Department of
Parks and Wildlife

Kimberley Education Manuals

Series 1

Cane Toads Years 1-3

Includes:

- curriculum-linked lesson plans
- project ideas and
- background information for Kimberley teachers.

Acknowledgements

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Department of Parks and Wildlife
17 Dick Perry Avenue, KENSINGTON WA 6151
Locked Bag 104 Bentley Delivery Centre

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This document is available in alternative formats on request.

Project leaders:
Sean McGee
Corrin Everitt
Sally Johnston

Project writers:
Sean McGee
Sally Johnston
Corrin Everitt
Jasper Kruse
Jackie Ellis
Bev Stephens

Illustrations:
p 3, 6, 20, 26-31 Jackie Ellis
p22 Sean McGee

Photographs: p8 (Blue-tongue lizard and king brown snake) Kimberley Reptiles

Perth Zoo
SAVING WILDLIFE

Key messages

This resource series aims to introduce the topic of cane toads to Kimberley classrooms. Some students will already be familiar with cane toads, they may already be in your town or community; others will be awaiting the impending arrival of toads with a mix of interest and trepidation. Toads are misplaced animals and are surviving and thriving in their new habitat with detrimental effect. These lessons introduce basic facts about toads, what they look like, what they eat, their life cycle, and how they affect our native wildlife, with an emphasis on individual actions that allow students to participate in the control of threats to our natural environment.

The key questions we are examining through these activities at all year levels are:

- What is a toad?
- How can cane toads affect native animals?
- What can we do to help?

Introducing cane toads to your classroom

The following passage can be used to introduce the topic of cane toads to your class. You may also like to organise an incursion with the Parks and Wildlife cane toad education team, participate in a community 'toadbust' or set up a community information event once you have completed all the lessons (see p12).

Cane toads look a lot like our native frogs. Can you tell the difference? Toads were brought to Queensland almost 100 years ago to eat beetles that were destroying sugar cane crops. They liked Australia so much that their population has been growing ever since. With lots of bugs to eat, nice warm weather, and plenty of water for swimming and laying eggs, the Kimberley is a perfect home for toads. Toads first made it to the Kimberley in 2009, and are spreading westwards at around 50km every year.

A lot of our Kimberley animals like to eat frogs. Did you know that we have around 20 different kinds of frogs in the Kimberley? Animals that eat frogs sometimes try to eat toads, too, as they can look very similar to frogs. Unfortunately cane toads are poisonous, so animals that eat a toad can get very sick and even die. There are some smart animals that know not to eat toads, or maybe they just don't like the taste of frogs like some people don't like the taste of fish or pumpkin or broccoli.

To help out the rest of our animals, some people like to go 'toadbusting', that is, going out in the evening to collect as many toads as they can find. It's important to know what a toad looks like, as we don't want to accidentally collect any of our native frogs. Toads have an 'm-shaped' bony brow ridge, dry warty skin and poison glands on their shoulders. If you aren't used to seeing toads, and you think you have found one, let Parks and Wildlife know. If you see toads a lot where you live, you might like to go toadbusting. We'll talk about how to do this in later lessons.

Scientists are also looking at other ways to protect our native animals from toads, like teaching them not to eat toads using special baits or inventing special traps using chemicals found in the toad's skin (pheromones).

The best way to make sure our native animals are looked after is to know how to tell the difference between a toad and a native frog, and to keep an eye out for all the different animals you might see roaming around the Kimberley. Don't forget to teach your friends and family about cane toads, too.

Series 1, Edition 1 Cane toads: Yr 1-3

This resource is the first edition of the first series of the Department Parks, and Wildlife Kimberley educational manuals. Further series will cover the Kimberley's biodiversity, marine environments, fire and introduced species. Each series comprises two editions, offering sets of six curriculum-linked lesson plans for Years 1-3, and 4-6 in addition to background information and useful resources for educators. Printable worksheets and presentations to use in the classroom are available on the accompanying USB.

Contents

Evolution of amphibians

Background information for teachers

The basics

Cane toads belong to the Anuran order of the class Amphibia. Amphibians are divided into three orders; the salamanders (Urodela, 'the tailed ones'), the frogs and toads (Anura, 'the tail-less ones'), and the caecilians (Apoda, 'the legless ones').

Amphibians evolved during the Devonian period over 350 million years ago, as plants began to grow at the edges of ponds and swamps providing a new food source for fish. Over time, some fish evolved developing lungs and limbs which enabled them to live in shallow water and paved the way for breathing and walking on land. After tens of millions of years this transition from water to land produced the amphibians.

The word amphibian means 'two lives', a reference to the metamorphosis of most frogs. The larva of a frog, a tadpole, has gills to breathe and a long finned tail to move, much like a fish. In the process of becoming a young frog their body transforms to adapt to life on land. They grow lungs to breathe, form legs to walk, and lose their tail. When this transformation is complete the young frog is called a metamorph.

Amphibians typically have soft, moist skin, which is permeable to water to help regulate moisture levels. Amphibians lay shell-less eggs that are also permeable to water, which stops them from drying out if laid in a moist environment. These features make amphibians highly sensitive to environmental changes, and they are often referred to as 'ecological indicators'. Recent decades have seen a dramatic decline in amphibian populations around the world, many of which are now considered threatened or extinct.

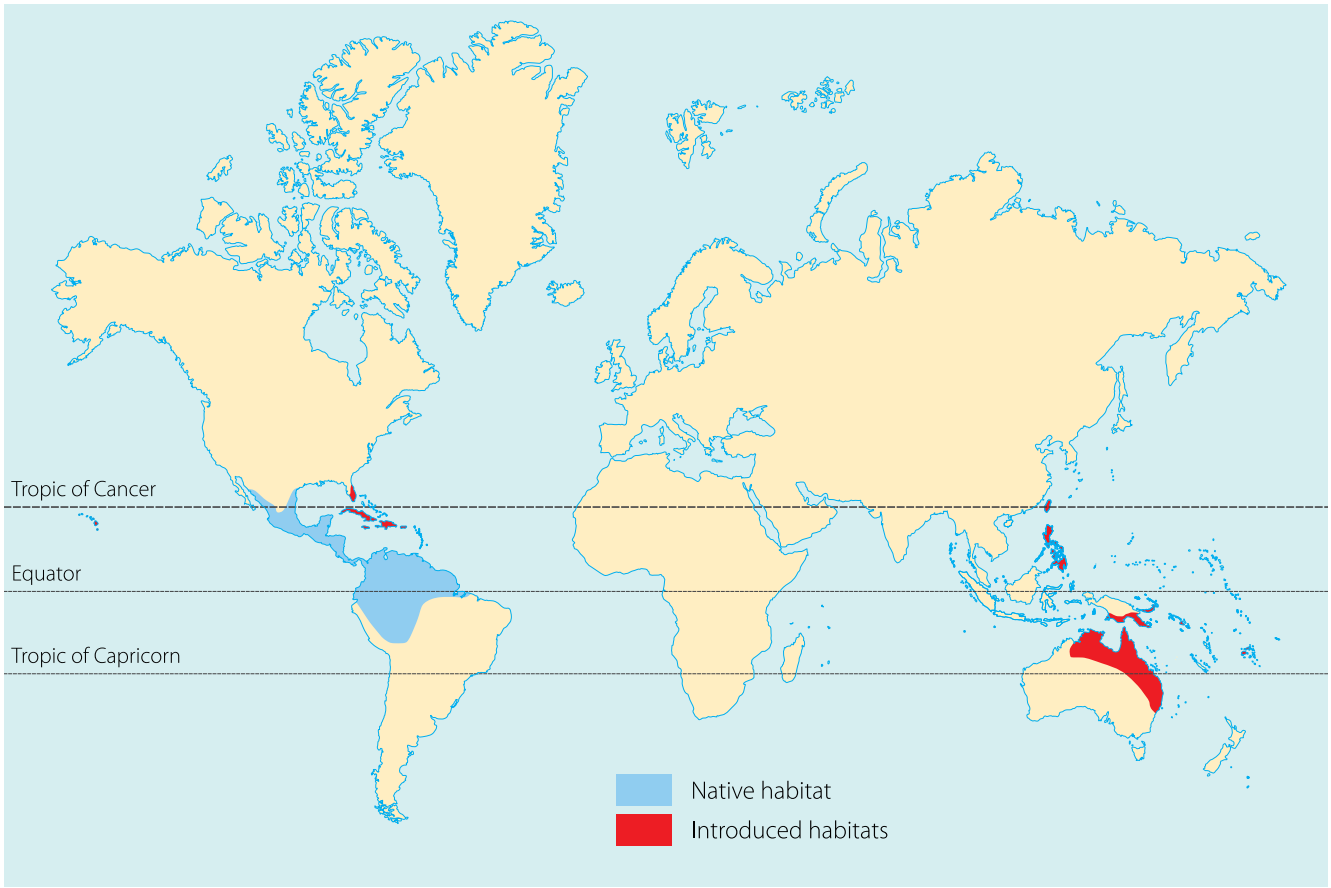
A history of toads in the Kimberley

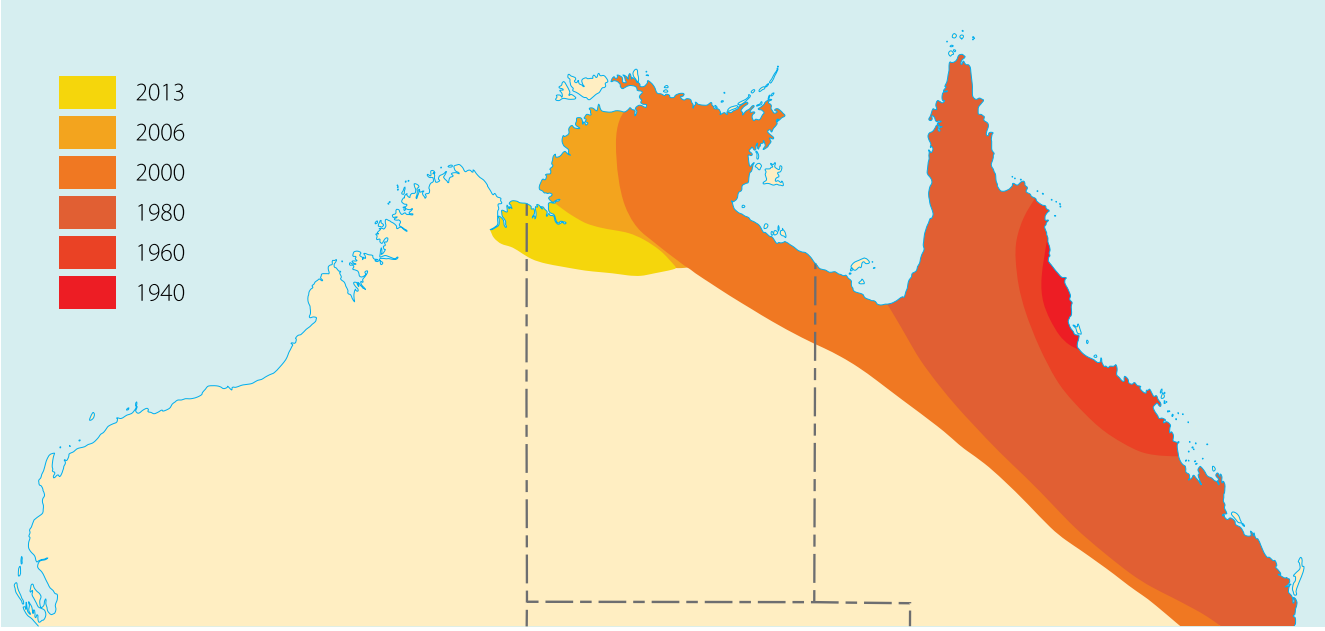
The cane toad (*Bufo marinus* or *Rhinella marina*), also known as the giant toad, giant neo-tropical toad, or marine toad, is the largest toad in the world, growing up to 23cm in length. The cane toad is native to southern and central America, with their natural range extending north from Brazil to the state of Texas in the United States. The map below shows the native range of the cane toad in blue, and their approximate present range in red.

During the 1930s, sugar crops around the world, including in Queensland, were suffering significant damage from pest beetles. Reports from both South America and Hawaii suggested that the introduction of cane toads could help manage the beetle population through predation, and thus increase the yield of sugar. As a result, in 1935, a man by the name of Reginald Mungomery, from the Bureau of Sugar Experiment Stations, was sent to Hawaii to organise the importation of 101 cane toads to Australia. These original cane toads were released in the cane fields of Gordonvale, Queensland. It wasn't long before an additional 3000 toads were released into sugar plantations across northern New South Wales and central Queensland.

The success of cane toads in pest insect control in Australia was never measured. Agricultural chemicals designed to combat the pest beetles were developed and became widely available shortly after the introduction of the cane toad. Cane toads found the climate and environment in Queensland very similar to their natural American habitat and started to breed prolifically. Stories are told of people taking cane toads from one sugar plantation to another to reduce numbers of venomous snakes.

In Australia, cane toad populations are currently found along the east coast from northern New South Wales to far North Queensland, and in recent decades they have expanded across the top of the Northern Territory, westwards to the east Kimberley in Western Australia.





Tell us more

Cane toads are the only 'true toads' found in Australia. True toads are mainly terrestrial (live on land) and have dry, warty skin. Cane toads are heavily built, and typical adults are 10-15cm in length. With the right conditions, toads can grow to more than 20cm in length and weigh more than 1kg, but in dense populations they are lucky to reach 10cm.

Appearance

The skin of a cane toad is dry and rough, rather than moist and slippery like most native frogs. Toads have visible warty lumps on their backs, with males having more prominent, sandpapery lumps than females. Colour can vary from a dull brown to yellowish or blackish, with juveniles more highly patterned than adults. The underside of the toad (its belly) is a dirty cream colour, with grey and cream mottling that fades with age. A 'mango-shaped' eye and an 'm-shaped' bony brow ridge further distinguish cane toads from native frogs.

Toxicity

Large parotid ('poison') glands are clearly visible on the toad's shoulder behind its round tympanum (ear), and exude a milky toxin when the toad feels threatened. Cane toads are poisonous at all stages of their life cycle, including as eggs and tadpoles.

Behaviour

Cane toads are most active at night, hiding in moist places during the day and coming out after dark. They are frequently observed sitting in a distinctive upright position in open areas, or under light sources as they wait for insects to come close enough to catch. Toads walk and bound short distances but cannot climb smooth surfaces or leap long distances or great heights. Males can produce a guttural trill lasting up to 30 seconds, while females do not call.

Life cycle

Female toads generally breed once a year and can lay up to 35,000 eggs in one sitting. Only a very small percentage of these eggs will develop and hatch as tadpoles. The eggs are laid in gelatinous strands at the edge of shallow freshwater pools, and take around two days to hatch depending on water temperature.

Cane toad tadpoles are an opaque jet black, and reach a maximum of 30mm in length. Their tails are almost the same length as their bodies, with a central black muscle and transparent fins. The tadpoles form large, slow-moving groups that do not rise to the surface to breathe as native frogs do. After approximately three weeks the tadpoles metamorphose into small toads; growing legs, developing lungs and losing their tail. These tiny cane toads, approximately 1cm in length and identifiable by a mottled belly and little orange spots on their backs where warts will later develop, are referred to as metamorphs.

Like cane toad eggs, only around 0.5 per cent of metamorphs will ever make it to adulthood. For those that do, their orange spots turn into warts, and their parotid glands further develop as they grow, increasing their toxicity. In the tropics, cane toads take around a year to reach sexual maturity, and their average lifespan is five years.

Cane toad life cycle

University of Sydney researcher, Georgia Ward-Fear and the Balanggarra Rangers are investigating whether goannas can learn to avoid toads

How do cane toads affect Kimberley animals?

Whenever a new plant or animal species is introduced into an environment, it is bound to have an impact on the existing ecosystem. Whether it is a new weed species that strangles native trees, or a species of bird that competes with others for food and nesting sites, the effect of these new species can range from minimal to catastrophic.

Cane toads were introduced to sugar cane fields internationally with mixed impacts on native populations. In Egypt, toad populations failed to establish and thus had a negligible impact on the native flora and fauna. In the Asia-Pacific region, toads found the climate and environment very similar to their native habitat and populations quickly expanded. The IUCN (World Conservation Union) includes the cane toad in its list of 100 'world's worst invaders', and since 2005 the biological effect of the cane toad has been listed nationally as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*.

In Australia, cane toads impact native animals in a variety of ways. As toads take their place in the intricate food webs of Kimberley ecosystems, their main impact on native wildlife is through lethal toxic ingestion, poisoning predators that try to eat them. Toads may also upset the balance by eating small invertebrates and the eggs of other species, competing for food and shelter with other frogs, and taking over the nests of burrowing animals such as bee-eaters. These additional effects, however, have minimal impact on overall native populations.

As cane toads are toxic throughout their life cycle, any predators that usually eat frog eggs, tadpoles, or frogs are likely to come into contact with the toad's potent bufotoxins (poisons). While some crustaceans, reptiles, fish, birds and mammals are able to eat toads without dying, or inherently know to avoid toads, many frog-eaters will die or become severely ill after eating, or even just mouthing (putting it in its mouth but not swallowing), a toad. Cases report domestic dogs dying within 15 minutes of ingesting the cane toad's bufotoxin. Kimberley animals most likely to be affected include goannas, blue-tongue lizards, frog-eating snakes such as king browns, freshwater crocodiles and northern quolls. Indirect ('follow-on') effects may be further observed following a shift in abundance of these significant predators within the ecosystem's food web.

Examples of native animals affected by cane toads

With a broad range of threats such as fire, development, other introduced species and annual variation in weather patterns, it is difficult to pinpoint the exact population effect of cane toads. Many species impacted by toads, such as northern quolls, have already been in decline for many decades thus a correlation between the arrival of toads and a decrease in the species cannot be confirmed. Certain species that experience a significant decline following the initial arrival of toads may be found in abundance in areas with long-term toad populations. It is possible that some of these species adapt to knowingly avoid toads as a food source, whereas others may experience a come-back as the initial 'frontline' passes and the population density of toads settles to a lower level. While it is indisputable that the introduction of cane toads is in itself a major threat to many large Kimberley predators, no species extinctions caused by cane toads have been recorded in Australia so far.

What can we do to minimise impacts?

Shortly after the arrival of toads in the Kimberley in 2009, the State Government released the *Cane toad strategy for Western Australia*, a ten-year plan highlighting management options, methods of minimising the impact of toads and potential long-term solutions. A key component of the strategy is community involvement, which complements scientific research and government-led operations conducted by the Cane Toad Initiative. An updated strategy was released in May 2014 to reflect the current status of toads in Western Australia, and to consolidate the aims and objectives for cane toad management into the future taking into account the results of ongoing research.

Individuals and communities

The most effective way to control cane toads on a small scale, such as in a backyard or school ground, is through toad-proof fencing and regular toadbusts.

As toads are poor climbers and jumpers, a regularly maintained low fence can prevent most toads from entering your enclosed area.

Toadbusting, or going out and collecting toads by hand, then allows for the removal of any existing toads within your yard. These toads can then be euthanased using a humane method such as cooling followed by freezing (see brochure *Euthanasing cane toads*). If your yard contains a pond, you may like to try cane toad tadpole trapping by using a dead toad as 'bait' inside a funnel trap made out of an old soft drink bottle (see Year 4-6 extension activities). Cane toad tadpoles are attracted to the adult toad's bufotoxins and congregate in the trap, allowing for easy removal. Active communities might consider setting up drop-off-points where residents can bring in live toads they have collected to be positively identified, euthanised, and disposed of appropriately. While toadbusting proves ineffective on a landscape scale, regularly toadbusting in key locations can reduce the density of the area's toad population.

Cane Toad Initiative for Western Australia

Parks and Wildlife manages the Cane Toad Initiative through a multi-faceted approach in addressing the continued westward progression of cane toads. As well as preventing the premature spread of 'hitchhiker toads' through quarantine measures such as the use of a cane toad detector dog, a large focus is given to monitoring the Kimberley region's biodiversity (variety of flora and fauna species) with the aim of developing management strategies to minimise the impact of toads. Further emphasis is placed on education, as a sound level of public awareness and an understanding of the potential impacts of toads sets the foundation for engaging stakeholders, such as pastoralists, traditional owners and the wider community, in toad management.

Cane toad detector dog, Reggie, searched freight leaving the East Kimberley

Further research

Research into a number of potential strategies to reduce the impact of toads has been carried out by institutions around Australia over the past few decades. Initial research by the University of Sydney into chemical ecology and the the use of pheromones to influence toad behaviour showed potential, although further studies have discounted it as a viable control option. Similarly, lungworms, a parasite present in both cane toads and native frogs, were thought to provide another biological solution, but again field testing determined this was not an effective landscape-scale control method.

It is widely believed that the only possibility for complete eradication of the cane toad population will come from a genetic or immune control option. Progress in this field is slow, as it requires the comparison of cane toad and native frog genomes. Scientists from the University of Western Australia have succeeded in mapping genomes of both the cane toad and one native frog species so far, but the development of a 'silver bullet' for cane toad control is still a long way off.

For now, many scientists have shifted their focus to projects that may reduce the impact of toads in new areas, through strategies such as taste aversion. This involves feeding key species at risk metamorphs, which contain only a small amount of bufotoxins, or feeding them toad-meat sausages with an added nausea-inducing chemical. It is hoped that by ingesting either the metamorphs or sausages and becoming ill, the animal will learn to associate the smell and taste of toads with nausea and know not to eat them in future. Field trials are currently being conducted with both goannas and northern quolls.

Additional resources for the classroom

Fiction books

- ***Quoll***, Sandra Kendell, 2008, Windy Hollow Books. **Picture book.**

  As cane toads arrive in the top end, quoll does her best to protect her babies from this new danger. Introduces species at risk, the concept of extinction and the Northern Territory Island Ark project.

- ***999 Tadpoles Find a New Home***, Ken Kimura, 2010, Gecko Press. **Picture book.**

  After having 999 babies, this frog family have outgrown their home and need to move. Along the way they meet some scary predators before they unconventionally fly to their new home with the aid of a hawk. The idea of frogs outgrowing their home and having to move somewhere new fits well with the question of why the range of toads is continually expanding, and the snake, hawks and frogs form a typical food chain.

- ***Toad Rage*** Morris Gleitzman, 2005, Yearling. Series also includes *Toad Heaven, Toad Away, Toad Surprise.*

  For advanced readers or to read aloud with the class. Limpy the toad doesn't understand why humans hate his kind and are always trying to run them over. In a bid to improve toad-human relations, Limpy sets out on a journey to prove to humans just how fabulous toads really are.

Non-fiction books

- ***Who am I?*** Moira Butterfield, Wayne Ford, 1997, Belitha Press. **Picture book.**

  Take an up close look at a frog. Identify its body parts and what they're used for, what frogs like to eat, where they live and a brief introduction to life cycles.

- ***Fun Facts about Frogs***, Carmen Bredeson, 2008, Enslow Publishers.

  A science reader with lots of great frog photos. Explores how tadpoles become frogs, how frogs croak, and what the difference is between frogs and toads.

- ***Tadpoles and Frogs***, Anna Milbourne, 2002, Usborne Books.

  Another reader presenting basic information on frogs, their life cycle, how they live and frogs around the world. More detailed information is presented in fact boxes on each page.

- ***Finding out about… Cane Toads***, Greg Pyers, 2006, Echidna Books. ***Animal Invaders: Cane Toad***, Barbara A Somervill, 2008, Cherry Lake Publishing.

  For more advanced readers or to use with a teacher. These books look at cane toads, their introduction to Australia, their impact on our ecosystems and potential methods of control.

Posters and brochures

Contact the Parks and Wildlife cane toad team on 9168 4200 for hardcopies of posters or class sets of brochures, or for stickers featuring the six Kimberley frogs most commonly confused with toads. Parks and Wildlife brochures and posters are available online at: http://www.dpaw.wa.gov.au/plants-and-animals/animals/cane-toads .

Frogs of the Kimberley – produced by the Western Australian Museum and Alcoa.

Cane toads and… bluetongue lizards; crocodiles; quolls; goannas - Parks and Wildlife poster series.

Is it a cane toad? Safety and cane toad; Euthanasing cane toads - Parks and Wildlife brochure series.

Websites

Parks and Wildlife's cane toad page: http://www.dpaw.wa.gov.au/plants-and-animals/animals/cane-toads

WA Museum's Frogwatch Kimberley page: http://museum.wa.gov.au/explore/frogwatch/regions/kimberley

WA Museum's Frogwatch Schools (south west) page: http://museum.wa.gov.au/explore/frog-watch-schools

Purchase taxidermied toads for your classroom: http://toadfactory.com/

Apps

Cane toad – produced by SPICE and Parks and Wildlife. Features Kimberley and southwest frogs that are commonly confused with toads, and includes pictures, frog calls and a 'frog log' for you to record sightings.

Videos

Behind the News has a few stories on toads, including a couple that explain how we are trying to protect our native animals through taste aversion:

- Toad training: http://www.abc.net.au/btn/story/s3991562.htm
- Cane toad snags: http://www.abc.net.au/btn/story/s2817830.htm

For teachers:

- ***The unnatural history of Cane Toads***, Mark Lewis, 2003, Umbrella Entertainment
- ***Cane toads the conquest***, Mark Lewis, 2001, Pinnacle Films.

Incursions, excursions and toadbusts

Contact the Parks and Wildlife cane toad education team on 9168 4200 for ideas tailored to your school.

Incursions

Learn how to identify a toad, toad safety and cool facts about toads and some of our native critters. With a regularly changing program we have something to suit every classroom. We can tailor activities to your location if you wish to continue your toad studies on an excursion or camp.

Toadbusts

If toads are in your community, or you are planning to travel to a location with toads, we can help you plan a toadbust. You will need torches, gloves, bags, handwashing stations or antiseptic hand gel and plenty of adult supervisors. Toadbusts work most effectively in an enclosed area such as a school ground, but may also be held at other key locations where you wish to reduce the density of toads, for example around a waterhole or within a gorge. These locations should be decided in consultation with Parks and Wildlife.

Extension activities, projects and games

- Frog, frog, toad! (Played like duck, duck, goose!).
- Hold a froglympics with lots of jumping and hopping events, leapfrog, and toad-walking.
- Build a frog pond or 'frog bog' in your school grounds. Keep track of species you find there. Check out the Frogwatch website for ideas: museum.wa.gov.au/explore/frog-watch-schools/frog-watch-schools-kit/think-about-building-frog-friendly-garden
- Design posters to educate your school community about the differences between frogs and toads.
- Create a short play to teach other students and parents how to tell the difference between frogs and toads (link with Lessons two and five). Don't forget to make masks and costumes!
- Celebrate finishing your unit of work by making 'frog in a pond' with green jelly and chocolate frog.

Curriculum link overview Year 1-3

Australian Curriculum (AC) Links	Lesson 1 A toad like me	Lesson 2 This is a toad	Lesson 3 Tadpoles to toads
	Australian Curriculum - Science	**Australian Curriculum - Science**	**Australian Curriculum - Science**
Year 1	Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS029) *Engaging in whole class or small group discussions to share observations and ideas*	Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS029) *Engaging in whole class or small group discussions to share observations and ideas*	Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings*
Year 2	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Recognising that living things have predictable characteristics at different stages of development* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS042) *Presenting ideas to other students, both one-to-one and in small groups*	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Recognising that living things have predictable characteristics at different stages of development* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS042) *Presenting ideas to other students, both one-to-one and in small groups*	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Exploring different characteristics of life stages in animals such as egg, caterpillar and butterfly*
Year 3	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports. (ACSIS060) *Communicating with other students carrying out similar investigations to share experiences and improve investigation skill*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports. (ACSIS060) *Using simple explanations and arguments, reports or graphical representations to communicate ideas to other students*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing*

Australian Curriculum (AC) Links	Lesson 4 Toads for dinner	Lesson 5 Frog or toad?	Lesson 6 Catch that toad
	Australian Curriculum - Science	**Australian Curriculum - Science**	**Australian Curriculum –Ethical Understanding**
Year 1	Living things live in different places where their needs are met. (ACSSU211) *Exploring what happens when habitats change and some living things can no longer have their needs met.*	Living things have a variety of external features (ACSSU017). *Recognising common features of animals such as head, legs and wings*	Recognise ethical concepts: (Level 2) Describe ethical concepts, such as right and wrong, honesty, fairness and tolerance *Describing instances of fair and unfair treatment* Explore ethical concepts in context: (Level 2) Discuss ethical concepts within a range of familiar contexts *Discuss story scenarios involving fair and tolerant behaviour*
Year 2	People use science in their daily lives, including caring for the environment and living things (ACSHE035) *Recognising that many living things rely on resources that may be threatened, and that science understanding can contribute to the preservation of such resources*	Living things grow, change and have offspring similar to themselves (ACSSU030). *Recognising that living things have predictable characteristics at different stages of development*	Recognise ethical concepts: (Level 2) Describe ethical concepts, such as right and wrong, honesty, fairness and tolerance *Describing instances of fair and unfair treatment* Explore ethical concepts in context: (Level 2) Discuss ethical concepts within a range of familiar contexts *Discuss story scenarios involving fair and tolerant behaviour*
Year 3	Science involves making predictions and describing patterns and relationships (ACSHE050) *Making predictions about change and events in our environment*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044). *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing*	Recognise ethical concepts: (Level 2) Describe ethical concepts, such as right and wrong, honesty, fairness and tolerance *Describing instances of fair and unfair treatment* Explore ethical concepts in context: (Level 2) Discuss ethical concepts within a range of familiar contexts *Discuss story scenarios involving fair and tolerant behaviour*

Lesson one: A toad like me

Department of Parks and Wildlife

Australian Curriculum - Science

Year 1	Year 2	Year 3
Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS029) *Engaging in whole class or small group discussions to share observations and ideas*	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Recognising that living things have predictable characteristics at different stages of development* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS042) *Presenting ideas to other students, both one-to-one and in small groups*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports. (ACSIS060) *Communicating with other students carrying out similar investigations to share experiences and improve investigation skill*

Teacher notes: The bodies of frogs and toads (Anuran order of amphibians) can be compared with human bodies. A frog/toad's front 'legs' are technically arms with hands and fingers (usually four fingers). The rear legs are referred to as legs, having feet and toes.

Teachers may like to display the Frogs of the Kimberley poster, or explore the Western Australian Museum's Frogwatch website to show students the range of frogs in the Kimberley region:

http://museum.wa.gov.au/explore/frogwatch/regions/kimberley .

Resources: 'Frog meditation' mp3 (on USB), paint, staple/glue/tape, paper plate

For each student: 1 paper plate, 1 sheet paper, pencil, scissors

Introduction: Meditation

Students find a space on the floor and lie down with their eyes closed.

Teacher plays frog sounds meditation, 'Frog meditation'.

After meditation ask some focus questions to link students prior knowledge of their own bodies with those of frogs/toads:

What animal do you think made these sounds? Frogs

How many different frogs did you hear? Five

Why do you think frogs make these sounds? They are talking to one another just like we use our voices to communicate.

How else are frogs like us? They have eyes, ears, mouth, legs and arms. The important facts to explore are that they have feet and toes, hands and fingers. This can be seen when students show their best frog pose.

Ask several students to show their best frog pose and sound, maybe even hop!

Activity: Students identify how the frog/toad has hands and fingers as well as feet and toes.

Students dip hands and feet in paint and press onto paper, set aside to dry. A variation may be to have students paint an A4 sheet of paper (or use coloured paper) and once dry trace around the students' feet and hands.

Students paint both sides of a paper plate, set aside to dry.

Students use scissors to cut out hand and foot prints.

Students fold paper plate in half to make a semi-circle (this becomes the body/head).

Students attach (glue/staple/sticky tape) feet and hands.

Students can then decorate by painting/drawing eyes or even adding a tongue.

Reflection: Sharing
Students share their frogs with the rest of the class.
For example: • "My frog is just like me because……" • "These are the frog's hands because….."

CANE TOAD HOTLINE 1800 44 WILD

Lesson two: This is a toad

Department of Parks and Wildlife

Australian Curriculum - Science

Year 1	Year 2	Year 3
Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS029) *Engaging in whole class or small group discussions to share observations and ideas*	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Recognising that living things have predictable characteristics at different stages of development* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play. (ACSIS042) *Presenting ideas to other students, both one-to-one and in small groups*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports. (ACSIS060) *Using simple explanations and arguments, reports or graphical representations to communicate ideas to other students*

Teacher notes: This lesson teaches some of the key features of the cane toad (*Bufo marinus / Rhinella marina*). Specifically, it is to enable students to make an educated identification of an adult cane toad by using the three main tell-tale features ('M-shaped' bony brow ridge, dry warty skin, poison glands).

Resources: Common classroom items for reflections, colouring pencils

For each student: jigsaw worksheet, scissors.

Introduction: Describe and draw

Students think, pair, share: What does a cane toad look like?

Teacher to draw a toad on the board from the description given by the students (pretending that you have never seen a toad or frog before). Encourage descriptive language to get a good diagram.

Label any parts that students think show that it is a toad and not a frog.

Introduce the three easily recognisable features of a toad and add to your picture (if not already present):

- 'M-shaped' bony ridge
- Warty skin
- Poison glands

Activity: Jigsaw puzzle

Hand out one jigsaw puzzle to each student.

Students colour the puzzle completely.

Students then cut out puzzle pieces.

Each student swaps their puzzle pieces with another student who is to reassemble the puzzle.

Students get own puzzle back and glue into science book or A4 sheet for display.

Reflection: Role play

Role play in pairs.

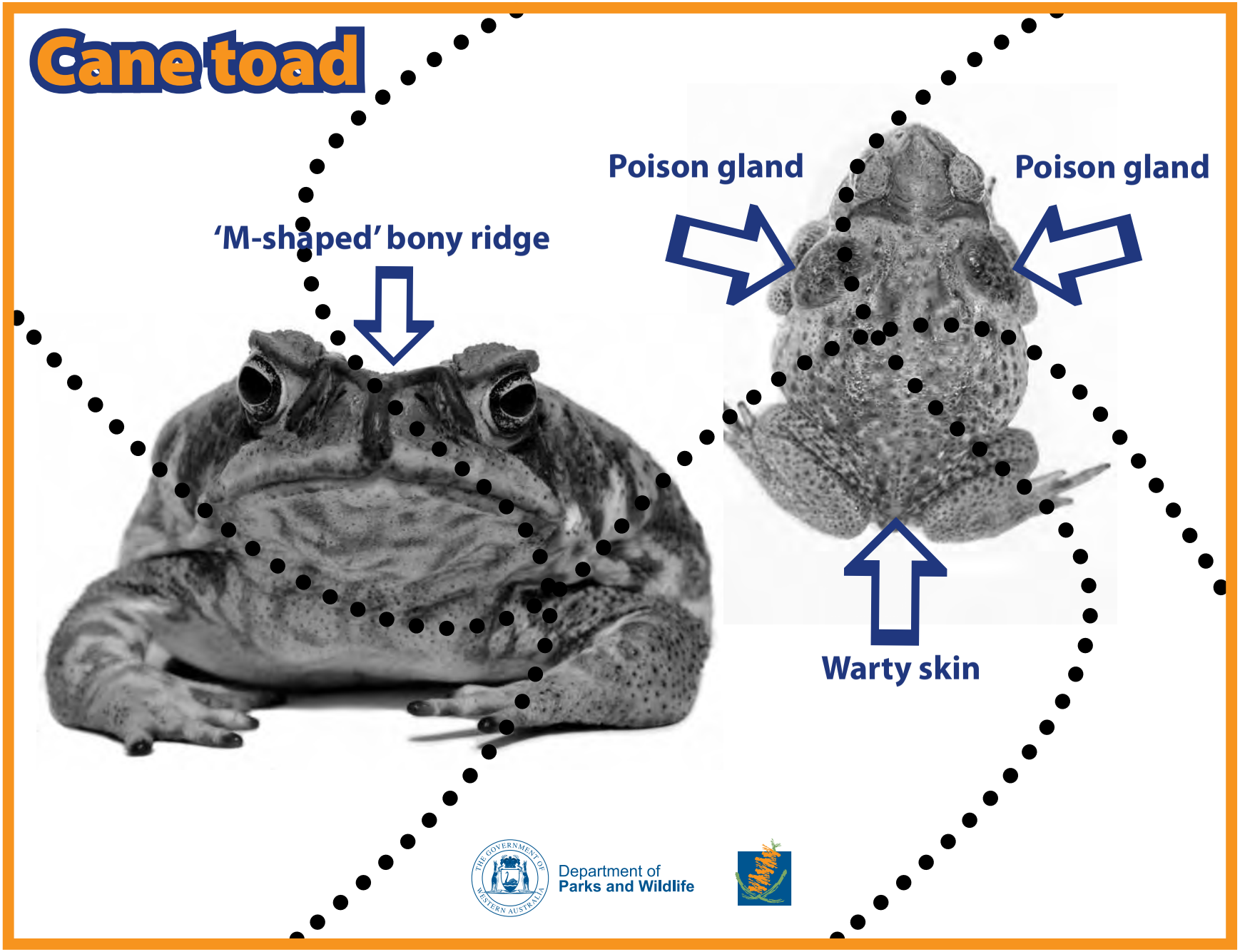
Students use common classroom items as props to represent the three common descriptors of a cane toad as part of the role play.

For example:

- place pipe cleaners on students brow to make an 'M-shaped' ridge,
- scrunched up paper and place under shirt to represent warty skin,
- sticky tape on oval shaped scrap of paper to represent the poison glands.

One student pretends to be a toad (squatting in a frog/toad stance), the other student approaches their partner and says "I think this may be a toad because….." or "I don't think this is a toad because…."

Cane toad



Department of
Parks and Wildlife

Lesson three: Tadpoles to toads

Department of Parks and Wildlife

Australian Curriculum - Science

Year 1	Year 2	Year 3
Living things have a variety of external features. (ACSSU017) *Recognising common features of animals such as head, legs and wings*	Living things grow, change and have offspring similar to themselves. (ACSSU030) *Exploring different characteristics of life stages in animals such as egg, caterpillar and butterfly*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044) *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing*

Teacher notes: The cane toad evolves through a life cycle that includes different forms: egg, tadpole, metamorph and adult. Their life cycle is similar to a frog but they have distinct differences in appearance throughout the cycle. It is important for students to recognise the different stages of the cane toad so that they can recognise the similarities/differences to native frogs.

Resources: You will need to enlarge one of the worksheets to A3 (to display on the board during discussion), photos of teacher at different stages of life (eg. baby, child, teeenager).

For each student: A4 copy of 'Toads' worksheet, scissors, glue

Introduction: Life stages of a teacher

Bring in several pictures of yourself as a baby, toddler, child, teenager and adult. Introduce one at a time starting with baby and work through to the adult picture (maybe ask who is in the picture).

Discuss changes that have occurred and how old the person is in each picture.

For example:

- What makes them think the picture is of a baby or toddler?
- Why is the person in a pram? Why are they crawling and not walking?
- Why is someone feeding them?

Questions will depend on the pictures that you have.

Attach the pictures in a circle drawing arrows in between to show life as a cycle.

Activity: Toad life cycle worksheet

Hand out the 'Toads' worksheet (one per student) and discuss any differences that students can see between each picture.

Focus questions: Do they think they are all the same animal? How is it different to us humans?

Students cut out each picture (along dotted circles) and put them into the order that they think they belong (can be done as individuals, pairs or groups).

Discuss what they have come up with and correct any errors as you work through a shared class discussion building the cane toad life cycle on the board using your own A3 set of pictures. Stick each one on the board in a circle with an arrow linking each picture.

Students then complete their individual sheet by gluing in book or on A4 page to display.

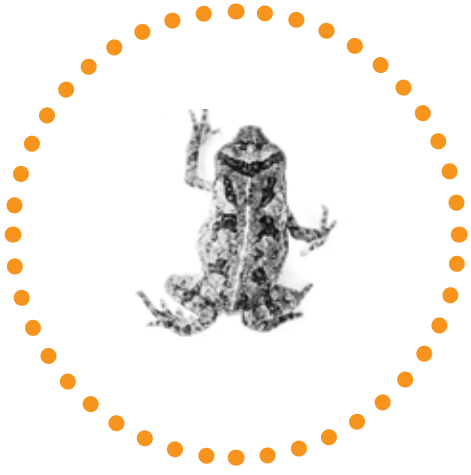
Reflection: I wonder why…?

Ask students to share "I wonder why….." questions.

For example:

- I wonder why they change?
- I wonder what other animals change?
- I wonder why humans stay the same just get bigger?

Cane toads



Lesson four: Toads for dinner

Department of Parks and Wildlife

Australian Curriculum - Science

Year 1	Year 2	Year 3
Living things live in different places where their needs are met. (ACSSU211) *Exploring what happens when habitats change and some living things can no longer have their needs met.*	People use science in their daily lives, including caring for the environment and living things (ACSHE035) *Recognising that many living things rely on resources that may be threatened, and that science understanding can contribute to the preservation of such resources*	Science involves making predictions and describing patterns and relationships (ACSHE050) *Making predictions about change and events in our environment*

Teacher notes: The cane toad impacts on food chains of the Kimberley region. The two chains investigated are far from extensive but give an idea how some of the native animals (in both water and land environments) are affected by cane toads. Students will recognise that toads are living things that live in different places such as land and water. The lesson tries to keep the two environments separate but there may be some discussion about animals that live in both. Students are also exploring what happens when the habitat of native animals changes due to the arrival of cane toads. A food chain is a simple way of showing the energy transfer through food (in this case it just involves animals). A conventional food chain has arrows showing where the food is going (left to right OR top to bottom).

insect → frog → fish → crocodile

Resources for each student: 1x land environment sheet, 1x water environment sheet, 2x cane toads, scissors, glue.

Introduction: Build a food chain

Build a food chain using humans as the apex. It may help to start on the right with the human first,

grass → cow → human or **insects → fish → human.**

After showing students an example of a food chain, take students' suggestions to produce a food chain on the board.

Talk briefly about what happens if we don't look after the environment and one of the links of the chain is removed. From the examples above look at what happens when the 'fish' or the 'cow' are removed. Focus question: Do we want to eat insects or grass? What happens to animals when we change their environment by taking away their food?

Activity: Kimberley animal food chains worksheet

Hand out a worksheet to each student. There are two to choose from, do one at a time.

Give students time to cut out and order animals into the food chain and glue into book or make into a mobile.

Discuss what they have made.

At this point introduce the term 'lethal toxic ingestion' or for younger students 'poisonous'. Lethal toxic ingestion is the main way cane toads impact upon on native fauna. Barramundi die after eating a cane toad. Snakes die after eating a cane toad. Any animals that eat frogs will try to eat toads.

Discuss what students think will happen if they swap the frogs for toads. What happens to the food chain?

Students place the cane toad into the 'land' chain and show how the snakes will then die and how it disrupts the food chain.

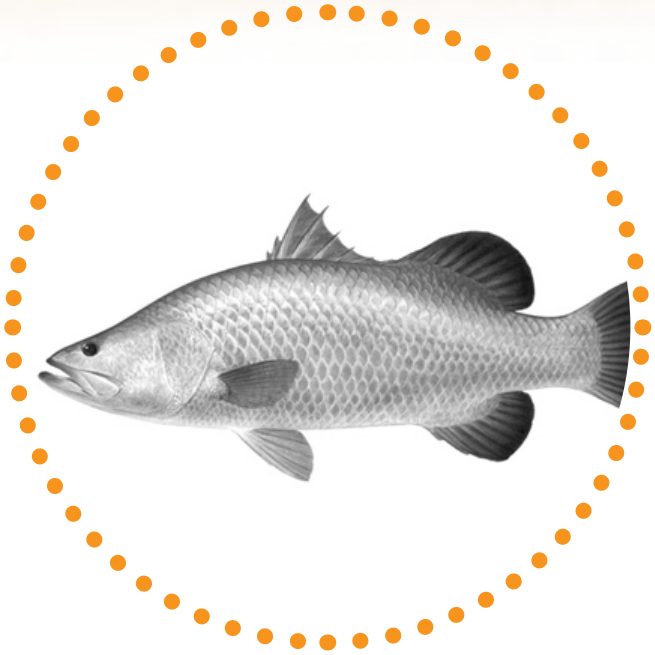
Reflection: Add-on an animal

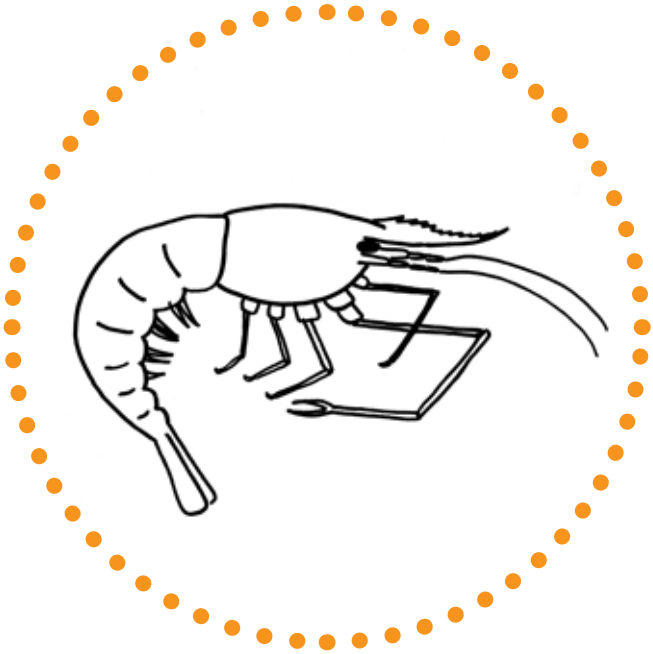
Reconstruct one of the food chains on the board (water or land).

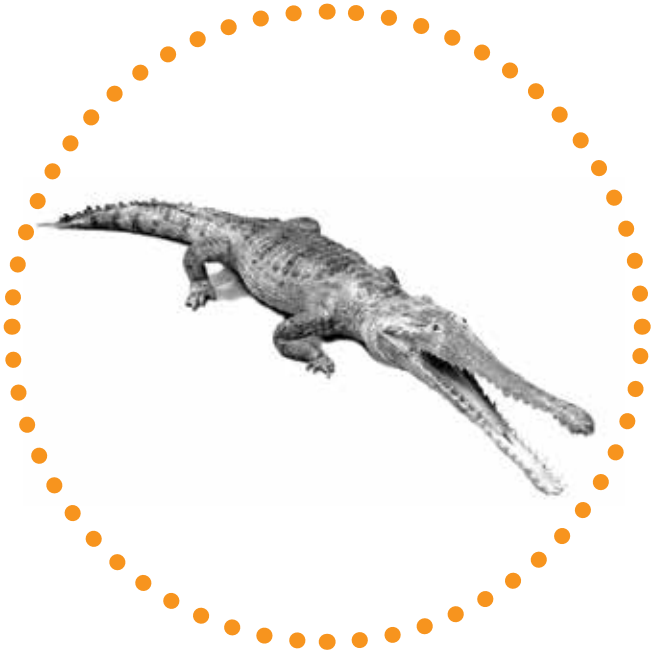
Students suggest an animal to add into one of the food chains, for example dingo for land or pelican for water.

Teacher to discuss where it might fit and illustrate/write it on the board. How extensive your food chain is will depend on the students' prior knowledge of what animals eat.

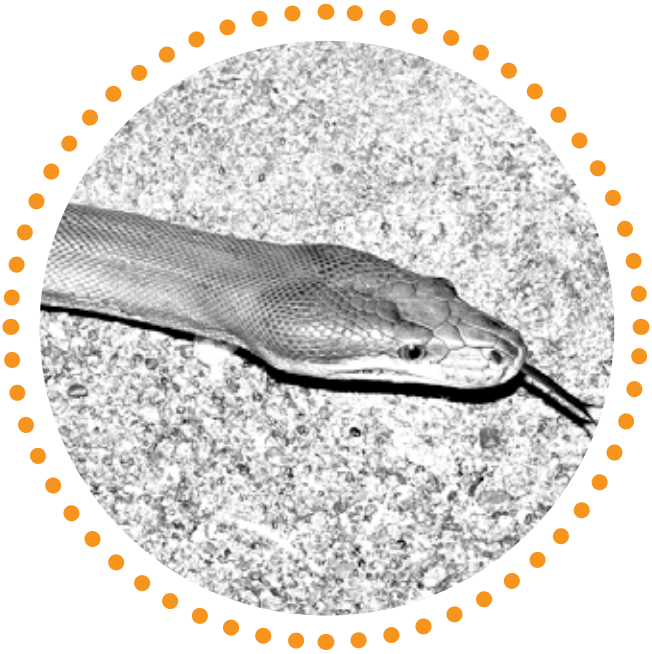
Water







Land



Cane toad






Lesson five: Frog or toad?

Department of Parks and Wildlife

Australian Curriculum - Science

Year 1	Year 2	Year 3
Living things have a variety of external features (ACSSU017). *Recognising common features of animals such as head, legs and wings*	Living things grow, change and have offspring similar to themselves (ACSSU030). *Recognising that living things have predictable characteristics at different stages of development*	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044). *Recognising characteristics of living things such as growing, moving, sensitivity and reproducing*

Teacher notes: In this lesson students recognise distinguishing features of the six Kimberley frogs that are most commonly confused with a cane toad. Parks and Wildlife frequently receives reports of 'cane toads' that have been euthanased by members of the public who are keen to protect our natural environment, only for them to turn out to be native frogs. Several formats of the pictures (Word and PowerPoint) are supplied on the resource USB to enable you to best display them. The pictures show natural variations that occur; students should be looking to observe the markings and shapes unique to each species. You will need to print out the 'Six Kimberley frogs'(simple version) for the number of groups or students in the class

Resources: Six Kimberley frogs booklet (simple version) for Intro and the Activity (1x each group). 'Frog Identification Sheet' PowerPoint presentation or Word document to display, or enlarged, laminated printouts. A selection of "The frog is cool because…" sheets (enough for 1 frog per student)

Introduction: Identifying native frogs

Put students in groups or pairs, hand each group/pair the 'Six Kimberley Frogs'.

Students take time to look at the pictures of each frog.

Students suggest a detail/s that helps to identify that frog from the other five.

Build a table of this information on the board for use during the activity.

Sample table

#1 Marbled frog Light skin with dark patches all over	**#2 Giant frog** Pointy nose….etc	**#3**
#4	**#5**	**#6**

Activity: 'ID that frog' competition

The activity can be completed as a competition between students.

Display the 'Frog identification sheet' Word document or PowerPoint presentation. If there is no electronic display available then use laminated, enlarged printouts. Each group/pair uses the 'Six Kimberley frogs' booklet and the information that was compiled on the board.

Show the first picture from the slideshow/document.

Students use the 'Six Kimberley frogs' booklet to try to identify the frog on the screen/page.

Award point/s to the first group to correctly identify each frog.

Repeat the process until all eleven photos have been used.

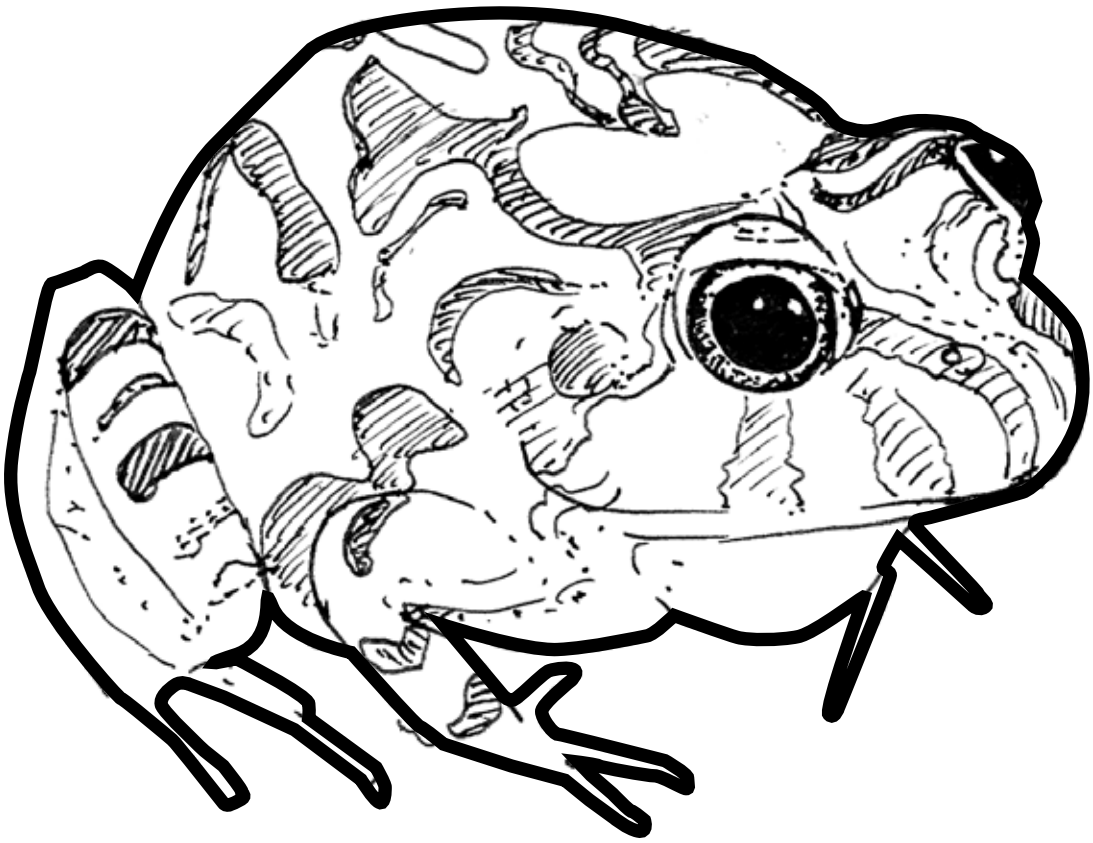
Reflection: 'Frogs are cool' creative writing

Students choose their favourite frog and complete "The frog is cool because…."

Students colour and/or write on their frog sheet.

Students may then like to share their work with the rest of the class.

Ornate Burrowing Frog



The ornate burrowing frog is cool because

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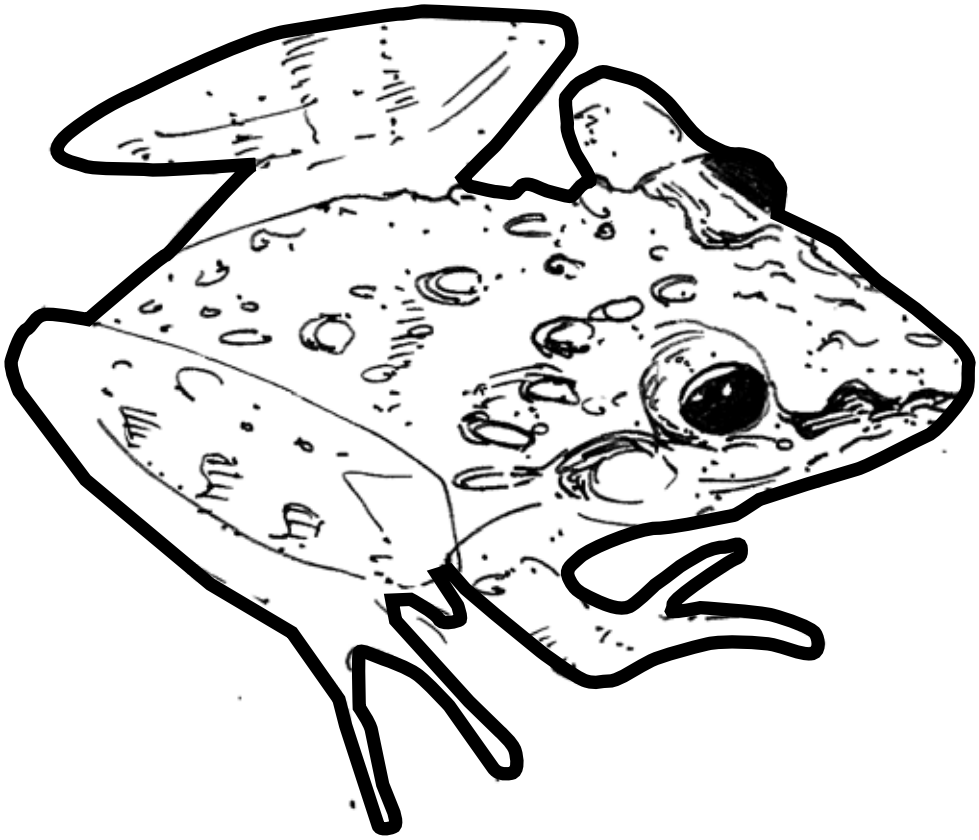
Bumpy Rocket Frog



The bumpy rocket frog is cool because

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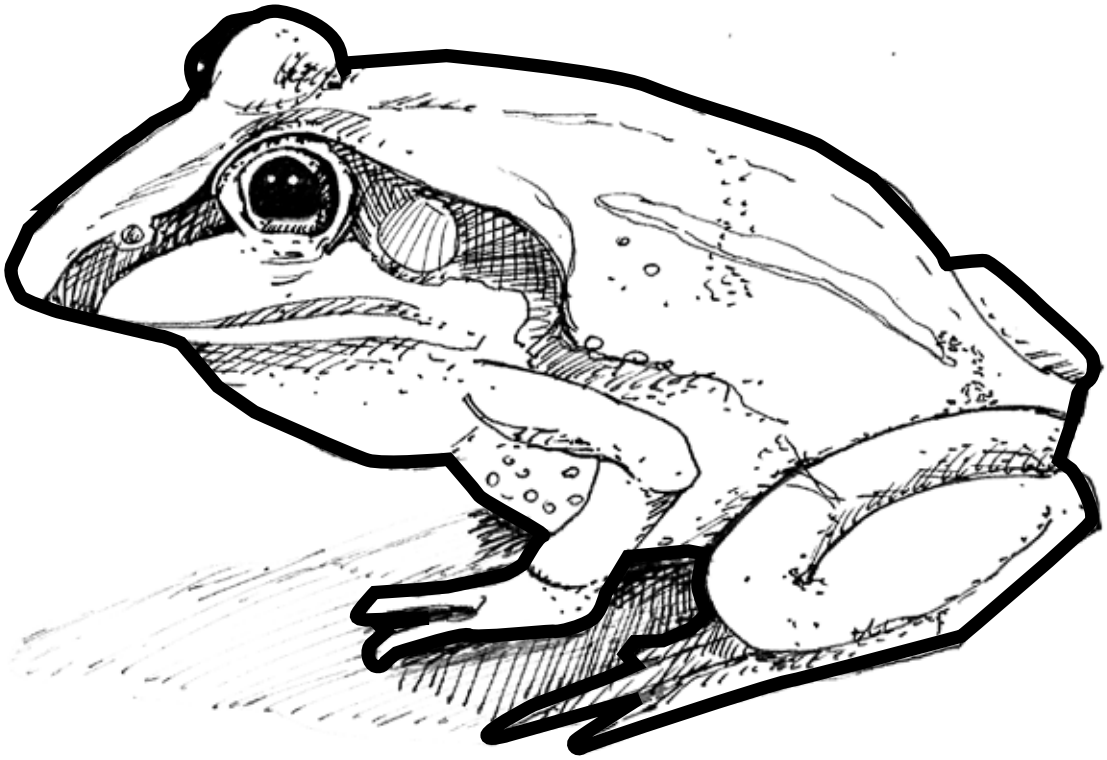
Giant Frog



The giant frog is cool because

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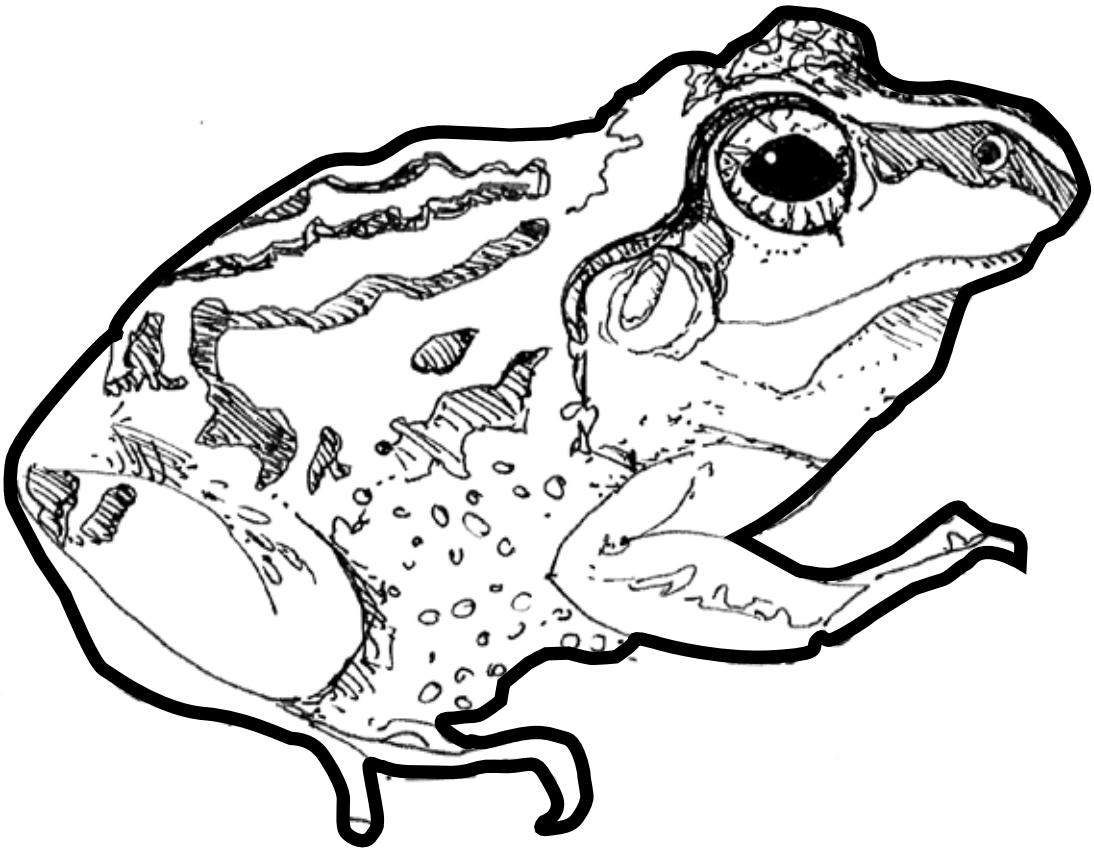
Parks and Wildlife

Long Footed Frog



The long footed frog is cool because

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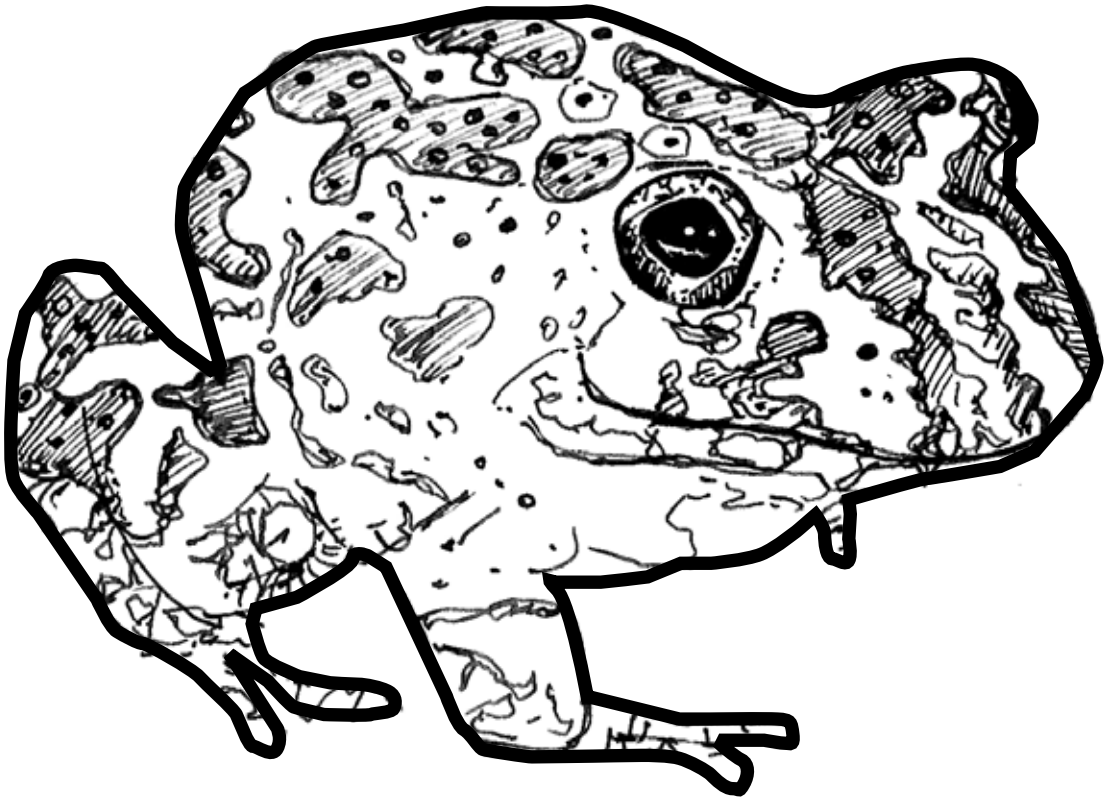
Marbled Frog



The marbled frog is cool because

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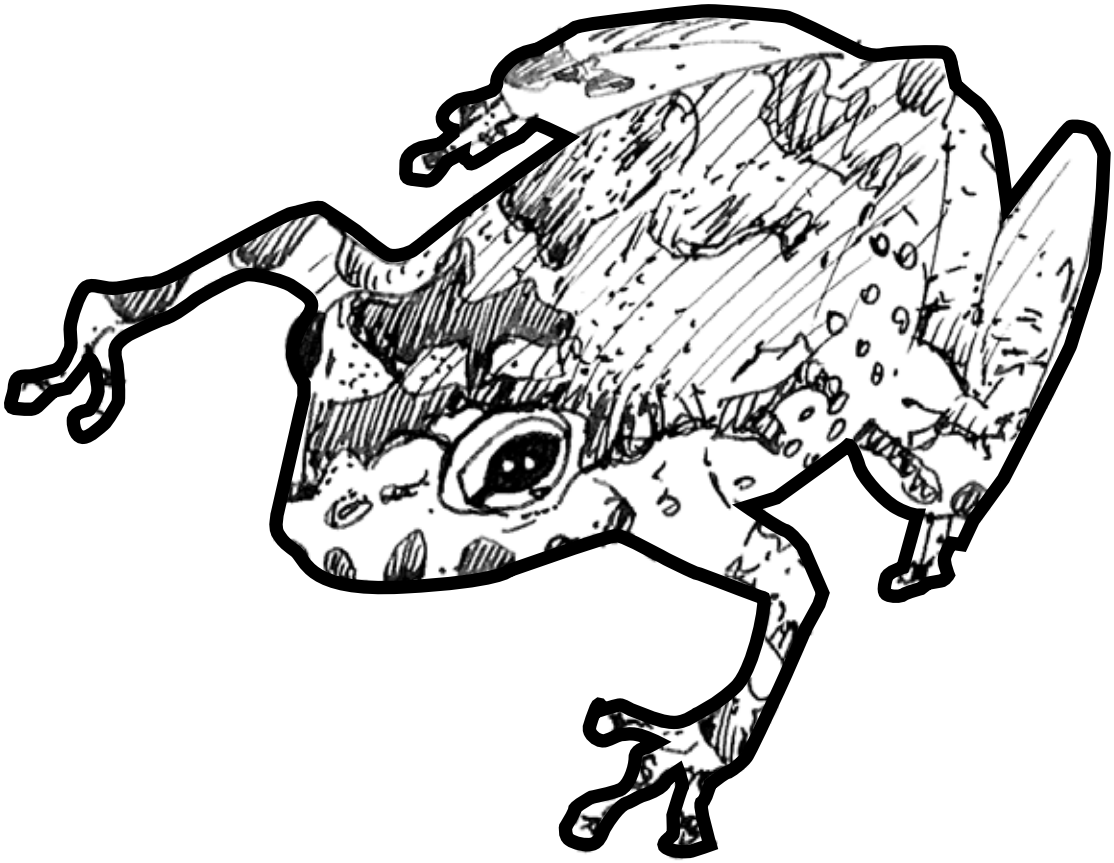
Rock Hole Frog



The rock hole frog is cool because

Lesson six: Catch that toad

Australian Curriculum – Ethical Understanding

Year 1	Year 2	Year 3

Recognise ethical concepts: (Level 2) Describe ethical concepts, such as right and wrong, honesty, fairness and tolerance

Describing instances of fair and unfair treatment

Explore ethical concepts in context: (Level 2) Discuss ethical concepts within a range of familiar contexts

Discuss story scenarios involving fair and tolerant behaviour

Teacher notes: A concern that has arisen from the arrival of cane toads into the Kimberley is that many otherwise ethically-minded citizens deem animal cruelty towards cane toads acceptable due to the toad's 'pest' status. The aim of this lesson is for the students to link ethical ideas in a context that they should be familiar with (ie their pets), with fairness towards cane toads. In addition, students learn how to humanely euthanase a cane toad. Although we want people to remove and euthanase the cane toads, this needs to be done in a humane manner.

Health and Safety: Note that toads have poison glands and are known to carry bacteria, so they should only be handled with gloves or a plastic bag covering the hand, and hands should be washed with soap afterwards. Toads should be held by their rear legs, with their back facing away from you to reduce the likelihood of coming into contact with their toxin on the very rare occasion that it spurts from the animal. For this activity, we recommend using a bag over the hand rather than gloves as it's an item most kids have at home and it prevents wastage. For a real toadbust gloves are appropriate, however some children like to suck on them and find it hard to break this habit even after they have just been handling toads.

Resources: cane toad cut outs (as many as required), plastic supermarket bags 1x pair of students,

For each student: 'Junior Toad Controller' certificate

Introduction: Treating pets fairly discussion

On the board draw up a table with two columns labelled 'fair (or good)' and 'not fair (or bad)' and the heading of 'my pet'.

Ask students for some ideas of how they can be fair/good with their pet. Then ask them what might be not fair/not good to do to your pet.

Older students could explore why some of the suggestions are in the particular column

Explain that all animals should be treated 'fairly'.

Activity: Humane method of euthanasing cane toads using a role play

The focus is that the students are treating the cane toads fairly/humanely when we put them to sleep.

Cut up the cane toad pictures and hide them in a suitable area for the students to find. This can be completed in the classroom or outside.

Demonstrate the humane euthanasia of a toad:

- Is it a toad? (bony brow ridge, warty skin, poison glands)
- Catch the toad (in a real situation grab by the hind legs as shown with either gloves or bag over hand)
- Place into bag (tie it up) or container with lid
- Put into fridge for four hours (puts them to sleep)
- Place into freezer for 24 hours or until frozen solid

Students in pairs search the area for the paper cut outs and practise the humane euthanasia of the cane toads (use a suitable classroom cupboard as the 'fridge'/'freezer').

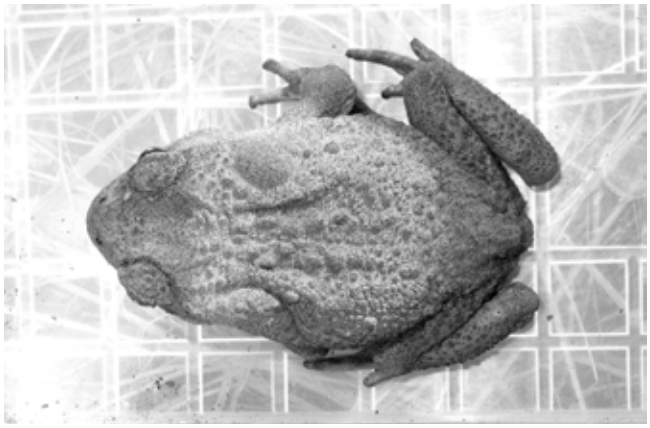
Reflection: Take-home message: how to catch and euthanase a toad

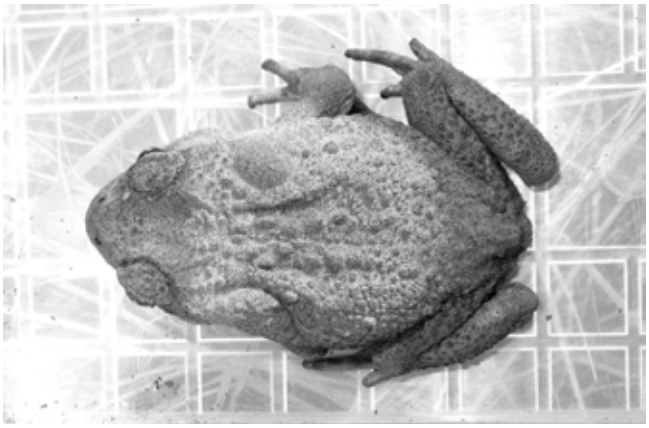
Class discussion on the four stages of humane/fair toad control [catch-bag-cool-freeze]

Individually ask each student a question about the process, for example "what do you do after you catch the toad?" or "What do we do before we put them into the freezer?"

When correct answer is given hand them a "Junior Toad controller" certificate to take home.
Encourage them to put their certificate on the fridge at home.

Cane toads






Junior Toad Controller
Catch
Bag
Cool
Freeze
Department of Parks and Wildlife


Junior Toad Controller
Catch
Bag
Cool
Freeze
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KIMBERLEY REGION

For more information contact the Parks and Wildlife cane toad team
on (08) 9168 4200 or email canetoads@dpaw.wa.gov.au

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