FrogID

EDUCATION RESOURCES

Frog Habitats and Adaption

MAJOR PARTNER

IBM

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AUSTRALIAN MUSEUM

frogid.net.au

Frog habitats

Frogs live on all the large landmasses of the world, except Antarctica and Greenland. Many people assume that they only live in moist areas, but in fact their habitats are far more varied. While they are most common in the warm, wet tropics, they also live:

- in rainforests to deserts,
- in alpine to coastal areas,
- in treetops to under the ground,
- on cliff faces to sphagnum moss bogs,
- in still water to running streams.

Frogs always require moisture to survive and to breed because during the tadpole phase of their life cycle, they are dependent on water. Depending on their habitat, some tadpoles will develop more quickly than others due to limitations on water sources. They are also very sensitive to water loss because their skin is permeable. This means that frogs who live in drier areas have behavioural adaptations to survive, for example burrowing, which helps to retain skin moisture, while frogs that live in moist environments are free to live above the ground.

Frog adaptations

Frogs are especially adapted for the places they live in and their colouring is often dependent on their habitat. Many different species that live in the same types of habitats, have similar colourings that helps them to hide from potential predators. Some have even adapted to look like bird poo! The colour of frog skin can also be used to actively deter predators – some species have bright colours to indicate that they are unpleasant tasting or poisonous. Some have bright markings on their inner thighs, called flash markings, to startle predators when they jump.

Many frogs that live in forests and rainforests have sticky toe discs that help them climb and keep them in place when resting on leaves and branches. Frogs that live in arid areas have tough tubercles (nodules) on their back feet to help them dig into the earth when burrowing. Frogs that swim have webbed feet to make them more efficient in the water.

Due to the moist environments most frogs live in, it is necessary for them to have adaptations that will protect them from the bacteria that also thrives in wet environments. Frog skin produces substances such as alkaloids, steroids and peptides which have antibacterial and antifungal properties. These substances are often released in response to stress or infection.

Some frogs are adapted to live in dry deserts. When conditions become dry the frogs:

- burrow down into the earth to a depth of up to a metre by shovelling the sand or mud from under them with their back feet.
- make a small chamber in the earth.
- form a cocoon made from many layers of dead skin, encasing their entire body.

When rain falls again, frogs emerge; find mates, lay eggs and feed – all in a short space of time. The tadpoles must develop very quickly into adults before the puddle they live in dries up.

What is FrogID?

FrogID is a national citizen science project that 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!

The app is also being used to collect data on the Cane Toad, allowing us to track its whereabouts, and to identify where frog populations are thriving and where they are threatened. Using FrogID, you can help scientists determine where frogs are most at risk of habitat loss, climate change and disease.

How to use the FrogID mobile app: https://www.youtube.com/watch?v=sl73oSP1MjE
Why Frogs are important FrogID: https://www.youtube.com/watch?v=KKzPq-gOQro

What's so important about frogs?

Frogs play a vital role in many food webs, as both predators and prey. Their role as predators of insects is a key factor in the eradication of millions of pests that could destroy valuable crops. As prey, they provide food for birds, fish, snakes, and other larger animals. Tadpoles can even act as a kind of filter by feeding on algae.

They are also key biological indicators of the health of the environment. Environmental degradation, climate change and disease have detrimental effects on frog populations. Their soft, absorbent skin often means that environmental changes, such as increasing pollution, are indicated early by declining populations and rising numbers of physical deformities.

By returning to sites where frogs have been recorded at different times and under different weather conditions, we can track changes in frog populations and habitats over time, and so gauge the effect of environment change on different frog species.

Data obtained through the app can also help us to track the spread of introduced Cane Toads.

Frog Habitats – Teacher Resource

1. **Summary**
   Students explore habitats and investigate the different adaptations different frog species need to survive in the habitat.
2. **Objectives**
   - Students are introduced to the concepts of adaptations, habitats and food webs.
   - They are encouraged to use design-based problem-solving skills.
   - Students will know different species of frogs and their associated features.
3. **Curriculum links**
   - **Stage 1**
     - ACSSU017
     - ACSSU211
     - ACSHE021
     - ACSHE022
     - ACSHE034
     - ACSHE035
   - **Stage 2**
     - ACSSU073
   - **Stage 3**
     - ACSSU043
     - ACSIS090
     - ACSSU094
   - **Stage 4**
     - ACSSU112
     - ACSHE120
     - ACSIS124
     - ACSIS125
     - ACSIS129
     - ACSIS130
     - ACSIS133
     - ACSIS139
     - ACSIS140
     - ACSIS144
     - ACSIS145
4. **Resources**
   - Habitat Sorting Game – Student Activity (pages 10-15)
   - Design Your Own Frog Pond -Teacher Resource (page 16)
   - Design Your Own Frog Pond – Student Activity (page 17)
   - Frogs as Bio-indicators – Student Activity (page 21)
   - Frogs and Climate Change – Student Activity (page 23)
   - Finding Frogs in Nests video - https://vimeo.com/71330538
   - Tips for using FrogID video - https://www.youtube.com/watch?v=GQDF7uCjsTY
   - Tree Frogs and Ground-Dwelling Frogs fact sheets on Australian Museum website: https://australianmuseum.net.au/frogs-amphibians
   - Links to frog species and their habitats on the Australian Museum website: http://australianmuseum.net.au/frogs-amphibians
   - Frog hands and feet article about adaptations: http://australianmuseum.net.au/blogpost/science/put-your-hands-up-and-best-foot-forward
   - Keeping frogs in a Terrarium: http://australianmuseum.net.au/care-of-amphibians
   - Noisy frogs in your garden: http://australianmuseum.net.au/noisy-frogs
   - The Strangest Tadpole: http://australianmuseum.net.au/blogpost/science/the-strangest-tadpole

5. Session structure

a) Introduction - Engage

- Establish students' prior knowledge about habitats and animals' needs:
    - As humans, what do we need to survive? What do animals need to survive? What do frogs need?

b) Suggested activities – Explore, Explain and Elaborate

- **Habitat Sorting Game (pages 10-15)**
    - Students look at the different photos of the frogs focusing on body shape, feet (spade feet) and toe pads etc. to match frogs to one of 4 habitats.
    - Extension: Students could explain how the frogs' adaptations help them survive in their habitat.

- **Frog Pond Activity (pages 16-20)**
    - Students research the frogs that live in their local area and their needs.
    - They design a pond appropriate for their local frogs. They could draw their habitat design on paper or use a digital drawing program.
    - Students could also create a 3D model of their habitat inside an old shoe-box using craft materials such as crepe paper, cellophane etc.
    - Extension:
        - Students consider the specific plant needs for the pond.
        - Students design a frog pond for the school.

- **Frogs as Bio-indicators Activity (page 22)**
    - Students look at the information provided and do their own research regarding how frogs can be used as bio-indicators.
    - Students could present their findings to the class or have a class discussion on the topic 'Do frogs make good bio-indicators?'

- **Frogs and Climate Change Activity (page 23)**
    - Students create a digital presentation or speech to present at the United Nations Environment Program in New York about the relationship between frogs and climate change.

Frog Adaption and Evolution – Teacher Resource

1. Summary

Students learn about how animals have evolved to suit their environments and possess adaptations that make them best suited for their environment.

2. Objectives

- Students identify differences between habitats.
- They link different habitats to the different frog species inhabiting a range of ecosystems
- They learn about the theory of evolution by natural selection.
- They learn that frogs have features that suit their habitat.

3. Curriculum links

- **Stage 1**
  - ACSSU211
- **Stage 2**
  - ACSSU073
- **Stage 3**
  - ACSSU043
  - ACSSU094
- **Stage 4**
  - ACSIS133
  - ACSIS124
- **Stage 5**
  - ACSSU176
  - ACSSU185

4. Resources

- Habitat Sorting Game – Student Activity (pages 10-15)
- Frog Adaption and Evolution – Student Activity (page 21)
- Classification – Student Activity (pages 24-29)
- Tree Frogs and Ground-Dwelling Frogs fact sheets on Australian Museum website: https://australianmuseum.net.au/frogs-amphibians
- Frog feet and hand adaptations: https://australianmuseum.net.au/blogpost/science/put-your-hands-up-and-best-foot-forward
- Adaptations to hide from predators: https://australianmuseum.net.au/blogpost/amri-news/amri-bird-poo-frogs-more-species
- Evolution of tree frogs: https://australianmuseum.net.au/blogpost/science/frogs-in-the-trees
- 'Flying frogs' adaptations: https://australianmuseum.net.au/blogpost/science/aerodynamic-amphibians]
- Frogs behaviour in their habitat: https://australianmuseum.net.au/blogpost/amri-news/linking-frogs-with-flows
- A frog that build nests: https://vimeo.com/71330538

5. Session structure

a) Introduction – Engage

- Establish prior knowledge of types of habitats frogs may live in.
- Establish prior knowledge of evolution and adaptations.

- **Habitat Sorting Game – Student Activity (pages 10-15)**
  - Students look at the different photos of frogs focusing on body shape, feet (spade feet) and toe pads etc. to match 8 frogs to one of 4 habitats.
  - Extension: Students could explain how the frogs' adaptations help them survive in their habitat.

- **Frog Adaption and Evolution – Student Activity (page 21)**
  - Students act as scientists and complete research about their selected frog.
  - They consider what adaptations it would need to survive in a different environment.
  - Students can use many different modes of research - books, internet, videos, mobile apps.
  - They could report their findings back to the class and in groups through role play, a digital presentation, a speech, a sculpture or replicate the interview structure from the video (depending on their age group).
  - Encourage students to ask questions about each other's presentations.

- **Classification – Student Activity (pages 24-30)**
  - **Exercise 1: Classifying Vertebrates**
    - Students classify vertebrates using a dichotomous key.
  - **Exercise 2: Classifying Frogs**
    - Students use the physical features of frogs in photos and a dichotomous key to identify the species names of 6 frogs. They could construct a table to show their answers – a template is given.
  - **Exercise 3: Amphibian Exhibit Confusion (Research Task)**
    - Students use a dichotomous key and the frog profiles on the Australian Museum's website to match 9 frogs with their correct enclosure in the Amphibian Exhibit at the State Zoo. There are template tables for their response.

Habitat Sorting Game – Student Activity

Introduction

What do we need to survive?

Humans

- Water
- Space
- Food
- Shelter
- Social interactions

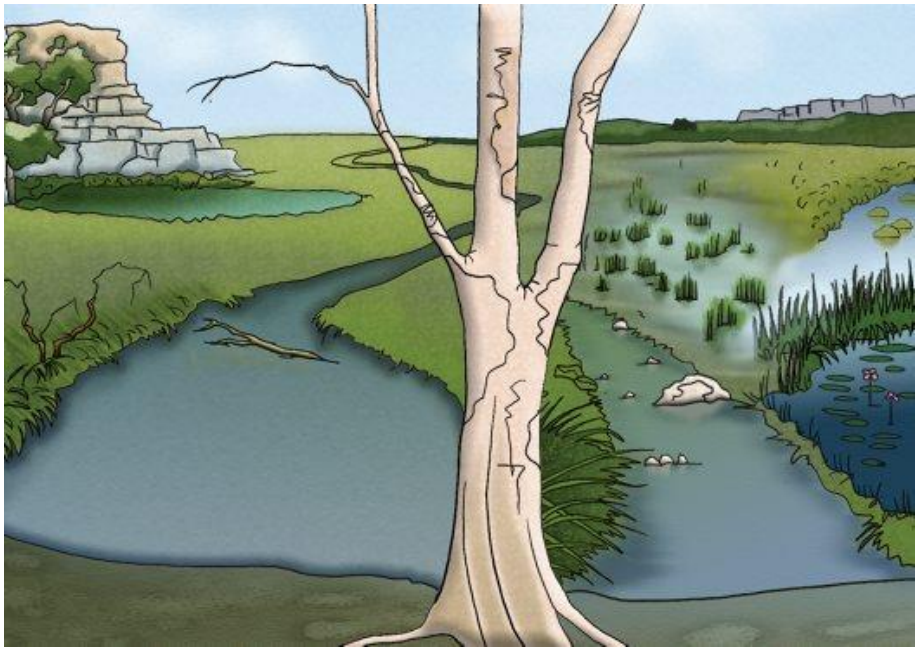
Other animals

- Water
- Space
- Food
- Shelter

What is a habitat?

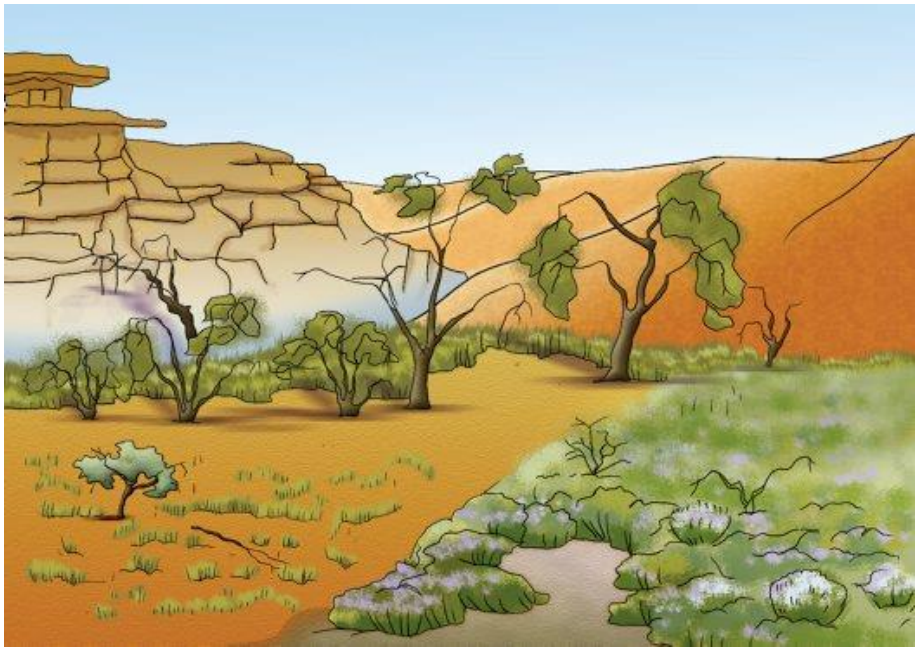
A habitat is the natural environment of an organism It is a place that is natural for the life and growth of an organism.

Freshwater habitats



- Lake
- River
- Stream
- Pond
- Wetland
- Billabong

Arid habitats



- Tall shrubs
- Heath
- Grasslands
- Sand dunes
- Rocky areas

Forest habitats

- Dry Forest
- Wet Forest
- Rainforest

Urban habitats

- Garden
- Harbour
- Park
- High-Rise Buildings
- Houses

Match the frog to its habitat!

Look at features such as hands, feet, body shape and skin to determine which habitat these 8 frogs are best suited to.

1. 

2. 

3. 

4.

5.

6.

7.

8.

Design Your Own Frog Pond – Teacher Resource

Summary
Students research their local frog species and design a frog pond to meet the needs of these local species. The activity could be done individually or in groups.

Designing the pond
The students do research to determine which frog species are local to their area and what their needs are. They choose what type of pond they would like to design. They could use paper or a digital drawing program to display their ideas. Their design should show that they have taken into consideration the needs of the local frogs. They could annotate their drawing with notes.

Building a model pond
They could also build a 3D model of their design using an old shoe box and paper, cellophane etc.

A school-wide design competition
This activity could be a school-wide activity with a prize for the winning design. The best design could be built in the school grounds.

Raising awareness about frogs
This may also be an opportunity to work with the local community and raise awareness around the plight of frogs, perhaps encouraging locals to build frog ponds of their own. There are numerous events throughout the year that this could be linked to, such as World Frog Day on March 20th and Frog Week in November for more event suggestions please see: https://australianmuseum.net.au/create-your-own-water-event

Presenting their design
There are numerous ways in which students might present their frog pond design that they have researched, some suggestions follow:

- A poster with an illustration of the pond, including labels of why it is suitable for local populations
- A model of their frog pond with labels or verbal explanation
- A presentation with slides explaining their frog pond and why it is suitable for local populations

Using FrogID
After the frog pond has been built, students can use the FrogID app after a period of a few months to see if their pond has changed frog numbers in the area.

Design Your Own Frog Pond – Student Activity

Design your own frog pond that will meet the needs of frogs in your local area.

Find out which frog species are local to your area

- The FrogID app can help you with this!
- FrogID website www.frogid.net.au
- Your local council and national parks service may also be able to help.
- The Atlas of Living Australia (ala.org.au) is another good place to look.

Research the frogs found in your local area

Find out what the frogs' needs are:

- Do they need shallow or deep areas?
- Do they need places to hide inside and outside the pond?
- Do they breed in ponds, streams or swamps?

Choose what type of frog pond you will create

- Liner Pond
- Pre-fabricated Pond
- Natural habitat revegetation



Design your frog pond!

- How big should it be?
- How deep should it be?
- What plants should you use?
- Draw your design onto paper or use a digital drawing program. You could also create a 3D model of your pond inside an old shoe box using paper, cellophane etc.

Pick a good spot in the school for your frog pond.

- Is there an existing habitat that can be revegetated?
- If you built the pond in the school grounds where would be a good location?
- Do you have a school garden it could be close to?
- Should it be away from classrooms and playgrounds?

Other visitors to your pond:

How to Build a Frog Pond – Student Activity

Choose a good location

Select somewhere:

- not too close to houses (frogs can be very noisy)
- not too close to big trees (tree roots can cause problems in your pond)
- to provide enough sun for plants to grow
- with enough room to fit your frog pond

Choose the type of frog pond you want to build

- **Revegetation of natural stream or waterway**
  Revitalise natural habitat by removing rubbish and weeds and replanting native vegetation

- **Liner frog pond**
  If you use a plastic pond liner, make sure it's tough and not easily punctured.

- **Above ground frog pond**
  Make sure that any container you plan to use is watertight and doesn't contain harmful chemicals

- **Pre-fabricated plastic frog pond**
  Ensure you rinse your new plastic pond before you install it as frogs are sensitive to chemicals.

Dig your hole for your frog pond

- Ensure that your pond has shallow and deep areas of water, with a minimum of 50 cm in the deepest parts.

Add in rocks, pebbles and dirt to cover the bottom of your pond

- This will help to make sure that the sides aren't too slippery for your frogs to get in and out.

Add mulch, leaf litter, rocks and logs around the outside

- This will give your frogs somewhere to hide from predators and to keep cool during the day.

Add the water!

- If you use tap water, put the water outside in a bucket in the sun and wait about 5 days for the chlorine to disappear before adding it to your pond or use a chlorine neutralizer from a pet shop
- Rainwater works perfectly but if it comes from a metal tank, you will need to let it sit for a few days as well.

Add local plants and fish (if you like)

- Check your local nursery for good native options for your area! Some options are:
    - Tussock Sedges, Sedges and Nardoo for the shallow end
    - Marsh Flower, Purple Loosestrife, Tassel Sedge and Water Ribbons for deeper areas
    - Lomandra, Kangaroo Grass, Swamp Banksia, Saw-Leafed Sedge and Native Ginger for around the edges
- Native fish are great for mozzie control, the Pacific Blue Eye and Australian Smelt make great choices.

Enjoy all your new froggy friends!

- You can now sit back and relax; the frogs will come given a little time - all you have to do it wait.
- Remember don’t introduce frogs or tadpoles into your new habitat.

Frog Adaption and Evolution – Student Activity

Select a species of frog and find out about its current environment.

What adaptations does your frog have in order to survive in its current environment?

- Does it have sticky toe pads for climbing?
- Does it hibernate out of the cold?
- Does it lay its eggs in a particular way?

Now think of a new environment that your frog has to live in.

What differences are there between the current and new environments?

- Is it drier?
- Is it hotter?
- Is it wetter?

What adaptations does your frog need to survive in its new environment?

- Does it need to stay out of the sun?
- Does it need to travel to find water?
- Does it need to hold water?

Would you expect your frog to change its size?

- Would it get bigger?
- Smaller?
- Flatter?
- Rounder?
- Why?

Are there any frogs living in similar environments around the world today?

What adaptations do they have?

- Do you think your frog would have the same adaptations?

Draw your new frog with its new adaptations

- Make sure you label the new adaptations
- What they are for?

Frogs as Bio-indicators – Student Activity

Freshwater bio-indicators are animals and plants that can be used to determine the state of health of freshwater habitats. Some creatures are very sensitive to water-borne pollutants while others less so. Changes in the number and diversity of these animals can be used as a measuring tool to determine water quality. Bio-indicator organisms typically live in freshwater and so are subject to the changes in the amount of pollutants. They are often more effective than laboratory-based measuring tools as they are unable to escape the effects of the pollutants, are more sensitive than most meters and are cheaper to use.

One of the biggest problems in using laboratory probes or taking water samples is that water quality is not static, it changes constantly, and pollution loads may vary from high to immeasurably low. Water meters can only record water quality at one point in time and often fail to assess fluctuations in water quality.

Frogs are amphibians, animals that live both on land and in water. One of the factors that allow frogs to move from water to land is their specialised skin. The moist skin of a frog achieves several important biological functions including:

- absorbing oxygen and releasing carbon dioxide
- regulating their salt content and absorbing water
- changing colour to camouflage themselves
- secreting mucus to avoid drying out.

Frogs are susceptible to many changes in their environment. Changes in salinity (the amount of salt), temperature and pH affect the distribution of many species. Salinity can impact on a frog's ability to regulate its salt/water balance. Temperature change can affect the ecology of frogs by forcing populations to alter habitat use and spawning times. Large changes in pH can also impact the distribution of local species and, in some cases, they will move out of an area altogether.

Some frog species prefer turbid water instead of clear pools. At present, frog populations are declining all around the world. Using frogs as bio-indicators can be as simple as noticing that a formerly noisy frog habitat has become silent while other nearby habitats are still active.

Using the information above and your own research discuss how frogs can be used as Bio-indicators.

Frogs and Climate Change – Student Activity

Currently the climate around the world is changing rapidly, the world is getting warmer and weather patterns are changing. Humans are the primary cause. This is agreed by almost every climate scientist and world government. Climate change is not something for the future: it is happening right now in front of our eyes. Frogs are a good bio-indicator because they are very sensitive to changes in their environments.

Your task

You have been asked to do a presentation to the United Nations Environment Program in New York about frogs and climate change. It may be in the form of a speech or a digital presentation.

You will need to do some research. Consider these points:

How is climate change likely to affect your local environment?

- Will it be hotter, drier, colder, wetter? Will there be rising see levels near you?

What about frogs in your local area?

- Give examples of how frogs in your local area will be affected by the change in the local environment e.g. It may be harder for them to find somewhere to live and breed.

How do you think that climate change may affect frogs?

Give examples of how frogs may be affected for example:

- Changes in weather patterns might mean less rain. As frogs need water to breed and lay their eggs this may affect frog numbers.
- Frogs that live in the cold might become extinct, for example: the Corroboree Frog.

How can we find out what is happening to frogs?

- Explain how FrogID can help us track frog numbers.

What can you do to help frogs?

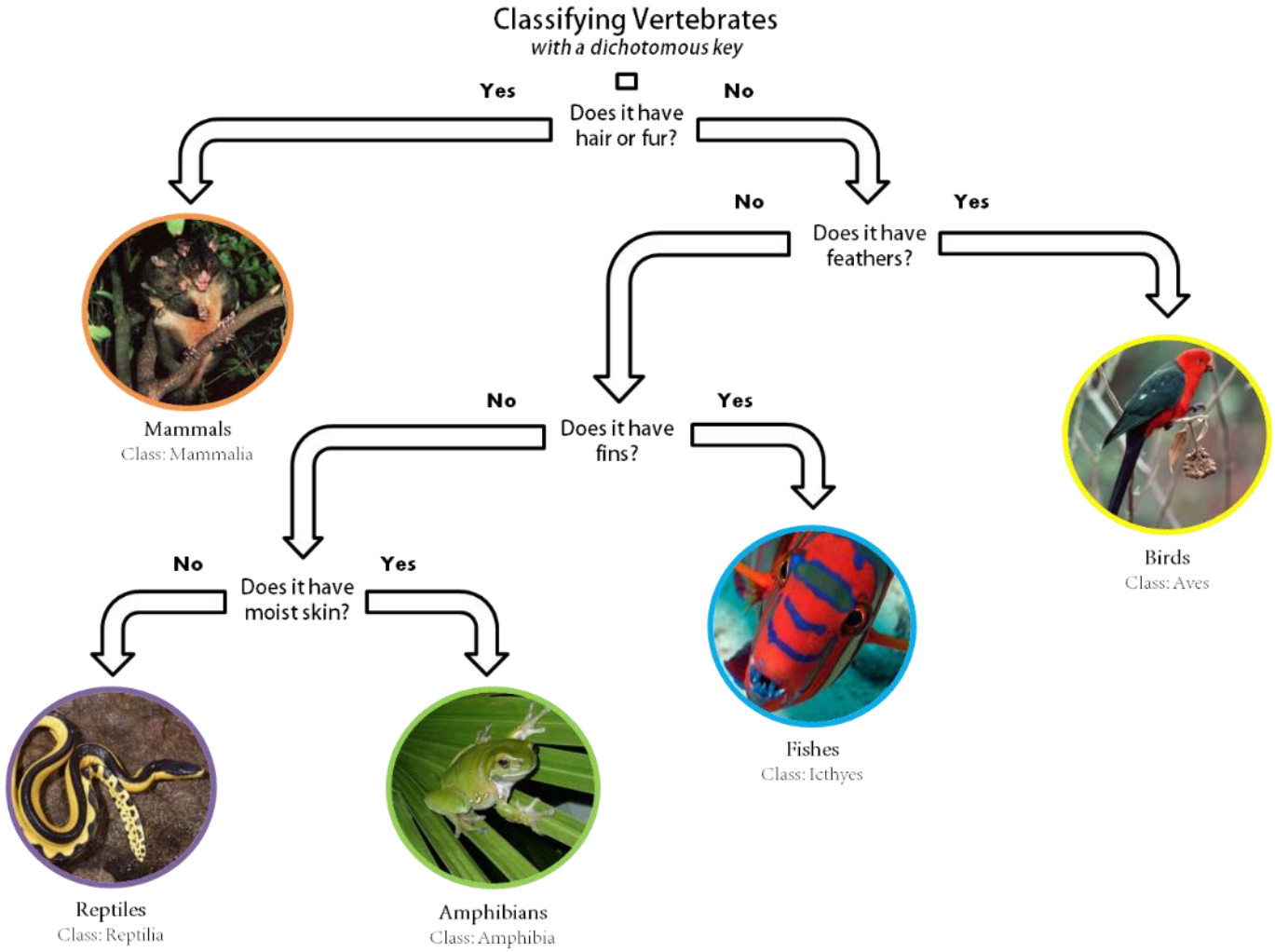
Make suggestions about what we can all do at a local level for example:

- Create new habitats for frogs, like building a frog pond in your backyard.

Classification – Student Activity

Exercise 1: Classifying Vertebrates

Use the key below to describe the features of each class of animals (Mammals, Birds, Fishes, Reptiles and Amphibians).



Exercise 2: Classifying Frogs

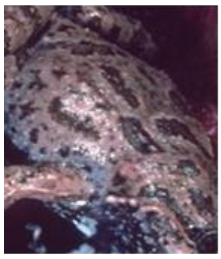
Use the physical features of the frogs in the photos and the dichotomous key to identify the species of 6 frogs:

a. Study the 6 unknown species of frogs' photos over the page.
b. Look carefully at the 'Classifying Amphibians' dichotomous key.
c. Use the dichotomous key to identify the 6 unknown frog species.
d. Construct a table to match the frog photos with their scientific and common name.

Exercise 2: Classifying Frogs




Unknown Species 1




Unknown Species 2




Unknown Species 3




Unknown Species 4



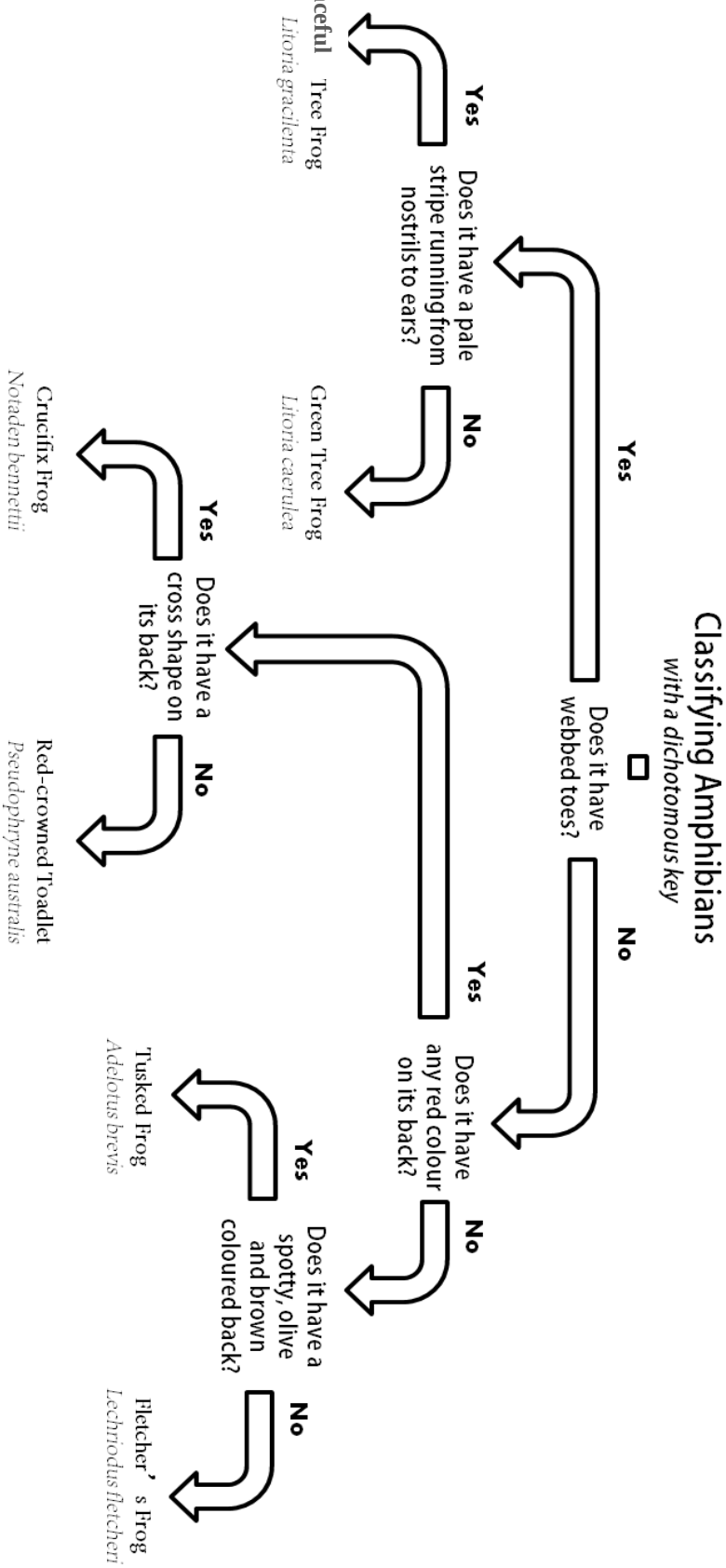

Unknown Species 5




Unknown Species 6

Exercise 2: Classifying Frogs

Dichotomous key



Exercise 2: Classifying Frogs

Example table for students to complete:

Unknown Species	Species Common Name	Species Scientific Name
Unknown Species 1		
Unknown Species 2		
Unknown Species 3		
Unknown Species 4		
Unknown Species 5		
Unknown Species 6		

Exercise 3 – Amphibian Exhibit Confusion! (Research Task)

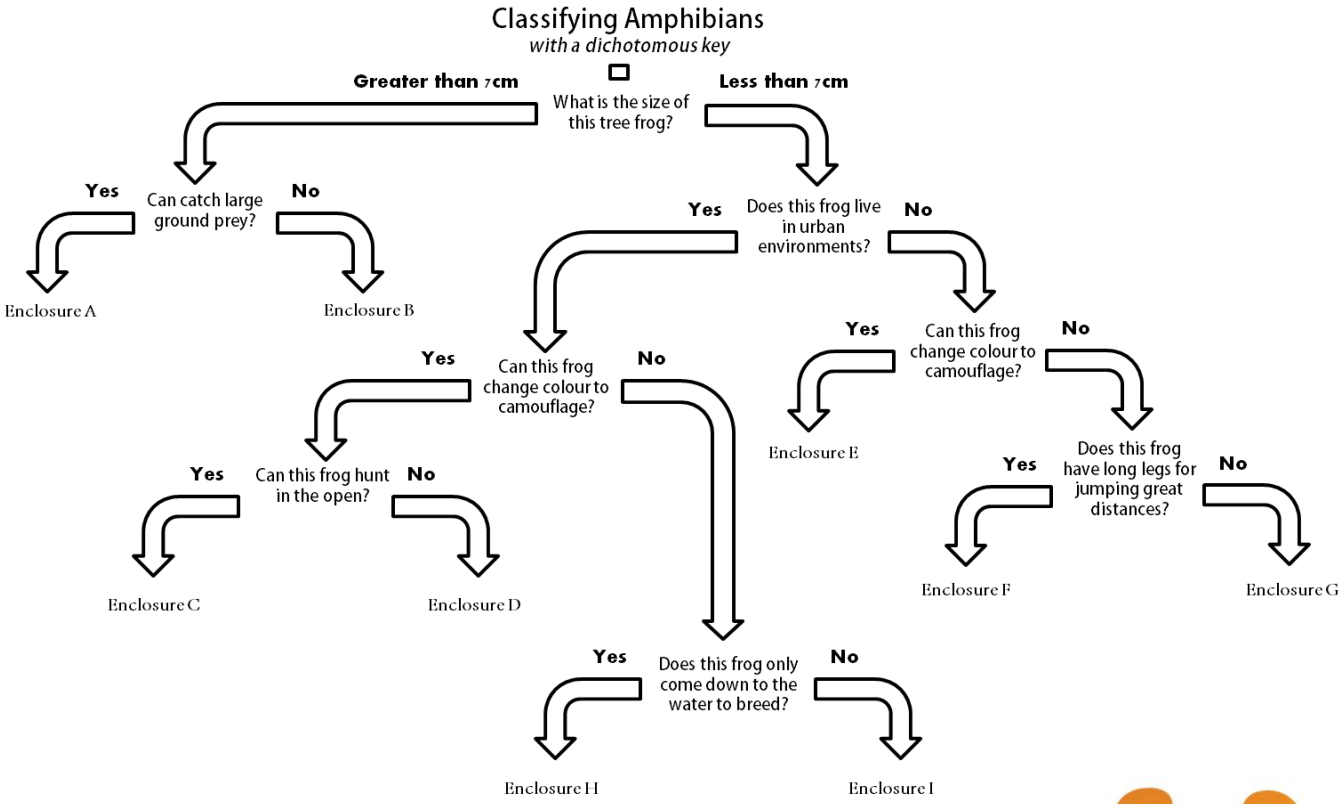
There has been a mix up at the Amphibian Exhibit at the State Zoo, and, as the new Head Amphibian Keeper, you have to solve it! The Amphibian Exhibit has nine different habitat enclosures for their nine different frog species. Last week, the exhibit was closed so that the enclosures could be cleaned and updated and the frogs were temporarily removed from their habitats. Now that the enclosures have been updated, no one can figure out which frog belongs in which habitat!

Resources you have:

- The 9 frog names.
- Classifying Amphibians with a dichotomous key.
- The frog profiles on Australian Museum website.

Use the frog profiles on the website to gather information about each species and use the key to match each frog to its new enclosure. Make sure the frogs are comfortable in their own habitat and make sure you keep your job!

Use the tables to record your findings.



Exercise 3 – Amphibian Exhibit Confusion! (Research Task)

Frog Species	Q.1	Q.2	Q.3	Q.4	Letter
Peron's Tree Frog *Litoria peroni*					
Leaf Green Tree Frog *Litoria phyllochroa*					
Red-eyed Tree Frog *Litoria chloris*					
Graceful Tree Frog *Litoria gracilenta*					
Eastern Sedgefrog *Litoria fallax*					
Rocket Frog *Litoria nasuta*					
Jervis Bay Tree Frog *Litoria jervisiensis*					
Green and Golden Bell Frog *Litoria aurea*					
Green Tree Frog *Litoria caerulea*					

Frog Species	Enclosure Code
Peron's Tree Frog *Litoria peroni*	
Leaf Green Tree Frog *Litoria phyllochroa*	
Red-eyed Tree Frog *Litoria chloris*	
Graceful Tree Frog *Litoria gracilenta*	
Eastern Sedgefrog *Litoria fallax*	
Rocket Frog *Litoria nasuta*	
Jervis Bay Tree Frog *Litoria jervisiensis*	
Green and Golden Bell Frog *Litoria aurea*	
Green Tree Frog *Litoria caerulea*	

Appendix- Answers for educators

Habitat Sorting Game

Number	Frog name	Distribution	Habitat	Adaptations
1	Eastern Banjo Frog	Throughout south-eastern Australia	Common in a wide range of habitats from woodland and rainforests to farmland and grassy areas	No toe pads and no webbing – ideal for burrowing in drier areas Long foot digit
2	Tapping Green Eyed Frog	North-east QLD	Sub-tropical and tropical lowland forests, sub-tropical or tropical montane forests, rivers, intermittent rivers, freshwater marshes and rural gardens.	Its skin allows it to camouflage in moss or leaf litter Large toe pads for gripping in moist areas
3	Orange-thighed Frog	Northern QLD	Lives in the canopies of dense rainforests	Large toe pads for gripping in moist areas Hands are ¾ webbed Feet are fully webbed

4	Dahl's Aquatic Frog	Eastern WA, eastern NT and north-western QLD	Flood plains and savannah woodlands of northern Australia. Common around the edges of permanent water or areas where the water remains for several months during the wet season.	No toe pads No webbing Long foot digit Hides in cracks in the soil during the dry season.
5	Northern Stony-creek Frog	East coast of north-east QLD	River systems, drainages, catchments and flowing streams	Constructs water filled basins to lay its eggs Small toe pads
6	Littlejohn's Tree Frog	Along the east coast from central NSW to eastern VIC, usually fro, 280-1,200m above sea level	Wet or dry sclerophyll forest on eastern slopes of the Great Dividing Range. In some areas, it prefers flowing rocky streams. Near permanent and ephemeral pools in heath, woodland and forest towards the northern part of its range.	Reduced toe pads
7	Common Spadefoot Toad	VIC, NSW, QLD and pockets of SA	Dry habitats such as woodlands, shrub land, mallee, open grasslands and disturbed areas.	No toe pads No webbing Burrow into the ground and only become active after rains Breed after heavy rain and flooding
8	New Holland Frog	QLD and north-eastern corner of NSW	Semi-arid/seasonally dry areas. Breed and lay eggs by shallow, static or slow moving water.	No toe pads No webbing Burrows during dry periods.

Classification – Student Activity

Exercise 1: Classifying Vertebrates

Class of Vertebrate:	Does it have fur?	Does it have feathers?	Does it have fins?	Does it have moist skin?
Mammals	**Yes**	**-**	**-**	**-**
Birds	**No**	**Yes**	**-**	**-**
Fishes	**No**	**No**	**Yes**	**-**
Amphibians	**No**	**No**	**No**	**Yes**
Reptiles	**No**	**No**	**No**	**No**

Exercise 2: Classifying Frogs

Unknown Species	Species Common Name	Species Scientific Name
Unknown Species 1	Graceful Tree Frog	*Litoria gracilenta*
Unknown Species 2	Tusked Frog	*Adelotus brevis*
Unknown Species 3	Fletcher's Frog	*Lechriodus fletcheri*
Unknown Species 4	Red-crowned Toadlet	*Pseudophryne australis*
Unknown Species 5	Green Tree Frog	*Litoria caerulea*
Unknown Species 6	Crucifix Frog	*Notaden bennettii*

Exercise 3 – Amphibian Exhibit Confusion (Research Task)

Frog Species	Enclosure Code
Peron's Tree Frog *Litoria peroni*	C
Leaf Green Tree Frog *Litoria phyllochroa*	D
Red-eyed Tree Frog *Litoria chloris*	H
Graceful Tree Frog *Litoria gracilenta*	I
Eastern Sedgefrog *Litoria fallax*	E
Rocket Frog *Litoria nasuta*	F
Jervis Bay Tree Frog *Litoria jervisiensis*	G
Green and Golden Bell Frog *Litoria aurea*	B
Green Tree Frog *Litoria caerulea*	A

Frog Species	First Q.	Second Q	Third Q	Fourth Q	Letter
Peron's Tree Frog *Litoria peroni*	<7 cm	Can live in urban areas	Changes colour to camouflage	Does hunt in the open	C
Leaf Green Tree Frog *Litoria phyllochroa*	<7 cm	Can live in urban areas	Changes colour to camouflage	Doesn't hunt in the open	D
Red-eyed Tree Frog *Litoria chloris*	<7 cm	Can live in urban areas	Cannot change colour to camouflage	Only comes down from trees to breed	H
Graceful Tree Frog *Litoria gracilenta*	<7 cm	Can live in urban areas	Cannot change colour to camouflage	No. Eggs are often laid on plants	I
Eastern Sedgefrog *Litoria fallax*	<7 cm	Cannot live in urban areas	Changes colour to camouflage		E
Rocket Frog *Litoria nasuta*	<7 cm	Cannot live in urban areas	Cannot change colour to camouflage	Has long legs that allow it to jump long distances	F
Jervis Bay Tree Frog *Litoria jervisiensis* Green and Golden Bell Frog *Litoria aurea*	<7 cm	Cannot live in urban areas	Cannot change colour to camouflage	Does not have long legs	G
Green Tree Frog *Litoria caerulea*	>7 cm	Can catch large ground prey			B
Peron's Tree Frog *Litoria peroni*	>7 cm	Cannot catch large ground prey			A

Curriculum Links

Stage 1

ACSSU017 - Living things have a variety of external features:

- Recognising common features of animals such as head, legs and wings
- Describing the use of animal body parts for particular purposes such as moving and feeding

ACSSU211 - Living things live in different places where their needs are met:

- Exploring different habitats in the local environment such as the beach, bush and backyard
- Recognising that different living things live in different places such as land and water
- Exploring what happens when habitats change and some living things can no longer have their needs met
- Recognising that frogs live in lots of different types of environments in Australia
- Recognising that frogs have needs that are met by their environment
- Identify which frog species live in the local area
- Identify what needs local frog species might have and how these could be met

ACSHE021 - Science involves observing, asking questions about, and describing changes in, objects and events:

- Jointly constructing questions about the events and features of the local environment with teacher guidance
- Recognising that descriptions of what we observe are used by people the help identify change

ACSHE022 – People use science in their daily lives, including when caring for their environment and living things:

- Considering how science is used in activities such as cooking, fishing, transport, medicine and caring for plants and animals
- Identifying ways that science knowledge is used in the care of the local environment such as animal habitats, and suggesting changes to parks and gardens to better meet the needs of native animals

ACSHE034 - Science involves observing, asking questions about, and describing changes in, objects and events:

- Describing everyday events and experiences and changes in our environment using knowledge of science

ACSHE035 - People use science in their daily lives, including when caring for their environment and living things:

- Monitoring information about the environment and Earth's resources, such as rainfall, water levels and temperature
- Recognizing that many living things rely on resources that may be threatened, and that science understanding can contribute to the preservation of such resources

Stage 2:

ACSSU073 - Living things depend on each other and the environment to survive:

- Recognising that environmental factors can affect life cycles such as fire and seed germination
- Recognising that frogs depend on their environment
- Recognising that frogs are adapted to their environment
- Designing a pond which can support local frog populations

Stage 3:

ACSSU043 - Living things have structural features and adaptations that help them to survive in their environment:

- Explaining how particular adaptations help survival such as nocturnal behaviour, silvery coloured leaves of dune plants
- Describing and listing adaptations of living things suited for particular Australian environments
- Exploring general adaptations for particular environments such as adaptations that aid water conservation in deserts
- Describing particular adaptations that help frogs survive in their environments

ACSIS090 - Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate:

- Constructing tables, graph and other graphic organisers to show trends in data
- Identifying patterns in data and developing explanations that fit these patterns
- Identifying similarities and differences in qualitative data in order to group items or materials

ACSSU094 - The growth and survival of living things are affected by physical conditions of their environment:

- Investigating how changing the physical conditions for plants impacts on their growth and survival such as salt water, use of fertilizers and soil types
- Observing the growth of fungi such as yeast and bread mould in different conditions
- Researching organisms that live in extreme environments such as Antarctica or a desert
- Considering the effects of physical conditions causing migration and hibernation
- Investigating how changes in their environment can impact frogs
- Recognising that damage to the environment (through climate change, deforestation etc.) can reduce frog populations
- Designing a frog pond which takes the growth and survival of local frog populations into account

Stage 4:

ACSSU112 - Interactions between organisms, including the effects of human activities can be represented by food chains and food webs:

- Using food chains to show feeding relationships in a habitat
- Constructing and interpreting food webs to show relationships between organisms in an environment
- Classifying organisms of an environment according to their position in a food chain
- Recognizing the role of microorganisms within food chains and food webs
- Investigating the effect of human activity on local habitats, such as deforestation, agriculture or the introduction of a new species
- Exploring how living things can cause changes to their environment and impact other living things, such as the effect of cane toads

ACSHE120 - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations:

- Considering how human activity in the community can have positive and negative effects on the sustainability of ecosystems
- Investigating ways to control the spread of the Cane Toad

ACSIS124 - Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge:

- Working collaboratively to identify a problem to investigate

- Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation
- Using information and knowledge from previous investigations to predict the expected results from an investigation
- Identifying and researching scientific questions relating to frog populations
- Making predictions based on scientific knowledge about the future of frog populations
- Designing a frog pond based on research and scientific knowledge

ACSIS125 - Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed:

- Working collaboratively to decide how to approach an investigation
- Identifying whether the use of their own observations and experiments or the use of other research materials is appropriate for their investigation
- Developing strategies and techniques for effective research using secondary sources, including use of the internet

ACSIS129 - Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate:

- Understanding different types of graphical and physical representation and considering their advantages and disadvantages
- Using spreadsheets to aid in the presentation and simple analysis of data
- Describing the trends shown in collected data

ACSIS130 - Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence:

- Using diagrammatic representations to convey abstract ideas and to simplify complex situations
- Comparing and contrasting data from a number of sources in order to create a summary of collected data
- Identifying data which provides evidence to support or negate the hypothesis under investigation
- Referring to relevant evidence when presenting conclusions drawn from an investigation

ACSIS133 - Communicate ideas, findings and evidence-based solutions to problems using scientific language, and representations, using digital technologies as appropriate:

- Presenting the outcomes of research using effective norms of representation or data or ideas and scientific language that is appropriate for the target audience
- Using digital technologies to access information and to communicate and collaborate with others on and off site
- Researching and presenting scientific information about Australian frogs

ACSIS139 - Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge:

- Considering whether investigation using available resources is possible when identifying questions or problems to investigate
- Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation
- Using information and knowledge from their own investigations and secondary source to predict the expected results from an investigation

ACSIS140 - Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed:

- Working collaboratively to decide how to approach an investigation
- Identifying any ethical concerns that may apply to the investigation
- Taking into consideration all aspects of fair testing, available equipment and safe investigation when planning investigations

ACSIS144 - Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate:

- Describing measures of central tendency and identifying outliers for quantitative data
- Explaining the strengths and limitations of representations such as physical models, diagrams and simulations in terms of the attributes of systems included or not included

ACSIS145 - Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence:

- Constructing tables, graphs, keys and models to represent relationships and trends in collected data
- Drawing conclusions based on a range of evidence.

Stage 5:

ACSSU176 - Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems:

- Recognising that changes in ecosystems impact on frog populations
- Investigating how changes in the ecosystem, such as climate change, can have wide ranging impacts on species in the system
- Developing a functioning ecosystem through the creation of a frog pond

ACSSU185 - The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence:

- Identifying adaptions of frogs which makes them suited to their environment

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