelter sites as well as a pond. One of the easiest and cheapest ways to do this is with a PVC pipe. A piece of pipe approximately one metre long, planted vertically in the ground without including the cap will provide a dark and moist shelter for tree frogs.

Making your frog pond safe

As with any activity around water, there are some risks involved. These include:

- Drowning hazards
- Unsupervised access to the pond
- Water quality and related health hazards
- Overhanging branches, obstructed paths and unstable or steep banks
- Hygiene issues relating to the water
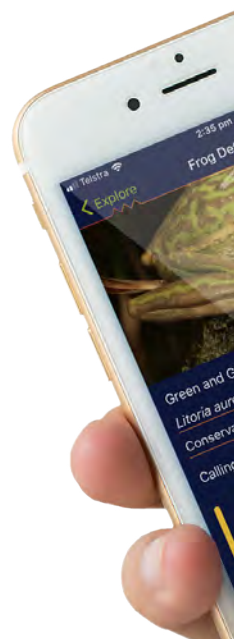
Suggested methods to manage water risk and frog pond health are as follows:

- Check the local council and school requirements for water risk management in regards to children. Ensure that the frog pond meets those requirements and that any school building a pond is aware of ongoing duty of care in regard to the frog pond.

- Control access to the pond using fencing or cover the pond with rigid mesh to prevent falling in. A rigid metal grille should be used. Do not forget to check it regularly to make sure it is up to the job of keeping young children out of the water and that any entry points (e.g. gates) are locked.

- Ensure there is adequate supervision of children at all times.

- Ensure that children wash their hands after visiting the pond.

- The banks of the pond should be clearly identifiable or feature a barrier of rocks, logs and vegetation.

- Ensure that the area is regularly maintained so that the perimeter of the pond is visible.

- Clear signage should be used at the access points to the pond.

- Ensure that both children and adults wear the appropriate footwear.

- In schools, all supervising teachers should be trained in first aid and be aware of the required regulations and risk management requirements.

- Frog ponds should only be populated by frogs that have moved into the pond by themselves. Do not introduce frogs to the pond.

- Do not handle the frogs as they are very sensitive to chemicals.

Australian Museum's Amphibian Biologist, Dr Jodi Rowley, with students at Camdenville Public School in Newtown for the Bunnings and FrogID partnership launch.

Other Safety Information

Water safety

- Each state has their own relevant code and legislation. Please check your state legislation with your local council before building a pond.

- However, keeping the pond depth to less than 300mm and with additional safety measures such as mesh over the water body should be adequate in the majority of school settings.

Frog ponds attracting snakes

- Building a frog pond is about creating an ecosystem, and this means that it may attract other wildlife to the pond, particularly in spells of dry weather. Some species of snakes are attracted to water bodies due to an abundance of food, but they are generally not attracted to areas where people are frequently moving. If a snake is spotted near your pond treat this like you would any other area in your garden or school, stay calm, move away from the area and call in a relevant person to remove the snake. If a snake is near your pond it is more likely to have already existed in the area prior to the ponds installation.

Ponds attracting cane toads

- It is unlikely that you will get cane toads specifically for your small water body, unless they are already present in the area. There is always a potential that a cane toad will visit your pond – if this is the case it is essential that you report it to your local biosecurity agency. They will be able to provide you with the appropriate advice on how to deal with it.

3. How to Build a Prefabricated Frog Pond

STEP 1:
Ensure that the prefabricated frog pond mould make is strong and will not easily be punctured by rocks or other debris. It should have varying depths of both shallow and deeper areas. This will allow your frogs to manoeuvre around the pond according to their needs for water depth and temperature.

STEP 2:
If you are using a pre-fabricated container such as a plastic frog pond mould, rinse the container before you install it to get rid of any harmful chemicals.

STEP 3:
Dig a hole to fit your container. The top of the container should be level with the surrounding ground. Back fill any edges to close any gaps next to the container so that it is snug. Consider what will happen in the case of heavy rain. For example, an overflow area below the pond height to catch a surplus of water may be required.

STEP 4:
Line the bottom of the container with washed sand or gravel. Ensure that neither have been treated chemically.

STEP 5:
Building a frog pond is just as much as about the environment around the pond as the pond itself. It is important to ensure the walls of your pond are not too steep or slippery, as some frogs can get stuck in the water and drown. Use pebbles and larger rocks on the base and around the sides of your pond to provide a surface that the frogs can grip when exiting the pond.

TIP: Think about how a frog would enter and exit the pond by submerging some rocks and logs at the bottom of your pond. This will also encourage algal growth, which provides food and shelter for tadpoles.

STEP 6:
Add in your native plants and let them settle in for at least a week. Reeds and sedges are ideal for the shallows of your pond. These plants keep the water clean and provide shelter for frogs and food for tadpoles. Create a wet area around the pond that will not dry out quickly by including logs, rocks, mulch and other native plants of various types that will provide shelter and shade.

STEP 7:
If you are using tap or tank water to fill the pond, let it sit in the sun for approximately 5 days for chlorine and any other harmful substances to dissipate. A chlorine neutraliser can also be used in tap water. This process should be adhered to every time water is added to the pond.

STEP 8:
The use of aquatic plants will act as a natural filter to keep your pond water clear. However, if you still wish to use a water pump, it should be covered by mesh to protect any tadpoles from being harmed.

STEP 9:
Wait for the frogs! Once they arrive start recording the frogs on the FrogID app.

STEP 10:
Remember to maintain the frog pond. Top up the pond with water if required and remove excess leaves and other dead plant material. Aquatic plants should be thinned out to ensure they do not cover more than a quarter of the pond surface.

NOTE:
All ponds in gardens with young children or in schools should be covered by a metal mesh panel (100 x 100mm square holes) to avoid children falling in. The Australian Museum will not be supplying frogs to put in your frog pond. The pond you build will attract frogs that are already living in the surrounding environment.

4. How to Build a Frog Pond From Scratch

STEP 1:
Mark out the shape of the frog pond that you would like to dig. A simpler shape is easiest, such as a kidney bean, as the pond must be lined.

STEP 2:
Begin removing the turf. The base of the pond will require varying levels, both shallow and deep. Although frogs do not require very deep water (about 50cm), if you plan to add fish their requirements for water depth should also be considered. Sloped pond sides will enable young frogs to enter and exit the pond. Check that the sides of the pond are level on all sides otherwise water will escape. This can be done using a spirit level and a plank.

STEP 3:
Seal the pond with a pond underlay. The sides of the underlay should extend beyond the sides of the pond by a margin that can be covered by turf and stones. This will protect the pond liner and the pond. Press the underlay into the shape of the pond using your hands.

STEP 4:
Line the pond with pond liner again pressing it into the shape of the pond and making it as wrinkle free as possible. The sides of the pond liner should extend beyond the sides of the pond by a margin that can be covered by turf and stones. Ensure that you do not tear the liner.

STEP 5:
Line the bottom of the pond with washed sand or gravel. Ensure that neither have been treated chemically.

STEP 6:
It is important to ensure the walls of your pond are not too steep or slippery, as some frogs can get stuck in the water and drown. Use pebbles and larger rocks on the base and around the sides of your pond to provide a surface that the frogs can grip when exiting the pond.

TIP: Think about how a frog would enter and exit the pond by submerging some rocks and logs at the bottom of your pond. This will also encourage algal growth, which provides food and shelter for tadpoles.

STEP 7:
Add in your native plants and let them settle in for at least a week. Reeds and sedges are ideal for the shallows of your pond. These plants keep the water clean and provide shelter for frogs and food for tadpoles. Create a wet area around the pond that will not dry out quickly by including logs, rocks, mulch and other native plants of various types that will provide shelter and shade.

STEP 8:
If you are using tap or tank water to fill the pond, let it sit in the sun for approximately 5 days for chlorine and any other harmful substances to dissipate. A chlorine neutraliser can also be used in tap water. This process should be adhered to every time water is added to the pond.

STEP 9:
The use of aquatic plants will act as a natural filter to keep your pond water clear. However, if you still wish to use a water pump, it should be covered by mesh to protect any tadpoles from being harmed.

STEP 10:
Trim the pond underlay and pond liner around the edges of your pond in areas you have not covered with turf, stones or plants.

STEP 11:
Wait for the frogs! Once they arrive start recording the frogs on the FrogID app.

STEP 12:
Remember to maintain the frog pond. Top up the pond with water if required and remove excess leaves and other dead plant material. Aquatic plants should be thinned out to ensure they do not cover more than a quarter of the pond surface.

NOTE:
All ponds in gardens with young children or in schools should be covered by a metal mesh panel (100 x 100mm square holes) to avoid children falling in. The Australian Museum will not be supplying frogs to put in your frog pond. The pond you build will attract frogs that are already living in the surrounding environment.

5. Additional Learning Resources

Download and explore the FrogID app or visit the FrogID website for information on Australia's native frogs, their habitats, breeding times and to listen to their calls. https://www.frogid.net.au/

The Australian Museum has also created a number of educational resources and assets to use in the classroom and outside. Links to these resources are provided below and can be downloaded for use at home or in the classroom. Alternatively please go to directly to the FrogID website

Each of the educational topics include:

• summary and objectives

• curriculum links for stages 1-5

• presentation slides

• suggested session structure

• a number of student activities.

a. Australian Frogs

Introduces students to the diversity of Australian frogs.

• media.australianmuseum.net.au/media/dd/documents/ australian_frogs_2018_dsdp9v.6074d11.pdf

b. What Is A Frog?

Introduces students to the classification of frogs and toads.

• media.australianmuseum.net.au/media/dd/documents/ what_is_a_frog_2018_ao8f2g.cf378ee.pdf

c. Frog Habitats and Adaptation

Introduces students to the concepts of habitats, adaptations and food webs.

• media.australianmuseum.net.au/media/dd/documents/ frog_habitat_adaptation_2018_gtpkei.7e1b201.pdf

Habitat Sorting Game – Student Activity

Introduction

What do we need to survive?

Humans

- Water
- Space
- Food
- Shelter
- Social interactions

Other animals

- Water
- Space
- Food
- Shelter

What is a habitat?

A habitat is the natural environment of an organism. It is a place that is natural for the life and growth of an organism.

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